



World Wide Competence

filter technology
fluid management *electronics*
system technology *contamination monitoring*
software solutions

Архангельск (8182)63-90-72
Астана (7172)727-132
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Волгоград (844)278-03-48
Вологда (8172)26-41-59
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Иваново (4932)77-34-06

Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Липецк (4742)52-20-81
Киргизия (996)312-96-26-47

Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Казахстан (772)734-952-31

Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
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Симферополь (3652)67-13-56
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Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Таджикистан (992)427-82-92-69

Сургут (3462)77-98-35
Тверь (4822)63-31-35
Томск (3822)98-41-53
Тула (4872)74-02-29
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Ярославль (4852)69-52-93



Competence through **experience**

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INTERNORMEN is a company with worldwide recognition. It is synonymous with technical craftsmanship, entrepreneurial continuity and innovative strength. The name stands for an entire range of products in the field of filter technology including modern software, measuring equipment and analysis systems.

INTERNORMEN Technology has its origin in 1972 when Helmut Franger, along with a few employees, founded *INTERNORMEN-Filter GmbH* in Mannheim. Helmut Franger targeted the manufacturing and distribution of hydraulic and lubrication filters, demanding the highest quality to set a standard on the international market. The competence of *INTERNORMEN* is based on more than thirty years of experience.

Started as a manufacturer of filter elements and housings, *INTERNORMEN* became an international technology company which accompanies its customers into the future as a technologically professional partner.

Driving forces in this process are:

- Our wide-range knowledge.
- Our ability to expeditiously implement new technologies.
- The consistent orientation towards our customers' needs.

World Wide Competence



For more than thirty years our headquarters have been located in Altlussheim, alongside of the Rhine River. This is where, in an area of about 22.000 square meters (236.806 square feet), our products are being developed and manufactured. The R&D department, administration and central store are also located in this facility. *INTERNORMEN* has 260 highly qualified employees worldwide maintaining a special commitment to the company impartial of a subsidiary's size.

INTERNORMEN's management is already in its second generation, upholding tradition and looking towards the future global market expansion, at the same time.

This management ensures that in future the name *INTERNORMEN* will still stand for a brand of quality, and remain a standard for technical competence and partnership.

Continuous development

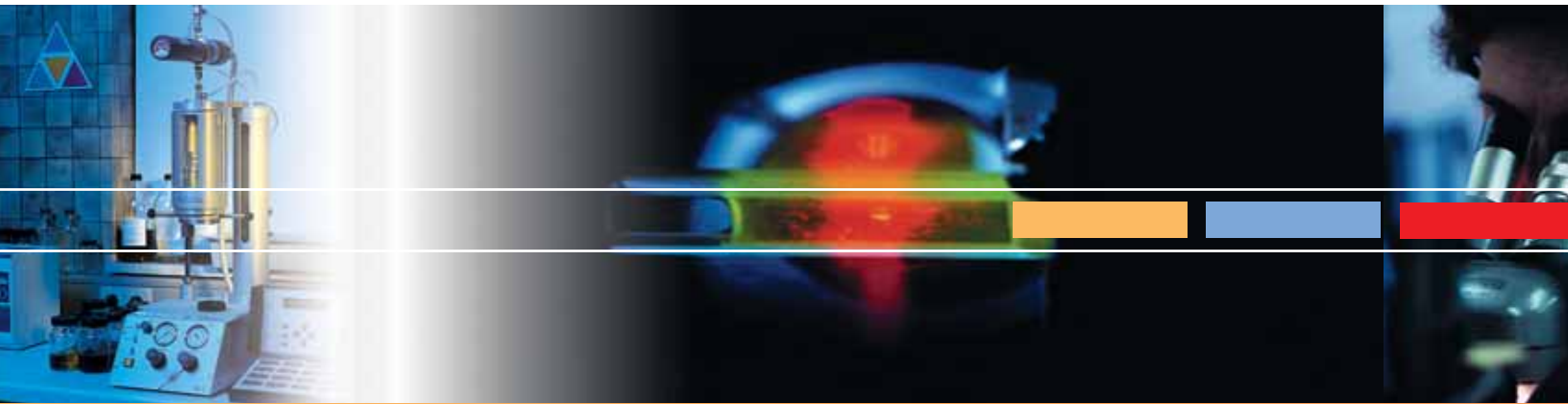
Today *INTERNORMEN Technology* masters important key technologies, going far beyond traditional Filter Technology:

Filter Technology
Fluid Management
Electronics
System Technology
Contamination Monitoring
Software Solutions

This enables us to further strengthen our technology- and market position and extend our global leadership in the field of technology.

Master the future through experience - this is what counts.





Competence through research



Altlußheim is approx. 20 min. away from Mannheim, right on the "Asparagus Route" in Baden ("Badische Spargelstrasse") near Speyer, noted for its famous cathedral.

Our physicists, chemists, engineers and technicians are concentrated in a kind of "think-tank" always searching for the perfect solution. This is also the home of our important research and development center.

Craftsmanship in series production

For *INTERNORMEN*, the reliability and quality of its products is the first priority. Therefore, quality, as a common hallmark of all products and services, is a fundamental element of the *INTERNORMEN* corporate strategy. All products are designed and made ready for production in-house.

INTERNORMEN invests far more capital in research and development than other companies in this field. The company's objective is to develop products that comply with market requirements, with exemplary usefulness and which are able to offer a highly competitive price-performance ratio. Already in this phase, a "brainstorming department" begins its activity with being in close contact with the customer, in order to guarantee from the beginning that the later product will satisfy all practical requirements.

Constructive ideas on the test stand

All great ideas, produced by *INTERNORMEN* research and development and design teams, are then being tested in the extensive testing facility in our separate technology center.

World Wide Competence



and development

For oil analysis, modern spectral analysis units/atomic emission spectrometers, laser particle counters and porometers are being used. All data from those tests are being set as standards for the physical construction of the filter and as an improvement of existing standards.

Success through consistency

Today, in the world of bits and bytes, developments from the previous year often become obsolete. However, this cannot be applied to the world of filter technology, which has a totally different time horizon. Here, innovations are made in the area of high quality fine finishing and by continuous improvement of applied and tested products and technologies. This is precisely the path *INTERNORMEN* has taken. On one hand, thinking with technical fantasy in long-term developments, but also carrying out patiently long-term detailed research, until a quality breakthrough is achieved.

Our name is quality

The certification according to ISO 9001:2000 is a result of our high quality standards. All of our subsidiaries are working in accordance with this standard.



Also, due to the successful certification of our filter series by the American Society of Mechanical Engineers, *INTERNORMEN* gained the "Certificate of Authorization" according to ASME Section VIII, Division 1.

The ASME Code regulates requirements in regard to manufacturer certification, quality assurance, construction, material selection, production, testing, trial, inspection and certification of steam and heating boilers, pipeworks, pressure tanks and nuclear components.



Competence through **competent**

People from *INTERNORMEN* are by your side when you need them

People from *INTERNORMEN* are the decisive factor of our competitiveness. This is why at *INTERNORMEN* - on every level - our employees are very well trained, highly flexible and thinking on a global scale. They listen to their customers, understand their problems and needs, advise them with professional competence, and accompany them in their work - in about 20 different languages.

It is their pleasure to communicate with people from various cultures, to perceive market changes quickly and take appropriate actions, and to work and strive in multicultural teams towards mutual success.

Product optimization and good customer support, are always the worldwide objectives of our experts from different sales departments. At international exhibitions, our experts are also responsible for the presentation of our products and services.

In the meantime, back home, our technical specialists take care of on-time deliveries and quality production.

The most modern ERP technology, with an open interface architecture, facilitates, trouble free and direct, data exchange within the whole group and other external systems.



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people on every level



Everyday, competent people at all levels are accepting new challenges, and are pleased when problems are resolved in a concise, creative and reliable manner.

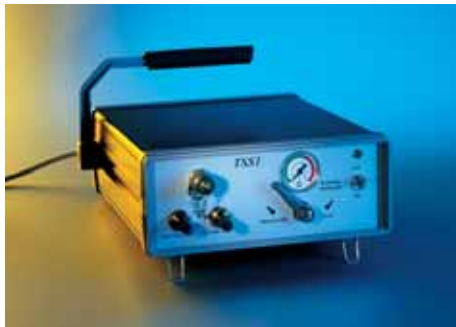
One of the most important features of the entire company is the trust, human cooperation within the company, on one hand, and the understanding of customers' problems and tasks, on the other hand.



Why don't you meet people from *INTERNORMEN*?
You are very welcome.



Competence through **variety**



Ideas coming from research, development and design, are implemented in the manufacturing process. The result are products, which comply with all demands of a final user.

An example is the range wide-ness of our products. In the field of hydraulic and lubrica-tion filters, *INTERNORMEN* currently offers a product selection with more than 4000 different filter elements, including corresponding filter housings.

Wide range of standard products

Our standard range in the filter technology division includes:

Low, medium and high-pressure filters, return-line filters and suction filters. All of them are available in single or duplex, and in other various mounting types.

World Wide Competence



Individual special solutions

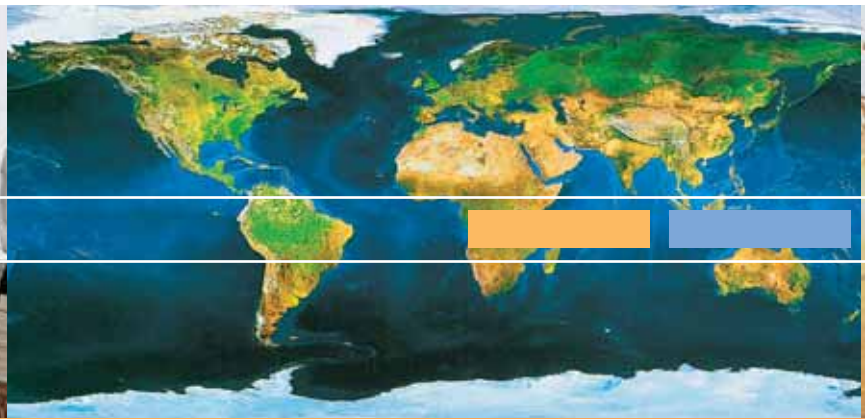
Considering of individual customers needs and prompt deliveries are two more advantages *INTERNORMEN* can offer:
special solutions for all kinds of different business areas, from mobile hydraulic technology, and steel industry to the off-shore area.

INTERNORMEN is able to find economical solutions for even difficult types of problems. This success is based on the interdisciplinary combination of development, design and manufacturing, as well as practical engineering and maintaining constant communication with the customer.

The rich and wide range experience gained by providing optimum solutions for various problems, is a solid basis for successfully meeting challenges in nearly every area of application.



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software solutions



Competence through internatio



The company *INTERNORMEN Technology GmbH*, in Altlussheim, is the head office for a group of internationally active companies. A cosmopolitan strategy ensures an optimum care for our customers, as well as our expansion into new markets. Problems we have been asked to solve are as numerous and diverse as the countries and continents in which we are represented. Due to these circumstances, our knowledge and experience is very broad, enabling us to be flexible and versatile.

At home all over the world

Today, *INTERNORMEN Technology* is represented in more than eighty countries, with fourteen independent subsidiaries and six company owned engineering & distribution centres. Installation and service work are carried out on location by systematically trained staff. Well-coordinated logistics guarantee on-time delivery.

In Germany, China, India and the United States, *INTERNORMEN* runs production facilities in order to develop and manufacture special product versions for supplying the regional market.

World Wide Competence



nal cooperation

As one example for the international presence of *INTERNORMEN* we would like to describe our branch in Zanesville Ohio, based in North America. Built on an area of 22,000 square meters, *INTERNORMEN Technology Inc.* holds a large inventory of products, and produces, among other things, special filters for users and OEM's for all relevant industrial sectors. A team of local experts is on hand for professional advice, sales and services.

Here, as in all other worldwide *INTERNORMEN* subsidiaries, the harmonious co-operation of individual strengths, from headquarters and branches, has proven itself and is the reason for the power and efficiency of the organization as a whole.

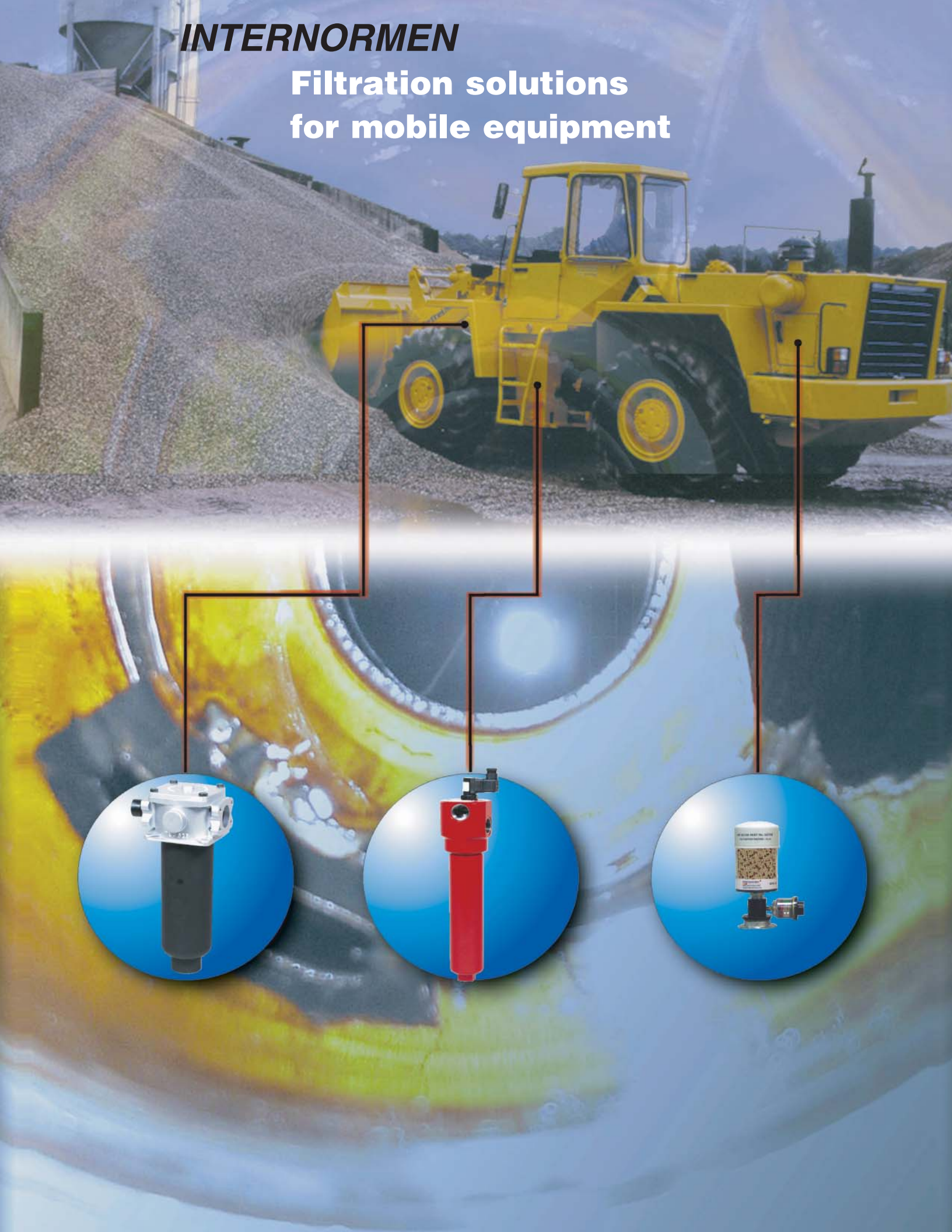
This cooperation is the breeding ground for innovative power needed in an ambitious process of development, and focuses that power where *INTERNORMEN*-products and services are specifically needed.



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INTERNORMEN

Filtration solutions for mobile equipment



Mobile Hydraulics

INTERNORMEN Technology

is a leading global manufacturer of high quality hydraulic and lubrication filters, oil service equipment and analysis products which are separated in different product ranges:



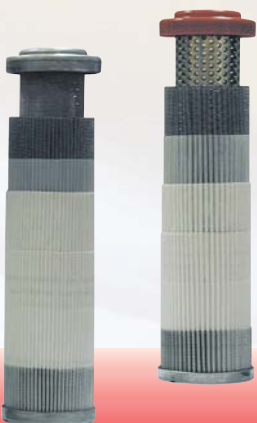
filter technology
fluid management
electronics
process technology
system technology
contamination monitoring
software solutions

The head office is located in Altlussheim, Germany. Furthermore, production facilities are located in Germany, India and the United States as well as subsidiaries in Poland, Austria, Great Britain, Brazil and China. A global distribution network in more than 87 countries completes the company's structure.

INTERNORMEN Technology Group is committed to promptly supplying and servicing our customers with high quality products. The target of the company is the manufacturing and distribution of hydraulic and lubrication filters, oil contamination control systems as well as various accessories.

INTERNORMEN Technology also offers a wide variety of filter-related products:

- Oil analysis sets (PAS 01 / WAS 01)
- The Contamination Control System CCS 2
- The Tank Sampling System TSS 1
- The Bottle Sampling system BSS 2
- Clogging indicators and sensors (optical, electrical, optical-electrical and electronic)
- Off-line filter units (mobile and stationary)
- The Expert system CD (software for filter selection and filter performance simulation)

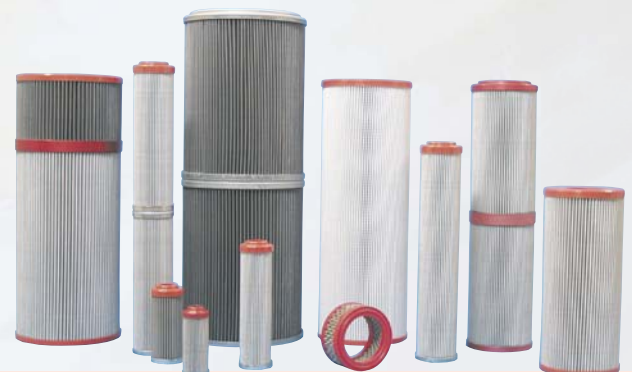


Brands we interchange with:

- Hydac
- EPE
- Mahle
- Pall ...and many others

Our advantages:

- Superior dirt holding capacity
- Highest Δp capability
- Best filtration efficiency



In-Tank Filters

TEF
Pressures to 145 PSI
Flow Rates to 2113 GPM

In-Tank Return Line TEF series

Applications:

Tank mounted return-line filters

Element options:

Paper, Interpor fleece, stainless steel wire mesh

User Benefits: Lightweighted, tank mounted return-line filters, model TEF 41-7201 are easy to change and reduce the possibility of oil spillage during element change (environmental concern). Filters have a removable bowl which prevents contamination from entering reservoir during filter element change. Multiple inlet ports are possible.



TEFB
Pressures to 145 PSI
Flow Rates to 80 GPM

In-Tank Return Line with additional airbreather TEFB series

Applications:

Tank mounted return-line filters with additional breather filter

Element options:

Paper, Interpor fleece, stainless steel wire mesh

User Benefits: Lightweighted, tank mounted return-line filters, model TEFB 41-310 are easy to change and reduce the possibility of oil spillage during element change (environmental concern). No additional breather port in the tank needed.



TRS/TNRS
Pressures to 145 PSI
Flow Rates to 120 GPM

Return- / Suction Combination Filters TRS/TNRS series

Applications:

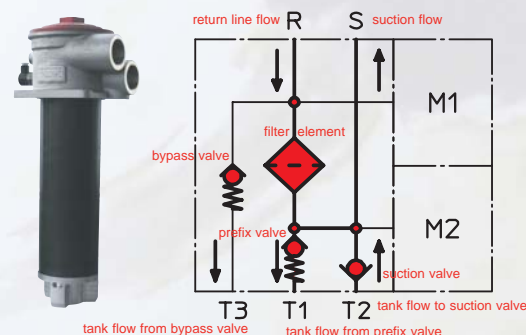
Tank mounted return-line filter with suction connection for mobile hydraulic applications with minimum 2 independent hydraulic circuits

Element options:

Paper, Interpor fleece, stainless steel wire mesh

User Benefits:

Tank-top mounted in-line filters supply clean suction flow and prevent cavitation. Custom designs possible.



TRW
Pressures to 145 PSI
Flow Rates to 80 GPM

Return Filters under the fluid level TRW series

Applications:

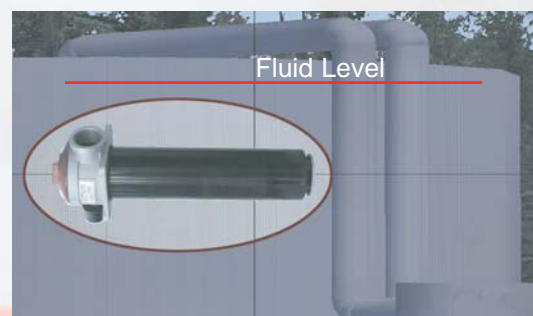
Horizontal tank mounted return-line filters

Element options:

Paper, Interpor fleece, stainless steel wire mesh

User Benefits:

Space-saving mounting under the fluid level (does not need an additional check valve)



Pressure Filters

MNL/ML -
Pressures to 2320 PSI
Flow Rates to 120 GPM

MNL/ML series Medium Pressure Filters

Applications:

In-line mounted pressure filter (partial aluminum construction)

Element options:

Interpor fleece, stainless steel wire mesh

User Benefits:

Economical, lightweighted filter range for Low to Medium pressure applications. Requires only minimal clearance during element change and therefore saves valuable space.



HP
Pressures to 6000 PSI
Flow Rates to 360 GPM

HP series High Pressure Filters

Applications:

In-line or flange mounted high pressure filter

Element options:

Interpor fleece, stainless steel wire mesh

User Benefits:

In-Line or flange mounting possible with various different port and Δp indicator options. Very high flow rates with a single housing possible.



MDV
Pressures to 2900 PSI
Flow Rates to 40 GPM

MDV/HPV series Pressure Filters with Cold Start Valve

HPV
Pressures to 6000 PSI
Flow Rates to 120 GPM

Applications:

In-line pressure filter with differential pressure (cold start) valve

Element options:

Interpor fleece, stainless steel wire mesh

User Benefits:

Permanent supply of clean oil guaranteed.
If the element is clogged, change is forced, this means no damage is possible to the downstream components.
Forced (third port) return to the reservoir.



Special Filters

RF
Pressures to 145 PSI
Flow Rates to 85 GPM

Return In-Line Filters RF series

Applications:

Return-line filters for connection in return lines

Element options:

Paper, Interpor fleece, stainless steel wire mesh

User Benefits:

Economical line mounted return filters.

Light-weighted aluminum design.

Several and multiple ports available.

Hose connections possible.



AS - Flow Rates to 168 GPM
TS - Flow Rates to 187 GPM
TSW - Flow Rates to 32 GPM

In-Tank Suction Filters AS/TS/TSW series

Applications:

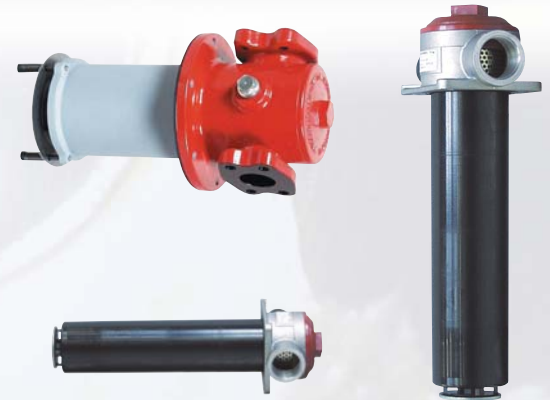
Suction filter, directly mounted to the reservoir vertically (TS-series) or horizontally (TSW-series)

Element options:

Paper, Interpor fleece, stainless steel wire mesh

User Benefits:

Suction filters which can be serviced from the outside of the reservoir with no additional check valve needed.



FHP
Pressures to 3625 PSI
Flow Rates to 40 GPM

Manifold Mounted Filters FHP/HPP/HPF series

HPP/HPF
Pressures to 4568 PSI
Flow Rates to 360 GPM

Applications:

FHP/ HPF - Pressure filter, manifold side mounted

HPP - Pressure filter, manifold bottom mounted

Element options:

Interpor fleece, stainless steel wire mesh

User Benefits:

Simplified mounting, which saves valuable space.

Provides filtration directly at the point needed. Prevents dirty fluid from passing downstream during element change.



Spin-on Filters

WPL
Pressures to 145 PSI
Flow Rates to 120 GPM

WPL series Spin-on Filters

Applications:

In-line filter series, mounted into pressure and return lines for all hydraulic systems.

Element options:

Interpor fleece, Paper

User Benefits:

Easy maintenance.

Die-cast aluminum construction saves overall weight.

Can be used as suction or return filter.



Accessories

ASF 25 - ASF 275
Flow Rates to 106 GPM

SUCTION STRAINERS

Applications:

Suction Strainers are used in the tank to protect the hydraulic pump from large contaminants.

Element options:

Stainless steel wire mesh with by-pass options

User Benefits:

Protect pumps from large particulate

Ensure long service life

Reduce maintenance and replacement costs

Available in BSPP up to 3"



Flow Rates to 933 GPM

FILLER/AIR BREATHERS

Applications:

Air breathers assure that no contamination reaches the tank through air exchange and condensation of water in reservoirs.

Element options:

NBF Interpor fleece, Paper EBF Paper

TBF Paper BF-WP Interpor fleece, Paper

BFD-series Silicagel, Interpor fleece

User Benefits:

Protect systems from airborne debris and / or moisture



CLOGGING INDICATORS

Applications:

Clogging indicators are warning devices that should be used on all filter applications to ensure in time change of elements, allowing maximum element service life.

User Benefits:

Wide variety available in differential pressure indicators, electronic indicators and suction indicators

Prevent system downtimes

Prevent premature element changeout



Other Products offered by **internormen** technology

internormen fluid management

Off-line filtration units in stationary and mobile versions, with options like heat exchanger and watersorp elements as well as vacuum dehydration systems.



internormen electronics

Contamination Control Systems (Laser Particle Counters) with options like Bottle Sampling System and Tank Sampling System as well as mobile and stationary water sensors and electronic sensor systems.



internormen contamination monitoring

Mobile Sampling and Oil Analysis Sets as well as in-house laboratory services including oil analysis and element checks performing optical emission spectrum and infrared spectroscopy analysis.





World Wide Competence

Contamination Monitoring



Measuring systems
for off-line, on-line
and in-line monitoring
of hydraulic and
lubricating fluids

Competence through Experience



Particulate contamination

Particulate contamination is the most common reason for failure and downtime of hydraulic and lubricating systems.

Therefore, knowing the precise level of contamination can be essential for the efficiency and functionality of a system.

This knowledge enables the operator to influence the situation with appropriate counteractive measures. By doing so the best possible equipment availability can be ensured.

Effects of particulate contamination

- Accelerated oil aging
- Shortened fluid lifetime
- Failure of additives
- Corrosion, cavitation, abrasion, erosion
- Increased wear



Particle

Contact us to learn more about the wide range of our filtration products!

Applications of INTERNORMEN Contamination Monitoring Systems

- Immediate and precise diagnosis of a hydraulic system's condition
- Monitoring of filter performance with respect to the standards required by certain system components
- Accurate determination of the optimal time for performing filter element changes
- Reliable monitoring of running-in time of new systems
- Diagnosis of hydraulic components, such as pumps, bearings or sealings
- Defining the condition of new fluids during start up of a system
- Verification of effective off-line filtration
- Proof of how changed external conditions influence the particle level in a hydraulic system

Element	Spectral Analysis - Potential Sources of Metals In Oil
Aluminium	abrasives, aluminium mill, bauxite, bearing metal, catalyst, coal contaminant, fly ash, foundry dust, granite, paint
Antimony	journal bearings, solder
Arsenic	antioxidants, bactericide, mineral oil
Bismuth	engine additives, grease
Boron	journal bearings
Cadmium	EP-additives, coolant inhibitor
Calcium	journal bearings, platings
Carbon	cement dust, detergent, fuller's earth, grease, gypsum, hard water, lignite, limestone, mining dust, oil additive, road dust, rubber, salt water, slag
Chromium	abrasives, carbides, carbon steel, graphite, hard metal, mineral oil, chrome plating, hardcoat, paint, ring plating, stainless steel, tooling steels
Cobalt	additives, hard metal, tooling steels
Iron	reactor technique
Lead	asbestos, cast iron, catalyst, cleaning detergent, fly ash, mill scale
Lithium	grease, paint, rust, talc, zinc
Magnesium	barbit, bearing overlay, gasoline additive, solder, paint
Mercury	dust, grease, salt water
Molybdenum	alloy of aluminium, engine additives, fuller's earth, hard water
Nickel	bactericide, batteries
Niobium	alloying metal, EP-additives, MoS ₂ , rings
Phosphorus	hard steel, plating, stainless steel, stellite
Platinum	turbine blades
Potassium	AW / EP-additives, cleaning detergents, oil additives, surface
Scandium	catalyst, mineral oil
Silicon	additives, coolant inhibitor, fly ash, granite, paper mill dust, vermiculite
Silver	ICP-reference
Sodium	antifreeze
Sulphur	foundry dust, glass, granite, limestone, mica, road dust, slag
Tantalum	steel, synthetic lubricant, talc, wet clutch
Tellurium	bearing overlay, needle bearings, solder
Titanium	additives, base stocks, coolant inhibitor, dirt, fly ash, grease, paper mill dust, road dust, salt, water
Tungsten	gypsum, mineral oil, MoS ₂ , rubber
Vanadium	hard metal, tooling steel
Yttrium	hard metal, points, turbine bearings, turbine blades
Zinc	hard dust, road dust (some)
Zirconium	mineral oil, turbine blades, valves

internormen filter technology		Guidelines for Determining, Achieving, and Maintaining Target Cleanliness Levels with High Performance Filtration (Beta Ratio ≥ 200)					
		Low Pressure Under 2000 psi (moderate conditions)		Medium Pressure 2000 to 2999 psi (or low pressure plus severe conditions) ¹⁾		High Pressure 3000 psi and Over (or medium pressure plus severe conditions) ²⁾	
Most Sensitive System Component		ISO Target (max)	Filter Media Rating ¹⁾	ISO Target (max)	Filter Media Rating ¹⁾	ISO Target (max)	Filter Media Rating ¹⁾
		22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
PUMPS							
Fixed External Gear		22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Vane		22/18/14	25VG	20/16/13	6VG	19/15/11	3VG
Fixed Piston		20/16/13	6VG	19/15/11	3VG	18/14/10	3VG
Variable Piston							
VALVES							
Check Valve		22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Directional (solenoid)		22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Standard Flow Control		20/16/13	10VG	20/16/13	6VG	19/15/11	3VG
Cartridge Valve		19/15/11	3VG	18/14/10	3VG	17/13/9	3VG
Proportional Valve		18/14/10	3VG	17/13/9	3VG	16/12/8	3VG
Servo Valve							
ACTUATORS							
Cylinders, Vane Motors, Gear Motors		23/19/15	25VG	22/18/14	16VG	20/16/13	6VG
Piston Motors, Swash Plate Motors		20/16/13	10VG	20/16/13	6VG	19/15/11	6VG
Hydrostatic Drives		19/15/11	6VG	18/14/10	3VG	17/13/9	3VG
TEST STANDS		15/11/7	1VG	15/11/7	1VG	15/11/7	1VG
LUBRICATING OILS							
Paper Machine Oils		20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Steam Turbine Oils		19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Diesel Engine		20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Mobile Gear Box		19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Industrial Gear Box		19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Journal Bearing		18/14/10	3VG	not applicable	not applicable	not applicable	not applicable
Roller Bearing		17/13/9	3VG	not applicable	not applicable	not applicable	not applicable
Ball Bearing							

Notes: ¹⁾ Severe conditions may include high flow surges, pressure spikes, frequent cold starts, extremely heavy duty use or the presence of water.
²⁾ Two or more systems filters of the recommended rating may be required to achieve and maintain the desired Target Cleanliness Level, for more details and accuracy use our filter simulation software.



INTERNORMEN monitoring systems provide the opportunity of mobile and stationary fluid monitoring and particle counting. All diagnoses are made immediately and accurately according to available and valid standards.

Benefit from the advantages of immediate diagnosis opposite to external lab analysis



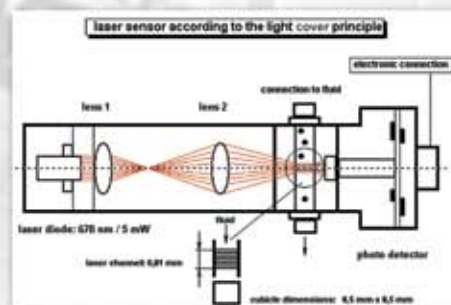
Our numerous products for particulate contamination measurement are an essential part of any broad maintenance concept. The systems are meant for in-line and off-line operation as well as for various on-line applications.

All of our systems can be connected to an external PC in order to control operations and manage measurement data using a MS-Excel based Data-Manager. By using the MWS 02, the CCS 2 can also be accessed over the Ethernet or the Internet.

The CCM 01 and CCT 01 are inexpensive in-line monitoring systems for permanent and stationary operations based on the successful CCS 2 technology.

Technology

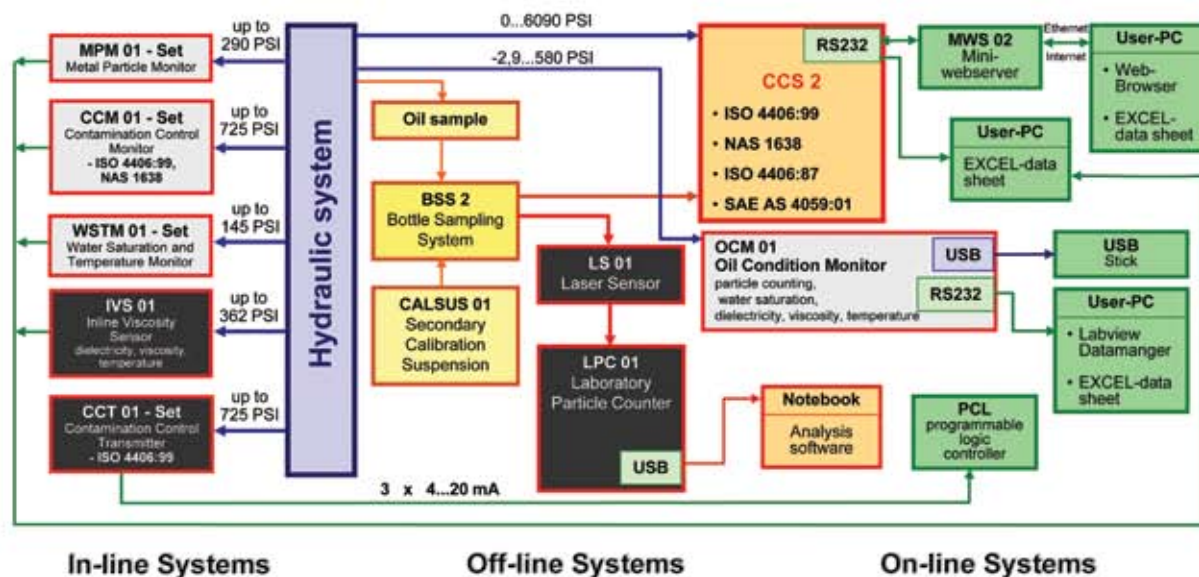
The *INTERNORMEN* particle counters operate with different sensors. The CCS 2, the CCM 01 set and the CCT 01 set are equipped with a laser sensor, which, based on the light cover principle, detects particles in a fluid. For example, the sensor integrated in the CCS 2 determines the current particulate level of the pressure or lubricating fluid in combination with an integrated dosing system which automatically adapts the pressure of the connected system. On the other hand, both, the CCM 01 set and the CCT 01 set, generate results by an additional measurement of the volume flow rate. The MPS 01.2 detects coarse metal particles by using an inductive measuring technique.



Contact us to learn more about our water-in-oil monitoring solutions!



Contamination Monitoring



On-line Monitoring Solutions



CCS 2 - Contamination Control System

Content customers - worldwide

On-line measurements - lab quality results



Wide range of accessories



Case in standard-size of carry-on baggage



CCS 2 with bottle sample

- Particle counter with laser sensor for hydraulic and lubricating fluids
- Precise determination of contamination classes according to ISO 4406:99, ISO 4406:87, NAS 1638 and SAE AS 4059
- High precision measuring system for mobile and stationary applications
- Makes measurements at different points of a system possible, even at points with dynamic operating conditions
- Numerous special measuring programs
- Results being displayed immediately
- Internal storage and management of measurements
- Automatic monitoring function with control signal output if set thresholds are exceeded
- RS 232 interface to control system operations using an external PC or the Internet
- Data transfer to an external PC or the Internet
- Data management using a MS-Excel based LabVIEW Data-Manager software
- Comfortable and user-friendly software
- Storage capacity 4 x 100 data sets
- Mains or battery operation
- 6.5" TFT color display

Integrated printer



Technical data

Fluid compatibility

Mineral oil based hydraulic and lubricating fluids as well as synthetic esters

Laser

650nm

Counting channels

8; sizes $\geq 4\mu\text{m}_{(c)}$, $\geq 4.6\mu\text{m}_{(c)}$, $\geq 6\mu\text{m}_{(c)}$, $\geq 6.4\mu\text{m}_{(c)}$, $\geq 10\mu\text{m}_{(c)}$, $\geq 14\mu\text{m}_{(c)}$, $\geq 21\mu\text{m}_{(c)}$, $\geq 37\mu\text{m}_{(c)}$

Accuracy

<2%

Max. particle concentration

24000 particles/ml

Calibration

ISO-MTD in oil (ISO 11171)

Supply pressure

22...6100 PSI

Viscosity

46...1850 SUS

Oil temperature range

32...176 °F

Ambient temperature range

32...122 °F

Connections

Minimess measuring connection with screw coupling M16x2, connector coupling for hose 0.24"

Power supply

90...250 V AC 50/60 Hz, 12 V DC

Internal accumulator

12 V DC



Competence through Experience

internormen
electronics

In-line Monitoring Solutions

MPS 01.2 - Metal Particle Sensor

- Metal particle sensor based on an inductive measurement technique for hydraulic and lubricating fluids
- Detects metal particles $>200\mu\text{m}$
- Designed as an inexpensive in-line monitoring solution for stationary and permanent operations
- Suitable for installation in new or existing systems
- Two output signals; counting impulses (24V, 7ms) as well as a diagnostic signal



CERTIFIED!



Technical data

Fluid compatibility	Hydraulic and lubricating fluids, as well as synthetic esters
Measuring method	Inductive method
Metal particles	$>200\mu\text{m}$
Detection rate	max. 100 particles/sec
Pressure	up to 290 PSI
Temperature range	$-40...176\text{ }^{\circ}\text{F}$
Flow velocity	13.3 gal/min
Connections	Hose or flange
Electronic	M12, 4 poles
Power supply	24 V DC

MPM 01 Set - Metal Particle Monitor System

- Consists of the metal particle sensor MPS 01.2, based on an inductive measurement technique, and the control and display unit MPM 01 for direct measurement survey
- Detection and counting of metal particles $>200\mu\text{m}$
- Designed as an inexpensive in-line monitoring solution for stationary and permanent operation
- Suitable for installation in new or existing systems
- Internal storage of measurements
- Automatic monitoring function with control signal output if set thresholds are exceeded
- RS 232 interface
- Data-transfer to an external PC
- Data management using a MS-Excel based LabVIEW Data-Manager software
- Comfortable and user-friendly software
- Numeric 4-line display
- Robust case



In-line Monitoring Solutions

PFS 01 - Laser Sensor



- Consists of two sensor elements, a laser sensor for particle counting and a thermal flow sensor for volume flow measurements
- Advantages of the thermal volume flow sensor: no mobile component parts, no abrasion, simple electronic evaluation procedures, the sensor is insensitive to contamination
- The laser sensor integrated in the PFS operates based on the light cover principle
- Advantages over precision sensors: compact construction, lower costs, applicable for permanent and spontaneous monitoring
- Calibrated according to ISO 11171:99
- Suitable for installation in new or existing systems
- Intended to be used with the CCT 01 or CCM 01

Operating fluids: Hydraulic oils H, HL, HLP and HV;
Gear oils C, CL, CLP; Motor oils, gas oils; MIL-H-5606 E;
Vegetable oils (HTG, Triglyceride); Synthetic esters (HEES)

Technical data

Calibration of the particle size	ISO MTD in oil (ISO 11171:2000) ≤ 725 PSI
Max. acceptable operating pressure	158 °F
Max. oil temperature (short term)	46...1850 SUS
Viscosity range	32...113 °F
Ambient temperature	13.3 gal/min
Max. acceptable volume flow	Pipes, 1" or 3/4"
Connections	IP 65
Protection class	3.3 lbs
Weight	

CCM 01 Set - Contamination Control Monitor System



- The system consists of the PFS 01, particle counter with a laser sensor for hydraulic and lubricating fluids, and the CCM 01, a monitor and display unit.
- Designed as an inexpensive in-line monitoring solution for stationary and permanent operations
- Reliable determination of contamination classes according to ISO 4406:99 or NAS 1638 (switchable)
- CAN-interface acc. to ISO 11898, CAN 2.0A, CANopen compatible
- Suitable for installation in new or existing systems
- Results displayed immediately
- Internal storage of measurements
- Automatic monitoring function with control signal output if set thresholds are exceeded
- RS 232 interface
- Data transfer to an external PC
- Data management using a MS-Excel based LabVIEW Data-Manager software
- Comfortable and user-friendly software
- Numeric 4-line display
- Robust case



Technical data

Fluid compatibility	Hydraulic and lubricating fluids as well as synthetic esters
Laser	650 nm
Counting channels	4; sizes (switchable): ≥4μm _(c) , ≥6μm _(c) , ≥14μm _(c) , ≥21μm _(c) ; or ≥6.4μm _(c) , ≥14μm _(c) , ≥21μm _(c) , ≥37μm _(c)
Pressure	up to 725 PSI
Temperature range	32...158 °F
Calibration	ISO MTD in oil
Connection	1" or 3/4" pipes
Power supply	24 V DC



Competence through Experience

internormen
electronics

In-line Monitoring Solutions

CCT 01 Set - Contamination Control Transmitter System

- Particle counter with the PFS 01 laser sensor for hydraulic and lubricating fluids
- Contamination monitoring at different test stands, for hydraulic components, filter service devices, wind energy plants, mobile and stationary hydraulic systems in general
- Inexpensive and reliable in-line system for contamination class control
- Consists of the contamination class transmitter CCT 01 with an integrated three-channel particle counter combined with the particle flow sensor PFS 01
- CAN-interface acc. ISO 11898, CAN 2.0A, CANopen compatible
- When used as a contamination class transmitter, the CCT 01 transforms measurement signals, received from the laser sensor, into contamination classes which are being displayed as analog outputs (4...20mA)
- The emitted signals are consistent with the contamination classes based on ISO 4406:99 ($\geq 4 \mu\text{m}_{(C)}$, $\geq 6 \mu\text{m}_{(C)}$, $\geq 14 \mu\text{m}_{(C)}$)
- Measurements can be saved in user-defined intervals (up to 1000 measurements)
- By using an USB-interface the CCT 01 can be PC-configured, calibration values can be set and current or saved particle numbers can be transmitted to a PC



Technical data

Interface	USB (for configuration) M 12 - connector, CAN - option
Dimensions	7.9 x 3.3 x 1.4 in. x in. x in.
Mass	0.85 lbs
Output signals	3 x 4...20 mA



A complex interaction of market and technological innovations, brought up outstanding solutions - accurate, immediate, mobile and stationary fluid monitoring and particle counting according to ISO, NAS and SAE standards.

.... making your systems operate at their maximum capacity.

Oil Condition Monitoring Systems

IVS 01 - In-line Multifunction Oil Condition Sensor

- In-line multifunction sensor meant for oil condition monitoring in hydraulic and lubrication systems
- Able to determine the aging condition of oil and detect various mixtures by measuring and detecting changes of viscosity, temperature and relative dielectricity before system failures can occur
- Enables the user to program an automatic oil condition monitoring function, make a precise assessment of the condition of a system and perform maintenance accurately timed
- Simple screw-in assembling G 3/4

Technical data

Operating parameters:	
Max. admissible pressure	362 PSI
Ambient temperature	-40...158 °F
Power supply	24 V DC
Output interface	analog, 4...20 mA (4x) or CAN-Open
Connection thread	G 3/4
Protection class	IP 65
Measurement parameters:	
Dynamic viscosity	5...1500 cP
Temperature	-22...266 °F
Relative dielectricity	1...10
Accuracy of measurements	viscosity: $\pm 2.5 \%$ temperature: $\pm 0.5 \text{ }^{\circ}\text{F}$ rel.dielectric.constant: ± 0.15
Reproducibility viscosity/temperature	$\pm 1\%$



OCM 01 - Oil Condition Monitor

- Mobile diagnostic system able to determine the aging condition of oil in hydraulic and lubrication systems by measuring solid contamination, water saturation, temperature, viscosity and relative dielectricity
- Applicable for both pressure and suction lines (can as well be used when working with foamed oils in gears)
- Enables the user to make a precise assessment of the condition of a system and perform a cost-effective maintenance on time

Technical data

Operating parameters:	
Voltage supply	90...230 V, 50/60 Hz
Pressure operating range	-3...580 PSI
Viscosity range	4...1850 SUS
Max. permitted oil temperature	32...158 °F
Ambient temperature	32...122 °F
Protection class	IP 67 (with cover closed)
Measurement parameters:	
Particle counting according to ISO 4406:99, NAS 1638, SAE AS 4059	
Automatic particle counting in 8-channels	4,0 $\mu\text{m}_{(c)}$, 4,6 $\mu\text{m}_{(c)}$, 6,0 $\mu\text{m}_{(c)}$, 6,4 $\mu\text{m}_{(c)}$, 10 $\mu\text{m}_{(c)}$, 14 $\mu\text{m}_{(c)}$, 21 $\mu\text{m}_{(c)}$, 37 $\mu\text{m}_{(c)}$
Coincidence barrier	10.000 particles / ml
Calibration	ISO MTD in oil (ISO 11171:2000)
Measuring accuracy	± 1 (contamination class)
Water saturation	0...100%
Dynamic viscosity	0.8...320 cP
Temperature	32...158 °F
Relative dielectricity constant	1...10



Competence through Experience

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electronics

The new standard in advanced Fluid Management and Contamination Control

UMFC 41/81 - Mobile Oil Service with Fluid Control Function

- Mobile off-line filter unit with a Fluid Control Function
- Simplifies off-line filtration and filling of reservoirs
- Selectively equipped with the *Interporvlies* filter elements or well proven *Watersorp* filter elements
- A continuous measurement of contamination classes and the saturation of oil with water is provided between the pump and filter unit by the PFS 01 laser sensor and the contamination class transmitter CCT 01
- The output is displayed in contamination classes according to ISO 4406:99 and in percent (%) of saturation of oil with water
- Data can be read-out and transferred to a standard PC via RS232 interface
- The unit is equipped with 4 separate operating modes and a temperature control function meant to protect the particle sensor
- By entering the desired contamination class and/or water saturation an automated shutdown of the UMFC is effected when thresholds for contamination classes, water saturation or contamination classes and water saturation are reached



	Technical data UMFC 41 single phase AC motor	Technical data UMFC 81 three phase AC motor / pole changing	
Volume flow	11.3 GPM	11.3 GPM	22.5 GPM
Max. working pressure	87 PSI	145 PSI	
Viscosity	46 - 1850 SUS	46 - 3680 SUS	46 - 1850 SUS
Electrical connection	110 V - 60 Hz (1 phase)	480 V - 60 Hz (3 phase)	480 V - 60 Hz (3 phase)
Max. oil temperature	32...158 °F particle measuring possible up to 122 °F	32...158 °F particle measuring possible up to 122 °F	

UMCC 40 - Mobile Oil Service with Contamination Control Function

- Mobile off-line filter unit with a Contamination Control Function
- Combined with the particle counter system CCS 2, contamination classes can be determined on-line or via bottle samples with our optional BSS 2 system according to ISO 4406:99 and NAS 1638 standards
- The integrated Y-filter protects the laser sensor within the CCS 2 against particles larger than 200 µm and prolongs the service life of the integrated low noise pump (enabling the usage of the unit in severe and dirty application areas/environment)
- The user is informed about the condition and contamination of the elements by continuous Δp monitoring of filter elements
- The particle counter CCS 2 can be used separately from the flushing system, packed in a handy aluminum case including an user-friendly Data-Manager software



	Technical data UMCC 40 single phase AC motor
Volume flow	11.3 GPM
Max. working pressure	116 PSI
Viscosity	46 - 1850 SUS
Electrical connection	110 V - 60 Hz (1 phase)

Contamination Monitoring Accessories

BSS 2 - Bottle Sampling System

This optional auxiliary unit for the CCS 2 measuring system ensures optimal bottle sampling processing and sample preparation and therefore lab quality results. Essential degasification is being performed by generating a vacuum. A variable adjustable pressure can be applied to feed the fluid to the CCS 2 system.

Technical data

Pressure range	0...58 PSI
Vacuum range	0...28 in. Hg
External supply pressure	min. 72 PSI, max. 145 PSI
	Air volume $Q_{min} = 10.5$ GPM
Supply pressure connection	Quick coupling NW 7.2
Hose connection	Minimess measuring connection with screw coupling M16x2
Power supply	110...230 V AC, 12 V DC

Optionally available with a compressor



MWS 02 - Mini Web Server

The Mini Web Server enables on-line measurements with the CCS 2 measuring system and therefore immediate remote diagnosis of hydraulic systems using the Ethernet or the Internet. An easily operated website is being provided in order to operate the CCS 2, display measured data or download data.



TSS 1 - Tank Sampling System

The TSS 1 is a user-friendly, mobile oil sampling system able to supply fluid to the CCS 2 system or extract tank samples.



CALSUS 01 + CALSOFT 01

This set allows - in combination with the BSS 2 - a secondary calibration of the CCS 2 laser sensor according to ISO 11171:99. All necessary solutions and certificates are included. By using the software CALSOFT 01 this secondary calibration can be performed automatically.



WSH 01 - Set with WSSB

Sensor and display unit for quick, mobile, easy and reliable monitoring of saturation of oil with water. The WSSB sampling bottle makes measurements in combination with the CCS 2 possible.



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US-08/2009
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World Wide Competence

Water-in-Oil Monitoring Solutions

**Mobile and
stationary
electronic
sensor systems**

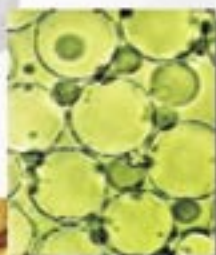
for
inline and offline
applications





Water in hydraulic fluids -

Water is a type of contamination and has negative effects on the characteristics of a fluid. After particulate contamination, water is the second most common reason for breakdowns and failures of hydraulic and lubricating systems.



Microscopic photo of water in oil



Filtered rust particles

How can water get in a system?

- Inappropriate storage
- Residue from cleaning
- Humidity/condensation
- Bearings
- Permeable spots (hairline cracks, caps, defective sealings, etc.)

Types of water

These types of water can be present:

- dissolved water
up to the saturation limit of a fluid
- emulsified and free water
above the saturation limit of a fluid



Oil sample with 100 ppm



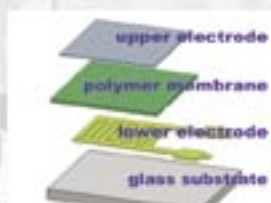
Oil sample with 600 ppm

Effects and consequences of water in hydraulic fluids

- | | |
|--|-----------------------------------|
| → Accelerates oil aging | → Increases wear |
| → Shortens fluid life | → Noise |
| → Worsens ability of air segregation | → Failure of polarizing additives |
| → Worsens lubricating performance | → Increased acid numbers |
| → Worsening of control characteristics | → Worsened filterability |
| | → Rust |
| | → Higher contamination levels |



About the WSPS Sensors



Measuring principle

The WSPS 01/03 are capacitive sensors and utilize a polymer foil as dielectric between two electrodes. This foil is capable of absorbing water molecules due to its microporous structure. The absorption causes the capacity of the sensor element to change. This change of capacity changes the frequency of the resonant circuit and is detected and converted into an output.

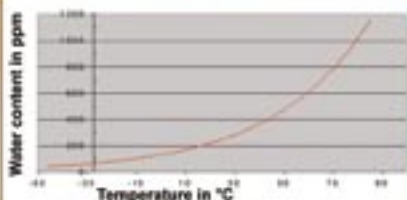
What is being measured?

These sensors measure the relative humidity of a fluid, unlike the water content determination using the Karl-Fischer-Method (total water of the fluid - free and dissolved). The result of a measurement is the saturation level of the fluid with water in percent.

0% - 60%	No free water
60% - 80%	Small amounts of free water
80% - 100%	Free water

The indication of 100% means the total saturation of a fluid and therefore the presence of dangerous free water in the fluid.

A theoretic relation to the ppm (mg/kg) water content (determined by the Karl-Fischer method) can be made for values between 0% and 100%. For this purpose it is necessary to know the characteristic curve of the saturation level and the temperature of the fluid.



Characteristic curves for different fluids are pre-programmed in the WSTM 01 display unit. Operating with the WSPS 03, results can be displayed in ppm.





Technical Data

WSPS 01

Measuring water saturation	✓
Measuring range	0%...100 %
Accuracy	+/- 2%
Ambient temperature	-40°C...+110°C
Flow velocity	maximum 2 m/s
Power supply	9 V...30 V DC
Analogue outputs	0 V...1 V
Clean with	Isopropanol
Protective cap	Plastic
Cable length	1.5 m
Protection class sensor	IP 67
display unit	IP 40

Offline Sensor

Recommended Display Unit WSH 01

- with colored LED display
- for mobile offline applications

WSPS 03

Measuring water saturation	✓
Measuring range	0%...100 %
Accuracy	+/- 2%
Pressure resistance	16 bars
Flow velocity	maximum 2 m/s
Measuring fluid temperature	✓
Temperature range	-20°C...+80°C
Connection thread	G 3/4
Power supply	12 V...30 V
Ohmic resistance	600 Ohm at 24 V DC
Analogue output saturation	4 mA...20 mA
Analogue output temperature	4 mA...20 mA
Protective cap	Stainless steel
Cable length	5 m
Protection class sensor	IP 67
display unit	IP 65

Inline Sensor

Recommended Display Unit WSTM 01

- with numeric 4-row display
- for stationary online applications
- results for certain fluids can be displayed in ppm

Fluid compatibility

Mineral oil based fluids as well as synthetic fluids such as hydraulic oils, lubricating oils, transformer oils, and ester based synthetic oils.

Tested and for the WSTM 01 pre-programmed fluids

- | | |
|----------------------|------------------------|
| ✓ HLP 22 (Shell) | ✓ CLP 220 (Shell) |
| ✓ HLP 46 (Shell) | ✓ HEES 46 (Fuchs) |
| ✓ HLP 68 (Shell) | ✓ Red Army Oil (China) |
| ✓ MIL-H 5606 (Shell) | ✓ ... |

Additional fluids are being tested constantly and added to the program. Research on special fluids is available (upon request).

Product Overview

WSPS 01 Sensor

- Sensor to monitoring and diagnose hydraulic and lubricating fluids
- For quick, simple and reliable offline measurements of saturated water in oil
- Analogue output of water saturation in volts
- Simple cleaning



WSPS 03 Sensor

- Sensor for monitoring and diagnosing hydraulic and lubricating fluids
- For reliable online measurements of saturated water in oil
- Also measures temperature
- Analogue output of water saturation and temperature both in milliamps
- Simple cleaning



WSH 01 - Set

- WSPS 01 Sensor with the WSH 01 display unit
- For quick, simple and reliable mobile offline measurements of saturated water in oil
- Small and comfortable handheld measuring device
- Multiple applications
- Battery powered
- Simple cleaning
- Colored LED display



Separate display units available

WSTM 01 - Set

- WSPS 03 sensor with the WSTM 01 display unit
- For reliable, stationary inline measurements of water saturation of an oil
- Also measures temperature
- Results can be displayed in either saturation level or theoretical ppm
- Simple cleaning
- 4-row, numeric display
- Simple menu navigation
- Saves up to 100 measurements
- Serial bus (RS 232)



Including Data Manager software for PCs

MSS 01

Enables the operation of up to 8 separate WSPS 03 sensors with only one WSTM 01 display unit



WSSB

Bottle sampling glass for direct measurements when using the CCS 2



Additional Products

from our product range, which - if you have problems with water - might be of great interest to you:

internormen 
fluid management

IFPM/IFPS Fluid Purifier Systems

- Remove free, dissolved and emulsified water from operating fluids
- Remove free and dissolved gases
- Remove particulate contamination down to 1 micron
- Extend fluid life and prevent oil aging
- Improve reliability and productivity of your systems
- Reduce down-time of machinery
- Extend life of system components



internormen 
filter technology

Watersorp - water-absorbing filter elements

- Absorb free and emulsified water from oil
- Particulate contamination is also filtered
- Reduce oil aging and deadditivation of fluids



BFD - Desiccant Breather Filters

- Reduce the influence of humidity
- Remove particulate contamination and humidity of air entering a system or a tank
- Extend fluid life
- Reduce down time of machinery
- Reduce system component repairs and replacements



INTERNORMEN

Sampling and Oil Analysis-Set PAS 01/WAS 01

- Microscope
- Drop-ball viscosimeter



For professional
• ***vendor inspection***
• ***condition control***
of the operating fluid at site

Sampling- and Oil-Test-Kit

PAS 01

Dynamic sampling



Mini-measuring connections and tubes for the dynamic sampling out of pressure pipes
Order-No. 313624



Order-No. 306594

Static sampling



Vacuum pump, tubes and telescopic stick for the static sampling out of tanks or packing drums
Order-No. 313625



Vacuum-filtration-set with electrical vacuum-pump to prepare membrane samples for:

- microscopical particle counting with the attached micro pocket lens
- analysis of the kind of contamination
- gravimetric analysis

One-way-pipette



One-way-pipette for the static sampling used for heavy contaminated fluids
Order-No. 312950

Supplementary sets for oil analysis

WAS 01

Sample bottle-set



2 high purity glass bottles (250 ml) with self adhesive labels and cardbox.
Order-No. 313427
12 pieces: Order-No. 314781



Water-test-kit WAS 01 to determine the contents of water in mineral oils according to the calciumhydride-method.

Order-No. 311077

Drop-ball viscosimeter



Graduated tube with integrated thermometer, 3 measuring-balls, mirror and electronic stop-watch.
Order-No. 313347



Consumables and reagents:

Order-No.

Membrane-filters

0,45 μm 313326

5 μm 313327

of equal weight 313321

transparent-fluid 313328

Petri slides 313329

WAS 01:

reagent A and B 313235

cleaning spray 313346

Microscope



Microscope with eyepiece micrometer, 3 lenses (40, 100, 200 x magnification) transmitted light equipped and compound table for the microscopical particle counting.
Order-No. 313322

Lab-Service for Hydraulic- and Lubricating Oils



Lab-Service by means of most modern measuring and test equipment executed by qualified staff

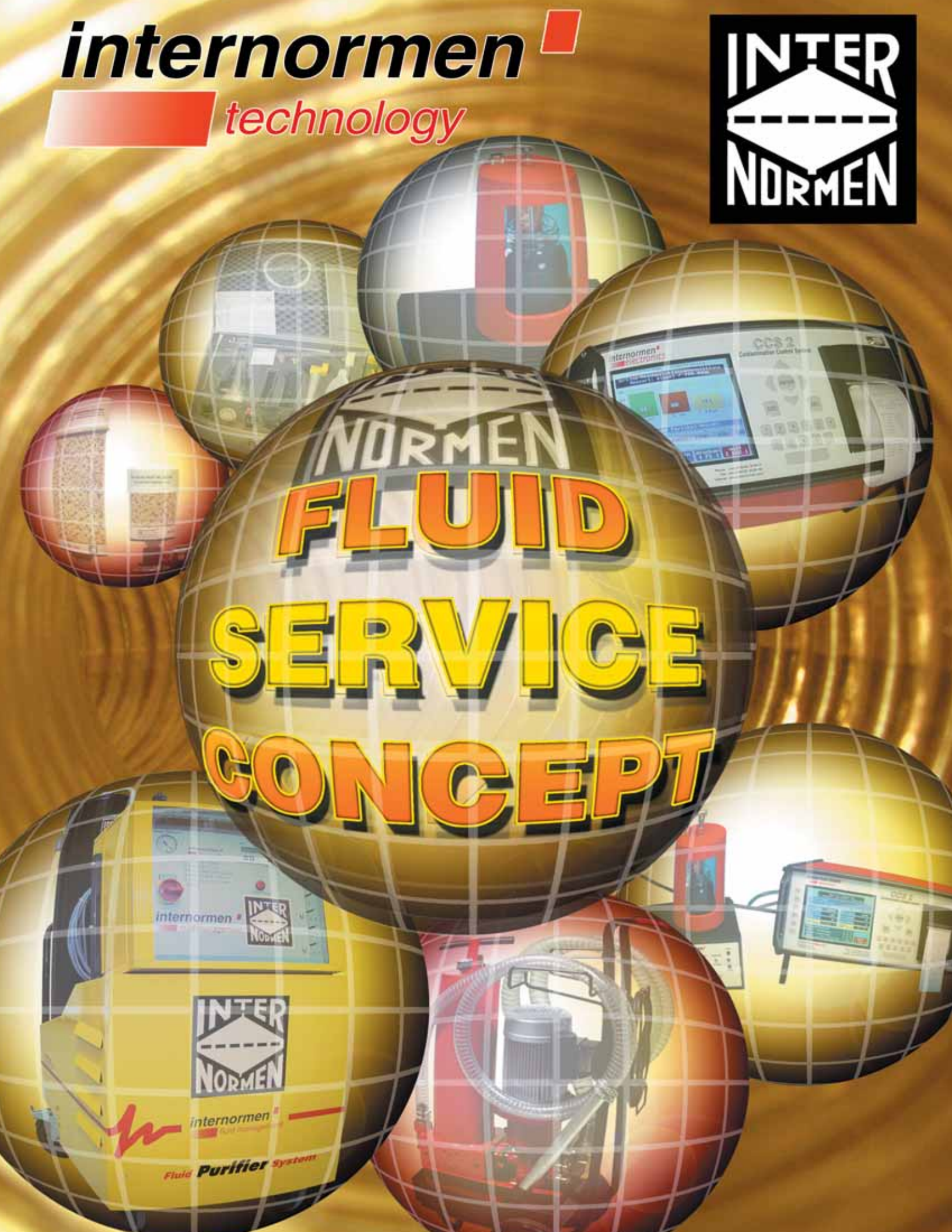
- ***Determination of contamination classes***
- ***Contamination analysis***
- ***Oil condition analysis***




internormen 
 *technology*

**INTER
NORMEN**

NORMEN
**FLUID
SERVICE
CONCEPT**





In addition to our standard program of hydraulic and lubrication filters in the range of **INTERNORMEN**  *filter technology* there are the following **INTERNORMEN** divisions:

 *fluid management*

 *electronics*

 *system technology*

 *contamination
monitoring*

 *software solutions*

For our “Fluid-Service-Centers” which are established for certain territories **INTERNORMEN** offers a comprehensive Service Consulting - including the appropriate products - which requires the following basic proceeding:

INTERNORMEN's Fluid

Solutions contain:

➔ **Setting of targets for contamination classes in regards to particle and moisture contamination**

➔ **Fixing of critical values and alarm settings**



➔ **Preparation of complete interpretations of analyses:**

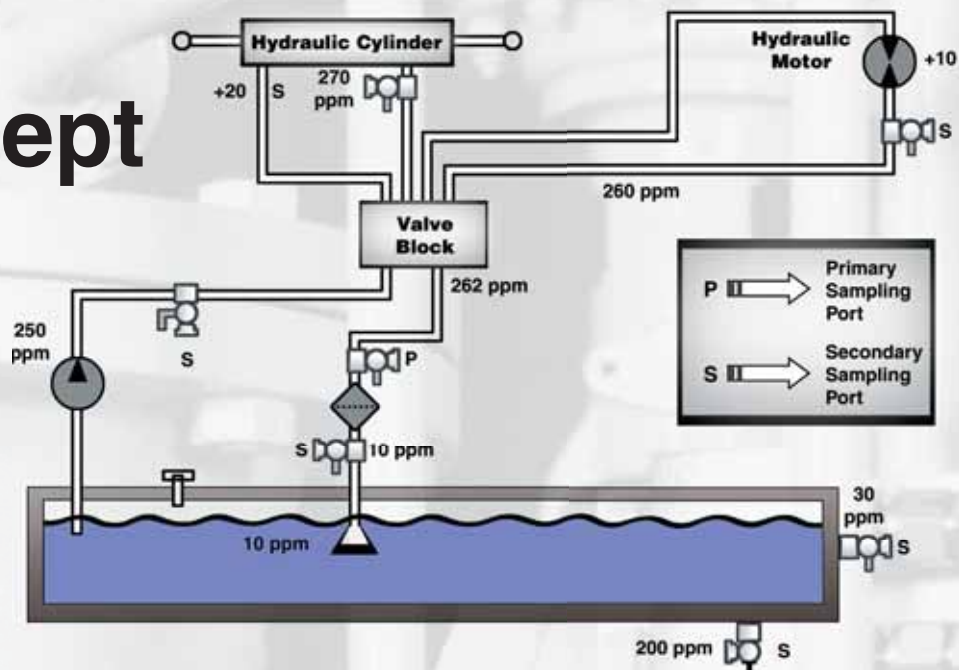
internormen filter technology		Guidelines for Determining, Achieving, and Maintaining Target Cleanliness Levels with High Performance Filtration (Beta Ratio ≥ 200)				
Most Sensitive System Component	Low Pressure Under 2000 psi (moderate conditions)		Medium Pressure 2000 to 2999 psi (or low pressure plus severe conditions) ¹		High Pressure 3000 psi and Over (or medium pressure plus severe conditions) ¹	
	ISO Target Levels	Filter Micron Ratings ²	ISO Target Levels	Filter Micron Ratings ²	ISO Target Levels	Filter Micron Ratings ²
PUMPS						
Fixed External Gear	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Vane	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Fixed Piston	20/16/13	10VG	19/15/11	6VG	19/15/11	3VG
Variable Piston	20/16/13	6VG	18/14/10	3VG	18/14/10	3VG
VALVES						
Check Valve	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Directional (solenoid)	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Standard Flow Control	20/16/13	10VG	18/14/10	6VG	19/15/11	3VG
Cartridge Valve	19/15/11	3VG	17/13/9	3VG	17/13/9	3VG
Proportional Valve	18/14/10	3VG	17/13/9	3VG	16/12/8	3VG
Servo Valve						
ACTUATORS						
Cylinders, Vane Motors, Gear Motors	23/19/15	25VG	22/18/14	16VG	20/16/13	6VG
Piston Motors, Swash Plate Motors	20/16/13	10VG	18/14/10	6VG	19/15/11	3VG
Hydrostatic Drives	19/15/11	1VG	15/11/7	1VG	15/11/7	1VG
TEST STANDS						
LUBRICATING OILS						
Paper Machine Oils	20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Steam Turbine Oils	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Diesel Engine	20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Mobile Gear Box	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Industrial Gear Box	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Journal Bearing	18/14/10	3VG	not applicable	not applicable	not applicable	not applicable
Roller Bearing	17/13/9	3VG	not applicable	not applicable	not applicable	not applicable
Ball Bearing						

Notes: ¹ Severe conditions may include high flow surges, pressure spikes, frequent cold starts, extremely heavy duty use or the presence of water.
² Two or more systems filters of the recommended rating may be required to achieve and maintain the desired Target Cleanliness Level, for more details and accuracy use our filter simulation software.

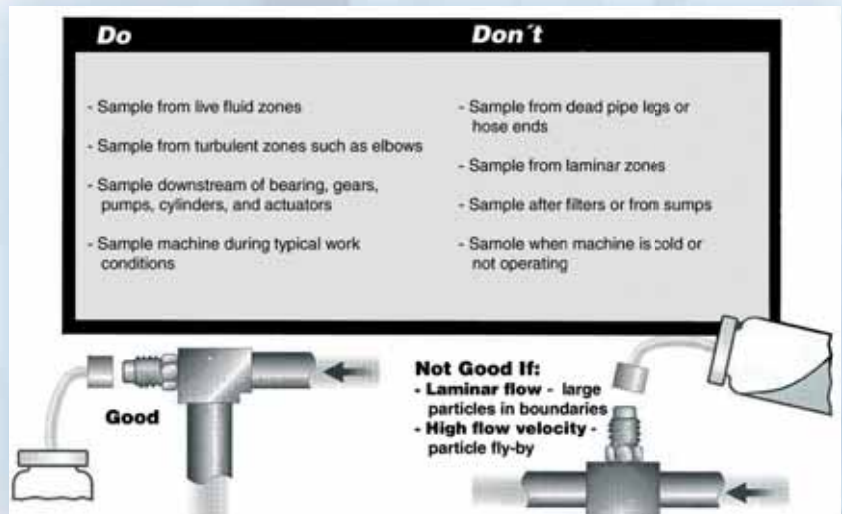
Element	Spectral Analysis of Metals in Oil	Potential Sources
Aluminium		abrasives, aluminium mill, bauxite, bearing metal, catalyst, coal contaminant, fly ash, foundry dust, granite, paint, journal bearings, solder
Antimony		antioxidants, bactericide, mineral oil
Arsenic		aircraft construction, bearings, mineral oil
Barium		journal bearings
Beryllium		journal bearings, coolant inhibitor
Bismuth		journal bearings, platings
Boron		lime, limestone, mining dust, oil additive, road dust, rubber
Cadmium		salt water, slag
Calcium		abrasives, carbides, carbon steel, graphite, hard metal, mineral oil, soot, synthetic material
Carbon		chrome plating, hardcoat, paint, ring plating, stainless steel, tooling steels
Chromium		reactor technique
Cobalt		abrasives, hard metal, tooling steels
Iron		ore dust, paint, rust, talc, zeolit
Lead		babbit, bearing overlay, gasoline additive, solder, paint
Lithium		dust, grease, salt water
Magnesium		slit of aluminium, engine additives, fuller's earth, hard water
Mercury		road dust, salt water, turbine
Molybdenum		bactericide, batteries
Nickel		silencing metal, EP-additives, MoS ₂ , rings
Niobium		hard steel, plating, stainless steel, stellite
Phosphorus		turbine blades
Platinum		AW / EP-additives, cleaning detergents, oil additives, surface finish
Potassium		catalyst, mineral oil
Scandium		additives, coolant inhibitor, fly ash, granite, paper mill dust, veritiser
Silicon		ICP-reference
Silver		antifoam additives, asbestos, cement dust, coolant additives, fly ash, foundry dust, glass, granite, limestone, mica, road dust, slag
Sodium		steel, synthetic lubricant, talc, wet clutch
Sulphur		bearing overlay, needle bearings, solder
Tantalum		additives, base stocks, coolant inhibitor, dirt, fly ash, grease
Tellurium		paper mill dust, road dust, salt, sea water
Titanium		gypsum, mineral oil, MoS ₂ , rubber
Tungsten		hard metal, tooling steel
Uranium		mineral oil
Vanadium		hard metal, paints, turbine bearings, turbine blades
Yttrium		ore dust, road dust (some)
Zinc		mineral oil, turbine blades, valves
Zirconium		ICP-reference
		AW additives, brass, galvanizing, grease, oil additives, plating, solder
		abrasives, hard steel, reactor technique

Service Concept

Selection of possible measuring points in the system



Installation of possible measuring valves and access points



Supply of corrective customer specific solutions



INTERNORMEN offers service devices for sale, leasing or rent

INTERNORMEN service devices - application and benefits:

CCS 2 + BSS 2 / Particle Counter and Bottle Sampling System

- Online determination of contamination classes according to ISO 4406:1999, NAS 1638 and ISO 4406:1987
- Verifies the filter performance
- Permits "on-condition" laboratory oil analysis
- Confirms improved maintenance
- Verifies pump condition
- Determines the cleanliness of stored hydraulic and lubrication fluids
- Identifies changing atmospheric conditions
- Troubleshoots and isolates problems and problematic components
- Identifies the necessity of spectral analysis
- Determines the benefit of offline filter units
- Determines the optimal time/frequency for the change of elements
- Identifies filter failures
- Verifies centrifuge performance
- Detects high-corrosive wear
- Monitors new system start-up time
- Verifies bearing condition
- Confirms target contamination classes are achieved
- Verifies breather condition
- Verifies the effectiveness of the filters selected
- Identifies abnormal gear wear
- Determines new oil cleanliness



BSS 2 - Bottle Sampling System

- Serves as bottle sampling device for the CCS 2
- Deaerates the processed oil sample before feeding it into the CCS 2
- Serves as calibration device for the CCS 2, using **INTERNORMEN's** software CALSOFT 01 and **INTERNORMEN's** certified test fluid CALSUS 01



TSS 1 - Tank Sampling System

- Serves as a device for feeding oil samples from reservoirs to the CCS 2
- Also serves for bottle sampling device from reservoirs



INTERNORMEN's Fluid



WAS01 - Water-in-Oil Analyse Set

- Determines the water content in oils
- Determines condensation in the reservoir
- Identifies damages/leaks of watercooled heat exchangers
- Determines the saturation of water absorbing breather filters
- Demonstrates the effectiveness of water extracting devices
- Identifies the effectiveness of cylinder wiper seals



PAS01 - Sampling and Oil Analyse Set

- Serves for receiving inspection of hydraulic and lubrication fluids
- Includes mini-measuring connections for simple sampling
- Determines the condition of operating fluids on site
- Identifies the type of contamination
- Visual appraisal of fluids and their contamination
- Serves for static or dynamic bottle sampling
- Serves for particle analyse by means of membrane sample
- Serves for optical particle counting by means of membrane sample under a microscope
- Serves for gravimetric analysis of solid contamination



UM/US - Mobile and Stationary Off-line Filter Units

- Serve for improvement of the contamination classes in fluid systems
- Extend the service life of system components
- Reduce the down times of machines
- Usable for filling of reservoirs and sumps with new fluid
- Flushing of fluid systems after machine repairs and maintenance
- Extend the service life of „In-Line“-Filters
- Improve the general cleanliness classes of fluid systems
- Extend the service life of the oil, respectively change intervals
- Reduce the fine contamination / polishes the fluid
- Reduce the oil ageing and extend the oil service life
- Serve as flushing unit for new systems and machine break-ins

Service Concept

USP/UST - Off-Line Filter with additional Heat Exchanger

- Serves for filtration and cooling of fluids
- Improves the oil service life
- Increases the lubricating properties of operation fluids



Watersorp - Water Absorbing Filter Elements

- Serve for absorption of free and emulsified water from oils
- Additionally reduce solid contamination
- Reduce the oil ageing and deadditivation of fluids



IFPM/IFPS - Fluid Purifier Systems

- Remove free, solved and emulsified water from operation fluids
- Remove free and dissolved gases
- Remove particle contamination down to 1 μm
- Extend the oil service times and prevent oil ageing
- Improve the reliability and productivity of plants
- Reduce the down times of machine equipment / systems
- Extend the service life of system components



WSH 01 - Water Analysis Sensor

- Measures percent water saturation level of fluids
- Determines proactive a water problem, before water turns into an emulsified or even free state
- Serves to avoid deadditivation, corrosion, loss of dielectric strength in transformer oils and a reduction of lubrication film thickness



BFD - Desiccant Breather Filter

- Reduces the coefficient of high ambient humidity
- Removes particle and moisture contamination from the ambient air before tank inlet
- Extends oil service life
- Reduces machine down times
- Reduces repairs and replacement of system components





INTERNORMEN's „In-house Laboratory Services"

has state of the art equipment and with special expert knowledge to immediately analyse the problems and present solutions in teaming up with the experts from the Fluid Management.

INTERNORMEN's equipment in the oil analyse laboratory (abstract):

Atomic Emission Spectroscopy

The ICP-OES (Inductive coupled plasma-optical emission spectrum) serves for the analyse of chemical elements. In the range of hydraulics and lubrication oil area the OES analysis is mainly applied for the determination of wear, respectively contamination particles. The ICP technology enables a determination of up to 72 chemical elements relating to quality and quantity.

Infrared Spectroscopy

The FTIR-method (Fourier-Transformation-Infrared spectroscopy) is the most advanced method of infrared spectroscopy and provides the concurrent analysis over a wide range of the electromagnetic spectrum (7500-370 cm^{-1}). The infrared spectroscopy serves for the determination of chemical compounds (molecules) and indicates the chemical changes, polymerisation and impurities in comparison with known samples.

Wet chemical method of analysis

1. Testing of mineral and hydrocarbons; determination of water content according to Karl Fischer, ASTM.D 1744-64

The determination of the water content is based on the oxidation of sulphur dioxide through iodine in the presence of water as described by Bunsen. The water content is determined by end point titration.

2. Determination of total base or strong acid number (TAN/TBN)

The acid number indicates the amount of acid or base in mg that has to be added until the colour changes. The TAN (Total Acid Number), respectively the TBN (Total Base Number) indicates the ageing state of the oils. A practical assessment is only possible by a comparison with new oil.





Oil Sample Analysis

Contamination analysis according to NAS 1638 and ISO 4406:1999

Microscopic particle counting according to ISO 4407

Gravimetric analysis according to ISO 4405

Microscopic contamination analysis

Center viscosity (105F)

Viscosity - temperature diagram

pH-value measurement

(only aqueous fluids)

Examination of Filter Elements

Bubble Point Test according to ISO 2942

Collapse pressure resistance according to ISO 2941

Multi Pass test according to ISO 16889 (new element)

p/Q-characteristic according to ISO 3968 (new element)

Compatibility with hydraulic fluids according to ISO 2943

Analysis of the element structure

Pore size + spectrum of the filter material

Type of contamination, microscopic analysis

Determination of contamination, manometric



How you benefit from the "Fluid-Service-Center" :

INTERNORMEN Fluid Management has invested in highly talented and well-trained people, highest product technology, research and development equipment as well as a „top-of-the-line“ laboratory for oil analysis in order to get the best for our customers. We are proud of being able to lead our customers and partners to the next level in the range of Fluid Management. You may rely on our team of specialists to:

- Optimise your oil analysis program
- Obtain analyses and solutions for reaching your targets from one supplier
- Get the newest products in the range of oil analysis and filter technology and to get trained how to benefit from them
- Reduce unscheduled downtime of your systems, machinery and equipment
- Increase the reliability of your systems and thus improve your product quality
- Minimize the chance of a catastrophic failure
- Reduce the number of fluid changes, lubricant consumption cost and save substantial cost for their disposal
- Reduce environmental impact by minimizing lubricant consumption (integral part of ISO 14001)
- On base of our training material which is always updated and kept at the best state of the art, you and your personnel are regularly trained to get a know-how which enables you to achieve an active cost-saving maintenance. These training sessions can take place either in our Training Center in Altlussheim or world-wide at any requested site and in different languages.





Mobile Oil Service Units UMFC 41/81

Equipped with the Particle Counter CCT 01-Set
and Water sensor WSPS 05



Technical Description:

The UMFC is a mobile off-line filter unit with a "Fluid-Control" function, simplifying off-line filtration and filling of reservoirs, selectively equipped with the "Interporvlies" filter elements or with our well proven "Watersorp" filter elements.

For a representative conclusion about the prevailing condition of a fluid, a continuous measurement of the contamination classes and the saturation of the oil with water is provided between pump and filter unit.

The output is displayed in contamination classes according to ISO 4406:99 and in percent (%) of saturation of the oil with water, additionally data may be read out and transferred to a standard PC via serial interface RS232.

The unit UMFC is equipped with 4 separate operating modes. By entering the desired contamination classes and/or desired water saturation an automated shutdown of the UMFC is effected when reaching threshold for contamination classes, for water saturation or for contamination classes and water saturation.

As for protection of the particle sensor, the unit is equipped with a temperature control function. For avoiding any damages, the sensor of the particle counter set CCT 01 is switched off, when reaching an oil temperature of over 122°F. The maximum allowable oil temperature of the system is up to 158°F, reaching this value causes an automated shutdown. All conditions are displayed via pilot lamps on the LCD-monitor.

Functional principle:

MODE 1

Manual Stop
Manual stop of the motor
through the motor switch
(possible for all modes)

MODE 2

Auto-Stop Contamination Classes
Automated stop of the motor when
all of the entered contamination classes
are underneath the set values



MODE 3

Auto-Stop Water Saturation
Automated stop of the motor
when the entered maximum
water saturation is underneath
the set value

MODE 4

Auto-Stop Contamination Classes
and Water Saturation.
Automated stop of the motor when
all of the entered contamination classes
and the entered maximum water
saturation are underneath the set values

High-value measuring technique

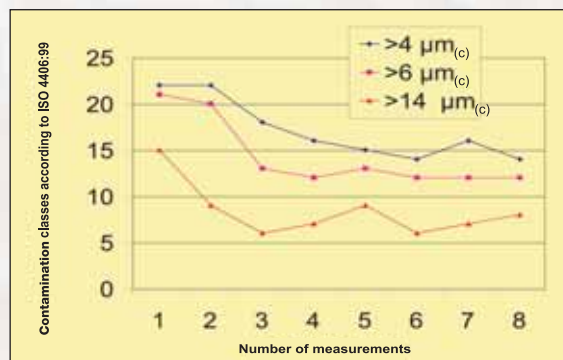
Specifically developed for a continuous monitoring, the CCT 01 - Set detects particles $> 4\mu\text{m}_{(c)}$, $> 6\mu\text{m}_{(c)}$ and $> 14\mu\text{m}_{(c)}$ and classifies them according to ISO 4406:99.

The sensor WSPS 03 determines the water saturation and offers a reliable conclusion on danger of free water in the fluid. The control unit examines the oil temperature and if necessary, prevents an overheating of the unit by switching it off automatically.



Economic efficiency

The investment for an *INTERNORMEN* system pays off in a short time through extended service intervals and higher machine or system availability.



Easy and comfortable handling

The filter element can be changed through anti-clockwise rotation of the handlebar and lifting of the tube cover. So there are no tools needed to change the filter element.



Quality in detail

According to the customer requirements and the field of application, the unit UMFC 41/81 may be equipped with the "Interporvlies"-filter elements as well as with the "Watersorp"-filter elements.

Highest separation rates and exceptional dirt holding capacity ensures accurately defined contamination classes and more favourable service ranges.



	Technical Data UMFC 41 single phase AC motor	Technical Data UMFC 81 three phase AC motor / pole changing	
Volume flow	11,3 GPM	11,3 GPM	22,5 GPM
Max. working pressure	87 PSI	145 PSI	
Viscosity	46-1840 SUS	46-3680 SUS	46-1840 SUS
Electrical connection	110 V - 60 Hz (1 phase)	460 V - 60 Hz (3 phase)	460 V - 60 Hz (3 phase)
Max. oil temperature	32...158°F particle measuring possible up to 122°F	32...158°F particle measuring possible up to 122°F	

Other products offered by

internormen fluid management

Off-line filtration units in stationary and mobile versions, with options like heat exchanger and watersorp elements as well as vacuum dehydration systems.



internormen electronics

Contamination Control Systems (Laser Particle Counters) with options like Bottle Sampling System and Tank Sampling System as well as mobile and stationary water sensors and electronic sensor systems.



internormen contamination monitoring

Mobile Sampling- and Oil Analysis Sets as well as in-house laboratory services including oil analysis and element checks performing optical emission spectrum and infrared spectroscopy analysis.



INTERNORMEN
MOBILE OIL SERVICE
UMCC 40



The new standard
for modern
fluid management,
flushing service &
contamination control

Always equipped with
Particle Counter System
CCS 2

Easy and user friendly handling

The element can be changed through anti-clockwise rotation of the handlebar and lifting of the tube cover. So there are no tools needed to change the filter element.



Fluid Management

In combination with the ultimate CCS 2 particle counter system, contamination classes can be determined online or via bottle samples with our optional BSS 2 system, according to the standards ISO 4406:99 and NAS 1638. This way, controlled flushing can be achieved with the integrated software and relais output.



Y-strainer

protects and prolongs the service life of the integrated low noise pump. This guarantees, that the unit can be used for tough and dirty cleaning jobs. In addition it protects the laser sensor of the particle counter from particles larger than 200 µm.



Continuous Δp monitoring

of the filter element points to the true state of the contamination in the element. Because of the element's large filtration area, the user can save costs over time by not having to change elements frequently.



Storage facilities

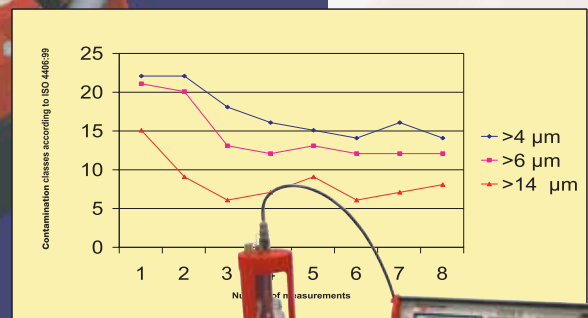
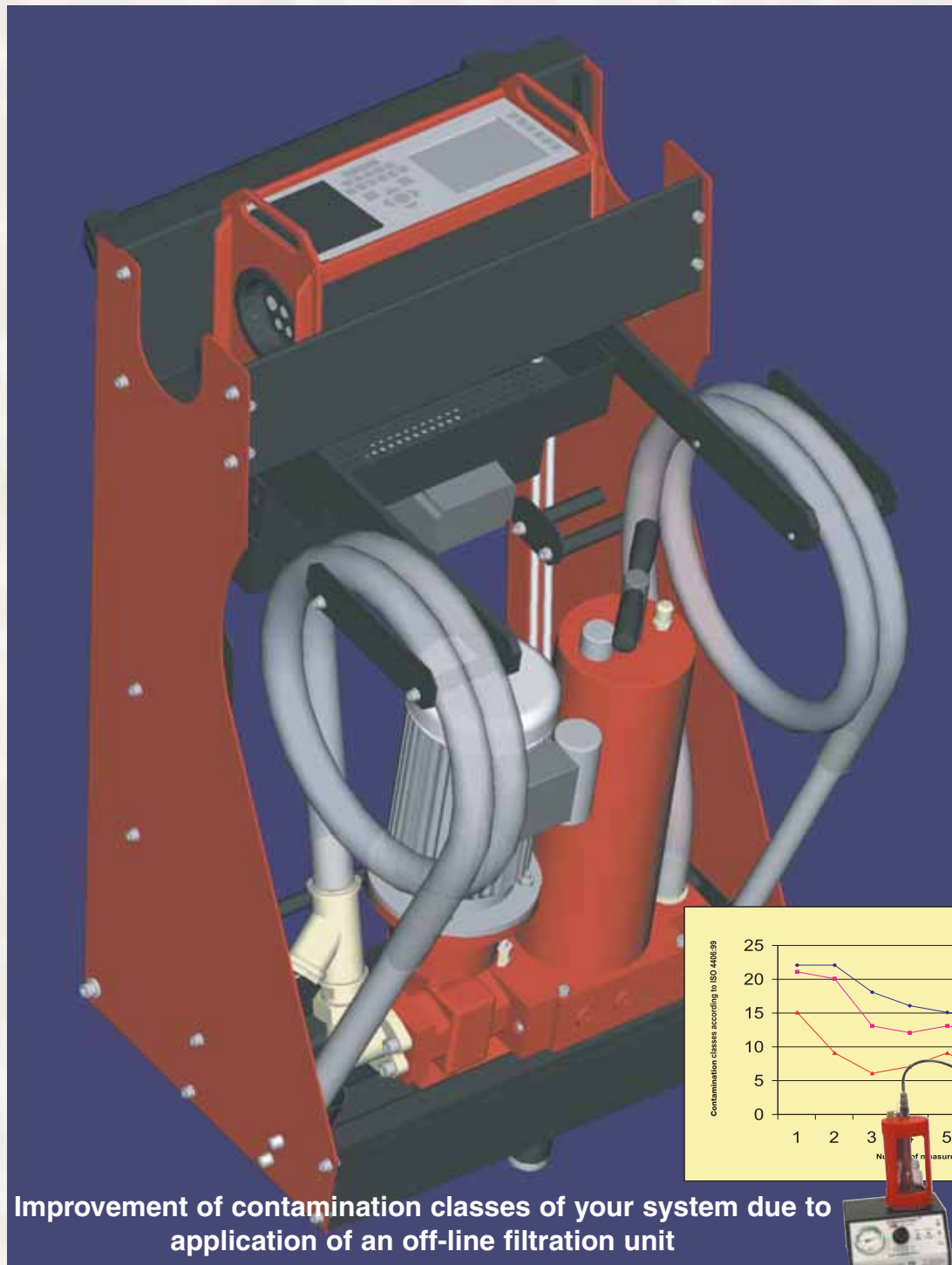
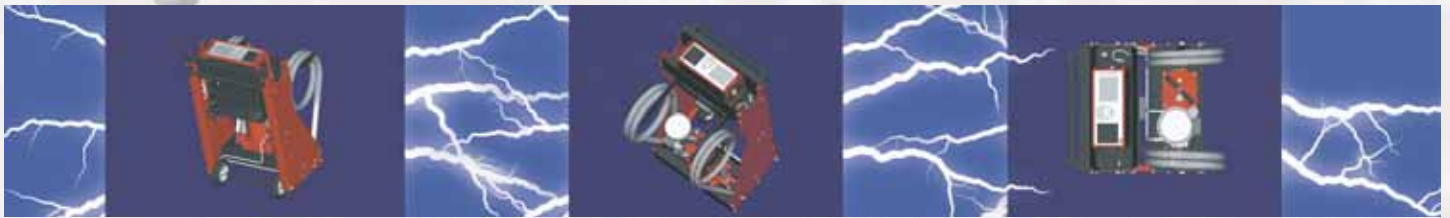
Storage departments are integrated for all necessary tools and accessories the user might need.



Particle counting system CCS 2

can also be used separate from the flushing system with this handy, lightweight carrying case, which is included in this package, as well as our user-friendly data manager software.





Improvement of contamination classes of your system due to application of an off-line filtration unit



Other Products offered by

internormen 
technology

internormen fluid management

Off-line filtration units in stationary and mobile versions, with options like heat exchanger and watersorp elements, as well as vacuum dehydration systems.



internormen electronics

Contamination Control Systems (Laser Particle Counters) with options like Bottle Sampling System and Tank Sampling System, as well as mobile and stationary water sensors and electronic sensor systems.



internormen contamination monitoring

Mobile Sampling- and Oil Analysis Sets, as well as in-house laboratory services, including oil analysis and element checks, performing optical emission spectrum and infrared spectroscopy analysis.



INTERNORMEN

Fluid Purifier Systems

NEW

EXPLOSION-PROOF VERSION



INTERNORMEN - IFPM/IFPS

Fluid Purifier Systems are
self-contained systems, able to:

- remove free, emulsified and dissolved water
- remove free and dissolved gases
- remove particulate contamination down to 1 µm

Effects of water contamination

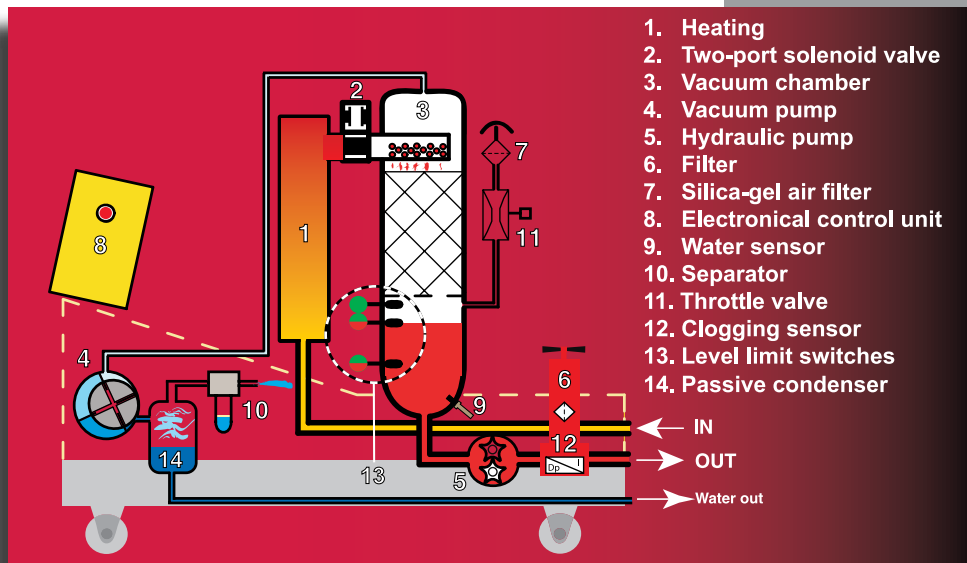
Water is ranked as one of the most frequently occurring kind of contamination and as a destructive foreign matter in second place, right after particulate contamination. Some of the problems and damages, water contamination can cause, are:

- Fluid destruction
- Exhaustion of additives
- Reduction of lubrication characteristics of the liquid
- Oil oxidation
- Internal corrosion
- Increased conductivity



Operating principle

The deployed procedure of vacuum evaporation with inert gas is the most effective method of dehydration principles for this application. This method combines high water separating rates with efficient energy use for a large variety of application possibilities. Using dry air as inert gas, enables the dehydration process to achieve water levels underneath the saturation level of the processed fluid at any given operating temperature. In contrast to the standard vacuum evaporation process, which can only reach equilibrium between the fluid and the surrounding water vapor.



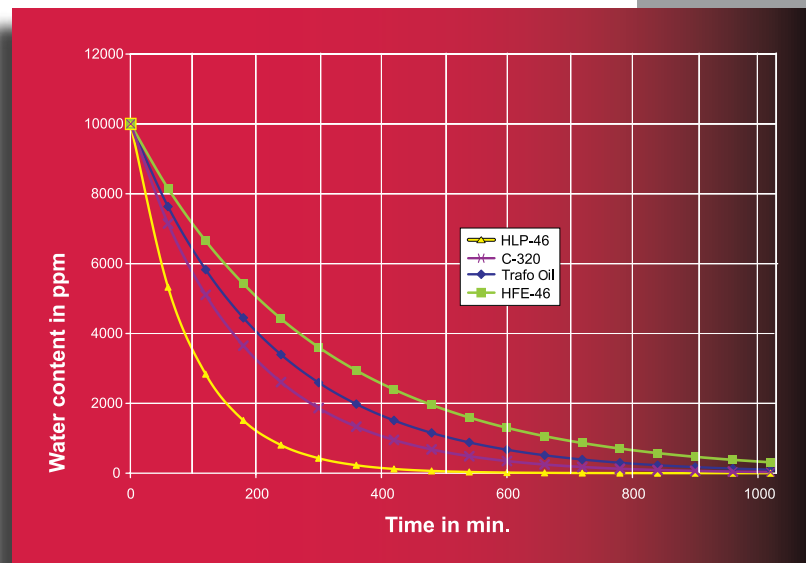
Structure of the IFPM/IFPS systems

The fluid to be purified is drawn out of a reservoir by a vacuum generated by the vacuum pump. It then enters a tank with a heater and is being heated up to the temperature set in the operation unit. A certain amount of fluid is drawn through a two-port solenoid valve into the vacuum chamber, where it diffuses over dispersal material, which enlarges the surface of the fluid. Free and dissolved water vaporises in the chamber due to the lower evaporation point caused by the vacuum. Air from the surrounding area is led into the vacuum chamber through an air filter and a throttle valve. The air which enters approximately in the middle of the chamber, moves upward to the flow of the fluid. Water and gas join the upward airflow and enter the vacuum pump after having left the vacuum chamber. At this point, the air and the water vapour are either condensed and emitted to the atmosphere or emitted immediately.



Technology of *INTERNORMEN* Purifier Systems

The compact IFPM/IFPS systems have been constructed as fully automated, PLC controlled units applicable even in tight areas. The implemented water sensor WSPS 03 in connection with the display unit WFD 01 allows a permanent monitoring of the water level in the purified fluid and the electronic Δp sensor VS1 provides the optimal use and maintenance scheduling of the included particle removal filter element. The desiccant air breather dries up the inert gas and increases therefore the efficiency of the purifier even in high humidity environments.



Water content - timing diagram for different fluids

Factors influencing the Purifier efficiency

The processing time to reach the desired level of water in the operating fluid mainly depends on the type of fluid used. Other factors, influencing the speed of the dehydration process are:

		Water extraction rate
Temperature	↑	strongly increased
Vacuum	↑	increased
Initial content of water	↑	increased
Additive	↑	reduced
Flow rate of the IFPM / IFPS systems	↑	increased

All types also available in explosion-proof version

	IFPM 21	IFPM 31	IFPM 71	IFPS 71	IFPS 101
Data sheet no.	4035	4036	4045	4046	4043
Dry weight	695 lbs	717 lbs	1301 lbs	1301 lbs	1742 lbs
Dimensions in inches:					
Lenght					
ball valve closed	47.3 in.	47.3 in.	62 in.	62 in.	65.2 in.
ball valve opened	48.3 in.	48.3 in.	66 in.	66 in.	70.7 in.
Width	27.7 in.	27.7 in.	35.4 in.	35.4 in.	49.8 in.
Height	60.9 in.	60.9 in.	71.1 in.	61.8 in.	62.4 in.
Inlet connection	1 1/2" SAE flange	1 1/2" SAE flange	2 1/2" SAE flange	2 1/2" SAE flange	3" SAE flange
Outlet connection	1 1/4" SAE flange	1 1/4" SAE flange	2" SAE flange	2" SAE flange	2 1/2" SAE flange
Flow rate *	5.3 GPM	8.0 GPM	18.7 GPM	18.7 GPM	26.7 GPM
Operating pressure	145 PSI	145 PSI	145 PSI	145 PSI	145 PSI
Operating vacuum **	18-27 in. Hg	18-27 in. Hg	18-27 in. Hg	18-27 in. Hg	18-27 in. Hg
Total motor power	1.7 HP	2.2 HP	3.8 HP	3.8 HP	5.4 HP
Heater capacity	3000 W	3000 W	4000 W (3 phase)	4000 W (3 phase)	8000 W (3 phase)
Filter type	1 x NF.631	1 x NF.631	1 x NF.1000	1 x NF.1000	2 x NF.1000
Filter element	01.NR 630	01.NR 630	01.NR 1000	01.NR 1000	2 x 01.NR 1000
Sealing material	Viton	Viton	Viton	Viton	Viton
Max. viscosity	3245 SUS	3245 SUS	3245 SUS	3245 SUS	3245 SUS
Water extraction rate ***	20 gal/day	28 gal/day	84 gal/day	84 gal/day	120 gal/day

* At liquid viscosity of 150 SUS (32 mm²/s)

** Operating vacuum adapted to specific applications

*** Water content 6% at 105 F (40°C) and 150 SUS (32 mm²/s)



Mobile Service Unit MKS 601 for coolant and lubricant systems



Features

This system simplifies the draining of CNC-machine tanks containing coolant and/or lubricant and removes contamination of the emulsion originated by machining. An air pressure operated membrane pump feeds the equipment, for a mechanical cleaning of the emulsion the medium is led through a filter unit to a reservoir of 160 gallons capacity. In this reservoir, followed by an adequate span of time, the incorporated oil is separated from the emulsion and is removed by systematic use of "Skimmer-Technology" and oil separation mechanisms.

The System MKS 601 may also be applied as an off-line filtration circuit, therefore the fluid is conducted out of the machine tank through the mentioned filter unit, freed from finest particles and led back to the machine circuit by a return line. The control block, located upstream in the pressure line provides several intelligent possibilities, how to run the system as for example the flow may be directed to the exit line without passing the filter element. This is useful and timesaving in the case of a coolant/lubricant change. Another function is the activation of the low pressure cleaning gun intended for a cautious and effective cleaning of the system. In this case the cleaning gun is supplied from the machinery tank. The single components of the system MKS 601 are easily and quickly to be dismantled.

Details



Filter unit

The return-line filter TEF 952 is mounted directly on the top of the tank and connected to the pressure line. The used filter element Interporvlies "VG" is characterised by deep filtration at low pressure difference and highest dirt holding capacity.

Control block

Following to the suction of the fluid by the membrane pump the control block may route to the filter unit, to the exit line or to the low pressure cleaning gun. Additionally there is an extension port for retrofitting components.

Air pressure operated membrane pump

This type of self-priming pump is air driven and designed especially for a conveyance of chemical fluids. Low service efforts, dry run resistance and easy handling are the main advantages of this pump.

Oil separation mechanism

Floating oil separator with adjustable oil supply. This guarantees highest separation performance even at a changing level of the fluid.

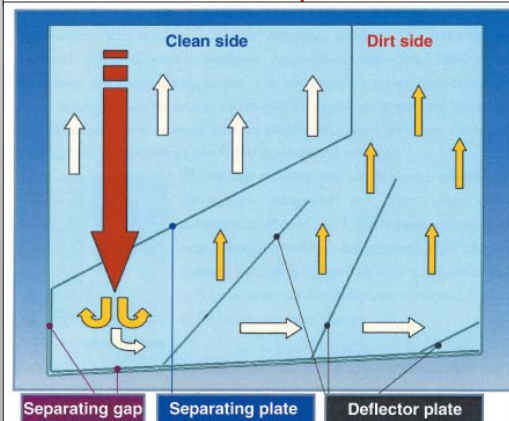
Economic advantages

The application of a service system for coolant/lubricant fluids shows up outstanding possibilities regarding less change, less consumption and less disposal as well as to an increasing technical demand on the coolant/lubricant itself. The consumption of concentrate may decrease over 15% and the service time can be reduced about 2h per change in comparison to a conventional service on machinery systems. As a matter of fact, the clearance between changes is extended considerably.

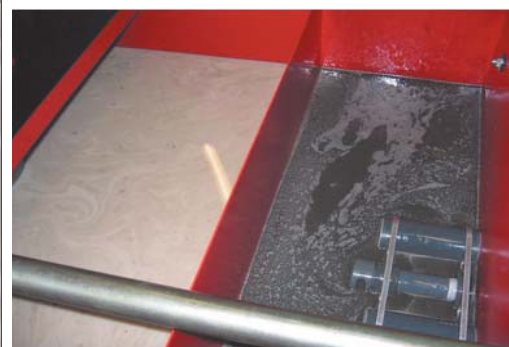
Additional aspects like environmental protection and the exposure of co-workers, caused by contaminated coolant require new, intelligent solutions.

These requirements, economical nose and ergonomic enhancement combined with an easy operation and the multifaceted functions are fully covered by the system MKS 601.

Function of the separation tank



Clean phase



Dirt phase



Technical data

Function	MKS 601
Net weight	approx. 595 lbs
Dimensions	57 x 44 x 47 inch
Operation	by air pressure
Reservoir volume	160 gallons
Extraction of other fluids	Yes
Extraction of chips	max. grain size 0.24 in. pilot filter suggested
Separation of other fluids	separation tank
Solid particle separation	filter fineness from 1 µm to 25 µm
Cleaning of the machine	hand cleaning gun up to 87 PSI



Other products offered by **internormen** technology

internormen filter technology

Filters for hydraulic and lubrication purposes as well as for process filtration in single or duplex versions up to 5,300 GPM and pressure up to 20.000 PSI, equipped with filter elements in glass fibre, paper and stainless steel wire mesh, with highest dirt-holding capacities and highest pressure difference resistance.



internormen fluid management

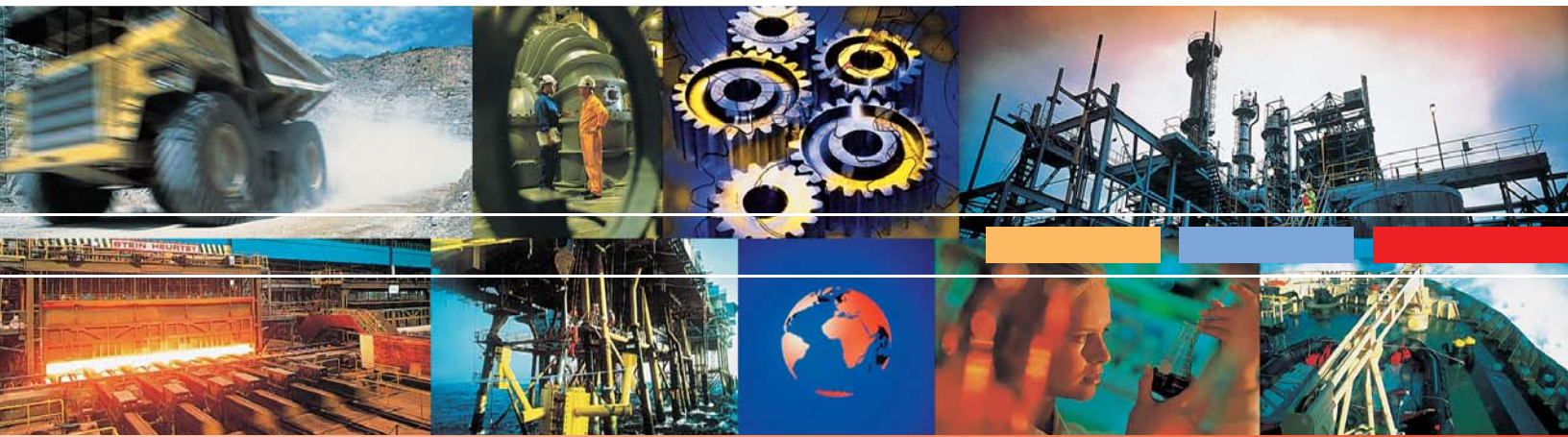
Off-line filtration units, stationary and mobile versions, with options like heat exchanger and watersorp elements, and vacuum dehydration systems.



internormen electronics

Contamination Control Systems (Laser Particle Counters) with options like Bottle Sampling System and Tank Sampling System as well as mobile and stationary water sensors and electronic sensor systems.





Oil Service Equipment

Off-line filtration, oil change and filling



Oil-Service for Hydraulics and Lubrication

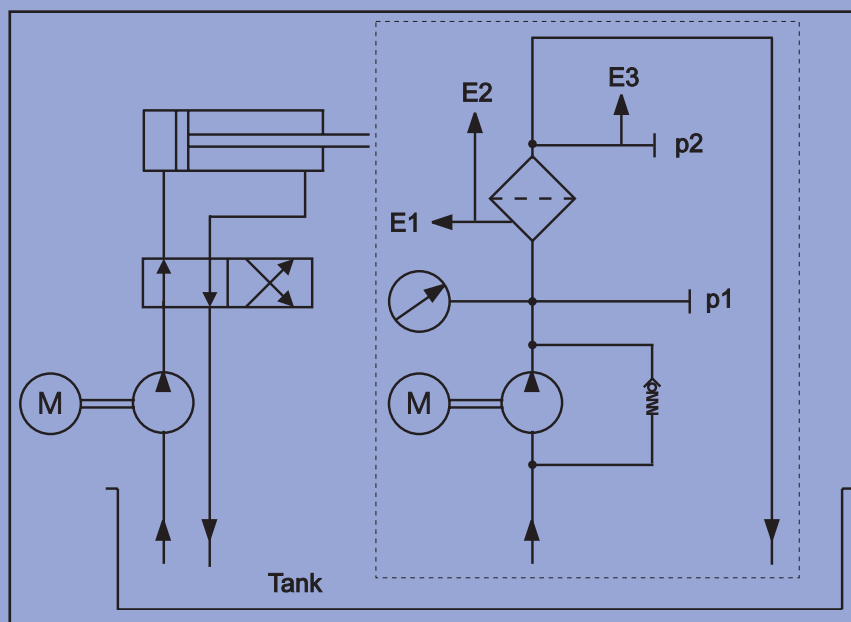
The oil-service for systems of hydraulic and lubrication techniques demands, apart from the operating filter, the application of a filter unit for off-line filtration and for oil change or rather for filling. The reasons for this can be found in different application matters. So initiation rinsing does not often take place, for example in production and lubrication systems as well as in mobile and stationary hydraulic. Oil is poured in unfiltered and an accumulation of mud of the tanks takes place because of finest dirt particles.

The equipment of a hydraulic system with an electromotive unit to the off-line filtration allows to improve the cleanness of the operating fluid by system filters who achieve a higher quality. Especially reduced is the finest dirt level and though the early wear and tear of the system components is prevented. Beyond this, the durability of the operating fluid is prolonged distinctly.

To avoid negative and uncontrolled influences of polluted decanting systems as well as the pollution of the system upon adding unclean fresh oils, the fluid should in any case be filled in via a fine filter of an off-line filter unit.

Off-Line Filtration

At the off-line filtration the filter is arranged in a circulation separated from the main stream. Because of the separation of both streams the filter can be determined exactly. The off-line filtration can now be operated as long as the operating fluid reaches the wanted cleanliness classes, regardless of the running time of the system.



Off-line filtration

Characteristics of the Off-Line-Filter Units

- Off-line filtration
- Off-line filtration in addition to an operating system filter
- Filtration when filling the oil tank
- Improvement of the cleanliness classes
- Extension of the service life of the system components and the fluid
- Change of the elements without downtime of the system
- High dirt holding capacity of the filter elements
- Element change without tools
- Safety valves allow an unattended operation of the units
- Standard visual clogging indicator
- Low overall volume



Off-line filtration on duty



IFPM-unit on duty



Filter testing and quality control according to ISO standards.

Description

The stationary and mobile off-line-filter units (US, UM) were particularly developed for oil maintenance on hydraulic systems. They are equipped with a gear pump driven by an electric motor. The flow is fed over a filter element to DIN 24550, part 4. Depending on the customers' wishes, the filter fineness is either 4, 5, 7 or 10 $\mu\text{m}_{(c)}$. In addition, we have developed the stationary series USP and UST with plate exchanger and tubular heat exchanger which provide the additional advantage of oil cooling. As third series we offer the UMW as mobile filter unit with water separator. The off-line-filter units must not be used to pump contaminated hydraulic fluids and are therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

Off-line-filter unit with cooler (USP, UST)

At first, the flow is fed over a filter element to DIN 24550, part 4 and afterwards over a plate exchanger or a tubular heat exchanger.

Mobile Oil Service UMCC - the new standard for modern fluid management

The mobile filter unit UMCC 40, always equipped with Particle Counter System CCS 2 is intended for oil maintenance on hydraulic systems.

The area of applications comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

Fluid Purifier Systems: IFPM/IFPS

are user friendly and safe in the operation.

They are in itself closed systems and:

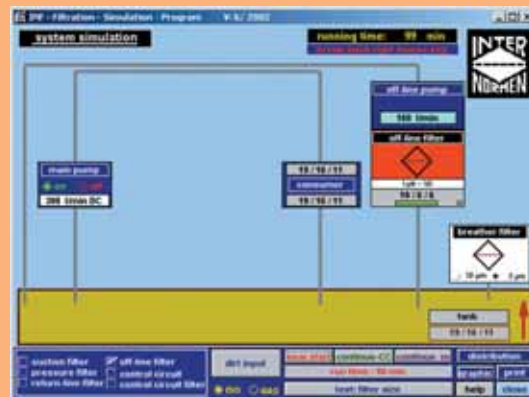
- remove free, emulsified and dissolved water
- remove free and dissolved gases
- remove particulate contamination down to 1 μm

The resulting advantages are:

- reduced down-times of individual components and complete systems
- reduced wear of all components
- extend the oil service life and prevent premature oil aging
- increased reliability and productivity of the plants

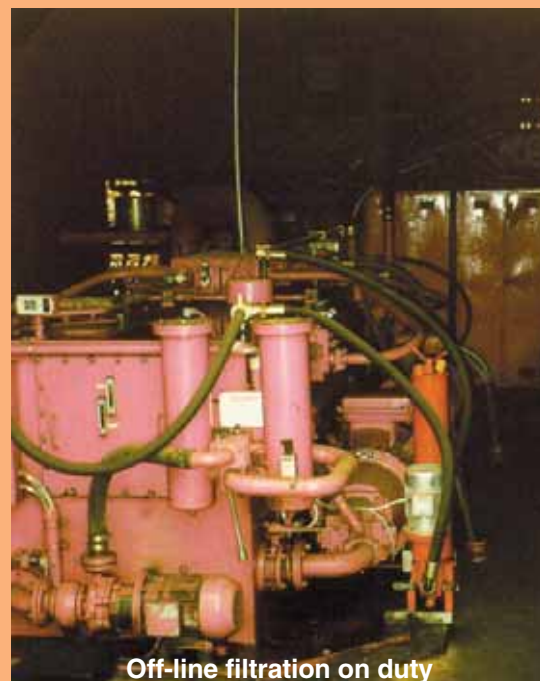
Type	data sheet no.
Filter unit, stationary, series US 20/21/22	4008.1/4008.2/4008.3
Filter unit, stationary, series US 40	4011.1
Filter unit, stationary, series US 80	4009.1
Filter unit, stationary, series US 161	4010.1
Filter unit, stationary, series US 320/321	4012.1/4012.2
Filter unit, mobile, series UM 20	4013
Filter unit, mobile, series UM 40	4014
Filter unit, mobile, series UM 80	4015
Filter unit, mobile, series UMCC 40 with CCS 2	4033
Filter unit, mobile, series UMFC 41 with fluid control	4052
Filter unit, mobile, series UMFC 81 with fluid control	4053
Filter unit, mobile with water separator, series UMW 80	4016
Filter unit, stationary with plate exchanger, series USP 20	4020
Filter unit, stationary with plate exchanger, series USP 41	4021
Filter unit, stationary with plate exchanger, series USP 81	4022
Filter unit, stationary with plate exchanger, series USP 161	4023
Filter unit, stationary with plate exchanger, series USP 320	4024
Filter unit, stationary with tubular heat exchanger, UST 20	4027
Filter unit, stationary with tubular heat exchanger, UST 40	4028
Filter unit, stationary with tubular heat exchanger, UST 80	4029
Filter unit, stationary with tubular heat exchanger, UST 160	4030
Filter unit, stationary with tubular heat exchanger, UST 320	4031
Fluid purifier system, mobile IFPM 21	4035
Fluid purifier system, mobile IFPM 31	4036
Fluid purifier system, stationary IFPM 71 / IFPS 71	4046/4045
Fluid purifier system, stationary IFPS 101	4043

Please ask for data sheets.



Simulation programs

We determine the most efficient and very reasonable off-line filtration for you by using our tools!

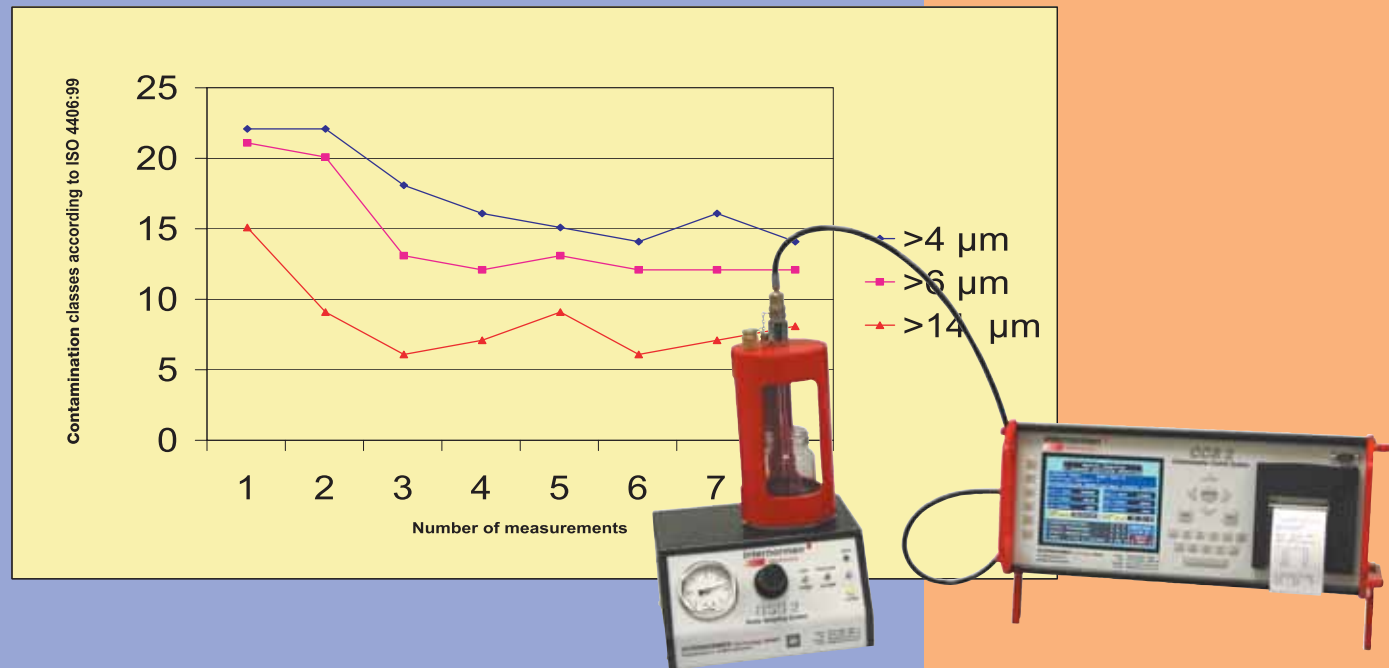


Confidence is good, control is better!
Contamination determination with our CCS 2.

We offer a competent and compact system supervision!

You can place confidence in us because we not only want you to provide with the necessary equipment to keep your hydraulic and lubrication systems clean, but also with the appropriate measuring technique for supervision and control of your systems. Beyond that, we offer competent technical advice and support for the choice of the right filter technique because of our filter expert system with a digital product catalog and other tools on the DVD.

Improvement of the contamination classes of your system because of the insert of an off-line filtration



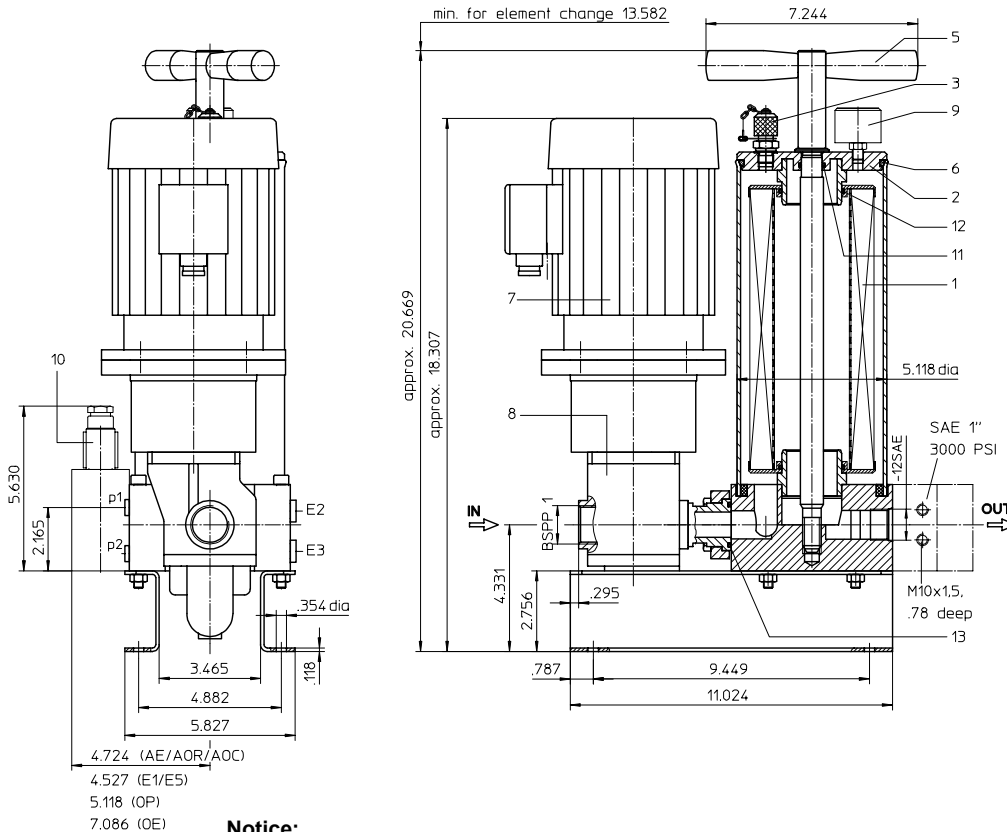
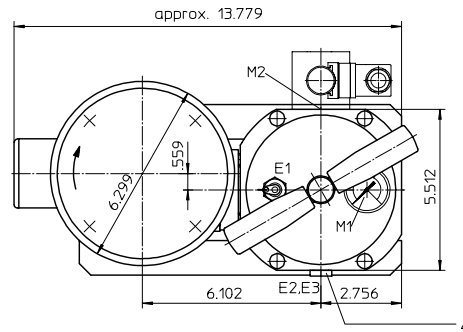
Technical and economic intelligent filter selection with our DVD



- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p_1 = dirt side
 p_2 = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 20

Sheet No.
4008.1 G
Sheet 1/3

1. Type index:

1.1. Filter unit: (ordering example)

US. 20. 6VG. 10. B. P. -. P01. D03. O. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
 US = filter unit, stationary
 2 **nominal size:** 20
 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element
 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
 5 **filter element design:**
 B = both sides open
 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
 7 **filter element specification:**
 - = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
 8 **pump unit:**
 P01 = pump unit 01, NG 20.16 (standard-pump unit / setting range 14.5 - 218 PSI)
 9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D03 ¹⁾	230/400V 50Hz	6.9 GPM	46-1860 SUS	58 PSI	-	-	42742-4
D03 ¹⁾	265/460V 60Hz	7.2 GPM	46-1860 SUS	58 PSI	-	-	42742-4
D34	230/400V 50Hz	6.9 GPM	46-1860 SUS	58 PSI	S	K	
D34	265/460V 60Hz	7.2 GPM	46-1860 SUS	58 PSI	S	K	
W01 ¹⁾	110V 60Hz	7.2 GPM	46-1860 SUS	58 PSI	-	-	43066-4
W03	230V 50Hz	6.9 GPM	46-1860 SUS	58 PSI	S	K	43044-4
W07	110V 60Hz	7.2 GPM	46-1860 SUS	58 PSI	S	K	43045-4

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
 11 **clogging indicator at M2:**
 - = without
 AOR = AOR 2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AOC = AOC 2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p_1 and p_2 , 36 PSI, see sheet-no. 1609
 OP = OP 2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 OE = OE 2.5..., visual-electrical, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 E1 = E1 2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616
 E5 = E5 2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
 2 **nominal size:** 250
 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	¼ BSPP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3.Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element. The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

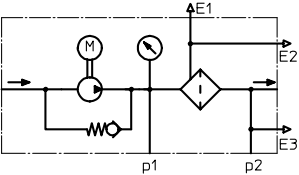
4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 62 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

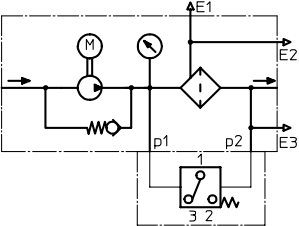
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

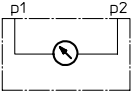
Filter unit without clogging indicator



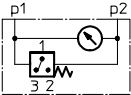
Filter unit with electrical clogging indicator AE30



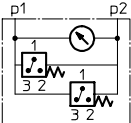
Filter unit with visual clogging indicator AOR, AOC, OP



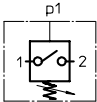
Filter unit with visual-electrical clogging indicator OE1



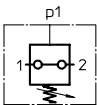
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

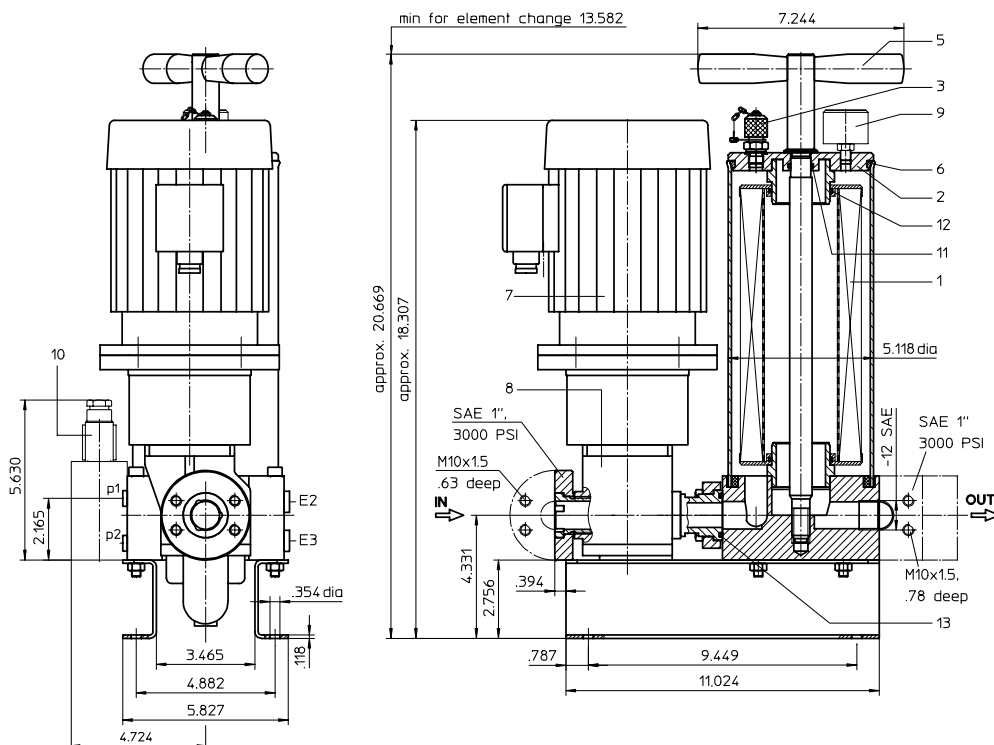
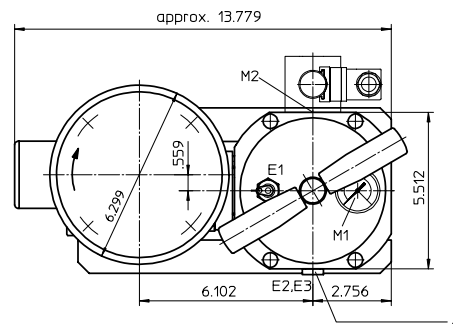
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p_1 = dirt side
 p_2 = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 21 58 PSI

Sheet No.
4008.2 G
Sheet 2/3

1. Type index:

1.1. Filter unit: (ordering example)

US. 21. 6VG. 10. B. P. - P08. D03. O. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
 US = filter unit, stationary
- 2 **nominal size:** 21
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Wassersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
- 8 **pump unit:**
 P08 = pump unit 08, NG 20.16 (standard-pump unit / setting range 14.5 - 218 PSI)
- 9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D03 ¹⁾	230/400V	50Hz	6.9 GPM	46-1860 SUS	58 PSI	-	42742-4
D03 ¹⁾	265/460V	60Hz	7.2 GPM	46-1860 SUS	58 PSI	-	42742-4
D34	230/400V	50Hz	6.9 GPM	46-1860 SUS	58 PSI	S	K
D34	265/460V	60Hz	7.2 GPM	46-1860 SUS	58 PSI	S	K
W01 ¹⁾	110V	60Hz	7.2 GPM	46-1860 SUS	58 PSI	-	43066-4
W03	230V	50Hz	6.9 GPM	46-1860 SUS	58 PSI	S	K
W07	110V	60Hz	7.2 GPM	46-1860 SUS	58 PSI	S	K

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
- 11 **clogging indicator at M2:**
 - = without
 AOR = AOR.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p_1 and p_2 , 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 250
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	¼ BSP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P08	1	NG 20.16	317378
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 μm_{c} . The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

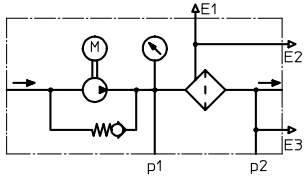
filter-fineness:	4, 5, 7 or 10 μm_{c}
weight:	approx. 62 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

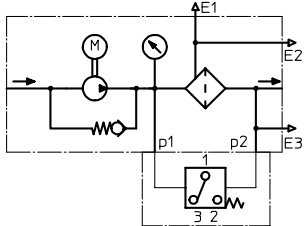
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

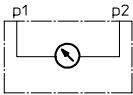
Filter unit without
clogging indicator



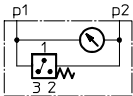
Filter unit with electrical
clogging indicator
AE30



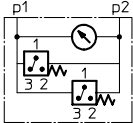
Filter unit with visual
clogging indicator
AOR, AOC, OP



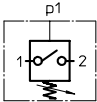
Filter unit with visual-electrical
clogging indicator
OE1



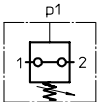
Filter unit with visual-electrical
clogging indicator
OE2



Filter unit with electrical
clogging indicator
contact maker E1



Filter unit with electrical
clogging indicator
contact breaker E5



6. Test methods:

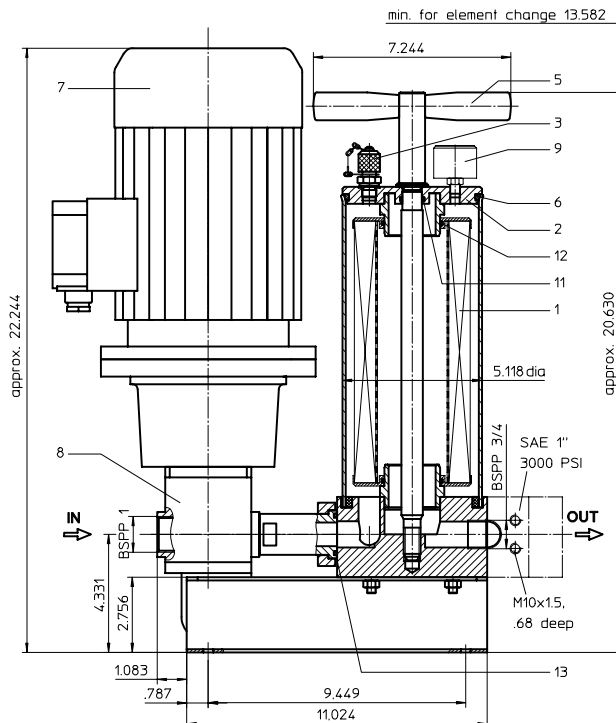
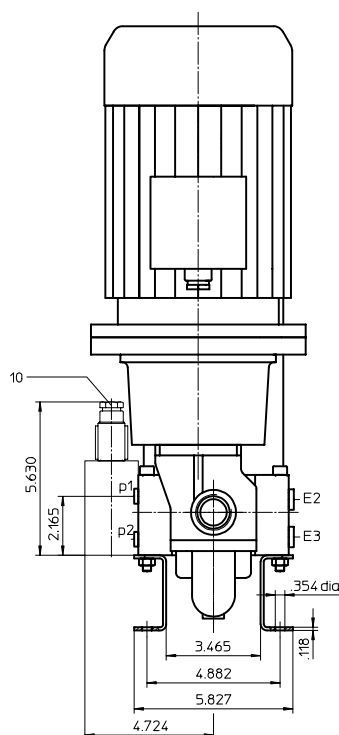
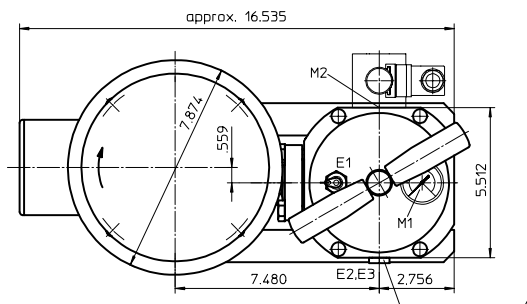
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p_1 = dirt side
 p_2 = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary
Series US 22

Sheet No.
4008.3 H
 Sheet 3/3

1. Type index:

1.1. Filter unit: (ordering example)

US. 22. 6VG. 10. B. P. -. P14. D13. O. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
 US = filter unit, stationary
- 2 **nominal size:** 22
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
- 8 **pump unit:**
 P14 = pump unit 14 NG 20.16 (standard-pump unit / setting range 14.5 - 218 PSI)

9 **motor: (D = rotary current motor)**

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D12	230/400V 50Hz	3.0 GPM	46-5580 SUS	218 PSI	S	K	42743-4
D12	265/460V 60Hz	3.6 GPM	46-4650 SUS	218 PSI	S	K	42743-4
D13 ¹⁾	230/400V 50Hz	3.0 GPM	46-14000 SUS	102 PSI	-	-	43656-4
D13 ¹⁾	265/460V 60Hz	3.6 GPM	46-11600 SUS	102 PSI	-	-	43656-4
D26	400/690V 50Hz	3.0 GPM	46-5580 SUS	102 PSI	-	-	44908-4
D26	460/790V 60Hz	3.6 GPM	46-4650 SUS	102 PSI	-	-	44908-4

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
- 11 **clogging indicator at M2:**
 - = without
 AOR = AOR.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p_1 and p_2 , 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
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- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 250
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	1/4 BSPP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P14	1	NG 20.16	319735
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3.Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element. The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

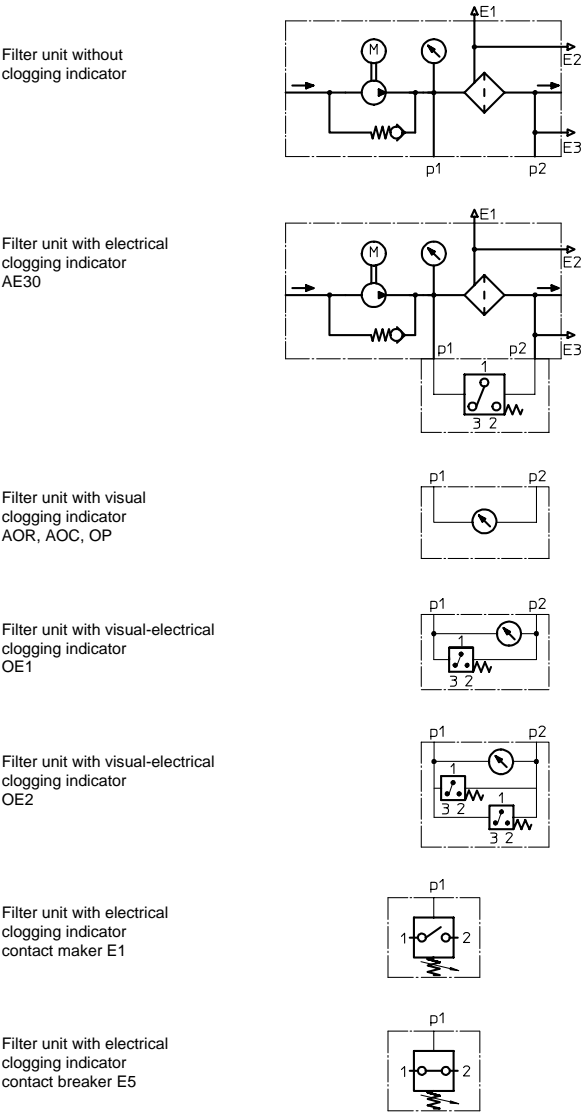
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 77 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Test methods:

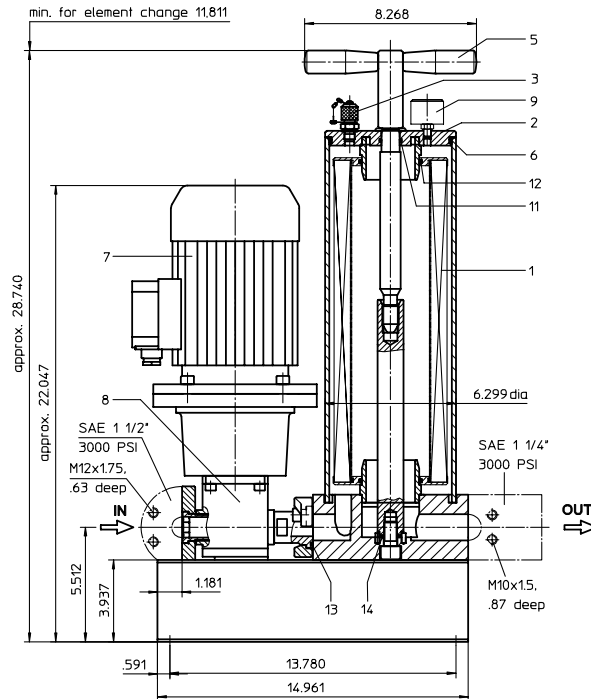
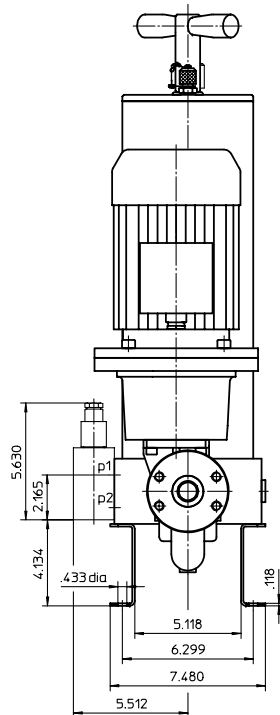
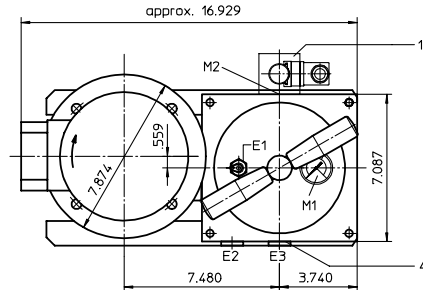
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 40

Sheet No.
4011.1 F
Sheet 1/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 40. 6VG. 10. B. P. -. P05. D05. O. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
 US = filter unit, stationary
- 2 **nominal size:** 40
- 3 **filter-material and filter-finness:**
 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)
 10 WVVG = 10 µm_(c), 3 WVVG = 5 µm_(c) Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 IS06 = see sheet-no. 31601
 VA = stainless steel
- 8 **pump unit:**
 P05 = pump unit 05, NG 40.25 (standard pump unit / setting range 14.5 to 218 PSI)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D05 ¹⁾	230/400V 50Hz	9.37 GPM	46-1860 SUS	87 PSI	-	-	42549-4
D05 ¹⁾	265/460V 60Hz	11.2 GPM	46-1860 SUS	87 PSI	-	-	42549-4
W10	230V 50Hz	9.37 GPM	46-1860 SUS	87 PSI	S	K	42754-4
W11	110V 60Hz	11.2 GPM	46-1860 SUS	87 PSI	S	K	42877-4

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
- 11 **clogging indicator at M2:**
 - = without
 AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P05	1	NG 40.25	316292
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	1	37,69 x 3,53	304353 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu\text{m}_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

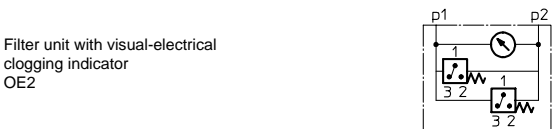
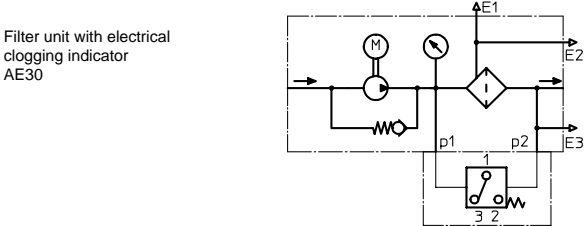
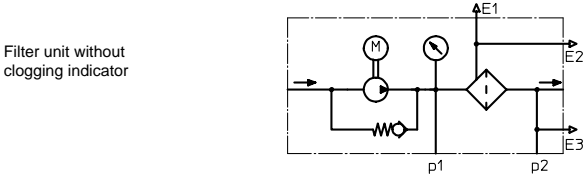
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 $\mu\text{m}_{(c)}$
weight: approx. 84 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Test methods:

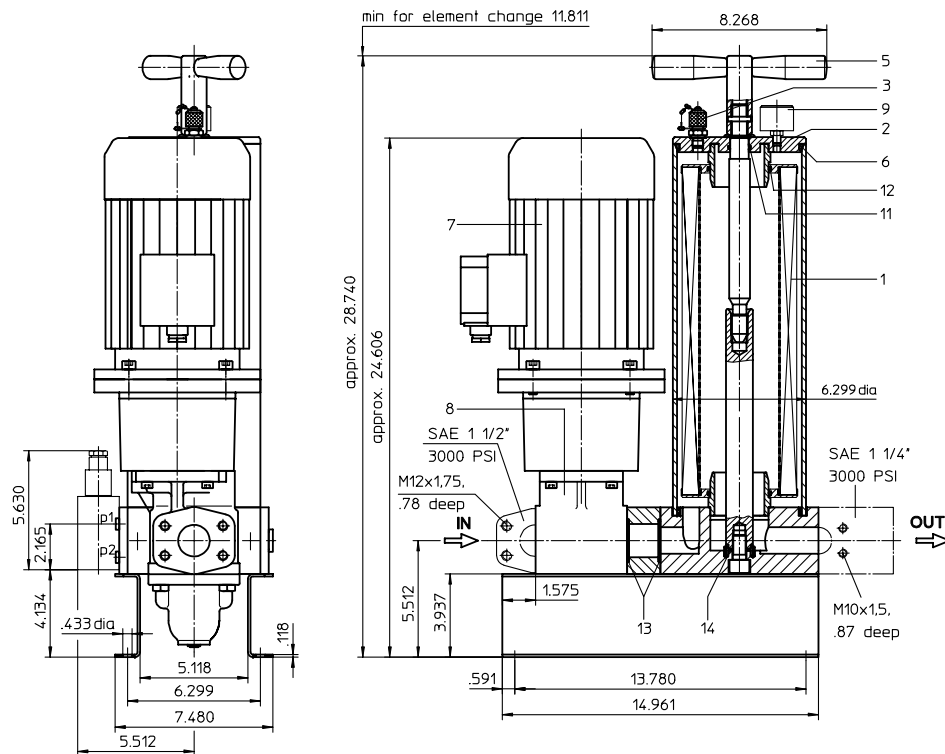
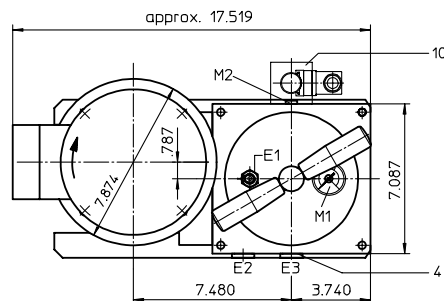
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 80

Sheet No.
4009.1 E
Sheet 1/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 80. 6VG. 10. B. P. -. P04. D01. O. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
 US = filter unit, stationary
 2 **nominal size:** 80
 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
 5 **filter element design:**
 B = both sides open
 6 **sealing material:**
 P = Nitrile (NBR), V = Viton (FPM), by agreement
 7 **filter element specification:**
 - = standard, VA = stainless steel, IS06 = see sheet-no. 31601
 8 **pump unit:**
 P04 = pump unit 04, NG 80.50 (standard-pump unit / setting range 14.5 -218 PSI)
 9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D01 ¹⁾	230/400V 50Hz	18.75 GPM	46-1860 SUS	72 PSI	-	-	41969-4
D01 ¹⁾	265/460V 60Hz	22.45 GPM	46-1860 SUS	72 PSI	-	-	41969-4
D17	230/400V 50Hz	18.75 GPM	46-1860 SUS	130 PSI	S	K	
D17	265/460V 60Hz	22.45 GPM	46-1860 SUS	116 PSI	S	K	
D18	230/400V 50Hz	12.54 GPM	46-3720 SUS	58 PSI	-	-	
D18	265/460V 60Hz	15.05 GPM	46-3022 SUS	58 PSI	-	-	
D31	230/400V 50Hz	18.75 GPM	46-1860 SUS	218 PSI	-	-	
D31	265/460V 60Hz	22.45 GPM	46-1860 SUS	218 PSI	-	-	
W06	230V 50Hz	18.75 GPM	46-1860 SUS	72 PSI	S	K	43056-4
W09	110V 60Hz	22.45 GPM	46-1860 SUS	58 PSI	S	K	43057-4
W12 ¹⁾	110V 60Hz	22.45 GPM	46-1860 SUS	58 PSI	-	-	43067-4
W18	230V 50Hz	18.75 GPM	46-1860 SUS	130 PSI	S	K	43060-4

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
 11 **clogging indicator at M2:**
 - = without
 AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
 2 **nominal size:** 630
 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P04	1	NG 80.50	317139
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

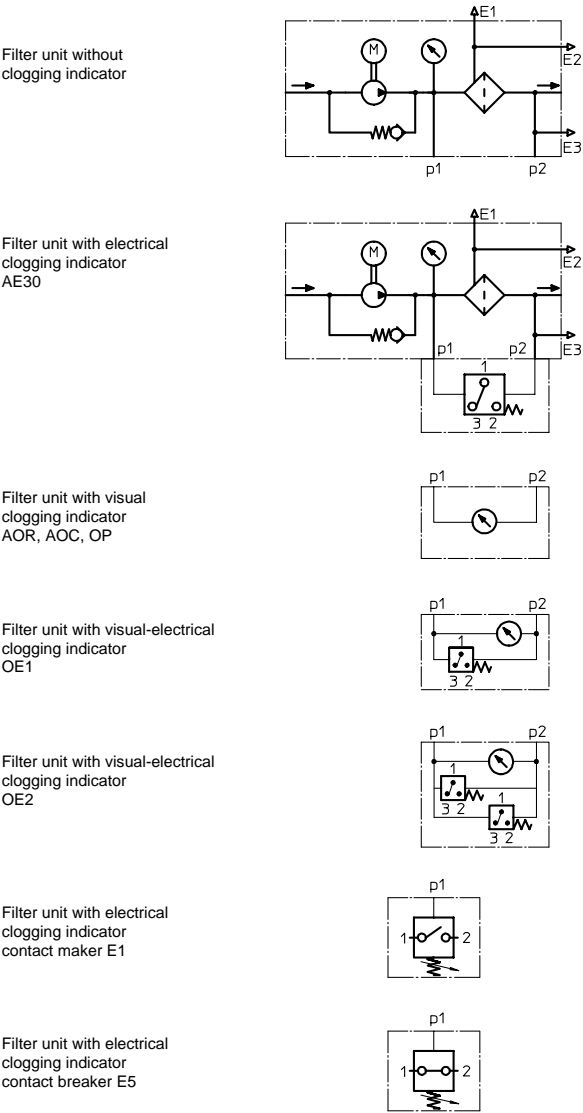
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm _(c)
weight:	approx. 130 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Test methods:

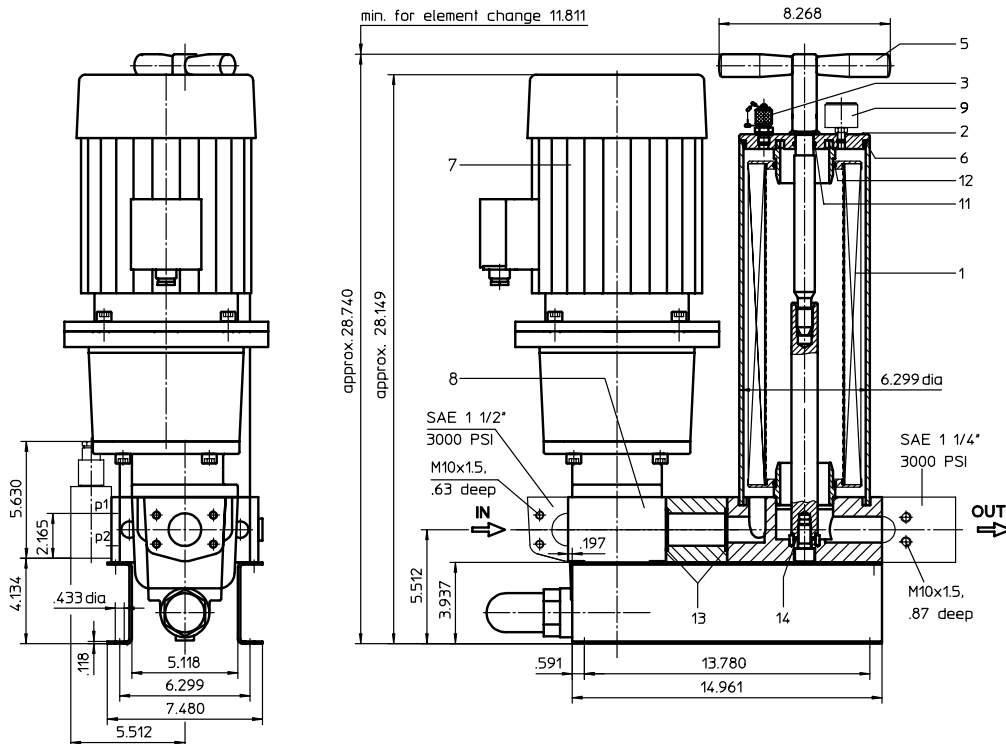
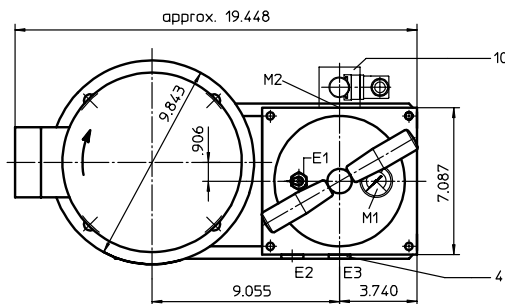
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 160

Sheet No.
4010.1 G
Sheet 1/3

1. Type index:

1.1. Filter unit: (ordering example)

US. 160. 6VG. 10. B. P. -. P03. D04. O. AE

1	2	3	4	5	6	7	8	9	10	11
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1 series:

US = filter unit, stationary

2 nominal size: 160

3 filter-material and filter-fineness:

10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)

10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c) Watersorp-filter element

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM), by agreement

7 filter element specification:

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 pump unit:

P03 = pump unit 03, NG 160.100 (standard-pump unit / setting range 58 -116 PSI)

9 motor: (D = rotary current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D04 ¹⁾	230/400V 50Hz	37.50 GPM	46-1860 SUS	58 PSI	-	-	42485-4
D04 ¹⁾	265/460V 60Hz	44.90 GPM	46-1860 SUS	58 PSI	-	-	42485-4
D06	110/190V 50Hz	37.50 GPM	46-1860 SUS	58 PSI	-	-	-
D08	400/690V 50Hz	37.50 GPM	46-1860 SUS	116 PSI	-	-	42744-4
D08	460/790V 60Hz	44.90 GPM	46-1860 SUS	116 PSI	-	-	42744-4
D19	400/690V 50Hz	25.10 GPM	46-2790 SUS	58 PSI	-	-	34374-4
D19	460/790V 60Hz	30.11 GPM	46-2790 SUS	58 PSI	-	-	34374-4
D24	400/690V 50Hz	37.50 GPM	46-1860 SUS	116 PSI	-	-	48816-4
D24	460/790V 60Hz	44.90 GPM	46-1860 SUS	116 PSI	-	-	48816-4

¹⁾ standard motor

10 clogging indicator at M1:

- = without

O = visual, 36 PSI

11 clogging indicator at M2:

- = without

AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,

AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,

AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609

OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628

OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628

E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P03	1	NG 160.100	316275
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu\text{m}_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

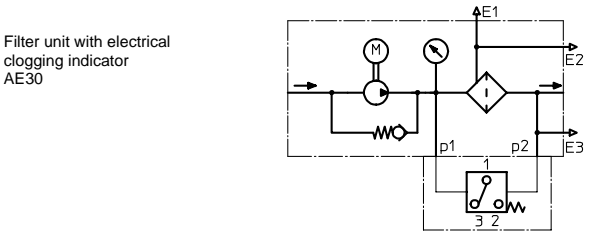
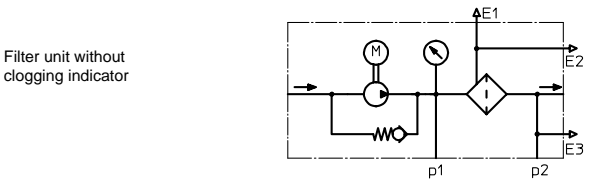
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu\text{m}_{(c)}$
weight:	approx. 210 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

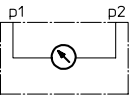
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

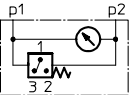
5. Symbols:



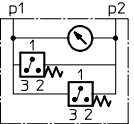
Filter unit with visual clogging indicator AOR, AOC, OP



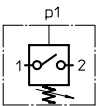
Filter unit with visual-electrical clogging indicator OE1



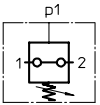
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

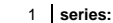
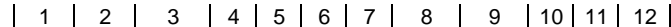
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Sheet No.
4012.1 E
Sheet 1/2

1.1. Filter unit: (ordering example)

- US. 320. 6VG. 10. B. P. -. P06. D08. 3. O. AE



2 | nominal size: 320

3 | **filter-material and filter-fineness:**

10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element

4 | resistance of pressure difference for filter element:

$$10 = \Delta p \text{ 145 PSI}$$

5 | **filter element design:**

B = both sides open

6 | **sealing material:**

P = Nitrile (NBR), V = Viton (FPM), by agreement

7 | filter element specification:

- = standard, VA = stainless steel, ISO6 = see sheet-no. 31601

8 | pump unit:

P06 = pump unit 06, NG 320.200 (standard-pump-unit / setting range 58-116 PSI)

9 | **motor:** (D = rotary current motor)

¹⁾ standard motor

10 | connection variant:

type: FS = flange SAE 3000 PSI

size: 9 = 2 1/2"

- = no connection

11 | clogging indicator at M1:

- = without

0 = visual,

12 | clogging indicator at M2:

- = without

AOR = AOR.2,5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,

AOC = AOC.2,5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,

AE = AE30.2,5..., electrical at p_1 and p_2 , 36 PSI, see sheet-no. 1609

OP = OP.2,5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1628

OE = OE.2,5..., visual-electrical, at p_1 and p_2 , 36 PSI, see sheet-no. 1628

E1 = E1.2,5 electrical at p₁, 36 PSI, see sheet-no. 1616

E5 = E5.2,5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1 | series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 | nominal size: 1000

3	- 7	see type index-filter unit
---	-----	----------------------------

Changes of measures and design are subject to alteration!

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22496-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P06	1	NG 320.200	316838
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	2	69,45 x 3,53	305868 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

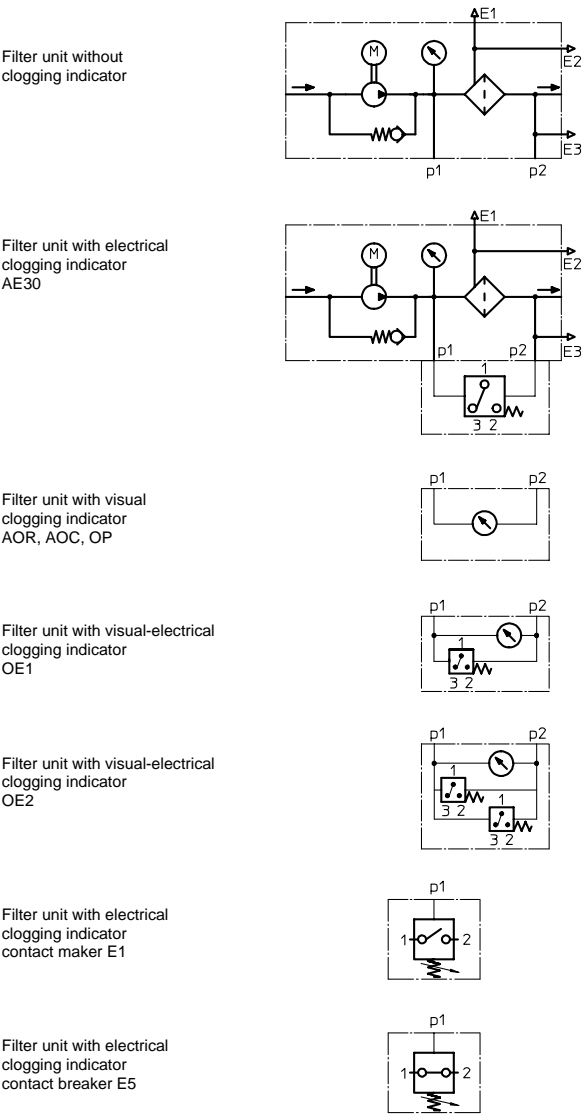
4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm(c)
weight:	approx. 243 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



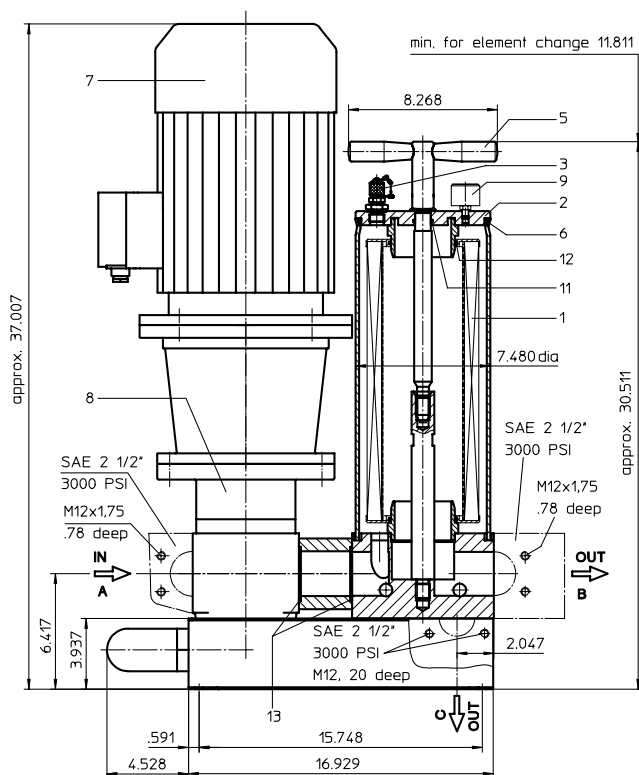
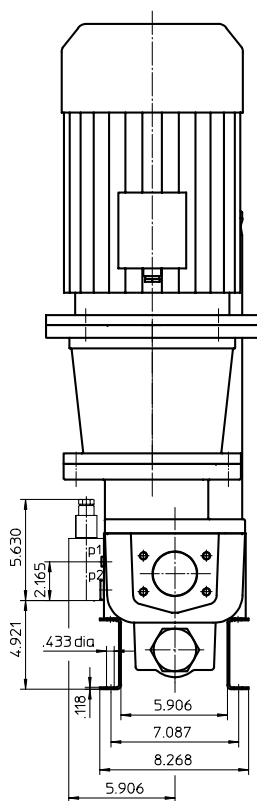
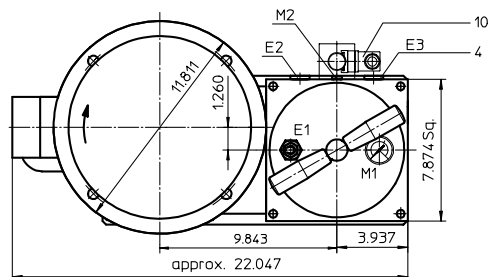
6. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection,
MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in
the housing cover, dirt side
M2: measure connection at filter housing
p₁ = dirt side
p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 321

Sheet No.
4012.2 E
Sheet 2/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 321. 6VG. 10. B. P. -. P07. D07. 3. O. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
US = filter unit, stationary
- 2 **nominal size:** 321
- 3 **filter-material and filter-fineness:**
10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)
10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c) Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601
- 8 **pump unit:**
P07 = pump unit 07, NG 320.200 (standard-pump-unit / setting range 58-116 PSI)
- 9 **motor:** (D = rotary current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D07 ¹⁾	400/690V 50Hz	75 GPM	46-1860 SUS	58 PSI	-	-	34378-4
D07 ¹⁾	460/790V 60Hz	90 GPM	46-1860 SUS	58 PSI	-	-	34378-4
D22	400/690V 50Hz	50 GPM	46-3720 SUS	87 PSI	-	-	34486-4
D22	460/790V 60Hz	60 GPM	46-3720 SUS	87 PSI	-	-	34486-4

¹⁾ standard motor

10 connection variant:

variant	connection A type	connection A size	connection B type	connection B size	connection C type	connection C size
3	FS	9	FS	9	-	-
4	FS	9	FS	9	FS	9

type: FS = flange SAE 3000 PSI
size: 9 = 2 1/2"
- = no connection

11 clogging indicator at M1:

- = without
O = visual, 36 PSI

12 clogging indicator at M2:

- = without
AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22496-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P07	1	NG 320.200	316908
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	2	69,45 x 3,53	305868 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

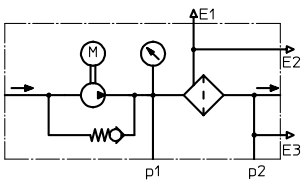
filter-fineness:	4, 5, 7 or 10 µm _(c)
weight:	approx. 275 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

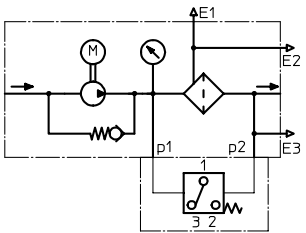
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

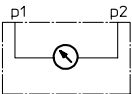
Filter unit without
clogging indicator



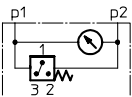
Filter unit with electrical
clogging indicator
AE30



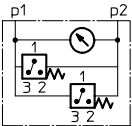
Filter unit with visual
clogging indicator
AOR, AOC, OP



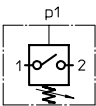
Filter unit with visual-electrical
clogging indicator
OE1



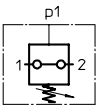
Filter unit with visual-electrical
clogging indicator
OE2



Filter unit with electrical
clogging indicator
contact maker E1



Filter unit with electrical
clogging indicator
contact breaker E5



6. Test methods:

Filter elements are tested according to the following ISO standards:

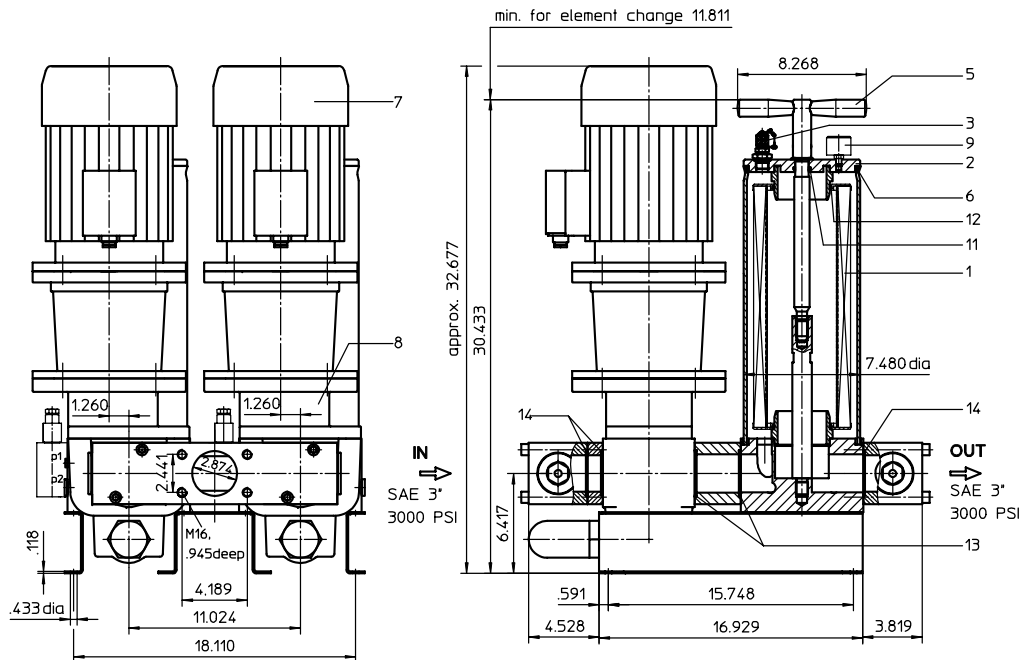
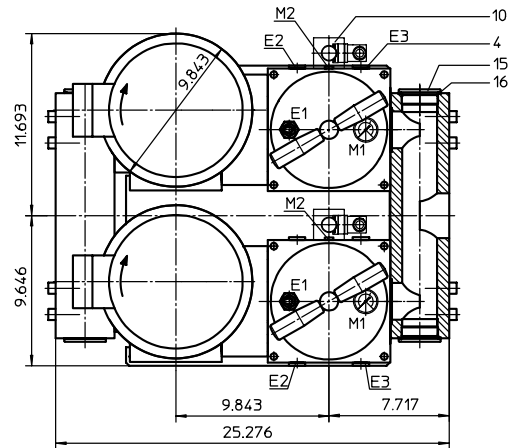
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary Series US 640

Sheet No.
4062 B

Assignment of connections and functions:

- E1: venting mini-measuring connection,
MA.1.ST see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in
the housing cover, dirt side
M2: measure connection at filter housing
p₁ = dirt side
p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

US. 640. 6VG. 10. B. P. -. P06. D08. O. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
US = filter unit, stationary
2 **nominal size:** 640
3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
5 **filter element design:**
B = both sides open
6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
8 **pump unit:**
P06 = pump unit 06, NG 320.200 (standard-pump-unit / setting range 58-116 PSI)
9 **motor:** (D = rotary current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D08 ¹⁾	400/690V	50Hz	2x 75 GPM	46-460 SUS	58 PSI	-	42744-4
D08 ¹⁾	460/790V	60Hz	2x 90 GPM	46-460 SUS	58 PSI	-	42744-4
D24	400/690V	50Hz	2x 75 GPM	46-460 SUS	58 PSI	-	48816-4
D24	460/790V	60Hz	2x 90 GPM	46-460 SUS	58 PSI	-	48816-4

¹⁾ standard motor

- 10 **clogging indicator at M1:**
- = without
O = visual, 36 PSI
11 **clogging indicator at M2:**
- = without
AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
2 **nominal size:** 1000
3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	2	01NR. 1000	
2	housing cover	2	22496-3	313837
3	mini-measuring connection	2	MA.1.ST	305453
4	screw plug	4	½ BSPP	304678
5	straining screw	2	31067-3	316893
6	O-ring	2	170 x 6	304799 (NBR)
7	electric motor	2	according to type index	
8	pump unit P06	2	NG 320.200	316838
9	clogging indicator (series)	2	visual 1.57 dia	315452
10	clogging indicator	2	according to type index	
11	O-ring	2	22 x 3	304387 (NBR)
12	O-ring	4	90 x 4	306941 (NBR)
13	O-ring	4	69,45 x 3,53	305868 (NBR)
14	O-ring	6	65,09 x 3,53	317621 (NBR)
15	screw plug	4	2 BSPP	310958
16	gasket	4	A 60 x 68	310959

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with two gear pumps driven by two electric-motors. The flow conveyed by the gear pumps is fed over two filter elements according to DIN 24550, T4, nominal size 1000.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump units in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected electric-motor and if the switch-off function of the electric-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

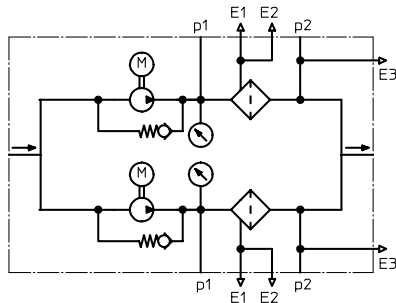
4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 507 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

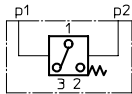
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

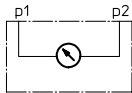
Filter unit without clogging indicator



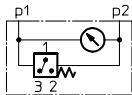
Filter unit with electrical clogging indicator AE30



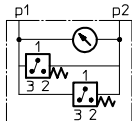
Filter unit with visual clogging indicator AOR, AOC, OP



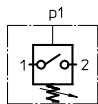
Filter unit with visual-electrical clogging indicator OE1



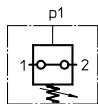
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

Filter elements are tested according to the following ISO standards:

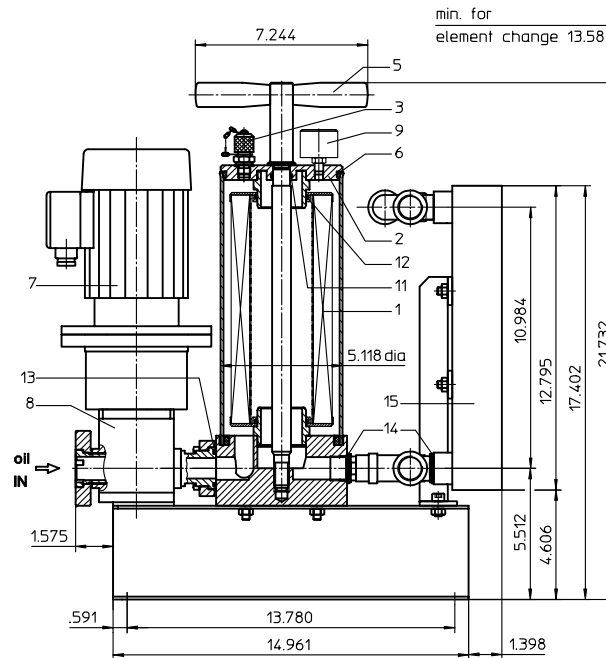
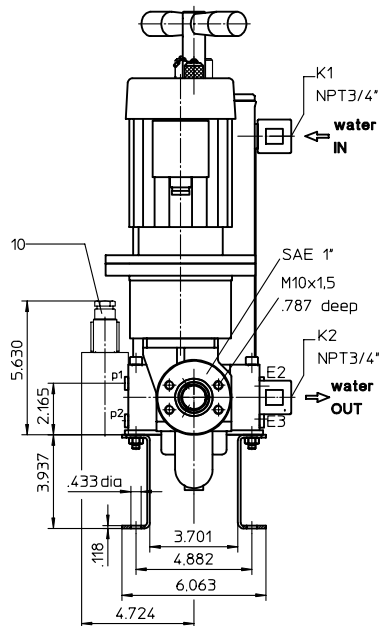
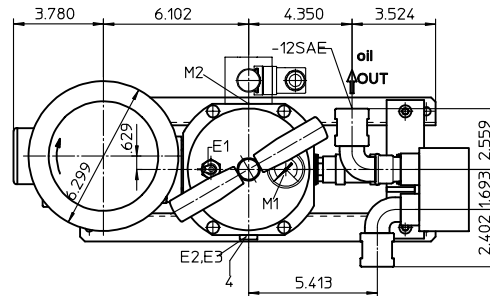
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger **Series USP 20 87 PSI**

Sheet No.
4020 C

Assignment of connections and functions:

E1: venting mini-measuring connection,
 MA.1.St see sheet-no. 1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 manometer 0-232 PSI
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side
 K1: cooling water IN
 K2: cooling water OUT



1. Type index:

1.1. Filter unit: (ordering example)

USP. 20. 6VG. 10. B. P. -. P08. W01. CP12. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
 USP = filter unit, stationary with plate-exchanger
- 2 **nominal size:** 20
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
- 8 **pump unit:**
 P08 = pump unit 08, NG 20.16
- 9 **motor:**
 W01 = B5/71/4.0.37.1800.110.W.60.1.L.-.- alternating current motor 110V, 60 Hz, approx. 1700 RPM, 0.5 HP, type of protection IP 54
 D03 = B5/71/4.0.44.1800.265/460.D.60.1.-.-.- rotary current motor 265/460V, 60 Hz, approx. 1700 RPM, 0.6 HP, type of protection IP 54
- 10 **plate-exchanger unit:**
 CP12 = plate-exchanger unit CP12
- 11 **clogging indicator at M2:**
 - = without
 AE = AE30.2.5.P.-.B electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
 AOR = AOR.2.5.P.- visual, 36 PSI, see sheet-no. 1606
 AOC = AOC.2.5.P.- visual, 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 250
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	¼ BSPP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	E-motor D03	1	0.6 HP, 265/460 V	316257
8	pump unit P08	1	NG 20.16	317378
9	manometer (series)	1	1.57 dia	
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)
14	gasket	2	A 27 x 32	308536
15	plate-exchanger unit	1	CP12	

3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250 and is led afterwards over a plate cooler.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 87 PSI.

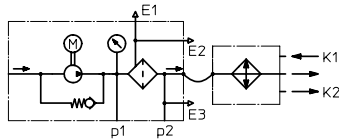
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.

Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator



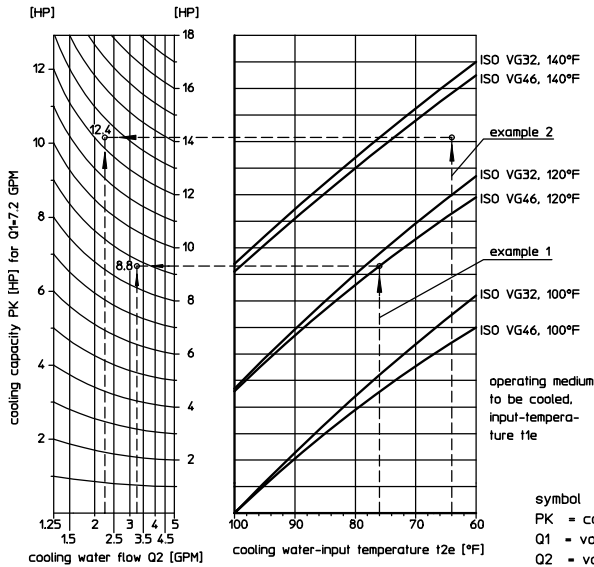
with electrical
clogging indicator AE30



with visual
clogging indicator
AOR, AOC



5. Cooling capacity graph:



operating medium-output temperature t1a [°F] $t1a = t1e - \frac{PK \cdot 12.4}{Q1}$

cooling water-output temperature t2a [°F] $t2a = t2e + \frac{PK \cdot 5.1}{Q2}$

example 1, operating medium ISO VG46

t1e = 120°F, t2e = 76°F,
Q1 = 7.2 GPM, Q2 = 3.25 GPM
cooling capacity PK from the graph = 8.8 HP

t1a = 120 - $\frac{8.8 \cdot 12.4}{7.2}$ = 104.8°F

t2a = 76 + $\frac{8.8 \cdot 5.1}{3.25}$ = 89.8°F

example 2, operating medium ISO VG32

t1e = 130°F, t2e = 64°F,
Q1 = 7.2 GPM, Q2 = 2.25 GPM
cooling capacity PK from the graph = 12.4 HP
(data linear interpolated)

t1a = 130 - $\frac{12.4 \cdot 12.4}{7.2}$ = 108.6°F

t2a = 64 + $\frac{12.4 \cdot 5.1}{2.25}$ = 96.1°F

symbol
PK = cooling capacity
Q1 = volume flow-operating medium
Q2 = volume flow-cooling water
t1e = operating medium-input temperature
t1a = operating medium-output temperature
t2e = cooling water-input temperature
t2a = cooling water-output temperature

units
HP
GPM
°F
°F
°F
°F

6. Technical data:

pump-volume flow : 7.2 GPM at 1700 RPM
E-motor: 0.6 HP, approx. 1700 RPM
rotary current: 265/460 V, 60 Hz
operating pressure: max. 87 PSI
filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 77 lbs.
operating medium: hydraulic oil based on mineral oil from 46 up to 464 SUS,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Test methods:

Filter elements are tested according to the following ISO standards:

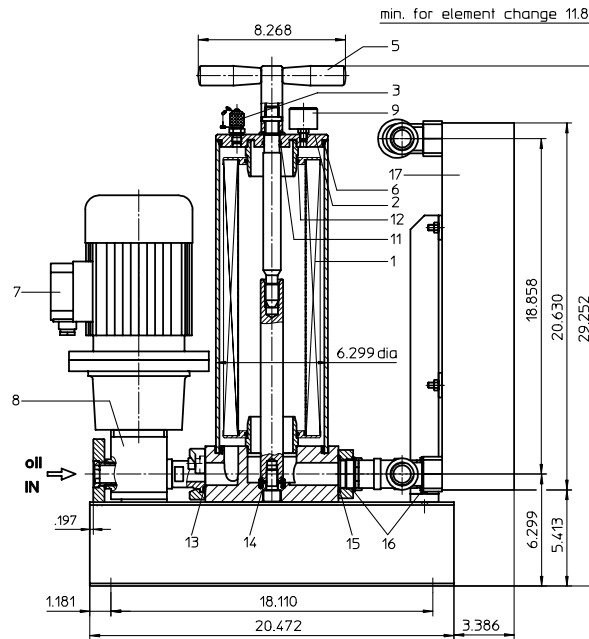
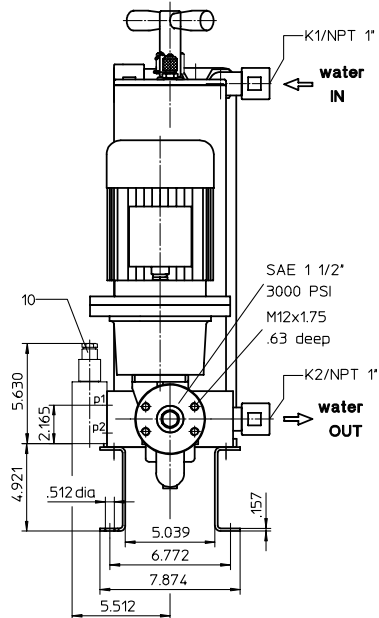
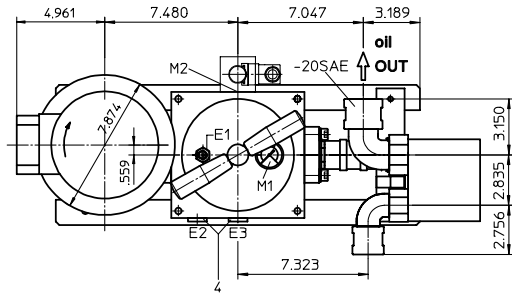
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger **Series USP 41 87 PSI**

Sheet No.
4021 E

Assignment of connections and functions:

- E1: venting mini-measuring connection,
 MA.1.St see sheet-no. 1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 manometer 0-232 PSI
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side
 K1: cooling water IN
 K2: cooling water OUT



1. Type index:

1.1. Filter unit: (ordering example)

USP. 41. 6VG. 10. B. P. -. P05. D05. CP16. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
 USP = filter unit, stationary with plate-exchanger
- 2 **nominal size:** 41
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(G)}$, 6 VG = 7 $\mu\text{m}_{(G)}$, 3 VG = 5 $\mu\text{m}_{(G)}$, 1 VG = 4 $\mu\text{m}_{(G)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(G)}$, 3 WVG = 5 $\mu\text{m}_{(G)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
- 8 **pump unit:**
 P05 = pump unit 05, NG 40.25
- 9 **motor:**
 D05 = B5/80/4.0,9.1800.265/460.D.60.1.-.- rotary current motor 265/460V, 60 Hz, approx. 1700 RPM, 1.2 HP, type of protection IP 54
- 10 **plate-exchanger unit:**
 CP16 = plate-exchanger unit CP16
- 11 **clogging indicator at M2:**
 - = without
 AE = AE30.2.5.P.-.B electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
 AOR = AOR.2.5.P.- visual, 36 PSI, see sheet-no. 1606
 AOC = AOC.2.5.P.- visual, 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	E-motor D05	1	1.2 HP, 265/460 V	311537
8	pump unit P01	1	NG 40.25	316292
9	manometer (series)	1	1.57 dia	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	1	37,69 x 3,53	304353 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	plate-exchanger unit	1	CP16	

3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems. The area of application comprises:

- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm (ø).

At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 87 PSI.

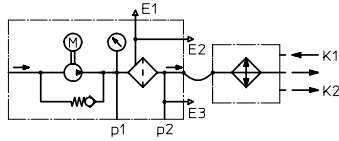
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.

Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator



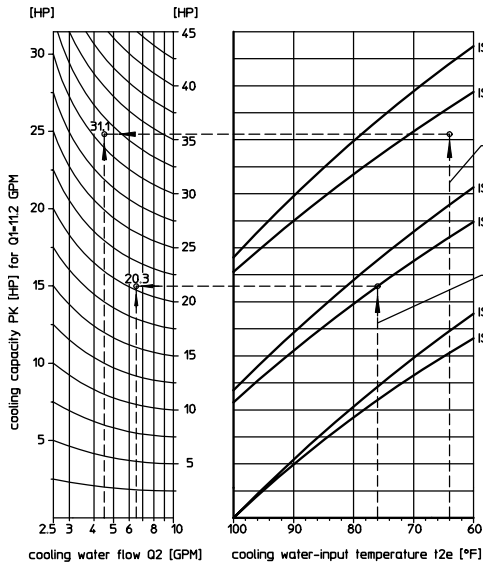
with electrical
clogging indicator AE30



with visual
clogging indicator
AOR, AOC



5. Cooling capacity graph:



$$\text{operating medium-output temperature } t1a \text{ [°F]} \quad t1a = t1e - \frac{PK \cdot 12.4}{Q1}$$
$$\text{cooling water-output temperature } t2a \text{ [°F]} \quad t2a = t2e + \frac{PK \cdot 5.1}{Q2}$$

example 1. operating medium ISO VG46

t1e = 120°F, t2e = 76°F,
Q1 = 11.2 GPM, Q2 = 6.5 GPM

cooling capacity PK from the graph = 20.3 HP

$$t1a = 120 - \frac{20.3 \cdot 12.4}{11.2} = 97.5^\circ\text{F}$$

$$t2a = 76 + \frac{20.3 \cdot 5.1}{6.5} = 91.9^\circ\text{F}$$

example 2. operating medium ISO VG32

t1e = 130°F, t2e = 64°F,
Q1 = 11.2 GPM, Q2 = 4.5 GPM

cooling capacity PK from the graph = 31.1 HP
(data linear interpolated)

$$t1a = 130 - \frac{31.1 \cdot 12.4}{11.2} = 95.6^\circ\text{F}$$

$$t2a = 64 + \frac{31.1 \cdot 5.1}{4.5} = 99.2^\circ\text{F}$$

symbol	units
PK = cooling capacity	HP
Q1 = volume flow-operating medium	GPM
Q2 = volume flow-cooling water	GPM
t1e = operating medium-input temperature	°F
t1a = operating medium-output temperature	°F
t2e = cooling water-input temperature	°F
t2a = cooling water-output temperature	°F

6. Technical data:

pump-volume flow : 11.2 GPM at 1700 RPM
E-motor: 1.2 HP, approx. 1700 RPM
rotary current: 265/460 V, 60 Hz
operating pressure: max. 87 PSI
filter-fineness: 4, 5, 7 or 10 µm (ø)
weight: approx. 128 lbs.
operating medium: hydraulic oil based on mineral oil from 46 up to 464 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Test methods:

Filter elements are tested according to the following ISO standards:

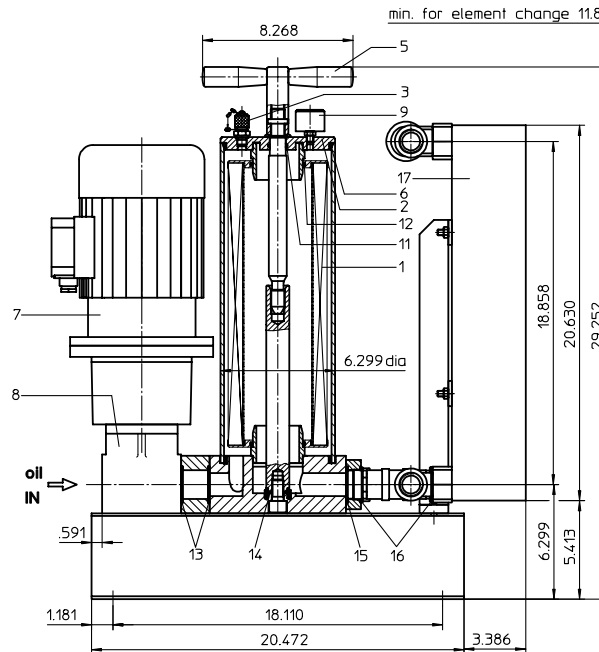
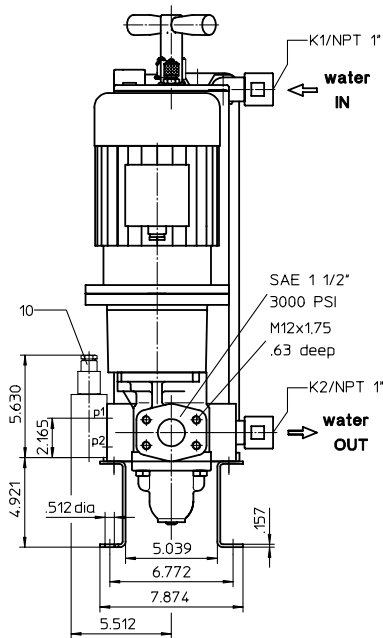
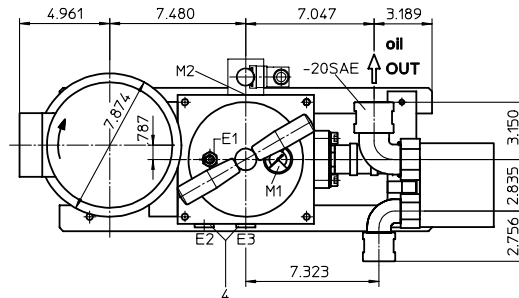
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger **Series USP 81 87 PSI**

Sheet No.
4022 E

Assignment of connections and functions:

E1: venting mini-measuring connection,
MA.1.St see sheet-no. 1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
manometer 0-232 PSI
M2: measure connection at filter housing
p₁ = dirt side
p₂ = clean side
K1: cooling water IN
K2: cooling water OUT



1. Type index:

1.1. Filter unit: (ordering example)

USP. 81. 6VG. 10. B. P. -. P04. D01. CP18. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
USP = filter unit, stationary with plate-exchanger
- 2 **nominal size:** 81
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **pump unit:**
P04 = pump unit 04, NG 80.50
- 9 **motor:**
D01 = B5/90L/4.1.8.1800.265/460.D.60.1.-.- rotary current motor 265/460V, 60 Hz, approx. 1700 RPM, 2.4 HP, type of protection IP 54
- 10 **plate-exchanger unit:**
CP18 = plate-exchanger unit CP18
- 11 **clogging indicator at M2:**
- = without
AE = AE30.2.5.P.-B electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
AOR = AOR.2.5.P.- visual, 36 PSI, see sheet-no. 1606
AOC = AOC.2.5.P.- visual, 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	E-motor D01	1	2.4 HP, 265/460 V	313465
8	pump unit P04	1	NG 80.50	317139
9	manometer (series)	1	1.57 dia	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	plate-exchanger unit	1	CP18	

3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems. The area of application comprises:

- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 87 PSI.

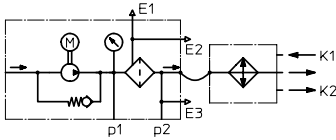
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.

Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator



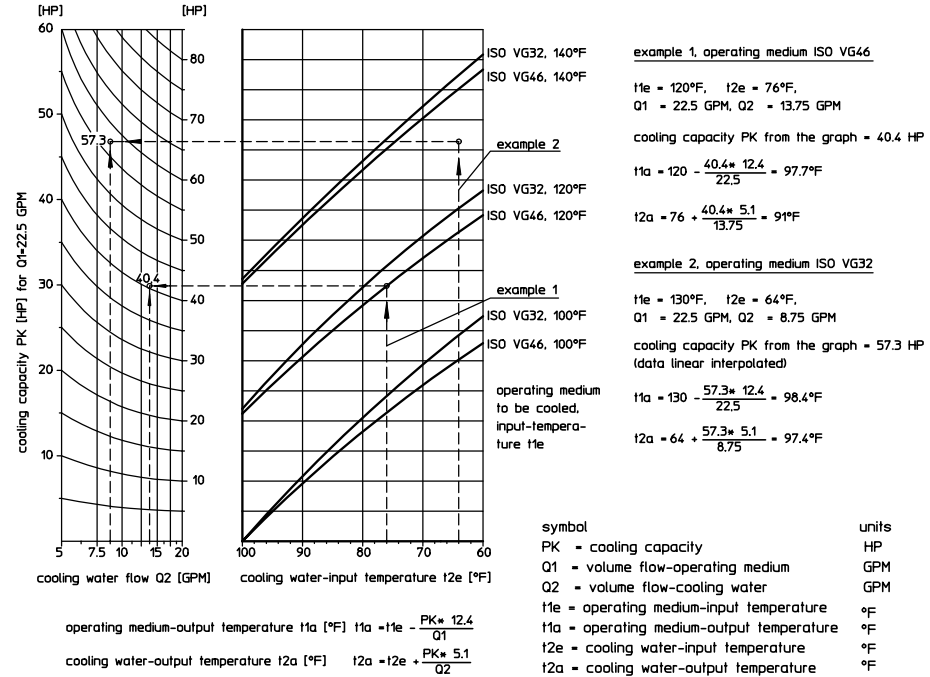
with electrical
clogging indicator AE30



with visual
clogging indicator
AOR, AOC



5. Cooling capacity graph:



6. Technical data:

pump-volume flow : 22.5 GPM at 1700 RPM
E-motor: 2.4 HP, approx. 1700 RPM
rotary current: 265/460 V, 60 Hz
operating pressure: max. 87 PSI
filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 176 lbs.
operating medium: hydraulic oil based on mineral oil from 46 up to 464 SUS,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger **Series USP 161 116 PSI**

1. Type index:

1.1. Filter unit: (ordering example)

USP. 161. 6VG. 10. B. P. -. P18. D11. CP20. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
USP = filter unit, stationary with plate-exchanger
- 2 **nominal size:** 161
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **pump unit:**
P18 = pump unit 18, NG 160.100.6, adjustable pressure 87 PSI
pump unit 18, NG 160.100.8, adjustable pressure 116 PSI
- 9 **motor:**
D11 = B5/100LB/4.3.5.1800.460/790.D.60.1.-.- rotary current motor 460/790V, 60 Hz, approx. 1700 RPM, 3.5 HP, type of protection IP 54
D08 = B5/112M/4.4.6.1800.460/790.D.60.1.-.- rotary current motor 460/790V, 60 Hz, approx. 1700 RPM, 4.6 HP, type of protection IP 54
v \leq 464 SUS
v > 464 SUS
v \leq 695 SUS
- 10 **plate-exchanger unit:**
CP20 = plate-exchanger unit CP20
- 11 **clogging indicator at M2:**
- = without
AE = AE30.2.5.P.-B electrical at p_1 and p_2 , 36 PSI see sheet-no. 1609
AOR = AOR.2.5.P.- visual, 36 PSI see sheet-no. 1606
AOC = AOC.2.5.P.- visual, 36 PSI see sheet-no. 1606

1.2. Filter element: (ordering example)

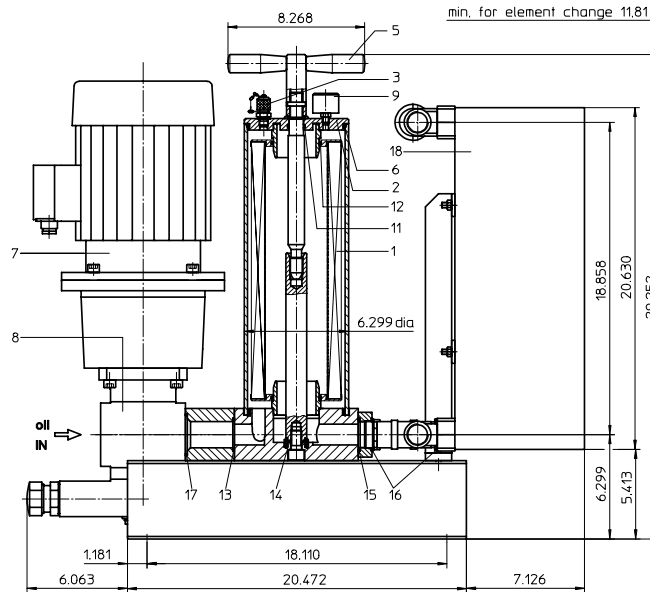
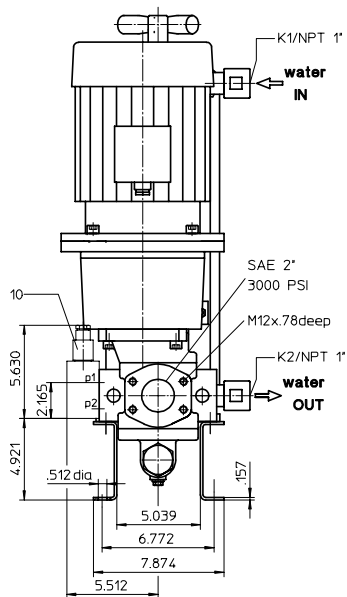
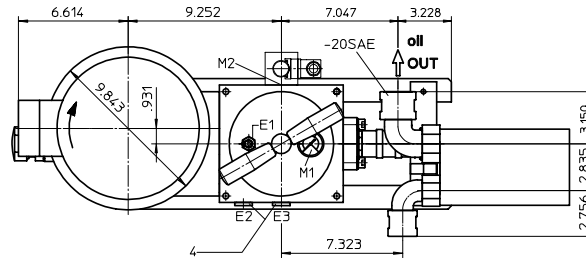
01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Assignment of connections and functions:

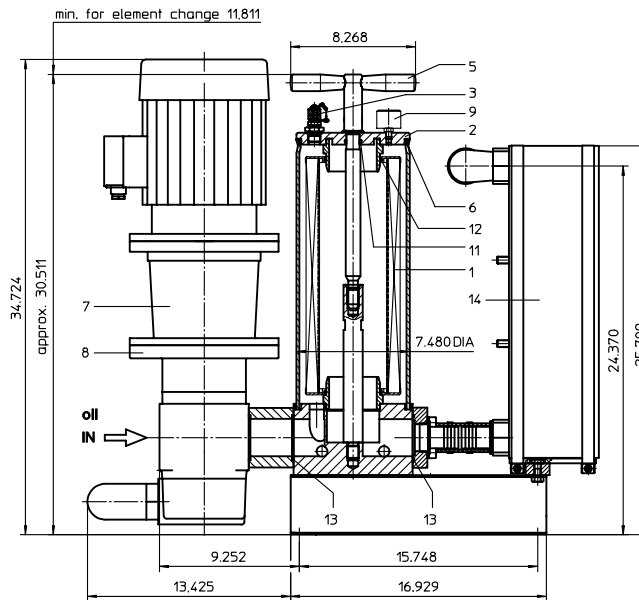
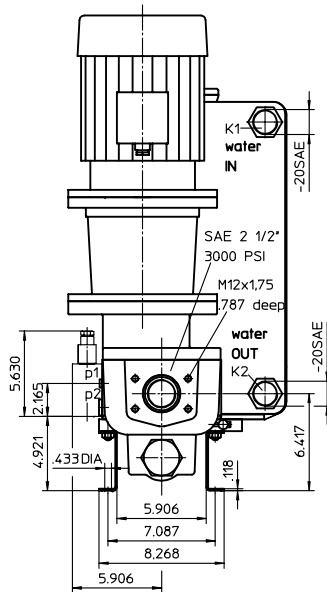
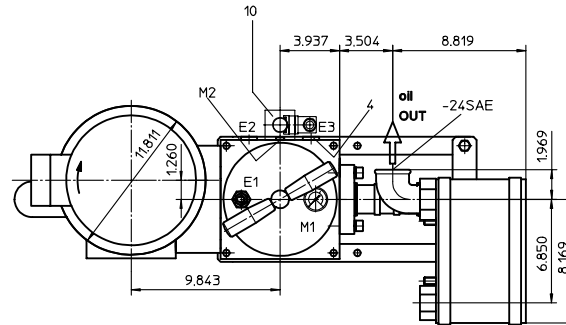
- E1: venting mini-measuring connection,
MA.1.St see sheet-no. 1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the
housing cover, dirt side
manometer 0-232 PSI
M2: measure connection at filter housing
 p_1 = dirt side
 p_2 = clean side
K1: cooling water IN
K2: cooling water OUT



FILTER UNIT, stationary with plate-exchanger **Series USP 320 87 PSI**

Assignment of connections and functions:

E1: venting mini-measuring connection,
MA.1.St see sheet-no. 1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the
housing cover, dirt side
manometer 0-232 PSI
M2: measure connection at filter housing
p₁ = dirt side
p₂ = clean side
K1: cooling water IN
K2: cooling water OUT



1. Type index:

1.1. Filter unit: (ordering example)

USP. 320. 6VG. 10. B. P. -. P07. D07. CP30. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
USP = filter unit, stationary with plate-exchanger
- 2 **nominal size:** 320
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$, Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **pump unit:**
P07 = pump unit 07, NG 320.200
- 9 **motor:**
D07 = B5/132S/4.6.3.1800.460/790.D.60.1.-.- rotary current motor 460/790V, 60 Hz, approx. 1700 RPM, 6.3 HP, type of protection IP 5
- 10 **plate-exchanger unit:**
CP30 = plate-exchanger unit CP30
- 11 **clogging indicator at M2:**
- = without
AE = AE30.2.5.P.-B electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
AOR = AOR.2.5.P.- visual, 36 PSI, see sheet-no. 1606
AOC = AOC.2.5.P.- visual, 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22694-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	170 x 6	304799 (NBR)
7	E-motor D01	1	6.3 HP, 460/790 V	316821
8	pump unit P04	1	NG 320.200	316908
9	manometer (series)	1	1.57 dia	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	3	69,45 x 3,53	305868 (NBR)
14	plate-exchanger unit	1	CP30	

3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems. The area of application comprises:

- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000 and is led afterwards over a plate cooler.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

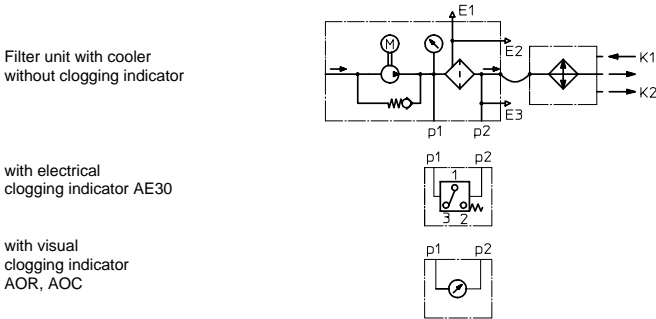
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 87 PSI.

The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.

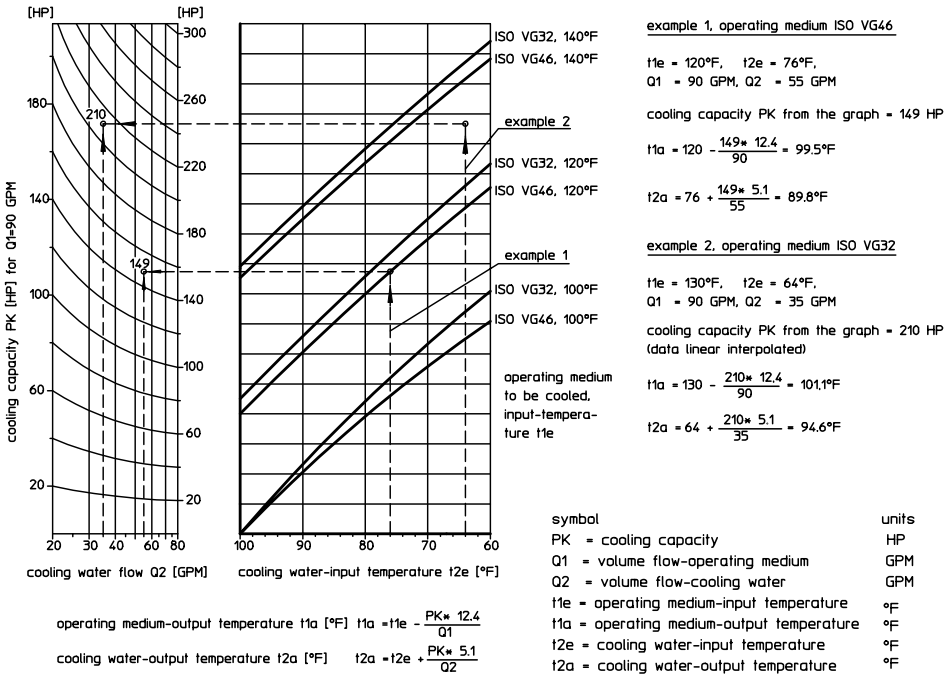
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:



5. Cooling capacity graph:



6. Technical data:

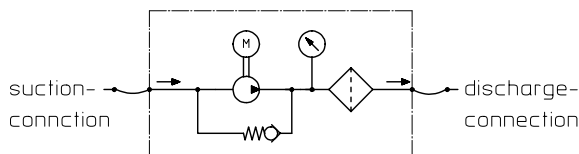
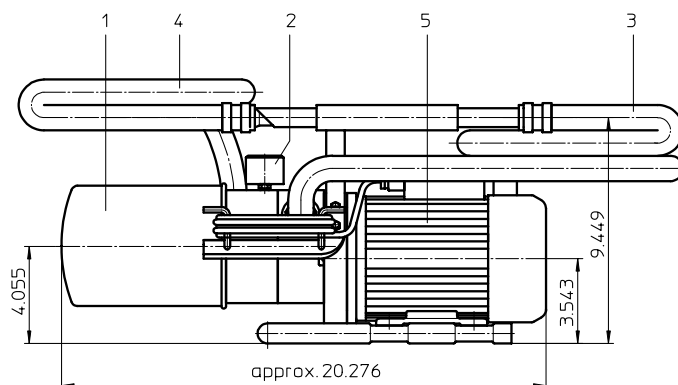
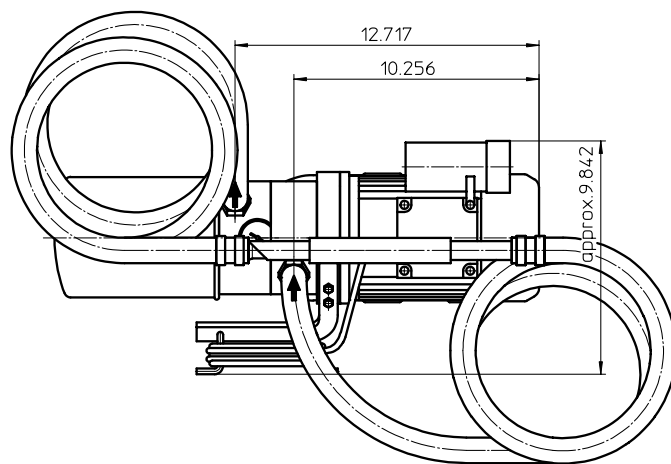
pump-volume flow :	90 GPM at 1700 RPM
E-motor:	6.3 HP, approx. 1700 RPM
rotary current:	460/790 V, 60 Hz
operating pressure:	max. 87 PSI
filter-fineness:	4, 5, 7 or 10 µm _(c)
weight:	approx. 341 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 up to 464 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



4. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design satisfies the prerequisites for small dimensions and high reliability.

As the filtration unit is portable and small, there is easy access even to difficult accessible points. Leaking oil from the suction respectively discharge hose is prevented by lances connected with the carrying handle.

The suction hose 3/4" and the discharge hose 3/4" are approximately 59 inch long inclusive of the lance.

The device is equipped with a gear pump driven by an electric motor. The flow conveyed by the geared pump is fed over a spin-on cartridge.

The filter fineness is 10 $\mu\text{m}_{(c)}$. The contamination level of the filter element can be read off from a pressure display.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 72.5 PSI.

The filter unit can be operated without supervision, since the unit switches off automatically after about 5 minutes when an operating pressure of > 87 PSI is reached. This pressure range is marked in red on the scale field of the pressure display.

The filter element can be changed without tools.

The filter elements are supplied including seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

1. Type index:

1.1. Filter unit: (ordering example)

UFM. 15. 10VG. E. P. W16

1	2	3	4	5	6
1	series:				
	UFM = filter unit, mobile				
2	nominal size: 15				
3	filter-material and filter-fineness:				
	10 VG = 10 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)				
	10 P = 10 μm paper				
4	filter element design:				
	E = single-end open				
5	sealing material:				
	P = Nitrile (NBR)				
6	motor:				
	W16 = B3-B14/71/4.0,25.1500/1800.230.W.50/60.1.R.S.K alternating current motor 230V, 50/60Hz, approx. 1300/1550 RPM, .34 HP, type of protection IP 54				
	W17 = B3-B14/71/4.0,25.1800.110.W.60.1.R.S.K alternating current motor 110V, 60Hz, approx. 1550 RPM, .34 HP, type of protection IP 54				

1.2. Filter element: (ordering example)

01WP. 90. 10VG. E. P

1	2	3	4	5
1	series:			
	01WP = spin-on cartridge			
2	nominal size: 90			
3	-	5	see type index-filter unit	

2. Technical data:

pump capacity:	3.7/4.8 GPM at 1300/1550 RPM
electric motor:	.34 HP
alternating current:	230 V, 50/60 Hz
alternating current:	110 V, 60 Hz
pressure load capacity:	max. 72.5 PSI
filter-fineness:	10 $\mu\text{m}_{(c)}$
weight:	approx. 26 lbs.
operating medium:	hydraulic oil based on mineral oil 46 to 1860 SUS other media on request

3. Spare parts:

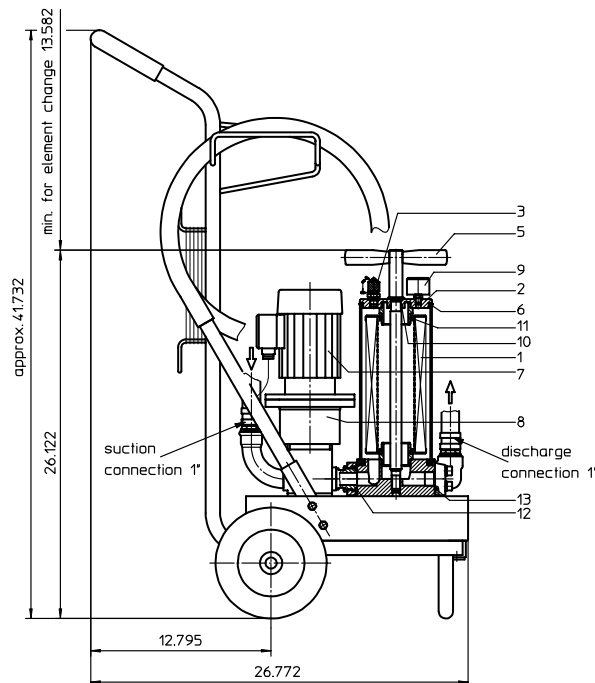
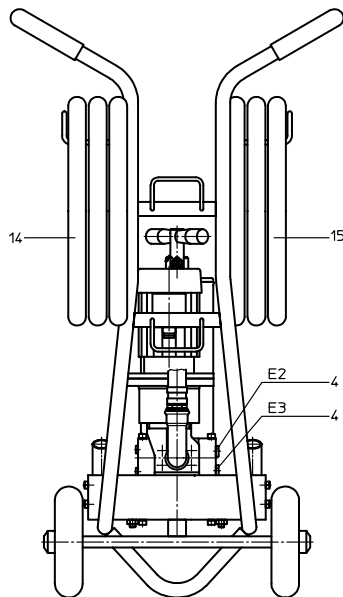
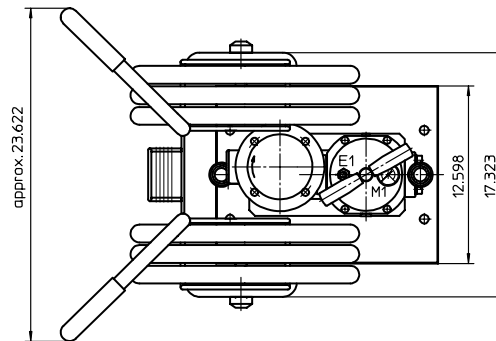
item	qty.	designation	dimension	article-no.
1	1	spin-on cartridge	01WP.90...	
2	1	clogging indicator	visual	315452
3	1	suction hose 3/4"	21938-3	
4	1	discharge hose 3/4"	21946-3	
5	1	electric motor W16	.34 HP, 230V	312053
	1	electric motor W17	34 HP, 110V	313095

FILTER UNIT, mobile **Series UM 20 58 PSI**

Sheet No.
4013 F

Assignment of connections and functions:

- E1: venting mini-measuring connection
MA.1.ST, see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side



1. Type index:

1.1. Filter unit: (ordering example)

UM. 20. 6VG. 10. B. P. -. P01. W07. L07. L11. O

1	2	3	4	5	6	7	8	9	10	11	12
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- 1 **series:**
UM = filter unit, mobile
- 2 **nominal size:** 20
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **pump unit:**
P01 = pump unit 01, NG 20.16 (standard-pump unit)

9 motor: (W = alternating current motor)

motor	electrical connection	volume flow	max. capacity	doc.-no.
W03 ¹⁾	230V	50Hz	6.0 GPM	46-1860 SUS
W07 ¹⁾	110V	60Hz	7.2 GPM	46-1860 SUS
				43044-4
				43045-4

¹⁾ standard-motor

10 suction connection 1" : (see sheet-no. 31992-4)

- L07 = hose-lance
L08 = hose-fitting-lance
L09 = hose-lance-protective filter
L10 = hose-fitting-lance-protective filter

11 discharge connection 1" : (see sheet-no. 31992-4)

- L11 = hose-lance
L12 = hose-fitting-lance

12 clogging indicator at M1:

- = without
O = visual, 36 PSI

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 250
- 3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA 1.St	305453
4	screw plug	2	1/4 BSPP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	O-ring	1	18 x 3	304359 (NBR)
11	O-ring	2	52 x 3	314206 (NBR)
12	O-ring	1	32 x 3,5	304378 (NBR)
13	O-ring	1	32,9 x 3,53	318850 (NBR)
14	suction hose 1"	1	according to type index	
15	discharge hose 1"	1	according to type index	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises: - secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose 1" and the discharge hose 1" are approximately 106 inch long inclusive of the lance.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element. The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 58 PSI.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 58 PSI, the motor-protection-switch cuts the E-motor out.

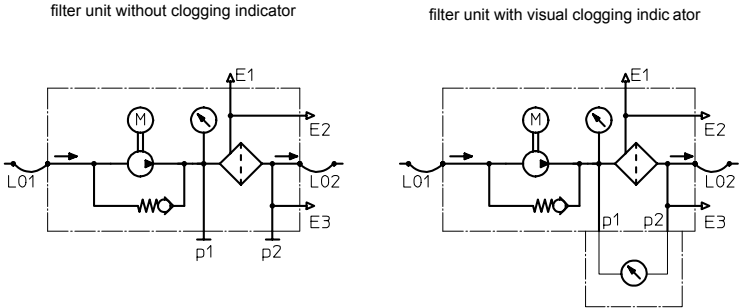
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
oil temepature: +23°F to +140°F
weight: approx. 92 lbs.
operating medium: hydraulic oil based on mineral oil from 10 mm²/s,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



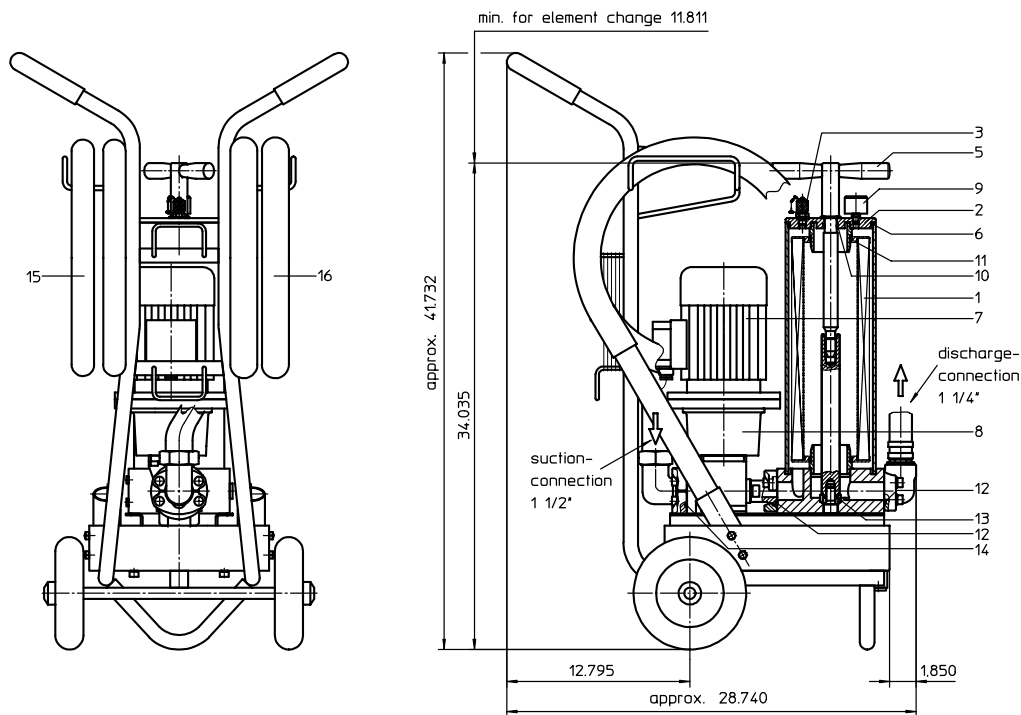
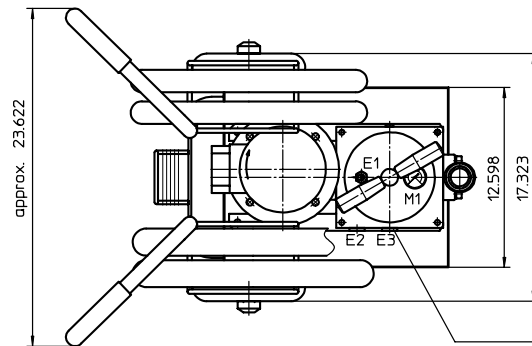
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side



FILTER UNIT, mobile Series UM 40 58 PSI

Sheet No.
4014 E

1. Type index:

1.1. Filter unit: (ordering example)

UM. 40. 6VG. 10. B. P. -. P05. W11. L01. L05. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
 UM = filter unit, mobile
- 2 **nominal size:** 40
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
- 8 **pump unit:**
 P05 = pump unit 05, NG 40.25 (standard-pump unit)
- 9 **motor:** (W = alternating current motor)

motor: (W = alternating current motor)						
motor		electrical connection		volume flow	max. viscosity	doc.-no.
W10 ¹⁾		230V	50Hz	9.4 GPM	46-1860 SUS	42754-4
W11 ¹⁾		110V	60Hz	11.2 GPM	46-1860 SUS	42877-4
W30 (CSA-motor)		110V	60Hz	11.2 GPM	46-930 SUS	44567-4

¹⁾ standard-motor

- 10 **suction connection 1 1/2 " :** (see sheet-no. 31961-4)
 L01 = hose-lance
 L02 = hose-fitting-lance
 L03 = hose-lance-protective filter
 L04 = hose- fitting-lance-protective filter
 L22 = hose- fitting
- 11 **discharge connection 1 1/4 " :** (see sheet-no. 31961-4)
 L05 = hose-lance
 L06 = hose-fitting-lance
 L21 = hose-fitting
- 12 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

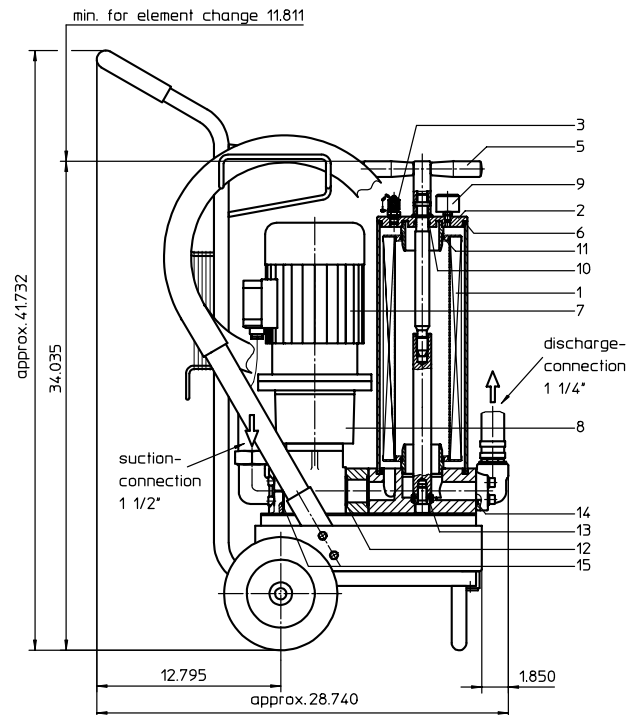
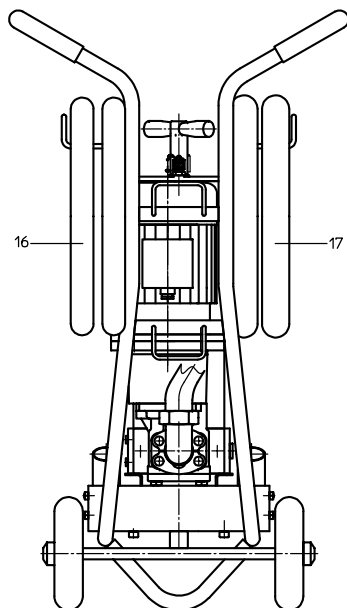
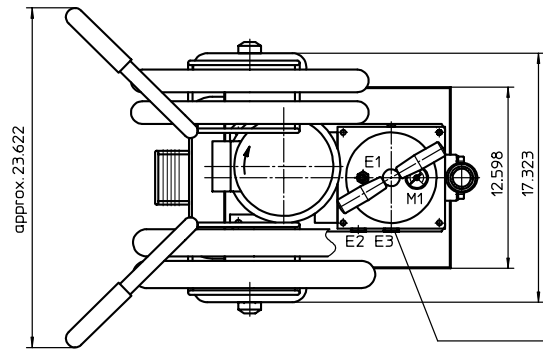
Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side



FILTER UNIT, mobile

Series UM 80 58 PSI

Sheet No.
4015 F

1. Type index:

1.1. Filter unit: (ordering example)

UM. 80. 6VG. 10. B. P. -. P04. W09. L01. L05. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

UM = filter unit, mobile

2 nominal size: 80

3 filter-material and filter-fineness:

10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)

10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element

4 resistance of pressure difference for filter element:

10 = Δp 10 bar

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM), by agreement

7 filter element specification:

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 pump unit:

P04 = pump unit 04, NG 80.50 (standard-pump unit)

9 motor: (W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	doc.-no.
W06 ¹⁾	230V 50Hz	18.75 GPM	46-1860 SUS	43056-4
W06 ¹⁾	230V 60Hz	22.45 GPM	46-1860 SUS	43056-4
W09 ¹⁾	110V 60Hz	22.45 GPM	46-1860 SUS	43057-4

¹⁾ standard-motor

10 suction connection 1 1/2 " : (see sheet-no. 31961-4)

L01 = hose-lance

L02 = hose-fitting-lance

L03 = hose-lance-protective filter

L04 = hose-fitting-lance-protective filter

11 discharge connection 1 1/4 " : (see sheet-no. 31961-4)

L05 = hose-lance

L06 = hose-fitting-lance

12 clogging indicator at M1:

- = without

O = visual, 36 PSI

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	1/2 BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P04	1	NG 80.50	317139
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	37,69 x 3,53	304353 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 1/2 "	1	according to type index	
17	discharge hose 1 1/4 "	1	according to type index	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises: - secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose 1 1/2 " and the discharge hose 1 1/4 " are approximately 106 inch long inclusive of the lance.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(ø). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element. The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 58 PSI.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 58 PSI, the motor-protection-switch cuts the E-motor out.

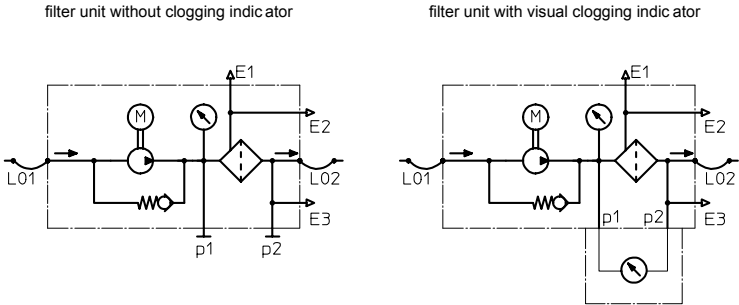
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(ø)
oil temperature: +23°F to +140°F
weight: approx. 161 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



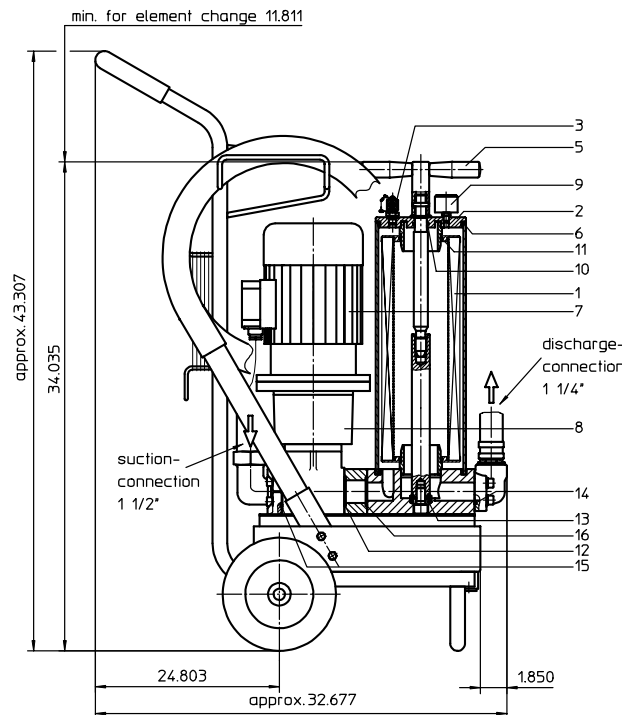
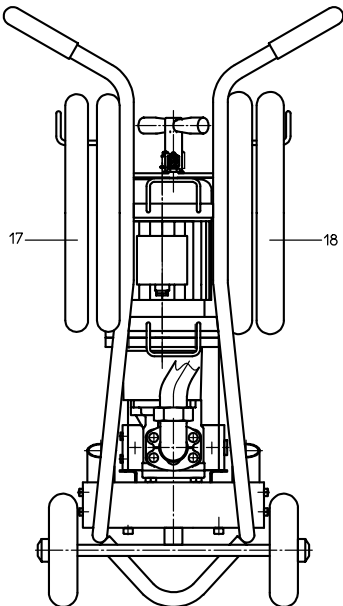
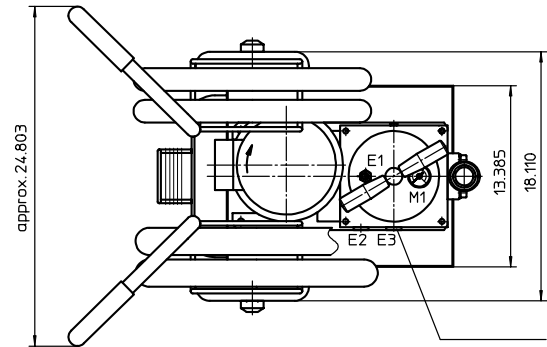
6. Test methods:

Filter elements are tested according to the following ISO standards:

- | | |
|-----------|---|
| ISO 2941 | Verification of collapse/burst resistance |
| ISO 2942 | Verification of fabrication integrity |
| ISO 2943 | Verification of material compatibility with fluids |
| ISO 3723 | Method for end load test |
| ISO 3724 | Verification of flow fatigue characteristics |
| ISO 3968 | Evaluation of pressure drop versus flow characteristics |
| ISO 16889 | Multi-pass method for evaluating filtration performance |

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side



FILTER UNIT, mobile Series UM 125 58 PSI

Sheet No.
4026

1. Type index:

1.1. Filter unit: (ordering example)

UM. 125. 6VG. 10. B. P. -. P79. D08. L01. L05. O

1	2	3	4	5	6	7	8	9	10	11	12
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1 series:

UM = filter unit, mobile

2 nominal size: 125

3 filter-material and filter-fineness:

10 VG = 10 $\mu\text{m}_{(0)}$, 6 VG = 7 $\mu\text{m}_{(0)}$, 3 VG = 5 $\mu\text{m}_{(0)}$, 1 VG = 4 $\mu\text{m}_{(0)}$ Interpor fleece (glass fiber)

10 WVG = 10 $\mu\text{m}_{(0)}$, 3 WVG = 5 $\mu\text{m}_{(0)}$ Watersorp-filter element

4 resistance of pressure difference for filter element:

10 = Δp 10 bar

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM), by agreement

7 filter element specification:

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 pump unit:

P04 = pump unit 79, NG 125.80 (standard-pump unit)

9 motor: (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
D08 ¹⁾	400/690V	50Hz	30 GPM	46-9300 SUS	42744-4
D08 ¹⁾	460/790V	60Hz	35 GPM	46-9300 SUS	42744-4

¹⁾ standard-motor

10 suction connection 1 1/2 " : (see sheet-no. 31961-4)

L01 = hose-lance

L02 = hose-fitting-lance

L03 = hose-lance-protective filter

L04 = hose-fitting-lance-protective filter

11 discharge connection 1 1/4 " : (see sheet-no. 31961-4)

L05 = hose-lance

L06 = hose-fitting-lance

12 clogging indicator at M1:

- = without

O = visual, 36 PSI

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P79	1	NG 160.80	337423
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	56,75 x 3,53	306035 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	37,69 x 3,53	304353 (NBR)
15	O-ring	1	56,75 x 3,53	306035 (NBR)
16	O-ring	1	45 x 3	304991 (NBR)
17	suction hose 1 ½ "	1	according to type index	
18	discharge hose 1 ¼ "	1	according to type index	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose 1 ½ " and the discharge hose 1 ¼ " are approximately 106 inch long inclusive of the lance.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_C. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 58 PSI.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 58 PSI, the motor-protection-switch cuts the E-motor out.

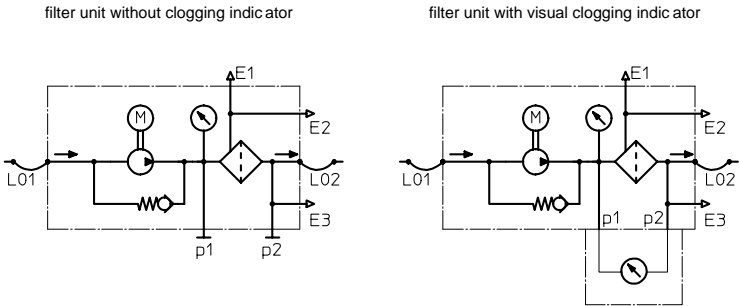
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_C
oil temperature: +23°F to +140°F
weight: approx. 187 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



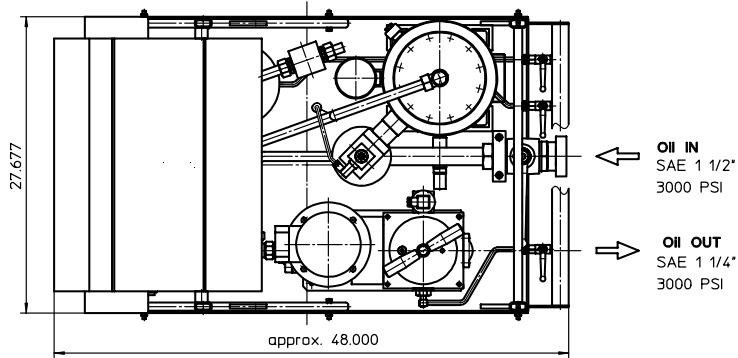
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FLUID PURIFIER SYSTEMS, mobile **Series IFPM 21**

Sheet No.
4035 E



1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPM. 21. 6VG. 10. B. V. - P21. D23. VP01. VS1. B

1	2	3	4	5	6	7	8	9	10	11	12
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- 1 series:
IFPM = INTERNORMEN-Fluid Purifier Systems, mobile
- 2 nominal size: 21
- 3 filter-material and filter-fineness:
10 VG = 10 μm_{G} , 6 VG = 7 μm_{G} , 3 VG = 5 μm_{G} , 1 VG = 4 μm_{G} Interpor fleece (glass fiber)
- 4 resistance of pressure difference for filter element:
10 = Δp 145 PSI
- 5 filter element design:
B = both sides open
- 6 sealing material:
V = Viton (FPM)
- 7 filter element specification:
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 pump unit:
P21 = pump unit 21, NG 20.16
- 9 motor:
D23 = B5/80/6.0,6.1200.265/460.D.60.1.-.-.-
rotary current motor 265/460 V, 60 Hz, approx..1150 RPM, 0.74 HP, protection IP 55
- 10 vacuum pump:
VP01 = vacuum pump 01, 265/460 V, 3-phase, 60 Hz, 0.74 HP, protection IP 55
- 11 clogging sensor:
VS1 = VS1.1,5.V.-.GS.B.E. electronical, at p_1 and p_2 , 22 PSI, see sheet-no. 1607
- 12 supply voltage:
B = 480V, 3-phase

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. V. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 nominal size: 630
- 3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

Changes of measures and design are subject to alteration!

2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
 - Additive depletion
 - Reduction of the lubrication properties of the fluid
 - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

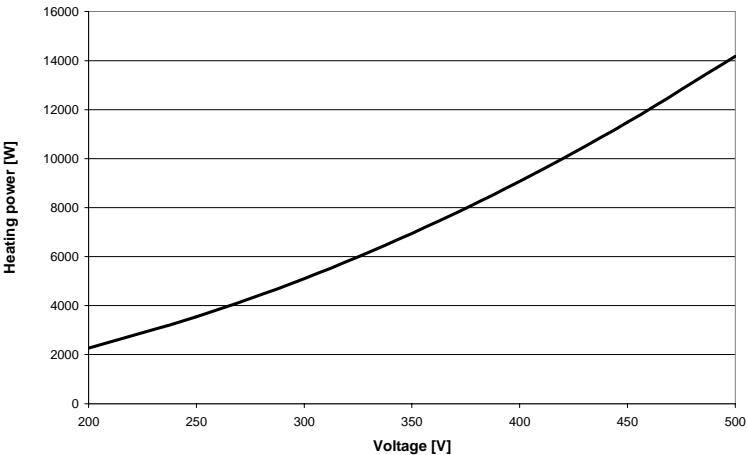
Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -9 PSI to -13 PSI. The fluid is passing a heater which is raising the temperature in order to increase the filtration speed. The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system. The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	1 ½" SAE-flange 3000 PSI
Outlet connection:	1 ¼ " SAE-flange 3000 PSI
Circulation flow rate:*	6.3 GPM
Operating vacuum:**	-9 to -13 PSI
E-motor hydraulic pump:	0.74 HP, 3-phase 265/460V, 60 Hz
E-motor vacuum pump:	0.74 HP, 3-phase 265/460V, 60 Hz
Heater capacity:	3000 Watt
Filter type:	NF 631
Seal material:	Viton (FPM)
Maximum viscosity:	3200 SUS
Water extraction rate:***	19.8 gal / day
Ambient temperature:	+14°F to +140°F
Fluid temperature:	+14°F to +176°F
weight:	approx. 693 lbs.

- * Viscosity of the liquid of 146 SUS
** Operating vacuum is preset for the specific application
*** Initial rate purifying mineral oil at 146 SUS, 104°F and with 6% water content

4. Heating power characteristic:



5. Test methods:

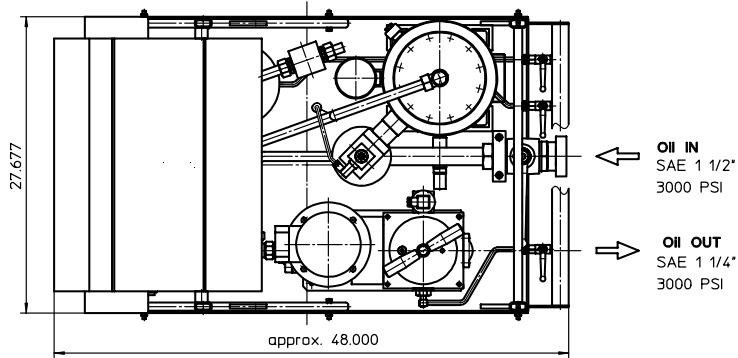
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

FLUID PURIFIER SYSTEMS, mobile **Series IFPM 31**

Sheet No.
4036 D



1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPM. 31. 6VG. 10. B. V. -. P22. D27. VP01. VS1. B											
1	2	3	4	5	6	7	8	9	10	11	12

- 1 series:
IFPM = INTERNORMEN-Fluid Purifier Systems, mobile
- 2 nominal size: 31
- 3 filter-material and filter-fineness:
10 VG = 10 μm_{G} , 6 VG = 7 μm_{G} , 3 VG = 5 μm_{G} , 1 VG = 4 μm_{G} Interpor fleece (glass fiber)
- 4 resistance of pressure difference for filter element:
10 = Δp 145 PSI
- 5 filter element design:
B = both sides open
- 6 sealing material:
V = Viton (FPM)
- 7 filter element specification:
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 pump unit:
P22 = pump unit 22, NG 60.40
- 9 motor:
D27 = B5/100/8.0.9.900.265/460.D.60.1.-.-.-
rotary current motor 265/460 V, 60 Hz, approx..850 RPM, 1.00 HP, protection IP 55
- 10 vacuum pump:
VP01 = vacuum pump 01, 265/460 V, 3-phase, 60 Hz, 0.74 HP, protection IP 55
- 11 clogging sensor:
VS1 = VS1.1.5.V.-.GS.B.E. electronical, at p_1 and p_2 , 22 PSI, see sheet-no. 1607
- 12 supply voltage:
B = 480V, 3-phase

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. V. -						
1	2	3	4	5	6	7

- 1 series:
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 nominal size: 630
- 3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

Changes of measures and design are subject to alteration!

2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
 - Additive depletion
 - Reduction of the lubrication properties of the fluid
 - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

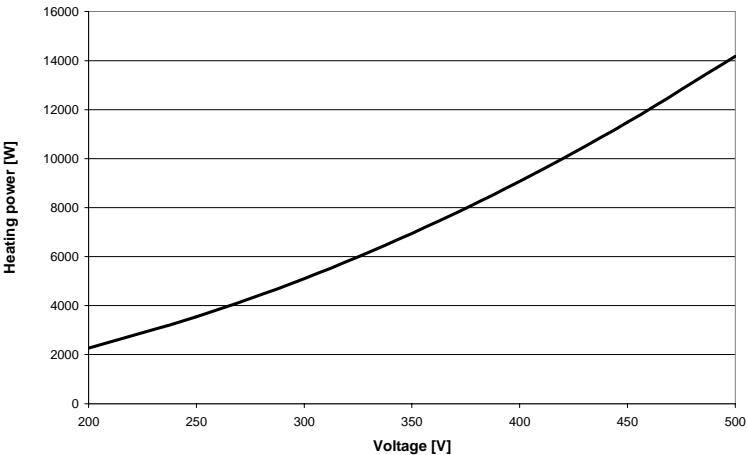
Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -9 PSI to -13 PSI. The fluid is passing a heater which is raising the temperature in order to increase the filtration speed. The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system. The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	1 ½" SAE-flange 3000 PSI
Outlet connection:	1 ¼ " SAE-flange 3000 PSI
Circulation flow rate:*	7.9 GPM
Operating vacuum:**	-9 to -13 PSI
E-motor hydraulic pump:	1.00 HP, 3-phase 265/460V, 60 Hz
E-motor vacuum pump:	0.74 HP, 3-phase 265/460V, 60 Hz
Heater capacity:	3000 Watt
Filter type:	NF 631
Seal material:	Viton (FPM)
Maximum viscosity:	3200 SUS
Water extraction rate:***	27.7 gal / day
Ambient temperature:	+14°F to +140°F
Fluid temperature:	+14°F to +176°F
weight:	approx. 715 lbs.

- * Viscosity of the liquid of 146 SUS
** Operating vacuum is preset for the specific application
*** Initial rate purifying mineral oil at 146 SUS, 104°F and with 6% water content

4. Heating power characteristic:



5. Test methods:

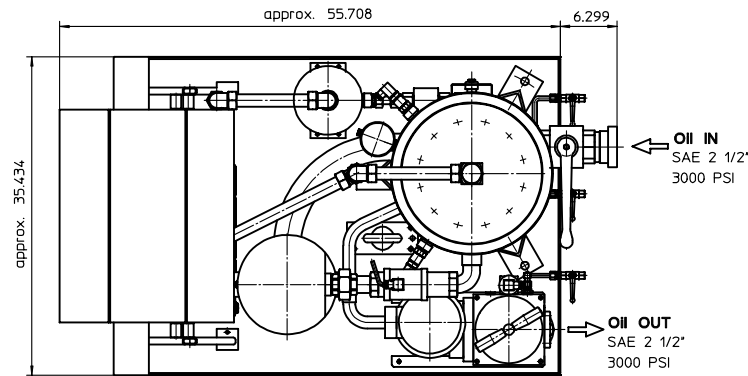
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

FLUID PURIFIER SYSTEMS, mobile **Series IFPM 71**

Sheet No.
4046 C



1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPM. 71. 6VG. 10. B. V. -. P23. D01. VP07. VS1. B											
1	2	3	4	5	6	7	8	9	10	11	12

- 1 series:
IFPM = INTERNORMEN-Fluid Purifier Systems, mobile
- 2 nominal size: 71
- 3 filter-material and filter-fineness:
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- 4 resistance of pressure difference for filter element:
10 = Δp 145 PSI
- 5 filter element design:
B = both sides open
- 6 sealing material:
V = Viton (FPM)
- 7 filter element specification:
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 pump unit:
P23 = pump unit 23, NG 80.50
- 9 motor:
D01 = B5/90L/4.1,8.1800.265/460.D.60.1-.-.-
rotary current motor 265/460 V, 60 Hz, approx. 1700 RPM, 2.4 HP, protection IP 55
- 10 vacuum pump:
VP07 = vacuum pump 07, 265/460 V, 3-phase, 60 Hz, 2.0 HP, protection IP 55
- 11 clogging sensor:
VS1 = VS1.1.5.V-.-. GS.B.E electronical, at p_1 and p_2 , 22 PSI, see sheet-no. 1607
- 12 supply voltage:
B = 480V, 3-phase

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	V.	-
1	2	3	4	5	6	7

- 1 series:
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 nominal size: 1000
- 3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

Changes of measures and design are subject to alteration!

2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
 - Additive depletion
 - Reduction of the lubrication properties of the fluid
 - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

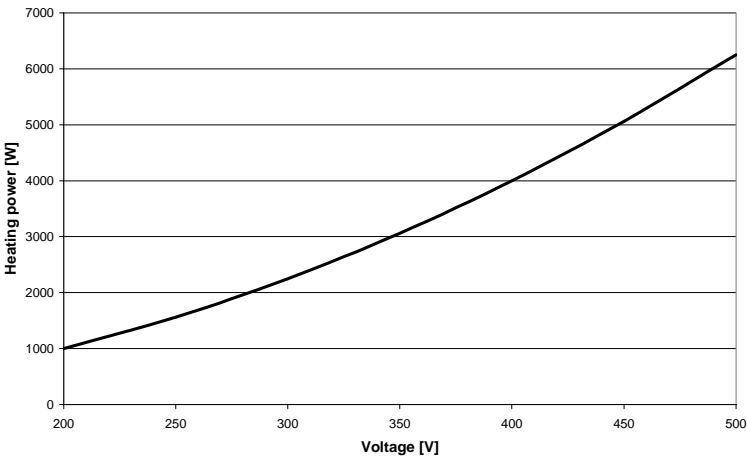
Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -9 PSI to -13 PSI. The fluid is passing a heater which is raising the temperature in order to increase the filtration speed. The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system. The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	2 ½ " SAE-flange 3000 PSI
Outlet connection:	2 ½ " SAE-flange 3000 PSI
Circulation flow rate: *	18.5 GPM
Operating vacuum:**	-9 to -13 PSI
E-motor hydraulic pump:	2.4 HP, 3-phase 265/460 V, 60 Hz
E-motor vacuum pump:	2.0 HP, 3-phase 265/460 V, 60 Hz
Heater capacity:	4000 Watt
Filter type:	NF 1000
Seal material:	Viton (FPM)
Maximum viscosity:	3200 SUS
Water extraction rate:***	83 gal / day
Ambient temperature:	+14°F to +140°F
Fluid temperature:	+14°F to +176°F
weight:	approx. 1300 lbs.

- * Viscosity of the liquid of 146 SUS
- ** Operating vacuum is preset for the specific application
- *** Initial rate purifying mineral oil at 146 SUS, 104°F and with 6% water content

4. Heating power characteristic:



5. Test methods:

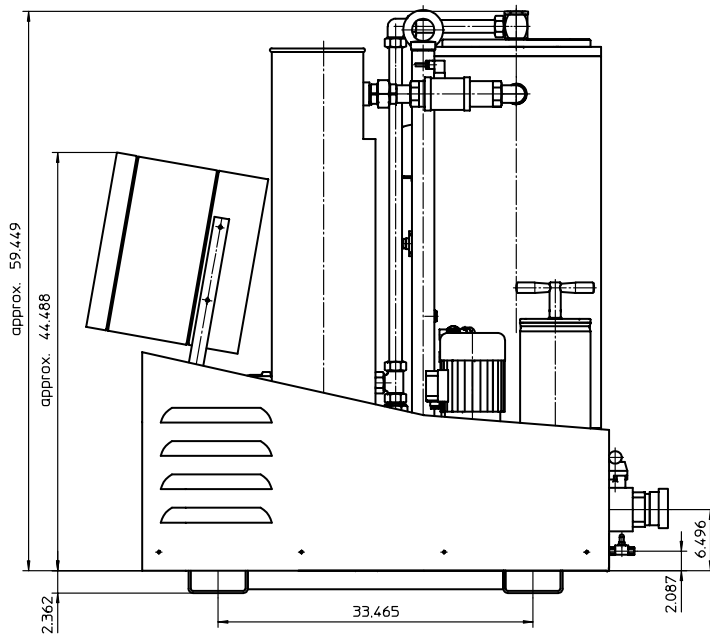
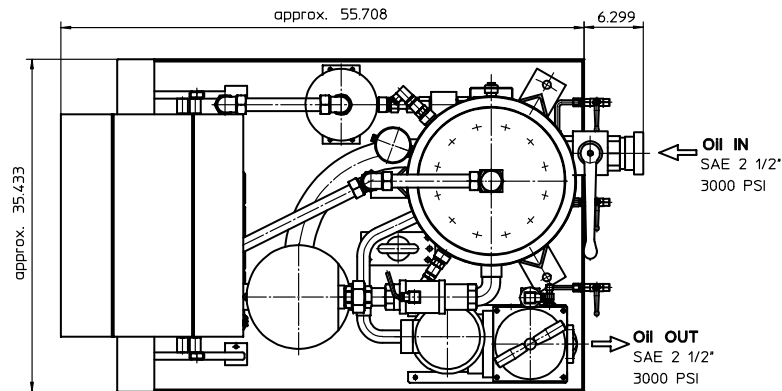
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

FLUID PURIFIER SYSTEMS, stationary **Series IFPS 71**

Sheet No.
4045 D



1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPS. 71. 6VG. 10. B. V. -. P23. D01. VP07. VS1. B

1	2	3	4	5	6	7	8	9	10	11	12
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- 1 **series:**
IFPS = INTERNORMEN-Fluid Purifier Systems, stationary
- 2 **nominal size:** 71
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **pump unit:**
P23 = pump unit 23, NG 80.50
- 9 **motor:**
D01 = B5/90L/4.1.8.1800.265/460.D.60.1.-.-
rotary current motor 265/460 V, 60 Hz, approx. 1700 RPM, 2.4 HP, protection IP 55
- 10 **vacuum pump:**
VP07 = vacuum pump 07, 265/460 V, 3-phase, 60 Hz, 2.0 HP, protection IP 55
- 11 **clogging sensor:**
VS1 = VS1.1.5.V.-. GS.B.E. electronic, at p_1 and p_2 , 22 PSI, see sheet-no. 1607
- 12 **supply voltage:**
B = 480V, 3-phase

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. V. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

Changes of measures and design are subject to alteration!

2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
 - Additive depletion
 - Reduction of the lubrication properties of the fluid
 - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

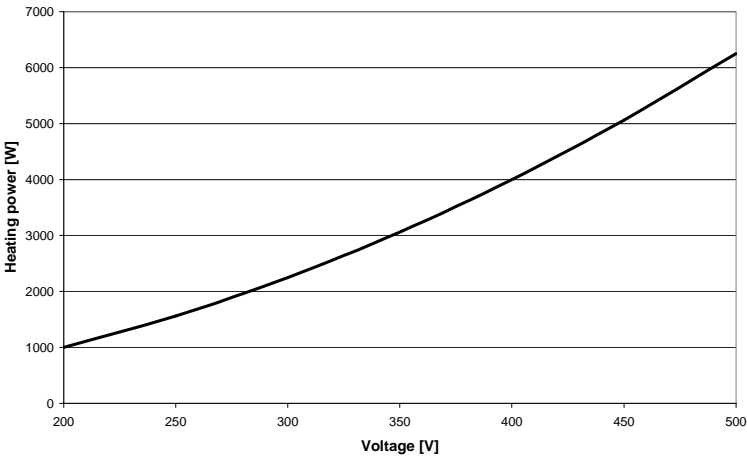
Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -9 PSI to -13 PSI. The fluid is passing a heater which is raising the temperature in order to increase the filtration speed. The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system. The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	2 ½ " SAE-flange 3000 PSI
Outlet connection:	2 ½ " SAE-flange 3000 PSI
Circulation flow rate: *	18.5 GPM
Operating vacuum:**	-9 to -13 PSI
E-motor hydraulic pump:	2.4 HP, 3-phase 265/460 V, 60 Hz
E-motor vacuum pump:	2.0 HP, 3-phase 265/460 V, 60 Hz
Heater capacity:	4000 Watt
Filter type:	NF 1000
Seal material:	Viton (FPM)
Maximum viscosity:	3200 SUS
Water extraction rate:***	83 gal / day
Ambient temperature:	+14°F to +140°F
Fluid temperature:	+14°F to +176°F
weight:	approx. 1300 lbs.

- * Viscosity of the liquid of 146 SUS
- ** Operating vacuum is preset for the specific application
- *** Initial rate purifying mineral oil at 146 SUS, 104°F and with 6% water content

4. Heating power characteristic:



5. Test methods:

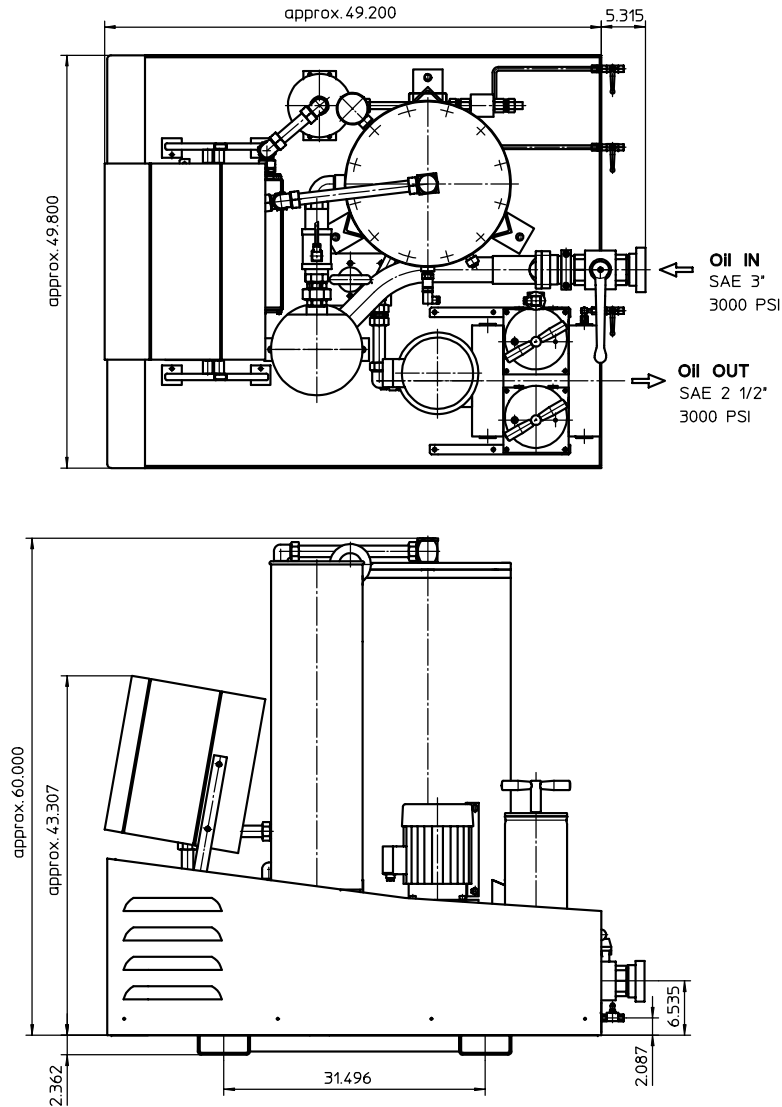
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

FLUID PURIFIER SYSTEMS, stationary **Series IFPS 101**

Sheet No.
4043 D



1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPS. 101. 6VG. 10. B. V. -. P69. D04. VP04. VS1. B											
1	2	3	4	5	6	7	8	9	10	11	12

- 1 **series:**
IFPS = INTERNORMEN-Fluid Purifier Systems, stationary
- 2 **nominal size:** 101
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(0)}$, 6 VG = 7 $\mu\text{m}_{(0)}$, 3 VG = 5 $\mu\text{m}_{(0)}$, 1 VG = 4 $\mu\text{m}_{(0)}$ Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
ISO6 = see sheet-no. 31601
- 8 **pump unit:**
P69 = pump unit 69, NG 125.80
- 9 **motor:**
D04 = B5/100L/4.2.5.1800.265/460.D.60.1.-.-
rotary current motor 265/460 V, 60 Hz, approx. 1700 RPM, 3.0 HP, typ of protection IP 54
- 10 **vacuum pump:**
VP04 = vacuum pump 04, 265/460 V, 3-phase, 60 Hz, 2.4HP, protection IP 54
- 11 **clogging sensor:**
VS1 = VS1.1.5.V.-.GS.B.E electronical, at p_1 and p_2 , 22 PSI, see sheet-no. 1607
- 12 **supply voltage:**
B = 480V, 3-phase

1.2. Filter element: (quantity 2, ordering example)

01NR. 1000. 6VG. 10. B. V. -						
1	2	3	4	5	6	7

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

Changes of measures and design are subject to alteration!

2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
 - Additive depletion
 - Reduction of the lubrication properties of the fluid
 - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

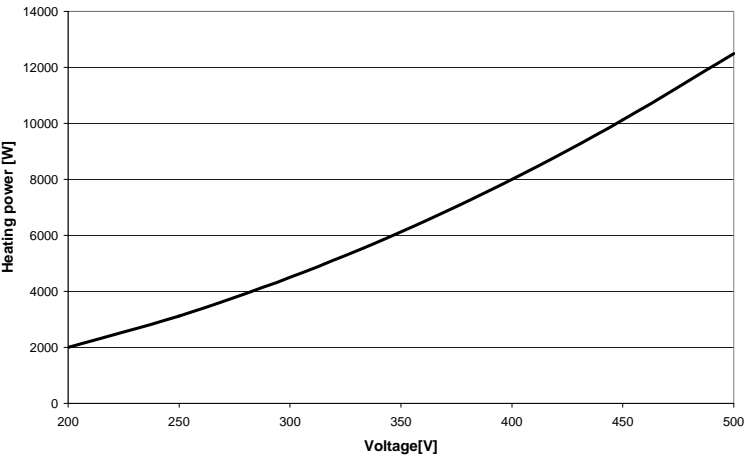
Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -9 PSI to -13 PSI. The fluid is passing a heater which is raising the temperature in order to increase the filtration speed. The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system. The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	3" SAE-flange 3000 PSI
Outlet connection:	2 ½" SAE-flange 3000 PSI
Circulation flow rate:*	26 GPM
Operating vacuum:**	-9 PSI to -13 PSI
E-motor hydraulic pump:	3.0 HP, 3-phase 265/460 V, 60 Hz
E-motor vacuum pump:	2.4 HP, 3-phase 265/460 V, 60 Hz
Heater capacity:	8000 Watt
Filter type:	2x NF 1000
Seal material:	Viton (FPM)
Maximum viscosity:	3000 SUS
Water extraction rate:***	119 gal / day
Ambient temperature:	+14°F to +140°F
Fluid temperature:	+14°F to +176°F
weight:	approx. 1740 lbs.

- * Viscosity of the liquid of 146 SUS
- ** Operating vacuum is preset for the specific application
- *** Initial rate purifying mineral oil at 146 SUS, 104°F and with 6% water content

4. Heating power characteristic:



5. Test methods:

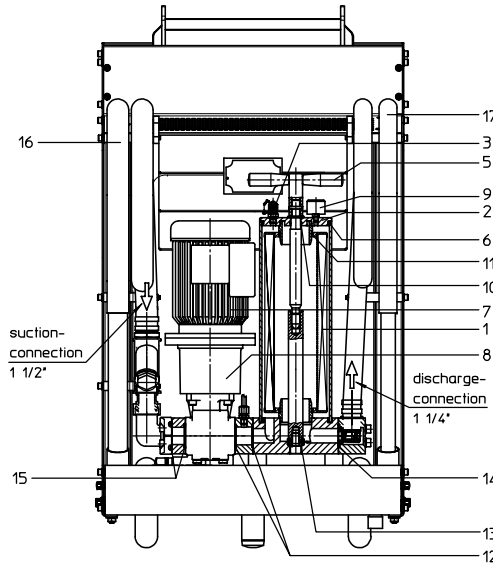
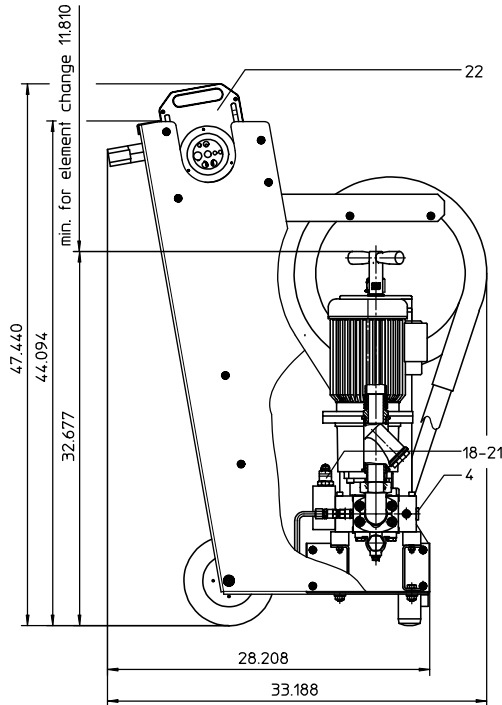
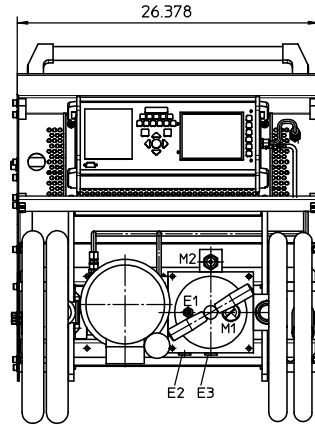
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side manometer 0-232 PSI
 M2: measure connection at filter housing, dirt side
 p₁ = dirt side
 p₂ = clean side



FILTER UNIT, mobile for contamination control Series UMCC 40 116 PSI

Sheet No.
 4033

1. Type index:

1.1. Filter unit: (ordering example)

UMCC. 40. 6VG. 10. B. P. -. P30. W09. L03. L28. AOR. CCS2

1	2	3	4	5	6	7	8	9	10	11	12	13
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- 1 **series:**
UMCC = filter unit, mobile for contamination control
- 2 **nominal size:** 40
- 3 **filter-material and filter- fineness:**
10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)
10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c) Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **pump unit:**
P30 = pump unit 30, NG 40.25 (standard-pump unit)
- 9 **motor:** (W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	doc.-no.
W06 ¹⁾	230V 50Hz	9.4 GPM	1860 SUS	43056-4
W09 ¹⁾	110V 60Hz	11.2 GPM	1860 SUS	43057-4

¹⁾ standard-motor

- 10 **suction connection 1 1/2"** : (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter
- 11 **discharge connection 1 1/4"** : (see sheet-no. 40572-4)
L28 = hose-lance
L29 = hose-fitting-lance
- 12 **clogging indicator at M2:**
AOR = visual, Δp 36 PSI, see sheet-no. 1606
AOC = visual, Δp 36 PSI, see sheet-no. 1606
- 13 **contamination control system:**
- = without
CCS2 = with contamination control system CCS2

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	BSP 1/2	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P30	1	NG 40.25	326584
9	manometer	1	visual Ø 40	317847
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	2	47,22 x 3,53	305078 (NBR)
16	suction hose 1 1/2"	1	according to type index	
17	discharge hose 1 1/2"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control system	1	CCS2	320595

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At a pressure difference 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 8 bar.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 116 PSI, the motor-protection-switch cuts the E-motor out.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

In order to measure the contamination class of the oil taken in, there is a connection for the electronic particle counter CCS 2 ahead the filter. The CCS 2 is supplied complete with case and extra connection hoses and can also be used separately. When measuring at the mobile filter unit please consider that a change of the measured contamination classes is shown after an adequate operation time only, depending on the total oil volume and its mixing with the filtered oil.

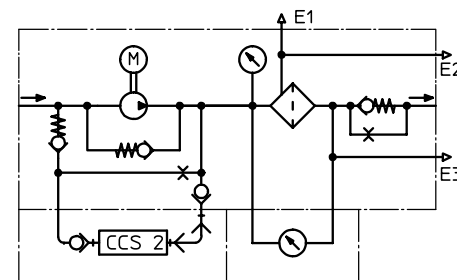
To protect the pump a cleanable coarse filter made of metal wire mesh with mesh size 250 µm is being placed in the suction hose.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
oil temperature: +23°F to +140°F
weight: approx. 249 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



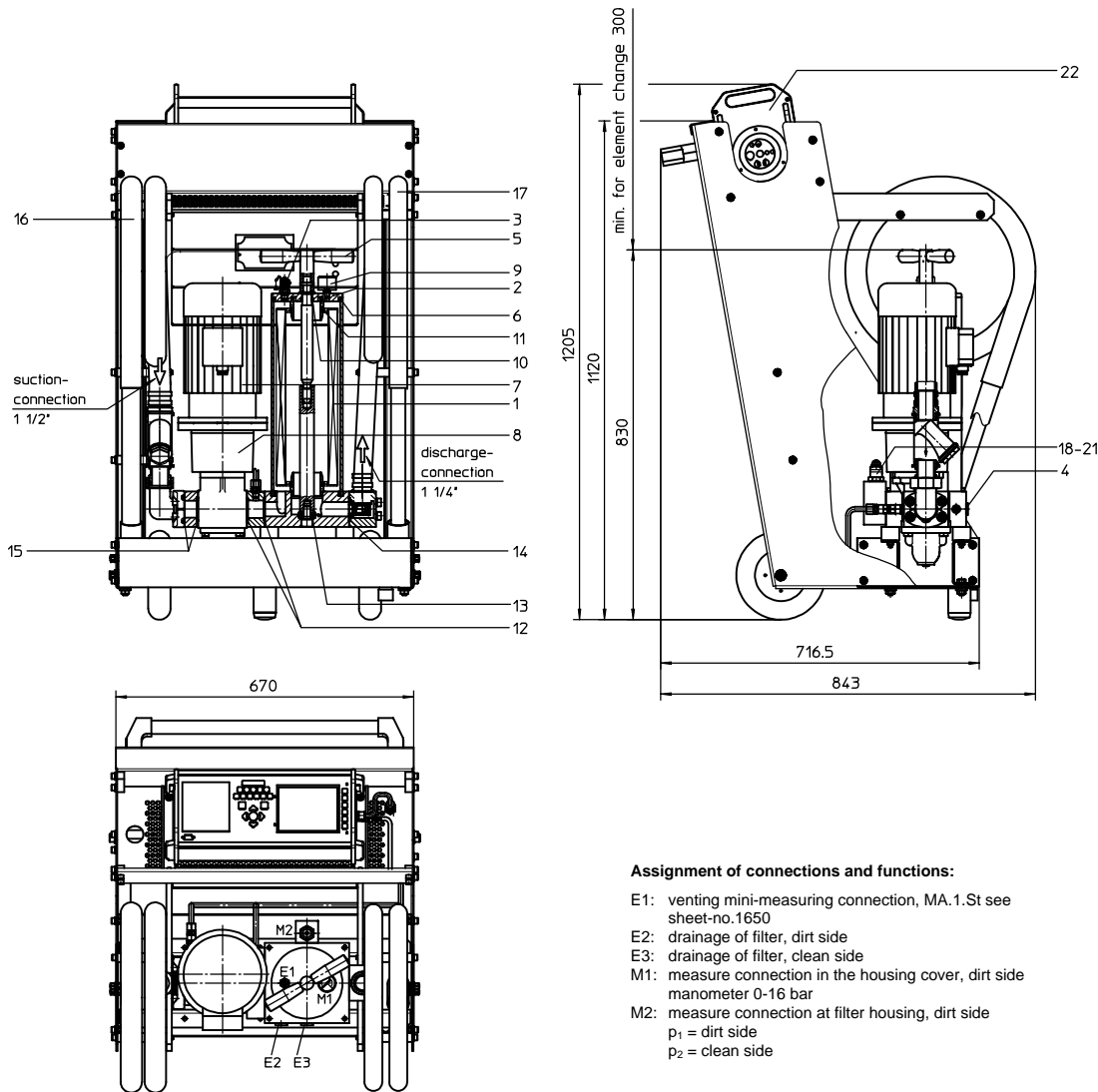
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile for contamination control **Series UMCC 80 PN 8**

Sheet No.
4032 B



1. Type index:

1.1. Filter unit: (ordering example)

UMCC. 80. 6VG. 10. B. P. -. P28. W18. L03. L28. AOR. CCS2

1	2	3	4	5	6	7	8	9	10	11	12	13
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- 1 **series:**
UMCC = filter unit, mobile for contamination control
- 2 **nominal size:** 80
- 3 **filter-material and filter- fineness:**
10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fibre)
10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c) Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **pump unit:**
P28 = pump unit 28, NG 80.50 (standard-pump unit)

9 motor: (W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	doc.-no.
W18 ¹⁾	230V 50Hz	71,0 l/min	400 mm ² /s	43060-4
W06	230V 50Hz	71,0 l/min	100 mm ² /s	43056-4

¹⁾ standard-motor

- 10 **suction connection 1 1/2"** : (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter
- 11 **discharge connection 1 1/4"** : (see sheet-no. 40572-4)
L28 = hose-lance
L29 = hose-fitting-lance
- 12 **clogging indicator at M2:**
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606
- 13 **contamination control system:**
- = without
CCS2 = with contamination control system CCS2

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P28	1	NG 80.50	325579
9	manometer	1	visual Ø 40	317847
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	2	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½"	1	according to type index	
17	discharge hose 1 ½"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control system	1	CCS2	320595

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At a pressure difference > 2,5 bar, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 8 bar.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 8 bar, the motor-protection-switch cuts the E-motor out.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

In order to measure the contamination class of the oil taken in, there is a connection for the electronic particle counter CCS 2 ahead the filter. The CCS 2 is supplied complete with case and extra connection hoses and can also be used separately. When measuring at the mobile filter unit please consider that a change of the measured contamination classes is shown after an adequate operation time only, depending on the total oil volume and its mixing with the filtered oil.

To protect the pump a cleanable coarse filter made of metal wire mesh with mesh size 250 µm is being placed in the suction hose.

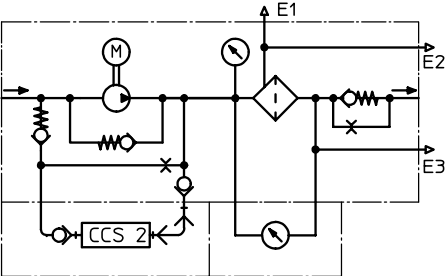
4. Technical data:

filter-fineness:
oil temperature:
weight:
operating medium:

4, 5, 7 or 10 µm_(c)
-5°C to +60°C
approx. 155 kg
hydraulic oil based on mineral oil from 10 mm²/s,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



6. Test methods:

Filter elements are tested according to the following ISO standards:

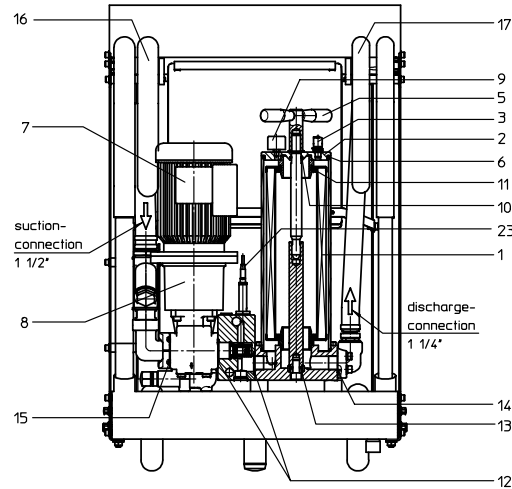
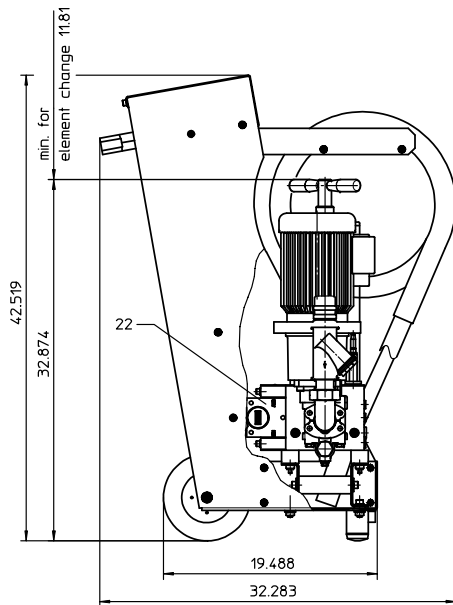
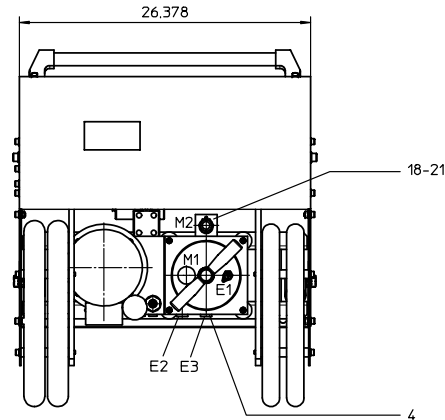
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with fluid control **Series UMFC 41 87 PSI**

Sheet No.
4052

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.ST
see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing, dirt side
p₁ = dirt side
p₂ = clean side



1. Type index:

1.1. Filter unit: (ordering example)

UMFC. 41. 6VG. 10. B. P. -. P44. W04. L03. L05. AOR

1	2	3	4	5	6	7	8	9	10	11	12
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- 1 **series:**
UMFC = filter unit, mobile with fluid control
2 **nominal size:** 41

- 3 **filter-material and filter-fineness:**
10 VG = 10 µm_(G), 6 VG = 7 µm_(G), 3 VG = 5 µm_(G), 1 VG = 4 µm_(G), Interpor fleece (glass fiber)
10 WVG = 10 µm_(G), 3 WVG = 5 µm_(G), Watersorp-filter element

4 resistance of presure difference for filter element:

- 10 = Δp 145 PSI

5 filter element design:

- B = both sides open

6 sealing material:

- P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 filter element specification:

- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 pump unit:

- P44 = pump unit 44, NG 40.25 (standard-pump unit)

9 motor: (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W27 ¹⁾	230V	50Hz	9.4 GPM	1860 SUS	43412-4
W04 ¹⁾	110V	60Hz	11.2 GPM	1860 SUS	43411-4

¹⁾ standard-motor

10 suction connection 1 1/2" with protective filter: (see sheet-no. 31961-4)

- L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 discharge connection 1 1/4" : (see sheet-no. 31961-4)

- L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting

12 clogging indicator at M2:

- = without
AOR = visual, Δp 36 PSI, see sheet-no. 1606
AOC = visual, Δp 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
2 **nominal size:** 630
3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alter ation!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	BSPF 1/2	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P44	1	NG 40.25	327963
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 1/2"	1	according to type index	
17	discharge hose 1 1/2"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control sensor	1	PFS 01	327213
23	water analysis- and temperature sensor	1	WSPS 03	326211

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu\text{m}_{(c)}$.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 87 PSI.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 87 PSI, the motor-protection-switch cuts the E-motor out.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

In case of the drawn-off oil the contamination classes can be determined in front of the filter with the contamination control sensor PFS01, with help of the water analysis- and temperature sensor WSPS03 the saturation of the water. With choice of the different operating modes the running filter unit can be switched off manually or, after reaching the given limits for the contamination classes and / or through saturation of the water.

For the protection of the pump there is a cleanable coarse filter made of metal with a mesh size of 250 μm in the suction line.

In order to protect the sensors the unit is being automatically stopped at an oil temperature of approx. 158°F. Measurement of the contamination class with PFS01 can be done at oil temperatures up to 122°F only. Otherwise the sensor will be overheated

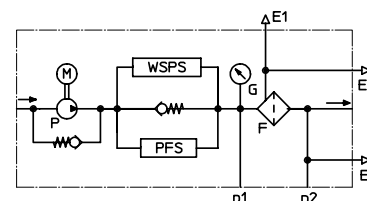
4. Technical data:

filter-fineness: 4, 5, 7 or 10 $\mu\text{m}_{(c)}$
oil temperature: 32°F to 158°F (122°F)
weight: approx. 231 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS, other media on request

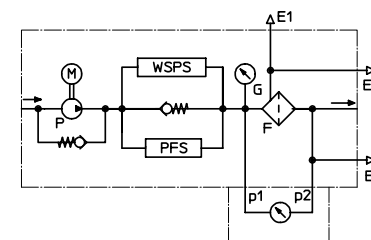
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:

filter unit without clogging indicator



filter unit with clogging indicator
AOR or AOC



6. Test methods:

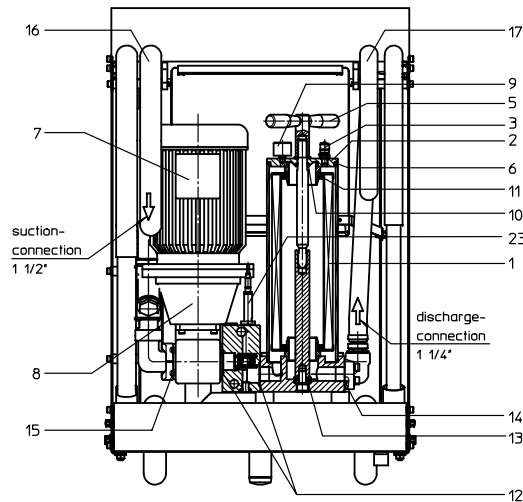
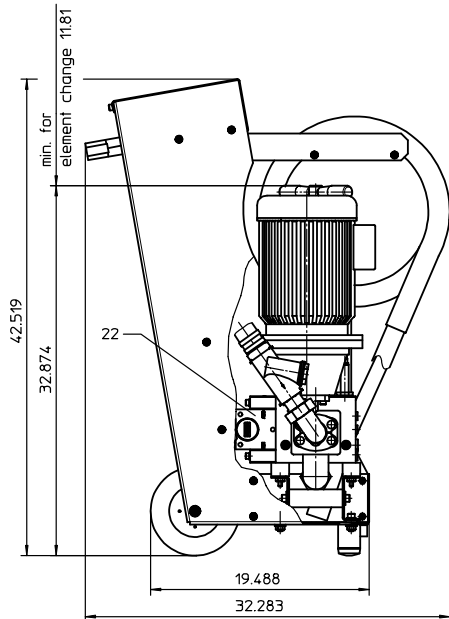
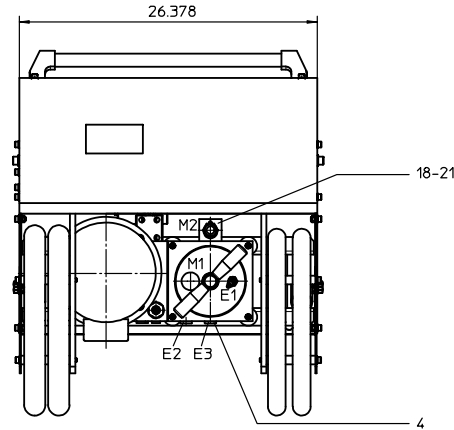
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with fluid control **Series UMFC 81 145 PSI**

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.ST
see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing, dirt side
p₁ = dirt side
p₂ = clean side



1. Type index:

1.1. Filter unit: (ordering example)

UMFC. 81. 6VG. 10. B. P. -. P42. D63. L03. L05. AOR

1	2	3	4	5	6	7	8	9	10	11	12
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- 1 **series:**
UMFC = filter unit, mobile with fluid control
- 2 **nominal size:** 81
- 3 **filter-material and filter-fineness:**
10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c), Interpor fleece (glass fiber)
10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c), Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **pump unit:**
P42 = pump unit 42, NG 80.50 (standard-pump unit)
- 9 **motor: (D = rotary current motor)**

motor	electrical connection	50Hz	volume flow	max. viscosity	doc.-no.
D63 ¹⁾	230/400V	50Hz	9.4 GPM	3720 SUS	43408-4
	230/400V	50Hz	18.7 GPM	1860 SUS	
	265/460V	60Hz	11.2 GPM	3720 SUS	
	265/460V	60Hz	22.5 GPM	1860 SUS	

¹⁾ standard-motor

- 10 **suction connection 1 1/2" with protective filter:** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter
- 11 **discharge connection 1 1/4" :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting
- 12 **clogging indicator at M2:**
- = without
AOR = visual, Δp 36 PSI, see sheet-no. 1606
AOC = visual, Δp 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

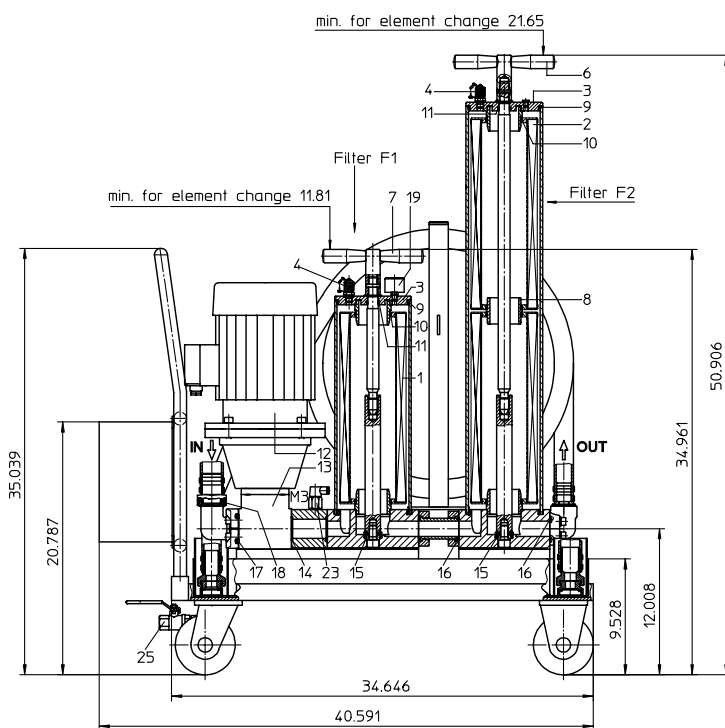
01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
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- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.



2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630...	
2	watersorp-filter element	2	01NR. 630...	
3	housing cover	2	30600-3	315492
4	mini-measuring connection	2	MA.1.ST	305453
5	screw plug	2	½ BSPP	304678
6	straining screw	1	31078-3	
7	straining screw	1	30595-3	316312
8	Verbindungszapfen	1	20899-4	308842
9	O-ring	2	140 x 6	315392 (NBR)
10	O-ring	2	70 x 4	306253 (NBR)
11	O-ring	2	22 x 3	304387 (NBR)
12	E-motor D 04	1	3.5 HP, 265/460 V	316276
13	pump unit P 09	1	NG 80.50	320268
14	O-ring	2	45 x 3	304991 (NBR)
15	O-ring	2	18 x 3	304359 (NBR)
16	O-ring	3	37,69 x 3,53	304353 (NBR)
17	O-ring	1	47,22 x 3,53	305078 (NBR)
18	O-ring	2	35 x 2,5	308893 (NBR)
19	clogging indicator visual	1	O	304907
20	clogging indicator visual	2	AOR.2.5.P.-	316431
21	O-ring	2	15 x 1,5	315357 (NBR)
22	O-ring	2	22 x 2	304708 (NBR)
23	pressure switch	1	E5.5	306165
24	evacuation connection	2	EE.3.G.ST	310449
25	evacuation connection	1	EE.3.W.ST	310534
26	suction tube 1 ½"	1	31090-4	
27	discharge hose 1 ¼"	1	31108-4	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration and water separation in addition to the existing operating filter
- secondary flow filtration and water separation without the action of the operating filter
- filtration and water separation when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction tube 1 ½" and the discharge hose 1 ¼" are approximately 118 inch long inclusive of the hose coupling.

The device is equipped with a gear pump driven by an electric motor. The flow conveyed by the geared pump is fed over a filter elements to DIN 24550, T4, nominal size 630.

Oil maintenance takes place in two stages via two in-line filters. The filter element in filter F1 ensures removal of the contamination. Depending on the customer requirements, the filter mesh in filter F1 is either 4, 5, 7 or 10µm_(c). Water is separated in filter F2 by means of two parallel-acting water absorption filter elements.

The degree of filter element contamination is indicated on the 4 measurement points M1 to M4.

If the permissible pressure difference of $\Delta p_1 = 36$ PSI is exceeded, the pressure difference is measured via the filter element in filter F1 and the degree of contamination is displayed at measurement point M1.

If the permissible pressure difference of $\Delta p_1 = 36$ PSI is exceeded, the pressure difference is measured via the filter element in filter F2 and the degree of contamination is displayed at measurement point M2.

The sum resulting from pressures $\Delta p_1 + \Delta p_2$ + the discharge pressure is measured at points M3 and M4.

The red sector of the gauge fitted to M4 indicates $p \leq 87$ PSI and so the opening of the bypass valve between the pressure and suction connection of the gear pump.

The pressure switch on M3 operates the electric control which ensures that, when the operating pressure of $p = 73$ PSI is exceeded, the electric motor of the gear pump is switched off.

The filter unit can be operated without supervision, because operational safety is guaranteed by the switching-off function of the pressure switch fitted to M3, the overload protection of the electric motor and the bypass valve in the gear pump. After independent switching off of the filter unit by the pressure switch fitted to M3, the display condition of the pressure switch at M1 and M2 is retained, which indicates that the filter elements must be changed.

After the filter element has been changed, the contamination display at M1 and M2 must be reset manually (see data sheet 1606 for reset function).

The filter element can be changed without tools. After removing the tensioning nut and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

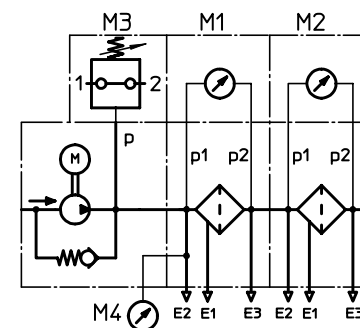
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

pumping capacity:	22.5 GPM at 1700 RPM
E-motor:	3.5 HP, approx. 1700 RPM
rotary current	265/460 V, 60 Hz
pressure load capacity:	max. 87 PSI
filter-fineness:	4, 5, 7 or 10µm _(c)
weight:	approx. 275 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 up to 1860 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, P ara. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



Hydraulic and Lubrication Filters



internormen 
 *filter technology*

The name *INTERNORMEN* stands for competence and more than four decades of experience in developing products in the field of filter technology, including modern software, measuring equipment and analysis systems.

Following a path of continuous development, we have maintained quality, a common hallmark of all our products and services, as a fundamental element of the *INTERNORMEN* corporate strategy. In the field of hydraulic and lubrication filters, *INTERNORMEN* currently offers a product selection with more than 4000 different filter elements, including corresponding filter housings.

Our wide range knowledge, our ability to expeditiously implement new technologies, the consistent orientation towards our customers' needs – have all resulted in seven product families:

filter technology

system technology

fluid management

**contamination
monitoring**

electronics

software solutions

process technology

WHY FILTRATION ?

What is Hydraulic System Cleanliness?

Cleanliness is a term used to describe the level of solid and liquid contamination found in hydraulic systems. *Contamination* may be defined as any substance that is not part of the hydraulic system's working fluid.



Why is cleanliness important to you?



Efficient production for clean systems provide maximum productivity.

Improved control of spare parts through preventive maintenance and contamination monitoring.

Reduced equipment downtime through scheduled inspections.

Safety hazards minimized through preventing contamination related failure.

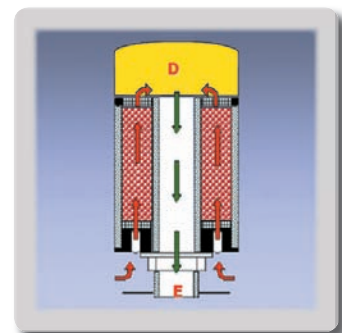
Increased life expectancy of system components, essentially increased economies of operation and therefore decreased maintenance charges.

Reduced repair costs due to fewer breakdowns.

How does contamination get in there?

There are three principal means through which contamination can occur in a typical hydraulic system. It can be:

1. Built in during system assembly
2. Generated during system operation
3. Ingested by the system during operation



FILTER MEDIA

Mainly used filter material:

- deep filtration
- high particle-holding capacity
- best micron rating at high delta p
- usable for mineral oils, emulsions and for most synthetic hydraulic fluids and lubrication oils
- filter fineness based on filtration quotient $\beta_{x(c)} \geq 200$:
 $4\mu_{m(c)}$, $5\mu_{m(c)}$, $7\mu_{m(c)}$, $10\mu_{m(c)}$,
 $15\mu_{m(c)}$, $20\mu_{m(c)}$



INTERPOR FLEECE "VG" GLASS FIBRE



PAPER MATTING "P"

- deep filtration
- paper matting consisting of paper and polyester fibre
- high material stability and strength
- available in 10 μm and 25 μm

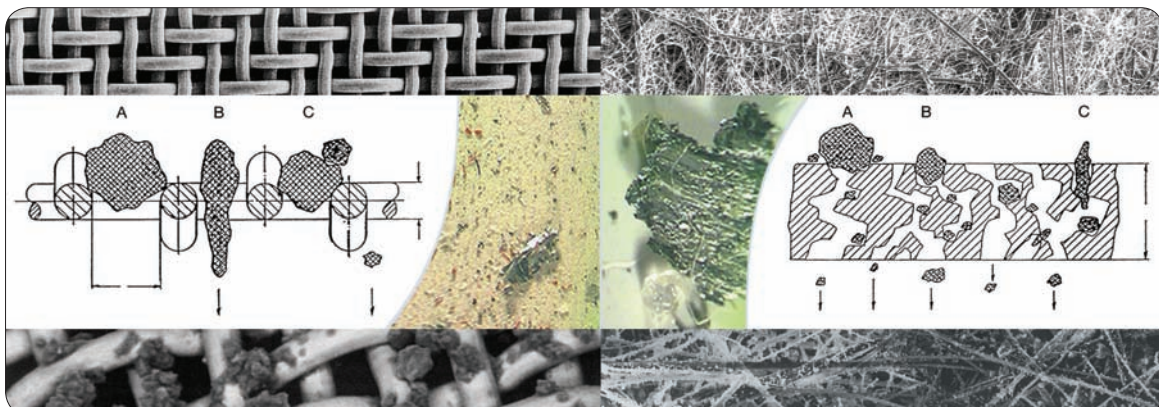
- surface filtration
- stainless steel wire mesh provides filter elements with high resistance in all kinds of hydraulic fluids
- partially cleanable
- available in 25 μm , 40 μm and 80 μm (other micron ratings on request)



STAINLESS STEEL MESH "G"

SURFACE FILTRATION (MESH)

BULK FILTRATION (FLEECE)



Please request separate data sheets for our **FILTER SERIES**

TANK MOUNTED RETURN-LINE FILTERS

SERIES TEF - DTEF - TEFB - RF - TRW

Application: Mounting is on the top of the reservoir with the outlet port returning to the reservoir.

Port size: up to -24 SAE, SAE 5" 3000 PSI, ANSI flange 8" 150 PSI.

Working pressure: 145 PSI

Flow rates: up to 1902 GPM, TEFB, TRW up to 79 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: Lightweight, easy to change, reduced possibility of oil spillage during element change (environmental concern).

TEF - filters have a removable bowl which prevents contamination from entering the reservoir during filter element change, multiple inlet ports are possible

TEFB - no additional breather port in the tank needed

TRW - horizontal tank mounted return-line filters.



RETURN-LINE FILTERS WITH SUCTION CONNECTION

SERIES TRS - TNRS

Application: Tank mounted return-line filters with suction connection for mobile hydraulic applications with minimum two independent hydraulic circuits.

Port size: up to 3x-20 SAE, SAE 2" 3000 PSI.

Working pressure: 145 PSI

Flow rates: up to 119 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: Tank-top mounted in-line filters supply clean suction flow and prevent cavitation, custom designs possible.



PRESSURE FILTERS, CHANGE OVER

SERIES MDD - HDD

Application: Can be mounted in suction, pressure or return lines.

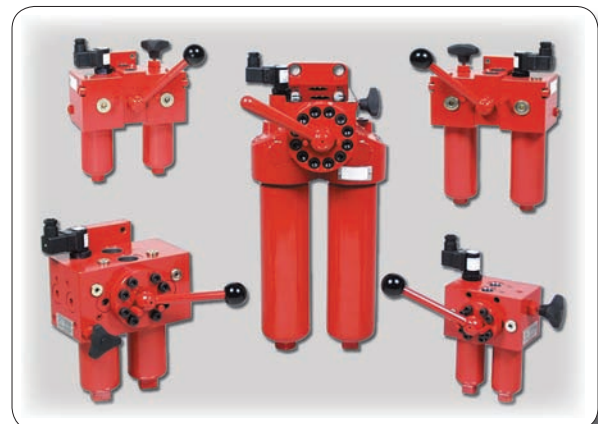
Port size: up to -16 SAE, SAE 2" 6000 PSI, AVIT flange 4" 640 PSI

Working pressure: up to 4568 PSI

Flow rates: MDD up to 25 GPM, HDD up to 356 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: Duplex filters can be maintained without interruption of the operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter side to the clean filter side without interruption.



SERIES DU - DUV

Application: The flow path through the filter can be changed to either of the two chambers.

For mounting in suction, pressure or return lines.

Port size: up to -12" SAE, SAE 5" 3000 PSI

Working pressure: 464 PSI

Flow rates: DU up to 1056 GPM, DUV up to 528 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh

User benefits: Rotary slide- or ball valve, which is integrated in the middle of the housing, makes it possible to switch from the dirty filter side to the clean filter side without interrupting the operation. The dirty element can be serviced or changed while in the "off" position.



SERIES DSF - DNR

Application: The flow path through the filter can be changed to either of the two chambers.

For mounting in suction, pressure or return lines.

Port size: SAE 5" 3000 PSI, ANSI flanges up to 10" 3000 PSI

Working pressure: 363 PSI, 232 PSI

Flow rates: DSF up to 2642 GPM, DNR up to 2113 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh

User benefits: A three-way change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter side to the clean filter side without interrupting the operation.



SERIES DA - DNA

Filters according to ASME design

Application: The flow path through the filter can be changed to either of the two chambers.

For mounting in suction, pressure or return lines.

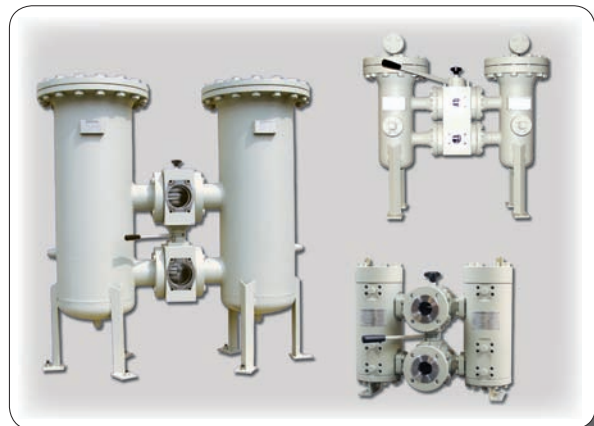
Port size: up to SAE 2" 3000 PSI, ANSI flange 4" 300 PSI

Working pressure: 232 PSI, 580 PSI

Flow rates: DA up to 264 GPM, DNA up to 542 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh

User benefits: Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter side to the clean filter side without interrupting the operation.



PRESSURE FILTERS

SERIES LF - RF

Application: For mounting in suction, pressure and return lines.

Port size: from -12 SAE up to ANSI flange 10"

Working pressure: 145 PSI, 232 PSI, 363 PSI, 464 PSI

Flow rates: up to 2642 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh

User benefits: The filter is mounted in such a way that the inlet and the outlet are on the same level. It can be used as a suction filter, pressure filter and return-line filter. RF-filter series have inlets on the side and outlets to the bottom.



PRESSURE FILTERS, PN > 100 bar

SERIES ML - MNL

Application: Mounting in pressure lines with threaded design.

Port size: up to -24 SAE

Working pressure: up to 2320 PSI

Flow rates: up to 119 GPM

Filtration materials: Interpor fleece or stainless steel wire mesh.

User benefits: Economical, lightweighted filter range for low to medium pressure applications. Requires only minimal clearance during element change and therefore saves valuable space.



SERIES HP 31 - 451

Application: Mounting in pressure lines with threaded design.

Port size: up to -24 SAE

Working pressure: up to 6000 PSI

Flow rates: up to 357 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: In-line or flange mounting possible with various different port and Δp indicator options. Very high flow rates with a single housing possible.



SERIES HP 170 - 1351

Application: Mounting in pressure lines with flange mounting.

Port size: up to SAE 2" 6000 PSI

Working pressure: up to 6000 PSI

Flow rates: up to 357 PSI

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: In-line or flange mounting possible with various different port and Δp indicator options. Very high flow rates with a single housing possible.



SERIES HPW

Application: Pressure filters for reversible filtration, mounting in pressure lines with flange or threaded mounting.

Port size: up to -24 SAE, flange 2"

Working pressure: up to 4568 PSI

Flow rates: up to 106 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: HPW filters are to be applied where the medium that should be filtered flows through the filter in two directions, and the filter effect for both directions of the flow exists.



SERIES HPV - MDV

Application: In-line pressure filters with differential pressure (cold start) valve.

Port size: HPV - up to -24 SAE, MDV - up to -12 SAE

Working pressure: HPV - 6000 PSI, MDV - 2901 PSI

Flow rates: HPV up to 119 GPM, MDV up to 40 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: Permanent supply of clean oil is guaranteed. If the element is clogged, change is forced, which means that no damage is possible to the downstream components.

Forced (third port) return to the reservoir.



PRESSURE FILTERS, MANIFOLD MOUNTED, PN > 100 bar

SERIES MNU - HNU - HPU - HPP

Application: Mounting in pressure lines with flange or manifold mounting.

Port size: 1 1/4"

Working pressure: 2320 PSI, 4568 PSI

Flow rates: HPP - up to 357 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: Simplified mounting, which saves valuable space. Provides filtration directly at the point needed. Prevents dirty fluid from passing downstream during the element change.



SERIES HPF - HPX - HPY

Application: Mounting in pressure lines with manifold mounting.

Port size: up to 1 1/4"

Working pressure: up to 4568 PSI

Flow rates: HPF - up to 357 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: Simplified mounting, which saves valuable space. Provides filtration directly at the point needed. Prevents dirty fluid from passing downstream during the element change.



TANK MOUNTED SUCTION FILTERS

SERIES AS - TS - TSW - ASF

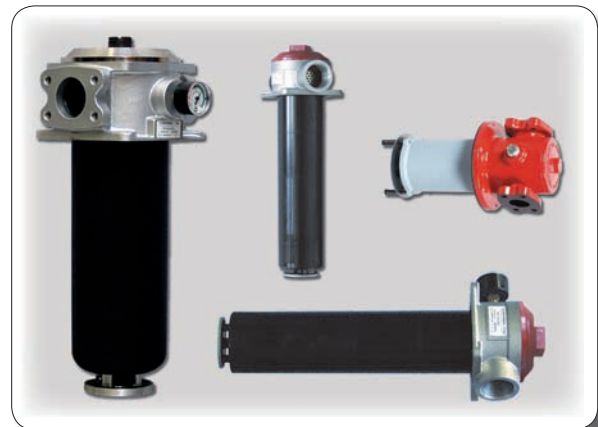
Application: Mount into the side of the reservoir below oil levels, directly mounted to the reservoir vertically (TS-series) or horizontally (TSW-series). Suction side is in the reservoir with a check valve to stop oil draining from the reservoir when being serviced.

Port size: up to flange SAE 3 1/2" 3000 PSI, up to -24 SAE

Flow rates: up to 185 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh.

User benefits: Suction filters which can be serviced from the outside of the reservoir with no additional check valve needed.



OFF-LINE FILTERS

SERIES NF

Application: The partial flow filter NF is foreseen for fine filtration in hydraulic and lubrication circuits additionally to the main filter.

Port size: up to SAE 2 1/2" 3000 PSI

Working pressure: 232 PSI

Flow rates: up to 264 GPM

Filtration materials: Paper, interpor fleece or stainless steel wire mesh. NF-filters can be provided with filter elements for water absorption.

User benefits: The large filtration area in comparison to the nominal size is the premise for a high dirt-retaining capacity even in a case of small filter fineness. Element change without tools is possible. After release of the straining screw and removal of the cover, the elements are accessible and can be changed.



TANK BREATHERS

SERIES NBF - EBF - BFD - BF

Application: Air breathers assure no contamination reaches the tank through air exchange and condensation of water in reservoirs.

Port size: up to BS PP 3

Flow rates: up to 925 GPM

Filtration materials: NBF - Interpor fleece, paper

EBF - Paper

TBF - Paper

BF - WP - Interpor fleece, paper

BFD - Silica gel, interpor fleece

User benefits: Protect systems from airborne debris and / or moisture.



SPIN ON FILTERS

SERIES WPL

Application: In-line filter series, mounted into pressure and return lines for all hydraulic systems.

Port size: up to NPT 1 1/2"

Flow rates: up to 69 GPM

Filtration materials: Paper or interpor fleece

User benefits: Easy maintenance. Die-cast aluminum construction saves overall weight. Can be used as suction or return filters.



CLOGGING INDICATORS

SERIES AE - OE - O - E - VS

Application: Wide range of clogging indicators for hydraulic and lubricating systems.

User benefits: Easy integration into automatic control systems, continuous contamination control, continuous pressure difference measuring, early identification of increased contamination, optimal utilization of filter elements.

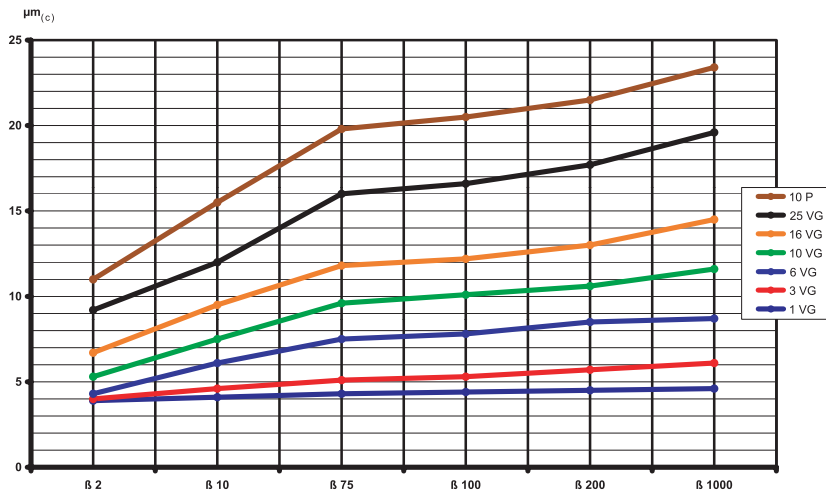
Types: optical, electrical, optical-electrical, electronical, available in the following variations - block execution, explosion-proof, thread execution, with reset function, with control function.



FILTER EFFICIENCY DATA

MULTI-PASS PERFORMANCE ACCORDING TO ISO 16889

FILTRATION QUOTIENT $\beta_{x(c)}$ INTERPOR GLASS FIBRE



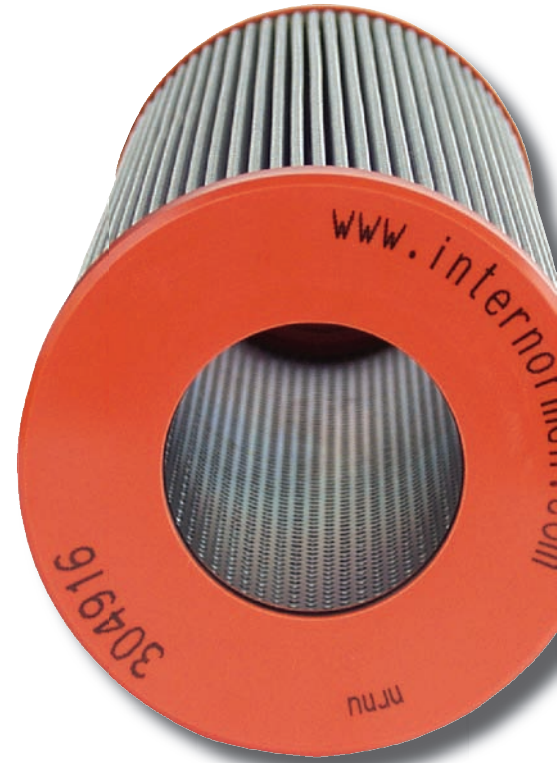
Calculation of the filtration quotient $\beta_{x(c)}$

$$\beta_{x(c)} = \frac{\text{amount of particles of the size } \geq x \mu m_{(c)} \text{ before the filter}}{\text{amount of particles of the size } \geq x \mu m_{(c)} \text{ after the filter}}$$

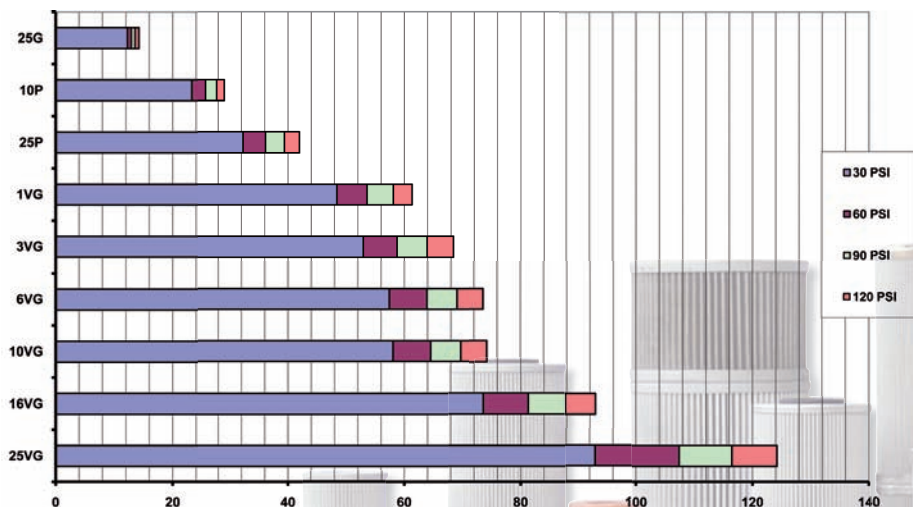
Conversion of the filtration quotient $\beta_{x(c)}$ into filtration efficiency in %

$$\frac{\text{filtration quotient} - 1}{\text{filtration quotient}} \times 100 = \%$$

$$\text{e.g. } \beta_{10(c)} = 200 \rightarrow \frac{(200-1)}{200} \times 100 = 99,5\%$$



DIRT HOLDING CAPACITY ACCORDING TO ISO 16889



Dirt holding capacity according to ISO 16889 (test dust : ISO-MTD) of different filter media and different filtration grades. Dirt holding capacities at 30, 60, 90, 120 PSI pressure difference.



NECESSARY CLEANLINESS CLASSES IN DEPENDANCY OF SYSTEM SENSITIVITY

The cleanliness of the oil in a hydraulic system is dependent on the micron rating of the element, the specific dirt entry as well as the size distribution of the particles in the fluid. The data in the table are standard values. To ascertain the quality of oil, it has to be analysed.

Kind of system Case of application	Req. class acc. to ISO 4406:99	Req. class acc. to NAS 1638	Recommended INTERNORMEN filter material
Against fine soiling and mud- ding up of sensitive systems	16/12/8	2-3	1 VG
	17/13/9	3-4	3 VG
Heavy-duty servo systems, high pressure systems with long service life	19/15/11	4-6	6 VG
Proportional valves, industrial hydraulics with high operating safety	20/16/13	7-8	10 VG
Mobile hydraulics, common mechanical engineering, medium pressure systems	22/18/14	7-9	16 VG
Heavy industries, low pressure systems, mobile hydraulics	23/19/15	9-11	25 VG

In addition to tests developed by **INTERNORMEN Technology**, testing of our filter elements is done according to the following ISO-Standards:

- ISO 2941** Verification of collapse/burst resistance
- ISO 2942** Verification of fabrication integrity
- ISO 2943** Verification of material compatibility with fluids
- ISO 3723** Method for end load testing
- ISO 3724** Verification of flow fatigue characteristics
- ISO 3968** Evaluation of pressure drop versus flow characteristics
- ISO 16889** Multi-pass method for evaluating filtration performance



Solution of customer specific filter problems, service in lab and at site are based on the work of our research and development and design teams, supported by computer analysis and measurement methods, and the availability of all necessary test stands according to ISO standards, and continuous production control of filter elements.

The beta ratio of the filter element and its permanent efficiency are guaranteed for high pressure differences. Filter materials, bonding and processing are regularly controlled by means of bubble-point tests, on our test stand, according to ISO 2942.

INTERNORMEN Technology elements can be supplied with 100 % bubble-point tests and corresponding certificates on request.



FULLY AUTOMATIC BACKFLUSHING FILTER TYPE ABF 50 - 1000

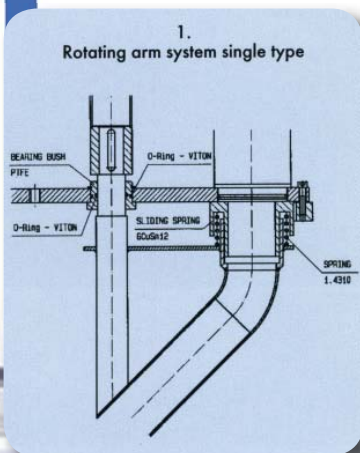


Application

INTERNORMEN - backflushing filters are primarily used for filtration of highly contaminated liquids. They are suitable for filtering fuels, lubrication oils, solvents, machine tool cooling lubrications, chemical process cleaning fluids, water treatment plants in the power industry, in the food sector and for filtration of cooling- and seawater. This filter type is designed to operate trouble free in batch format or continuously. ABF filters may also be used in hazardous areas with all electrical components being designed in accordance with explosion proof classes, for example Eex d2 II CT4.

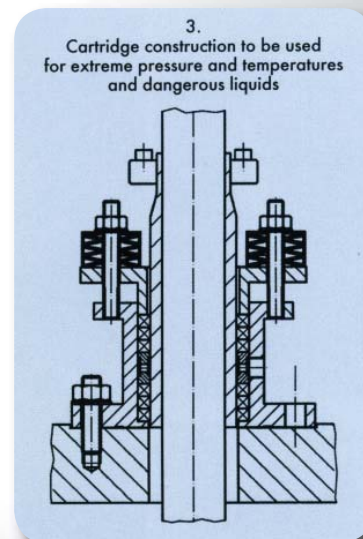
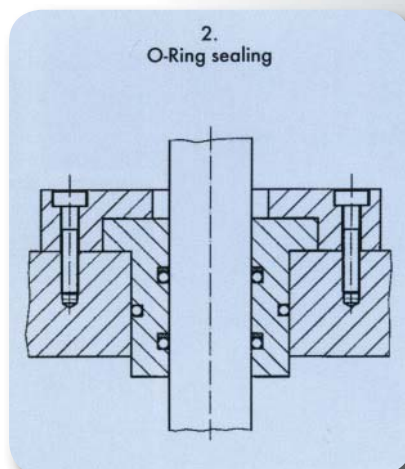
Construction

The filter type ABF consists of a filter housing with dished bottom and a flat removable cover. Manufactured in either carbon or specific stainless steels, for example 1.4541 (AISI 321), 1.4571 (AISI 316), 1.4539 (AISI 904L) or other high alloy steels, such as Hastelloy C22, Alloy 624, Inconel, CuNi 90/10. The housing cover sealing is being selected, depending on existing operational conditions, such as pressure, temperature and fluid to be filtered. Two different kinds of sealings are available, according to Pos. 2: O-Ring sealing, or according to Pos.3: as a special cartridge construction suitable for high pressure and high temperatures, as well as for dangerous liquids. The product inlet is located at the lower portion of the filter housing and the product outlet at the top, complete with connecting flanges according to DIN/ANSI as standard. The contaminant discharge point is installed at the lowest point of the filter and equipped with a shut-off valve and flange connection to DIN/ANSI as standard. The vent connection is located at the highest point of the housing.



The filter unit can be equipped with:

- 1 differential pressure gauge with output signals 0 to 20 mA
- 1 electrical gear motor
- 1 shut-off drain valve under electrical or pneumatic operation (optional)
- 1 electric control panel



Fully automatic backflushing filter

Type ABF 50 - 1000

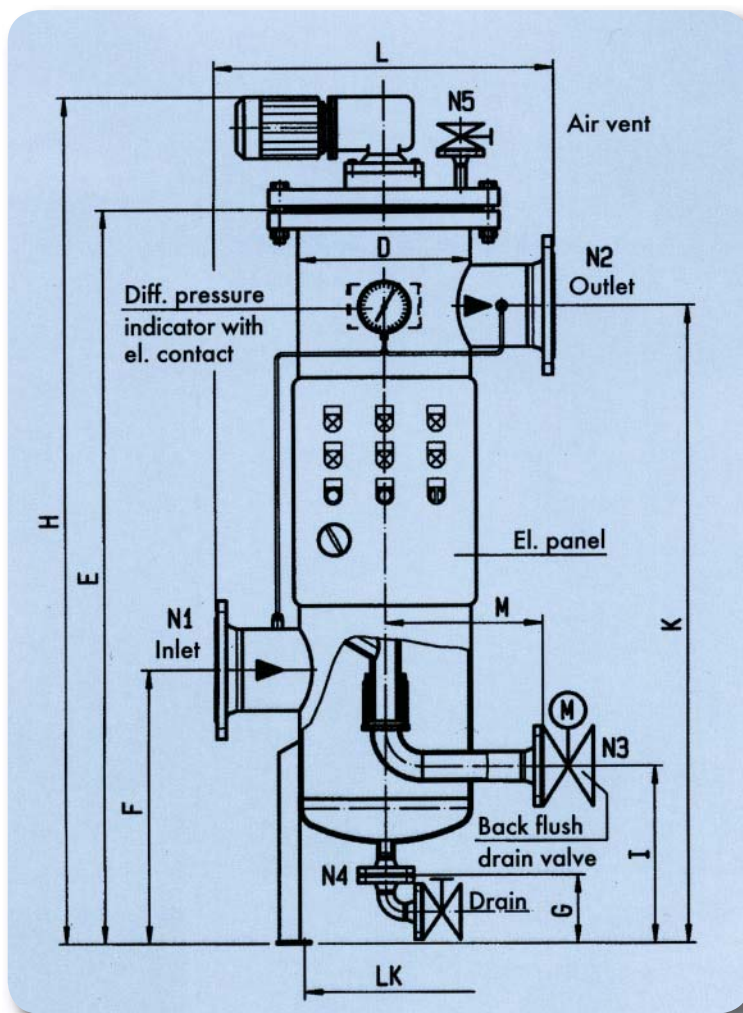
Housing material:

Carbon steel
Stainless steel SS304, SS316,
SS347 or CuNi 90/10

Filter element

wedge wire type:

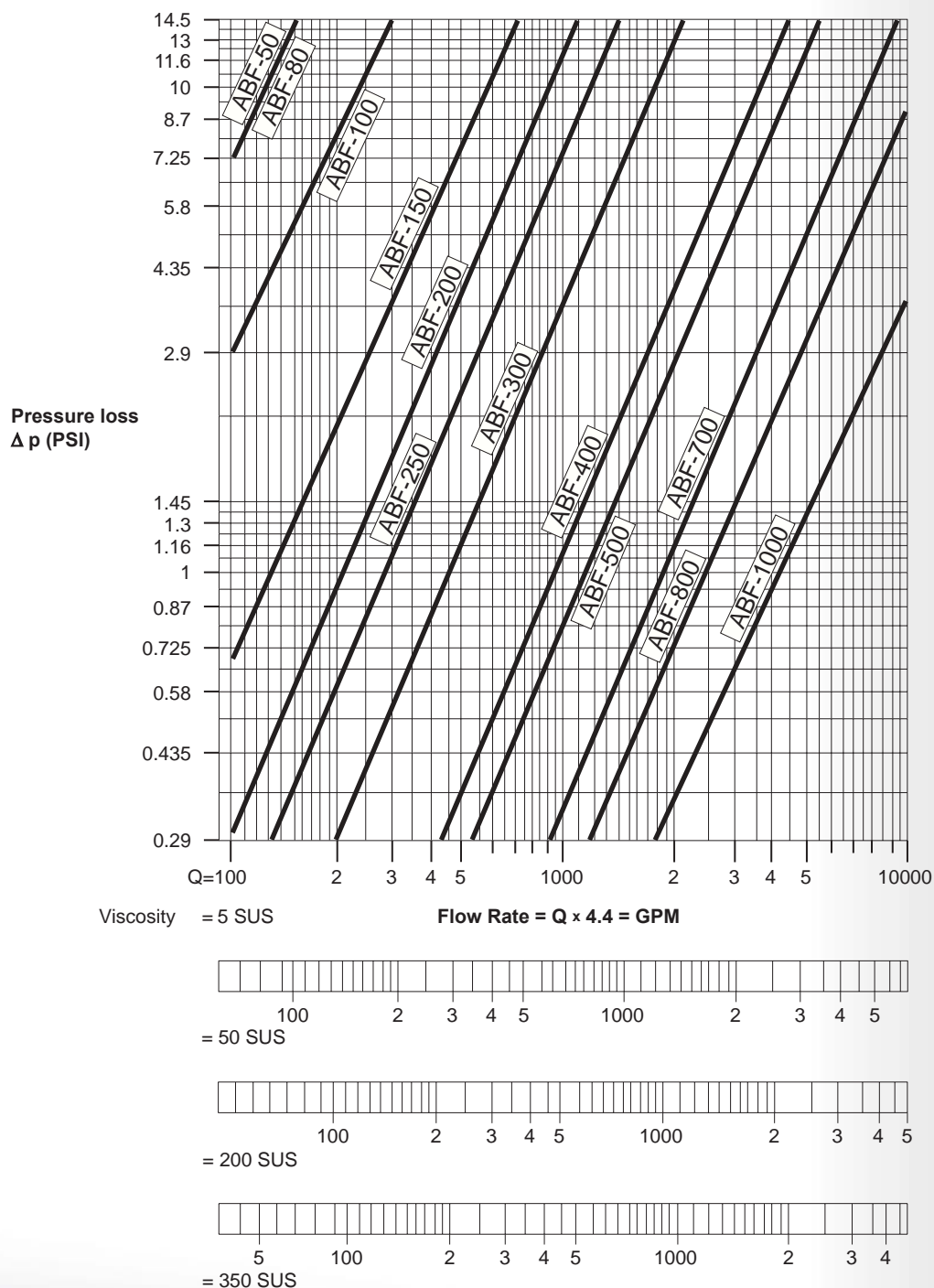
Stainless steel SS304, SS316,
Monel or CuNi 90/10



Filter Type	Connection max. N1/N2	Connection N3	Connection N4	Filter Area ft ²	Contents Gal	Dimensions in inches									
						D	E	F	G	H	I	K	L	M	LK
ABF 50	2"	1"	1/2"	7.53	13.21	8.63	70.87	18.89	7.87	80.71	17.72	62.99	19.67	9.06	8.66
ABF 80	3"	1"	1/2"	7.53	13.21	8.63	70.87	18.89	7.87	80.71	17.72	62.99	19.67	9.06	8.66
ABF 100	4"	1 1/2"	1/2"	9.69	21.13	10.75	70.87	20.08	7.87	80.71	18.50	61.02	23.22	10.63	10.83
ABF 150	6"	2"	1"	8.30	36.98	13.98	72.84	21.65	7.87	82.68	19.69	61.02	27.56	12.21	13.98
ABF 200	8"	2"	1"	23.10	63.40	17.99	74.80	23.62	7.87	86.61	20.47	61.02	33.47	14.17	17.99
ABF 250	10"	2 1/2"	1"	33.90	113.59	23.62	76.78	25.98	7.87	88.58	22.05	62.99	39.37	16.93	23.62
ABF 300	12"	2 1/2"	1"	52.74	153.22	27.56	78.74	27.95	7.87	90.55	22.84	62.99	45.28	18.89	27.56
ABF 400	16"	4"	2"	76.96	285.31	35.43	86.61	33.86	9.84	98.43	27.56	68.89	53.15	23.23	35.43
ABF 500	20"	4"	2"	91.49	359.27	39.37	102.36	35.83	9.84	118.11	28.35	84.65	59.06	25.19	39.37
ABF 700	28"	5"	2"	53.92	1027.50	55.12	125.98	44.09	9.84	141.73	32.28	102.36	72.84	33.47	55.12
ABF 800	32"	6"	2"	185.14	1320.90	59.06	133.86	47.24	9.84	149.61	33.86	108.27	78.74	35.43	59.06
ABF 1000	40"	6"	2"	245.42	2166.20	70.87	149.61	53.20	9.84	165.36	35.83	118.11	90.55	41.34	70.87

Pressure Drop Diagram:
Fully automatic backflushing filter
Type ABF 50 - 1000
Degree of filtration: 200 Microns
Density = 62.4 lbs/ft³

The flow diagram shows the pressure drop of a particular filter size in clean condition, taking into account the volume flow (gpm), viscosity and slot width (degree of filtration).



Installation and start up

ABF-backflushing filters are being installed vertically in an existing pipeline. Product inlet and outlet are equipped with appropriate valves and fittings, and connected to the existing pipework. Individual motors are internally wired and connected to the control box. Cable connection between the control box and mains is to be carried out on site. Care must be taken during the start-up that all flange connections are tightened via a torque wrench, thus ensuring a tight seal. Check if the discharge fitting is closed. Product inlet and outlet are then opened, and the filter housing must be vented until the product is discharged. The vent fitting must be closed then.

Press the start push button on the control box and the filter is now ready to operate.

Maintenance and spare parts

The maintenance of backflushing filters is simple. It is limited to checking electrical components such as the differential pressure gauge, the gear motor, the shut-off valve and the control panel. The seats of the filter element, housing cover and shut-off fitting must be checked for leakage from time to time, and if necessary seals should be replaced and flange connections retightened.

Possible spare parts:

Filter elements, seals, bolts, nuts and washers, electrical components.

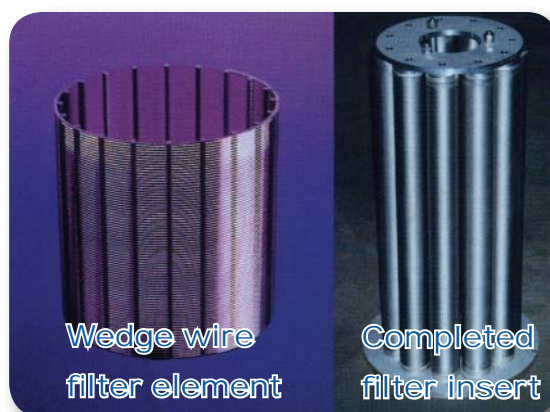
Spare parts should be ordered stating, if possible, the filter type and serial number, together with spare part name and serial number.

Filter insert

Insert consists of a V-profile wire filter element, wound in various diameters and lengths. They are located in parallel, and loaded from inside to outside, while backflushing is made from outside to inside with a cleaned liquid. The filter elements are available in the following materials:

Stainless steel AISI 304, AISI 347, AISI 316L, AISI 321, Monel, Hastelloy C22, Inconel, CuNi 90/10

The minimum operating pressure has to be 29 PSI.



Automatically with geared motor, available in various configurations and voltages of 230-790 volts, 50 or 60 Hz, and protection classes from IP54 to IP65. Additionally hazardous protection to Eex d2 CT4 with PLC controlling system may be supplied.

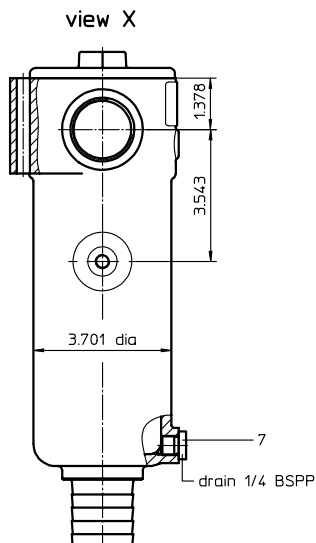
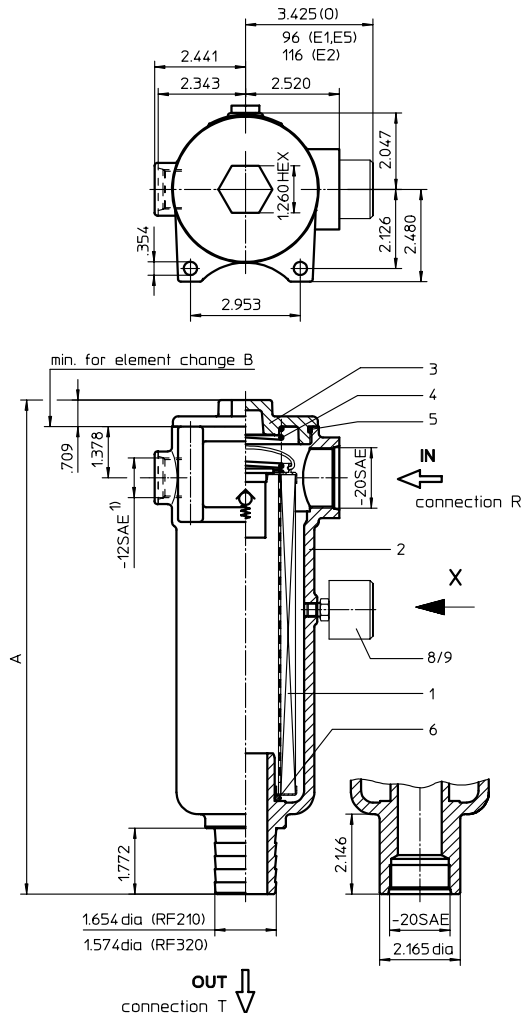


Control panels are available either for direct mounting on the filter housing or on a separate location (see photo - right). IP54 and IP65 protection classes are available for the control unit. Additionally hazardous protection to Eex d2 CT4 with PLC controlling system may be supplied.

RETURN LINE FILTER

Series RF 210-320 145 PSI

Sheet No.
1102 G



1. Type index:

1.1. Complete filter: (ordering example)

RF. 210. 10VG. 16. S. P. -. UG. 4. -. O

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
RF = return-line filter
- 2 **nominal size:** 210, 320
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- 5 **filter element design:**
S = with by-pass valve, Δp 29 PSI
E = without by-pass valve
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602
- 8 **connection:**
UG = thread connection
- 9 **no. of version:**

version	3	4
connection R type	UG	UG
size	6	6
connection T type	UG	SA
size	6	42 or 40

type: UG = thread
SA = hose nozzle

size: 6 = -20 SAE
42 = 1.65 dia (RF 210)
40 = 1.57 dia (RF 320)
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01E. 210. 10VG. 16. S. P. -. D

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 210, 320
- 3 **- 7** see type index-complete filter
- 8 **accessories:**
D = with wire strap

2. Dimensions: (inch)

Type	A	B	weight lbs.	volume tank
RF 210	13.26	8.07	6.0	.30 Gal.
RF 320	16.61	11.41	7.7	.45 Gal.

¹⁾ additional connection „IN“ max. -12 SAE, by agreement

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension		article-no.
			RF 210	RF 320	
1	1	filter element	01E. 210	01E. 320	
2	1	filter housing	NG 210	NG 320	
3	1	screw plug	M90 x 2		301910
4	1	spring			302144
5	1	O-ring	82 x 3		305191 (NBR) 305298 (FPM)
6	1	O-ring	40 x 3		304389 (NBR) 304391 (FPM)
7	1	screw plug	¼ BSPP		305003
8	1	clogging indicator, visual	O		301721
9	1	pressure switch, electrical	E1, E2 or E5		see sheet-no. 1616

4. Description:

Return-line filters type RF 210-320 are designed for connection in return pipes. The feed pressure at „IN“ can be pressurized to 145 PSI.

The return pipes at the „OUT“ connection must be < 39.37 inch long. The pressure in the return pipe is added to the differential pressure over the filter element and must be considered when consulting the contamination indicator.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

Filter finer than 40 microns should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 microns_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter can be used with mineral oils, bio-oils, emulsions and most synthetic hydraulic fluids and lubricating oils.

During changing of the filter element care should be taken to ensure that the contaminated side of the filter is emptied before the filter is removed, to ensure that no contaminated liquid enters the discharge pipes. After depressurizing the filter or emptying the contaminated side of the filter and removing the filter cover, the element should be removed by the wire strap and a new element fitted.

Disposal of the contaminated fluid removed from the filter must be carried out in accordance with national regulations.

5. Technical data:

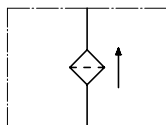
temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	thread connection
output:	hose nozzle or thread connection
housing material:	Al-cast; glass fiber reinforced polyamide (filter cover)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

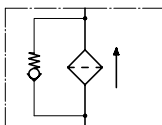
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

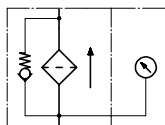
without accessories



with by-pass valve



visual
O



electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

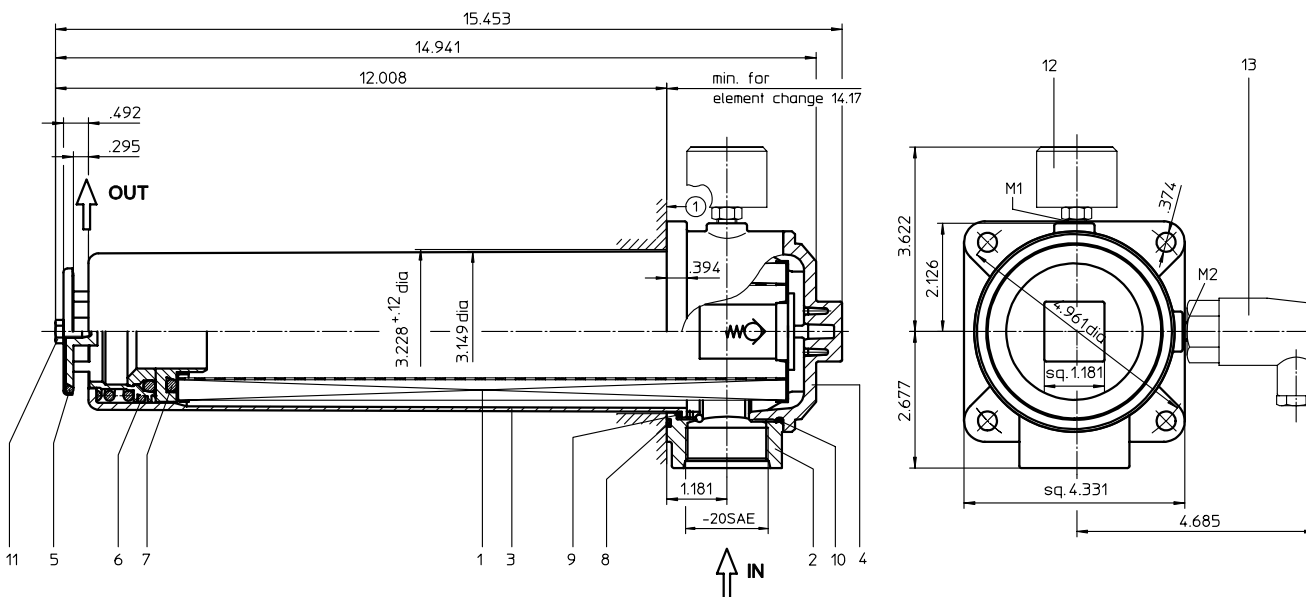
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, for horizontal tank-mounting

Series TRW 310 145 PSI

Sheet No.
1068 C



1. Type index:

1.1. Complete filter: (ordering example)

TRW. 310. 10VG. 16. S. P. -. UG. 6. -. O. E2

- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
- 1 **series:**
TRW = return-line-filter for horizontal tank-mounting
- 2 **nominal size:** 310
- 3 **filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
25 P = 25 μm , 10 P = 10 μm paper
- 4 **resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- 5 **filter element design:**
E = without by-pass valve
S = with by-pass valve, Δp 29 PSI
- 6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
6 = - 20SAE
- 10 **filter housing specification:**
- = standard
- 11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01E. 320. 10VG. 16. S. P. -

- | | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
- 1 **series:**
01E. = filter element according to
INTERNORMEN factory specification
- 2 **nominal size:** 320
- 3 - 7 see type index-complete filter

mounting surface

①

surface quality

3,2
▽

flatness tolerance

□ 0,2

weight: approx. 6.20 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.E 320		
2	1	filter head	NG 210-310	304423	
3	1	filter bowl	NG 310		
4	1	screw plug	M 90 x 2	316637	
5	1	O-ring	53 x 4	309143 (NBR)	- (FPM)
6	1	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
7	2	O-ring	44 x 6	302222 (NBR)	304384 (FPM)
8	1	O-ring	88 x 3	304417 (NBR)	310266 (FPM)
9	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
10	1	O-ring	82 x 3	305191 (NBR)	305298 (FPM)
11	1	sheet metal screw	DIN 7976-F 6,3x13	316641	
12	1	clogging indicator, visual	O	301721	
13	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	

3. Description:

Return-line filters in the TRW series are suitable for a working pressure up to 145 PSI.

Pressure peaks will be absorbed by a sufficient margin of safety.

The TRW-filters are directly mounted to the reservoir and connected to the return-line. The return-area „IN“ must be below the oil level.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(G) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

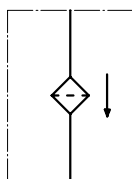
temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	thread connection
housing material:	Al-cast, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.40 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

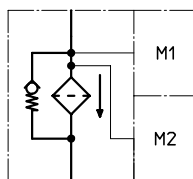
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without indicator



with by-pass valve



visual O



electrical
contact maker
E1



electrical
contact breaker
E5



electrical
contact maker/breaker
E2



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

7. Test methods:

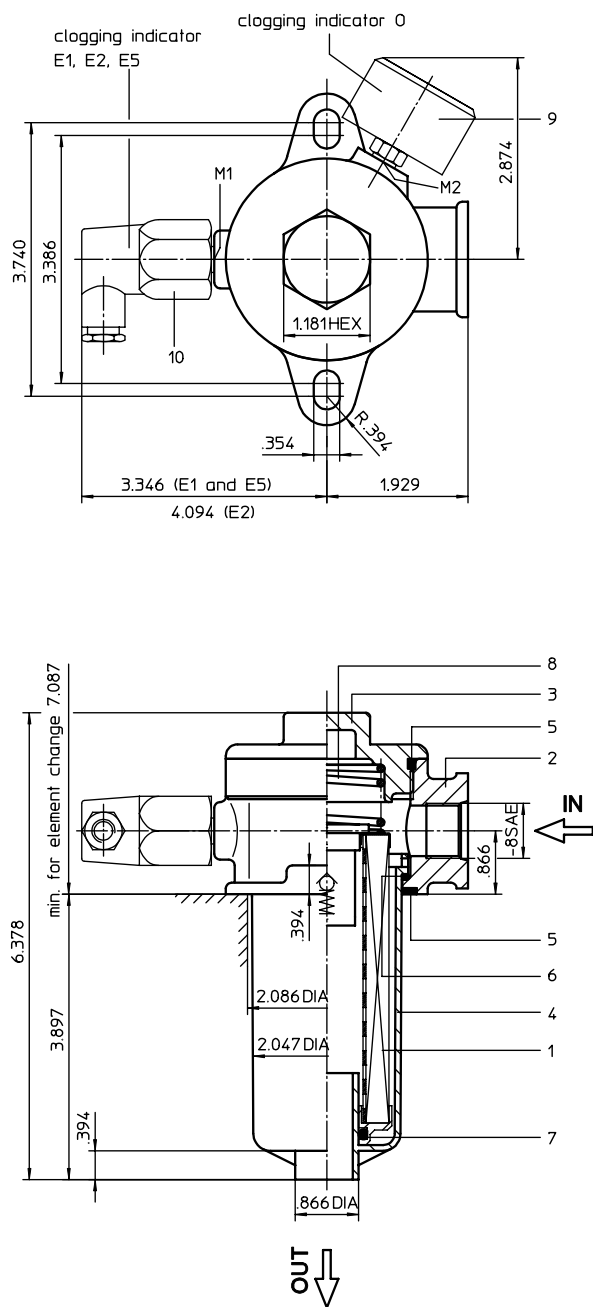
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER

Series TEF 41 145 PSI

Sheet No.
1040 D



When equipped with one clogging indicator use preferably connection M1.

1. Type index:

1.1. Complete filter: (ordering example)

TEF.41.10VG.16.S.P.-.UG.3.-.E1.O (filter with by-pass valve)

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

TEF.41.10VG.30.E.P.-.UG.3.-.E1.O (filter without by-pass valve)

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

TEF = tank-mounted return-line-filter

2 nominal size: 41

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
 25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c),
 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
 25 P = 25 μ m, 10 P = 10 μ m paper only with 01E.41

4 resistance of pressure difference for filter element:

16 = 01E.41 for Δp 232 PSI (standard with by-pass valve)
 30 = 01E.60 for Δp 435 PSI (standard without by-pass valve)

5 filter element design:

S = with by-pass valve (01E.41) Δp 29 PSI
 E = without by-pass valve (01E.60)

6 sealing material:

P = Nitrile (NBR)
 V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601

8 connection:

UG = thread connection

9 connection size:

3 = - 8 SAE

10 filter housing specification: (see catalog)

- = standard
 IS06 = see sheet-no. 31605

11 clogging indicator at M1:

- = without
 O = visual, see sheet-no. 1616
 E1 = pressure switch, see sheet-no. 1616
 E2 = pressure switch, see sheet-no. 1616
 E5 = pressure switch, see sheet-no. 1616

12 clogging indicator at M2:

possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 41. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

(with by-pass valve)

01E. 60. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

(without by-pass valve)

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 41, 60

3 - 7 see type index-complete filter

weight: 1.76 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element with by-pass	01.E 41		
	1	filter element without by-pass	01.E 60		
2	1	filter head	TEF 41 - 55	308646	
3	1	filter cover	M 60 x 2	303621	
4	1	filter bowl	TEF 41	306673	
5	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	1	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
8	1	spring	DA = 40	304982	
9	1	clogging indicator visual	O	301721	
10	1	clogging indicator electrical	E1, E2 or E5	see sheet-no. 1616	

3. Description:

Return-line filters in the TEF series are suitable for a working pressure up to 145 PSI.

Pressure peaks will be absorbed by a sufficient margin of safety.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(o) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

145 PSI

opening pressure by-pass valve:

29 PSI

connection system:

thread connection

housing material:

Al-cast, glass fiber reinforced polyamide

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

volume tank:

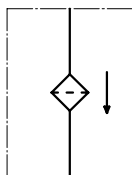
.05 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

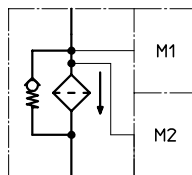
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without indicator



with by-pass valve



visual O



electrical
contact maker
E1



electrical
contact breaker
E5



electrical
contact maker/breaker
E2



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

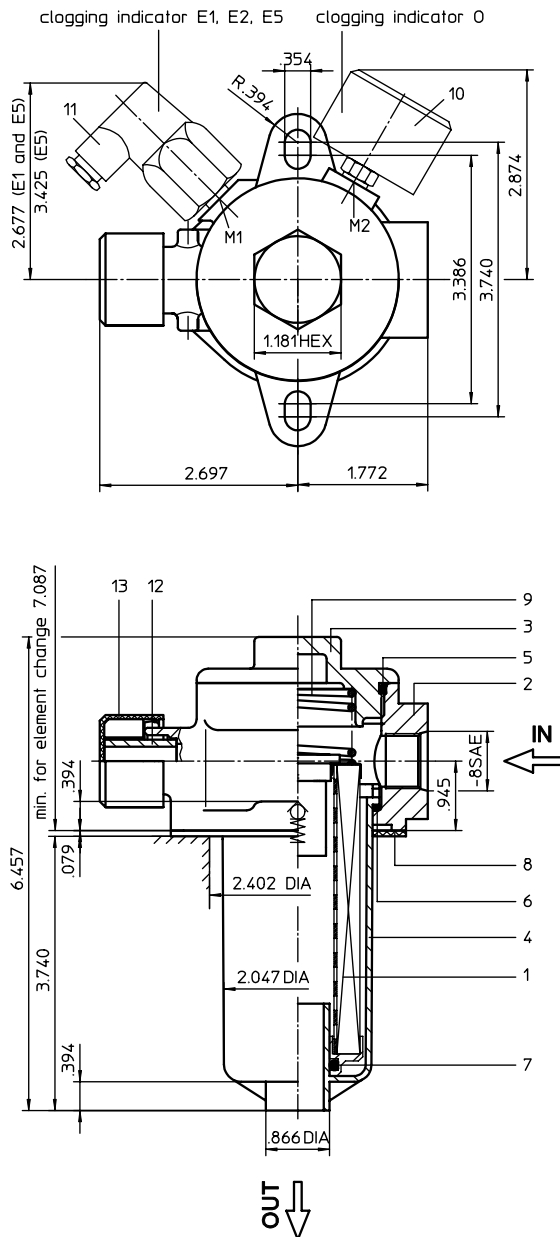
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER with breather filter

Series TEFB 41 145 PSI

Sheet No.
1041 E



When equipped with one clogging indicator use preferably connection M2.

1. Type index:

1.1. Complete filter: (ordering example)

TEFB.41.10VG.16.S.P. -. UG. 3. -. E1. O (filter with by-pass valve)

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

TEFB.41.10VG.30.E.P. -. UG. 3. -. E1. O (filter without by-pass valve)

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

TEFB = tank-mounted return-line-filter with breather filter

2 nominal size: 41

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
 25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c),
 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
 25 P = 25 μ m, 10 P = 10 μ m paper only with 01E.41

4 resistance of pressure difference for filter element:

16 = 01E.41 for Δp 232 PSI (standard with by-pass valve)
 30 = 01E.60 for Δp 435 PSI (standard without by-pass valve)

5 filter element design:

S = with by-pass valve (01E.41) Δp 29 PSI
 E = without by-pass valve (01E.60)

6 sealing material:

P = Nitrile (NBR)
 V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601

8 connection:

UG = thread connection

9 connection size:

3 = - 8 SAE

10 filter housing specification: (see catalog)

- = standard
 IS06 = see sheet-no. 31605

11 clogging indicator at M1:

- = without
 O = visual, see sheet-no. 1616
 E1 = pressure switch, see sheet-no. 1616
 E2 = pressure switch, see sheet-no. 1616
 E5 = pressure switch, see sheet-no. 1616

12 clogging indicator at M2:

possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 41. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 (with by-pass valve)

01E. 60. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 (without by-pass valve)

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 41, 60

3 - 7 see type index-complete filter

weight: 2.0 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element with by-pass	01.E 41		
		filter element without by-pass	01.E 60		
2	1	filter head	TEFB 41 - 55	308751	
3	1	filter cover	M 60 x 2	303621	
4	1	filter bowl	TEF 41	306673	
5	1	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	1	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
8	1	gasket	.08 thick	303039	
9	1	spring	DA = 40	304982	
10	1	clogging indicator visual	O	301721	
11	1	clogging indicator electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	filter element breather	01BFE.70	301865	
13	1	protection cap		305312	

3. Description:

Return-line filters in the TEFB series are suitable for a working pressure up to 145 PSI.

Pressure peaks will be absorbed by a sufficient margin of safety. The TEFB-filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the build-in air filter. The air filter has a 10 µm throw-away element.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

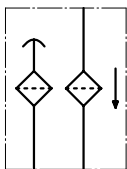
temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	thread connection
housing material:	Al cast; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.05 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

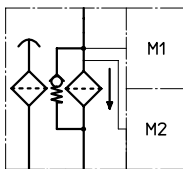
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without indicator



with by-pass valve



visual O



electrical
contact maker
E1



electrical
contact breaker
E5



electrical
contact maker/breaker
E2



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

7. Test methods:

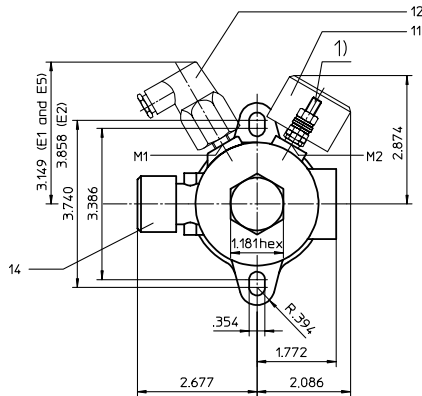
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

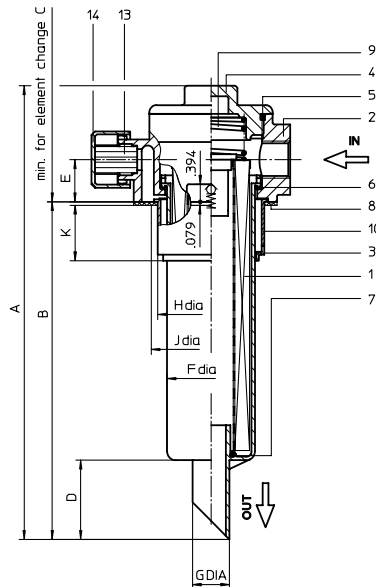
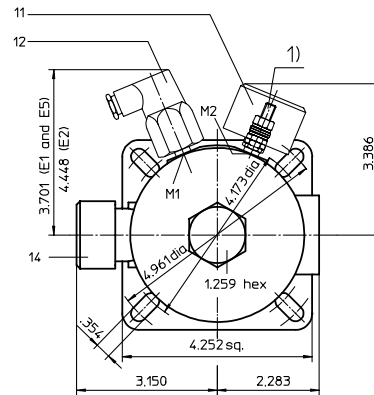
RETURN LINE FILTER, with breather filter Series TEFB 55-120 145 PSI

Sheet No.
1061 K

views TEFB 55, 70



view TEFB 120



1) connection for the potential equalisation, only for application in the explosive area

When equipped with one clogging indicator use preferably connection M2.

2. Dimensions: inch

type	TEFB 55	TEFB 70	TEFB 120
connection	- 8 SAE	-12 SAE	-16 SAE
A	10.24	10.24	11.42
B	7.56	7.56	8.27
C	10.63	10.63	11.81
D	1.77	1.77	2.56
E	.94	.94	1.18
F	2.05	2.05	2.76
G	.87	.87	.94
H	2.38	2.38	3.09
J	2.40	2.40	3.11
K	1.25	1.25	1.65
weight lbs.	2.20	2.20	3.30
volume tank	.08 Gal.	.08 Gal.	.15 Gal.

1. Type index

1.1. Complete filter: (ordering example)

TEFB. 120. 10VG. 16. S. P. -. UG. 5. -. E1. O. 1

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- series:**
TEFB = tank-mounted return-line-filter with breather filter
- nominal size:** 55, 70, 120
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
UG = thread connection
- connection size:**
3 = - 8 SAE TEFB 55
4 = - 12 SAE TEFB 70
5 = - 16 SAE TEFB 120
- filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS011 = see sheet-no. 40530
- clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = potential equalisation
- clogging indicator at M2:**
possible indicators see position 11 of the type index
- oil separator:**
- = without
1 = with oil separator

1.2. Filter element: (ordering example)

01E. 120. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E = filter element according to INTERNORMEN factory specification
- nominal size:** 70, 120
- 7** see type index-complete filter

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension and article-no.		
			TEFB 55	TEFB 70	TEFB 120
1	1	filter element	01E, 70		01E, 120
2	1	filter head	308751	308752	308648
3	1	filter bowl	304595		303041
4	1	screw plug	M 60 x 2		M 82 x 2
5	1	O-ring	56 x 3		75 x 3
			305072 (NBR)		302215 (NBR)
			305322 (FPM)		304729 (FPM)
6	1	O-ring	50 x 2,5		68 x 4
			305239 (NBR)		303037 (NBR)
			305321 (FPM)		313046 (FPM)
7	1	O-ring	22 x 3		24 x 3
			304387 (NBR)		303038 (NBR)
			314733 (FPM)		304397 (FPM)
8	1	gasket (filter without oil separator)	.08 thick 307706		.12 thick 303039
	1	gasket (filter with oil separator)	.08 thick 306786		.12 thick 303039
9	1	spring	DA = 40 304982		DA = 52 302144
10	1	oil separator	304544		310261
11	1	clogging indicator visual	O 301721		
12	1	clogging indicator electrical	E1, E2 or E5 see sheet-no. 1616		
13	1	filter element breather	01BFE.70		01BFE.120
14	1	protection cap	305312		303048

4. Description:

Return-line filters in the TEFB series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The TEFB-filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the build-in air filter. The air filter has a 10 µm throw-away element.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service. When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:

operating medium:

max. operating pressure:

opening pressure by-pass valve:

connection system:

housing material standard:

housing material IS11, category M2:

housing material IS11, category 2:

sealing material:

installation position:

+ 14°F to +176°F (for a short time +212°F)

mineral oil, other media on request

145 PSI

29 PSI

thread connection

filter head AL , filter cover / filter bowl glass fibre reinforced polyamide

filter head GG, filter cover steel, filter bowl carbon fibre reinforced polyamide

filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide

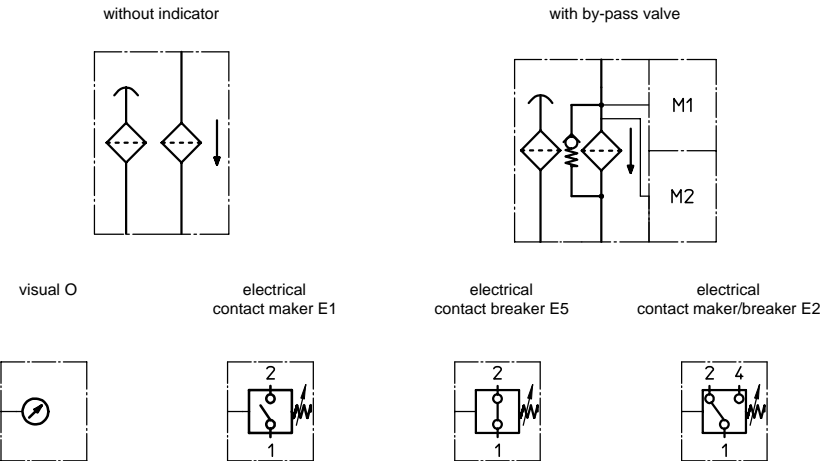
Nitrile (NBR) or Viton (FPM), other materials on request

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941

ISO 2942

ISO 2943

ISO 3723

ISO 3724

ISO 3968

ISO 16889

Verification of collapse/burst resistance

Verification of fabrication integrity

Verification of material compatibility with fluids

Method for end load test

Verification of flow fatigue characteristics

Evaluation of pressure drop versus flow characteristics

Multi-pass method for evaluating filtration performance

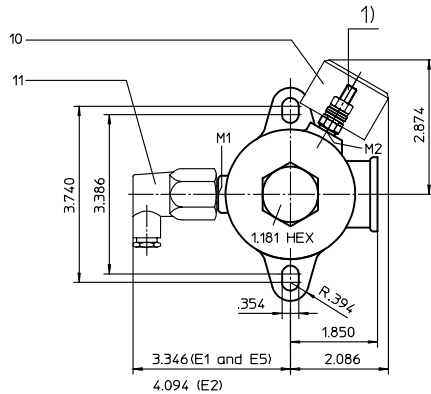
RETURN LINE FILTER

Series TEF 55-320

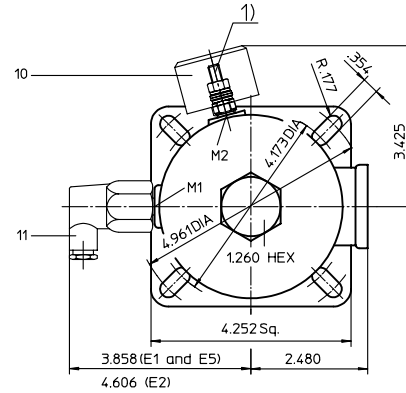
145 PSI

Sheet No.
1002 T

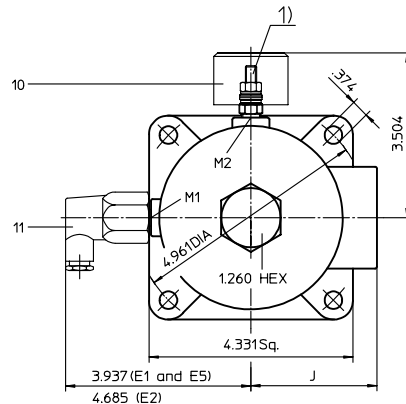
view TEF 55,70



view TEF 120



view TEF 210,310,320



When equipped with one clogging indicator use preferably connection M1.

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

1. Type index

1.1. Complete filter: (ordering example)

TEF. 70. 10VG. 16. S. P. -. UG. 4. -. E1. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
TEF = tank-mounted return-line-filter
- nominal size:** 55, 70, 120, 210, 310, 320
- filter-fineness and filter-material:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG=20 μ m_(G), 16 VG=15 μ m_(G), 10 VG=10 μ m_(G), 6 VG=7 μ m_(G), 3 VG=5 μ m_(G) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
UG = thread connection
- connection size:**
3 = - 8 SAE TEF 55
4 = - 12 SAE TEF 70
5 = - 16 SAE TEF 120
6 = - 20 SAE TEF 210/310
7 = - 24 SAE TEF 320
- filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS11 = see sheet-no. 40530
- measure connection at M1:**
- = without clogging indicator
O = clogging indicator, visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = potential equalisation
- measure connection at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 70. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 70 (TEF55/70), 120 (TEF120), 210 (TEF210), 320 (TEF310/320)
- 7 | see type index-complete filter

Changes of measures and design are subject to alteration!

2. Dimensions: inch

type	connection	A	B	C	D	E	F	G	H	J	K	weight lbs.	volume tank
TEF 55	-8 SAE	10.11	7.64	10.63	1.77	.87	.39	2.05	.87	-	2.08	1.98	.08 Gal.
TEF 70	-12 SAE	10.11	7.64	10.63	1.77	.87	.39	2.05	.87	-	2.08	1.98	.08 Gal.
TEF 120	-16 SAE	11.30	8.39	11.80	2.56	1.06	.39	2.76	.97	-	2.83 ⁺¹¹	3.30	.15 Gal.
TEF 210	-20 SAE	12.00	9.06	13.78	.98	1.18	.39	3.15	1.50	2.86	3.22 ⁺¹¹	4.60	.29 Gal.
TEF 310	-20 SAE	15.25	12.26	15.94	.98	1.18	.39	3.15	1.50	2.86	3.22 ⁺¹¹	5.50	.36 Gal.
TEF 320	-24 SAE	16.54	13.00	18.31	1.57	1.42	.39	3.35	1.73	2.79	3.38 ⁺²³	6.20	.45 Gal.

3. Spare parts:

item	qty.	designation	dimension and article-no.					
			TEF 55	TEF 70	TEF 120	TEF 210	TEF 310	TEF 320
1	1	filter element	01E. 70		01E. 120	01E.210	01E.320	01E. 320
2	1	filter head						
3	1	filter bowl						
4	1	filter cover	M 60 x 2		M 82 x 2	M 90 x 2		M100 x 2
5	1	O-ring	56 x 3	75 x 3	82 x 3		96 x 3	
			305072 (NBR)	302215 (NBR)	305191 (NBR)		305292 (NBR)	
			305322 (FPM)	304729 (FPM)	305298 (FPM)		305297 (FPM)	
6	1	O-ring	50 x 2,5	68 x 4	75 x 3		82 x 3	
			305239 (NBR)	303037 (NBR)	302215 (NBR)		305191 (NBR)	
			305321 (FPM)	313046 (FPM)	304729 (FPM)		305298 (FPM)	
7	1	O-ring	22 x 3	24 x 3	40 x 3		40 x 3	
			304387 (NBR)	303038 (NBR)	304389 (NBR)		304389 (NBR)	
			304931 (FPM)	304397 (FPM)	304391 (FPM)		304391 (FPM)	
8	1	O-ring	56 x 3	86 x 3	88 x 3		96 x 3	
			305072 (NBR)	305470 (NBR)	304417 (NBR)		305292 (NBR)	
			305322 (FPM)	313047 (FPM)	310266 (FPM)		305297 (FPM)	
9	1	spring	DA = 40 304982		DA = 52 302144		DA = 52 302144	
10	1	clogging indicator	O 301721					
11	1	clogging indicator electrical	alternatively E1, E2 or E5 see sheet-no. 1616					

4. Description:

Return-line filters in the TEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycol's, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filter elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:

operating medium:

max. operating pressure:

opening pressure by-pass valve:

connection system:

housing material standard:

housing material IS11, category M2:

housing material IS11, category 2:

sealing material:

installation position:

+ 14°F to +176°F (for a short time +212°F)

mineral oil, other media on request

145 PSI

29 PSI, 51 PSI

thread connection

filter head AL , filter cover / filter bowl glass fibre reinforced polyam ide

filter head GG, filter cover steel, filter bowl carbon fibre reinforced polyamide

filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide

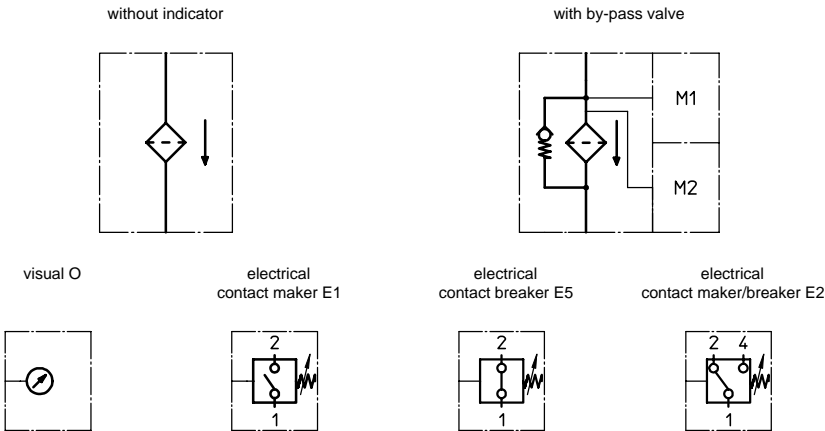
Nitrile (NBR) or Viton (FPM), other materials on request

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941

ISO 2942

ISO 2943

ISO 3723

ISO 3724

ISO 3968

ISO 16889

Verification of collapse/burst resistance

Verification of fabrication integrity

Verification of material compatibility with fluids

Method for end load test

Verification of flow fatigue characteristics

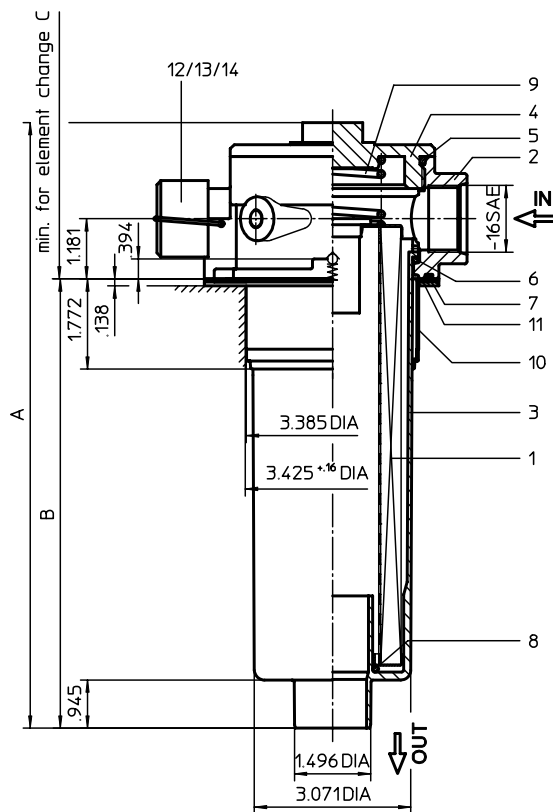
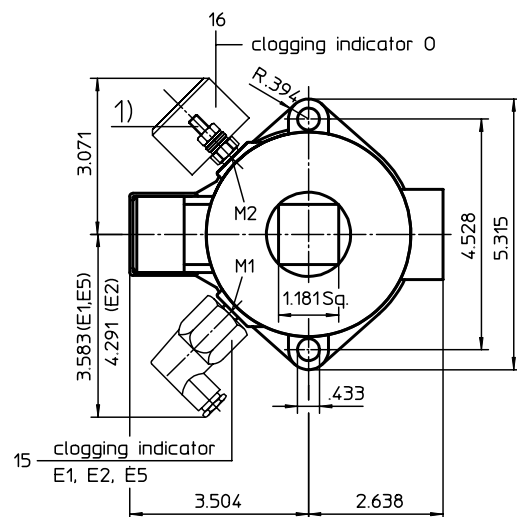
Evaluation of pressure drop versus flow characteristics

Multi-pass method for evaluating filtration performance

RETURN LINE FILTER

Series TEFB 210-310 145 PSI

Sheet No.
1062 F



1) connection for the potential equalisation, only for application in the explosive area

When equipped with one clogging indicator use preferably connection M2.

2. Dimensions: inch

type	A	B	C	weight lbs.	volume tank
TEFB 210	11.89	8.82	13.78	5.0	.26 Gal.
TEFB 310	15.24	12.16	17.13	5.1	.36 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

TEFB. 210. 10VG. 16. S. P. -. UG. 5. -. E1. O. 1

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- series:**
TEFB = tank-mounted return-line-filter with breather filter
- nominal size:** 210, 310
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- sealing material:**
P = Nitrile (NBR)
v = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
UG = thread connection
- connection size:**
5 = -16 SAE
- filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS11 = see sheet-no. 40530
- clogging indicator at M1:**
- = without
O = see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = potential equalisation
- clogging indicator at M2:**
possible indicators see position 11 of the type index
- oil separator:**
- = without
1 = with oil separator

1.2. Filter element: (ordering example)

01E. 210. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 210, 320
- 7** see type index complete filter

3. Spare parts:

item	qty.	designation	dimension		article-no.	
			TEFB 210	TEFB 310		
1	1	filter element	01.E 210	01E.320		
2	1	filter head	TNR 100		313952	
3	1	filter bowl	NG 210	NG 310	304518	305471
4	1	filter cover	M 92 x 3		317014	
5	1	O-ring	82 x 3,5		304403 (NBR)	308745 (FPM)
6	1	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
7	1	O-ring	95 x 3		305808 (NBR)	304828 (FPM)
8	1	O-ring	40 x 3		304991 (NBR)	304997 (FPM)
9	1	spring	DA = 52		305053	
10	1	oil separator				
11	1	gasket (with execution oil separator)	.078 thick		325389	
12	1	filter element breather	01BFE. 120		301866	
13	1	protection cap			303048	
14	1	clip			303046	
15	1	clogging indicator electrical	E1, E2 or E5		see sheet-no. 1616	
16	1	clogging indicator visual	O		301721	

4. Description:

Return-line filters in the TEFB series are suitable for a working pressure up to 145 PSI.

Pressure peaks will be absorbed by a sufficient margin of safety. The TEFB-filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the build-in air filter. The air filter has a 10 µm throw-away element.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

145 PSI

opening pressure by-pass valve:

29 PSI

connection system:

thread connection

housing material standard:

filter head AL, filter cover / filter bowl glass fibre reinforced polyamide

housing material IS11, category M2:

filter head GG, filter cover steel, filter bowl carbon fibre reinforced polyamide

housing material IS11, category 2

filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

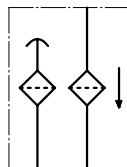
vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

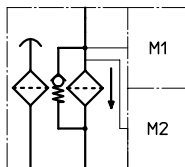
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator



with by-pass valve



visual O



electrical
contact maker
E1



electrical
contact breaker
E5



electrical
contact maker/breaker
E2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

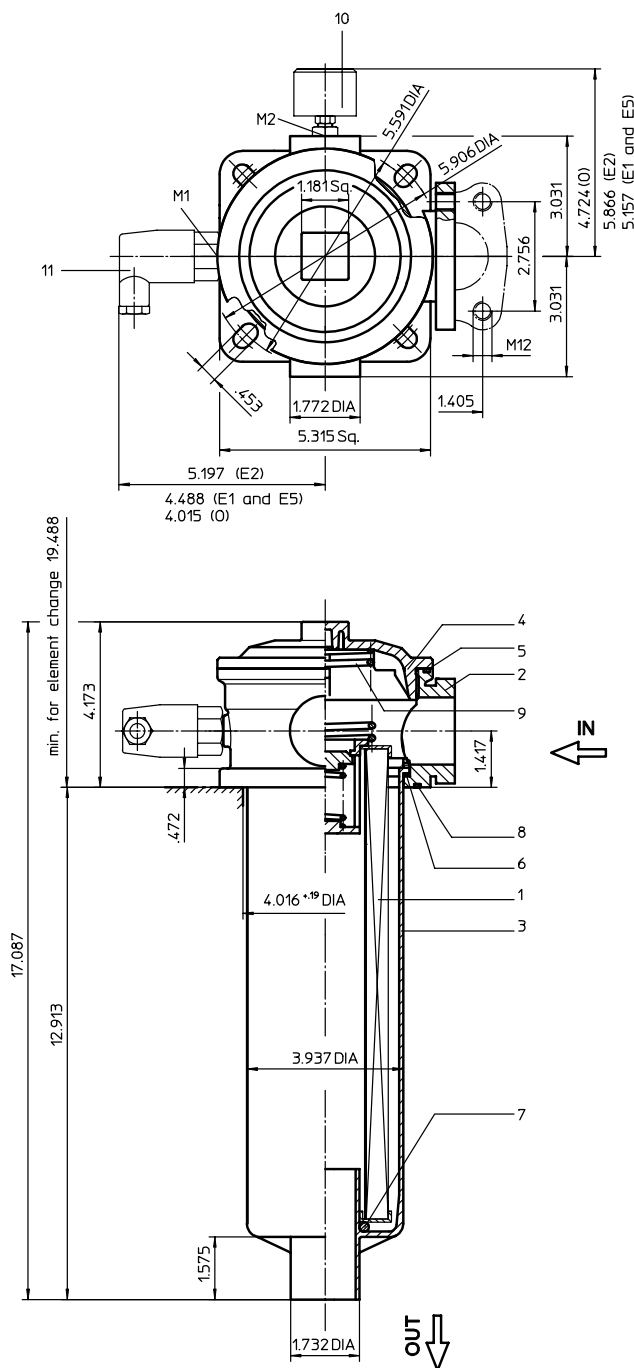
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER

Series TEF 426 145 PSI

Sheet No.
1043 F



When equipped with one clogging indicator use preferably connection M1.

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 426. 10VG. 16. S. P. -. FS. 7. -. O. E1

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

TEF = tank-mounted return-line-filter

2 nominal size: 426

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper

4 resistance of pressure difference for filter element:

16 = Δp 232 PSI

5 filter element design:

E = without by-pass valve
S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:

FS = SAE-flange connection 3000 PSI

9 connection size:

7 = 1 1/2"

10 filter housing specification: (see catalog)

- = standard
IS06 = see sheet-no. 31605

11 clogging indicator at M1:

- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 clogging indicator at M2:

possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 425. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 425

3 - 7 see type index-complete filter

weight: 5.7 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.E 425	-	
2	1	filter head	nominal size 426	313571	
3	1	filter bowl	nominal size 425	303732	
4	1	screw plug	M 120 x 3	313649	
5	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
6	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
7	1	O-ring	44 x 6	302222 (NBR)	304384 (FPM)
8	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	1	spring	DA = 63,5	304983	
10	1	clogging indicator visual	O	see sheet-no. 1616	
11	1	clogging indicator electrical	alternatively E1, E2 or E5	see sheet-no. 1616	

3. Description:

Return-line filters of the TEF series are suitable for a working pressure up to 145 PSI.

Pressure peaks will be absorbed by a sufficient margin of safety.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

145 PSI

opening pressure by-pass valve

29 PSI

connection system:

SAE-flange connection 3000 PSI

housing material:

AL-casting; glass fiber reinforced polyamide

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

volume tank:

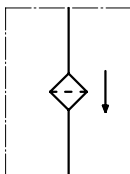
.65 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

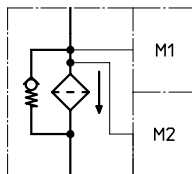
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without indicator



with by-pass valve



visual O



electrical contact maker E1



electrical contact breaker E5



electrical contact maker/breaker E2



6. Pressure drop flow curves:

Precise flow rates see INT-Expert-System Filter respectively Δp -curves - depending on filter fineness and viscosity.

7. Test methods:

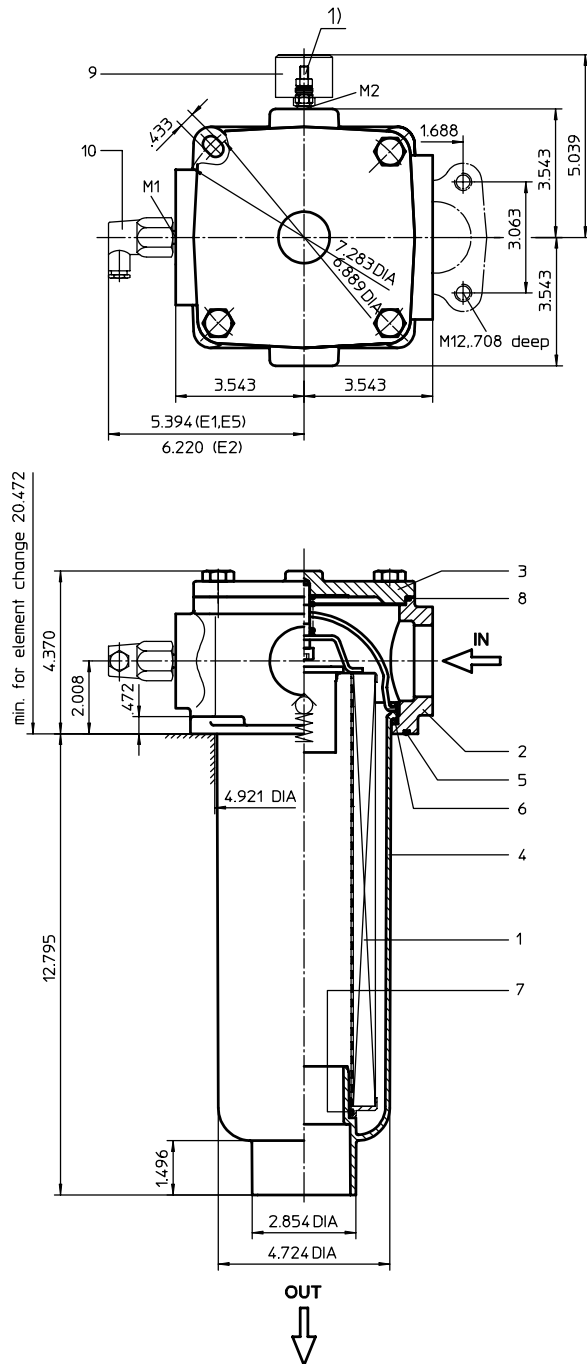
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER

Series TEF 625 145 PSI

Sheet No.
1042 F



When equipped with one clogging indicator use preferably connection M1.

1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 625. 10VG. 16. S. P. -. FS. 8. -. E1. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

TEF = tank-mounted return-line-filter

2 nominal size: 625

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m

stainless steel wire mesh

25 VG = 20 μ m(c), 16 VG = 15 μ m(c), 10 VG = 10 μ m(c),

6 VG = 7 μ m(c), 3 VG = 5 μ m(c) Interpor fleece (glass fiber)

25 P = 25 μ m, 10 P = 10 μ m paper

4 resistance of pressure difference for filter element:

16 = Δp 232 PSI

5 filter element design:

E = without by-pass valve

S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR)

v = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

FS = SAE-flange connection 3000 PSI

9 connection size:

8 = 2"

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

IS11 = see sheet-no. 40530

11 measuring connection at M1:

- = without clogging indicator

O = clogging indicator visual, see sheet-no. 1616

E1 = pressure switch, see sheet-no. 1616

E2 = pressure switch, see sheet-no. 1616

E5 = pressure switch, see sheet-no. 1616

PA = potential equalisation

12 measuring connection at M2:

possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 631. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 631

3 - 7 see type index complete filter

2. Accessories:

- Counter flange, see sheet-no. 1652

weight: 10 lbs.

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E. 631		
2	1	filter head	NG 625		
3	1	filter cover			
4	1	filter bowl	NG 625		
5	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
6	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	1	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
8	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
9	1	clogging indicator, visual	O	301721	
10	1	clogging indicator, electrical	alternatively E1 , E2 or E5	see sheet-no. 1616	

4. Description:

Return-line filters in the TEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The TEF-filters are directly mounted to the reservoir and connected to the return-line. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece. Filter elements as fine as 5 µm_(c) are available; finer filter elements on request. INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications. INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service. When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

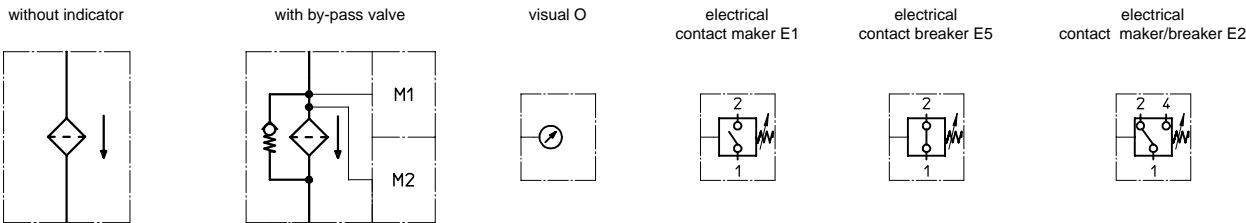
temperature range:
operating medium:
max. operating pressure:
opening pressure by-pass valve:
connection system:
housing material:

sealing material:
installation position:
volume tank:

+14°F to +176°F (for a short time +212°F)
mineral oil, other media on request
145 PSI
29 PSI
SAE-flange connection 3000 PSI
filter head / filter cover AL; filter bowl glass fiber reinforced polyamide (standard)
filter head / filter cover GG; filter bowl carbon fiber reinforced polyamide (according to IS11)
Nitrile (NBR) or Viton (FPM), other materials on request
vertical
.95 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

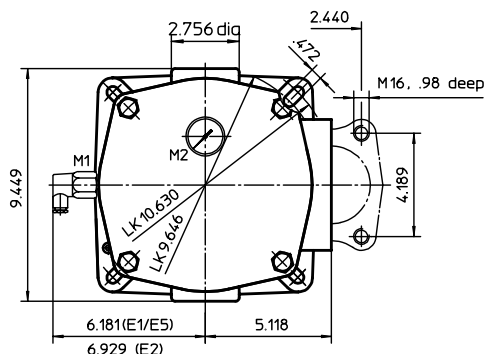
Filter elements are tested according to the following ISO standards:

- ISO 2941
ISO 2942
ISO 2943
ISO 3723
ISO 3724
ISO 3968
ISO 16889
- Verification of collapse/burst resistance
Verification of fabrication integrity
Verification of material compatibility with fluids
Method for end load test
Verification of flow fatigue characteristics
Evaluation of pressure drop versus flow characteristics
Multi-pass method for evaluating filtration performance

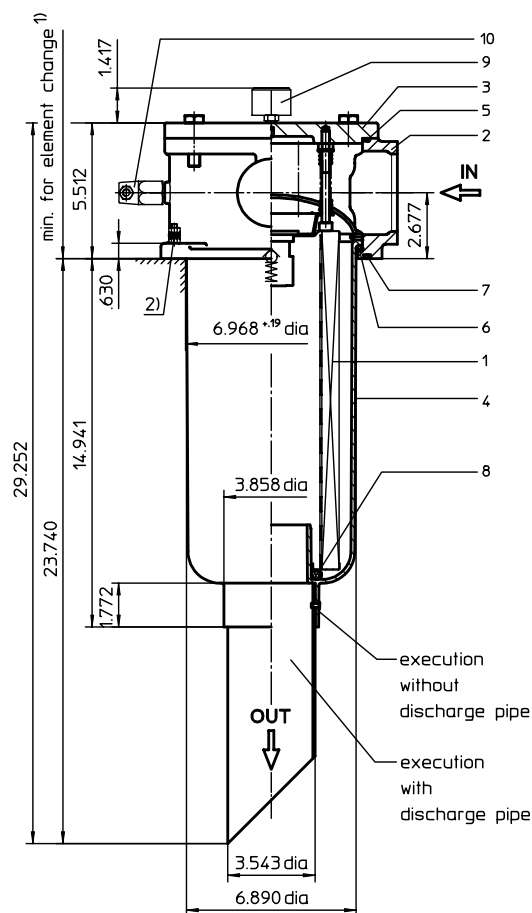
RETURN LINE FILTER

Series TEF 952 145 PSI

Sheet No.
1060 E



- 1) min. for element change without discharge pipe 21.88
min. for element change with discharge pipe 30.70



When equipped with one clogging indicator use preferably connection M1.

- 2) Connection for the potential equalisation, only for application on the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 952. 10VG. 10. S. P. -. FS. A. -. E1. O. -

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 **series:**
TEF = tank-mounted return-line-filter
- 2 **nominal size:** 952
- 3 **filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm
stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
25 P = 25 μm , 10 P = 10 μm paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
E = without by-pass valve
S = with by-pass Δp valve 29 PSI
S1 = with by-pass Δp valve 51 PSI
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
A = 3"
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS11 = see sheet-no. 40530
- 11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 **clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 **discharge pipe:**
- = without
1 = with discharge pipe

1.2. Filter element: (ordering example)

01E. 950. 10VG. 10. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 950
- 3 **- 7** see type index-complete filter

2. Accessories:

- Counter flange see sheet-no. 1652

weight: 40 lbs.

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.E 950...		
2	1	filter head			
3	1	filter cover			
4	1	filter bowl without discharge pipe			
	1	filter bowl with discharge pipe			
5	1	O-ring	195 x 3,5	301831 (NBR)	306528 (FPM)
6	1	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	1	O-ring	190 x 5	305432 (NBR)	310283 (FPM)
8	1	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
9	1	clogging indicator visual	O	301721	
10	1	clogging indicator electrical	alternatively E1, E2 or E5	see sheet-no. 1616	

4. Description:

Return-line filters in the TEF series are suitable for a working pressure up to 145 PSI.

Pressure peaks will be absorbed by a sufficient margin of safety.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

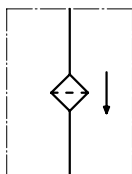
temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI, 51 PSI
connection system:	SAE-flange J518c 3000 PSI
housing material:	filter head / filter cover AL; filter bowl glass fiber reinforced polyamide (standard) filter head / filter cover GG; filter bowl carbon fiber reinforced polyamide (IS11)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2.60 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

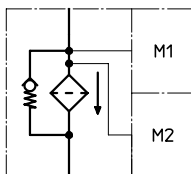
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator



with by-pass valve



visual O



electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp -curves ; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Sheet No.
1056 D



- Counter flange see sheet-no. 1652

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension	article-no..	
1	3	filter element	01E.631		
2	1	filter head ¹⁾			
3	3	filter bowl with discharge pipe ¹⁾			
	3	filter bowl without discharge pipe ¹⁾			
4	1	filter cover ¹⁾			
5	1	O-ring	355 x 5	314740 (NBR)	314739 (FPM)
6	3	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	1	gasket	430 x 350 x 2	313271 (NBR)	316659 (FPM)
8	3	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
9	1	clogging indicator, visual	O	301721	
10	1	clogging indicator, electrical	E1, E2 or E5	see sheet-no. 1616	

¹⁾ in case of ordering these spare parts use the complete type index

4. Description:

Return-line filters in the TEF series are suitable for a working pressure up to 145 PSI.

Pressure peaks will be absorbed by a sufficient margin of safety.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(O) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

145 PSI

opening pressure by-pass valve:

29 PSI

connection system:

SAE-flange connection 3000 PSI

housing material:

C-steel; glass fiber reinforced polyamide

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

volume tank:

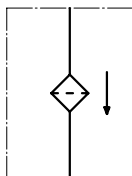
5.80 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

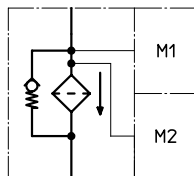
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator



with by-pass valve



visual O



electrical contact maker E1



electrical contact breaker E5



electrical contact maker/breaker E2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

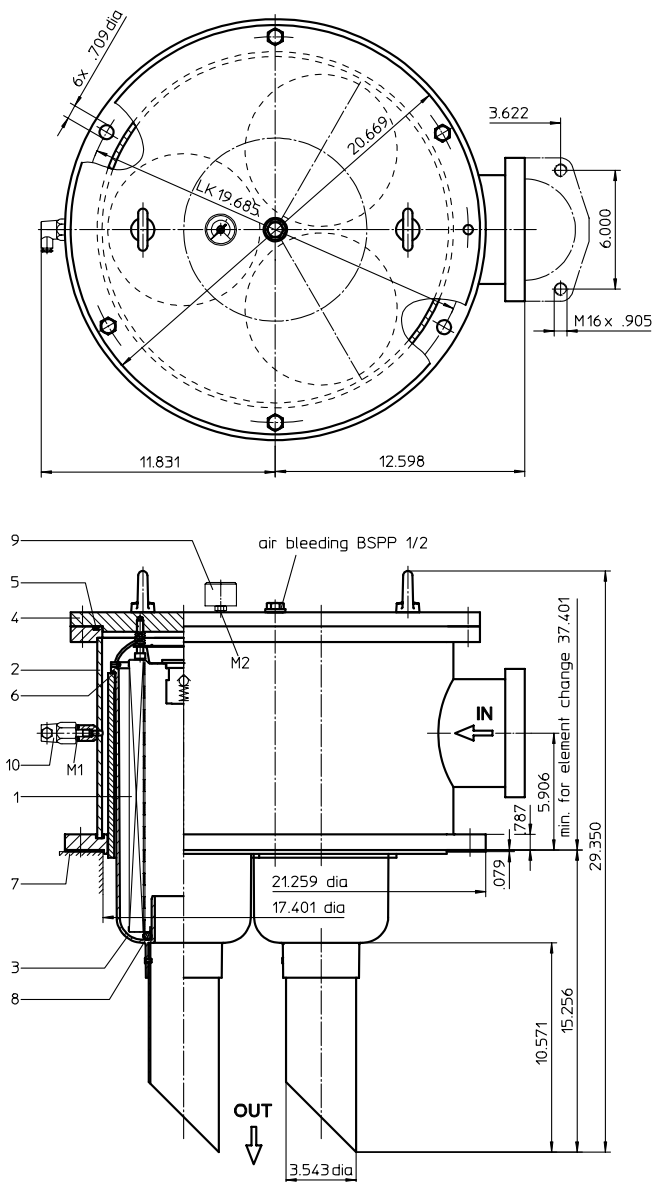
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER

Series TEF 2551 145 PSI

Sheet No.
1015 O



When equipped with one clogging indicator use preferably connection M1.

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 2551. 10VG. 10. S. P. -. FS. C. -. E1. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

TEF = tank-mounted return-line-filter

2 nominal size: 2551

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh

25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),

6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)

25 P = 25 μ m, 10 P = 10 μ m paper

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass valve

S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification:

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

FS = SAE-flange connection 3000 PSI

9 connection size:

C = 5"

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

11 clogging indicator at M1:

- = without

O = visual, see sheet-no. 1616

E1 = pressure switch, see sheet-no. 1616

E2 = pressure switch, see sheet-no. 1616

E5 = pressure switch, see sheet-no. 1616

12 clogging indicator at M2:

possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 950. 10VG. 10. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to
INTERNORMEN factory specification

2 nominal size: 950

3 - 7 see type index-complete filter

2. Accessories:

- Counter flange, see sheet-no. 1652

weight: approx. 275 lbs.

3. Spare parts:

item	qty.	designation	dimension	article-no..	
1	3	filter element	01E.950		
2	1	filter head ¹⁾		313295	
3	3	filter bowl ¹⁾		327461	
4	1	filter cover ¹⁾			
5	1	O-ring	455 x 5	314742 (NBR)	314741 (FPM)
6	3	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	1	gasket	540 x 441 x 2	313293	
8	3	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
9	1	clogging indicator, visual	O	301721	
10	1	clogging indicator, electrical	E1, E2 or E5	see sheet-no. 1616	

¹⁾ in case of ordering these spare parts use the complete type index

4. Description:

Return-line filters in the TEF series are suitable for a working pressure up to 145 PSI.

Pressure peaks will be absorbed by a sufficient margin of safety.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

145 PSI

opening pressure by-pass valve:

29 PSI

connection system:

SAE-flange connection 3000 PSI

housing material:

C-steel, glass fibre reinforced polyamide (filter bowl)

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

volume tank:

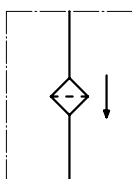
12.5 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

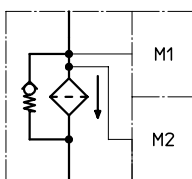
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator



with by-pass valve



visual O



electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance

ISO 2942 Verification of fabrication integrity

ISO 2943 Verification of material compatibility with fluids

ISO 3723 Method for end load test

ISO 3724 Verification of flow fatigue characteristics

ISO 3968 Evaluation of pressure drop versus flow characteristics

ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER

Series TEF 4801-7201

145 PSI

Sheet No.
1058 D

1. Type index

1.1. Complete filter: (ordering example)

TEF. 4801. 10VG. 10. S. P. -. FA11. D. -. E1. O

1	2	3	4	5	6	7	8	9	10	11	12
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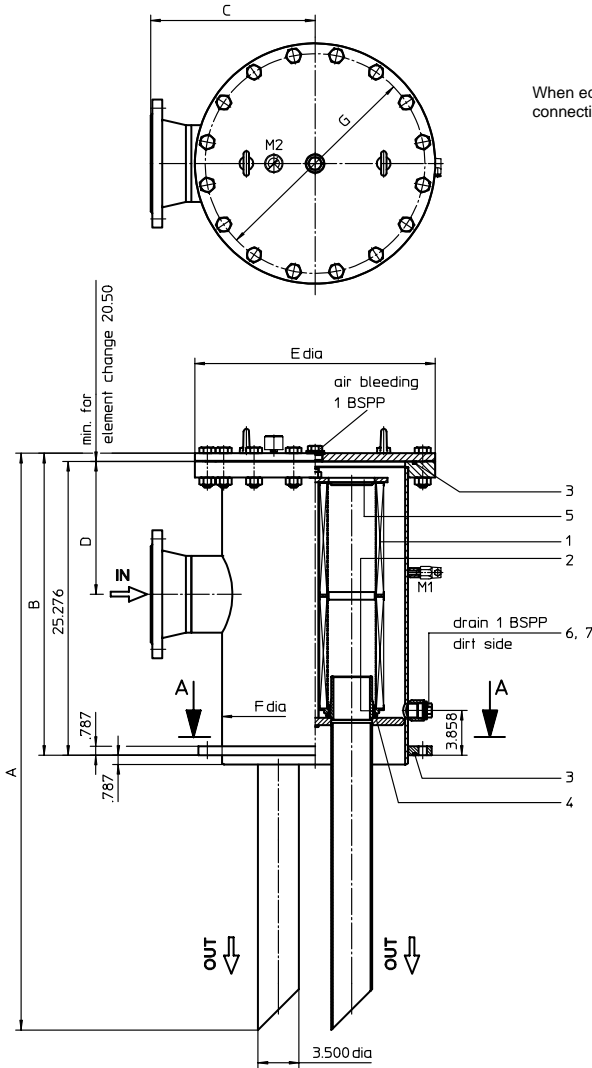
- 1 **series:**
TEF = tank-mounted return-line-filter
- 2 **nominal size:** 4801, 7201
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG = 20 μ m(c), 16 VG = 15 μ m(c), 10 VG = 10 μ m(c), 6 VG = 7 μ m(c), 3 VG = 5 μ m(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
FA11 = ANSI-flange connection 150 PSI, sealing surface rough grind 1600-3600 μ m (TEF 4801)
FA12 = ANSI-flange connection 150 PSI, sealing surface rough grind < 640 μ m (TEF 7201)
- 9 **connection size:**
D = 6" (TEF 4801)
E = 8" (TEF 7201)
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 1201. 10VG. 10. S. P. -

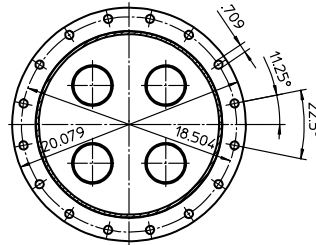
1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 1201
- 3 - 7 see type index-complete filter

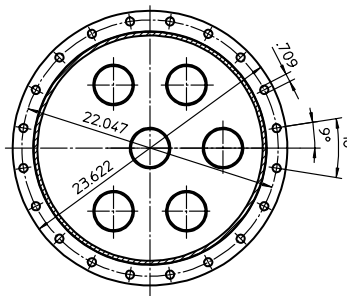


When equipped with one clogging indicator use preferably connection M1.

section A-A
TEF 4801



section A-A
TEF 7201



2. Diomensions: inch

type	connection ANSI	A	B	C	D	E	F	G	weight lbs.	volume tank
TEF 4801	6"	49.60	26.00	14.13	11.41	20.67	15.98	18.90	425	19.8 Gal.
TEF 7201	8"	49.80	26.14	17.30	11.02	24.21	20.00	22.44	555	31.0 Gal.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	designation	qty.	dimension and article-no. TEF 4801	qty.	dimension and article-no. TEF 7201
1	filter element	4	01E. 1201	6	01E. 1201
2	O-ring	4	93 x 5 307588 (NBR) 307589 (FPM)	6	93 x 5 307588 (NBR) 307589 (FPM)
3	O-ring	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)
4	O-ring	4	85 x 10 304386 (NBR) 304541 (FPM)	6	85 x 10 304386 (NBR) 304541 (FPM)
5	pressure plate	1	313116	1	327718
6	screw plug	2	1 BSPP 309732		
7	gasket	2	A 33 x 39 308257		
8	clogging indicator, visual	1	O see sheet-no. 1616		
9	pressure switch, electrical	1	E1, E2 or E5 see sheet-no. 1616		

4. Description:

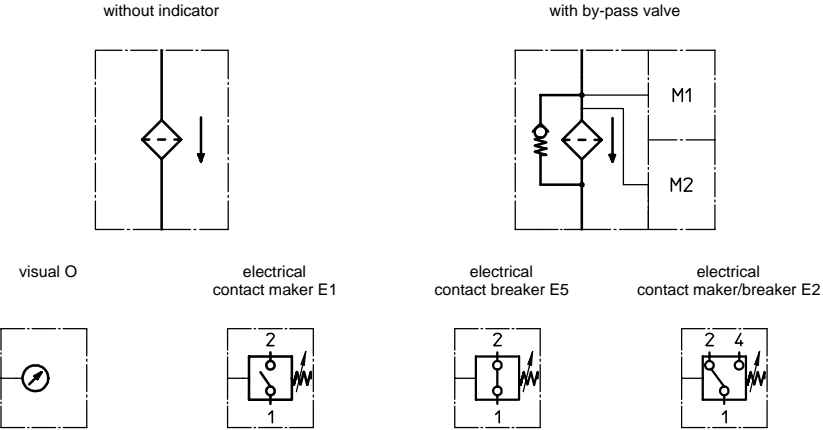
Return-line filters in the TEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The TEF-filters are directly mounted to the reservoir and connected to the return-line. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request. INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycol's, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications. INTERNORMEN-Filter elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service. When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	+ 14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	ANSI-flange connection 150 PSI
housing material:	c-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3. Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

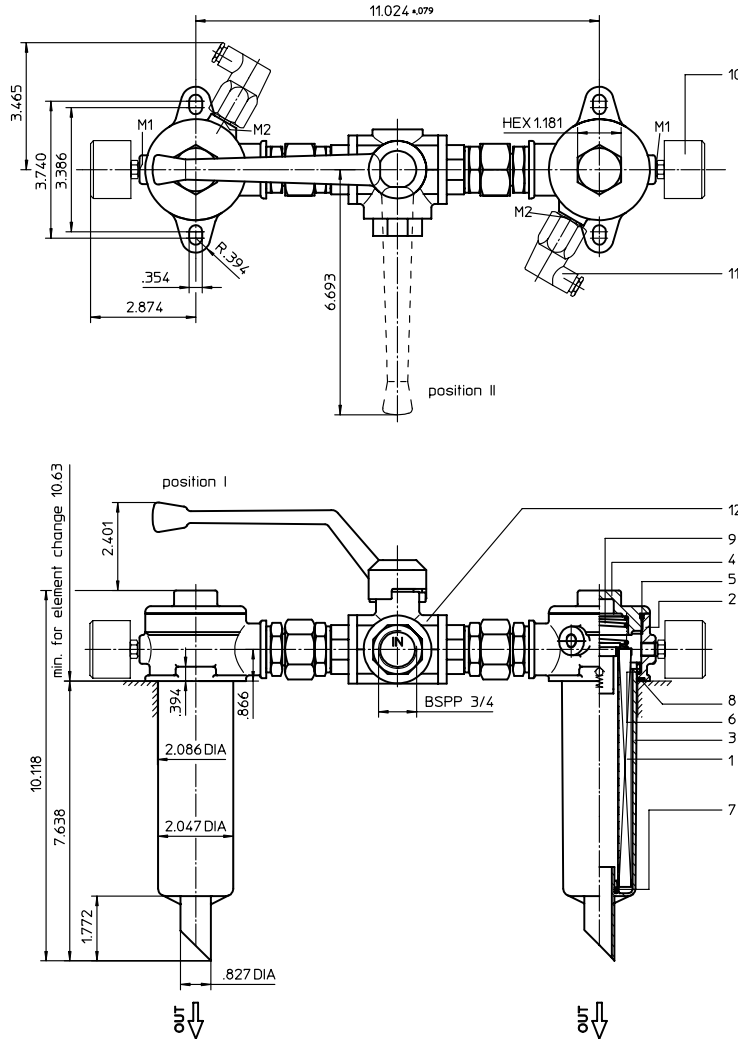
Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over **Series DTEF 70 145 PSI**

Sheet No.
1021 E



Position I: left filter-side in operation
 Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 70. 10VG.16. S. P. -. G. 4. -. O. E5

1	2	3	4	5	6	7	8	9	10	11	12
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- 1 **series:**
DTEF = tank-mounted return-line filter, change-over
- 2 **nominal size:** 70
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG=20 μ m_(c), 16 VG=15 μ m_(c), 10 VG=10 μ m_(c), 6 VG=7 μ m_(c), 3 VG=5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- 5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 29 PSI
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification: (see catalog)**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
G = thread connection
- 9 **connection size:**
4 = BSPP 3/4
- 10 **filter housing specification: (see catalog)**
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 70. 10VG.16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 70
- 3 - 7 see Type index-complete filter

weight: approx. 8.0 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 70	-	
2	2	filter head		305459	
3	2	filter bowl		304595	
4	2	screw plug	M 60 x 2	303621	
5	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	2	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	2	O-ring	22 x 3	304387 (NBR)	304931 (FPM)
8	4	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
9	2	spring	DA = 40	304982	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308115	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the r eturn-line. A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operat ion.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm_{0.1} are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubricat ion fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retain ing capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

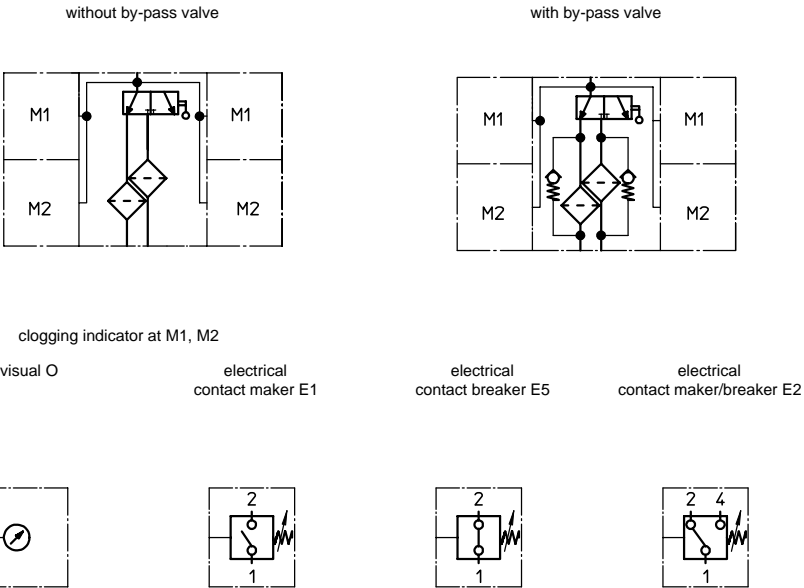
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	thread connection
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 1.98 gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over **Series DTEF 120 145 PSI**

Sheet No.
1022 E

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 120. 10VG. 16. S. P. - . G. 5. - . O. E1

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 series:**
DTEF = tank-mounted return-line filter, change-over
- 2 nominal size:** 120
- 3 filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG=20 µm_(c), 16 VG=15 µm_(c), 10 VG=10 µm_(c), 6 VG=7 µm_(c), 3 VG=5 µm_(c), Interpor fleece (glass fiber)
25 P = 25 µm, 10 P = 10 µm paper
- 4 resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- 5 filter element design:**
E = without by-pass
S = with by-pass, Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification: (see catalog)**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 connection:**
G = thread connection
- 9 connection size:**
5 = BSPP 1
- 10 filter housing specification: (see catalog)**
- = standard
IS06 = see sheet-no. 31605
- 11 clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

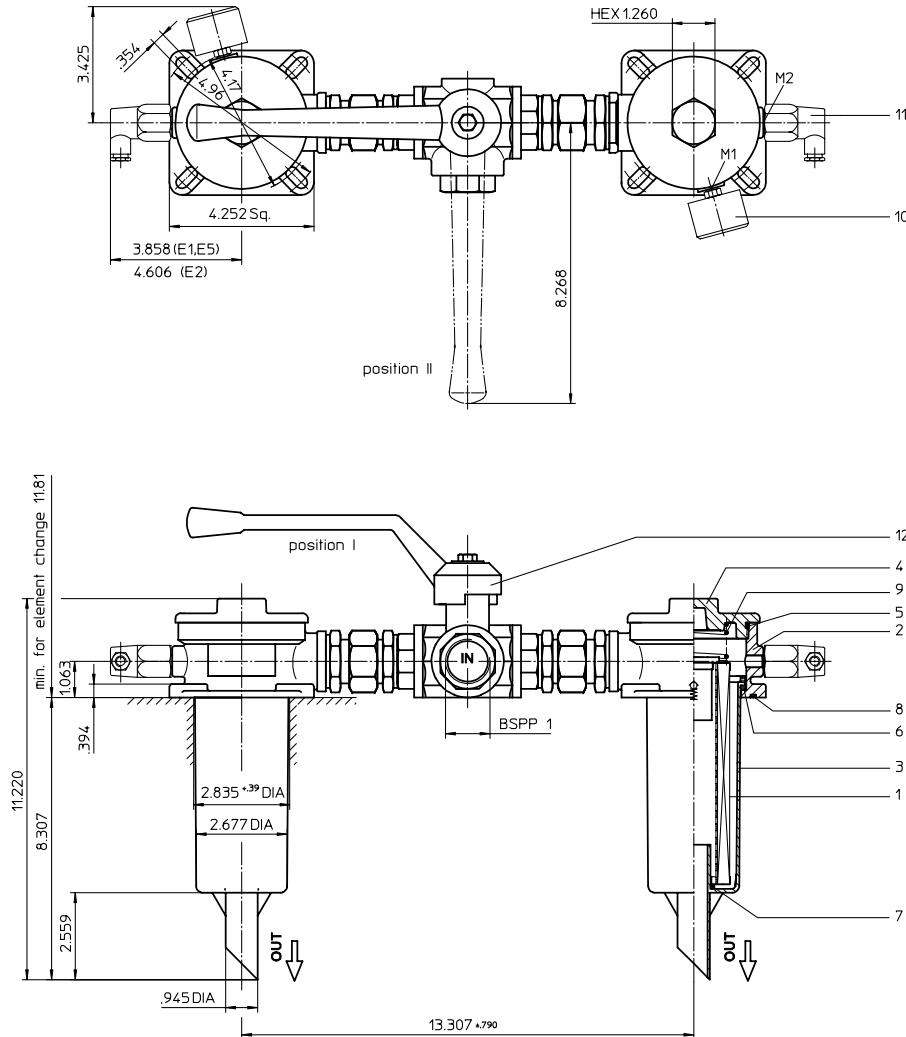
01E. 120. 10VG. 16. S. P. -

1	2	3	4	5	6	7
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- 1 series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 nominal size:** 120
- 3 - 7** see Type index-complete filter

weight: approx. 13 lbs.

Changes of measures and design are subject to alteration!



Position I: left filter-side in operation
Position II: right filter-side in operation

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 120	-	
2	2	filter head	NG 120	305467	
3	2	filter bowl	NG 120	303041	
4	2	screw plug	M 60 x 2	302069	
5	2	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
6	2	O-ring	68 x 4	303037 (NBR)	313046 (FPM)
7	2	O-ring	24 x 3	303038 (NBR)	304397 (FPM)
8	4	O-ring	86 x 3	305470 (NBR)	313047 (FPM)
9	2	spring	DA = 52	302144	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308128	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the r eturn-line. A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

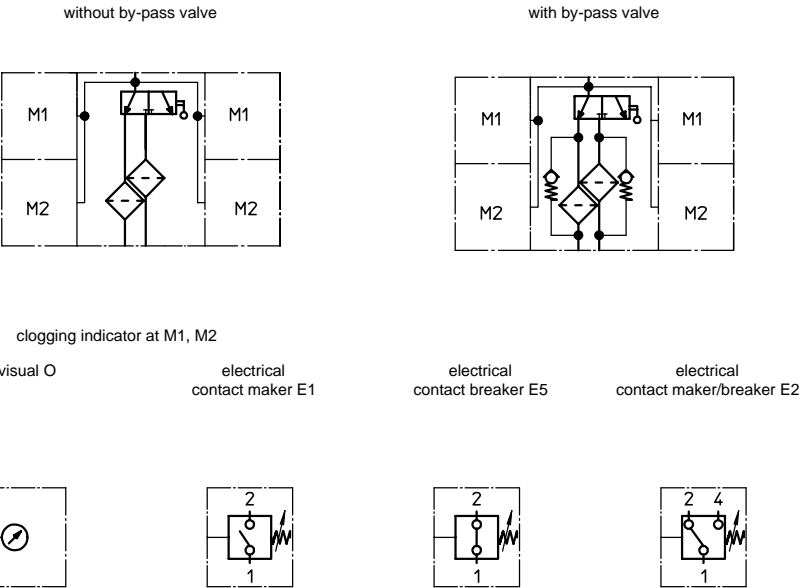
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	thread connection
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x .16 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



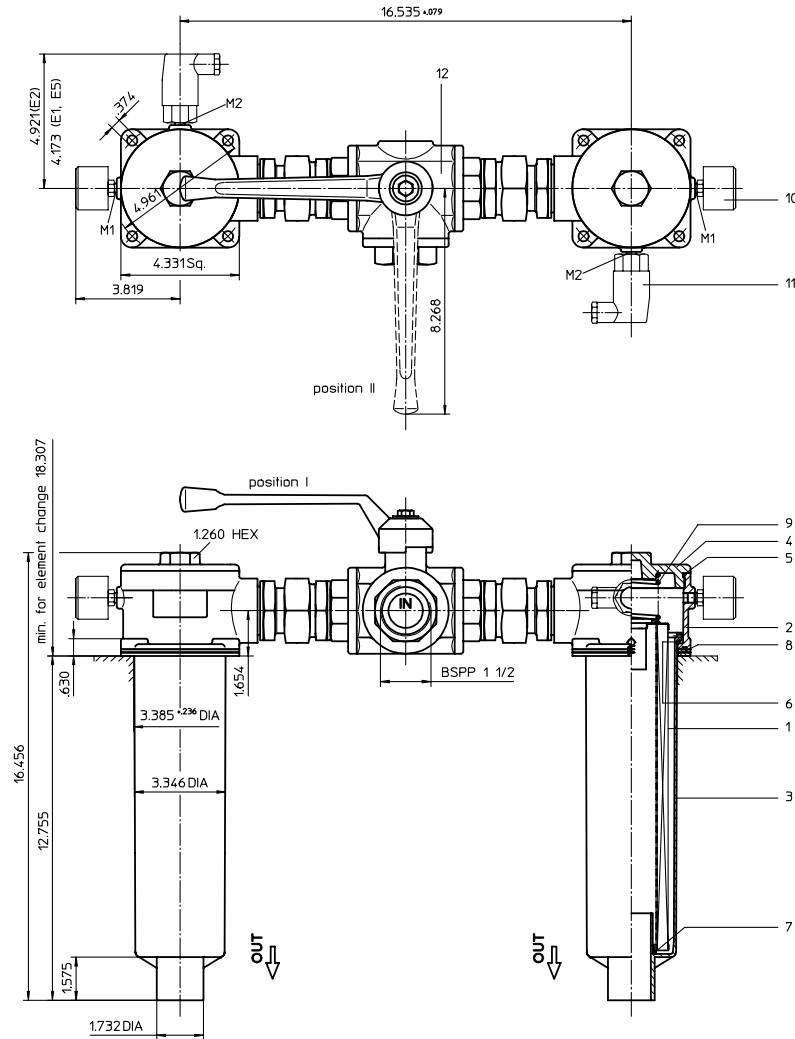
6. Pressure drop flow curves: Precise flow rates see 'INt-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over
Series DTEF 320 145 PSI

Sheet No.
1023 L



Position I: left filter-side in operation
Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 320. 10VG. 16. S. P. -. G. 7. -. O. E1

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
DTEF = tank-mounted return-line filter, change-over |
| 2 | nominal size: 320 |
| 3 | filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG=20 µm _(c) , 16 VG=15 µm _(c) , 10 VG=10 µm _(c) , 6 VG=7 µm _(c) , 3 VG=5 µm _(c) Interpor fleece (glass fiber)
25 P = 25 µm, 10 P = 10 µm paper |
| 4 | resistance of pressure difference for filter element:
16 = Δp 232 PSI |
| 5 | filter element design:
E = without by-pass
S = with by-pass, Δp 29 PSI |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
ISO6 = see sheet-no. 31601 |
| 8 | connection:
G = thread connection |
| 9 | connection size:
7 = BSPP 1 ½ |
| 10 | filter housing specification: (see catalog)
- = standard
ISO6 = see sheet-no. 31605 |
| 11 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616 |
| 12 | clogging indicator at M2:
possible indicators see position 11 of the type index |

1.2. Filter element: (ordering example)

01E.320.10VG. 16. S. P. -

1	2	3	4	5	6	7
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- | | | |
|---|----------------------|--------------------------------|
| 1 | series: | |
| 2 | nominal size: | 320 |
| 3 | - 7 | see Type index-complete filter |

weight: approx. 22 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 320	-	
2	2	filter head	NG 320	305475	
3	2	filter bowl	NG 320	302145	
4	2	screw plug	M 100 x 2	302338	
5	2	O-ring	96 x 3	305292 (NBR)	305297 (FPM)
6	2	O-ring	82 x 3	305191 (NBR)	305298 (FPM)
7	2	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
8	4	gasket	110 x 110 x 3	304456 (NBR)	314138 (FPM)
9	2	spring	DA = 52	305053	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308128	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line. A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm_{0.9} are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

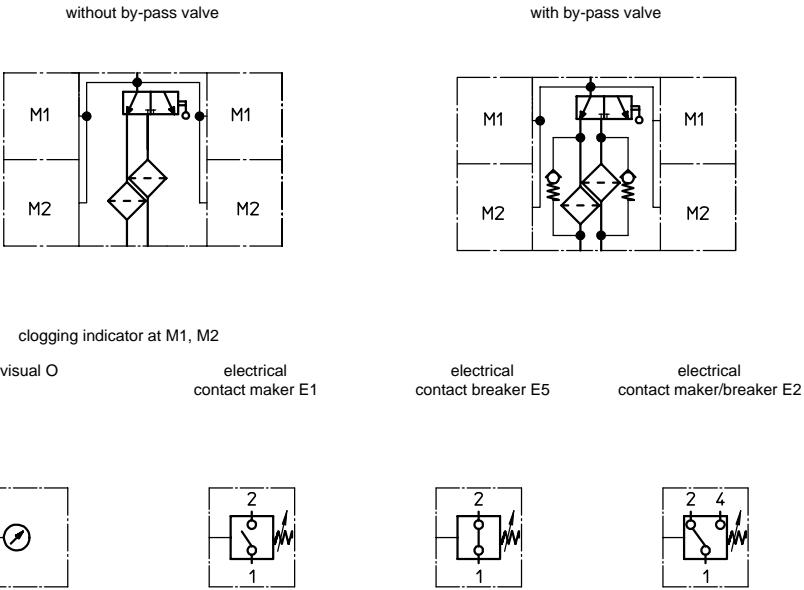
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	thread connection
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x .48 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

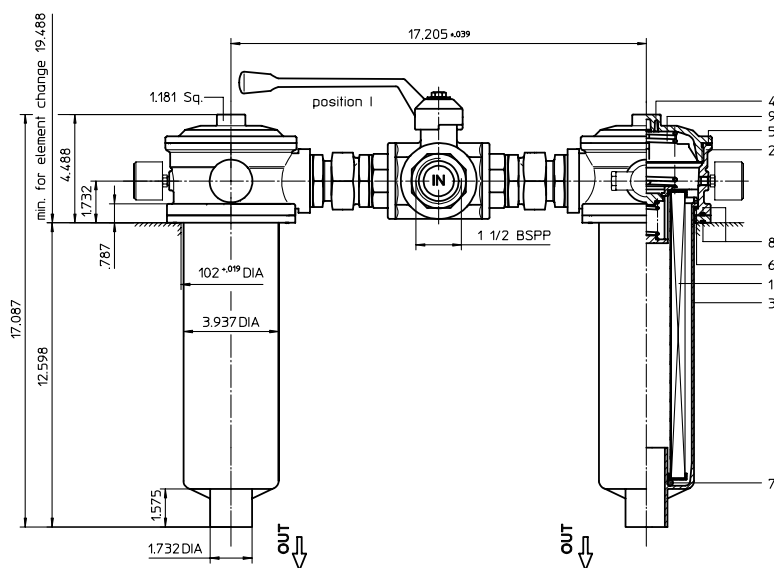
5. Symbols:



6. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



Position I: left filter-side in operation
Position II: right filter-side in operation

RETURN LINE FILTER, change-over
Series DTEF 426 145 PSI

Sheet No.
1035 D

1. Type index:

1.1. Complete filter: (ordering example)

DTEF.	426.	10VG.	16.	S.	P.	-.	G.	7.	-.	O.	E1.	-
1	2	3	4	5	6	7	8	9	10	11	12	13

- | | |
|----|--|
| 1 | series: |
| | DTEF = tank-mounted return-line filter, change-over |
| 2 | nominal size: 426 |
| 3 | filter-material and filter-fineness: |
| | 80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh,
25 VG=20 $\mu\text{m}_{(\text{G})}$, 16 VG=15 $\mu\text{m}_{(\text{G})}$, 10 VG=10 $\mu\text{m}_{(\text{G})}$, 6 VG=7 $\mu\text{m}_{(\text{G})}$, 3 VG=5 $\mu\text{m}_{(\text{G})}$ Interpor fleece (glass fiber)
25 P = 25 μm , 10 P = 10 μm paper |
| 4 | resistance of pressure difference for filter element: |
| | 16 = Δp 232 PSI |
| 5 | filter element design: |
| | E = without by-pass
S = with by-pass, Δp 29 PSI |
| 6 | sealing material: |
| | P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog) |
| | - = standard
VA = stainless steel
IS06 = see sheet-no. 31601 |
| 8 | connection: |
| | G = thread connection |
| 9 | connection size: |
| | 7 = BSPP 1 1/2 |
| 10 | filter housing specification: (see catalog) |
| | - = standard
IS06 = see sheet-no. 31605 |
| 11 | clogging indicator at M1: |
| | - = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616 |
| 12 | clogging indicator at M2: |
| | possible indicators see position 11 of the type index |
| 13 | clogging indicator at M3: |
| | possible indicators see position 11 of the type index |

1.2. Filter element: (ordering example)

01E. 425. 10VG. 16. S. P. -						
1	2	3	4	5	6	7

- | | | |
|---|----------------------|---|
| 1 | series: | |
| | 01E. | = filter element according to INTERNORMEN factory specification |
| 2 | nominal size: | 425 |
| 3 | - 7 | see Type index-complete filter |

weight: approx. 27.5 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 425	-	
2	2	filter head	NG 426	313434	
3	2	filter bowl	NG 425	303732	
4	2	screw plug	M 120 x 3	313649	
5	2	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
6	2	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
7	2	O-ring	44 x 6	302222 (NBR)	304384 (FPM)
8	4	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	2	spring	DA = 63,5	304983	
10	2	clogging indicator. visual	O	see sheet-no. 1616	
11	2	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308128	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the r eturn-line. A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm_{0.1} are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

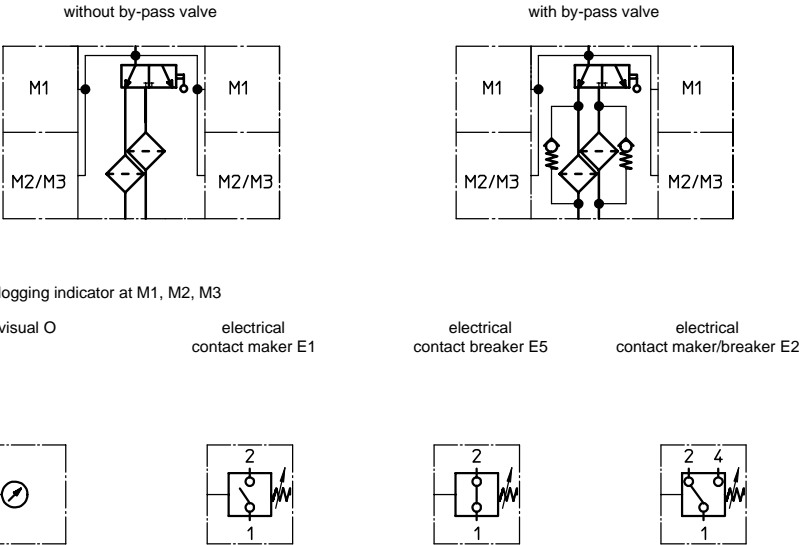
4. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	thread connection
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x .70 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

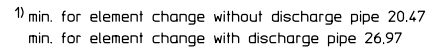


6. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Sheet No.
1074 B



2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 631		
2	2	filter head	TEF 625	316414	
3	2	filter cover	32571-4		
4	2	filter bowl without discharge pipe		316416	
	2	filter bowl with discharge pipe			
5	2	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
6	2	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	2	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
8	2	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
9	1	O-ring	56,75 x 3,53	306035 (NBR)	310264 (FPM)
10	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
11	2	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
12	2	screw plug	¼ BSPP	305003	
13	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
14	1	clogging indicator, visual	O	see sheet-no. 1616	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line. A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm_{ISO} are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

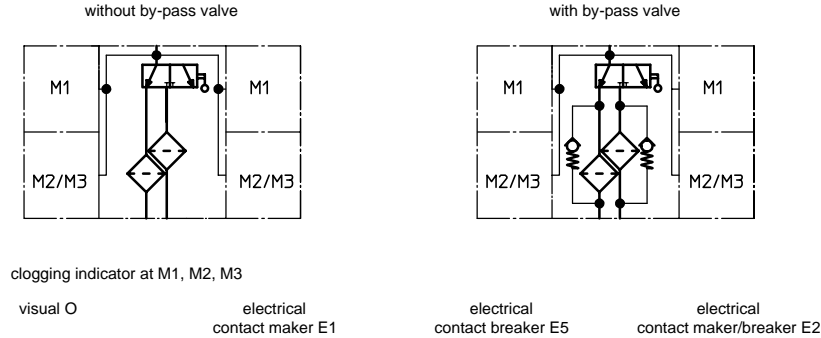
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	Al-casting; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 1.0 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



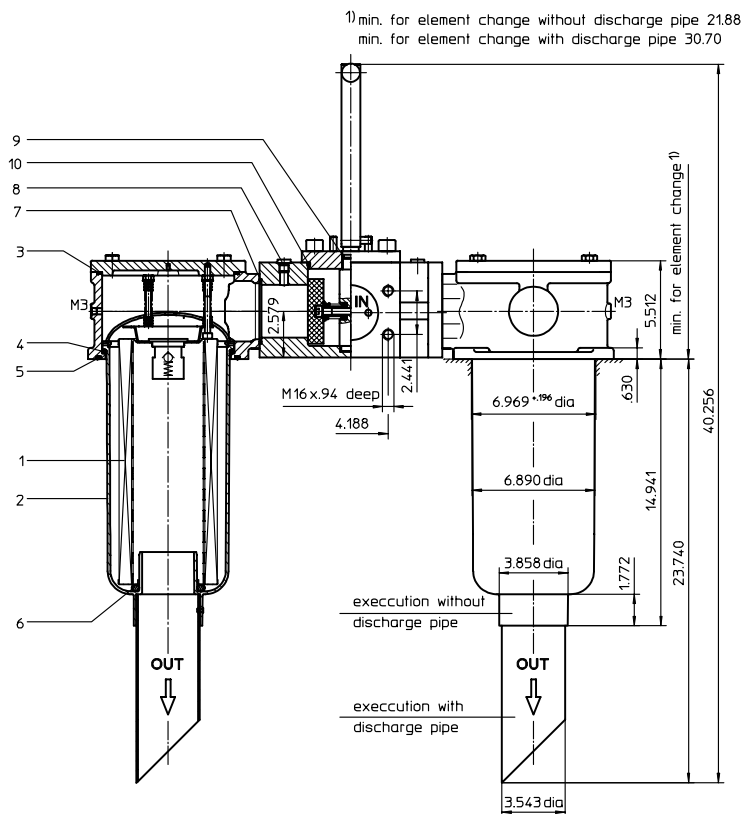
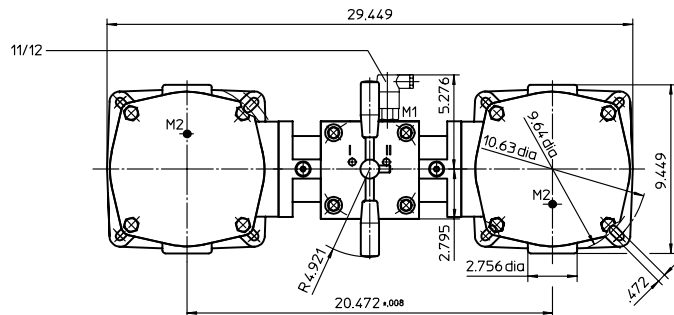
6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



Position I: left filter-side in operation
Position II: right filter-side in operation

RETURN LINE FILTER, change-over

Series DTEF 952 145 PSI

Sheet No.
1075 B

1. Type index:

1.1. Complete filter: (ordering example)

DTEF.	952.	10VG.	10.	S.	P.	-.	FS.	A.	-.	E2.	-.	-.	-.
1	2	3	4	5	6	7	8	9	10	11	12	13	14

- 1 **series:**
DTEF = tank-mounted return-line filter, change-over
- 2 **nominal size:** 952
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG=20 μ m_(G), 16 VG=15 μ m_(G), 10 VG=10 μ m_(G), 6 VG=7 μ m_(G), 3 VG=5 μ m_(G) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 29 PSI
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
A = 3"
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 **clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 **clogging indicator at M3:**
possible indicators see position 11 of the type index
- 14 **discharge pipe:**
- = without
1 = with discharge pipe

1.2. Filter element: (ordering example)

01E.	950.	10VG.	10.	S.	P.	-
1	2	3	4	5	6	7

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 950
- 3 - 7 see Type index-complete filter

2. Accessories:

- counter flange, see sheet-no. 1652

weight: approx. 119 lbs.
Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 950		
2	2	filter bowl without discharge pipe		327460	
	2	filter bowl with discharge pipe		327461	
3	2	O-ring	195 x 3,5	301831(NBR)	306528 (FPM)
4	2	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
5	2	O-ring	190 x 5	305432 (NBR)	310283 (FPM)
6	2	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
7	2	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
8	2	screw plug	¼ BSPP	305003	
90	1	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
10	1	O-ring	105 x 5	310003 (NBR)	323080 (FPM)
11	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	clogging indicator, visual	O	see sheet-no. 1616	

4. Description:

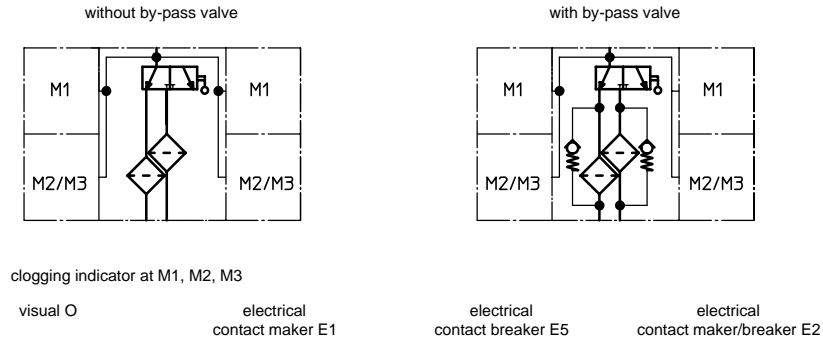
Return-line filters change-over in the DTEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line. A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_{ISO} are available; finer filter elements on request. INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications. INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service. When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	SAE-flange connection J518c 3000 PSI
housing material:	AL; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 2.6 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over Series DTEF 1652 145 PSI

Sheet No.
1038 D

1. Type index:

1.1. Complete filter: (ordering example)

DTEF.	1652.	10VG.	16.	S.	P.	-.	FS.	B.	-.	E5.	O.	-.	-.
1	2	3	4	5	6	7	8	9	10	11	12	13	14

- 1 **series:**
DTEF = tank-mounted return-line filter, change-over
- 2 **nominal size:** 1652
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG=20 μ m_(c), 16 VG=15 μ m_(c), 10 VG=10 μ m_(c), 6 VG=7 μ m_(c), 3 VG=5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- 5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 29 PSI
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
B = 4"
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 **clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 **clogging indicator at M3:**
possible indicators see position 11 of the type index
- 14 **discharge pipe:**
- = without
1 = with discharge pipe

1.2. Filter element: (ordering example)

01E.	631.	10VG.	16.	S.	P.	-
1	2	3	4	5	6	7

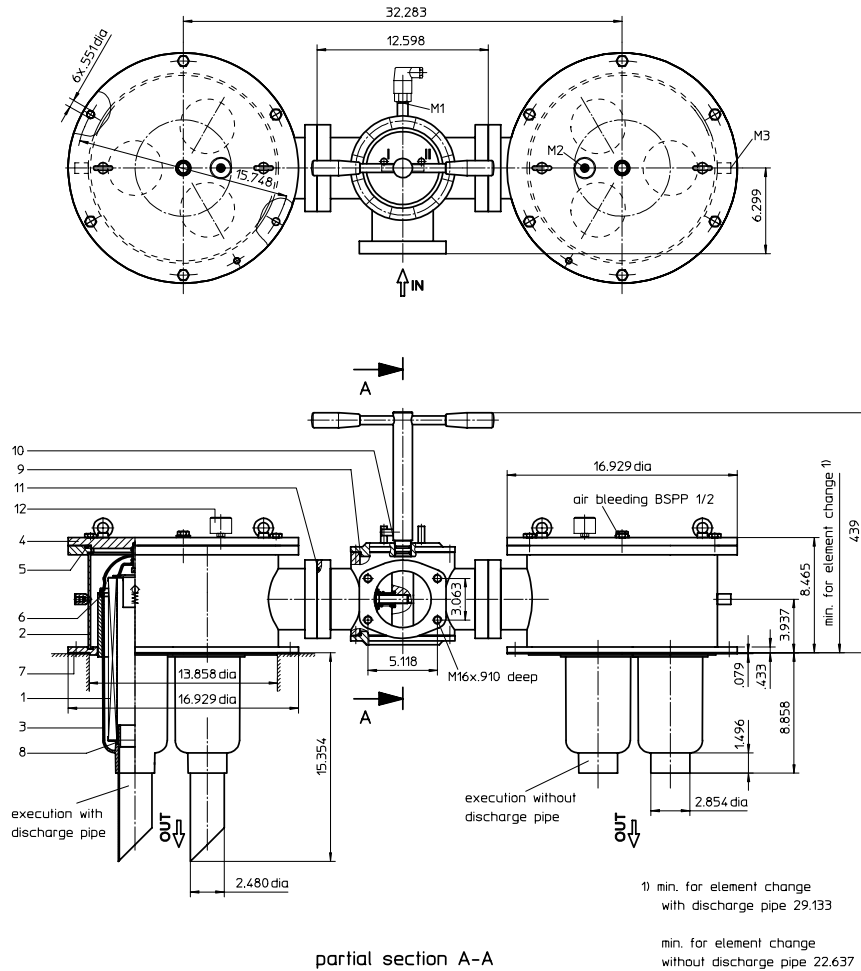
- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 631
- 3 - 7 see Type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- evacuation and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652

weight: approx. 273 lbs.

Changes of measures and design are subject to alteration!



3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	6	filter element	01.E 631	-	
2	2	filter head ¹⁾			
3	6	filter bowl with discharge pipe ¹⁾			
	6	filter bowl without discharge pipe ¹⁾			
4	2	filter cover ¹⁾			
5	2	O-ring	355 x 5	314740 (NBR)	314739 (FPM)
6	6	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	2	gasket	430 x 350 x 2	317271 (NBR)	316659 (FPM)
8	2	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
9	2	O-ring	150 x 4	313278 (NBR)	- (FPM)
10	2	O-ring	24 x 3	303038 (NBR)	304397 (FPM)
11	2	O-ring	110,72 x 3,53	316355 (NBR)	316356 (FPM)
12	1	clogging indicator, visual	O	see sheet-no. 1616	
13	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	

¹⁾ in case of ordering these spare parts use the complete type index

4. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the r eturn-line. A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clea n filter-side without interrupting operation.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm_{0.1} are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubricati on fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaini ng capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

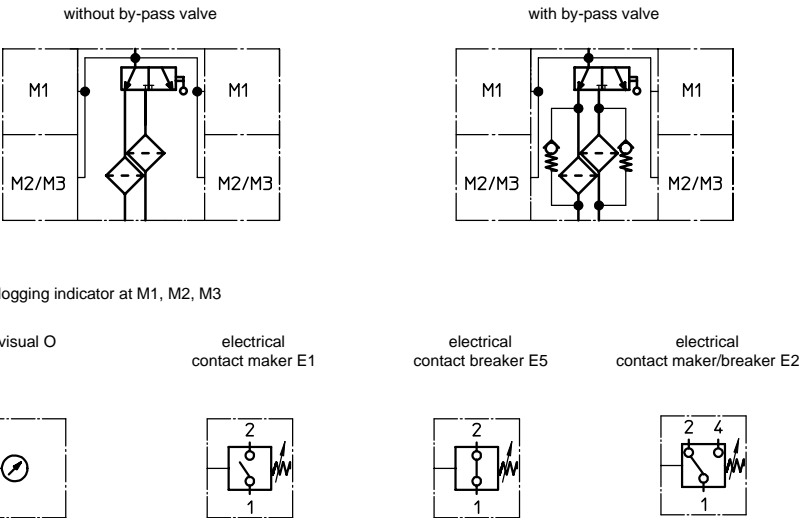
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	C-steel; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 5.80 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over **Series DTEF 2551 145 PSI**

1. Type index:

1.1. Complete filter: (ordering example)

DTEF.	2551.	10VG.	10.	S.	P.	-.	FS.	C.	-.	E2.	O.	-
1	2	3	4	5	6	7	8	9	10	11	12	13

- 1 **series:**
DTEF = tank-mounted return-line filter, change-over
- 2 **nominal size:** 2551
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 29 PSI
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
C = 5"
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 **clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 **clogging indicator at M3:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E.	950.	10VG.	10.	S.	P.	-
1	2	3	4	5	6	7

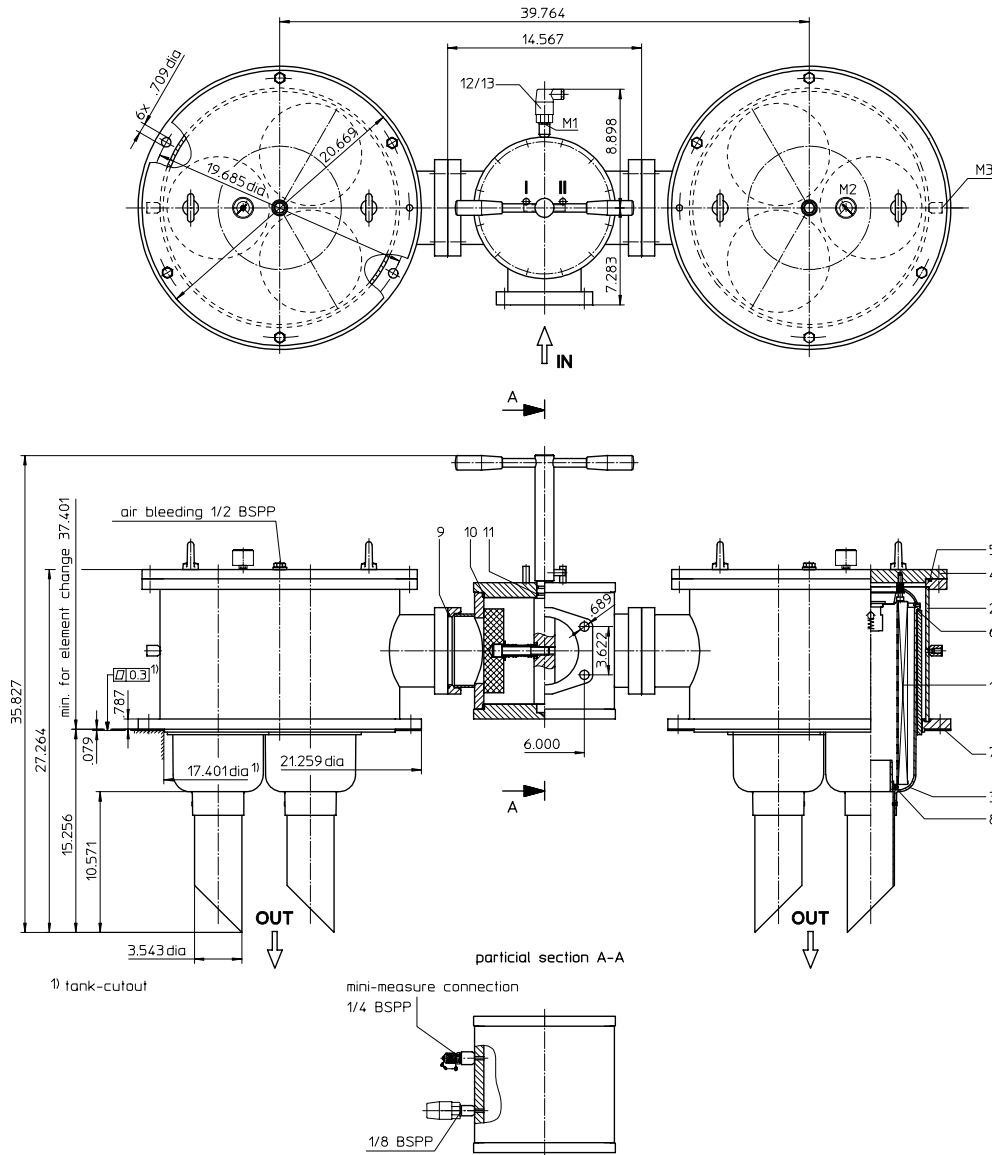
- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 950
- 3 - 7 see Type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- evacuation and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652

weight: approx. 605 lbs.

Changes of measures and design are subject to alteration!



3. Spare parts:

item	qty.	designation	dimension	article-no	
1	6	filter element	01E.950		
2	2	filter head ¹⁾		313295	
3	6	filter bowl ¹⁾		327461	
4	2	filter cover ¹⁾			
5	2	O-ring	455 x 5	314742 (NBR)	314741 (FPM)
6	6	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	2	gasket	540 x 441 x 2	313293 (NBR)	317461 (FPM)
8	6	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
9	2	O-ring	136,12 x 3,53	320162 (NBR)	320163 (FPM)
10	2	O-ring	225 x 5	308652 (NBR)	311473 (FPM)
11	2	O-ring	24 x 3	303038 (NBR)	304397 (FPM)
12	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
13	1	clogging indicator, visual	O	301721	

¹⁾ in case of ordering these spare parts use the complete type index

4. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the r eturn-line. A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the cle-an filter-side without interrupting operation.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

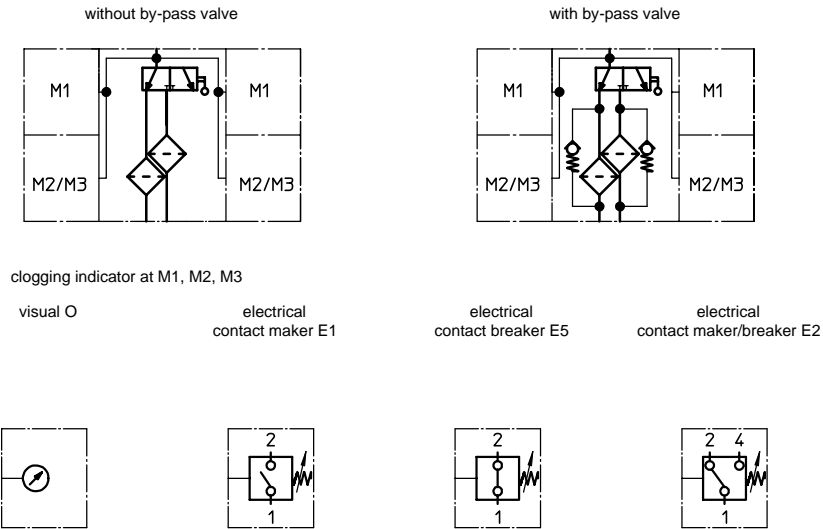
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	C-steel, glass fiber reinforced polyamide (filter bowl)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 12.5 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

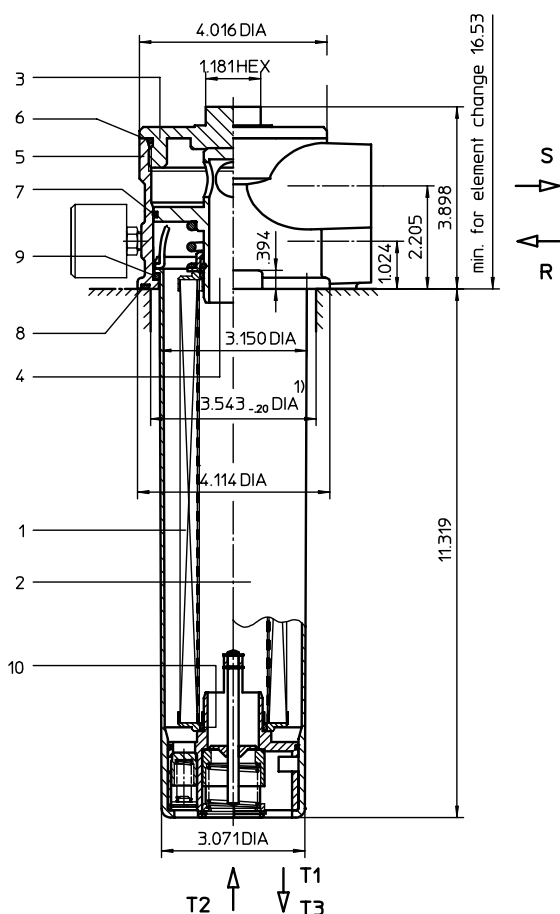
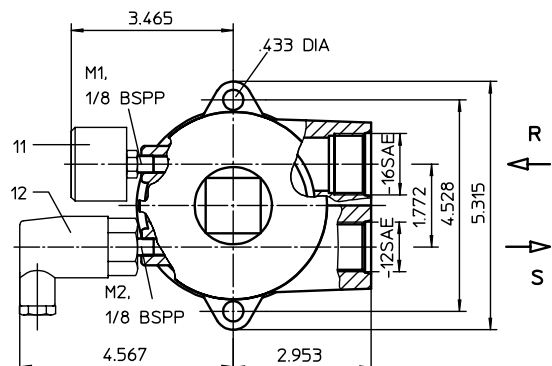
8. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, with suction connection

Series TNRS 101 145 PSI

Sheet No.
1070 F



1) tank cutout according to DIN 24550, T5

1. Type index:

1.1. Complete filter: (ordering example)

TNRS. 101. 10VG. 10. B. P. -. UG. 5. -. S2,5. Z. O. E2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
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- 1 **series:**
TNRS = tank-mounted return-line filter with suction connection
- 2 **nominal size:** 101
- 3 **filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm
stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$,
3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
25 P = 25 μm , 10 P = 10 μm paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
5 = -16 SAE
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
S2,5 = with by-pass valve Δp 36 PSI
- 12 **suction valve:**
Z = with suction valve
- 13 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 14 **preload pressure indicator at M2:**
- = without
E2 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 100. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 100
- 3 - 7 see type index-complete filter

weight: approx. 4.62 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.NR 100		
2	1	filter bowl with valve combination	TNRS 101		
3	1	screw plug	M 92 x 3	317014	
4	1	centering pivot	TNRS 63-100		
5	1	filter head	TNRS 101		
6	1	O-ring	82 x 4	331337 (NBR)	337365 (FPM)
7	1	O-ring	80 x 2,5	313179 (NBR)	314148 (FPM)
8	1	O-ring	92 x 3	325584 (NBR)	325585 (FPM)
9	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
10	2	O-ring	32 x 3,5	304378 (NBR)	304401 (FPM)
11	1	clogging indicator at M1	O, E1, E5 or E2	see sheet-no. 1616	
12	1	clogging indicator at M2	E2	see sheet-no. 1616	

3. Description:

The filters of the series TNRS are tank-top mounted in-line filters. In addition to the return-line connection they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 7.25 PSI.

This combination, return-line and suction filter, is foreseen for hydraulic circuits which are equipped with minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration for the pump with the smaller volume flow.

The operating status in general wherein the preload pressure and the full stream filtration are effecting the Q_R (return-line flow) $>$ Q_S (suction flow). When the operating status is $Q_R = Q_S$ no preload pressure is effective.

During the operating status $Q_R < Q_S$ the suction valve is effective operates at the connection T2, what makes a feeding out of the receptable possible without preload pressure and without filter efficiency.

Return-line filters in the TNRS series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety.

The filter element according to DIN 24550, T4 consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filter finer than $40 \mu m$ should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as $5 \mu m_{(G)}$ are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

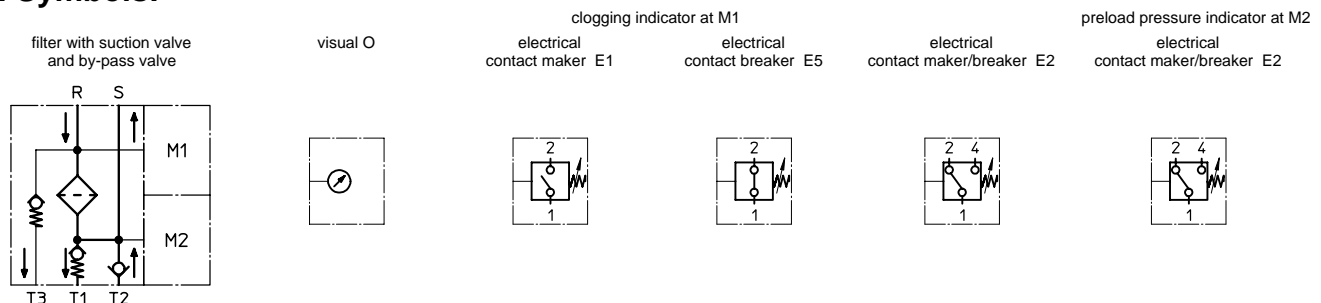
4. Technical data:

temperature range:	+14 °F to + 176 °F (for a short time + 212 °F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	36 PSI
opening pressure preload valve:	7.25 PSI
opening pressure suction valve:	0.72 PSI
line adapter:	-16 SAE and -12 SAE
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.35 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp -curves ; depending on filter fineness and viscosity.

7. Test methods:

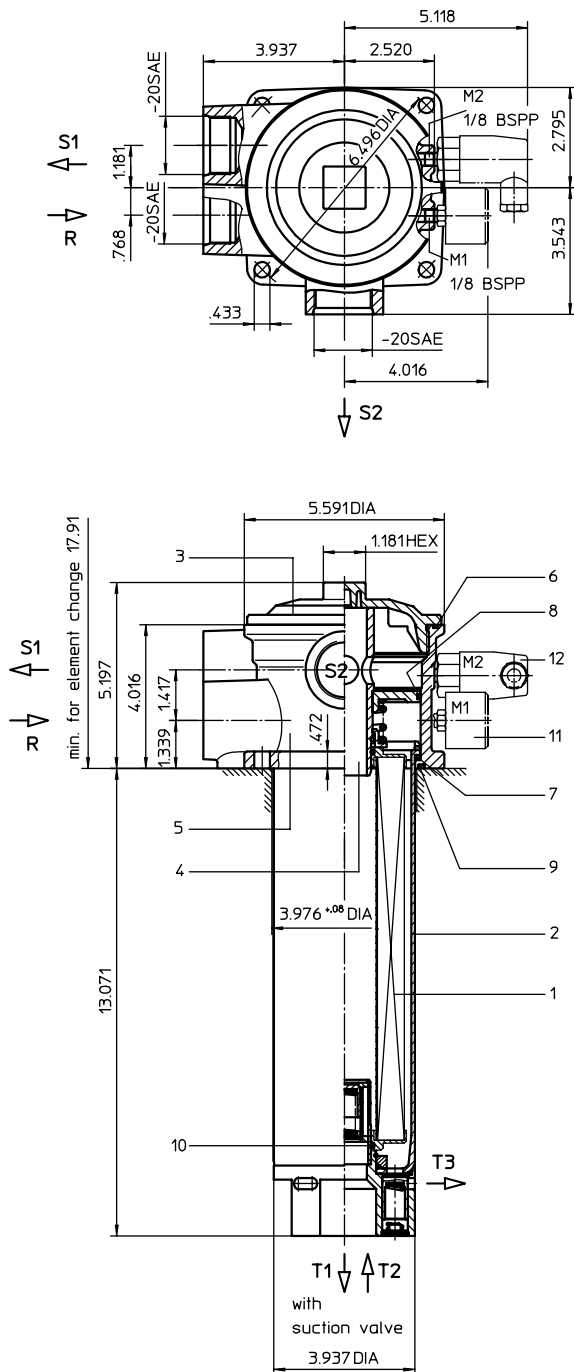
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristi
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, with suction connection

Series TRS 226 145 PSI

Sheet No.
1065 C



1. Type index:

1.1. Complete filter: (ordering example)

TRS.226.10VG.10.B.P. -. UG. 6. -. S2,5. Z. O. E2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
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- 1 **series:**
TRS = tank-mounted return-line filter with suction connection
- 2 **nominal size:** 226
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
6 = -20 SAE
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
S2,5 = with by-pass valve Δp 36 PSI
- 12 **suction valve:**
Z = with suction valve
- 13 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 14 **preload pressure indicator at M2:**
- = without
O1 = visual, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01RS.225.10VG.10.B.P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01RS. = return-line suction filter element
- 2 **nominal size:** 225
- 3 - 7 see type index-complete filter

weight: approx. 7 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.RS 225		
2	1	filter bowl with suction valve and by-pass valve	TRS 226		
3	1	screw plug	M 120 x 3	313649	
4	1	centering pivot	TRS 175-225		
5	1	filter head	TRS 175-225		
6	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
7	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
8	1	O-ring	96 x 3	305292 (NBR)	305297 (FPM)
9	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
10	2	O-ring	38 x 3	304340 (NBR)	317013 (FPM)
11	1	clogging indicator at M1	O, E1, E5 or E2	see sheet-no. 1616	
12	1	clogging indicator at M2	O1 or E2	see sheet-no. 1616	

3. Description:

The filters of the series TRS are tank-top mounted in-line filters. In addition to the return-line connection they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 7.25 PSI.

This combination, return-line and suction filter, is foreseen for hydraulic circuits which are equipped with minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration for the pump with the smaller volume flow.

The operating status in general wherein the preload pressure and the full stream filtration are effecting the Q_R (return-line flow) $> Q_S$ (sum of the suction flows at S1 and S2). When the operating status is $Q_R = Q_S$ no preload pressure is effective. For circuits wherein the operating status $Q_R < Q_S$ appears for a short time, the suction valve operates and as a result a feeding out of the vessel is possible without preload pressure and without filter effect.

Return-line filters in the TRS series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filter finer than $40 \mu\text{m}$ should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as $5 \mu\text{m}$ are available; finer filter elements on request.

INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

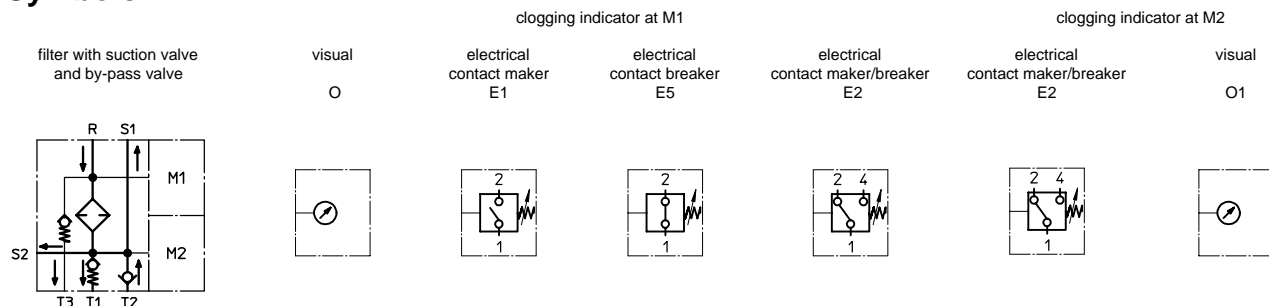
4. Technical data:

temperature range:	+14 °F to + 176 °F (for a short time + 212 °F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	36 PSI
opening pressure preload valve:	7.25 PSI
opening pressure suction valve:	0.72 PSI
line adapter:	-20 SAE
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.45 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp -curves ; depending on filter fineness and viscosity.

7. Test methods:

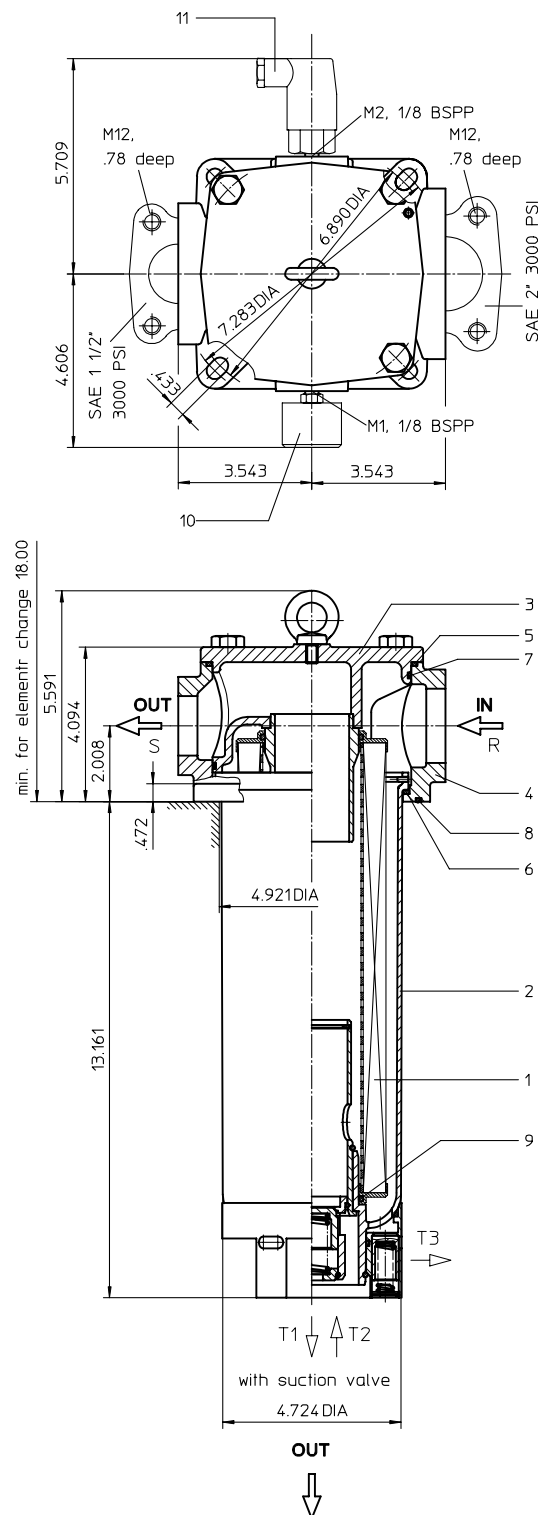
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristi
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, with suction connection

Series TRS 625 145 PSI

Sheet No.
1066 C



1. Type index:

1.1. Complete filter: (ordering example)

TRS.625.10VG.10. B. P. -. FS. 8. -. S2,5. Z. O. E2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
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- 1 **series:**
TRS = tank-mounted return-line filter with suction connection
- 2 **nominal size:** 625
- 3 **filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm
stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$,
3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
25 P = 25 μm , 10 P = 10 μm paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
8 = 2"
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
S2,5 = with by-pass valve Δp 36 PSI
- 12 **suction valve:**
Z = with suction valve
- 13 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 14 **preload pressure indicator at M2:**
- = without
E2 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01E. 625. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN-factory specification
- 2 **nominal size:** 625
- 3 - 7 see type index-complete filter

weight: approx. 13.2 lbs.

2. Spare parts:

item	qty.	designation	Abmessung	article-no.	
1	1	filter element	01.E 625		
2	1	filter bowl with suction valve and by-pass valve	TRS 625		
3	1	filter cover	TRS 625		
4	1	filter head	TRS 625		
5	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
6	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
8	2	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
10	1	clogging indicator at M1	O, E1, E5 or E2	see sheet-no. 1616	
11	1	clogging indicator at M2	E2	see sheet-no. 1616	

3. Description:

The filters of the series TRS are tank-top mounted in-line filters. In addition to the return-line connection they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 7.25 PSI.

This combination, return-line and suction filter, is foreseen for hydraulic circuits which are equipped with minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration for the pump with the smaller volume flow.

The operating status in general wherein the preload pressure and the full stream flow filtration are effecting the Q_R (return-line flow) $> Q_S$ (suction flow). When the operating status is $Q_R = Q_S$ no preload pressure is effective. For circuits wherein the operating status $Q_R < Q_S$ appears for a short time, the suction valve operates and as a result a feeding out of the vessel is possible without preload pressure and without filter effect.

Return-line filters in the TRS series are suitable for a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filter finer than $40 \mu\text{m}$ should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as $5 \mu\text{m}_{(c)}$ are available; finer filter elements on request. INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

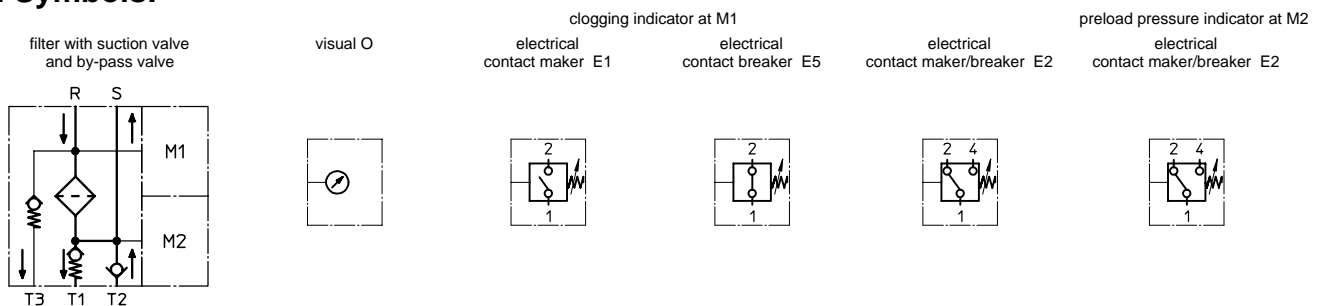
4. Technical data:

temperature range:	+14 °F to + 176 °F (for a short time + 212 °F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	36 PSI
opening pressure preload valve:	7.25 PSI
opening pressure suction valve:	0.72 PSI
line adapter:	SAE 2" and SAE 1 1/2"
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	1.0 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



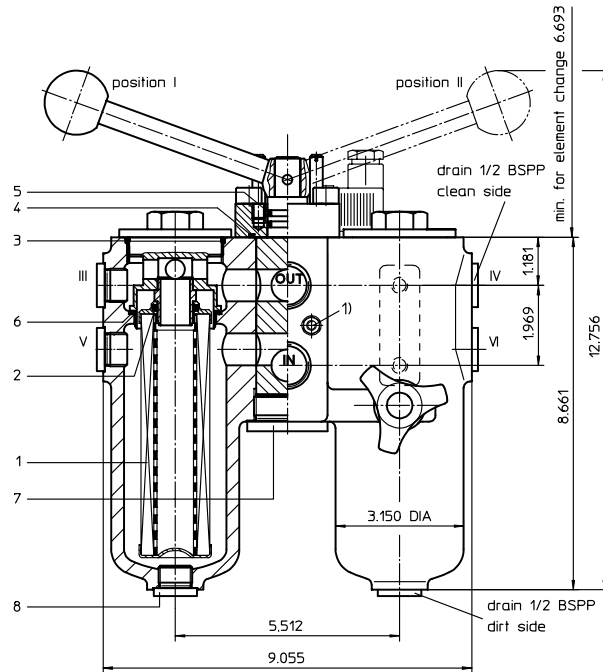
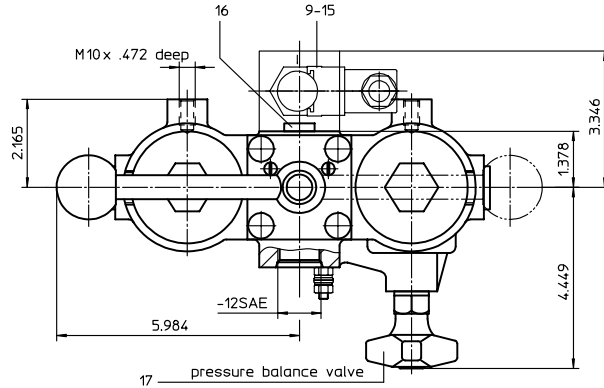
6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp -curves ; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristi
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance



1) connection for the potential equalisation,
only for application in the explosive area

Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

measure connection III, IV: air bleeding, pressure relief 1/2 BSPP - clean side
measure connection V, VI: air bleeding, pressure relief 1/2 BSPP - dirt side

PRESSURE FILTER, change-over

Series DU 63 464 PSI

Sheet No.
2121 K

1. Type index:

1.1. Complete filter: (ordering example)

DU. 63. 10VG. 30. E. P. -. UG. 4. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
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1 series:

DU = pressure filter, change-over

2 nominal size: 63

3 filter-material and filter-fineness:

80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh,
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
25 P = 25 μm , 10 P = 10 μm paper

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification:

- = standard
VA = stainless steel

8 connection:

UG = thread connection

9 connection size:

4 = -12 SAE

10 filter housing specification:

- = standard

11 internal valve

- = without

S1 = with by-pass valve Δp 51 PSI

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL. 63. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NL. = standard filter element according to DIN 24550, T3

2 nominal size: 63

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder-connections, see sheet-no. 1650

- evacuation- and bleeder-connections, see sheet-no. 1651

weight: 33 lbs.

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL 63		
2	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
3	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
4	1	O-ring	42,52 x 2,62	304352 (NBR)	304393 (FPM)
5	2	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
6	2	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
7	1	screw plug	1 ¼ BSPP	308530	
8	6	screw plug	½ BSPP	304678	
9	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
10	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
11	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
12	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
13	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
14	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
15	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
16	2	screw plug	¼ BSPP	305003	
17	1	pressure balance valve			

item 16 execution only without clogging indicator or clogging sensor

4. Description:

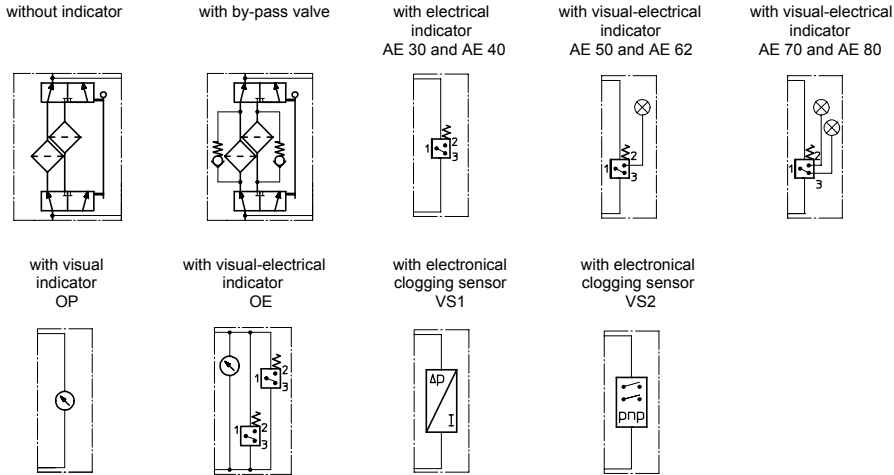
Pressure filter of the series DU 63 are suitable for a working pressure up to 464 PSI.
The pressure peaks are absorbed by a sufficient margin of safety.
Rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction-filters.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber).
Filter elements as fine as 5 µm₉₀ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

5. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	464 PSI
test pressure:	900 PSI
connection system:	thread connection
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connection:	¼ BSPP
evacuation-or bleeder-connection:	¼ BSPP
volume tank:	2x .17 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DU 101-401 464 PSI**

Sheet No.
2117 N

1. Type index:

1.1. Complete filter: (ordering example)

DU. 251. 10VG. 30. E. P. -. FS. 8. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
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1 series:

DU = pressure filter, change-over

2 nominal size: 101, 251, 401

3 filter-material and filter-fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
 25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
 25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:

16 = Δp 232 PSI (01.N 100);

30 = Δp 435 PSI (01NL. 250, 400)

5 filter element design:

E = single-end open

S = with by-pass valve Δp 29 PSI

S1 = with by-pass valve Δp 51 PSI

6 sealing material:

P = Nitrile (NBR) V = Viton (FPM)

7 filter element specification:

- = standard VA = stainless steel ISO6 = see sheet-no. 31601

8 connection:

FS = SAE-flange connection 3000 PSI

9 connection size:

6 = 1 1/4" (DU 101) 8 = 2" (DU 251/401)

10 filter housing specification:

- = standard IS12 = see sheet-no. 41028

11 internal valve:

- = without

12 clogging indicator or clogging sensor:

- = without,

AOR = visual, see sheet-no. 1606, OP = visual, see sheet-no. 1628

AOC = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628

AE = visual-electrical, see sheet-no. 1609, VS1 = electronic, see sheet-no. 1607

VS2 = electronic, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 250. 10VG. 30. E. P. -

1	2	3	4	5	6	7
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1 series:

01N. = standard filter element according to INTERNORMEN factory specification

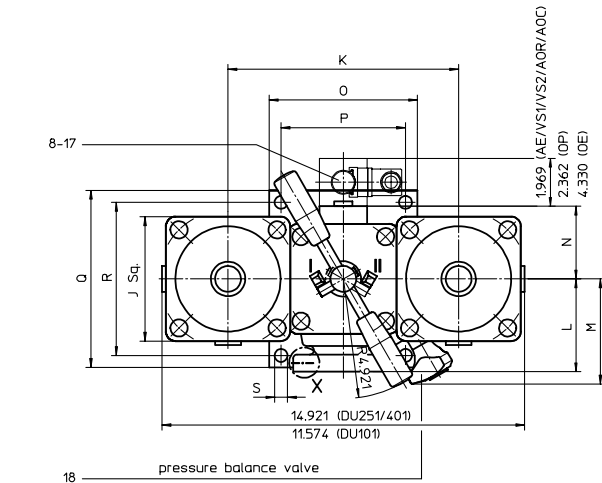
01NL. = standard filter element according to DIN 24550, T3

2 nominal size: 100 (01N.); 250, 400 (01NL.)

3 - 7 see type index-complete filter

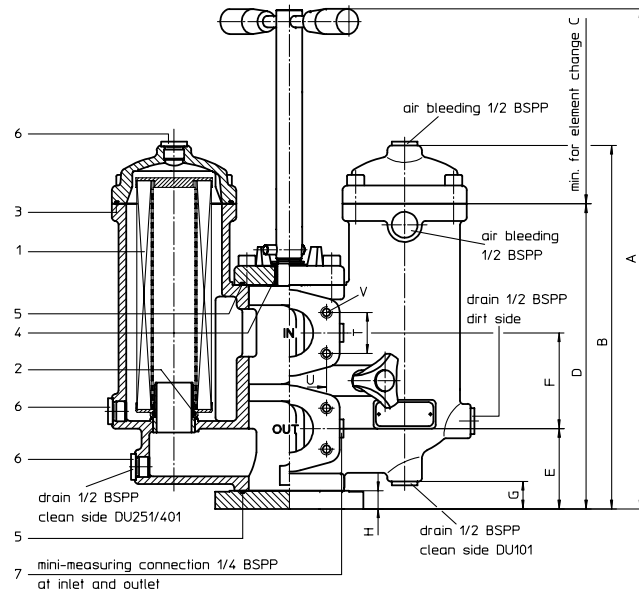
2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-connections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655



Pos. I: left filter-side in operation
 Pos. II: right filter-side in operation

connection for the potential equalisation
 at outlet, only for application
 in the explosive area



filter head execution
 with DU401

3. Dimensions: inch

type	SAE-connection size/metric bolts	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	weight lbs.
DU 101	SAE 1 1/4 ¹⁾	18.23	12.20	8.27	10.43	2.17	3.15	.87	.63	3.74	7.09	2.36	3.94	1.96	5.51	4.53	5.51	4.53	.47	1.19	2.31	M10, .75 deep	51
DU 101	SAE 1 1/4 ²⁾																						
DU 251	SAE 2 ²⁾	20.55	14.97	10.23	12.56	3.31	3.94	-	.75	5.12	9.45	3.82	4.33	2.99	6.10	5.12	7.28	6.30	.53	1.69	3.10	M12, .71 deep	88
DU 251	SAE 2"																						
DU 401	SAE 2"	24.88	20.87	16.14	18.46	3.31	3.94	-	.75	5.12	9.45	3.82	4.33	2.99	6.10	5.12	7.28	6.30	.53	1.69	3.10	M12, .71 deep	110

¹⁾ by counter flange BFS.6.A.33,7x2,6.St.P.3000

²⁾ by counter flange BFS.8.A.48,3x3,7.St.P.3000

Instead of P (Nitrile) also V (Viton) can be chosen.

Changes of measures and design are subject to alteration!

4. Spare parts:

item	designation	qty.	dimension/article no. DU 101	qty.	dimension/article no. DU 251	qty.	dimension/article no. DU 401
1	filter element	2	01N. 100	2	01NL. 250	2	01NL. 400
2	O-ring	2	32 x 3,5 304378 (NBR) 304401 (FPM)	2	40 x 3 304389 (NBR) 304391 (FPM)	2	40 x 3 304389 (NBR) 304391 (FPM)
3	O-ring	2	76 x 4 305599 (NBR) 310291 (FPM)	2	115 x 3 303963 (NBR) 307762 (FPM)	4	115 x 3 303963 (NBR) 307762 (FPM)
4	O-ring	1	24 x 3 303038 (NBR) 304397 (FPM)	1	24 x 3 303038 (NBR) 304397 (FPM)	1	24 x 3 303038 (NBR) 304397 (FPM)
5	O-ring	2	60 x 2,5 305601 (NBR) 310267 (FPM)	2	95 x 3 305808 (NBR) 304828 (FPM)	2	95 x 3 305808 (NBR) 304828 (FPM)
6	screw plug	8	½ BSPP 304678				
7	screw plug	2	¼ BSPP 305003				
8	clogging indicator, visual		AOR or AOC see sheet-no. 1606				
9	clogging indicator, visual	1	OP see sheet-no. 1628				
10	clogging indicator, visual-electrical	1	OE see sheet-no. 1628				
11	clogging indicator, visual-electrical	1	AE see sheet-no. 1609				
12	clogging sensor, electronical	1	VS1 see sheet-no. 1607				
13	clogging sensor, electronical	1	VS2 see sheet-no. 1608				
14	O-ring	1	15 x 1,5 315537 (NBR) 315427 (FPM)				
15	O-ring	1	22 x 2 304708 (NBR) 304721 (FPM)				
16	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)				
17	screw plug	2	¼ BSPP 305003				
18	pressure balance valve	1					

item 17 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DU 101-401 are suitable for operating pressure up to 464 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

A three-way-change-over valve which is, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

Filter finer than 40 microns should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

6. Technical data:

temperature range:

operating medium:

max. operating pressure:

test pressure:

connection system:

housing material:

sealing material:

installation position:

mini-measuring connections:

evacuation-or bleeder connections:

volume tank DU 101:

DU 251:

DU 401:

+14°F to + 176°F (for a short time + 212°F)

mineral oil, other media on request

464 PSI

900 PSI

SAE-flange connection 3000 PSI

EN-GJS-400-18-LT

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

¼ BSPP

¼ BSPP

2x .23 Gal

2x .66 Gal

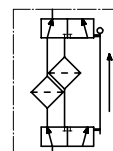
2x .97 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

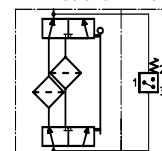
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

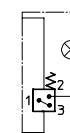
without indicator



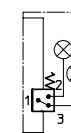
with electrical
indicator
AE 30 and AE 40



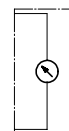
with visual -
electrical indicator
AE 50 and AE 62



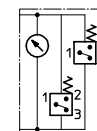
with visual -
electrical indicator
AE 70 and AE 80



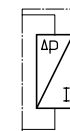
with visual
indicator
AOR/AOC/OP



with visual -
electrical indicator
OE



with electronical
clogging sensor
VS1



with electronical
clogging sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

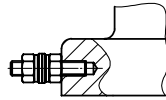
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Sheet No
2118 G



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation



connection for the potential equalisation
at outlet, only for application in the
explosive area

type	SAE-connection size/metric bolts	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	weight lbs.
DU 631	SAE 2 ½"	27.28	22.36	19.56	4.33	4.52	.94	6.29	11.29	3.26	4.76	5.23	5.51	4.52	8.26	7.28	.53	2.00	3.50	M12, .71 deep	198
DU 1001	SAE 3"	28.22	23.07	19.88	3.68	5.51	1.12	8.07	14.96	3.97	5.39	5.94	8.26	6.69	10.43	8.85	.70	2.44	4.18	M16, .91 deep	255
DU 1950	SAE 3"	44.05	38.89	35.70	3.68	5.51	1.12	8.07	14.96	3.97	5.39	5.94	8.26	6.69	10.43	8.85	.70	2.44	4.18	M16, .91 deep	374

1	2	3	4	5	6	7	8	9	10	11	12
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DU = pressure filter, change-over

| filter-material and filter-fineness

80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh,
25 VG = 20 $\mu\text{m}_{(\text{c})}$, 16 VG = 15 $\mu\text{m}_{(\text{c})}$, 10 VG = 10 $\mu\text{m}_{(\text{c})}$, 6 VG = 7 $\mu\text{m}_{(\text{c})}$, 3 VG = 5 $\mu\text{m}_{(\text{c})}$ Interpor fleece (glass fiber)
25 P = 25 μm , 10 P = 10 μm paper

30 = Δp 435 PSI (01NL.630) ; 10 = Δp 145 PSI (01NR.1000)

E	=	single-end open (DU 631)	B	=	both sides open (DU 1001/1950)
S	=	with by-pass valve Δp 29 PSI (DU 631)	S1	=	with by-pass valve Δp 51 PSI (DU 631)

P = Nitrile (NBR)

V = Viton (FPM)

- = standard VA = stainless steel IS06 = see sheet-no. 31601 IS07 = see sheet-no. 31602

FS = SAE-flange connection 3000 PSI

9 = 2 1/2 " (DU 631) A = 3" (DU 1001/1950)

- = standard IS06 = see sheet-no. 31605 IS12 = see sheet-no. 41028

- = without

S1 = with by-pass valve Δp 51 PSI (DU 1001/1950)

- = without OP
AQB visual assessment 1999 OF

AOC = visual, see sheet-no. 1606
AE = visual electrical, see sheet no. 1600

AE = visual-electrical, see sheet-no. 1609

4NI 630 10VC 20 E D

1	2	3	4	5	6	7
---	---	---	---	---	---	---

01NL. = standard filter element according to DIN 24550, T3

nominal size: 630 (01NL.); 1000 (01NR.)

see type index-complete filter

- measure- and bleeder connections, see sheet-no. 1650

- evacuation and bleeder-connections, see sheet-no. 1651

- counter flanges, see sheet-no. 1652

- shut-off valve, see sheet-no. 1655

Changes of measures and design are subject to alteration!

4. Spare parts:

item	designation	qty.	dimension and article-no. DU 631	qty.	dimension and article-no. DU 1001	qty.	dimension and article-no. DU 1950
1	filter element	2	01NL. 630	2	01NR. 1000	4	01NR. 1000
2	O-ring	2	60 x 3,5 304377 (NBR) 304398 (FPM)	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	2	125 x 3 306025 (NBR) 307358 (FPM)	2	185 x 4 305593 (NBR) 306309 (FPM)	4	185 x 4 305593 (NBR) 306309 (FPM)
4	O-ring	1	24 x 3 303038 (NBR) 304397 (FPM)	24 x 3 303038 (FPM) 304397 (FPM)			
5	O-ring	2	115 x 3 303963 (NBR) 307762 (FPM)	140 x 3 304604 (NBR) 307541 (FPM)			
6	O-ring	1	96 x 4 305190 (NBR) 308148 (FPM)	120 x 4 305300 (NBR) 307991 (FPM)			
7	O-ring	1	32 x 2,5 306843 (NBR) 308268 (FPM)	32 x 2,5 306843 (NBR) 308268 (FPM)			
8	O-ring	2	69,45 x 3,53 305868 (NBR) 307357 (FPM)	85,32 x 3,53 305590 (NBR) 306308 (FPM)			
9	screw plug	8	½ BSPP 304678	8	½ BSPP 304678	10	½ BSPP 304678
10	screw plug	2	½ BSPP 305003				
11	connecting pipe	2	- 3.543 dia 313233				
12	clogging indicator, visual	1	AOR or AOC see sheet-no. 1606				
13	clogging indicator, visual	1	OP see sheet-no. 1628				
14	clogging indicator, visual-electrical	1	OE see sheet-no. 1628				
15	clogging indicator, visual-electrical	1	AE see sheet-no. 1609				
16	clogging sensor, electronical	1	VS1 see sheet-no. 1607				
17	clogging sensor, electronical	1	VS2 see sheet-no. 1608				
18	O-ring	1	15 x 1,5 315357 (NBR) 315427 (FPM)				
19	O-ring	1	22 x 2 304708 (NBR) 304721 (FPM)				
20	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)				
21	screw plug	2	½ BSPP 305003				
22	pressure balance valve	1					

item 21 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DU 631-1950 are suitable for operating pressure up to 464 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

A three-way-change-over valve which is, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

These filters can be installed as suction filters, pressure filters or return-line filters.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:

operating medium:

max. operating pressure:

test pressure:

connection system:

housing material:

sealing material:

installation position:

mini-measuring connections:

evacuation-or bleeder connections:

volume tank DU 631:

DU 1001:

DU 1950:

+14°F to + 176°F (for a short time + 212°F)

mineral oil, other media on request

464 PSI

900 PSI

SAE-flange connection 3000 PSI

EN-GJS-400-18-LT

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

¼ BSPP

½ BSPP

2x 1.5 Gal

2x 3.4 Gal

2x 6.1 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

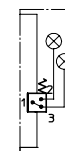
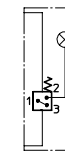
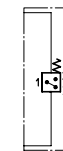
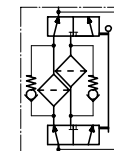
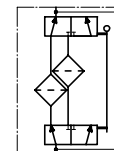
without indicator

with by-pass valve

with electrical
indicator
AE 30 and AE 40

with visual-electrical
indicator
AE 50 and AE 62

with visual-electrical
indicator
AE 70 and AE 80

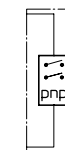
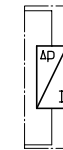
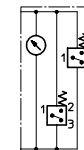
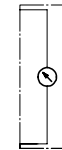


with visual
indicator
AOR/AOC/OP

with visual-electrical
indicator
OE

with electronical
clogging sensor
VS1

with electronical
clogging sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

12-20
21

7.28

10.433

8.858

8.075

position I

position II

7.874

9.449

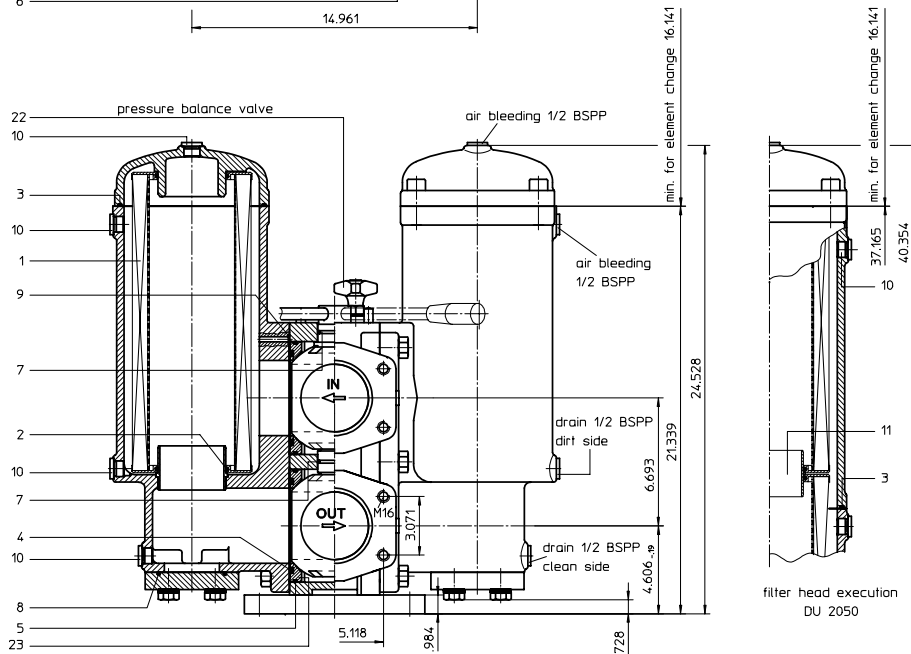
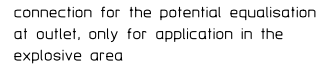
7.874

4.774

5.827 (Al/Si/VS2)
5.827 (Al/Si/VS2)
6.220 (OP)
8.188 (OE)

mini-measuring connection 1/4 BSPP at inlet and outlet

14.961



type	connection	SAE-connection size	weight lbs.
DU 1050	SAE 3" ¹⁾	SAE 4" 3000 PSI	330
DU 1050	SAE 4"	SAE 4" 3000 PSI	330
DU 2050	SAE 3" ¹⁾	SAE 4" 3000 PSI	440
DU 2050	SAE 4"	SAE 4" 3000 PSI	440

EDV 11/07

DU. 1050. 10VG. 10. B. P. -. FS. B. -. -. AE											
1	2	3	4	5	6	7	8	9	10	11	12

- | | | | | | | |
|-------|-------|-------|-----|----|----|---|
| 01NR. | 1000. | 10VG. | 10. | B. | P. | - |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- Changes of measures and design are subject to alteration!

4. Spare parts:

item	designation	qty.	dimension and article-no. DU 1050	qty.	dimension and article-no. DU 2050
1	filter element	2	01NR. 1000	4	01NR. 1000
2	O-ring	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	2	185 x 4 305593 (NBR) 306309 (FPM)	4	185 x 4 305593 (NBR) 306309 (FPM)
4	O-ring	4	114 x 6 314419 (NBR) 316531 (FPM)	4	114 x 6 314419 (NBR) 316531 (FPM)
5	O-ring	4	140 x 4 305145 (NBR) 305201 (FPM)	4	140 x 4 305145 (NBR) 305201 (FPM)
6	screw plug	2	¼ BSPP 305003	2	¼ BSPP 305003
7	O-ring	2	38 x 3 304340 (NBR) 317013 (FPM)	2	38 x 3 304340 (NBR) 317013 (FPM)
8	O-ring	2	85,32 x 3,53 305590 (NBR) 306308 (FPM)	2	85,32 x 3,53 305590 (NBR) 306308 (FPM)
9	O-ring	4	8 x 2 310004 (NBR) 316530 (FPM)	4	8 x 2 310004 (NBR) 316530 (FPM)
10	screw plug	8	½ BSPP 304678	10	½ BSPP 304678
11	slip coupling	-	-	2	3.543 dia 313233
12	clogging indicator visual	1	AOR or AOC	see sheet-no. 1606	
13	clogging indicator visual	1	OP	see sheet-no. 1628	
14	clogging indicator visual-electrical	1	OE	see sheet-no. 1628	
15	clogging indicator visual-electrical	1	AE	see sheet-no. 1609	
16	clogging sensor electronical	1	VS1	see sheet-no. 1607	
17	clogging sensor electronical	1	VS2	see sheet-no. 1608	
18	O-ring	1	15 x 1,5	315357 (NBR) 315427 (FPM)	
19	O-ring	1	22 x 2	304708 (NBR) 304721 (FPM)	
20	O-ring	2	14 x 2	304342 (NBR) 304722 (FPM)	
21	screw plug	2	¼ BSPP	305003	
22	pressure balance valve	1			
23	gasket	4	DN 90	312275	

item 21 execution only without clogging indicator or clogging sensor

5. Description:

ressure filters, change-over series DU 1050-2050 are suitable for operating pressure up to 464 PSI.

Pressure peaks can be absorbed with a sufficient margin o safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the cle-an filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the i inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₉₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:

operating medium:

max. operating pressure:

test pressure:

connection system:

housing material:

sealing material:

installation position:

mini-measuring connections:

evacuation-or bleeder connections:

volume tank DU 1050:

DU 2050:

+14°F to + 176°F (for a short time + 212°F)

mineral oil, other media on request

464 PSI

900 PSI

SAE-flange connection 3000 PSI

EN-GJS-400-18-LT

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

¼ BSPP

½ BSPP

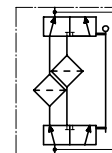
2x 3.6 Gal

2x 6.3 Gal

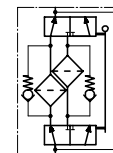
Classification according to the Presssure Equipment Directive 97/23/EC for mineral oil (fluid group 2) -article 3, paragraph 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

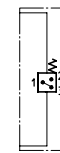
without indicator



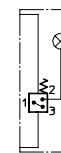
with by-pass valve



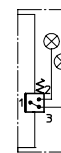
with electrical
indicator
AE 30 and AE 40



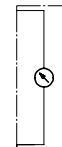
with visual-electrical
indicator
AE 50 and AE 62



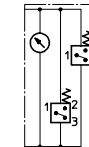
with visual-electrical
indicator
AE 70 and AE 80



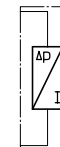
with visual
indicator
AOR/AOC/OP



with visual-electrical
indicator
OE



with electronical
clogging sensor
VS1



with electronical
clogging sensor
VS2



8. Pressure drop flow curves:

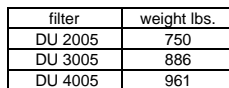
Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Sheet No
2153 A



3. Spare parts:

item	designation	qty.	dimension and article-no. DU 2005	dimension and article-no. DU 3005	dimension and article-no. DU 4005
1	filter element	2	01E. 2001	01E. 3001	01E. 4001
2	change over	1	5"		
3	O-ring (DU 2005)	2	240 x 5 307592 (NBR)		
	O-ring (DU 3005/4005)	4	328793 (FPM)		
4	O-ring	2	135 x 10	306016 (NBR)	307045 (FPM)
5	O-ring	2	125 x 10	304388 (NBR)	306006 (FPM)
6	O-ring	2	136,12 x 3,53	320162 (NBR)	320163 (FPM)
7	screw plug (DU 2005)	8	BSPP ½ 304678		
	screw plug (DU 3005/4005)	10			
8	clogging indicator visual	1	AOR or AOC	see seet-no. 1606	
9	clogging indicator visual-electrical	1	OE	see seet-no. 1628	
10	clogging indicator visual	1	OP	see seet-no. 1628	
11	clogging indicator visual-electrical	1	AE	see seet-no. 1609	
12	clogging sensor electronical	1	VS1	see seet-no. 1607	
13	clogging sensor electronical	1	VS2	see seet-no. 1608	
14	O-ring	1	15 x 1,5	315357 (NBR)	315427 (FPM)
15	O-ring	1	22 x 2	304708 (NBR)	304721 (FPM)
16	O-ring	2	14 x 2	304342 (NBR)	304722 (FPM)
17	screw plug	2	BSPP ¼	305003	

item 17 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DU 2005-4005 are suitable for operating pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_c are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

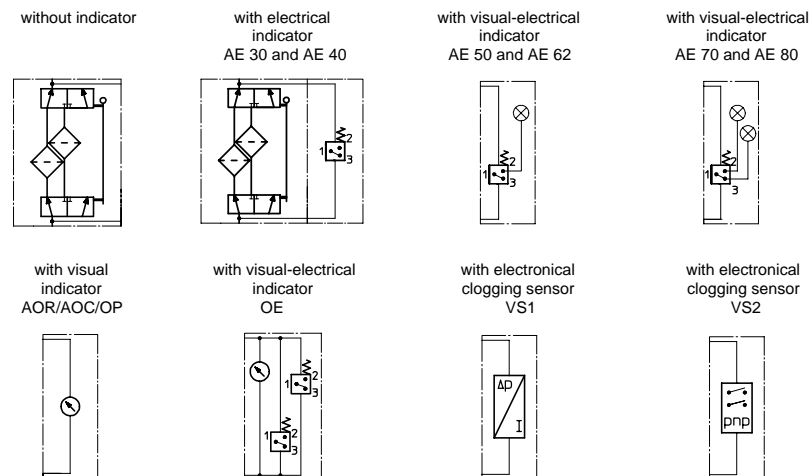
5. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	464 PSI
test pressure:	900 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measuring connections:	BSPP ¼
evacuation-or bleeder connections:	BSPP ½
volume tank	DU 2005: 2x 8 Gal
	DU 3005: 2x 10 Gal
	DU 4005: 2x 12 Gal

Classification according to the Pressure Equipment Directive 97/23/EG for mineral oil (fluid group 2) -article 3, paragraph3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

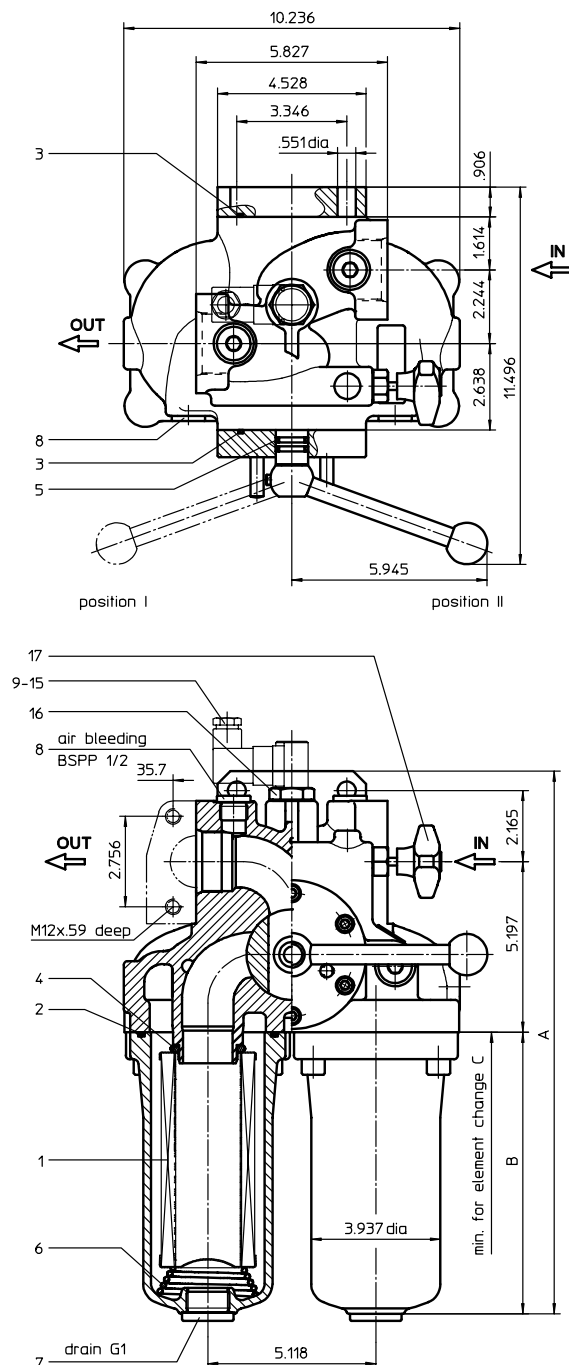
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over

Series DSF 176 - 331 363 PSI

Sheet No.
2148 A



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Information:
Execution IN left/OUT right
see data sheet-no. 2149 !

1. Type index:

1.1. Complete filter: (ordering example)

DSF.176.10VG.16. E. P. -. FS. 7. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
DSF = duplex filter, change-over
- 2 **nominal size:** 176, 331
- 3 **filter-material and filter- fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- 5 **filter element design:**
E = without by-pass valve
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
UG = thread connection
- 9 **connection size:**
7 = 1 1/2"
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
- 12 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.175.10VG.16. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 175, 330
- 3 **- 7** see type index complete filter

2. Accessories:

- counter flange see sheet-no. 1652

3. Dimensions:

type	A	B	C	weight lbs.	volume tank
DSF 176	16.35	8.58	9.84	79	2x .31 Gal.
DSF 331	21.85	13.89	15.35	84	2x .52 Gal.

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			DSF 176	DSF 331		
1	2	filter element	01E. 175	01E. 330		
2	2	O-ring	98 x 4		301914 (NBR)	304765 (FPM)
3	2	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
4	2	O-ring	44 x 6		302222 (NBR)	304384 (FPM)
5	2	O-ring	18 x 3		304359 (NBR)	304399 (FPM)
6	2	spring	Da = 52		304989	
7	2	screw plug	1 BSPP		305303	
8	4	screw plug	½ BSPP		304678	
9	1	clogging indicator, visual	AOR or AOC		see sheet-no.1606	
10	1	clogging indicator, visual-electrical	AE		see sheet-no.1615	
11	1	clogging sensor, electronical	VS1		see sheet-no.1617	
12	1	clogging sensor, electronical	VS2		see sheet-no.1618	
13	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
14	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
15	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
16	1	screw plug	20913-4		309817	
17	1	pressure balance valve				

item 16 execution only without clogging indicator or clogging sensor

5. Description:

Duplex filters of the series DSF 176-331 are suitable for a working pressure up to 363 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filters can be installed as suction filter, pressure filter or return-line filter.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

The internal valve is integrated in the filter. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

363 PSI

test pressure:

725 PSI

connection system:

SAE-flange 3000 PSI or thread

housing material:

EN-GJS-400-18-LT

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

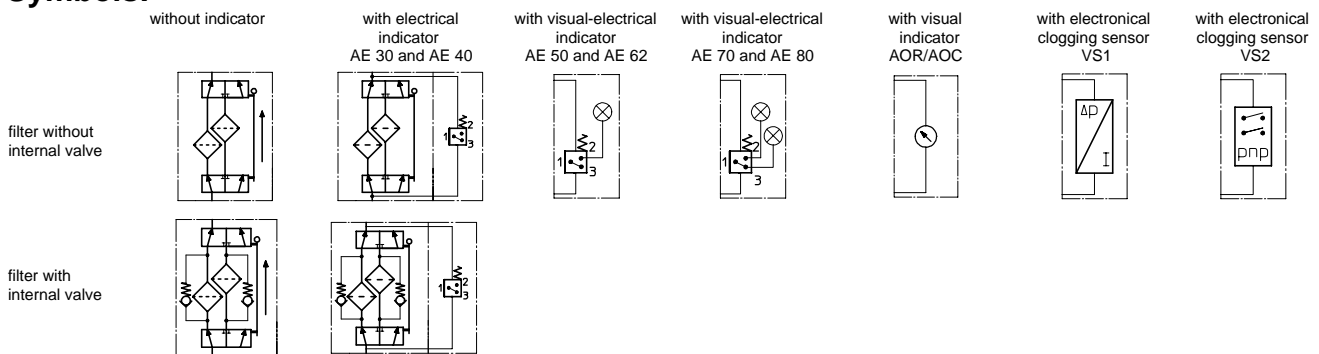
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

9. Test methods:

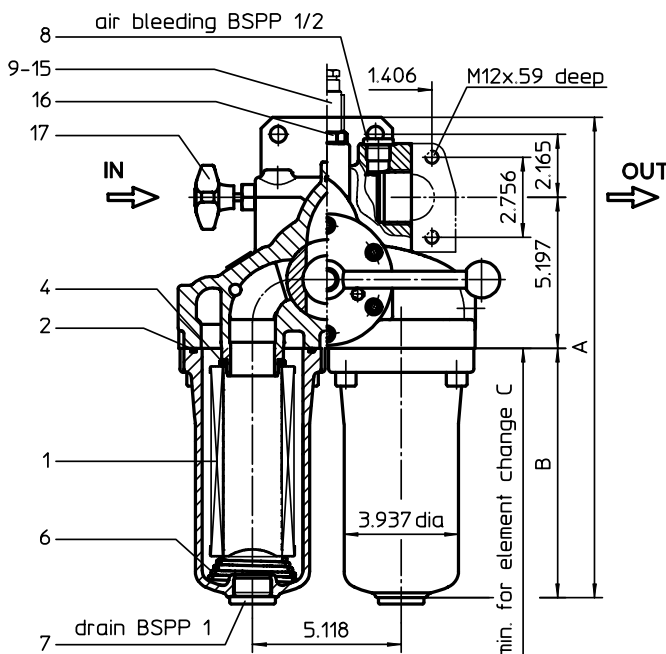
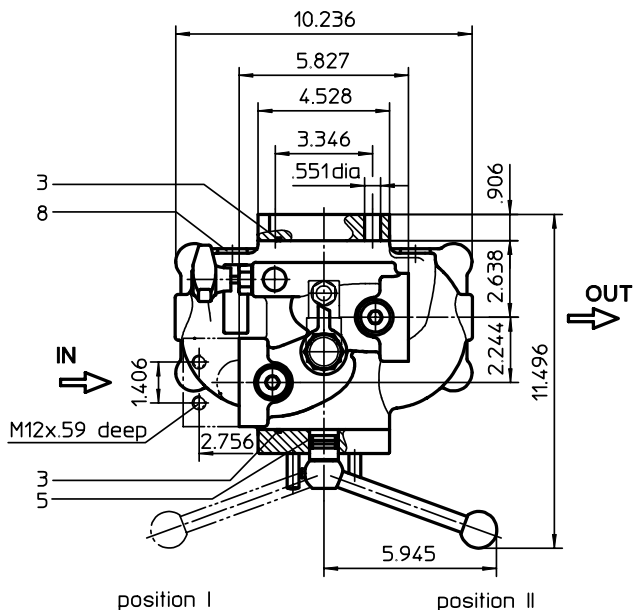
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over

Series DSF 180-340 363 PSI

Sheet No.
2149



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Information:
Execution IN right/OUT left
see data sheet-no. 2148 !

1. Type index:

1.1. Complete filter: (ordering example)

DSF. 180.10VG.16. E. P. -. FS. 7. -. -. AE

- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
- series:**
DSF = duplex filter, change-over
 - nominal size:** 180, 340
 - filter-material and filter- fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
 - resistance of pressure difference for filter element:**
16 = Δp 232 PSI
 - filter element design:**
E = without by-pass valve
 - sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
 - filter element specification:**
- = standard
VA = stainless steel
 - connection:**
FS = SAE-flange connection 3000 PSI
UG = thread connection
 - connection size:**
7 = 1 1/2"
 - filter housing specification:**
- = standard
 - internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
 - clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.175.10VG.16. E. P. -

- | | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
- series:**
01E. = filter element according to INTERNORMEN factory specification
 - nominal size:** 175, 330
 - 7** see type index complete filter

2. Accessories:

- counter flange see sheet-no. 1652

3. Dimensions:

type	A	B	C	weight lbs.	volume tank
DSF 180	16.53	8.58	9.84	79	2x .31 Gal.
DSF 340	21.85	13.89	15.35	84	2x .52 Gal.

Changes of measures and design are subject to alteration!

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			DSF 180 01E. 175	DSF 340 01E. 330		
1	2	filter element				
2	2	O-ring	98 x 4		301914 (NBR)	304765 (FPM)
3	2	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
4	2	O-ring	44 x 6		302222 (NBR)	304384 (FPM)
5	2	O-ring	18 x 3		304359 (NBR)	304399 (FPM)
6	2	spring	Da = 52		304989	
7	2	screw plug	1 BSPP		305303	
8	4	screw plug	½ BSPP		304678	
9	1	clogging indicator, visual	AOR or AOC		see sheet-no.1606	
10	1	clogging indicator, visual-electrical	AE		see sheet-no.1615	
11	1	clogging sensor, electronical	VS1		see sheet-no.1617	
12	1	clogging sensor, electronical	VS2		see sheet-no.1618	
13	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
14	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
15	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
16	1	screw plug	20913-4		309817	
17	1	pressure balance valve				

item 16 execution only without clogging indicator or clogging sensor

5. Description:

Duplex filters of the series DSF 180-340 are suitable for a working pressure up to 363 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filters can be installed as suction filter, pressure filter or return-line filter.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

The internal valve is integrated in the filter. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

363 PSI

test pressure:

725 PSI

connection system:

SAE-flange 3000 PSI or thread

housing material:

EN-GJS-400-18-LT

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

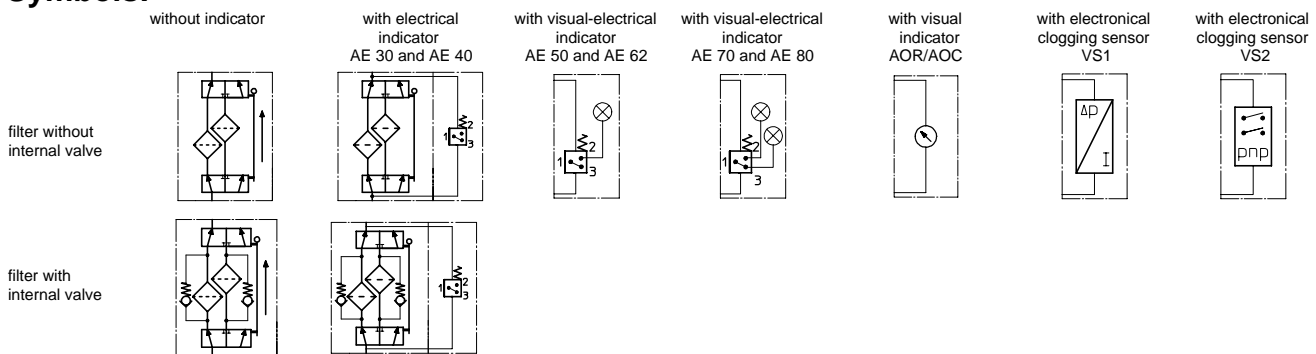
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DNR 1001-8201**

232 PSI

1. Type index:

1.1. Complete filter: (ordering example)

DNR. 3001. 10VG. 10. B. P. -. FA1. D. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
DNR = duplex filter with standard-return-line filter elements
- nominal size:** 1001, 2001, 3001, 4001; (1 level)
2201, 4201, 6201, 8201; (2 levels)
- filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- filter element design:**
B = both sides open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601 ; IS07 = see sheet-no. 31602
- connection:**
FA 1 = ANSI-flange 300 PSI, sealing surface rough 1600-3600 µin
FA 2 = ANSI-flange 300 PSI, sealing surface rough < 640 µin

filter nominal size	DNR 1001	DNR 2001	DNR 3001	DNR 4001
connection size	8-9-A-B	A-B-C-D	B-C-D-E	B-C-D-E
filter nominal size	DNR 2201	DNR 4201	DNR 6201	DNR 8201
connection size	A-B-C-D	A-B-C-D-E	B-C-D-E-F	B-C-D-E

8 = 2"; 9 = 2 1/2"; A = 3"; B = 4"; C = 5"; D = 6"; E = 8"; F = 10"

- filter housing specification:** (see catalog)
- = standard ; IS06 = see sheet-no. 31605
- internal valve:**
- = without ; S1 = with by-pass valve 51 PSI
- clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no.1609
OP = visual, see sheet-no.1614 VS1 = electronical, see sheet-no.1607
OE = visual-electrical, see sheet-no 1614 VS2 = electronical, see sheet-no.1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

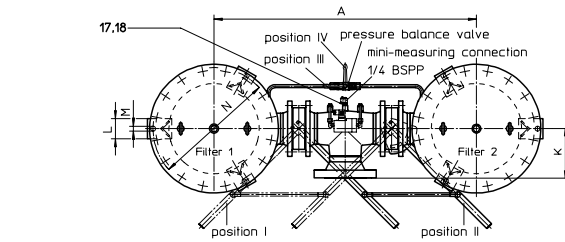
1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- nominal size:** 1000
- 7** see type index-complete filter

2. Accessories:

- measure-and bleeder -connection, see sheet-no. 1650
- evacuation- and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1653
- shut-off valve, see sheet-no. 1655
- lifting mechanism, see sheet-no. 1661

Changes of measures and design are subject to alteration!



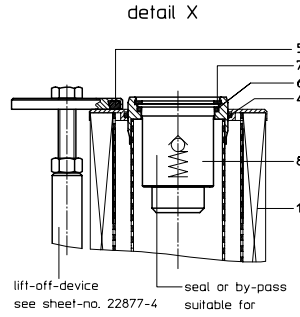
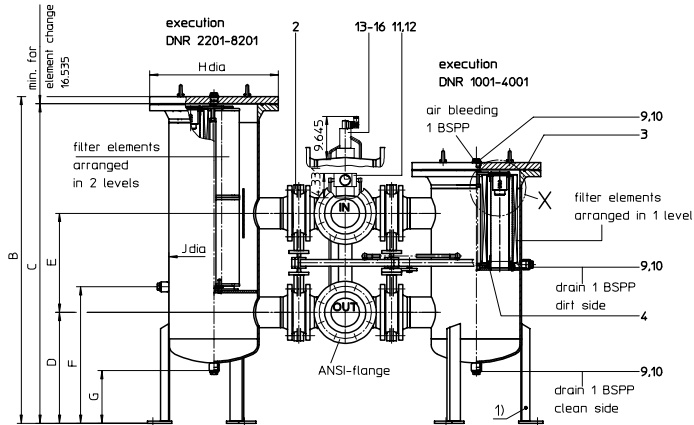
Pos. I: filter 1 in operation
Pos II: filter 2 in operation

with pressure balance valve:
Pos III: valve open
Pos IV: valve closed

Connection standard as in drawing.
On request: inlet- on top and backside
outlet - bottom and backside

Please specify on order!

1) connection for the potential equalisation,
only for application in the explosive area



3. Dimensions: inch

type	conn. ANSI	A	B	C	D	E	F	G	H	J	K	L	M	N	weight lbs.	volume tank
DNR 1001	2"	31.33	36.02	35.03	15.55	12.99	18.30	7.48	13.38	8.62	5.35	2.76	.71	12.99	374	2x 6.0 Gal.
	2 1/2"	32.36	36.02	35.03	15.55	13.66	18.30				6.06					2x 6.0 Gal.
	3"	33.93	37.99	37.00	15.55	15.75	20.27				6.57					2x 6.3 Gal.
	4"	35.98	39.17	38.18	15.55	16.57	21.45				7.59					2x 6.6 Gal.
DNR 2001	3"	42.99	43.50	42.12	19.68	15.75	25.39	9.84	22.83	15.98	6.57	3.54	.87	21.65	1166	2x 24.8 Gal.
	4"	45.03	44.68	43.30	19.68	16.57	26.57				7.59					2x 25.8 Gal.
	5"	46.53	46.25	44.88	19.68	17.56	28.14				8.81					2x 27.2 Gal.
	6"	47.71	48.62	47.24	19.68	19.37	30.51				9.56					2x 28.8 Gal.
DNR 3001	4"	45.03	44.68	43.30	19.68	16.57	26.57	9.84	22.83	15.98	7.59	3.54	.87	21.65	1188	2x 25.8 Gal.
	5"	46.53	46.25	44.88	19.68	17.56	28.14				8.81					2x 27.2 Gal.
	6"	47.71	48.62	47.24	19.68	19.37	30.51				9.56					2x 28.8 Gal.
	8"	52.36	52.95	51.57	20.86	21.38	34.84				11.45					2x 32.0 Gal.
DNR 4001	4"	50.15	45.86	44.48	20.47	16.57	27.75	9.44	28.14	20.00	7.59	3.54	.87	25.59	1210	2x 40.0 Gal.
	5"	52.04	47.44	46.06	20.47	17.56	29.33				8.81					2x 43.5 Gal.
	6"	53.22	50.19	48.81	20.86	19.37	32.08				9.56					2x 47.0 Gal.
	8"	56.69	54.13	52.75	22.04	21.38	36.02				11.45					2x 51.5 Gal.
DNR 2201	3"	33.93	53.74	52.75	15.55	15.75	20.27	7.48	13.38	8.62	6.57	2.76	.71	12.99	528	2x 10.0 Gal.
	4"	35.98	54.92	53.93	15.55	16.57	21.45				7.59					2x 10.3 Gal.
	5"	39.37	54.92	53.93	16.14	17.56	21.45				8.81					2x 10.3 Gal.
	6"	41.73	54.92	53.93	16.53	19.37	21.45				9.56					2x 10.3 Gal.
DNR 4201	3"	42.99	58.07	56.69	19.68	15.75	24.21	9.84	22.83	15.98	6.57	3.54	.87	21.65	2116	2x 36.0 Gal.
	4"	45.03	58.07	56.69	19.68	16.57	24.21				7.59					2x 36.0 Gal.
	5"	46.53	58.07	56.69	19.68	17.56	24.21				8.81					2x 36.0 Gal.
	6"	47.71	58.07	56.69	19.68	19.37	24.21				9.56					2x 36.0 Gal.
DNR 6201	8"	52.36	62.00	60.62	21.65	21.37	26.57	9.44	22.83	15.98	11.45	3.54	.87	21.65	1254	2x 39.0 Gal.
	4"	45.03	58.07	56.69	19.68	16.57	24.21				7.59					2x 36.0 Gal.
	5"	46.53	58.07	56.69	19.68	17.56	24.21				8.81					2x 36.0 Gal.
	6"	47.71	58.07	56.69	19.68	19.37	24.21				9.56					2x 36.0 Gal.
DNR 8201	8"	52.36	60.43	59.05	20.86	21.38	26.57	9.44	28.14	20.00	11.45	3.54	.87	25.59	1826	2x 38.3 Gal.
	4"	50.15	58.85	57.48	20.47	16.57	25.00				7.59					2x 57.5 Gal.
	5"	52.04	58.85	57.48	20.47	17.56	25.00				8.81					2x 57.5 Gal.
	6"	53.22	59.64	58.26	20.86	19.37	25.78				9.56					2x 58.5 Gal.
	8"	56.69	62.00	60.62	22.04	21.38	28.14				11.45					2x 61.5 Gal.

4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. DNR 1001	qty.	dimension and article-no. DNR 2001	qty.	dimension and article-no. DNR 3001	qty.	dimension and article-no. DNR 4001	qty.	dimension and article-no. DNR 2201	qty.	dimension and article-no. DNR 4201	qty.	dimension and article-no. DNR 6201	qty.	dimension and article-no. DNR 8201
1	filter element	2	01NR. 1000	4	01NR. 1000	6	01NR. 1000	8	01NR. 1000	4	01NR. 1000	8	01NR. 1000	12	01NR. 1000	16	01NR. 1000
2	stop flap ¹⁾	4	2"- 4" ANSI	4	3"- 6" ANSI	4	4"- 8" ANSI	4	4"- 8" ANSI	4	3"- 6" ANSI	4	3"- 8" ANSI	4	4"- 10" ANSI	4	4"- 8" ANSI
3	O-ring	2	225 x 5 308652 (NBR) 311473 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	225 x 5 308652 (NBR) 311473 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)
4	O-ring	6	90 x 4 306941 (NBR) 307031 (FPM)	12	90 x 4 306941 (NBR) 307031 (FPM)	18	90 x 4 306941 (NBR) 307031 (FPM)	24	90 x 4 306941 (NBR) 307031 (FPM)	10	90 x 4 306941 (NBR) 307031 (FPM)	20	90 x 4 306941 (NBR) 307031 (FPM)	30	90 x 4 306941 (NBR) 307031 (FPM)	40	90 x 4 306941 (NBR) 307031 (FPM)
5	O-ring	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	170 x 10 308662 (NBR) 317149 (FPM)
6	O-ring	2	62 x 4 308045 (NBR) 311472 (FPM)	4	62 x 4 308045 (NBR) 311472 (FPM)	6	62 x 4 308045 (NBR) 311472 (FPM)	8	62 x 4 308045 (NBR) 311472 (FPM)	2	62 x 4 308045 (NBR) 311472 (FPM)	4	62 x 4 308045 (NBR) 311472 (FPM)	6	62 x 4 308045 (NBR) 311472 (FPM)	8	62 x 4 308045 (NBR) 311472 (FPM)
7	circlip	2	DIN 472-75x2,5 311471	4	DIN 472-75x2,5 311471	6	DIN 472-75x2,5 311471	8	DIN 472-75x2,5 311471	2	DIN 472-75x2,5 311471	4	DIN 472-75x2,5 311471	6	DIN 472-75x2,5 311471	8	DIN 472-75x2,5 311471
8	by-pass valve	2	2" 311974	4	2" 311974	6	2" 311974	8	2" 311974	2	2" 311974	4	2" 311974	6	2" 311974	8	2" 311974
9	screw plug	6	1 BSPP 309732														
10	gasket	6	A 33 x 39 308257														

¹⁾ dimension of stop flap = connection size

4.2. Depending on the series:

item	qty.	designation	dimension	article-no.
11	1	clogging indicator, visual	OP	see sheet-no. 1614
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1614
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608
16	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
17	2	gasket	A 14 x 18	306330
18	2	screw plug	¼ BSPP	309734

5. Description:

Duplex filters of the series DNR 1001-8201 are suitable for a working pressure up to 232 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Four mechanically connected change-over flaps enabling the change-over without service-interruption from the clean to the dirty filter-side. The filters can be installed as suction filter, pressure filter or return-line filter.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throw-away elements made of Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the mayor „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

6. Technical data:

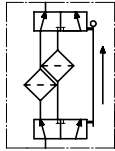
temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	332 PSI
connection system:	ANSI-flange
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	¼ BSPP for screw coupling (mini-measuring)

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

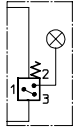
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

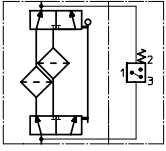
without indicator



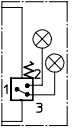
with visual -
electrical indicator
AE 50 and AE 62



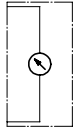
with electrical indicator
AE 30 and AE 40



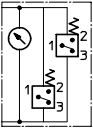
with visual -
electrical indicator
AE 70 and AE 80



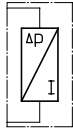
with visual
indicator
OP



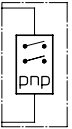
with visual -
electrical indicator
OE



with electronical
clogging sensor
VS1



with electronical
clogging sensor
VS2



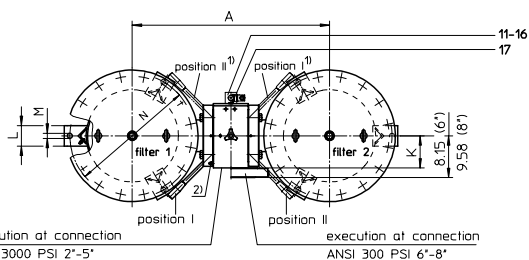
8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



Position I: filter 1 in operation
Position II: filter 2 in operation
Switch lever standard in the front

1) On request: Switch lever backside opposite to inlet and outlet.

Please specify on order !

2) connection for the potential equalisation at inlet and outlet resp. filter housing, only for application in the explosive area

PRESSURE FILTER, change-over Series DNR 1005-8205

232 PSI

Sheet No.
2141 F

1. Type index:

1.1. Complete filter: (ordering example)

DNR. 3005. 10VG. 10. B. P. -. FS. B. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
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- series:**
DNR = duplex filter with standard-return-line filter elements
- nominal size:** 1005, 2005, 3005, 4005 (1 level)
2205, 4205, 6205, 8205 (2 levels)
- filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 µm_(G), 16 VG = 15 µm_(G), 10 VG = 10 µm_(G), 6 VG = 7 µm_(G), 3 VG = 5 µm_(G), Interpor fleece (glass fiber)
25 P = 25 µm, 10 P = 10 µm paper
- resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- filter element design:**
B = both sides open ;
- sealing material:**
P = Nitrile (NBR); V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard ; VA = stainless steel ; IS06 = see sheet-no. 31601 ; IS07 = see sheet-no. 31602
- connection:**
FS = SAE-flange connection 3000 PSI, only for 2" - 5"
FA 1 = ANSI-flange connection 300 PSI, sealing surface rough grind 1600-3600 µin, only for 6" - 8"
FA 2 = ANSI-flange connection 300 PSI, sealing surface rough grind < 640 µin, only for 6" - 8"
- connection size:**

filter-nominal size	DNR 1005	DNR 2005	DNR 3005	DNR 4005	DNR 2205	DNR 4205	DNR 6205	DNR 8205
connection size	8-9-A-B	A-B-C-D	B-C-D-E	B-C-D-E	A-B-C-D	A-B-C-D-E	B-C-D-E	B-C-D-E

8 = 2" ; 9 = 2 1/2" ; A = 3" ; B = 4" ; C = 5" ; D = 6" ; E = 8"

10 filter housing specification: (see catalog)

- = standard
- IS06 = see sheet-no. 31605

11 internal valve:

- = without
- S1 = with by-pass valve 51 PSI

12 clogging indicator or clogging sensor:

- = without; AE = visual-electrical, see sheet-no.1609
- OP = visual, see sheet-no.1628; VS1 = electrical, see sheet-no.1607
- OE = visual-electrical, see sheet-no 1628; VS2 = electrical, see sheet-no.1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- nominal size:** 1000
- 7 | see type index-complete filter

2. Accessories:

- measure-and bleeder -connections see sheet-no. 1650
- evacuation- and bleeder-connections see sheet-no. 1651
- shut-off valve see sheet-no. 1655
- counter flange, see sheet-no. 1652
- adaptor for ANSI-flange 300 PSI (2"-5") see sheet-no. 1658
- lifting mechanism, see sheet-no. 1661

Changes of measures and design are subject to alteration!

3. Dimensions: inch

type	conn. ANSI	A	B	C	D	E	F	G	H	J	K	L	M	N	weight lbs.	volume tank
DNR 1005	2"	24.01	36.02	35.03	14.37	6.88	18.22	7.08	13.38	8.62	2.91	2.76	.71	12.99	396	2x 5.94 Gal
	2 1/2"	22.04	36.02	35.03	14.37	10.62	18.22				3.54				440	2x 5.94 Gal
	3"	23.03	36.41	35.43	14.76	11.41	18.62				3.93				462	2x 6.00 Gal
	4"	24.40	37.59	36.61	15.35	14.37	19.80				5.00				506	2x 6.30 Gal
DNR 2005	3"	30.70	43.50	42.12	19.68	11.41	25.31	9.44	22.83	15.98	3.93	3.54	.87	21.65	1122	2x 25.0 Gal
	4"	31.88	43.50	42.12	19.68	14.37	25.31				5.00				1144	2x 25.0 Gal
	5"	34.25	45.07	43.70	19.68	15.55	26.88				5.59				1188	2x 26.0 Gal
	6"	35.43	47.04	45.66	19.68	17.32	28.85				-				1232	2x 29.0 Gal
DNR 3005	4"	31.88	43.50	42.12	19.68	14.37	25.31	9.44	22.83	15.98	5.00	3.54	.87	21.65	1144	2x 25.0 Gal
	5"	34.25	45.07	43.70	19.68	15.55	26.88				5.59				1188	2x 26.0 Gal
	6"	35.43	47.04	45.66	19.68	17.32	28.85				-				1232	2x 29.0 Gal
	8"	38.97	52.95	51.57	21.06	20.47	34.76				-				1300	2x 32.0 Gal
DNR 4005	4"	35.82	45.86	44.48	20.47	14.37	27.67	9.44	28.14	20.00	5.00	3.54	.87	25.59	1144	2x 40.0 Gal
	5"	38.18	45.86	44.48	20.47	15.55	27.67				5.59				1188	2x 40.0 Gal
	6"	40.94	48.62	47.24	20.86	17.32	28.85				-				1249	2x 44.0 Gal
	8"	42.91	54.13	52.75	22.04	20.47	35.94				-				1284	2x 51.0 Gal
DNR 2205	3"	23.03	52.16	51.18	14.76	11.41	18.62	7.08	13.38	8.62	3.93	2.76	.71	12.99	550	2x 9.50 Gal
	4"	24.40	53.34	52.36	15.35	14.37	19.80				5.00				594	2x 9.80 Gal
	5"	26.77	54.13	53.14	15.74	15.55	20.59				5.59				616	2x 10.0 Gal
	6"	27.95	55.31	54.33	16.33	17.32	21.77				-				660	2x 10.6 Gal
DNR 4205	3"	30.70	58.07	56.69	19.68	11.41	24.13	9.44	22.83	15.98	3.93	3.54	.87	21.65	1188	2x 36.0 Gal
	4"	31.88	58.07	56.69	19.68	14.37	24.13				5.00				1210	2x 36.0 Gal
	5"	34.25	58.07	56.69	19.68	15.55	24.13				5.59				1255	2x 36.0 Gal
	6"	35.43	59.25	57.87	20.07	17.32	25.31				-				1300	2x 37.0 Gal
DNR 6205	8"	38.97	60.43	59.05	20.86	20.47	26.49	9.44	22.83	15.98	-	3.54	.87	21.65	1365	2x 38.0 Gal
	4"	31.88	58.07	56.69	19.68	14.37	24.13				5.00				1280	2x 36.0 Gal
	5"	34.25	58.07	56.69	19.68	15.55	24.13				5.59				1320	2x 36.0 Gal
	6"	35.43	58.07	56.69	19.68	17.32	24.13				-				1365	2x 36.0 Gal
DNR 8205	8"	38.97	60.43	59.05	20.86	20.47	26.49	9.44	28.14	20.00	-	3.54	.87	25.59	1430	2x 38.0 Gal
	4"	35.82	58.85	57.48	20.47	14.37	24.92				5.00				1830	2x 57.5 Gal
	5"	38.18	58.85	57.48	20.47	15.55	24.92				5.59				1870	2x 57.5 Gal
	6"	40.94	59.64	58.26	20.86	17.32	25.70				-				1915	2x 58.6 Gal
	8"	42.91	62.00	60.62	22.04	20.47	28.07				-				1980	2x 61.5 Gal

4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. DNR 1005	qty.	dimension and article-no. DNR 2005	qty.	dimension and article-no. DNR 3005	qty.	dimension and article-no. DNR 4005	qty.	dimension and article-no. DNR 2205	qty.	dimension and article-no. DNR 4205	qty.	dimension and article-no. DNR 6205	qty.	dimension and article-no. DNR 8205
1	filter element	2	01NR. 1000	4	01NR. 1000	6	01NR. 1000	8	01NR. 1000	4	01NR. 1000	8	01NR. 1000	12	01NR. 1000	16	01NR. 1000
2	change over UKK	1	2"-4" ANSI	1	3"-6" ANSI	1	4"-8" ANSI	1	4"-8" ANSI	1	3"-6" ANSI	1	3"-8" ANSI	1	4"-8" ANSI	1	4"-8" ANSI
3	O-ring	2	225 x 5 308652 (NBR) 311473 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	225 x 5 308652 (NBR) 311473 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)
4	O-ring	6	90 x 4 306941 (NBR) 307031 (FPM)	12	90 x 4 306941 (NBR) 307031 (FPM)	18	90 x 4 306941 (NBR) 307031 (FPM)	24	90 x 4 306941 (NBR) 307031 (FPM)	10	90 x 4 306941 (NBR) 307031 (FPM)	20	90 x 4 306941 (NBR) 307031 (FPM)	30	90 x 4 306941 (NBR) 307031 (FPM)	40	90 x 4 306941 (NBR) 307031 (FPM)
5	O-ring	-	-	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	170 x 10 308662 (NBR) 317149 (FPM)
6	O-ring	2	62 x 4 308045 (NBR) 311472 (FPM)	4	62 x 4 308045 (NBR) 311472 (FPM)	6	62 x 4 308045 (NBR) 311472 (FPM)	8	62 x 4 308045 (NBR) 311472 (FPM)	2	62 x 4 308045 (NBR) 311472 (FPM)	4	62 x 4 308045 (NBR) 311472 (FPM)	6	62 x 4 308045 (NBR) 311472 (FPM)	8	62 x 4 308045 (NBR) 311472 (FPM)
7	circlip	2	DIN 472-75x2,5 311471	4	DIN 472-75x2,5 311471	6	DIN 472-75x2,5 311471	8	DIN 472-75x2,5 311471	2	DIN 472-75x2,5 311471	4	DIN 472-75x2,5 311471	6	DIN 472-75x2,5 311471	8	DIN 472-75x2,5 311471
8	bypass valve	2	2" 311974	4	2" 311974	6	2" 311974	8	2" 311974	2	2" 311974	4	2" 311974	6	2" 311974	8	2" 311974
9	screw plug	6	1 BSPP 309732														
10	gasket	6	A 33 x 39 308257														

4.2. Depending on the series:

item	qty.	designation	dimension	article-no.
11	1	clogging indicator, visual	OP	see sheet-no. 1628
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608
16	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
17	2	screw plug	¼ BSPP	305003

5. Description:

Duplex filters of the series DNR 1005-8205 are suitable for a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient margin of safety. Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. The filters can be installed as suction filter, pressure filter or return-line filter. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 microns should use throw-away elements made of Interpor fleece (glass fiber). Filter elements as fine as 5 microns₀ are available; finer filter elements on request. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Approvals according to TÜV, and the mayor „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

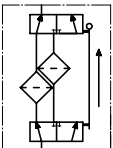
6. Technical data:

temperature range: +14°F to +176°F (for a short time +212°F)
operating medium: mineral oil, other media on request
max. operating pressure: 232 PSI
test pressure: 332 PSI
connection system: SAE-flange connection 3000 PSI or ANSI-flange connection
housing material: C-steel
sealing material: Nitrile (NBR) or Viton (FPM), other materials on request
installation position: vertical
mini-measuring connection: ¼ BSPP

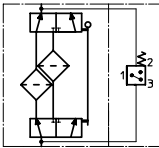
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

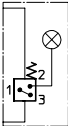
without indicator



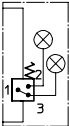
with electrical indicator
AE 30 and AE 40



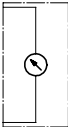
with visual -
electrical indicator
AE 50 and AE 62



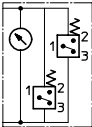
with visual -
electrical indicator
AE 70 and AE 80



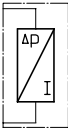
with visual
indicator
OP



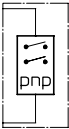
with visual -
electrical indicator
OE



with electronical
clogging sensor
VS1



with electronical
clogging sensor
VS2



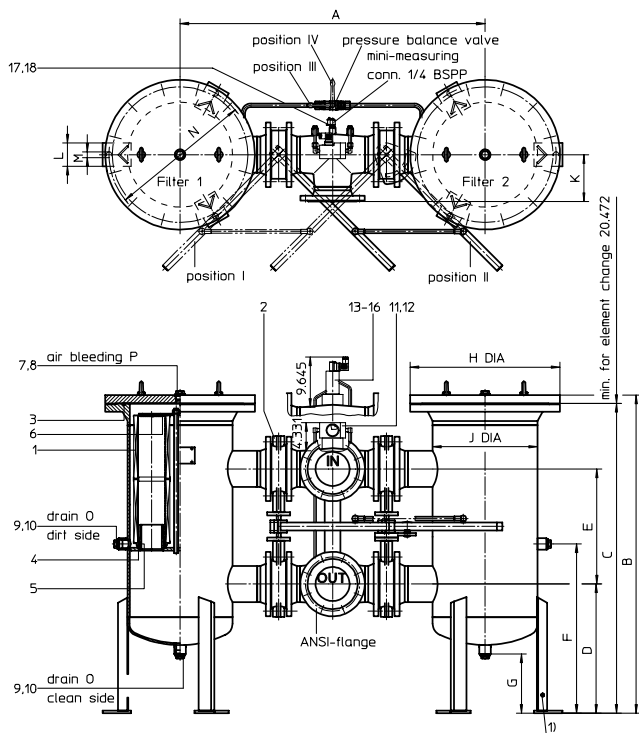
8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



Pos. I: filter 1 in operation
Pos II: filter 2 in operation
with pressure balance valve:
Pos III: valve open
Pos IV: valve closed

Connection standard as in drawing.
On request: inlet- on top and backside
outlet - bottom and backside

Please specify on order!

1) connection for the potential equalisation,
only for application in the explosive area

3. Dimensions: inch

type	conn. ANSI	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	weight lbs.	volume tank
DSF 1201	2"	31.33				12.99					5.35							
	2 1/2"	32.36	40.75	39.96	15.55	13.66	19.29	7.20	13.38	8.62	6.06	2.76	.71	12.99	1	1/2 BSPP	440	2x 6.5 Gal.
	3"	33.83				15.75					6.57							
	4"	35.98				16.57					7.59							
DSF 2001	2 1/2"	35.51				13.66					6.06							
	3"	37.08	43.50	42.32	16.73	15.75	21.65	7.32	15.94	10.75	6.57	2.76	.71	14.96	1	BSPP	616	2x 11.5 Gal.
	4"	38.74				16.57					7.59							
	5"	40.62				17.56					8.81							
DSF 2401	2 1/2"	37.48				13.66					6.06							
	3"	38.66	43.90	42.72	16.73	15.75	21.26	7.20	18.11	12.76	6.57	2.76	.71	17.72	1	BSPP	781	2x 16.5 Gal.
	4"	40.70				16.57					7.59							
	5"	42.59				17.56					8.81							
DSF 3601	3"	42.99				15.75					6.57							
	4"	45.03	48.62	47.24	19.69	16.57	25.79	9.37	22.83	15.98	7.59	3.54	.87	21.65	1	BSPP	1276	2x 28.5 Gal.
	5"	46.53				17.56					8.81							
	6"	47.71				19.37					9.56							
DSF 4001	2 1/2"	35.51				13.66					6.06							
	3"	37.08	62.83	61.81	16.73	15.75	21.65	7.32	15.94	10.75	6.57	2.76	.71	14.96	1	BSPP	748	2x 18.5 Gal.
	4"	38.74				16.57					7.59							
	5"	40.62				17.56					8.81							
DSF 4801/6001	4"	50.15	48.82	47.24	20.47	16.57	25.79		9.13	28.15	7.59			25.59	1	BSPP	1760	2x 45.0 Gal.
	5"	52.04				17.56					8.81	3.54	.87					2x 45.0 Gal.
	6"	53.22	50.79	49.21	20.87	19.37	27.76				9.56							2x 47.5 Gal.
	8"	56.69	54.72	53.15	22.05	21.38	30.12				11.45							2x 52.5 Gal.
DSF 10001	5"	62.67	52.75	51.18	24.41	17.56	29.72				8.81			35.43	1 1/2	BSPP		2x 93.5 Gal.
	6"	64.25	54.72	53.15	24.80	19.37	31.68	11.14	35.83	27.99	9.56	4.72	.87		1 1/2	BSPP	2090	2x 98.5 Gal.
	8"	66.93	58.66	57.09	25.59	21.38	34.25				11.45							2x 108.5 Gal.
	10"	70.87	63.77	62.20	26.77	24.33	39.37				13.22							2x 121.5 Gal.

PRESSURE FILTER, change-over Series DSF 1201-10001

232 PSI

Sheet No.
2133 M

1. Type index:

1.1. Complete filter: (ordering example)

DSF. 3601. 10VG. 10. E. P. -. FA1. B. -. AE

1	2	3	4	5	6	7	8	9	10	11
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1 series:

DSF = duplex filter

2 nominal size: 1201, 2001, 2401, 3601, 4001, 4801, 6001, 10001

3 filter material and filter fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 µm_(ch), 16 VG = 15 µm_(ch), 10 VG = 10 µm_(ch), 6 VG = 7 µm_(ch), 3 VG = 5 µm_(ch) Interpor fleece (glass fiber)
25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass valve; S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR); V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:

FA 1 = ANSI-flange connection 300 PSI
sealing surface rough grind 1600-3600 µin;
FA 2 = ANSI-flange connection 300 PSI
sealing surface rough grind < 640 µin

9 connection size:

connection	filter nominal size							
8 = 2"	1201							
9 = 2 1/2"	1201	2001	2401		4001			
A = 3"	1201	2001	2401	3601	4001			
B = 4"	1201	2001	2401	3601	4001	4801	6001	
C = 5"		2001	2401	3601	4001	4801	6001	10001
D = 6"			2401	3601		4801	6001	10001
E = 8"						4801	6001	10001
F = 10"								10001

10 filter housing specification: (see catalog)

- = standard
IS06 = see sheet-no. 31605

11 clogging indicator or clogging sensor:

- = without
OP = visual, see sheet-no.1614
AE = visual-electrical, see sheet-no.1609; VS1 = electronical, see sheet-no.1607
OE = visual-electrical, see sheet-no 1614; VS2 = electronical, see sheet-no.1608

1.2. Filter element: (ordering example)

01E. 1201. 10VG. 10. E. P. -

1	2	3	4	5	6	7
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1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 1201, 2001, 4001

3 - 7 see type index-complete filter

2. Accessories:

- measure-and bleeder -connections see sheet-no. 1650
- evacuation- and bleeder-connections see sheet-no. 1651
- counter flanges , ANSI-flange 300 PSI
- shut-off valve see sheet-no. 1655
- lifting mechanism see sheet-no. 1661

Changes of measures and design are subject to alteration!

4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. DSF 1201	dimension and article-no. DSF 2001	qty.	dimension and article-no. DSF 2401	dimension and article-no. DSF 3601	qty.	dimension and article-no. DSF 4001	dimension and article-no. DSF 4801	qty.	dimension and article-no. DSF 6001	dimension and article-no. DSF 10001
1	filter element	2	01E.1201	01E.2001	4	01E.1201	01E.1201	2	01E.4001	01E.1201	6	01E.2001	01E.2001
2	stop flap ¹⁾	4	2" - 4" ANSI	2 ½" - 5" ANSI	4	2 ½" - 6" ANSI	3" - 6" ANSI	4	2 ½" - 5" ANSI	4" - 8" ANSI	4	4" - 8" ANSI	5" - 10" ANSI
3	O-ring	2	225 x 5 308652 (NBR) 311473 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)	2	330 x 5 303080 (NBR) 310275 (FPM)	429 x 6 308659 (NBR) 310273 (FPM)	2	275 x 5 307414 (NBR) 310288 (FPM)	516 x 6 301962 (NBR) 311474 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	722 x 8 308145 (NBR) 311805 (FPM)
4	O-ring	2	85 x 10 304386 (NBR) 304541 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)	4	85 x 10 304386 (NBR) 304541 (FPM)	85 x 10 304386 (NBR) 304541 (FPM)	2	125 x 10 304388 (NBR) 306006 (FPM)	85 x 10 304386 (NBR) 304541 (FPM)	6	125 x 10 304388 (NBR) 306006 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)
5	O-ring	2	93 x 5 307588 (NBR) 307589 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)	4	93 x 5 307588 (NBR) 307589 (FPM)	93 x 5 307588 (NBR) 307589 (FPM)	2	135 x 5 306016 (NBR) 307045 (FPM)	93 x 5 307588 (NBR) 307589 (FPM)	6	135 x 5 306016 (NBR) 307045 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)
6	spring	2	Da = 95 304414		2	pressure plate		2	Da = 95 304414	pressure plate			
7	screw plug	2	1 BSPP 309730	1 BSPP 309732	2			1 BSPP 309732				2	1 ½ BSPP 318556
8	gasket	2	A 22 x 27 305564	A 33 x 39 308257	2			A 33 x 39 308257				2	A 48 x 55 309764
9	screw plug	4	1 BSPP 309732	1 BSPP 309732	4			1 BSPP 309732				4	1 ½ BSPP 318556
10	gasket	4	A 33 x 39 308257	A 33 x 39 308257	4			A 33 x 39 308257				4	A 48 x 55 309764

¹⁾ dimension of stop flap = connection size

4.2. Depending on the series:

item	qty.	designation	dimension	article-no.
11	1	clogging indicator, visual	OP	see sheet-no. 1614
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1614
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608
16	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
17	2	gasket	A 14 x 18	306330
18	2	screw plug	½ BSPP	309734

5. Description:

Duplex filters of the series DSF 1201-10001 are suitable for a working pressure up to 232 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Four mechanically connected change-over flaps enabling the change-over without service-interruption from the clean to the dirty filter-side. The filters can be installed as suction filter, pressure filter or return-line filter.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throw-away elements made of Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	332 PSI
connection system:	ANSI-flange connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	½ BSPP

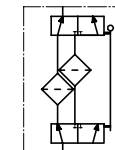
Classification according to the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2) -article 3, paragraph 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

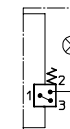
US 2133 M

7. Symbols:

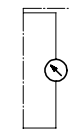
without indicator



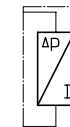
with visual -
electrical indicator
AE 50 and AE 62



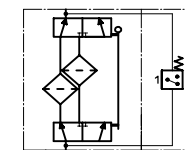
with visual
indicator
OP



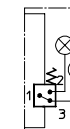
with electronical
clogging sensor
VS1



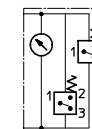
with electrical indicator
AE 30 and AE 40



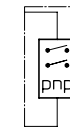
with visual -
electrical indicator
AE 70 and AE 80



with visual -
electrical indicator
OE



with electronical
clogging sensor
VS2



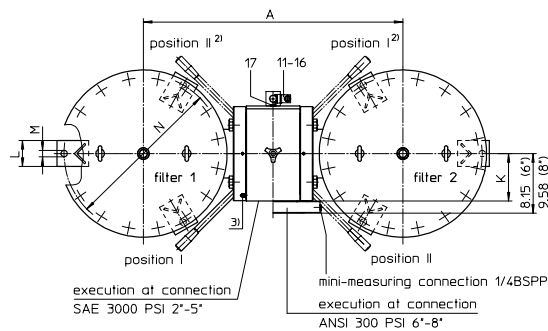
8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively
Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

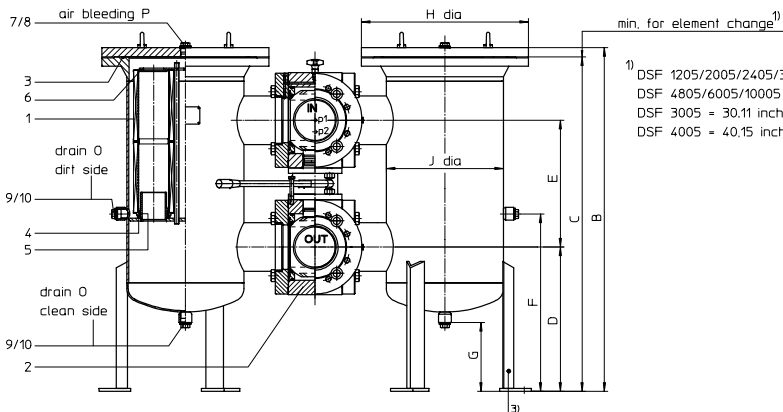


Position I: filter 1 in operation
Position II: filter 2 in operation
Switch lever standard in the front

²⁾ On request: Switch lever backside opposite to inlet and outlet.

Please specify on order !

³⁾ connection for the potential equalisation at inlet and outlet resp. filter housing, only for application in the explosive area



¹⁾ DSF 1205/2005/2405/3605 = 20.47 inch
DSF 4805/6005/10005 = 20.47 inch
DSF 3005 = 30.11 inch
DSF 4005 = 40.15 inch

3. Dimensions: inch

type	ANSI	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	weight lbs.	volume tank
DSF 1205	2"	24.02	39.72	38.78	14.37	6.89	18.11				2.91							2x 7 Gal
	2 1/2"	22.04	39.72	38.78	14.37	10.63	18.11	7.28	13.38	8.62	3.54	2.76	.71	12.99	1	1/2 BSPP	440	2x 7 Gal
	3"	23.03	39.72	38.78	14.76	11.42	18.11				3.93							2x 7 Gal
	4"	24.41	40.31	39.37	15.35	14.37	18.70				5.00							2x 7 Gal
DSF 2005	2 1/2"	24.80	39.80	38.78	14.96	10.63	18.11				3.54							2x 10 Gal
	3"	25.20	39.80	38.78	14.96	11.42	18.11	7.28	15.94	10.75	3.93	2.76	.71	14.96	1	1 BSPP	616	2x 10 Gal
	4"	26.38	41.18	40.16	15.75	14.37	19.49				5.00							2x 11 Gal
	5"	28.74	42.76	41.73	16.53	15.55	21.06				5.59							2x 12 Gal
DSF 2405	2 1/2"	26.77	41.46	40.35	15.35	10.63	18.90				3.54							2x 15 Gal
	3"	27.56	41.46	40.35	15.75	11.42	18.90	7.28	18.11	12.76	3.93	2.76	.71	17.72	1	1 BSPP	781	2x 15 Gal
	4"	28.74	42.44	41.34	16.14	14.37	19.88				5.00							2x 16 Gal
	5"	30.31	43.82	42.72	16.73	15.55	21.26				5.59							2x 17 Gal
DSF 3005	2 1/2"	24.80	39.80	38.77	14.96	10.63	18.11				3.54							2x 14 Gal
	3"	25.20	39.80	38.77	14.96	11.42	18.11				3.93							2x 14 Gal
	4"	26.38	41.18	40.15	15.75	14.37	19.49	7.28	15.94	10.75	5.00	2.76	.71	14.96	1	1 BSPP	682	2x 14.5 Gal
	5"	28.74	42.75	41.73	16.53	15.55	21.06				5.59							2x 15 Gal
DSF 3605	6"	29.92	42.75	41.73	16.53	17.32	21.06	6.89										2x 15 Gal
	3"	30.71	45.35	44.10	18.90	11.42	22.63				3.93							2x 26 Gal
	4"	31.89	45.35	44.10	18.90	14.37	22.63	9.25	22.83	15.98	5.00	3.54	.87	21.65	1	1 BSPP	1276	2x 26 Gal
	5"	34.25	46.93	45.67	19.69	15.55	24.21				5.59							2x 27 Gal
DSF 4005	6"	35.43	46.93	45.67	19.69	17.32	24.21				-							2x 27 Gal
	2 1/2"	24.80	49.52	48.50	14.96	10.63	18.11				3.54							2x 17 Gal
	3"	25.20	49.52	48.50	14.96	11.42	18.11	7.28	15.94	10.75	3.93	2.76	.71	14.96	1	1 BSPP	748	2x 17 Gal
	4"	26.38	50.90	49.88	15.75	14.37	19.49				5.00							2x 17.5 Gal
DSF 4805	5"	28.74	52.48	51.45	16.53	15.55	21.06				5.59							2x 18 Gal
	4"	35.83	47.87	46.46	20.47	14.34	25.00				5.00							2x 45.5 Gal
	5"	35.83	47.87	46.46	20.47	15.55	25.00	9.25	28.15	20.00	5.59	3.54	.87	25.59	1	1 BSPP	1760	2x 43.5 Gal
	6"	40.94	48.66	47.24	20.87	17.32	25.79				-							2x 45 Gal
DSF 6005	8"	42.91	54.17	52.76	22.05	20.47	31.30				-							2x 52 Gal
	5"	46.10	53.14	51.57	24.80	15.55	30.12				5.59							2x 94.5 Gal
	6"	49.21	53.14	51.57	24.80	17.32	30.12	11.22	35.83	27.99	-	4.72	.87	35.43	1 1/2	1 1/2 BSPP	2090	2x 94.5 Gal
	8"	50.79	58.66	57.09	25.98	20.47	35.63				-							2x 108 Gal

PRESSURE FILTER, change-over ball valve

Series DSF 1205-10005 232 PSI

Sheet No.
2134 G

1. Type index:

1.1. Complete filter: (ordering example)

DSF. 3605. 10VG. 10. E. P. -. FS. B. -. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

1 series:

DSF = duplex filter

2 nominal size: 1205, 2005, 2405, 3005, 3605, 4005, 4805, 6005, 10005

3 filter material and filter fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh,

25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c),

6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)

25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass valve S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

ISO6 = see sheet-no. 31601

8 connection:

FS = SAE-flange connection 3000 PSI, only for 2" - 5"

FA 1 = ANSI-flange connection 300 PSI sealing surface rough grind 1600-3600 µin, only for 6" - 8"

FA 2 = ANSI-flange connection 300 PSI sealing surface rough grind < 640 µin, only for 6" - 8"

9 connection size:

filter-nominal size	DSF 1205	DSF 2005	DSF2405	DSF 3005	DSF3605
connection size	8-9-A-B	9-A-B-C	9-A-B-C	9-A-B-C-D	A-B-C-D
filter-nominal size	DSF 4005	DSF4805	DSF6005	DSF10005	
connection size	9-A-B-C	B-C-D-E	B-C-D-E	C-D-E	

8 = 2" 9 = 2 1/2" A = 3" B = 4" C = 5" D = 6" E = 8"

10 filter housing specification: (see catalog)

- = standard

ISO6 = see sheet-no. 31605

11 clogging indicator or clogging sensor:

- = without

OP = visual, see sheet-no. 1628

OE = visual-electrical, see sheet-no. 1628

AE = visual-electrical, see sheet-no. 1609

VS1 = electronical, see sheet-no. 1607

VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01E. 1201. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 1201, 2001, 3001, 4001

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder -connections see sheet-no. 1650

- evacuation- and bleeder-connections see sheet-no. 1651

- shut-off valve see sheet-no. 1655

- SAE-counter flanges see sheet-no. 1652

- adaptor for ANSI-flange 300 PSI (2"-5") see sheet-no. 1658

- lifting mechanism see sheet-no. 1661

Changes of measures and design are subject to alteration!

4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. DSF 1205 01E.1201	dimension and article-no. DSF 2005 01E.2001	qty.	dimension and article-no. DSF 2405 01E.1201	qty.	dimension and article-no. DSF 3005 01E.3001	qty.	dimension and article-no. DSF 3605 01E.1201	qty.	dimension and article-no. DSF 4005 01E.4001	qty.	dimension and article-no. DSF 4805 01E.1201	qty.	dimension and article-no. DSF 6005 01E.2001	dimension and article-no. DSF 10005 01E.2001
1	filter element	2			4		2		6		2		8		6		
2	change over UKK	1	2"- 4" ANSI	2 ½"- 5" ANSI	1	2 ½"- 5" ANSI	1	2 ½"- 6" ANSI	1	3"- 6" ANSI	1	2 ½"- 5" ANSI	1	4"- 8" ANSI	1	4"- 8" ANSI	5"- 8" ANSI
3	O-ring	2	225 x 5 308652 (NBR) 311473 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)	2	330 x 5 303080 (NBR) 310275 (FPM)	2	275 x 5 307414 (NBR) 310288 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	275 x 5 307414 (NBR) 310288 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	722 x 8 308145 (NBR) 311805 (FPM)
4	O-ring	2	85 x 10 304386 (NBR) 304541 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)	4	85 x 10 304386 (NBR) 304541 (FPM)	2	125 x 10 304388 (NBR) 306006 (FPM)	6	85 x 10 304386 (NBR) 304541 (FPM)	2	125 x 10 304388 (NBR) 306006 (FPM)	8	85 x 10 304386 (NBR) 304541 (FPM)	6	125 x 10 304388 (NBR) 306006 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)
5	O-ring	2	93 x 5 307588 (NBR) 307589 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)	4	93 x 5 307588 (NBR) 307589 (FPM)	2	135 x 5 306016 (NBR) 307045 (FPM)	6	93 x 5 307588 (NBR) 307589 (FPM)	2	135 x 5 306016 (NBR) 307045 (FPM)	8	93 x 5 307588 (NBR) 307589 (FPM)	6	135 x 5 306016 (NBR) 307045 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)
6	spring	2	Da = 95 304414	Da = 95 304414	2	pressure plate	2	Da = 95 304414	2	pressure plate	2	Da = 95 304414	2	pressure plate	2	pressure plate	pressure plate
7	screw plug	2															1 BSPP 309732
8	gasket	2	A 22 x 27 305564	A 33 x 39 308257	2												A 33 x 39 308257
9	screw plug	4	1 BSPP 309732	1 BSPP 309732	4												1 BSPP 309732
10	gasket	4	A 33 x 39 308257	A 33 x 39 308257	4												A 33 x 39 308257

4.2. Depending on the series:

item	qty.	designation	dimension	article-no.
11	1	clogging indicator, visual	OP	see sheet-no. 1628
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
14	1	clogging sensor, electronic	VS1	see sheet-no. 1607
15	1	clogging sensor, electronic	VS2	see sheet-no. 1608
16	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
17	2	screw plug	G ¼	305003

item 17 execution only without clogging indicator or clogging sensor

5. Description:

Duplex filters of the series DSF 1205-10005 are suitable for a working pressure up to 232 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. The filters can be installed as suction filter, pressure filter or return-line filter.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of Interpor fleece (glass fiber). Filter elements as fine as 5 µm_{ISO} are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

6. Technical data:

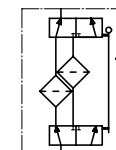
temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	332 PSI
connection system:	SAE-flange connection 3000 PSI or ANSI-flange connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	¼ BSPP

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

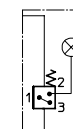
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

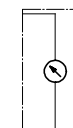
without indicator



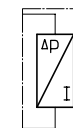
with visual -
electrical indicator
AE 50 and AE 62



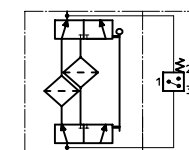
with visual
indicator
OP



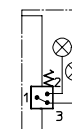
with electronic
clogging sensor
VS1



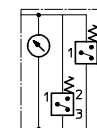
with electrical indicator
AE 30 and AE 40



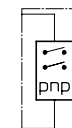
with visual -
electrical indicator
AE 70 and AE 80



with visual -
electrical indicator
OE



with electronic
clogging sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

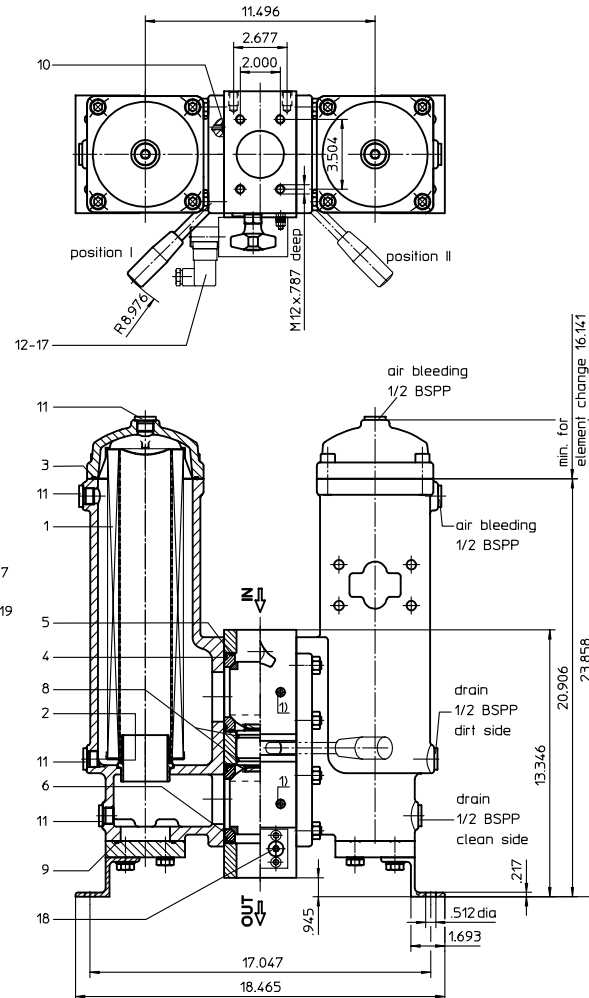
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over ball valve **Series DUV 635 464 PSI**

Sheet No
2146C

1) connection for the potential equalisation
 at inlet and outlet, only for the application
 in the explosive area

Pos. I: left filter-side in operation
 Pos. II: right filter-side in operation



1. Type index:

1.1. Complete filter: (ordering example)

DUV. 635. 10VG. 30. E. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

DUV = pressure filter, change-over with vertical connecting line

2 nominal size: 635

3 filter-material and filter-fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
 25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
 25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI,

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
 V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
 IS07 = see sheet-no. 31602

8 connection:

FS = SAE-flange connection 3000 PSI

9 connection size:

9 = 2 1/2"

10 filter housing specification: (see catalog)

- = standard
 IS06 = see sheet-no. 31605, IS12 = see sheet-no. 41028

11 internal valve:

- = without

12 clogging indicator or clogging sensor:

- = without
 AE = visual-electrical, see sheet-no. 1609
 OP = visual, see sheet-no. 1628
 OE = visual-electrical, see sheet-no. 1628
 VS1 = electronical, see sheet-no. 1607
 VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NL. = standard filter element according to DIN 24550, T3

2 nominal size: 630

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-connections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

weight: approx. 200 lbs.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL 630		
2	2	O-ring	60 x 3,5	304377 (NBR)	304398 (FPM)
3	2	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	4	O-ring	85 x 4	305685 (NBR)	310285 (FPM)
5	4	O-ring	95 x 3	305808 (NBR)	304828 (FPM)
6	4	gasket		317651	
7	2	screw plug	¼ BSPP	305003	
8	2	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
9	2	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
10	4	O-ring	8 x 2	310004 (NBR)	316530 (FPM)
11	8	screw plug	¼ BSPP	304678	
12	1	clogging indicator, visual	OP	see sheet no. 1628	
13	1	clogging indicator, visual-electrical	OE	see sheet no. 1628	
14	1	clogging indicator, visual-electrical	AE	see sheet no. 1609	
15	1	clogging sensor, electronical	VS1	see sheet no. 1607	
16	1	clogging sensor, electronical	VS2	see sheet no. 1608	
17	2	O-ring	14 x2	304342 (NBR)	304722 (FPM)
18	2	screw plug	¼ BSPP	305003	
19	1	pressure balance valve			

item 18 execution only without clogging indicator or clogging sensor

4. Description:

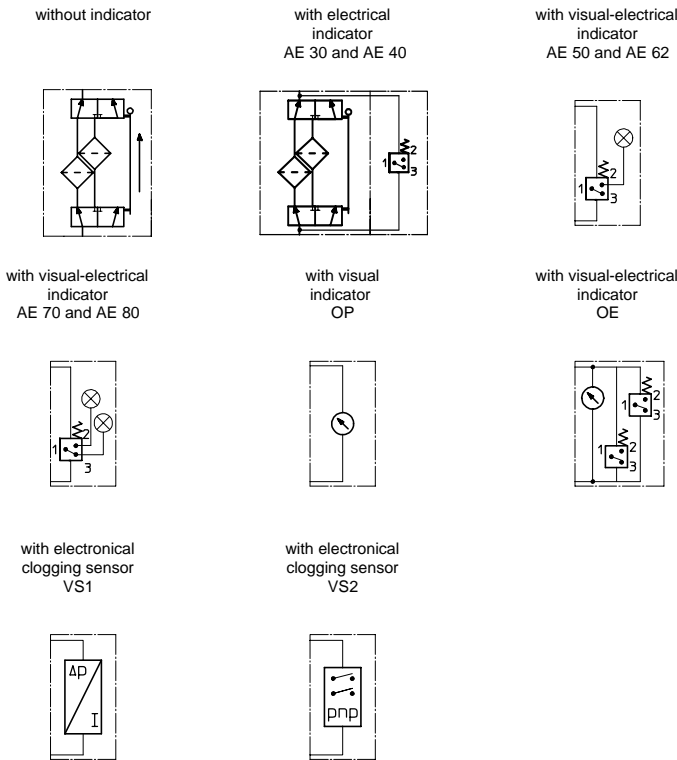
Pressure filters, change-over series DUV 635 are suitable for operating pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient margin of safety.
Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₉₀ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Approvals according to TUV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

5. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	464 PSI
test pressure:	900 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
switching housing -material:	S355J2G3
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	¼ BSPP
evacuation-or bleeder connections:	½ BSPP
volume tank:	2x 1.5 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

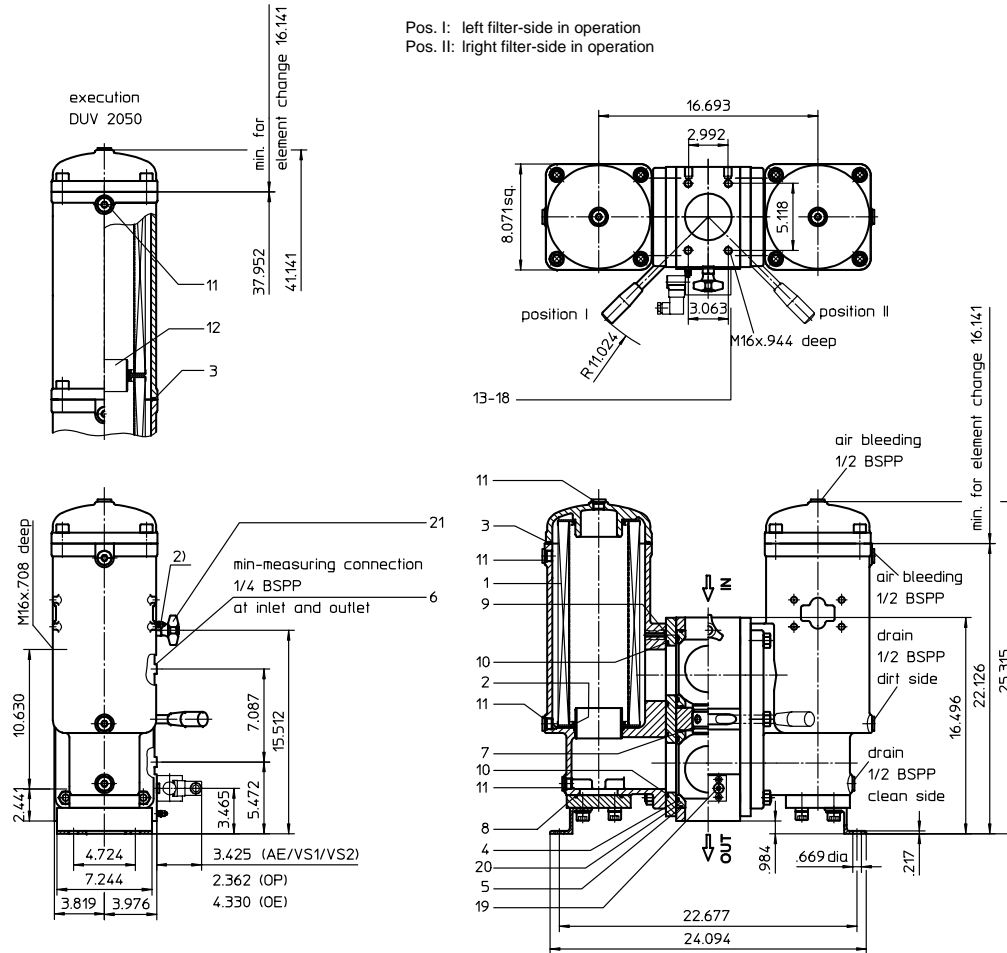
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

2) connection for the potential equalisation
at inlet and outlet, only for the application
in the explosive area

Pos. I: left filter-side in operation
Pos. II: right filter-side in operation



3. Dimensions: inch

type	connection	SAE-connection size	weight lbs.
DUV 1050	SAE 3" ¹⁾	SAE 4" 3000 PSI	330
DUV 1050	SAE 4"	SAE 4" 3000 PSI	330
DUV 2050	SAE 3" ¹⁾	SAE 4" 3000 PSI	440
DUV 2050	SAE 4"	SAE 4" 3000 PSI	440

¹⁾ with reducing flange BFS.B.E.88,9x3,2.St.P.3000
Instead of P (Nitrile) also V (Viton) can be chosen.

PRESSURE FILTER, change-over ball valve

Series DUV 1050-2050 464 PSI

Sheet No.
2147 C

1. Type index:

1.1. Complete filter: (ordering example)

DUV. 1050. 10VG. 10. B. P. -. FS. B. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
DUV = pressure filter, change-over with vertical connecting line
- nominal size:** 1050, 2050
- filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), Interpor fleece (glass fiber)
25 P = 25 µm, 10 P = 10 µm paper
- resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- filter element design:**
B = both sides open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602
- connection:**
FS = SAE-flange connection 3000 PSI
- connection size:**
B = 4"
- filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS12 = see sheet-no. 41028
- internal valve:**
- = without
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- nominal size:** 1000
- 7** see type index-complete filter

2. Accessories:

- measure- and bleeder-connection, see sheet-no. 1650
- evacuation- and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Changes of measures and design are subject to alteration!

4. Spare parts:

item	designation	qty.	dimension and article-no. DUV 1050	qty.	dimension and article-no. DUV 2050
1	filter element	2	01NR. 1000	4	01NR. 1000
2	O-ring	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	2	185 x 4 305593 (NBR) 306309 (FPM)	4	185 x 4 305593 (NBR) 306309 (FPM)
4	O-ring	4	114 x 6 314419 (NBR) 316531 (FPM)	4	114 x 6 314419 (NBR) 316531 (FPM)
5	O-ring	4	140 x 4 305145 (NBR) 305201 (FPM)	4	140 x 4 305145 (NBR) 305201 (FPM)
6	screw plug	2	¼ BSPP 305003	2	¼ BSPP 305003
7	O-ring	2	54 x 3 304657 (NBR) 304720 (FPM)	2	54 x 3 304657 (NBR) 304720 (FPM)
8	O-ring	2	85,32 x 3,53 305590 (NBR) 306308 (FPM)	2	85,32 x 3,53 305590 (NBR) 306308 (FPM)
9	O-ring	8	8 x 2 310004 (NBR) 316530 (FPM)	8	8 x 2 310004 (NBR) 316530 (FPM)
10	O-ring	4	115 x 5 306640 (NBR) 310287 (FPM)	4	115 x 5 306640 (NBR) 310287 (FPM)
11	screw plug	8	¼ BSPP 304678	10	¼ BSPP 304678
12	slip coupling	-	-	2	3.543 dia 313233
13	clogging indicator visual	1	OP	see sheet-no. 1628	
14	clogging indicator visual-electrical	1	OE	see sheet-no. 1628	
15	clogging indicator visual-electrical	1	AE	see sheet-no. 1609	
16	clogging sensor electronical	1	VS1	see sheet-no. 1607	
17	clogging sensor electronical	1	VS2	see sheet-no. 1608	
18	O-ring	2	14 x 2	304342 (NBR) 304722 (FPM)	
19	screw plug	2	¼ BSPP	305003	
20	gasket	4	DN 90	312275	
21	pressure balance valve	1			

item 19 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DUV 1050-2050 are suitable for operating pressure up to 464 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:

operating medium:

max. operating pressure:

test pressure:

connection system:

housing material:

switching housing-material:

sealing material:

installation position:

mini-measuring connections:

evacuation-or bleeder connections:

volume tank DUV 1050:

DUV 2050:

+14°F to + 176°F (for a short time + 212°F)

mineral oil, other media on request

464 PSI

900 PSI

SAE-flange connection 3000 PSI

EN-GJS-400-18-LT

S355J2G3

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

¼ BSPP

½ BSPP

2x 3.6 Gal

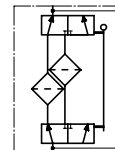
2x 6.3 Gal

Classification according to the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2) -article 3, paragraph 3.

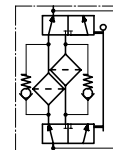
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

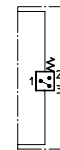
without indicator



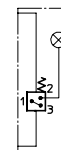
with by-pass valve



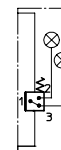
with electrical
indicator
AE 30 and AE 40



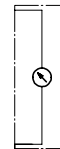
with visual-electrical
indicator
AE 50 and AE 62



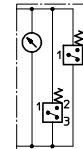
with visual-electrical
indicator
AE 70 and AE 80



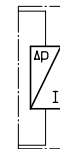
with visual
indicator
OP



with visual-electrical
indicator
OE



with electronical
clogging sensor
VS1



with electronical
clogging sensor
VS2



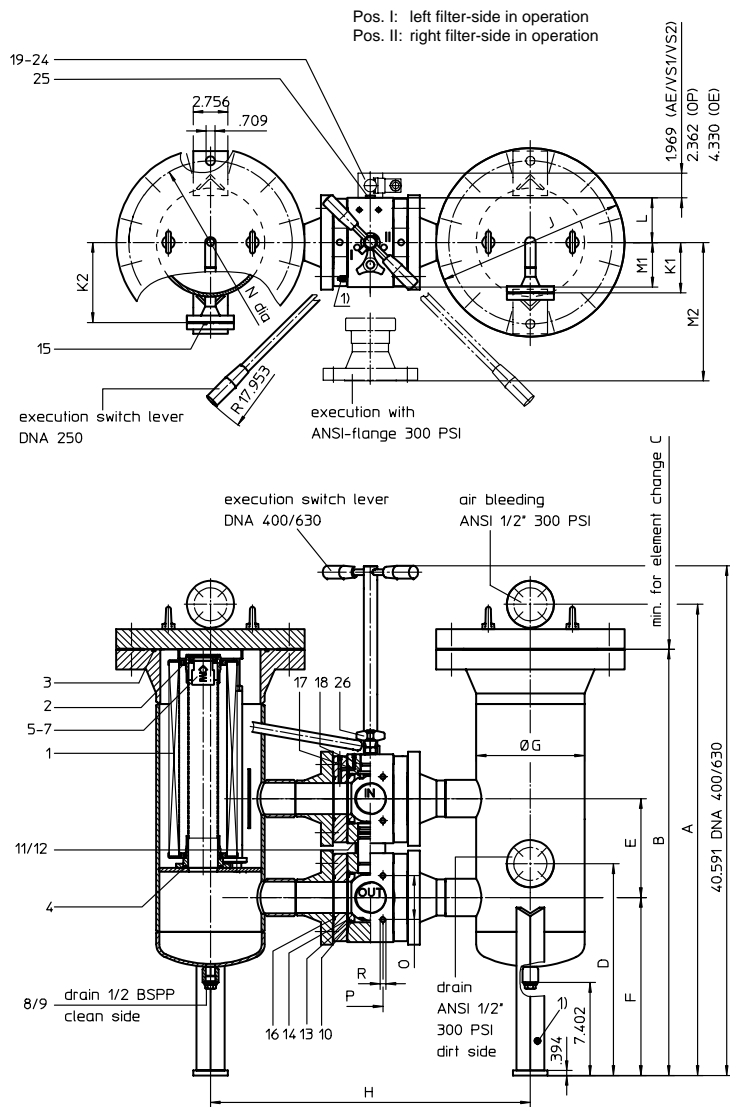
8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



1) connection for the potential equalisation at inlet and outlet resp. filter housing, only for application in the explosive area

3. Dimensions: inch

type	connection	A	B	C	D	E	F	G	H	J	K1	K2	L	M1	M2	N	O	P	R	weight lbs.	volume tank
DNA 250	2"	32.32	28.15	10.62	17.05	6.89	14.37	6.62	23.74	12.50	3.22	5.37	2.91	2.91	7.52	10.94	1.68	3.06	M12x.78 deep	491	2x 2.4 Gal
DNA 400	2 1/2"	33.34	29.76	10.62	18.58	7.87	14.17	8.62	25.47	15.00	4.01	6.37	3.54	3.54	8.58	12.99	2.07	3.50	M12x.86 deep	582	2x 4.5 Gal
DNA 630	2 1/2"	37.51	33.93	16.53	16.85	7.87	14.17	8.62	25.47	15.00	4.01	6.37	3.54	3.54	8.58	12.99	2.07	3.50	M12x.86 deep	600	2x 5.5 Gal

PRESSURE FILTER, change-over

Series DNA 250-630 232 PSI

Sheet No.
2137 H

1. Type index:

1.1. Complete filter: (ordering example)

DNA. 630. 10VG. 10. B. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
DNA = pressure filter, change-over according to ASME - code
- nominal size:** 250, 400, 630
- filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 µm_(G), 16 VG = 15 µm_(G), 10 VG = 10 µm_(G), 6 VG = 7 µm_(G), 3 VG = 5 µm_(G) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- filter element design:**
B = both sides open
- sealing material:**
P = Nitrile (NBR) V = Viton (FPM)
- filter element specification:**
- = standard VA = stainless steel
- connection:**
FS = SAE-flange connection 3000 PSI
FA = ANSI-flange connection 300 PSI
- connection size:**
8 = 2" (DNA 250)
9 = 2 1/2" (DNA 400/630)
- filter housing specification:**
- = standard
- internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI S2 = with by-pass valve Δp 102 PSI
- clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628 VS1 = electronic, see sheet-no. 1607
OE = visual-electrical, see sheet-no. 1628 VS2 = electronic, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 630. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- nominal size:** 250, 400, 630
- 7** see type index-complete filter

2. Accessories:

- shut-off valve see sheet-no. 1655
- SAE-counter-flange see sheet-no. 1652
- adaptor for ANSI-flange 300 PSI see sheet-no. 1658

Changes of measures and design are subject to alteration!

4. Spare parts:

item	designation	qty.	dimension and article-no. DNA 250	dimension and article-no. DNA 400	dimension and article-no. DNA 630
1	filter element	2	01NR. 250	01NR. 400	01NR. 630
2	O-ring	4	52 x 3 314206 (NBR) 316698 (FPM)	70 x 4 306253 (NBR) 310280 (FPM)	
3	O-ring	2	170 x 6 304799 (NBR) 306529 (FPM)	225 x 5 308652 (NBR) 311473 (FPM)	
4	O-ring	2	47,22 x 3,53 305078 (NBR) 310269 (FPM)	68 x 5 304376 (NBR) 304394 (FPM)	
5	by-pass valve	2	¾"	1 ¼"	
6	O-ring	2	28 x 3 316778 (NBR) 318366 (FPM)	45 x 3 304991 (NBR) 304997 (FPM)	
7	circlip	1	DIN 472-38x1,5 311921	DIN 472-57x5 317668	
8	screw plug	2	½ BSPP 309730	½ BSPP 309730	
9	gasket	2	A 22 x 27 305564	A 22 x 27 305564	
10	O-ring	4	76 x 4 305599 (NBR) 310291 (FPM)	95 x 3 305808 (NBR) 304828 (FPM)	
11	O-ring	3	98 x 4 301914 (NBR) 304765 (FPM)	45 x 3 304991 (NBR) 304997 (FPM)	
12	support ring	3	103,4 x 97 x 5 318551	-	
12	gasket	4	2" 318549	2 ½" 317651	
14	O-ring	4	56 x 3 305072 (NBR) 305322 (FPM)	85 x 4 305685 (NBR) 310285 (FPM)	
15	O-ring	4	22 x 3 304387 (NBR) 304931 (FPM)	22 x 3 304387 (NBR) 304931 (FPM)	
16	O-ring	4	63 x 3,5 311189 (NBR) 311592 (FPM)	82 x 3,5 304403 (NBR) 308745 (FPM)	
17	O-ring	4	-	8 x 2 310004 (NBR) 316530 (FPM)	
18	O-ring	4	-	34 x 3,5 304338 (NBR) 304730 (FPM)	
19	clogging indicator, visual-electrical	1	OE	see sheet-no. 1628	
20	clogging indicator, visual	1	OP	see sheet-no. 1628	
21	clogging indicator, visual-electrical	1	AE	see sheet-no. 1609	
22	clogging sensor, electronical	1	VS1	see sheet-no. 1607	
23	clogging sensor, electronical	1	VS2	see sheet-no. 1608	
24	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)		
25	screw plug	2	½ BSPP	305003	
26	pressure balance valve	1			

Item 25 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DNA 250-630 are suitable for operating pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suction filters.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated in the filter. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	348 PSI
connection system:	SAE-flange 3000 PSI or ANSI-flange 300 PSI
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
calculation according to:	ASME - code, sec. VIII / Div.1 - 1998; Add.98

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

without indicator	with by-pass valve	with electrical indicator AE 30 and AE 40	with visual-electrical indicator AE 50 and AE 62	with visual-electrical indicator AE 70 and AE 80
with visual indicator OP	with visual-electrical indicator OE	with electronical clogging sensor VS1	with electronical clogging sensor VS2	

8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

4. Spare parts:

item	designation	qty.	dimension and article-no. DNA 1050	qty.	dimension and article-no. DNA 2050
1	filter element	2	01NR. 1000	4	01NR. 1000
2	O-ring	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	2	225 x 5	308652 (NBR) 311473 (FPM)	
4	O-ring	2	90 x 4	306941 (NBR) 307031 (FPM)	
5	by-pass valve	2	DN 50	311470	
6	O-ring	2	62 x 4	308045 (NBR) 311472 (FPM)	
7	circlip	2	DIN 472-75x2,5	311471	
8	screw plug	2	½ BSPP	309730	
9	gasket	2	A 22 x 27	310476	
10	O-ring	4	140 x 4	305145 (NBR) 305201 (FPM)	
11	O-ring	3	54 x 3	304657 (NBR) 304720 (FPM)	
12	sliding ring	2	087 x 060 x 1,5	318100	
13	gasket	4	DN 90	312275	
14	O-ring	4	114 x 6	314419 (NBR) 316531 (FPM)	
15	O-ring	4	22 x 3	304387 (NBR) 304931 (FPM)	
16	O-ring	4	120 x 4	305300 (NBR) 307991 (FPM)	
17	O-ring	2	8 x 2	310004 (NBR) 316530 (FPM)	
18	O-ring	1	45 x 3	304991 (NBR) 304997 (FPM)	
19	clogging indicator visual-electrical	1	OE	see sheet-no. 1628	
20	clogging indicator visual	1	OP	see sheet-no. 1628	
21	clogging indicator visual-electrical	1	AE	see sheet-no. 1609	
22	clogging sensor electronical	1	VS1	see sheet-no. 1607	
23	clogging sensor electronical	1	VS2	see sheet-no. 1608	
24	O-ring	2	14 x 2	304342 (NBR) 304722 (FPM)	
25	screw plug	2	¼ BSPP	305003	
26	pressure balance valve	1			

Item 25 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DNA 1050-2050 are suitable for operating pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suction filters.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated into the filter. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

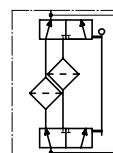
temperature range:
operating medium:
max. operating pressure:
test pressure:
connection system:
housing material:
sealing material:
installation position:
calculation according to:

+14°F to +176°F (for a short time +212°F)
mineral oil, other media on request
232 PSI
348 PSI
SAE-flange 3000 PSI or ANSI-flange 300 PSI
C-steel
Nitrile (NBR) or Viton (FPM), other materials on request
vertical
ASME-code, sec. VIII / div.1 - 1998; add.98

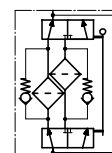
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

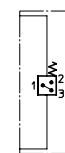
without indicator



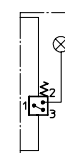
with by-pass valve



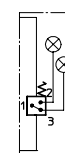
with electrical indicator
AE 30 and AE 40



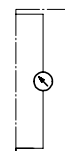
with visual-electrical indicator
AE 50 and AE 62



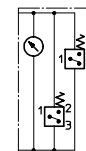
with visual-electrical indicator
AE 70 and AE 80



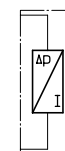
with visual indicator
OP



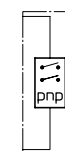
with visual-electrical indicator
OE



with electronical clogging sensor
VS1



with electronical clogging sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

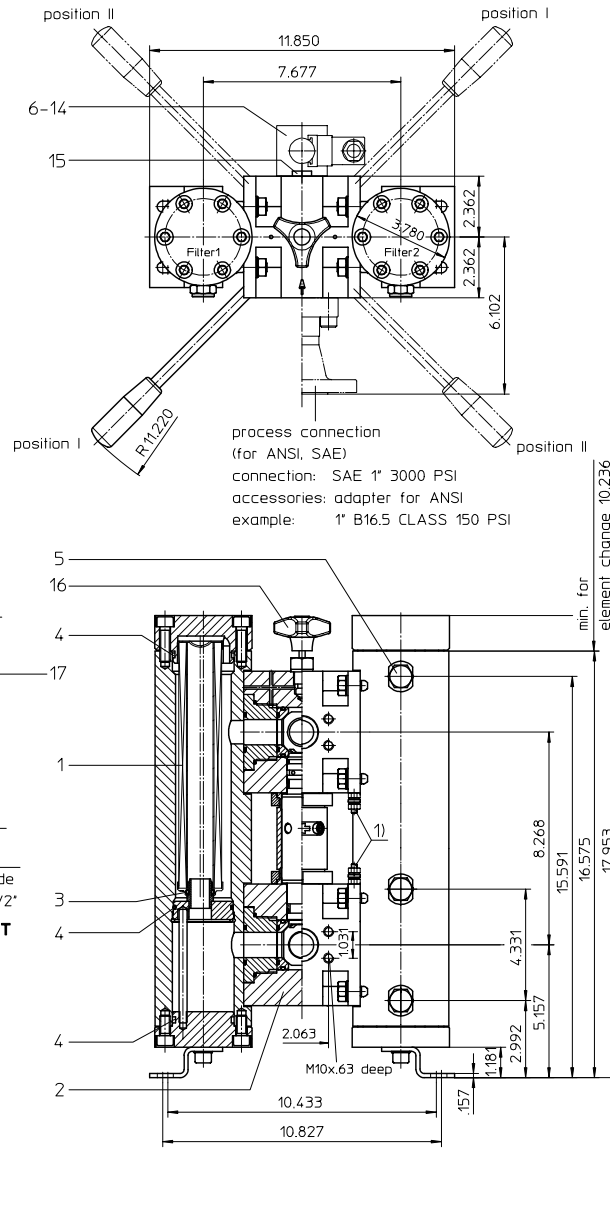
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 101 NPS 1" CLASS 150 PSI

Sheet No.
2163 B

1) Connection for the potential equalisation
 at inlet and outlet, only for application
 in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



1. Type index:

1.1. Complete filter: (ordering example)

DA. 101. 10VG. 30. E. P. -. FS. 5. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- 1 **series:**
DA = pressure filter change-over, according to ASME-code
- 2 **nominal size:** 101
- 3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API
25 P = 25 µm, 10 P = 10 µm paper
- 4 **resistance of pressure difference for filter element:**
30 = Δp 435 PSI
- 5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
- 6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- 7 **filter element specification:**
- = standard, VA = stainless steel
- 8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind 1600-3600 µin
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind < 640 µin
- 9 **process connection size:**
5 = 1"
- 10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028
- 11 **internal valve:**
- = without
- 12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608
- 13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- 14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- 15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- 16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 100. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NL. = standard filter element according to DIN 24550, T3
- 2 **nominal size:** 100
- 3 - 7 see type index complete filter

weight: approx. 132 lbs.

Changes of measures and design are subject to alteration!

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.100...		
2	1	change over UKK	1"		
3	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	6	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
5	6	screw plug	NPT ½	307766	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	BSPP ¼	305000	
16	1	pressure balance valve	3/8"	305000	
17	2	O-ring (only for execution with ANSI-flange)	32,9 x 3,53	318850 (NBR)	338231(FPM)

item 15 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 101 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

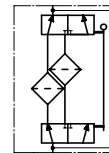
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼"
drain connection dirt side :	NPT ¼"
drain connection clean side :	NPT ¼"
volume tank :	2x .24 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

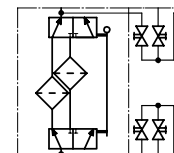
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

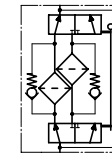
without indicator



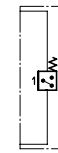
with shut-off valve



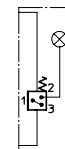
with by-pass valve



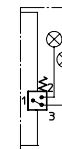
with electrical indicator
AE 30 and AE 40



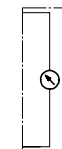
with visual-electrical indicator
AE 50 and AE 62



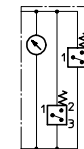
with visual-electrical indicator
AE 70 and AE 80



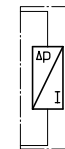
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

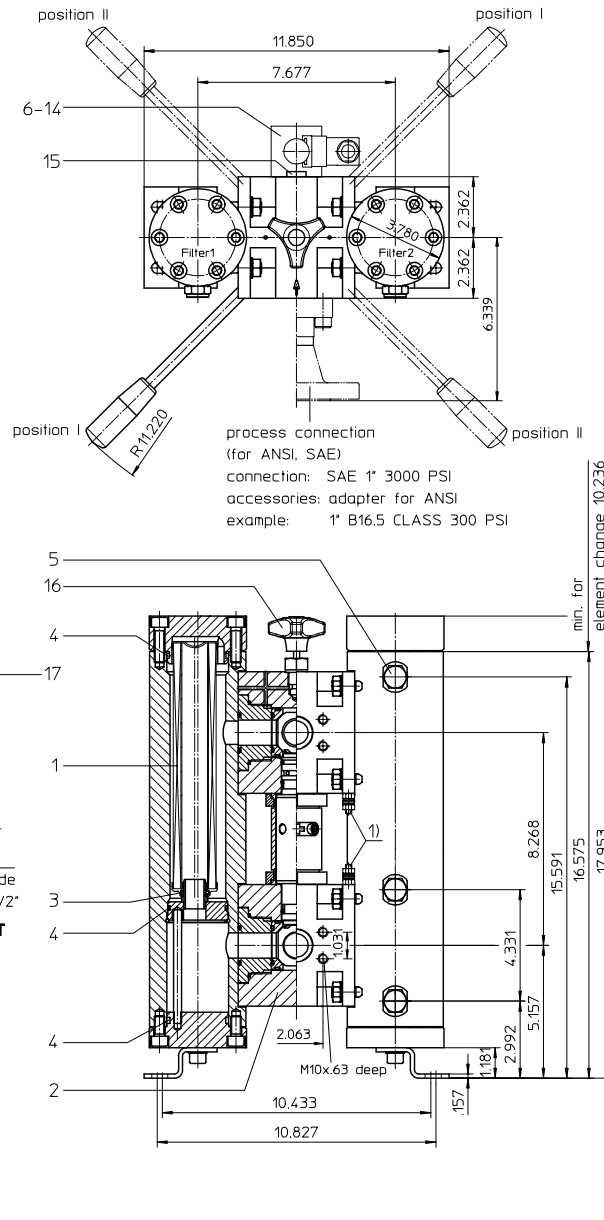
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 100 NPS 1" CLASS 300 PSI

Sheet No.
2152 C

1) Connection for the potential equalisation
 at inlet and outlet, only for application
 in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



1. Type index:

1.1. Complete filter: (ordering example)

DA. 100. 10VG. 30. E. P. -. FS. 5. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- series:**
 DA = pressure filter change-over, according to ASME-code
- nominal size:** 100
- filter-material and filter-fineness:**
 80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
 25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
 25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API
 25 P = 25 µm, 10 P = 10 µm paper
- resistance of pressure difference for filter element:**
 30 = Δp 435 PSI
- filter element design:**
 E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
- sealing material:**
 P = Nitrile (NBR), V = Viton (FPM)
- filter element specification:**
 - = standard, VA = stainless steel
- process connection:**
 FS = SAE-flange connection 3000 PSI
 FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 µin
 FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 µin
- process connection size:**
 5 = 1"
- filter housing specification:**
 - = standard
 IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028
- internal valve:**
 - = without
- clogging indicator or clogging sensor:**
 - = without, OP = visual, see sheet-no. 1628
 AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
 AOC = visual, see sheet-no. 1606, VS1 = electronic, see sheet-no. 1607
 AE = visual-electrical, see sheet-no. 1609, VS2 = electronic, see sheet-no. 1608
- shut-off valve:**
 - = without, AV = shut-off valve, see sheet-no. 1655
- specification pressure vessel:**
 - = standard (PED 97/23/EC)
 IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
 IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
 IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- switch lever:**
 F = toward IN/OUT, B = opposite IN/OUT
- air bleeding/drain:**
 F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 100. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
 01NL = standard filter element according to DIN 24550, T3
- nominal size:** 100
- 7 -** see type index complete filter

weight: approx. 132 lbs.

Changes of measures and design are subject to alteration!

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.100...		
2	1	change over UKK	1"		
3	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	6	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
5	6	screw plug	NPT ½"	307766	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	BSPP ¼"	305003	
16	1	pressure balance valve	3/8"	305000	
17	2	O-ring (only for execution with ANSI-flange)	32,9 x 3,53	318850 (NBR)	338231 (FPM)

item 15 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 100 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

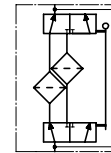
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼"
drain connection dirt side :	NPT ¼"
drain connection clean side :	NPT ¼"
volume tank :	2x .24 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

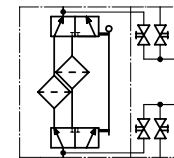
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

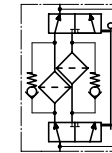
without indicator



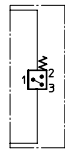
with shut-off valve



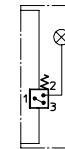
with by-pass valve



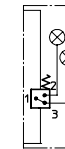
with electrical indicator
AE 30 and AE 40



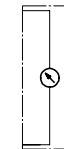
with visual-electrical indicator
AE 50 and AE 62



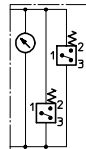
with visual-electrical indicator
AE 70 and AE 80



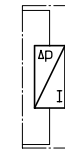
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

EDV 05/10

3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			DA 251	DA 401		
1	2	filter element	01NL. 250...	01NL. 400...		
2	1	change over UKK	2"			
3	2	O-ring	40 x 3		304389(NBR)	305482(FPM)
4	6	O-ring	100 x 5		327063 (NBR)	327064 (FPM)
5	8	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
6	6	screw plug	NPT ½		307766	
7	2	mini-measuring connection	MA.1.ST		305453	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	BSPP ¼		305003	
18	1	pressure balance valve	3/8"		305000	
19	2	O-ring (only for execution with ANSI-flange)	56,75 x 3,53		306035 (NBR)	310264 (FPM)

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DA 251-401 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

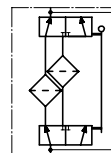
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½" and SAE ¼" 3000 PSI
drain connection dirt side :	NPT ½" and SAE ¼" 3000 PSI
drain connection clean side :	NPT ½"
volume tank DA 251:	2x .79 Gal.
DA 401:	2x 1.13 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

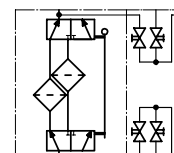
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

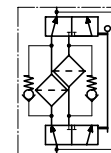
without indicator



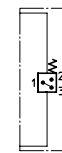
with shut-off valve



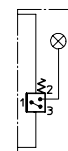
with by-pass valve



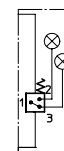
with electrical indicator
AE 30 and AE 40



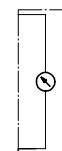
with visual-electrical indicator
AE 50 and AE 62



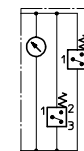
with visual-electrical indicator
AE 70 and AE 80



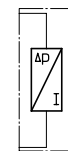
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

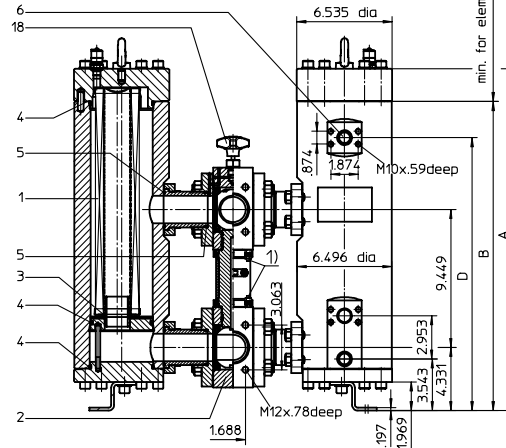
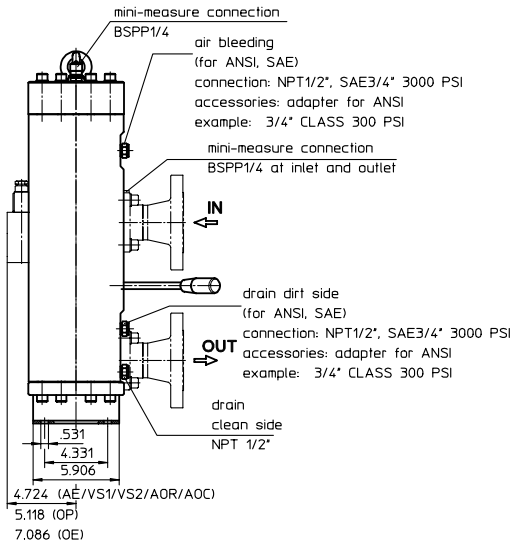
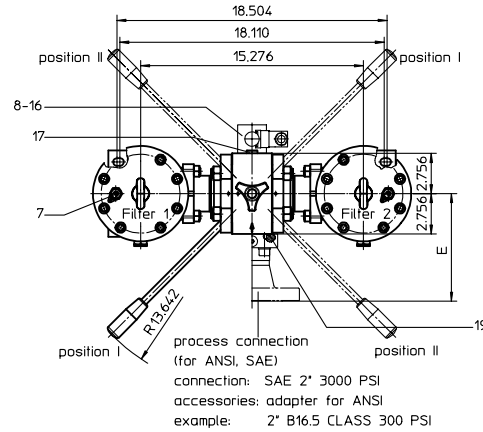
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



2. Dimensions: inch

type	connection	A	B	C	D	E	weight lbs.
DA 250	SAE 2"	17.91	15.66	10.23	14.27	-	approx. 287
	ANSI 2"					7.36	
	ANSI 1 1/2"					7.78	
DA 400	SAE 2"	23.42	21.18	16.14	17.76	-	approx. 353
	ANSI 2"					7.36	
	ANSI 1 1/2"					7.78	

PRESSURE FILTER, change-over Series DA 250-400 NPS 2" CLASS 300 PSI

Sheet No.
2155 G

1. Type index:

1.1. Complete filter: (ordering example)

DA. 400. 10VG. 30. E. P. -. FS. 8. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	series: DA = pressure filter change-over, according to ASME-code														
2	nominal size: 250, 400														
3	filter-material and filter-fineness: 80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh 25 VG = 20 µm _(c) , 16 VG = 15 µm _(c) , 10 VG = 10 µm _(c) , 6 VG = 7 µm _(c) , 3 VG = 5 µm _(c) Interpor fleece (glass fiber) 25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API 25 P = 25 µm, 10 P = 10 µm paper														
4	resistance of pressure difference for filter element: 30 = Δp 435 PSI														
5	filter element design: E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI														
6	sealing material: P = Nitrile (NBR), V = Viton (FPM)														
7	filter element specification: - = standard, VA = stainless steel														
8	process connection: FS = SAE-flange connection 3000 PSI FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 µin FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 µin														
9	process connection size: 7 = 1 ½" (only with adapter), 8 = 2"														
10	filter housing specification: - = standard IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028														
11	internal valve: - = without														
12	clogging indicator or clogging sensor: - = without, OP = visual, see sheet-no. 1628 AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628 AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607 AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608														
13	shut-off valve: - = without, AV = shut-off valve, see sheet-no. 1655														
14	specification pressure vessel: - = standard (PED 97/23/EC) IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217 IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415 IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218														
15	switch lever: F = toward IN/OUT, B = opposite IN/OUT														
16	air bleeding/drain: F = toward IN/OUT, B = opposite IN/OUT														

1.2. Filter element: (ordering example)

01NL. 400. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1	series:	01NL. = standard filter element according to DIN 24550, T3
2	nominal size:	250, 400
3	- 7	see type index complete filter

Changes of measures and design are subject to alteration!

3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			DA 250	DA 400		
1	2	filter element	01NL. 250...	01NL. 400...		
2	1	change over UKK	2"			
3	2	O-ring	40 x 3		304389(NBR)	305482(FPM)
4	6	O-ring	100 x 5		327063 (NBR)	327064 (FPM)
5	8	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
6	6	screw plug	NPT ½		307766	
7	2	mini-measuring connection	MA.1.ST		305453	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	BSPP ¼		305003	
18	1	pressure balance valve	3/8"		305000	
19	2	O-ring (only for execution with ANSI-flange)	56,75 x 3,53		306035 (NBR)	310264 (FPM)

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DA 250-400 are suitable for operating pressure up to 580 bar.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

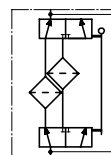
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½" and SAE ¾" 3000 PSI
drain connection dirt side :	NPT ½" and SAE ¾" 3000 PSI
drain connection clean side :	NPT ½"
volume tank DA 250:	2x .79 Gal.
DA 400:	2x 1.13 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

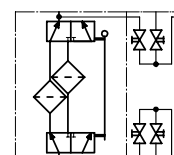
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

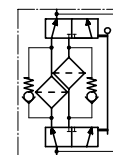
without indicator



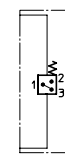
with shut-off valve



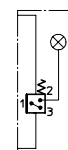
with by-pass valve



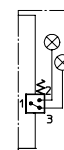
with electrical indicator
AE 30 and AE 40



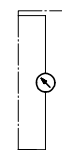
with visual-electrical indicator
AE 50 and AE 62



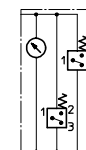
with visual-electrical indicator
AE 70 and AE 80



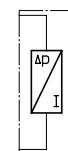
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DA 631-1001 NPS 3" CLASS 150 PSI**

Sheet No.
2165 B

1. Type index:

1.1. Complete filter: (ordering example)

DA. 1001. 10VG. 30. E. P. -. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- 1 series:**
 DA = pressure filter change-over, according to ASME-code
2 nominal size: 631, 1001
- 3 filter-material and filter- fineness:**
 80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
 25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
 25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API
 25 P = 25 µm, 10 P = 10 µm paper
- 4 resistance of pressure difference for filter element:**
 30 = Δp 435 PSI
- 5 filter element design:**
 E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
- 6 sealing material:**
 P = Nitrile (NBR), V = Viton (FPM)
- 7 filter element specification:**
 - = standard, VA = stainless steel
- 8 process connection:**
 FS = SAE-flange connection 3000 PSI
 FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind 1600-3600 µin
 FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind < 640 µin
- 9 process connection size:**
 A = 3"
- 10 filter housing specification:**
 - = standard
 IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028
- 11 internal valve:**
 - = without
- 12 clogging indicator or clogging sensor:**
 - = without, OP = visual, see sheet-no. 1628
 AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
 AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
 AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608
- 13 shut-off valve:**
 - = without, AV = shut-off valve, see sheet-no. 1655
- 14 specification pressure vessel:**
 - = standard (PED 97/23/EC)
 IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
 IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
 IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- 15 switch lever:**
 F = toward IN/OUT, B = opposite IN/OUT
- 16 air bleeding/drain:**
 F = toward IN/OUT, B = opposite IN/OUT

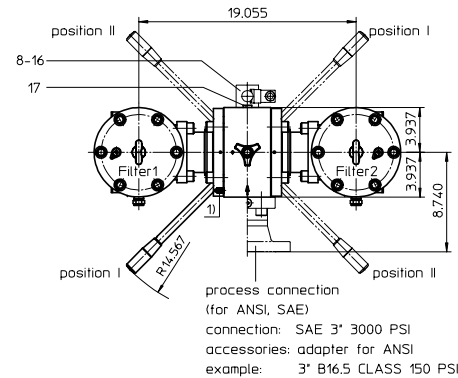
1.2. Filter element: (ordering example)

01NL. 1000. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

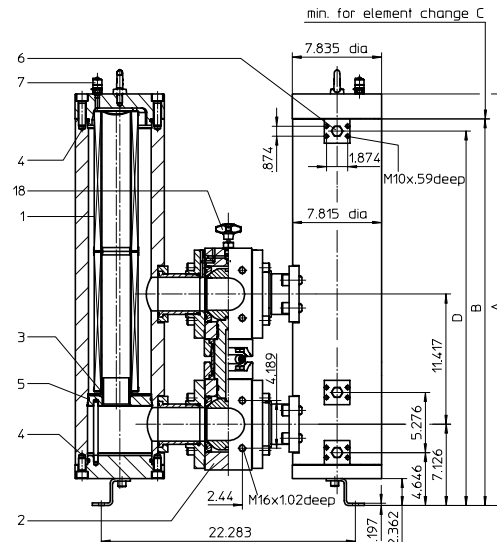
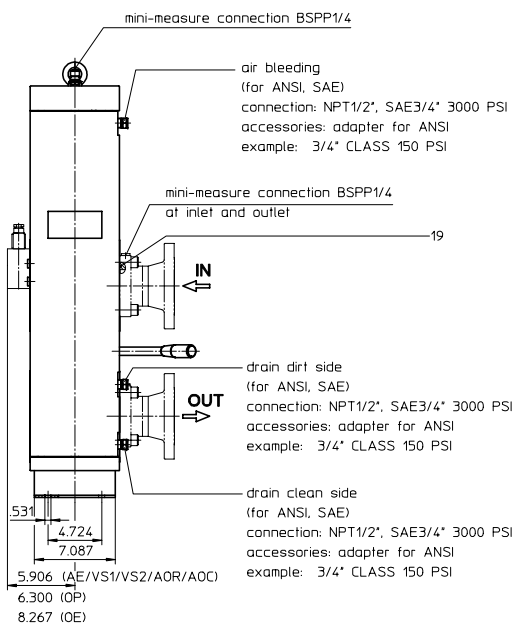
- 1 series:**
 01NL. = standard filter element according to DIN 24550, T3
- 2 nominal size:** 1000
- 3 - 7** see type index complete filter

Changes of measures and design are subject to alteration



¹⁾ Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Dimensions: inch

type	connection size	A	B	C	D	weight lbs.
DA 631	SAE or ANSI 3"	27.04	24.84	16.14	23.77	approx. 639
DA 1001	SAE or ANSI 3"	36.10	33.89	25.19	32.83	approx. 771

3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			DA 631	DA 1001		
1	2	filter element	01NL.630	01NL.1000		
2	1	change over UKK	3"			
3	2	O-ring	60 x 3,5		304377 (NBR)	304398 (FPM)
4	4	O-ring	135 x 4,75		326348 (NBR)	326349 (FPM)
5	2	O-ring	136,12 x 3,53		320162 (NBR)	320163 (FPM)
6	6	screw plug	NPT ½		307766	
7	2	mini-measuring connection	MA.1.ST		305453	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	BSPP ¼		305003	
18	1	pressure balance valve	3/8"		305000	
19	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53		305590 (NBR)	306308 (FPM)

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DA 631-1001 are suitable for operating pressure up to 580 PSI

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼" and SAE ¼" 3000 PSI
drain connection dirt side :	NPT ¼" and SAE ¼" 3000 PSI
drain connection clean side :	NPT ¼"
volume tank DA 631:	2x 2.20 Gal.
DA 1001:	2x 3.12 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

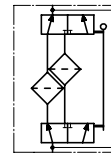
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

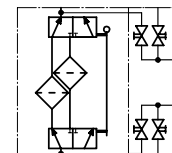
US 2165 B

7. Symbols:

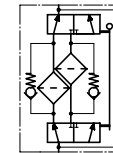
without indicator



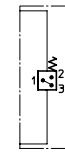
with shut-off valve



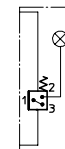
with by-pass valve



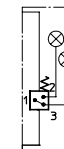
with electrical indicator
AE 30 and AE 40



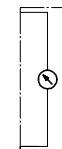
with visual-electrical indicator
AE 50 and AE 62



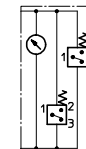
with visual-electrical indicator
AE 70 and AE 80



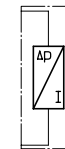
with visual indicator
AOR/AOC/OP



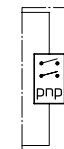
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

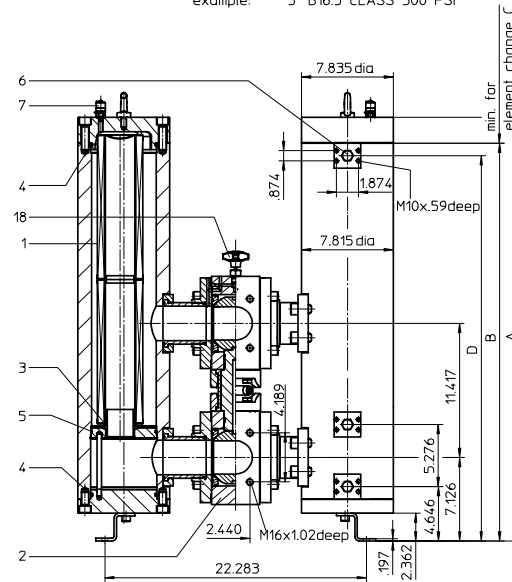
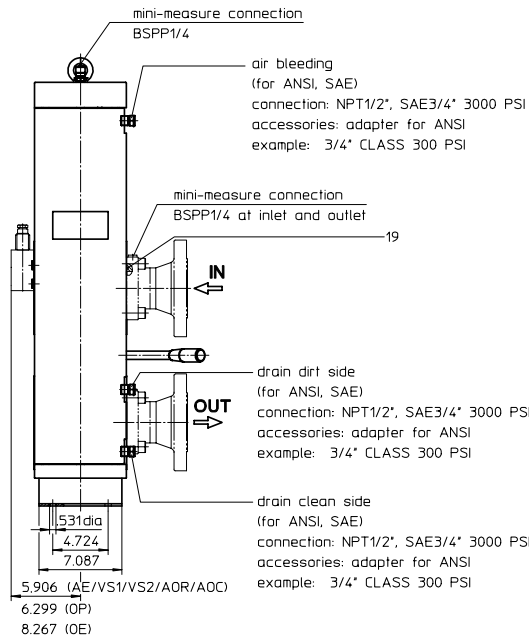
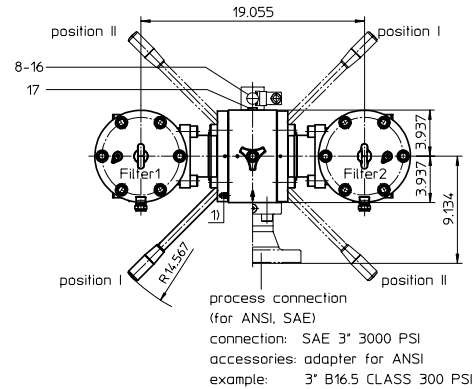
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DA 630-1000 NPS 3" CLASS 300 PSI**

Sheet No.
2156 C

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Dimensions: inch

type	connection size	A	B	C	D	weight lbs.
DA 630	SAE 3"	27.04	24.84	16.14	23.77	approx. 639
DA 1000	SAE 3"	36.10	33.89	25.19	32.83	approx. 771

1. Type index:

1.1. Complete filter: (ordering example)

DA. 1000. 10VG. 30. E. P. -. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- series:**
DA = pressure filter change-over, according to ASME-code
- nominal size:** 630, 1000
- filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API
25 P = 25 µm, 10 P = 10 µm paper
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
- filter element design:**
E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
- sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- filter element specification:**
- = standard, VA = stainless steel
- process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 µin
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 µin
- process connection size:**
A = 3"
- filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028
- internal valve:**
- = without
- clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608
- shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 1000. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NL = standard filter element according to DIN 24550, T3
- nominal size:** 630, 1000
- 7** see type index complete filter

Changes of measures and design are subject to alteration

3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			DA 630	DA 1000		
1	2	filter element	01NL 630...	01NL.1000...		
2	1	change over UKK	3"			
3	2	O-ring	60 x 3,5		304377 (NBR)	304398 (FPM)
4	4	O-ring	135 x 4,75		326348 (NBR)	326349 (FPM)
5	2	O-ring	136,12 x 3,53		320162 (NBR)	320163 (FPM)
6	6	screw plug	NPT ½		307766	
7	2	mini-measuring connection	MA.1.ST		305453	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	BSPP ¼		305003	
18	1	pressure balance valve	3/8"		305000	
19	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53		305590 (NBR)	306308 (FPM)

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DA 630-1000 are suitable for operating pressure up to 580 bar.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

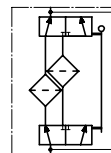
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼" and SAE ¼" 3000 PSI
drain connection dirt side :	NPT ¼" and SAE ¼" 3000 PSI
drain connection clean side :	NPT ¼" and SAE ¼" 3000 PSI
volume tank DA 630:	2x 2.19 Gal.
DA 1000:	2x 3.11 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

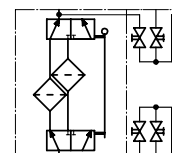
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

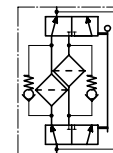
without indicator



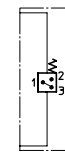
with shut-off valve



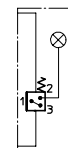
with by-pass valve



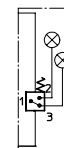
with electrical indicator
AE 30 and AE 40



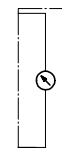
with visual-electrical indicator
AE 50 and AE 62



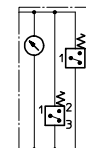
with visual-electrical indicator
AE 70 and AE 80



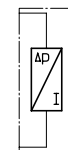
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DA 1004 NPS 3" CLASS 300 PSI**

Sheet No.
2185 A

1. Type index:

1.1. Complete filter: (ordering example)

DA. 1004. 10VG. 10. B. P. -. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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1 series:

DA = pressure filter change-over, according to ASME-code

2 nominal size: 1004

3 filter-material and filter- fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh

25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)

25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API

25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR), V = Viton (FPM)

7 filter element specification:

- = standard, VA = stainless steel

8 process connection:

FS = SAE-flange connection 3000 PSI

FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 µin

FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 µin

9 process connection size:

A = 3"

10 filter housing specification:

- = standard

IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 internal valve:

- = without, S1 = with by-pass valve Δp 51 PSI

12 clogging indicator or clogging sensor:

- = without,

OP = visual, see sheet-no. 1628

AOR = visual, see sheet-no. 1606,

OE = visual-electrical, see sheet-no. 1628

AOC = visual, see sheet-no. 1606,

VS1 = electrical, see sheet-no. 1607

AE = visual-electrical, see sheet-no. 1609,

VS2 = electrical, see sheet-no. 1608

13 shut-off valve:

- = without,

AV = shut-off valve, see sheet-no. 1655

14 specification pressure vessel:

- = standard (PED 97/23/EC)

IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217

IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 switch lever:

F = toward IN/OUT, B = opposite IN/OUT

16 air bleeding/drain:

F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
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1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 1000

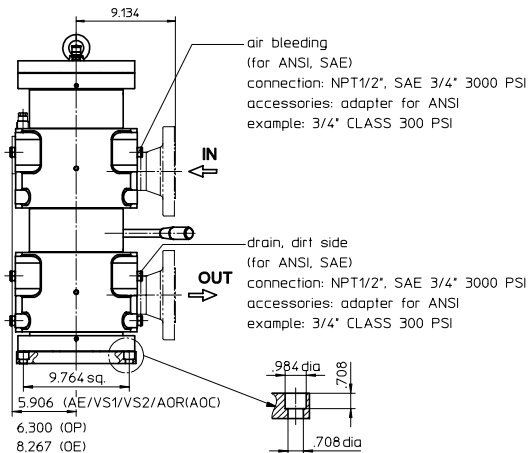
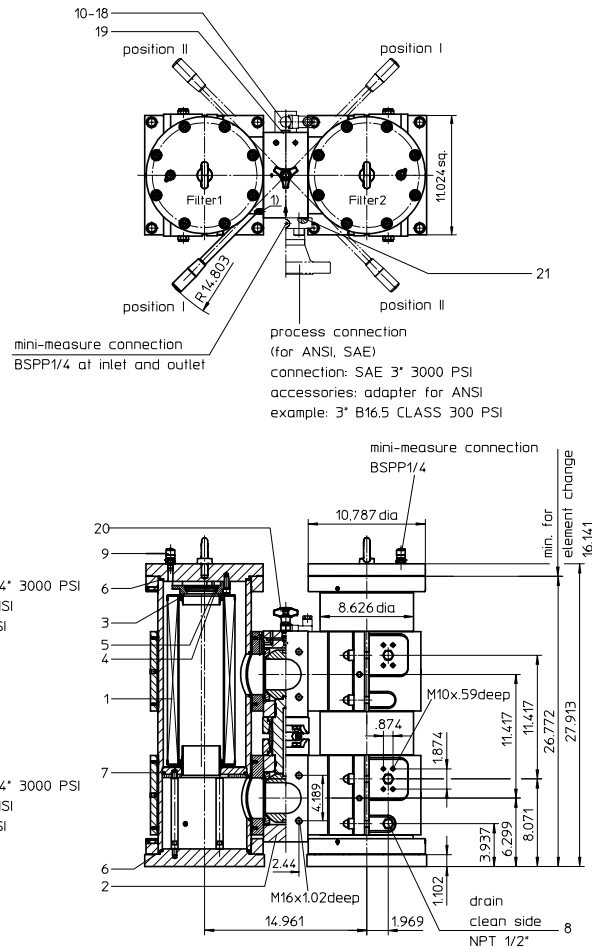
3 - 7 see type index complete filter

weight: approx. 816 lbs.

Changes of measures and design are subject to alteration!

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	3"		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼	305003	
20	1	pressure balance valve	3/8"	305000	
21	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53	305590 (NBR)	306308 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 1004 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

steel

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 5.02 Gal.

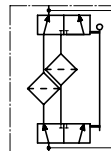
according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

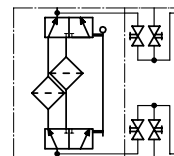
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

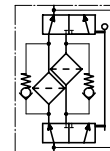
without indicator



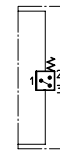
with shut-off valve



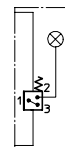
with by-pass valve



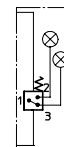
with electrical indicator
AE 30 and AE 40



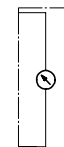
with visual-electrical indicator
AE 50 and AE 62



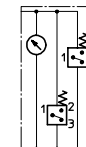
with visual-electrical indicator
AE 70 and AE 80



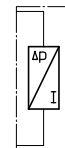
with visual indicator
AOR/AOC/OP



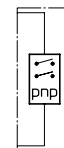
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively
Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DA 1005 NPS 4" CLASS 300 PSI**

Sheet No.
2186 A

1. Type index:

1.1. Complete filter: (ordering example)

DA. 1005. 10VG. 10. B. P. -. FS. B. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

1 series:

DA = pressure filter change-over, according to ASME-code

2 nominal size: 1005

3 filter-material and filter- fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh

25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)

25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API

25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR), V = Viton (FPM)

7 filter element specification:

- = standard, VA = stainless steel

8 process connection:

FS = SAE-flange connection 3000 PSI

FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 µin

FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 µin

9 process connection size:

B = 4"

10 filter housing specification:

- = standard

IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 internal valve:

- = without, S1 = with by-pass valve Δp 51 PSI

12 clogging indicator or clogging sensor:

- = without,

AOR = visual, see sheet-no. 1606,

AOC = visual, see sheet-no. 1606,

AE = visual-electrical, see sheet-no. 1609,

OP = visual, see sheet-no. 1628

OE = visual-electrical, see sheet-no. 1628

VS1 = electronical, see sheet-no. 1607

VS2 = electronical, see sheet-no. 1608

13 shut-off valve:

- = without,

AV = shut-off valve, see sheet-no. 1655

14 specification pressure vessel:

- = standard (PED 97/23/EC)

IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217

IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 switch lever:

F = toward IN/OUT, B = opposite IN/OUT

16 air bleeding/drain:

F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 1000

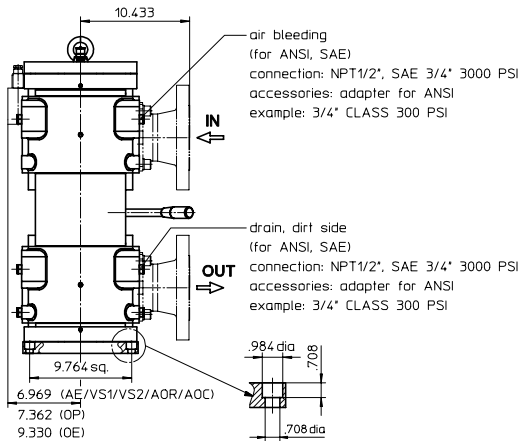
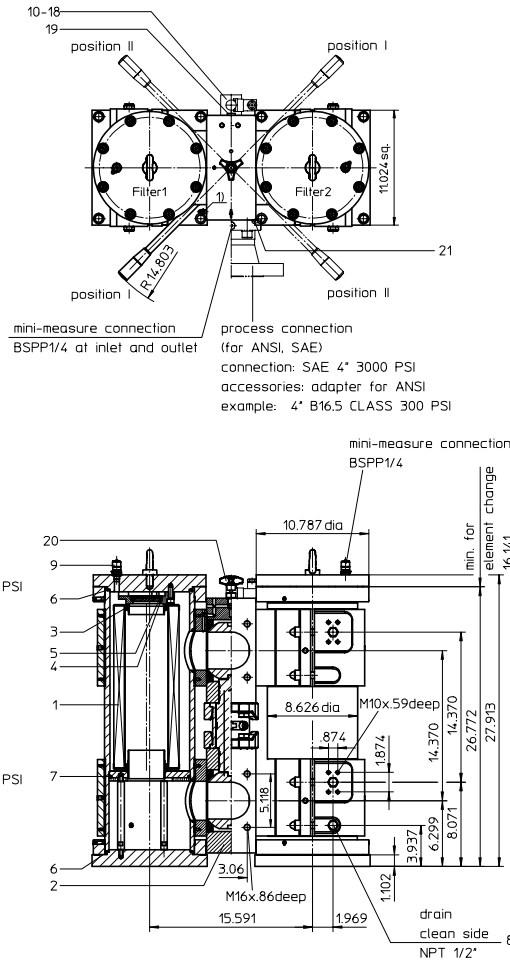
3 - 7 see type index complete filter

weight: approx. 915 lbs.

Changes of measures and design are subject to alteration!

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	4"		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼	305003	
20	1	pressure balance valve	3/8"	305000	
21	2	O-ring (only for execution with ANSI-flange)	110,72 x 3,53	316355 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 1005 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

steel

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 5.02 Gal.

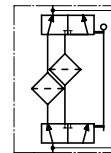
according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

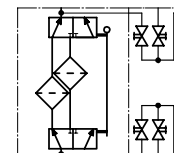
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

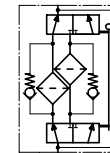
without indicator



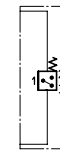
with shut-off valve



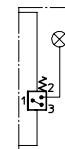
with by-pass valve



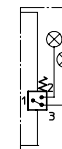
with electrical indicator
AE 30 and AE 40



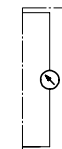
with visual-electrical indicator
AE 50 and AE 62



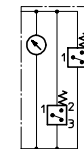
with visual-electrical indicator
AE 70 and AE 80



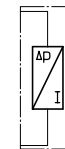
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively
Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DA 1014 NPS 3" CLASS 150 PSI**

Sheet No.
2180 A

1. Type index:

1.1. Complete filter: (ordering example)

DA. 1014. 10VG. 10. B. P. -. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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1 series:

DA = pressure filter change-over, according to ASME-code

2 nominal size: 1014

3 filter-material and filter- fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh

25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)

25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API

25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

B = both-sides open

6 sealing material:

P = Nitrile (NBR), V = Viton (FPM)

7 filter element specification:

- = standard, VA = stainless steel

8 process connection:

FS = SAE-flange connection 3000 PSI

FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind 1600-3600 µin

FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind < 640 µin

9 process connection size:

A = 3"

10 filter housing specification:

- = standard

IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 internal valve:

- = without, S1 = with by-pass valve Δp 51 PSI

12 clogging indicator or clogging sensor:

- = without,

OP = visual, see sheet-no. 1628

AOR = visual, see sheet-no. 1606,

OE = visual-electrical, see sheet-no. 1628

AOC = visual, see sheet-no. 1606,

VS1 = electrical, see sheet-no. 1607

AE = visual-electrical, see sheet-no. 1609,

VS2 = electrical, see sheet-no. 1608

13 shut-off valve:

- = without,

AV = shut-off valve, see sheet-no. 1655

14 specification pressure vessel:

- = standard (PED 97/23/EC)

IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217

IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 switch lever:

F = toward IN/OUT, B = opposite IN/OUT

16 air bleeding/drain:

F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 1000

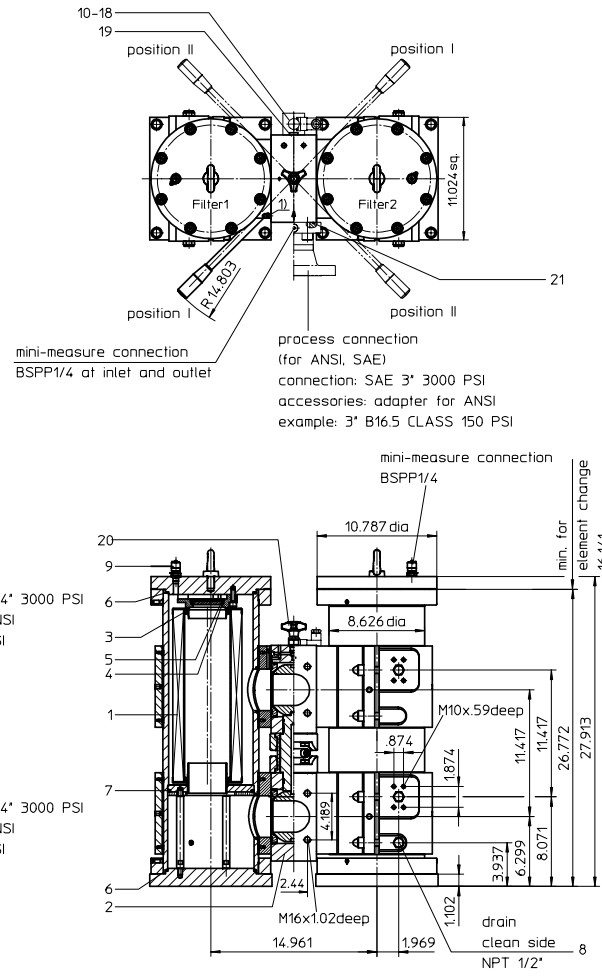
3 - 7 see type index complete filter

weight: approx. 816 lbs.

Changes of measures and design are subject to alteration

¹⁾ Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	3"		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½"	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼"	305003	
20	1	pressure balance valve	3/8"	305000	
21	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53	305590 (NBR)	306308 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 1014 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

steel

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 5.02 Gal.

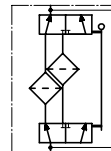
according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

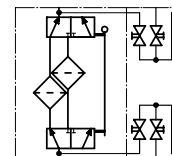
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

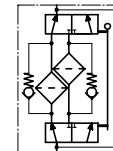
without indicator



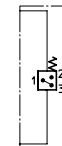
with shut-off valve



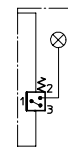
with by-pass valve



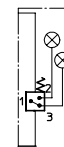
with electrical indicator
AE 30 and AE 40



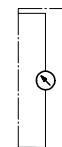
with visual-electrical indicator
AE 50 and AE 62



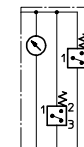
with visual-electrical indicator
AE 70 and AE 80



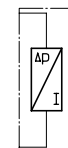
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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1	2	3	4	5	6	7
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EDV 05/10

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	4"		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½"	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼"	305003	
20	1	pressure balance valve	3/8"	305000	
21	2	O-ring (only for execution with ANSI-flange)	110,72 x 3,53	316355 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 1015 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

steel

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 5.02 Gal.

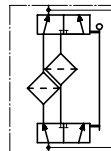
according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

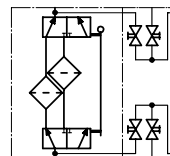
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

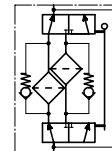
without indicator



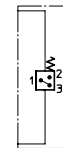
with shut-off valve



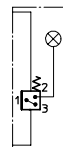
with by-pass valve



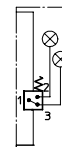
with electrical indicator
AE 30 and AE 40



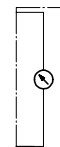
with visual-electrical indicator
AE 50 and AE 62



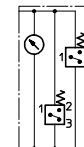
with visual-electrical indicator
AE 70 and AE 80



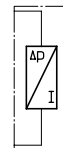
with visual indicator
AOR/AOC/OP



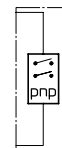
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DA 2204 NPS 3" CLASS 300 PSI**

Sheet No.
2188 A

1. Type index:

1.1. Complete filter: (ordering example)

DA. 2204. 10VG. 10. B. P. -. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

1 series:

DA = pressure filter change-over, according to ASME-code

2 nominal size: 2204

3 filter-material and filter-fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh

25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)

25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API

25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

B = both-sides open

6 sealing material:

P = Nitrile (NBR), V = Viton (FPM)

7 filter element specification:

- = standard, VA = stainless steel

8 process connection:

FS = SAE-flange connection 3000 PSI

FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 µin

FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 µin

9 process connection size:

A = 3"

10 filter housing specification:

- = standard

IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 internal valve:

- = without; S1 = with by-pass valve Δp 51 PSI

12 clogging indicator or clogging sensor:

- = without,

OP = visual, see sheet-no. 1628

AOR = visual, see sheet-no. 1606,

OE = visual-electrical, see sheet-no. 1628

AOC = visual, see sheet-no. 1606,

VS1 = electrical, see sheet-no. 1607

AE = visual-electrical, see sheet-no. 1609,

VS2 = electrical, see sheet-no. 1608

13 shut-off valve:

- = without,

AV = shut-off valve, see sheet-no. 1655

14 specification pressure vessel:

- = standard (PED 97/23/EC)

IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217

IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 switch lever:

F = toward IN/OUT, B = opposite IN/OUT

16 air bleeding/drain:

F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 1000

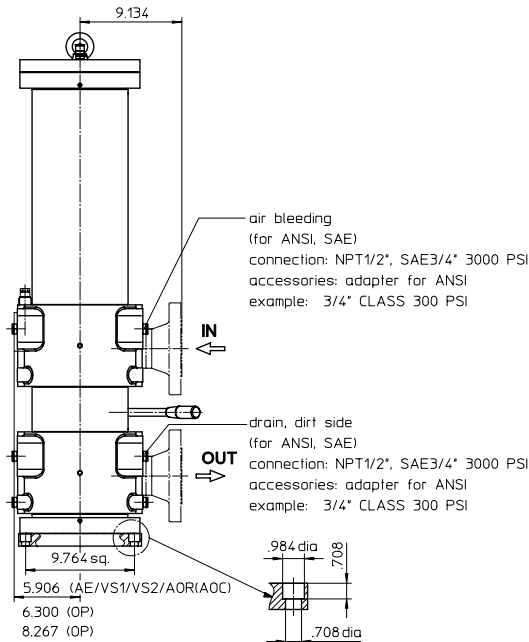
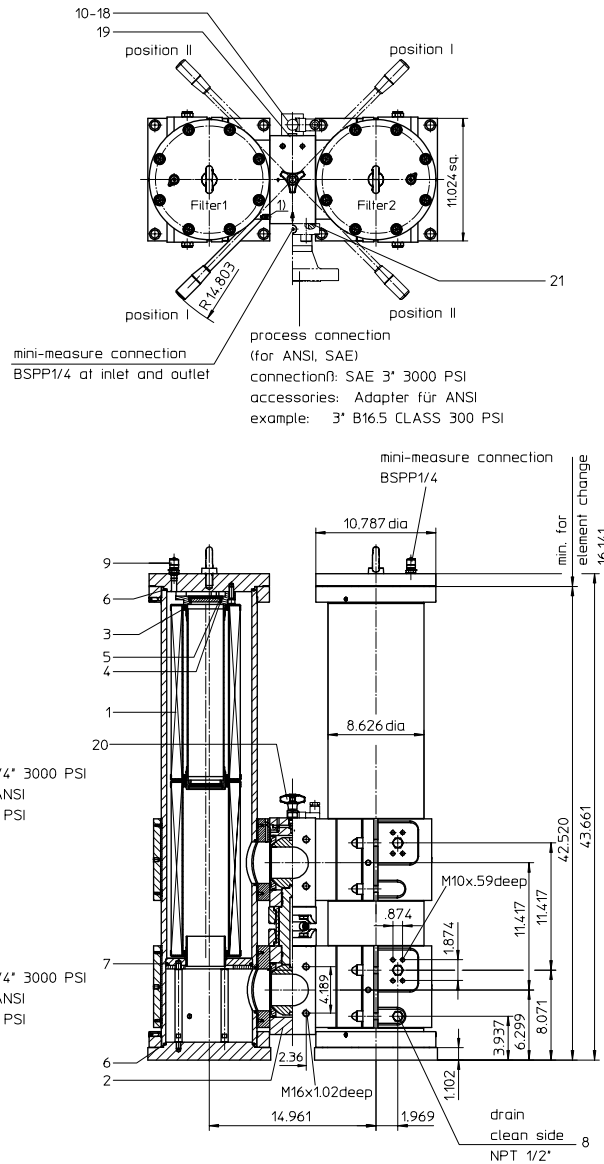
3 - 7 see type index complete filter

weight: approx. 1080 lbs.

Changes of measures and design are subject to alteration!

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	3"		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½"	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼"	305003	
20	1	pressure balance valve	3/8"	305000	
21	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53	305590 (NBR)	306308 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 2204 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

steel

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 7.92 Gal.

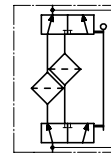
according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

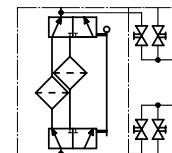
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

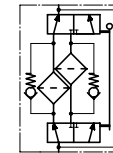
without indicator



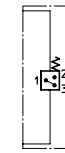
with shut-off valve



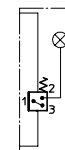
with by-pass valve



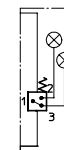
with electrical indicator
AE 30 and AE 40



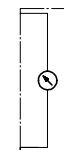
with visual-electrical indicator
AE 50 and AE 62



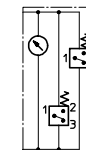
with visual-electrical indicator
AE 70 and AE 80



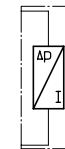
with visual indicator
AOR/AOC/OP



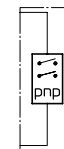
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over **Series DA 2205 NPS 4" CLASS 300 PSI**

Sheet No.
2187 A

1. Type index:

1.1. Complete filter: (ordering example)

DA. 2205. 10VG. 10. B. P. -. FS. B. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- 1 **series:**
DA = pressure filter change-over, according to ASME-code
- 2 **nominal size:** 2205
- 3 **filter-material and filter- fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m, 10 G = 10 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 API = 20 μ m, 10 API = 10 μ m Interpor fleece (glass fiber) according to API
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both-sides open
- 6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- 7 **filter element specification:**
- = standard, VA = stainless steel
- 8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 μ m
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 μ m
- 9 **process connection size:**
B = 4"
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028
- 12 **clogging indicator or clogging sensor:**
- = without, S1 = with by-pass valve Δp 51 PSI
AOR = visual, see sheet-no. 1606, OP = visual, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609, VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608
- 13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- 14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- 15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- 16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

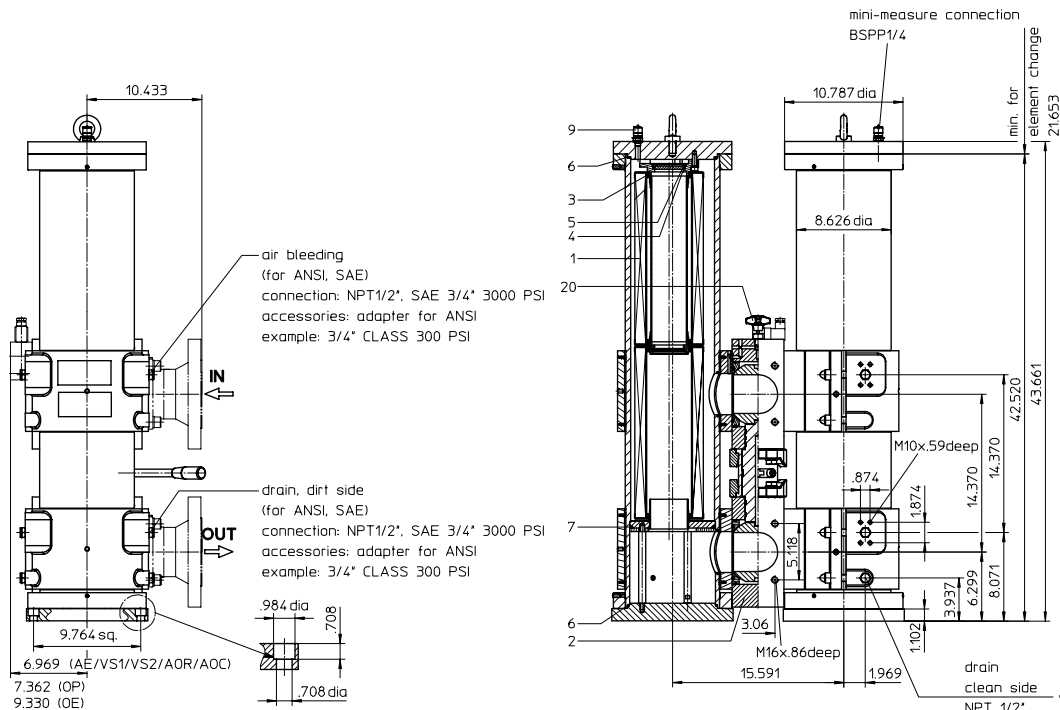
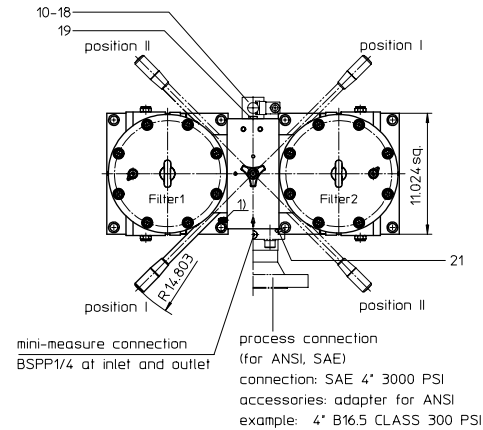
- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index complete filter

weight: approx. 1102 lbs.

Changes of measures and design are subject to alteration!

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	4"		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	311471	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼	305003	
20	1	pressure balance valve	3/8"	305000	
21	2	O-ring (only for execution with ANSI-flange)	110,72 x 3,53	316355 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 2205 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

steel

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 7.92 Gal.

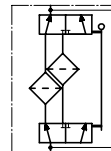
according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

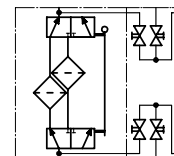
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

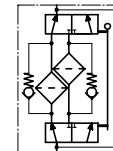
without indicator



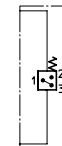
with shut-off valve



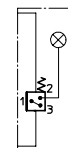
with by-pass valve



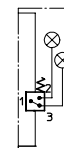
with electrical indicator
AE 30 and AE 40



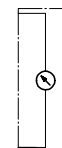
with visual-electrical indicator
AE 50 and AE 62



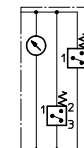
with visual-electrical indicator
AE 70 and AE 80



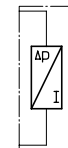
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

1	2	3	4	5	6	7
---	---	---	---	---	---	---

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	3"		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½"	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼"	305003	
20	1	pressure balance valve	3/8"	305000	
21	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53	305590 (NBR)	306308 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 2214 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

steel

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 7.92 Gal.

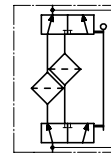
according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

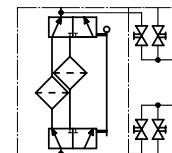
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

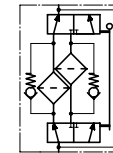
without indicator



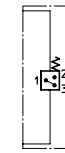
with shut-off valve



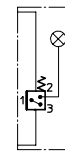
with by-pass valve



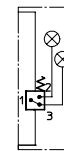
with electrical indicator
AE 30 and AE 40



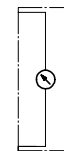
with visual-electrical indicator
AE 50 and AE 62



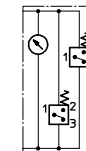
with visual-electrical indicator
AE 70 and AE 80



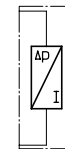
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	4"		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½"	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼"	305003	
20	1	pressure balance valve	3/8"	305000	
21	2	O-ring (only for execution with ANSI-flange)	110,72 x 3,53	316555 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 2215 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

steel

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 7.92 Gal.

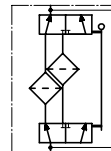
according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

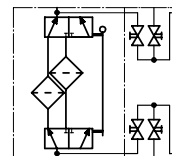
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

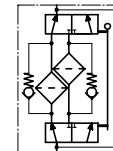
without indicator



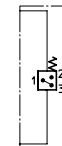
with shut-off valve



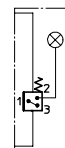
with by-pass valve



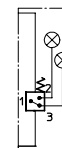
with electrical indicator
AE 30 and AE 40



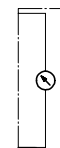
with visual-electrical indicator
AE 50 and AE 62



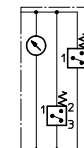
with visual-electrical indicator
AE 70 and AE 80



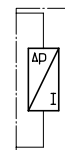
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



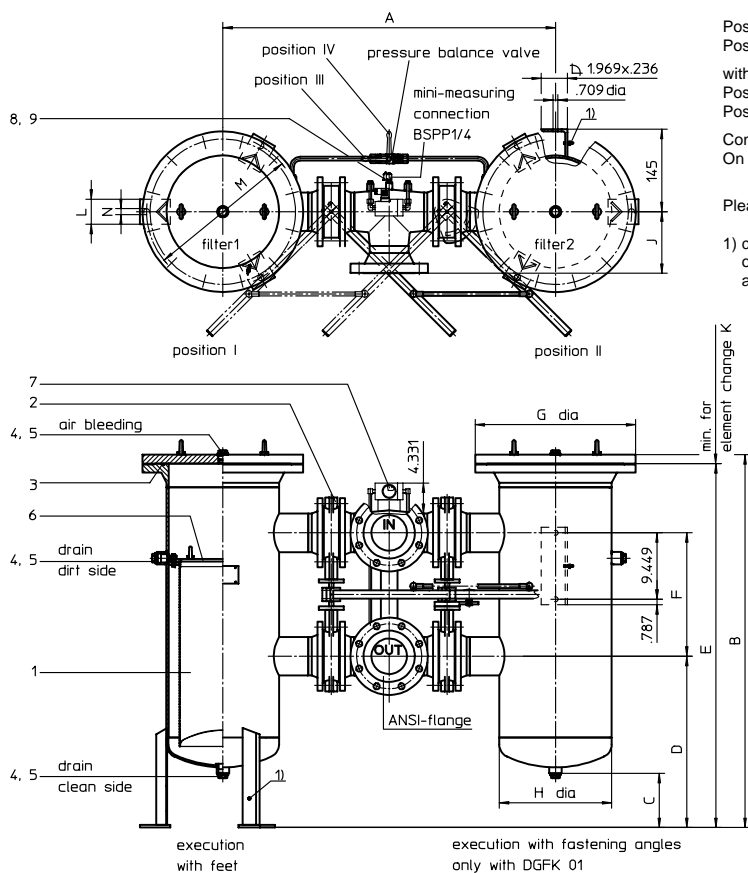
7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



Pos. I: left filter-side in operation
Pos II: right filter-side in operation

with pressure balance valve:

Pos III: valve open

Pos IV: valve closed

Connection standard as in drawing.

On request: inlet - on top and backside
outlet - bottom and backside

Please specify on order!

1) connection for the potential equalisation,
only for the application in the explosive
area

DUPLEX COARSE FILTER; change-over Series DGFK 01-06 232 PSI

Sheet No.
3109 E

1. Type index:

1.1. Complete filter: (ordering example)

DGFK. 04. ST. 0,50G. P. FA1. B. -. OE

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

- series:**
DGFK = duplex coarse filter with strainer basket
- nominal size:** 01, 02, 04, 06
- housing material:**
ST = of steel
VA = of stainless steel
- filter-material and filter-fineness:**
0,25 G = .0098 inch, 0,50 G = .0196 inch, 0,75 G = .0295 inch,
1,00 G = .0393 inch, 1,50 G = .0590 inch stainless steel wire mesh
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- connection:**
FA 1 = ANSI-flange 300 PSI, sealing surface rough grind 1600-36000 µin
FA 2 = ANSI-flange 300 PSI, sealing surface rough grind < 640 µin
- connection size:**

connection	filter nominal-size						
8 = 2"	01	02					
9 = 2 1/2"	01	02					
A = 3"	01	02	04				
B = 4"		02	04				
C = 5"		02	04	06			
D = 6"			04	06			
E = 8"				06			
F = 10"				06			
G = 12"						07	

- manner of fastening:**
- = execution with feet
B = fastening angle (only with DGFK 01)
- clogging indicator :**
- = without clogging indicator
OE = clogging indicator, visual-electrical see sheet-no. 1614
DM = differential pressure gauge
DKM = differential pressure gauge with contact

2. Dimensions: inch

type	conn. ANSI	Q=cc/ft/ hr	A	B	C	D	E	F	G	H	J	K	L	M	N	weight lbs.	volume tank gal.
DGFK 01	2"	885	31.33	29.13	4.72	12.00	28.35	12.99	11.02	7.68	5.35	16.53	2.76	11.41	.71	330	2x 2.70
	2 1/2"	1235	32.36	31.70		10.75	30.91	13.66			6.06						2x 3.80
	3"	1950	33.93			11.22	15.75	6.57			2x 4.20						
DGFK 02	2"	885	34.50	40.16	6.69	20.27	39.17	12.99	15.95	10.82	5.35	21.65	2.76	14.96	.71	374	2x 10.5
	2 1/2"	1235	35.51			19.61		13.66			6.06						
	3"	1950	37.09			17.52		15.75			6.57						
	4"	3200	38.74			16.69		16.58			7.59						
	5"	3900	40.63			15.71		17.56			8.81						
DGFK 04	3"	1950	37.09	61.22	6.69	36.93	60.24	15.75	15.95	10.82	6.57	41.34	2.76	14.96	.71	484	2x 18.5
	4"	3200	38.74			36.10		16.58			7.59						
	5"	3900	40.63			35.12		17.56			8.81						
	6"	6800	42.60			33.31		19.37			9.56						
	5"	3900	47.32			53.15		24.37			51.77						17.56
DGFK 06	6"	6800	48.50	22.56	19.37	9.56											
	8"	10000	53.15	53.94	7.09	21.34	52.56	21.38	22.83	15.98	11.45	28.35	3.54	21.65	.87	880	2x 34.0
	10"	15000	57.48	57.09	20.35	55.71	24.33	13.22	2x 36.0								
DGFK 07	12"	22200	69.29	71.06	6.57	26.14	69.88	31.92		28.14	20.00	13.14	41.33	3.54	25.59	.87	2100

1.2. Strainer basket: (ordering example)

Gr04. 0.50G. VA

1	2	3
---	---	---

- size of strainer basket:** Gr 01, Gr 02, Gr 04, Gr 06
- filter-fineness and filter-material:**
0,25 G = .0098 inch, 0,50 G = .0196 inch, 0,75 G = .0295 inch,
1,00 G = .0393 inch, 1,50 G = .0590 inch stainless steel wire mesh
- strainer basket material:**
VA = stainless steel

3. Spare parts:

item	qty.	designation	dimension and article-no.				
			DGFK 01	DGFK 02	DGFK 04	DGFK 06	DGFK 07
1	2	strainer basket	Gr 01	Gr 02	Gr 04	Gr 06	Gr 07
2	4	stop flap ¹⁾	2" - 3" ANSI	2" - 5" ANSI	3" - 6" ANSI	5" - 10" ANSI	12" ANSI
3	2	O-ring	190 x 5 305432 (NBR) 310283 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)		429 x 6 308659 (NBR) 310273 (FPM)	516 x 6 301962 (NBR) 311474 (FPM)
4	6	screw plug	½ BSPP 309730	1 BSPP 309732			
5	6	gasket	A 22 x 27 305564	A 33 x 39 308257			
6	2	spring	Da = 95 304414	pressure plate			
7	1	clogging indicator	OE, DM or DKM				
8	2	screw plug	¼ BSPP 309734				
9	2	gasket	A 14 x 18 306330				

¹⁾ dimension of stop flap = connection size

4. Description:

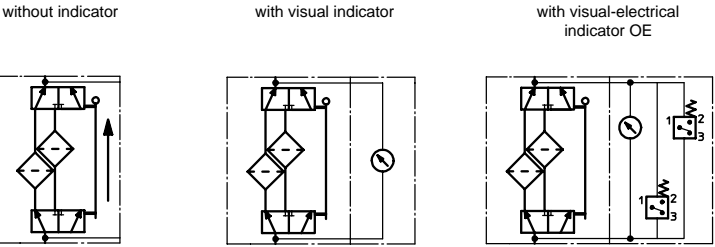
Duplex filters of the series DGFK 01-07 are suitable for a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient margin of safety. Four mechanically connected change-over flaps enabling the change-over without service-interruption from the clean to the dirty filter-side. The filters can be installed as suction filter, pressure filter or return-line filter. The filter elements are filter baskets with steel wire mesh as filter material. The perforated centre tube is layed out with steel wire mesh. The flow direction is from outside to the inside. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

5. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	333 PSI
connection system:	ANSI-flange 300 PSI
housing material:	C-steel or stainless steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	1/4 BSPP for screw coupling (mini-measuring)

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3. Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

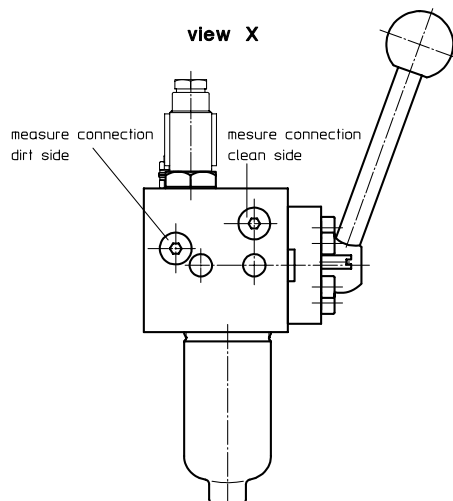
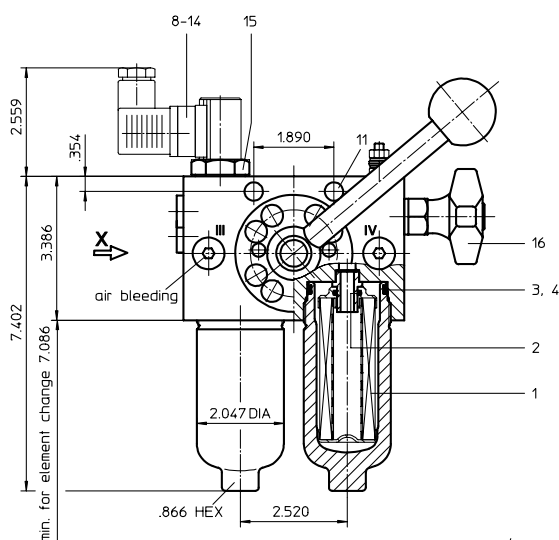
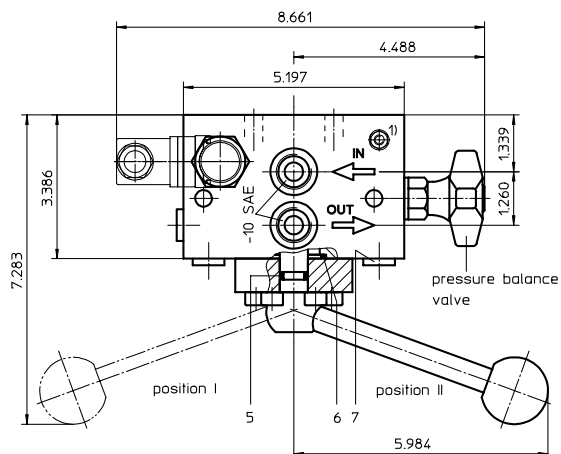


7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

PRESSURE FILTER, change-over

Series HDD 30 4568 PSI

Sheet No.
2510 G



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection III and IV to be used to bleed filter or to relieve pressure

1) connection for the potential equalisation, only for the application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HDD.30.10VG.HR.E.P.-.UG.3A.-.AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

1 series:

HDD = pressure filter, change-over

2 nominal size: 30

3 filter-material and filter-fineness:

25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI

HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification:

- = standard

VA = stainless steel

8 connection:

UG = thread connection

9 connection size:

3A = -10 SAE

10 filter housing specification:

- = standard

11 clogging indicator or clogging sensor :

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 30

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650

weight: 17.6 lbs.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01E.30 ...		
2	2	O-ring	12,37 x 2,62	304356 (NBR)	304396 (FPM)
3	2	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
4	2	support ring	48 x 2,6 x 1	305391	
5	2	O-ring	10 x 3	307285 (NBR)	311019 (FPM)
6	2	O-ring	32 x 3	304368 (NBR)	- (FPM)
7	4	screw plug	¼ BSPP	305003	
8	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	1	screw plug	20913-4	309817	
16	1	pressure balance valve			

item 15 execution only without clogging indicator or clogging sensor

4. Description:

Duplex pressure filters with change-over valve type HDD are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve has to be closed again. The closed filter-side has to be air-bled by vent III respectively by vent IV. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 2320 PSI and a rupture strength up to Δp 3625 PSI.

5. Technical data:

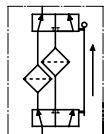
temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	5945 PSI
connection system:	thread connection
housing material:	EN-GJS-400-18-LT, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connection:	BSPP ¼
volume tank:	2x .02 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

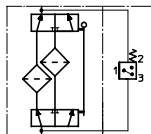
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

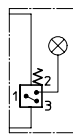
without indicator



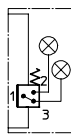
with electrical indicator
AE 30 and AE 40



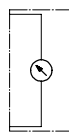
with visual-electrical indicator
AE 50 and AE 62



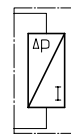
with visual-electrical indicator
AE 70 and AE 80



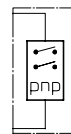
with visual indicator
AOR/AOC



with electronical clogging sensor
VS1



with electronical clogging sensor
VS1



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

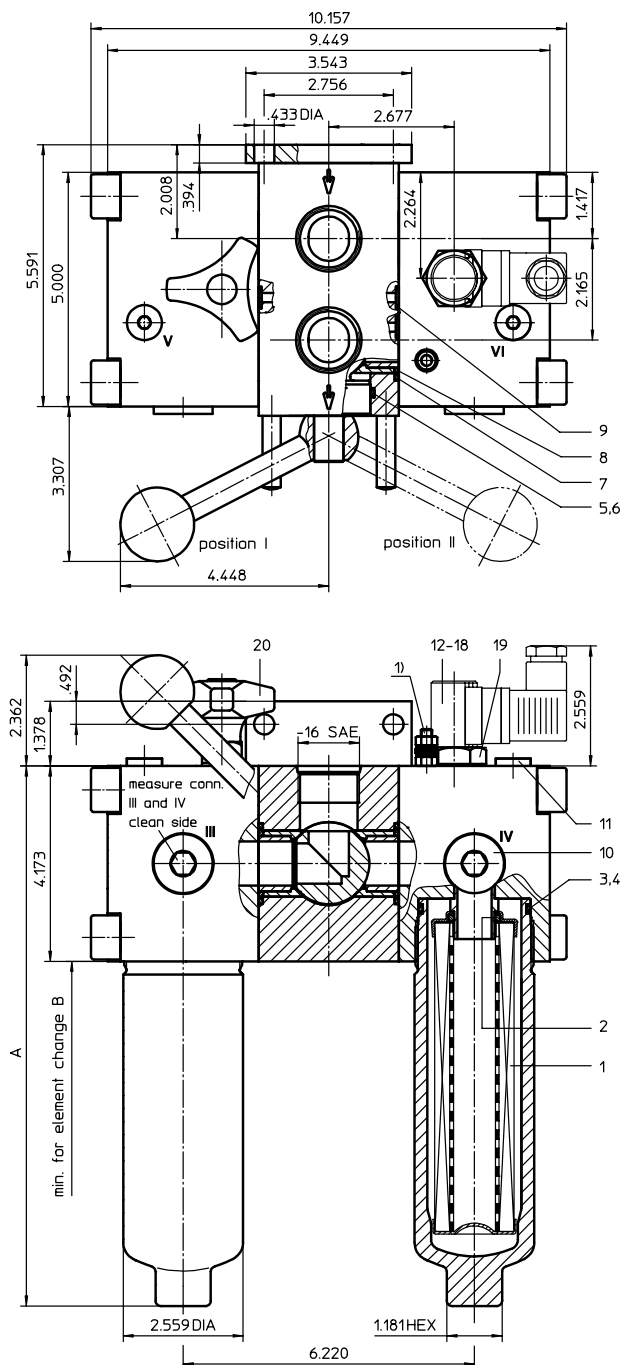
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over Series HDD 61 - 151 4568 PSI

Sheet No.
2517 D



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection V and VI to be used to bleed filter or to relieve pressure

1) connection for the potential equalisation, only for the application in the explosive area.

3. Dimensions: inch

type	connection	A	B	weight lbs.	volume tank
HDD 61	-16 SAE	8.97	10.82	53	2x .08 Gal.
HDD 91		11.53	13.38	55	2x .10 Gal.
HDD 151		15.82	17.71	59	2x .16 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HDD.91.10VG.HR.E.P.-.UG.5.-.-.AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HDD = pressure filter, change-over

2 nominal size:

61, 91, 151

3 filter-material and filter-fineness:

25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

UG = thread connection

9 connection size:

5 = -16 SAE

10 filter housing specification:(see catalog)

- = standard

IS06 = see sheet-no. 31605

11 internal valve:

- = without

S1 = with by-pass valve Δp 51 PSI

S2 = with by-pass valve Δp 102 PSI

R = reversing valve, Q \leq 18.50 GPM

12 clogging indicator or clogging sensor :

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.90.10VG.HR.E.P.-

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size:

60, 90, 150

3 - 7

see type index-complete filter

2. Accessories:

- measure- and bleeder connection see, sheet-no. 1650

Changes of measures and design are subject to alteration!

4. Spare parts:

item	qty.	designation	dimension			article-no.	
			HDD 61	HDD 91	HDD 151		
1	2	filter element	01E.60	01E.90	01E.150		
2	2	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	2	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	2	support ring		61 x 2,6 x 1		304660	
5	3	O-ring		45 x 3		304991 (NBR)	304997 (FPM)
6	2	support ring		49,7 x 2,4 x 1		317709	
7	4	O-ring		38 x 3		304340 (NBR)	317013 (FPM)
8	4	O-ring		28 x 3		316778 (NBR)	- (FPM)
9	4	O-ring		8 x 2		310004 (NBR)	316530 (FPM)
10	2	screw plug		¼ BSPP		308529	
11	2	screw plug		¼ BSPP		305003	
12	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
13	1	clogging indicator, visual-electrical		AE		see sheet-no. 1615	
14	1	clogging sensor, electrical		VS1		see sheet-no. 1617	
15	1	clogging sensor, electrical		VS2		see sheet-no. 1618	
16	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
17	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
18	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
19	1	screw plug		20913-4		309817	
20	1	pressure balance valve					

item 19 execution only without clogging indicator or clogging sensor

5. Description:

Duplex pressure filters with change-over valve type HDD are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve is to be closed again. The closed filter-side has to be air-bled by vent V respectively by vent VI. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 2320 PSI and a rupture strength up to Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

4568 PSI

test pressure:

5945 PSI

connection system:

thread connection

housing material:

C-steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

air bleeding and mini-measuring connections dirt side:

¼ BSPP

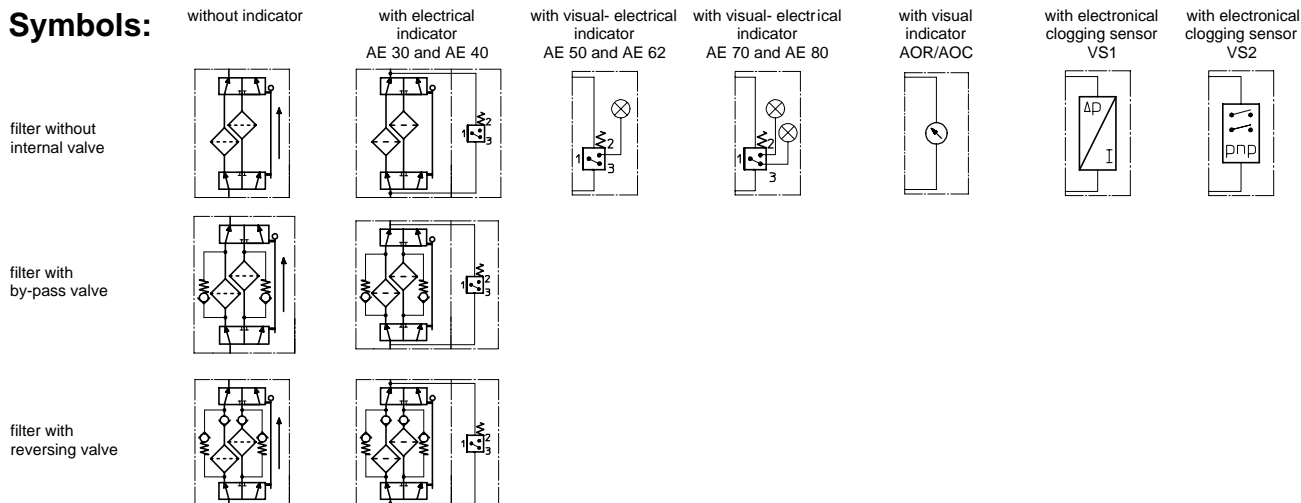
measuring connections clean side:

¼ BSPP

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

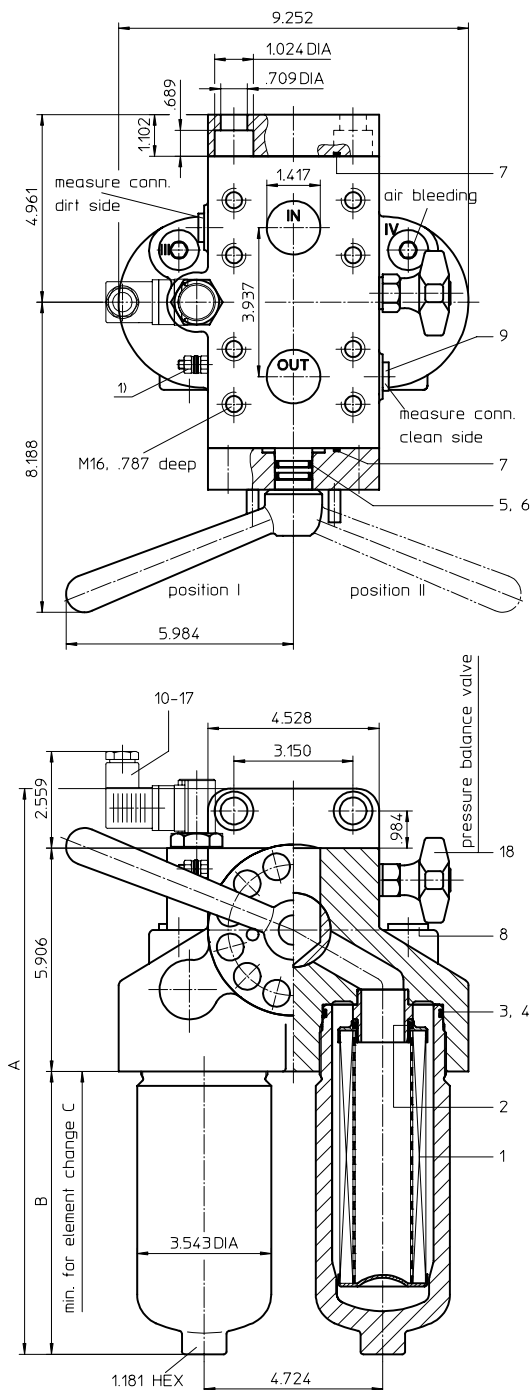
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over

Series HDD 170 - 450 4568 PSI

Sheet No.
2514 N



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection III and IV to be used to bleed filter or to relieve pressure

1) connection for the potential equalisation, only for the application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HDD. 170. 10VG. HR. E. P. -. FS. 7. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HDD = pressure filter, change-over

2 nominal size: 170, 240, 360, 450

3 filter-material and filter-fineness:

25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI

HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification:

- = standard

VA = stainless steel

8 connection:

FS = SAE-flange connection 6000 PSI

9 connection size:

7 = 1 1/2"

10 filter housing specification:

- = standard

11 internal valve:

- = without

S1 = with by-pass valve Δp 51 PSI

S2 = with by-pass valve Δp 102 PSI

R = reversing valve, Q \leq 55.75 GPM

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electrical, see sheet-no. 1617

VS2 = electrical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 170. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650

3. Dimensions: inch

type	connection	A	B	C	weight lbs.	volume tank
HDD 170	SAE 1 1/2"	14.96	7.48	13.78	86	2x .18 Gal.
HDD 240		16.93	9.45	15.75	90	2x .23 Gal.
HDD 360		20.08	12.60	18.90	99	2x .31 Gal.
HDD 450		24.21	16.73	23.03	110	2x .42 Gal.

Changes of measures and design are subject to alteration!

4. Spare parts:

item	qty.	designation	dimension				article-no.	
			HDD 170	HDD 240	HDD 360	HDD 450		
1	2	filter element	01E. 170	01E. 240	01E. 360	01E. 450		
2	2	O-ring		34 x 3,5			304338 (NBR)	304730 (FPM)
3	2	O-ring		75 x 3			302215 (NBR)	304729 (FPM)
4	2	support ring		81 x 2,6 x 1			304581	
5	2	O-ring		18 x 3			304359 (NBR)	304399 (FPM)
6	2	support ring		25 x 2,5 x 0,5			311311	
7	2	O-ring		56 x 3			305072 (NBR)	305322 (FPM)
8	2	screw plug		½ BSPP			304678	
9	2	screw plug		¼ BSPP			305003	
10	1	clogging indicator visual		AOR or AOC			see sheet-no. 1606	
11	1	clogging indicator visual-electrical		AE			see sheet-no. 1615	
12	1	clogging sensor electronical		VS 1			see sheet-no. 1617	
13	1	clogging sensor electronical		VS 2			see sheet-no. 1618	
14	1	O-ring		15 x 1,5			315357 (NBR)	315427 (FPM)
15	1	O-ring		22 x 2			304708 (NBR)	304721 (FPM)
16	1	O-ring		14 x 2			304342 (NBR)	304722 (FPM)
17	1	screw plug		20913-4			309817	
18	1	pressure balance valve						

item 17 execution only without clogging indicator or clogging sensor

5. Description:

Duplex pressure filters with change-over valve type HDD are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve is to be closed again. The closed filter-side has to be air-bled by vent III respectively by vent IV. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 2320 PSI and a rupture strength up to Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

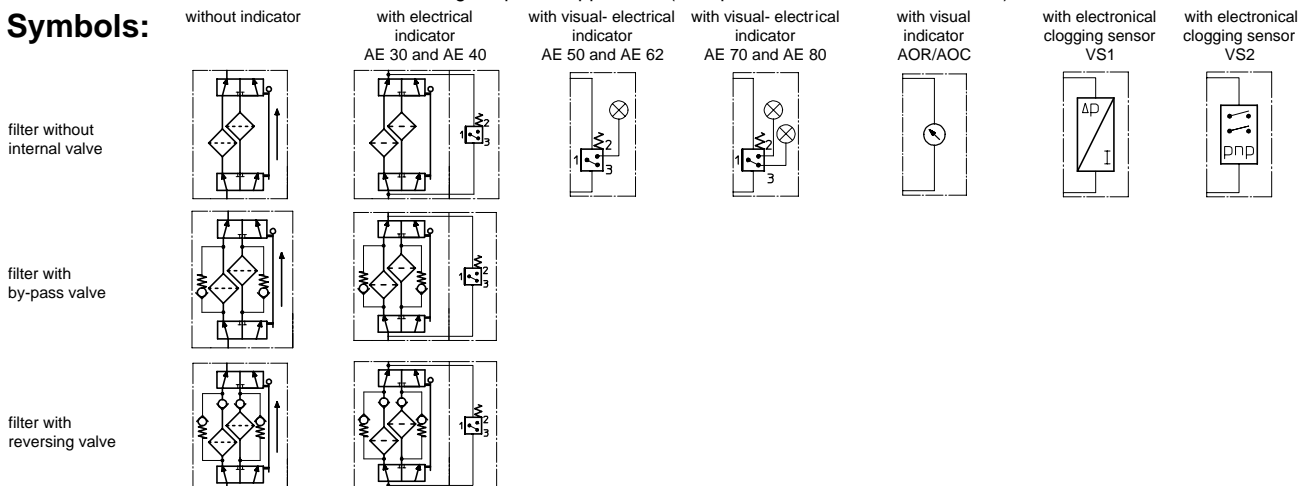
6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	5945 PSI
connection system:	SAE-flange connection 6000 PSI
housing material:	EN-GJS-400-18-LT, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	BSPP ¼
air bleeding connections:	BSPP ½

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

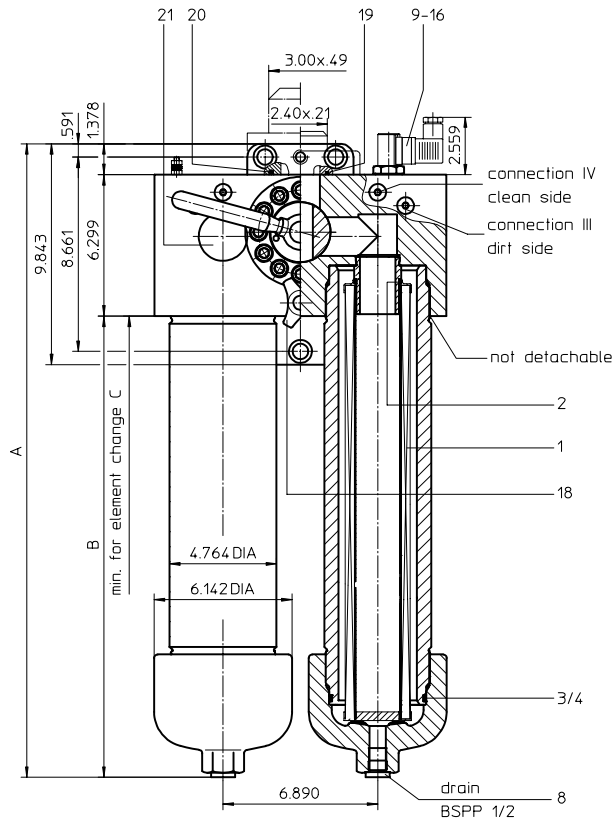
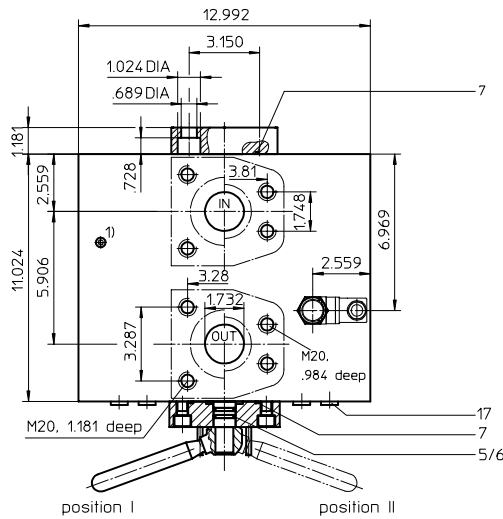
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over

Series HDD 601- 1351 4568 PSI

Sheet No.
2525 K



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation
1) connection for the potential equalisation, only for the application in the explosive area

connection III and IV to be used to bleed filter or to relieve pressure

3. Dimensions: inch

type	connection	A	B	C	weight lbs.	volume tank
HDD 601	2"	22.32	14.65	31.10	315	2x .55 Gal.
HDD 901	2"	28.22	20.55	37.00	330	2x .82 Gal.
HDD 1351	2"	37.99	30.30	56.70	356	2x 1.21 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HDD. 901. 10VG. HR. E. P. -. FS. 8. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HDD = pressure filter, change-over

2 nominal size: 601, 901, 1351

3 filter-material and filter-fineness:

25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI

HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification:

- = standard

VA = stainless steel

8 connection:

FS = SAE-flange connection 6000 PSI (standard)

FV = AVIT-flange connection 4640 PSI (special design)

9 connection size:

8 = 2"

10 filter housing specification:

- = standard

11 internal valve:

- = without

S1 = with by-pass valve Δp 51 PSI

S2 = with by-pass valve Δp 102 PSI

R = reversing valve, $Q \leq 122.94$ GPM

12 clogging indicator or clogging sensor :

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electrical, see sheet-no. 1617

VS2 = electrical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 600, 900, 1350

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- SAE-counter flange, see sheet-no. 1652
- AVIT-counter flange, see sheet-no. 1654

4. Spare parts:

item	qty.	designation	dimension			article-no.	
			HDD 601	HDD 901	HDD 1351		
1	2	filter element	01E.600	01E.900	01E.1350		
2	2	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	2	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	2	support ring		110 x 3,5 x 2			304802
5	2	O-ring		18 x 3		304359 (NBR)	304399 (FPM)
6	2	support ring		25 x 2,5 x 0,5			311311
7	2	O-ring		71 x 3		306451 (NBR)	306897 (FPM)
8	2	screw plug		½ BSPP			304678
9	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
10	1	clogging indicator, visual-electrical		AE		see sheet no. 1615	
11	1	clogging sensor, electronical		VS1		see sheet no. 1617	
12	1	clogging sensor, electronical		VS2		see sheet no. 1618	
13	1	O-ring		15 x 1,5		315457 (NBR)	315427 (FPM)
14	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
15	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
16	1	screw plug		20913-4			309817
17	4	screw plug		¼ BSPP			305003
18	1	pressure balance valve		nominal size 10			305000
19	1	O-ring (only with counter flange SAE)		56,75 x 3,53		306035 (NBR)	310264 (FPM)
20	1	O-ring (only with counter flange AVIT)		61 x 5			
21	8	screw plug		1½ BSPP			311475

5. Description:

Duplex pressure filters with change-over valve type HDD are suitable for a working pressure up to 4568 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety. Duplex filters can be maintained without interruption. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a reduction of area.

The change-over can be done easily by opening of the change-over valve. The mini-measuring connections on each filter-side allow the measuring of the pressure drop through the filter element, as well as at the pressure discharge of the tube plug during the maintenance.

Filter elements are available down to a filter fineness of 4 µm^(c).

INTERNORMEN-Filter elements consist of filter materials with a high intrinsic stability, an excellent particle retention, respectively a high dirt holding capacity and provide a long service life.

INTERNORMEN-Filters can be used for mineral oil based fluids, HW-emulsions, water glycols, most synthetic hydraulic fluids and lubrication fluids.

The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

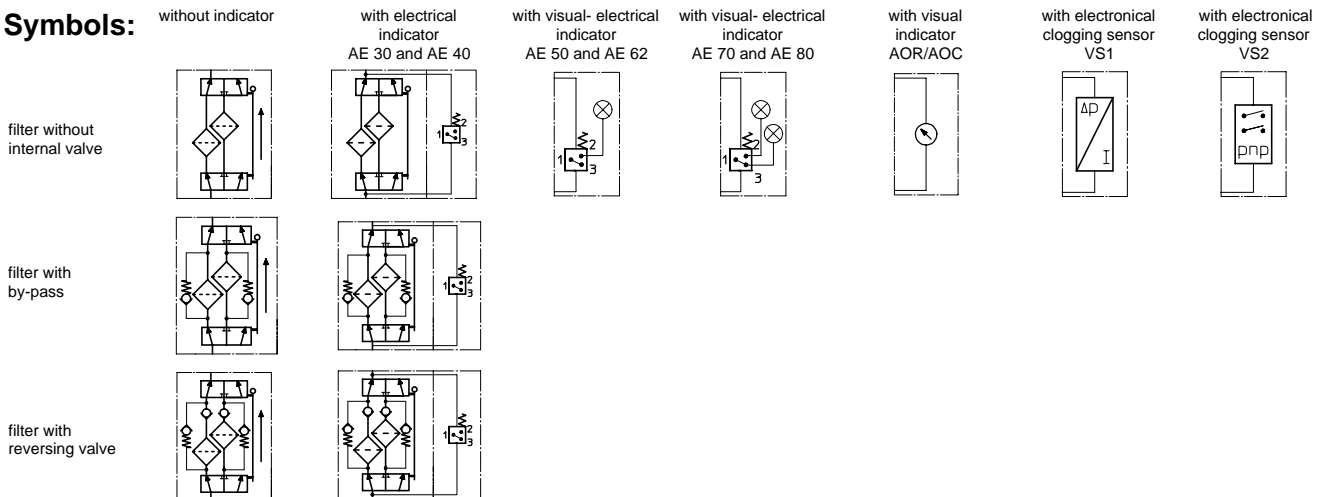
6. Technical Data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	5945 PSI
connection system:	SAE-flange 6000 PSI (standard) AVIT-flange 4640 PSI (special design)
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connection:	BSPP ¼

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

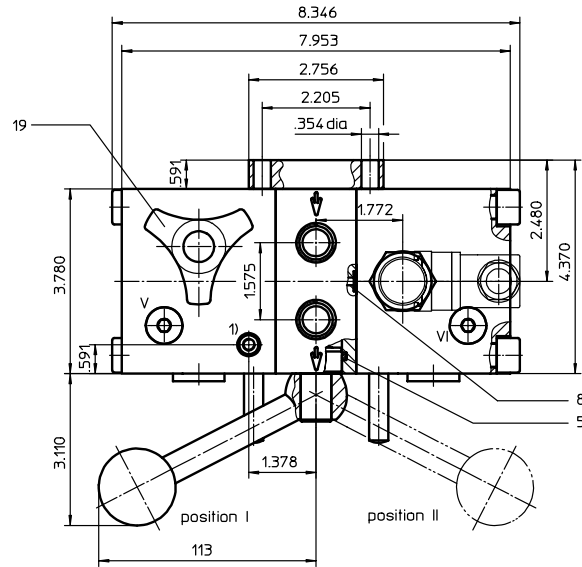
Filter elements are tested according to the following ISO standards:

ISO 2942	Verification of fabrication integrity
ISO 2941	Verification of collapse/burst resistance
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

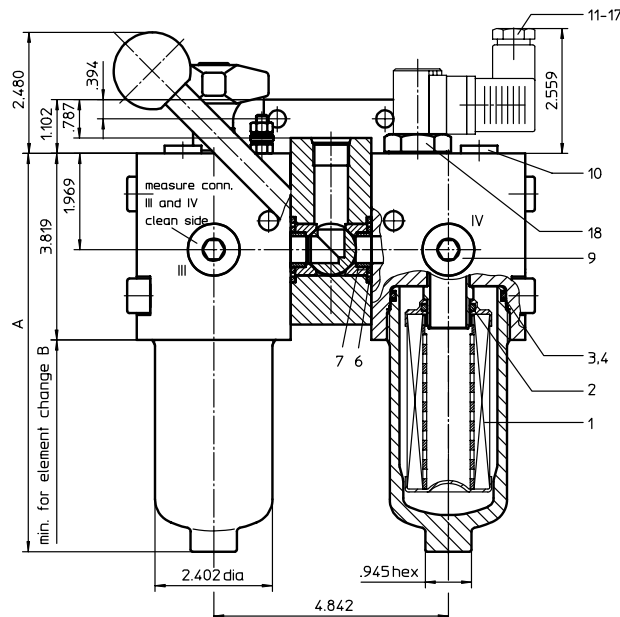
PRESSURE FILTER, change-over

Series MDD 40 - 63 2900 PSI

Sheet No.
2516 D



1) connection for the potential equalisation,
only for application in the explosive area.



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection V and VI to be used to bleed filter
or to relieve pressure

3. Dimensions: inch

type	connection	A	B	weight lbs.	volume tank
MDD 40	-8 SAE	8.15	11.22	34	2x .06 Gal.
MDD 63	-12 SAE	10.51	13.58	36	2x .09 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

MDD.40.10VG.HR. E. P. -. UG. 3. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

MDD = medium pressure filter, change-over

2 nominal size: 40, 63

3 filter-material and filter-fineness:

25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

UG = thread connection

9 connection size:

3 = -8 SAE (MDD 40)

4 = -12 SAE (MDD 63)

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

IS12 = see sheet-no. 41028

11 internal valve:

- = without

S1 = with by-pass valve Δp 51 PSI

S2 = with by-pass valve Δp 102 PSI

R = reversing valve, $Q \leq 18.50$ GPM

12 clogging indicator or clogging sensor :

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL. 40.10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NL. = standard filter element according to DIN 24550, T3

2 nominal size: 40, 63

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650

Changes of measures and design are subject to alteration!

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			MDD 40	MDD 63		
1	2	filter element	01NL.40	01NL.63		
2	2	O-ring		22 x 3,5	304341 (NBR)	304392 (FPM)
3	2	O-ring		54 x 3	304657 (NBR)	304720 (FPM)
4	2	support ring		60 x 2,6 x 1	311779	
5	3	O-ring		26 x 3	304379 (NBR)	318576 (FPM)
6	4	O-ring		28 x 3	316778 (NBR)	318366 (FPM)
7	4	O-ring		18 x 3	304359 (NBR)	304399 (FPM)
8	4	O-ring		6,5 x 2	313553 (NBR)	318577 (FPM)
9	2	screw plug		½ BSPP	304678	
10	2	screw plug		¼ BSPP	305003	
11	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
12	1	clogging indicator, visual-electrical	AE		see sheet-no. 1615	
13	1	clogging sensor, electronical	VS1		see sheet-no. 1617	
14	1	clogging sensor, electronical	VS2		see sheet-no. 1618	
15	1	O-ring		15 x 1,5	315357 (NBR)	315427 (FPM)
16	1	O-ring		22 x 2	304708 (NBR)	304721 (FPM)
17	1	O-ring		14 x 2	304342 (NBR)	304722 (FPM)
18	1	screw plug		20913-4	309817	
19	1	pressure balance valve				

item 18 execution only without clogging indicator or clogging sensor

5. Description:

Duplex pressure filters with change-over valve type MDD are suitable for a working pressure up to 2900 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve has to be closed again. The closed filter-side has to be air-bled by vent V respectively by vent VI. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 2320 PSI and a rupture strength up to Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

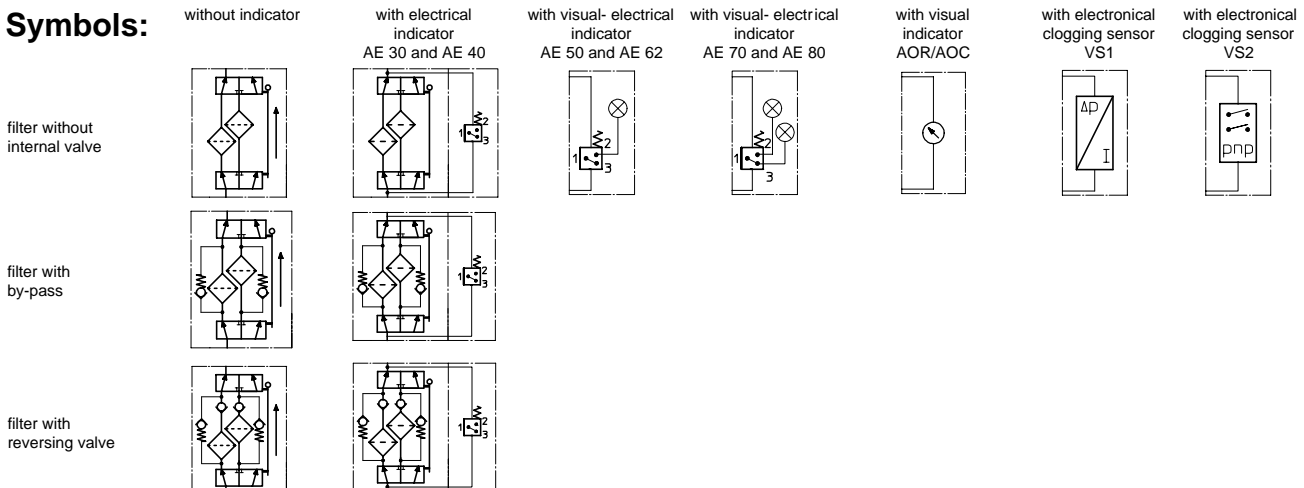
6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	2900 PSI
test pressure:	3770 PSI
connection system:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connections dirt side:	¼ BSPP
measuring connections clean side:	½ BSPP

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

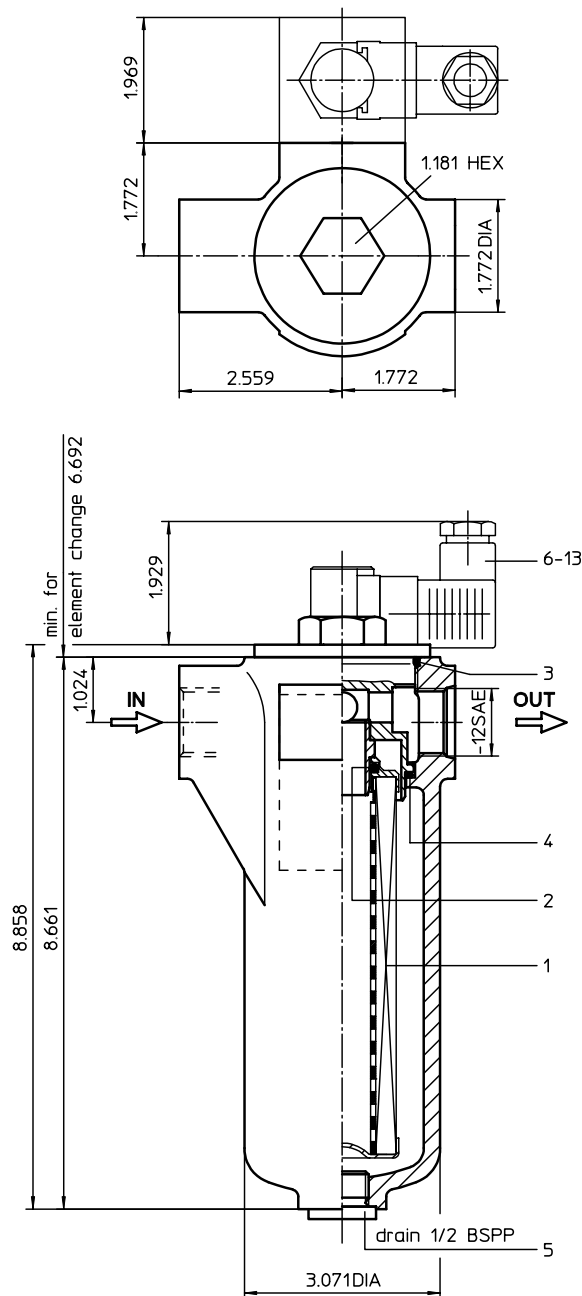
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series LF 63 363 PSI

Sheet No.
1109 G



1. Type index:

1.1. Complete filter: (ordering example)

LF. 63. 10VG. 30. E. P. -. UG. 4. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

LF = in-line filter

2 nominal size: 63

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m

stainless steel wire mesh

25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),

6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δ p 435 PSI

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

IS07 = see sheet-no. 31602

8 connection:

UG = thread connection

9 connection size:

4 = -12 SAE

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

11 internal valve

- = without

S1 = with by-pass valve Δ p 51 PSI

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL. 63. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NL. = standard filter element according to DIN 24550, T3

2 nominal size: 63

3 - 7 see type index-complete filter

weight: 4.40 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NL 63		
2	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
3	1	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
4	1	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
5	1	screw plug	1/2 BSPP	304678	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electrical	VS1	see sheet-no. 1617	
9	1	clogging sensor, electrical	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
13	2	screw plug	1/8 BSPP	305496	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

In-line filters of the type LF 63 are suitable for a working pressure up to 363 PSI.

Pressure peaks are absorbed with a sufficient margin of safety.

The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

The particles are held back on the outside. For cleaning (see special leaflet 21070-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated in the filter cover.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

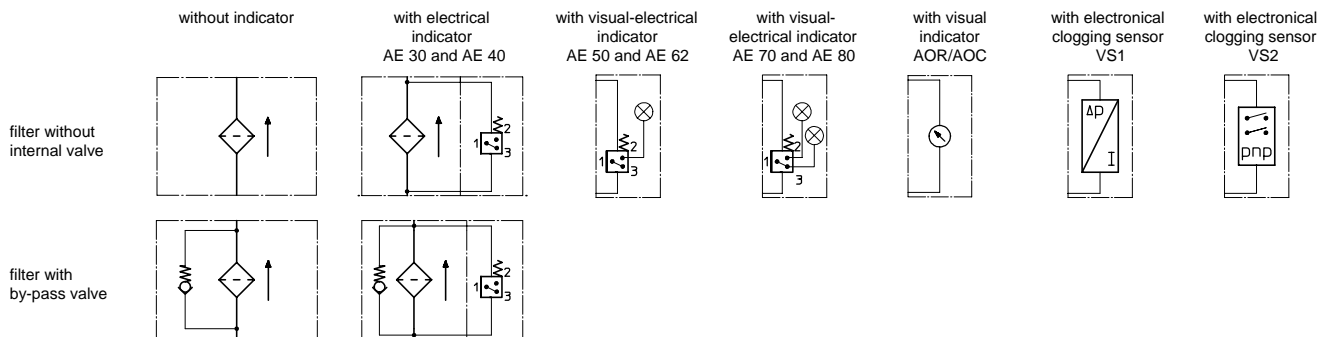
4. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	363 PSI
test pressure:	479 PSI
connection system:	thread connection
housing material:	aluminium-cast
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	1/4 BSPP
evacuation-or bleeder-connection:	1/2 BSPP
volume tank:	.18 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

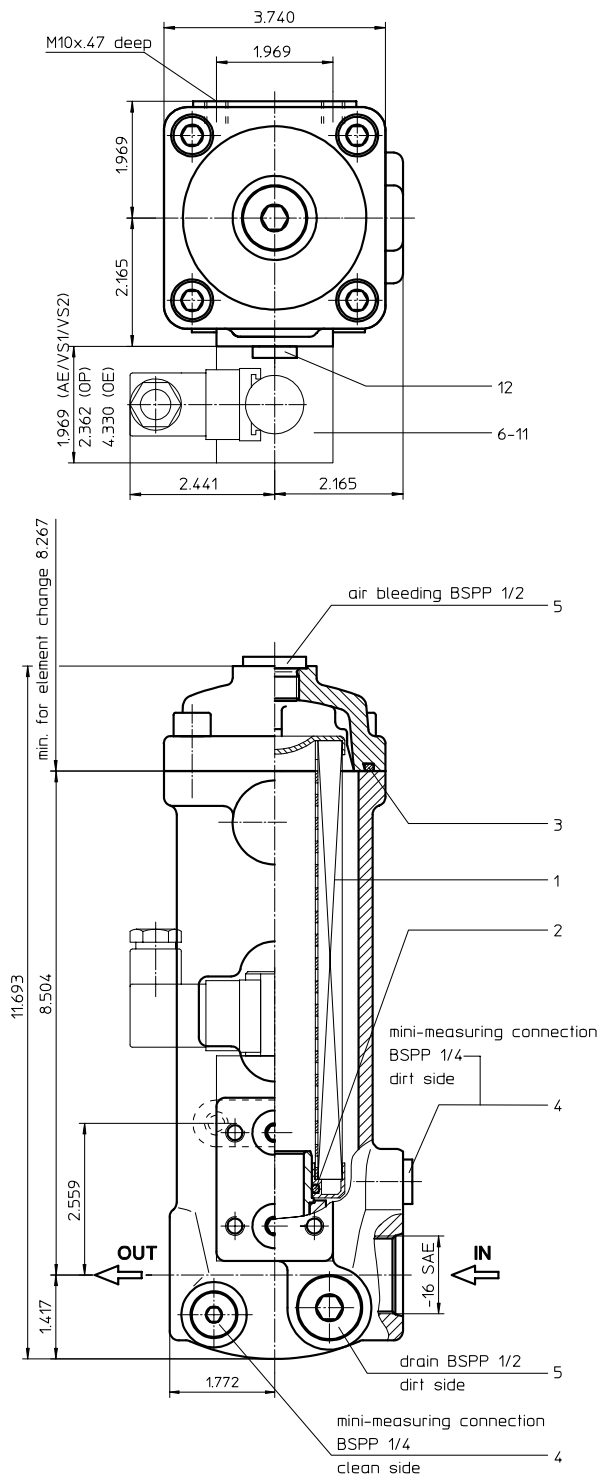
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series LF 101 464 PSI

Sheet No.
1125 B



1. Type index:

1.1. Complete filter: (ordering example)

LF. 101. 10VG. 16. E. P. -. UG. 5. -. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
LF = in-line filter
- 2 **nominal size:** 101
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
16 = Δp 232 PSI
- 5 **filter element design:**
E = single-end open
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
5 = -16 SAE
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01N. 100. 10VG. 16. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01N. = filter element according to
INTERNORMEN factory specification
- 2 **nominal size:** 100
- 3 - 7 see type index-complete filter

weight: 8.0 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01N. 100		
2	1	O-ring	32 x 3,5	304378 (NBR)	304401 (FPM)
3	1	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
4	2	screw plug	BSPP ¼	305003	
5	2	screw plug	BSPP ½	304678	
6	1	clogging indicator, visual	OP	see sheet-no. 1628	
7	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
9	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
10	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
11	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	2	screw plug	BSPP ¼	305003	

item 12 execution only without clogging indicator or clogging sensor

3. Description:

In-line filters of the type LF 101 are suitable for a working pressure up to 464 PSI.

Pressure peaks are absorbed with a sufficient margin of safety.

The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

To clean (see special leaflets 21070-4 and 34448-4) and change respectively the filter element, the filter cover will be removed and the filter element can be taken out.

Filter finer than 40 µm should use throw-away elements made of Interpor fleece (glass fibre). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

4. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

464 PSI

test pressure:

900 PSI

connection system:

thread connection

housing material:

aluminium-cast

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

mini-measuring connection:

BSPP ¼

evacuation-or bleeder-connection:

BSPP ½

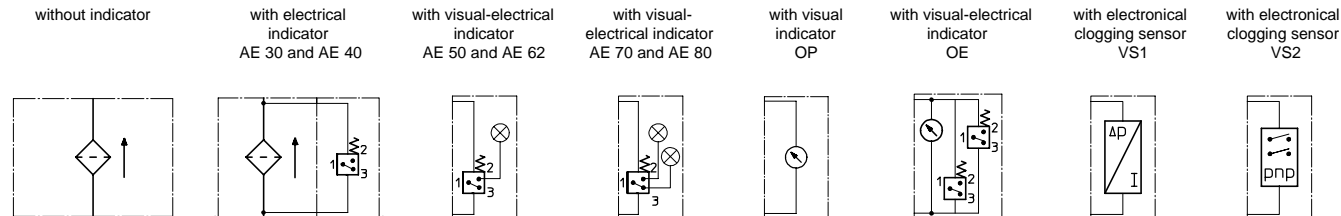
volume tank:

.26 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves ; depending on filter fineness and viscosity.

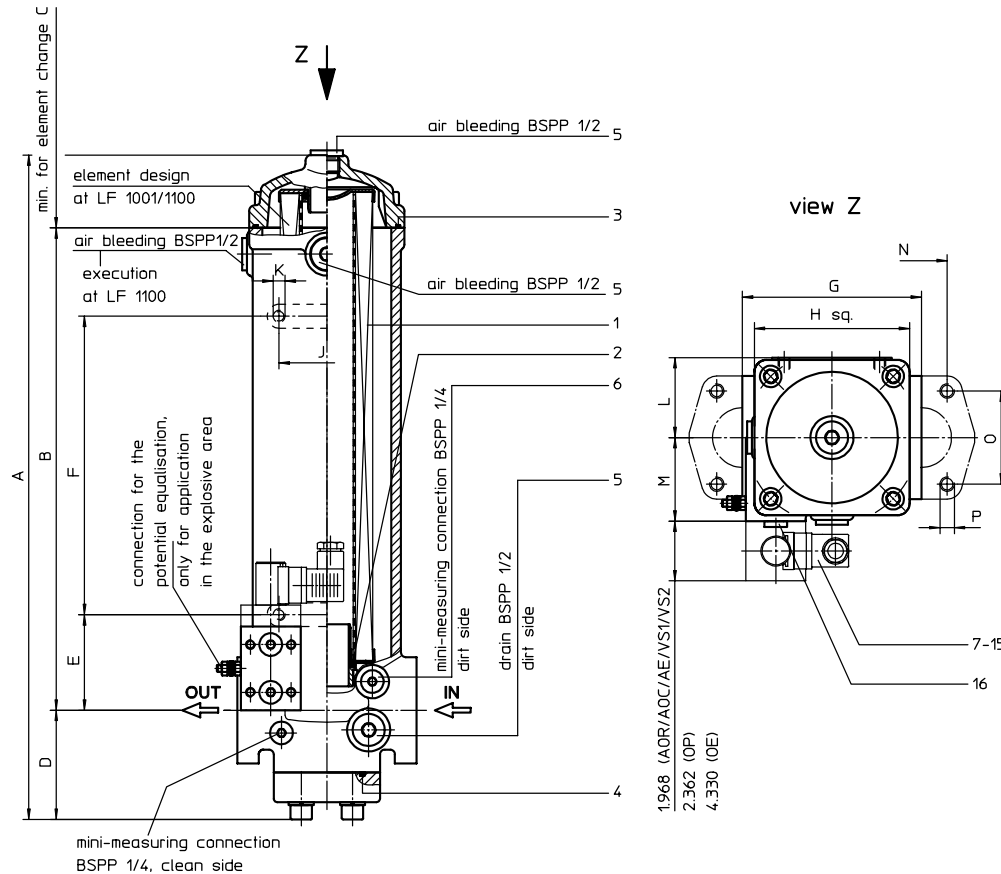
7. Test methods:

Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER **Series LF 251-1100 464 PSI**

Sheet No
1117 L



3. Dimensions: inch

type	LF 251	LF 401	LF 631	LF 1001	LF 1100
connection	SAE 1 1/2"	SAE 2"	SAE 2 1/2"	SAE 3"	SAE 5"
A	13.94	21.65	22.09	23.03	25.24
B	10.00	15.91	15.98	15.91	16.93
C	10.24	16.14	16.14	16.14	16.14
D	1.54	3.35	3.39	3.94	5.19
E	3.15	3.15	3.15	3.54	4.57
F	-	9.84	9.84	9.84	9.84
G	5.51	5.91	6.69	8.66	8.66
H	5.12	5.12	6.30	8.07	8.07
J	3.15	3.15	3.15	4.57	4.57
K	M10x.47 deep	M10x.47 deep	M12x.71 deep	M12x.71 deep	M12x.71 deep
L	2.64	2.64	3.23	4.17	4.17
M	2.83	2.76	3.39	4.17	4.17
N	1.40	1.68	2.00	2.44	3.62
O	2.75	3.06	3.50	4.19	6.00
P	M12x.74deep	M10x.74 deep	M12x.74 deep	M16x.94 deep	M16x.94 deep
weight lbs.	35	55	77	99	112
volume tank	.63 Gal	1.0 Gal	1.4 Gal	3.0 Gal	3.0 Gal

1. Type index:

1.1. Complete filter: (ordering example)

LF. 401. 10VG. 30. E. P. -. FS. 8. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
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- series:**
 LF = in-line filter
- nominal size:** 251, 401, 631, 1001, 1100
- filter-material and filter-fineness:**
 80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
 25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
 10 = Δp 145 PSI (01NR.) 30 = Δp 435 PSI (01NL.)
- filter element design:**
 E = single-end open S = with by-pass valve Δp 29 PSI
 B = both sides open (LF 1001/1100) S1 = with by-pass valve Δp 51 PSI
- sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM)
- filter element specification: (see catalog)**
 - = standard IS06 = see sheet-no. 31601
 VA = stainless steel IS07 = see sheet-no. 31602
- connection:**
 FS = SAE-flange connection 3000 PSI
- connection size:**
 7 = 1 1/2" (LF 251) 9 = 2 1/2" (LF 631) C = 5" (LF 1100)
 8 = 2" (LF 401) A = 3" (LF 1001)
- filter housing specification: (see catalog)**
 - = standard
 IS06 = see sheet-no. 31605
- internal valve:**
 - = without
 S = with by-pass valve Δp 29 PSI (LF 1001/1100)
 S1 = with by-pass valve Δp 51 PSI (LF 1001/1100)
- clogging indicator or clogging sensor:**
 - = without
 AOR = visual, see sheet-no. 1606
 AOC = visual, see sheet-no. 1606
 AE = visual-electrical, see sheet-no. 1609
 OP = visual, see sheet-no. 1628
 OE = visual-electrical, see sheet-no. 1628
 VS1 = electronic, see sheet-no. 1607
 VS2 = electronic, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 400. 10VG. 30. E. P. -

1	2	3	4	5	6	7
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- series:**
 01NL = standard filter element according to DIN 24550, T3
 01NR = standard return line filter element according to DIN 24550, T4
- nominal size:** 250, 400, 630 (01NL.), 1000 (01NR.)
- 7** see type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-connections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652

Changes of measures and design are subject to alteration!

4. Spare parts:

item	designation	qty.	dimension and article-no. LF 251	qty.	dimension and article-no. LF 401	qty.	dimension and article-no. LF 631	qty.	dimension and article-no. LF 1001/1100
1	filter element	1	01NL 250	1	01NL 400	1	01NL 630	1	01NR 1000
2	O-ring	1	40 x 3 304389 (NBR) 304391 (FPM)	1	40 x 3 304389 (NBR) 304391 (FPM)	1	60 x 3,5 304377 (NBR) 304398 (FPM)	1	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	1	115 x 3 303963 (NBR) 307762 (FPM)	1	115 x 3 303963 (NBR) 307762 (FPM)	1	125 x 3 306025 (NBR) 307358 (FPM)	1	185 x 4 305593 (NBR) 306309 (FPM)
4	O-ring (LF 401-1001)	-	-	1	56,75 x 3,53 306035 (NBR) 310264 (FPM)	1	69,45 x 3,53 305868 (NBR) 307357 (FPM)	1	85,32 x 3,53 305590 (NBR) 306308 (FPM)
	O-ring (LF 1100)	-	-	-	-	-	-	1	136,12 x 3,53 320162 (NBR) 320163 (FPM)
5	screw plug	3	BSPP ½ 304678	3	BSPP ½ 304678	3	BSPP ½ 304678	3	BSPP ½ 304678
6	screw plug	2	BSPP ¼ 305003						
7	clogging indicator, visual	1	AOR or AOC see sheet-no. 1606						
8	clogging indicator, visual	1	OP see sheet-no. 1628						
9	clogging indicator, visual-electrical	1	OE see sheet-no. 1628						
10	clogging indicator, visual-electrical	1	AE see sheet-no. 1609						
11	clogging sensor, electronical	1	VS1 see sheet-no. 1607						
12	clogging sensor, electronical	1	VS2 see sheet-no. 1608						
13	O-ring	1	15 x 1,5 315357 (NBR) 315427 (FPM)						
14	O-ring	1	22 x 2 304708 (NBR) 304721 (FPM)						
15	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)						
16	screw plug	2	BSPP ¼ 305003						

item 16 execution only without clogging indicator or clogging sensor

5. Description:

In-line filters of the type LF 251-1100 are suitable for a working pressure up to 464 PSI. Pressure peaks are absorbed with a sufficient margin of safety. The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning (see special leaflets 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as

5 µm_{ISO} microns are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils

Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:

operating medium:

max. operating pressure:

test pressure:

connection system:

housing material:

sealing material:

installation position:

mini-measuring connection:

evacuation-or bleeder-connection:

+14°F to +176°F (for a short time +212°F))

mineral oil, other media on request

464 PSI

900 PSI

SAE-flange connection 3000 PSI

EN-GJS-400-18-LT

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

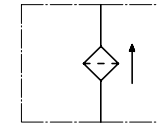
BSPP ¼

BSPP ¼

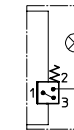
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

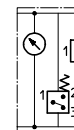
filter without
internal valve



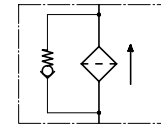
with visual -
electrical indicator
AE 50 and AE 62



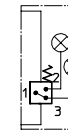
with visual -
electrical indicator
OE



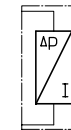
filter with
by-pass valve



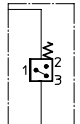
with visual -
electrical indicator
AE 70 and AE 80



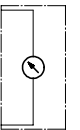
with electronical
clogging sensor
VS1



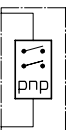
with electrical indicator
AE 30 and AE 40



with visual
indicator
AOR/AOC/OP



with electronical
clogging sensor
VS2



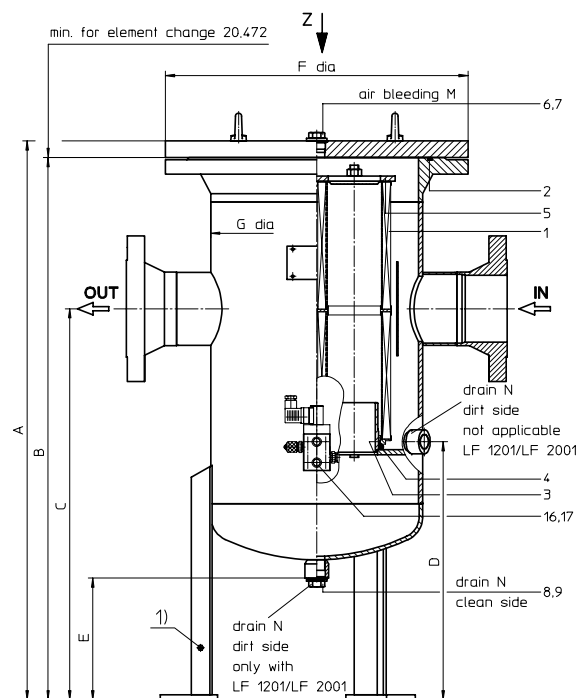
8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 293	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



1) connection for the potential equalisation, only for application in the explosive area

3. Dimensions: inch

type	conn. ANSI	A	B	C	D	E	F	G	H	J	K	L	M	N	weight lbs.	volume tank
LF 1201	2"	41.42	40.47	15.75	-	7.40	13.38	8.62	18.66	12.99	2.76	.71	1/2 BSPP	1 BSPP	132	6.8 Gal
	2 1/2"	42.20	41.22													7.1 Gal
	3"	41.42	40.47													6.8 Gal
	4"	44.40	43.46													7.6 Gal
LF 2001	2 1/2"	43.03	42.00	16.73	-	7.32	15.94	10.75	22.68	14.96	2.76	.71	1 BSPP	1 BSPP	242	11.5 Gal
	3"	43.77	42.75													11.7 Gal
	4"	43.30	42.28													11.5 Gal
	5"	46.77	45.74													12.6 Gal
LF 2401	2 1/2"	40.08	38.98	27.56	17.52	7.20	18.11	12.46	26.77	17.72	2.76	.71	1 BSPP	1 BSPP	286	14.5 Gal
	3"															
	4"															
	5"															
LF 3601	3"	42.20	40.94	29.53	19.49	9.37	22.83	15.98	28.74	21.65	3.54	.87	1 BSPP	1 BSPP	572	23.7 Gal
	4"															
	5"															
	6"															
LF 4801/6001	4"	43.94	42.52	31.50	21.06	9.13	28.15	20.00	35.04	25.95	3.54	.87	1 BSPP	1 BSPP	682	38.3 Gal
	5"															
	6"															
	8"															
LF 10001	5"	45.27	43.70	31.50	22.44	11.14	35.83	27.99	42.91	35.43	4.72	.87	1 1/2 BSPP	1 1/2 BSPP	1232	74.7 Gal
	6"															
	8"															
	10"															

PRESSURE FILTER

Series LF 1201-10001

232 PSI

Sheet No.

1118 J

1. Type index:

1.1. Complete filter: (ordering example)

LF. 2001. 10VG. 10. E. P. -. FA1. 9. -. AE

1	2	3	4	5	6	7	8	9	10	11
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1 series:

LF = in-line filter

2 nominal size: 1201, 2001, 2401, 3601, 4801, 6001, 10001

3 filter material and filter fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,

25 VG = 20 µm_(cl), 16 VG = 15 µm_(cl), 10 VG = 10 µm_(cl), 6 VG = 7 µm_(cl), 3 VG = 5 µm_(cl) Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass valve

S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR); V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

FA 1 = ANSI-flange connection 300 PSI,

sealing surface rough grind 1600-3600 µin

FA 2 = ANSI-flange connection 300 PSI,

sealing surface rough grind < 640µin

9 connection size:

connection	filter nominal size						
8 = 2"	1201						
9 = 2 1/2"	1201	2001	2401				
A = 3"	1201	2001	2401	3601			
B = 4"	1201	2001	2401	3601	4801	6001	
C = 5"		2001	2401	3601	4801	6001	10001
D = 6"				3601	4801	6001	10001
E = 8"					4801	6001	10001
F = 10"							10001

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

11 clogging indicator or clogging sensor:

- = without

AE = visual-electrical, see sheet-no.1609

OP = visual, see sheet-no.1628;

OE = visual-electrical, see sheet-no 1628;

VS1 = electronical, see sheet-no.1607

VS2 = electronical, see sheet-no.1608

1.2. Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 1201, 2001

3 - 7 see type index-complete filter

2. Accessories:

- measure-and bleeder -connection see sheet-no. 1650

- evacuation- and bleeder-connection see sheet-no. 1651

- counter flange, ANSI-flange 300 PSI

- lifting mechanism see sheet-no. 1661

Changes of measures and design are subject to alteration!

4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. LF 1201	dimension and article-no. LF 2001	qty.	dimension and article-no. LF 2401	qty.	dimension and article-no. LF 3601	qty.	dimension and article-no. 01E.1201	qty.	dimension and article-no. LF 4801	qty.	dimension and article-no. LF 6001	dimension and article-no. LF 10001
1	filter element	1	01E.1201	01E.2001	2	01E.1201	3	01E.1201	4	01E.1201	3	01E.2001	5	01E.2001	
2	O-ring	1	225 x 5 308652 (NBR) 311473 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)	1	330 x 5 303080 (NBR) 310275 (FPM)	1	429 x 6 308659 (NBR) 310273 (FPM)	1	516 x 6 301962 (NBR) 311474 (FPM)	1	516 x 6 301962 (NBR) 311474 (FPM)	1	722 x 8 308145 (NBR) 311805 (FPM)	
3	O-ring	1	93 x 5 307588 (NBR) 307589 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)	2	93 x 5 307588 (NBR) 307589 (FPM)	3	93 x 5 307588 (NBR) 307589 (FPM)	4	93 x 5 307588 (NBR) 307589 (FPM)	3	135 x 5 306016 (NBR) 307045 (FPM)	5	135 x 5 306016 (NBR) 307045 (FPM)	
4	O-ring	1	85 x 10 304386 (NBR) 304541 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)	2	85 x 10 304386 (NBR) 304541 (FPM)	3	85 x 10 304386 (NBR) 304541 (FPM)	4	85 x 10 304386 (NBR) 304541 (FPM)	3	125 x 10 304388 (NBR) 306006 (FPM)	5	125 x 10 304388 (NBR) 306006 (FPM)	
5	spring	1	304414		-	-	-	-	-	-	-	-	-	-	-
	pressure plate	-	-		1	309851	1	313116	1	314718	1	313335	1	313062	
6	screw plug	1	½ BSPP 309730	1 BSPP 309732	1	1 BSPP 309732				1	1 ½ BSPP 318556				
7	gasket	1	A 22 x 27 305564	A 33 x 39 308257	1	A 33 x 39 308257				1	A 48 x 55 309764				
8	screw plug	1	1 BSPP 309732	1 BSPP 309732	2	1 BSPP 309732				2	1 ½ BSPP 318556				
9	gasket	1	A 33 x 39 308257	A 33 x 39 308257	2	A 33 x 39 308257				2	A 48 x 55 309764				

4.2. Depending on the series:

item	qty.	designation	dimension	article-no.
10	1	clogging indicator, visual	OP	see sheet-no. 1628
11	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628
12	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
13	1	clogging sensor, electronical	VS1	see sheet-no. 1607
14	1	clogging sensor, electronical	VS2	see sheet-no. 1608
15	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
16	2	screw plug	½ BSPP	309734
17	2	gasket	A 14 x 18	306330

5. Description:

In-line filters of the series LF 1201-10001 are suitable for a working pressure up to 232 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

The filter is in-line mounted. Inlet and outlet are on the same level. The filters can be installed as suction-filter, pressure-filter or return-line filter.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. The particles are hold back on the outside. For cleaning (see special leaflet 21070-4 resp. 39448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubric ation oils.

Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	332 PSI
connection system:	ANSI-flange connection 300 PSI
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	½ BSPP

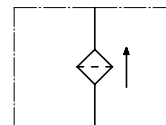
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

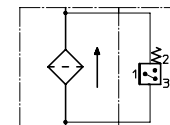
US 1118 J

7. Symbols:

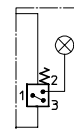
without indicator



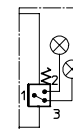
with electrical indicator
AE 30 and AE 40



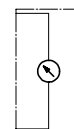
with visual -
electrical indicator
AE 50 and AE 62



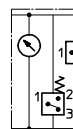
with visual -
electrical indicator
AE 70 and AE 80



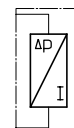
with visual
indicator
OP



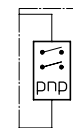
with visual -
electrical indicator
OE



with electronical
clogging sensor
VS1



with electronical
clogging sensor
VS2



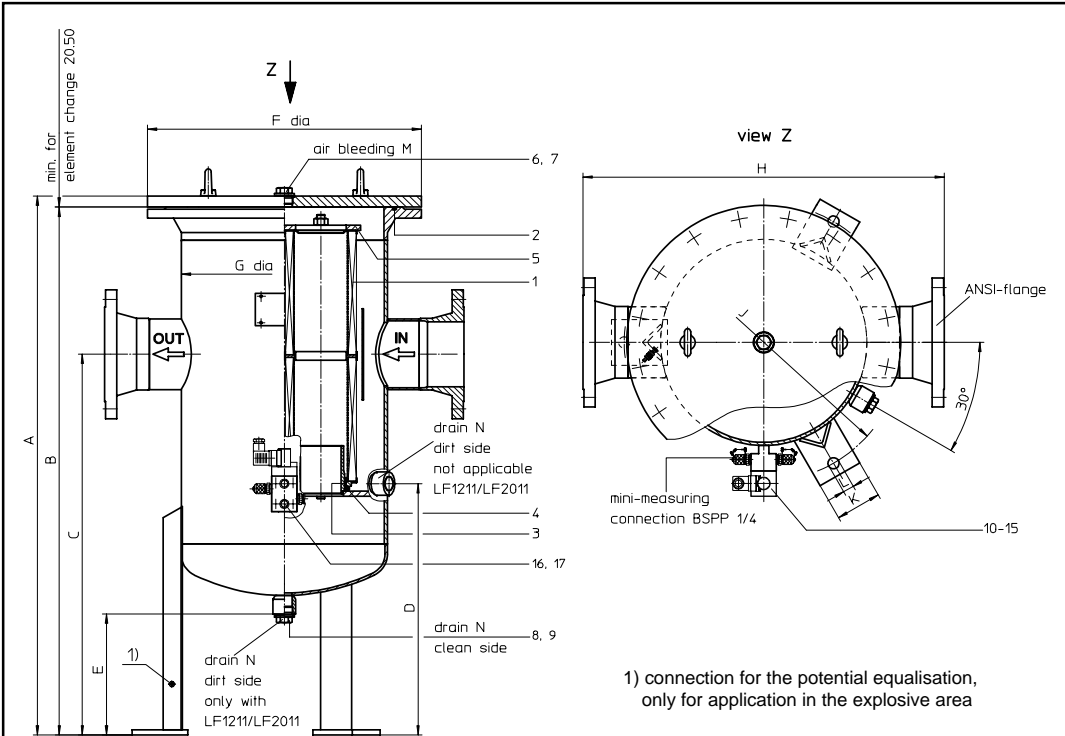
8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



1) connection for the potential equalisation, only for application in the explosive area

3. Dimensions: inch

type	conn. ANSI	A	B	C	D	E	F	G	H	J	K	L	M	N	weight lbs.	volume tank
LF 1211	2"	41.42	40.47	15.75	-	7.40	13.38	8.62	17.95	12.99	2.76	.71	1/2 BSPP	1 BSPP	132	6.8 Gal
	2 1/2"	42.20	41.22													7.1 Gal
	3"	41.42	40.47													6.8 Gal
	4"	44.40	43.46													7.6 Gal
LF 2011	2 1/2"	43.03	42.00	16.73	-	7.32	15.55	10.75	21.96	14.96	2.76	.71	1 BSPP	1 BSPP	242	11.5 Gal
	3"	43.77	42.75													11.7 Gal
	4"	43.30	42.28													11.5 Gal
	5"	46.77	45.74													12.6 Gal
LF 2411	2 1/2"	40.00	38.98	27.56	17.52	7.20	17.51	12.46	25.98	17.72	2.76	.71	1 BSPP	1 BSPP	286	14.5 Gal
	3"															
	4"															
LF 3611	3"	41.96	40.94	29.53	19.49	9.37	22.24	15.98	28.03	21.65	3.54	.87	1 BSPP	1 BSPP	572	23.7 Gal
	4"															
	5"															
LF 4811/6011	4"	43.62	42.52	31.50	21.06	9.13	26.37	20.00	34.48	25.95	3.54	.87	1 BSPP	1 BSPP	682	38.3 Gal
	5"															
	6"															
LF 10011	5"	45.11	43.70	31.50	22.44	11.14	35.23	27.99	41.73	35.43	4.72	.87	1 1/2 BSPP	1 1/2 BSPP	1232	74.7 Gal
	6"															
	8"															
	5"	45.11	43.70	31.50	22.44	11.14	35.23	27.99	41.73	35.43	4.72	.87	1 1/2 BSPP	1 1/2 BSPP	1232	74.7 Gal
	10"															

PRESSURE FILTER

Series LF 1211-10011

145 PSI

Sheet No.

1127 B1

1. Type index:

1.1. Complete filter: (ordering example)

LF. 2011. 10VG. 10. E. P. -. FA11. 9. -. AE

1	2	3	4	5	6	7	8	9	10	11
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1 series:

LF = in-line filter

2 nominal size: 1211, 2011, 2411, 3611, 4811, 6011, 10011

3 filter material and filter fineness:

80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh, 25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass valve; S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR); V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

FA11 = ANSI-flange 150 PSI

sealing surface rough grind 1600-3600 µin

FA12 = ANSI-flange 150 PSI,

sealing surface rough grind < 640 µin

9 connection size:

DN	filter nominal size						
8 = 2"	1211						
9 = 2 1/2"	1211	2011	2411				
A = 3"	1211	2011	2411	3611			
B = 4"	1211	2011	2411	3611	4811	6011	
C = 5"		2011	2411	3611	4811	6011	10011
D = 6"				3611	4811	6011	10011
E = 8"					4811	6011	10011
F = 10"							10011

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

11 clogging indicator or clogging sensor:

- = without

AE = visual-electrical, see sheet-no.1609

OP = visual, see sheet-no.1628;

VS1 = electronical, see sheet-no.1607

OE = visual-electrical, see sheet-no 1628;

VS2 = electronical, see sheet-no.1608

1.2. Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 1201, 2001

3 - 7 see type index-complete filter

2. Accessories:

- measure-and bleeder -connections, see sheet-no. 1650

- evacuation- and bleeder-connections, see sheet-no. 1651

- counter flanges, ANSI-flange 150 PSI

- lifting mechanism, see sheet-no. 1661

Changes of measures and design are subject to alteration!

4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. LF 1211	dimension and article-no. LF 2011	qty.	dimension and article-no. LF 2411	qty.	dimension and article-no. LF 3611	qty.	dimension and article-no. LF 4811	qty.	dimension and article-no. LF 6011	qty.	dimension and article-no. LF 10011
1	filter element	1	01E.1201	01E.2001	2	01E.1201	3	01E.1201	4	01E.1201	3	01E.2001	5	01E.2001
2	O-ring	1	225 x 5 308652 (NBR) 311473 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)	1	330 x 5 303080 (NBR) 310275 (FPM)	1	429 x 6 308659 (NBR) 310273 (FPM)	1	516 x 6 301962 (NBR) 311474 (FPM)	1	516 x 6 301962 (NBR) 311474 (FPM)	1	722 x 8 308145 (NBR) 311805 (FPM)
3	O-ring	1	93 x 5 307588 (NBR) 307589 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)	2	93 x 5 307588 (NBR) 307589 (FPM)	3	93 x 5 307588 (NBR) 307589 (FPM)	4	93 x 5 307588 (NBR) 307589 (FPM)	3	135 x 5 306016 (NBR) 307045 (FPM)	5	135 x 5 306016 (NBR) 307045 (FPM)
4	O-ring	1	85 x 10 304386 (NBR) 304541 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)	2	85 x 10 304386 (NBR) 304541 (FPM)	3	85 x 10 304386 (NBR) 304541 (FPM)	4	85 x 10 304386 (NBR) 304541 (FPM)	3	125 x 10 304388 (NBR) 306006 (FPM)	5	125 x 10 304388 (NBR) 306006 (FPM)
5	spring	1	304414		-	-	-	-	-	-	-	-	-	-
	pressure plate	-	-		1	309851	1	313116	1	314718	1	313335	1	313062
6	screw plug	1	½ BSPP 309730	1 BSPP 309732	1	1 BSPP 309732						1	1 ½ BSPP 318556	
7	gasket	1	A 22 x 27 305564	A 33 x 39 308257	1	A 33 x 39 308257						1	A 48 x 55 309764	
8	screw plug	1	1 BSPP 309732	1 BSPP 309732	2	1 BSPP 309732						2	1 ½ BSPP 318556	
9	gasket	1	A 33 x 39 308257	A 33 x 39 308257	2	A 33 x 39 308257						2	A 48 x 55 309764	

4.2. Depending on the series:

item	qty.	designation	dimension	article-no.
10	1	clogging indicator, visual	OP	see sheet-no. 1628
11	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628
12	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
13	1	clogging sensor, electronical	VS1	see sheet-no. 1607
14	1	clogging sensor, electronical	VS2	see sheet-no. 1608
15	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
16	2	screw plug	½ BSPP	309734
17	2	gasket	A 14 x 18	306330

5. Description:

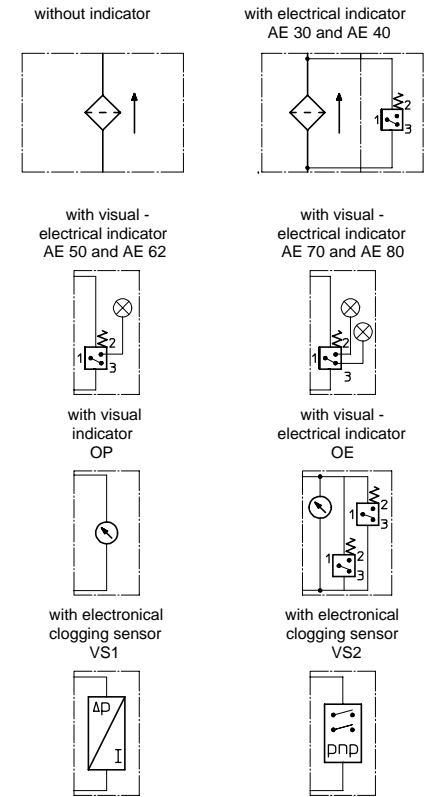
In-line filters of the series LF 1211-10011 are suitable for a working pressure up to 145 PSI. Pressure peaks can be absorbed with a sufficient margin of safety. The filter is in-line mounted. Inlet and outlet are on the same level. The filters can be installed as suction-filter, pressure-filter or return-line filter. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. The particles are hold back on the outside. For cleaning (see special leaflet 21070-4 resp. 39448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubricat ion oils. Approvals according to TÜV, and the mayor „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

6. Technical data:

temperature range: +14°F to +176°F (for a short time +212°F)
operating medium: mineral oil, other media on request
max. operating pressure: 145 PSI
test pressure: 208 PSI
connection system: ANSI-flange connection 150 PSI
housing material: C-steel
sealing material: Nitrile (NBR) or Viton (FPM), other materials on request
installation position: vertical
mini-measuring connection: ½ BSPP for screw coupling (mini-measuring)

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

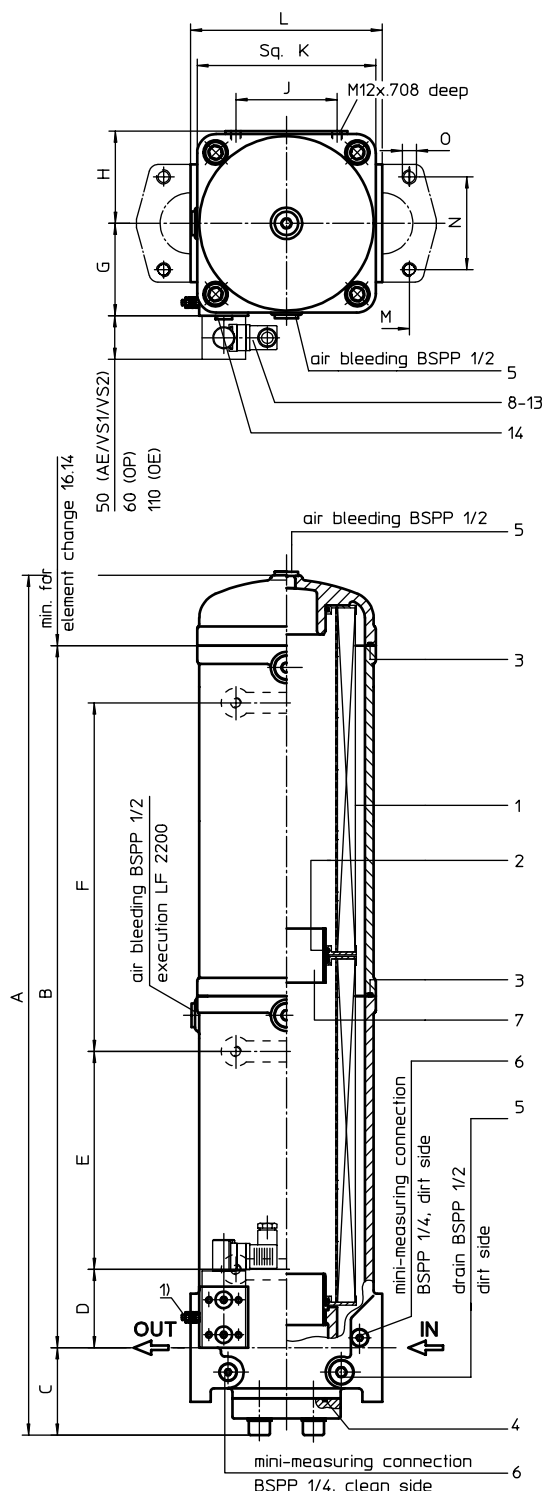
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series LF 1950-2200 464 PSI

Sheet No.
1119 K



1) connection for the potential equalisation,
only for application in the explosive area

3. Dimensions:

type	connection	A	B	C	D	E	F	G	H	J	K	L	M	N	O	weight lbs.
LF 1950	SAE 3"	38.86	31.73	3.94	3.54	9.84	15.75	4.17	4.17	4.57	8.07 sq.	8.66	2.44	4.19	M16x .94 deep	150
LF 2200	SAE 5"	41.10	32.75	5.12	4.57	9.84	15.75	4.17	4.17	4.57	8.07 sq.	8.66	3.62	6.00	M16x .94 deep	163

1. Type index:

1.1. Complete filter: (ordering example)

LF. 1950. 10VG. 10. B. P. - . FS. A. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
LF = in-line filter
- 2 **nominal size:** 1950, 2200
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fibre)
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
A = 3" (LF 1950)
C = 5" (LF 2200)
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **internal valve:**
- = without
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 12 **clogging indicator or clogging sensor :**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder-connection, se sheet-no. 1650
- evacuation- and bleeder-connection, see shet-no. 1651
- counter flange, see sheet-no. 1652

4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR. 1000		
2	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
3	2	O-ring	185 x 4	305593 (NBR)	306309 (FPM)
4	1	O-ring LF 1950	85,32 x 3,53	305590 (NBR)	306308 (FPM)
	1	O-ring LF 2200	136,12 x 3,53	320162 (NBR)	320163 (FPM)
5	4	screw plug	½ BSPP	304678	
6	2	screw plug	¼ BSPP	305003	
7	1	connecting pipe	21689-4	313233	
8	1	clogging indicator, visual	OP	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
11	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
12	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
13	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
14	2	screw plug	¼ BSPP	305003	

item 14 execution only without clogging indicator or clogging sensor

5. Description:

In-line filters of the type LF 1950-2200 are suitable for a working pressure up to 464 PSI.

Pressure peaks are absorbed with a sufficient margin of safety.

The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

For cleaning (see special leaflet 21070-4 and 39448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

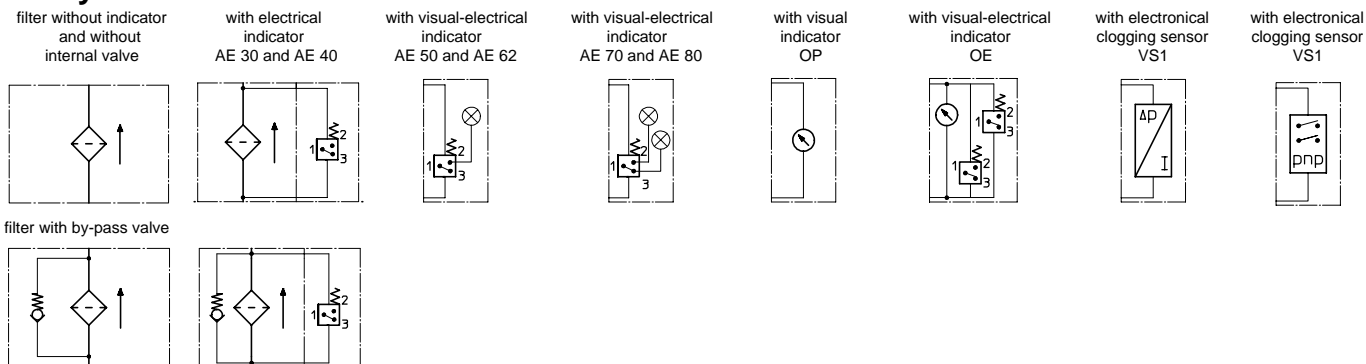
6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	464 PSI
test pressure:	900 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	GGG 40.3
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	¼ BSPP
evacuation-or bleeder-connection:	½ BSPP
volume tank LF 1950:	5.7 Gal
LF 2200:	5.8 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

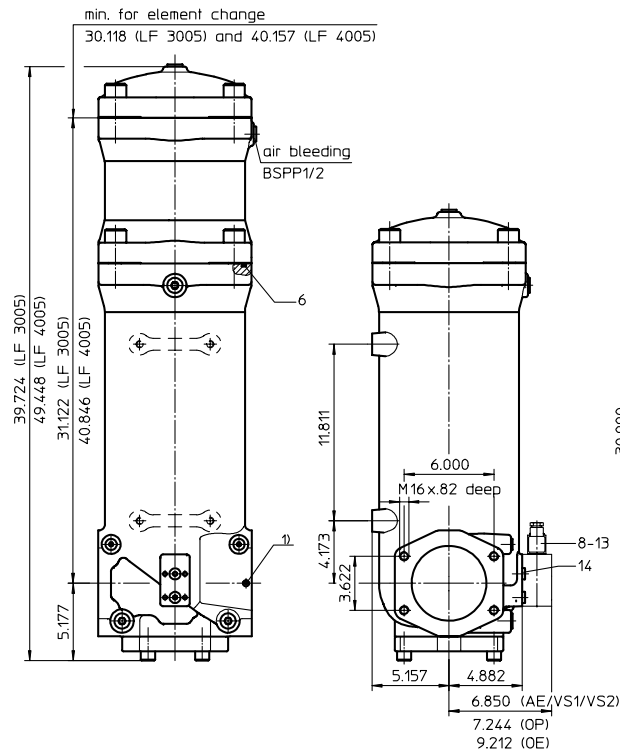
- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER **Series LF 2005-4005 464 PSI**

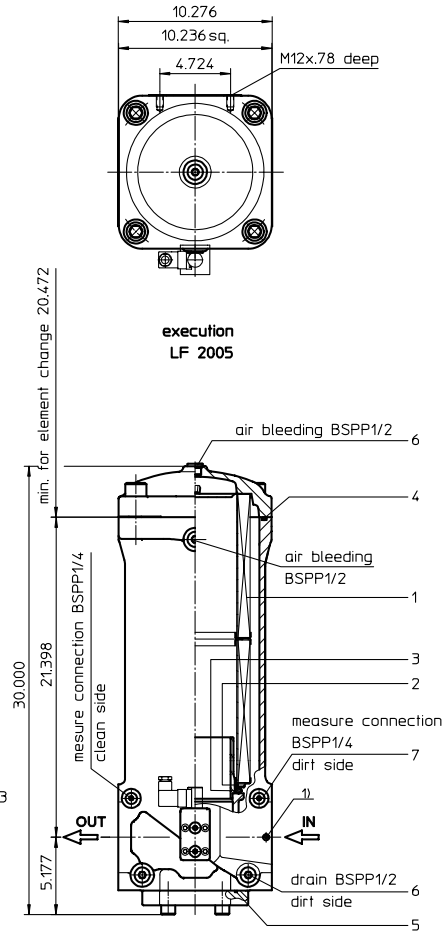
Sheet No
1128

¹⁾ connection for the potential equalisation,
only for application in the explosive area

execution
LF 3005/LF 4005



execution
LF 2005



filter	weight lbs.
LF 2005	392
LF 3005	545
LF 4005	626

1. Type index:

1.1. Complete filter: (ordering example)

LF. 2005. 10VG. 10. E. P. -. FS. C. -. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
LF = in-line filter
- 2 **nominal size:** 2005, 3005, 4005
- 3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification: (see catalog)**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
C = 5"
- 10 **filter housing specification: (see catalog)**
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 2001, 3001, 4001
- 3 - 7 see type index complete filter

2. Accessories:

- measure-and bleeder -connection, see sheet-no. 1650
- evacuation- and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652

Changes of measures and design are subject to alteration!

3. Spare parts:

item	designation	qty.	dimension and article-no. LF 2005	dimension and article-no. LF 3005	dimension and article-no. LF 4005
1	filter element	1	01E. 2001	01E. 3001	01E. 4001
2	O-ring	1	135 x 10 306016 (NBR) 307045 (FPM)		
3	O-ring	1	125 x 10 304388 (NBR) 306006 (FPM)		
4	O-ring (LF 2005)	1	240 x 5 307592 (NBR)		
	O-ring (LF 3005/4005)	2	328793 (FPM)		
5	O-ring	1	136,12 x 3,53 320162 (NBR) 320163 (FPM)		
6	screw plug (LF 2005)	4	BSPP ½ 304678		
	screw plug (LF 3005/4005)	5			
7	screw plug	2	BSPP ¼ 305003		
8	clogging indicator visual-electrical	1	OE see seet-no. 1628		
9	clogging indicator visual	1	OP see seet-no. 1628		
10	clogging indicator visual-electrical	1	AE see seet-no. 1609		
11	clogging sensor electronical	1	VS1 see seet-no. 1607		
12	clogging sensor electronical	1	VS2 see seet-no. 1608		
13	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)		
14	screw plug	2	BSPP ¼ 305003		

item 14 execution only without clogging indicator or clogging sensor

4. Description:

In-line filters of the type LF 2005-4005 are suitable for a working pressure up to 464 PSI. Pressure peaks are absorbed with a sufficient margin of safety.

The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ microns are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils

Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

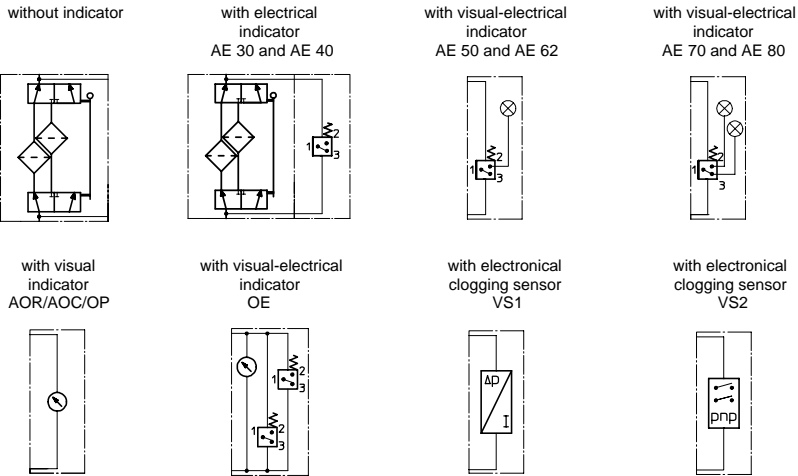
5. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	464 PSI
test pressure:	900 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measuring connections:	BSPP ¼
evacuation-or bleeder connections:	BSPP ½
volume tank	LF 2005: 6 Gal LF 3005: 8 Gal LF 4005: 10 Gal

Classification according to the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2) -article 3, paragraph 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

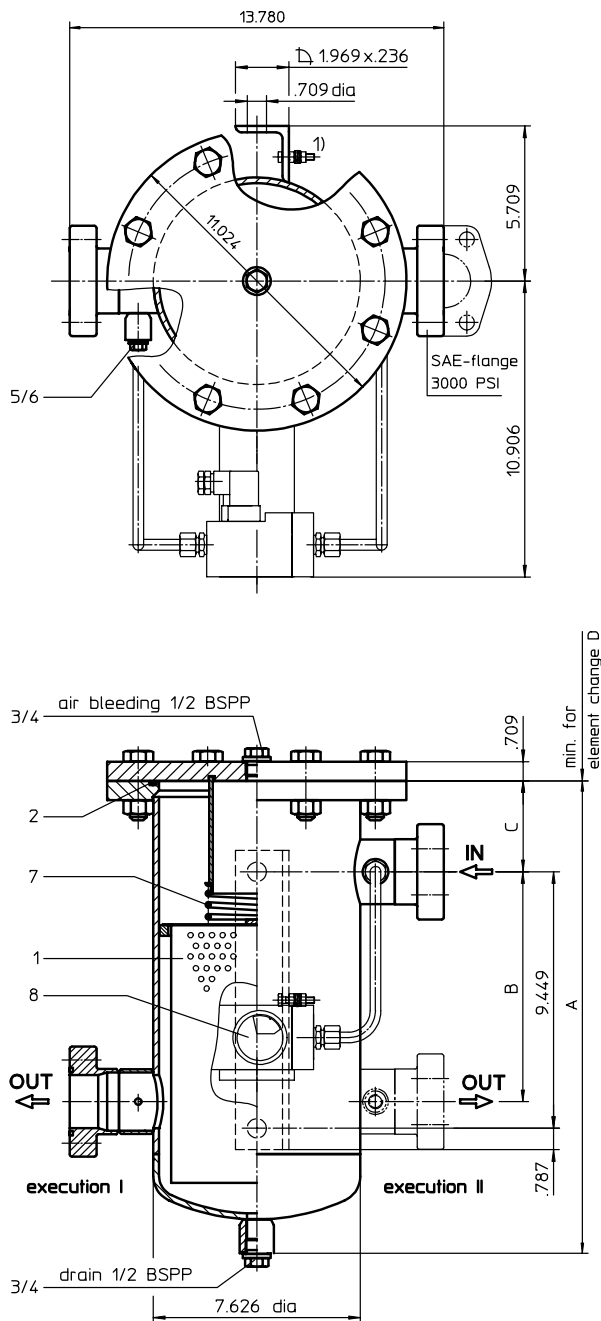
8. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

COARSE FILTER

Series GFK 50-80 232 PSI

Sheet No.
3005 C



1. Type index:

1.1. Complete filter: (ordering example)

GFK. 50. I. ST. 0,50G. P. FS. 8. OE

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

- 1 **series:**
GFK = coarse filter with strainer basket
- 2 **nominal size:** 50, 65, 80
- 3 **execution:**
I = filter outlet according to I
II = filter outlet according to II
- 4 **housing material:**
ST = housing of steel
VA = housing of stainless steel
- 5 **filter-material and filter-fineness:**
0,25 G = .0098 inch, 0,50 G = .0196 inch, 0,75 G = .0295 inch,
1,00 G = .0393 inch, 1,50 G = .0590 inch stainless steel wire
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **connection:**
FS = SAE-flange 3000 PSI
- 8 **connection size:**
8 = 2" (GFK50)
9 = 2 1/2" (GFK65)
A = 3" (GFK80)
- 9 **clogging indicator:**
- = without
OE = clogging indicator, visual-electrical, see sheet-no. 1614
DM = pressure difference gauge
DKM = pressure difference gauge with contact

1.2. Strainer basket: (ordering example)

Gr.00. 0,50. ST

1	2	3
---	---	---

- 1 **size of strainer basket :** Gr. 00, Gr. 01
- 2 **filter-material and filter-fineness:**
0,25 G = .0098 inch, 0,50 G = .0196 inch, 0,75 G = .0295 inch,
1,00 G = .0393 inch, 1,50 G = .0590 inch stainless steel wire
- 3 **material of strainer basket:**
ST = strainer basket of steel, wire mesh of stainless steel
VA = strainer basket and wire mesh of stainless steel

2. Dimensions: (inch)

type	GFK 50	GFK 65	GFK 80
connection	2"	2 1/2"	3"
size of strainer basket	Gr. 00	Gr. 01	Gr. 01
Q = cc/ft./hr	883	1236	1942
filter area sq.ft.	1.29	1.93	1.93
A	17.40	23.11	23.11
B	8.46	13.39	13.39
C	3.35	3.94	3.94
D	11.81	16.54	16.54
weight lbs.	88	96	99
volume tank	2.64 gal.	3.69 gal.	3.69 gal.

3. Spare parts:

item	qty.	designation	dimension and article-no.		
			GFK 50 Gr. 00	GFK 65 Gr. 01	GFK 80 Gr. 01
1	1	strainer basket			
2	1	O-ring		190 x 5 305432 (NBR) 310283 (FPM)	
3	2	screw plug		BSPP ½ 309730	
4	2	gasket		A 22 x 27 305564	
5	2	screw plug		BSPP ¼ 309734	
6	2	gasket		A 14 x 18 306330	
7	1	spring		Da = 95 304414	
8	1	clogging indicator		OE, DM or DKM	

4. Description:

Coarse filters of the series GFK 50-80 are suitable for a working pressure up to 232 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety. The filters can be installed as suction filter, pressure filter or return-line filter.

The filter elements are filter baskets with steel wire mesh as filter material. The perforated centre tube is layed out with steel wire mesh. The flow direction is from inside to the outside.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

232 PSI

test pressure:

332 PSI

connection system:

SAE-flange 3000 PSI

housing material:

C-steel or stainless steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

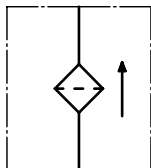
vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

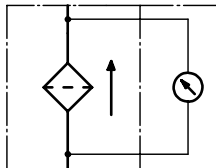
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

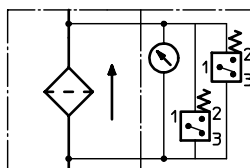
without indicator



with visual indicator



with visual-electrical
indicator OE



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

3. Spare parts:

item	qty.	designation	dimension and article-no.								
			GFK 100	GFK 125	GFK 150	GFK 200	GFK 250	GFK 300	GFK 350	GFK 400	GFK 500
1	-	strainer basket	1x Gr.02		1x Gr.04	1x Gr.06		1x Gr.07	4x Gr.04	3x Gr.07	12x Gr.04
2	1	O-ring	275 x 5 307414 (NBR) 310288 (FPM)			429 x 6 308659 (NBR) 310273 (FPM)		516 x 6 301962 (NBR) 311474 (FPM)	620 x 6 328918 (NBR) 328919 (FPM)	920 x 10 328920 (NBR) 328921 (FPM)	
3	3	screw plug	BSPP 1 309732						BSPP 1 ½ 309749		
4	3	gasket	A 33 x 39 308257						A 48 x 55 309764		
5	2	screw plug	BSPP ¼ 309734								
6	2	gasket	A 14 x 18 306330								
7	1	clogging indicator	OE, DM or DKM								

4. Description:

Coarse filters of the series GFK 100-500 are suitable for a working pressure up to 145 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety. The filters can be installed as suction filter, pressure filter or return-line filter.

The filter elements are filter baskets with steel wire mesh as filter material. The perforated centre tube is layed out with steel wire mesh. The flow direction is from inside to the outside.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

5. Technical data:

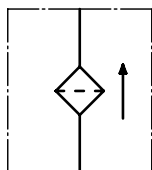
temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
test pressure:	207 PSI
connection system:	ANSI-flange 150PSI
housing material:	C-steel or stainless steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

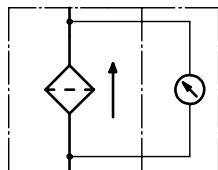
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

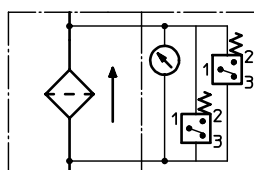
without indicator



with visual indicator



with visual-electrical indicator OE



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

Bei pulsierender Belastung wie z.B. bei Kunststoffspritzmaschinen, Druckgussmaschinen, Schmiedepressen ect. reduzieren sich die max. zulässigen Betriebsdrücke je nach Filterbaureihe auf folgende Daten:

(Ermüdungsfestigkeit ca. 1 Mio. Lastwechsel)

Bei der Filterbaureihe bis 160 bar z.B. MNL, ML
(Filtergehäusematerial Al-Speziallegierung / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 120 bar
Berstdruck: 480 bar

bei der Filterbaureihe bis 315 bar HDD, HPF, HPP
(Filtergehäusematerial GGG40.3 / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 250 bar
Berstdruck: 945 bar

bei der Filterbaureihe bis 420 bar HP, HPV
(Filtergehäusematerial GGG40.3 / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 340 bar
Berstdruck: 1344 bar

At pulsating loading like by injection moulding machines, diecasting machines, forging pressure etc. the max. admissible accumulator pressures reduce according to the line of filters to following facts:

(fatigue resistance appr. 1 million change of load)

At the line of filters up to 160 bar e.g. MNL, ML
(filter housing material Al-special alloy / C-steel) the admissible accumulator pressure reduces to 120 bar
burst pressure: 480 bar

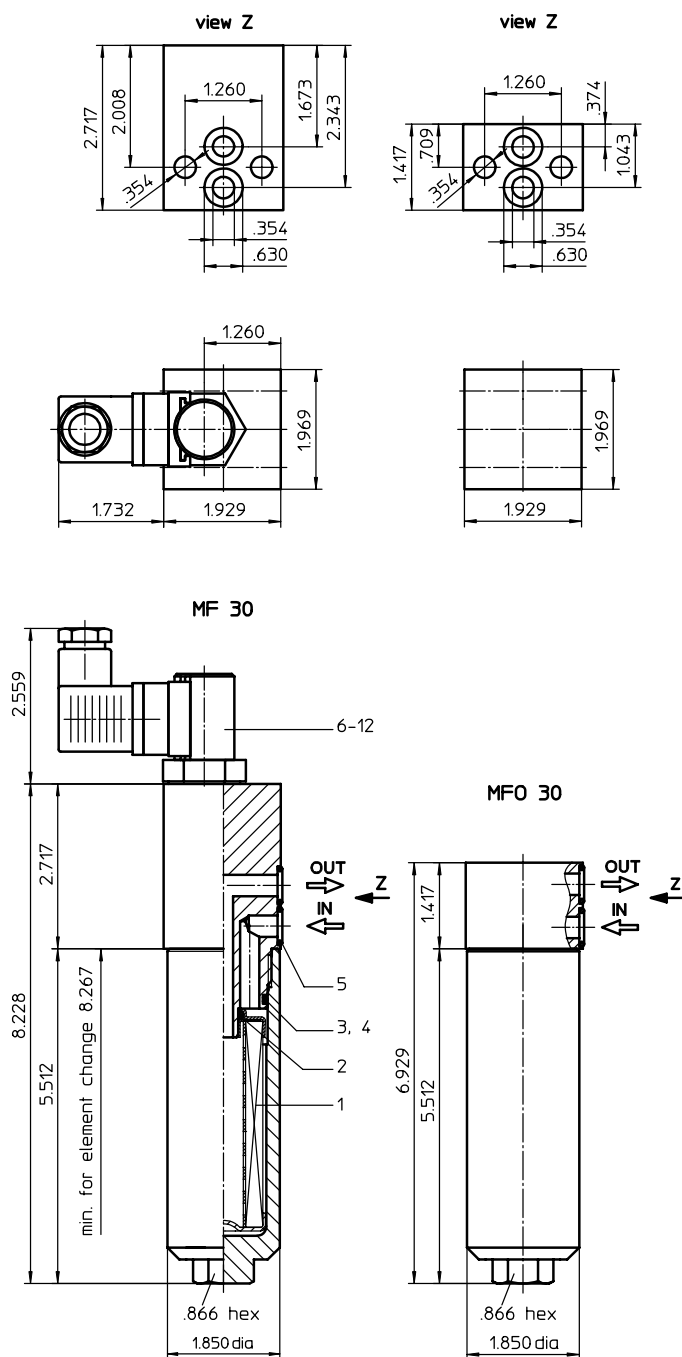
At the line of filters up to 315 bar e.g. HDD, HPF, HPP
(filter housing material GGG 40.3 / C-steel) the admissible accumulator pressure reduces to 250 bar
burst pressure: 945 bar

At the line of filters up to 420 bar e.g. HP, HPV
(filter housing material GGG 40.3 / C-steel) the admissible accumulator pressure reduces to 340 bar
burst pressure: 1344 bar

PRESSURE FILTER, manifold mounted

Series MF 30, MFO 30 2320 PSI

Sheet No.
1416 F



1. Type index:

1.1. Complete filter: (ordering example)

MF. 30. 10VG. HR. E. P. - F. 2. - AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
MF = medium pressure filter, manifold mounted with indicator
MFO = medium pressure filter, manifold mounted without indicator
- 2 **nominal size:** 30
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
F = manifold mounted
- 9 **connection size:**
2 = 3/8"
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator or clogging sensor:**
series MFO:
- = without
series MF:
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 30
- 3 - 7 see type index-complete filter

weight without indicator: approx. 2.60 lbs.
weight with indicator : approx. 3.10 lbs.

2. Spare parts:

item	qty.	designation	dimensions	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	2	O-ring	12 x 2	311014 (NBR)	310271 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electronic	VS1	see sheet-no. 1617	
9	1	clogging sensor, electronic	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

3. Description:

Pressure filter of the series MF 30 and MFO 30 are suitable for a working pressure up to 2320 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

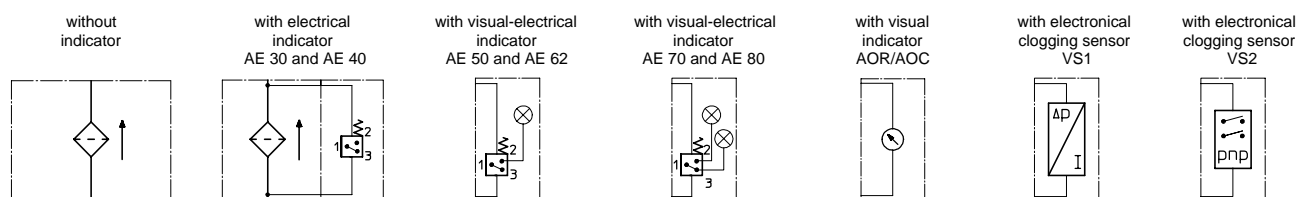
4. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	2320 PSI
test pressure:	3318 PSI
connection system:	manifold mounted
housing material:	Al; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.02 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

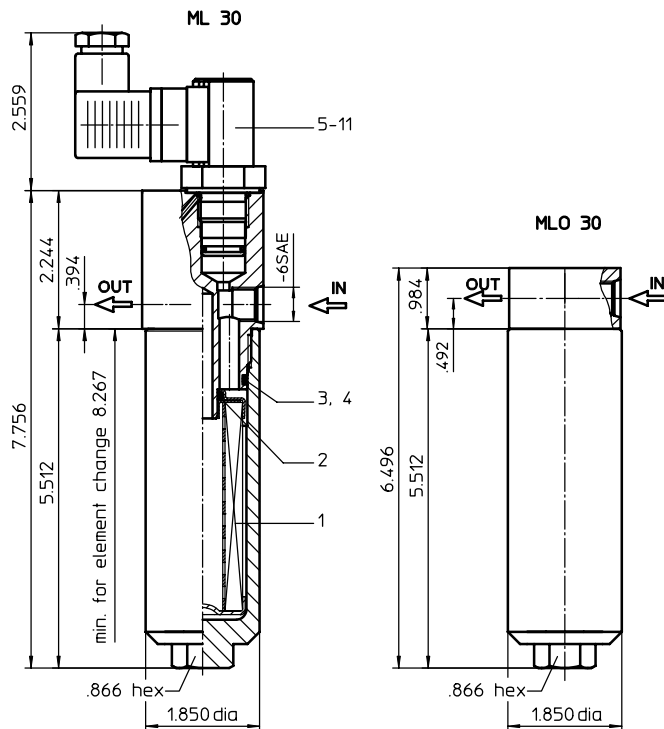
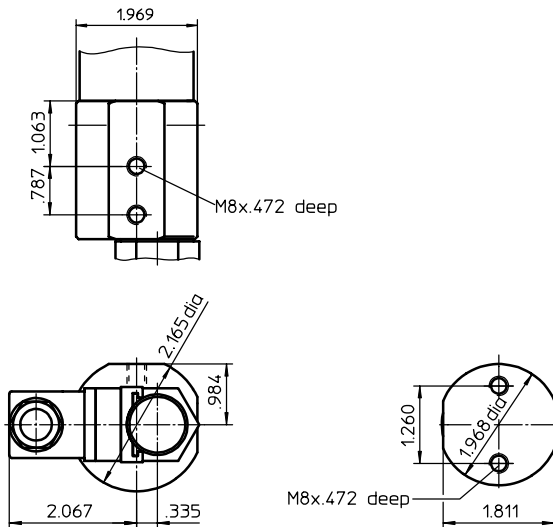
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series ML 30, MLO 30 2320 PSI

Sheet No.
1417 F



1. Type index:

1.1. Complete filter: (ordering example)

ML. 30. 10VG. HR. E. P. -. UG. 1. -. AE

1	2	3	4	5	6	7	8	9	10	11
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1 series:

ML = in-line filter-medium pressure range with indicator
MLO = in-line filter-medium pressure range without indicator

2 nominal size: 30

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m(c), 16 VG = 15 μ m(c), 10 VG = 10 μ m(c),
6 VG = 7 μ m(c), 3 VG = 5 μ m(c) Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:

UG = thread connection

9 connection size:

1 = -6 SAE

10 filter housing specification: (see catalog)

- = standard
IS06 = see sheet-no. 31605

11 clogging indicator or clogging sensor:

series MLO:
- = without
series ML:
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electrical, see sheet-no. 1617
VS2 = electrical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 30

3 - 7 see type index-complete filter

weight without indicator: approx. 2.50 lbs.
weight with indicator : approx. 2.90 lbs.

2. Spare parts:

item	qty.	designation	dimensions	article-no.	
1	1	filter element	01E.30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

3. Description:

Pressure filter of the series ML 30 and MLO 30 are suitable for a working pressure up to 2320 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Filter elements are available down to 4 $\mu\text{m}_{(e)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

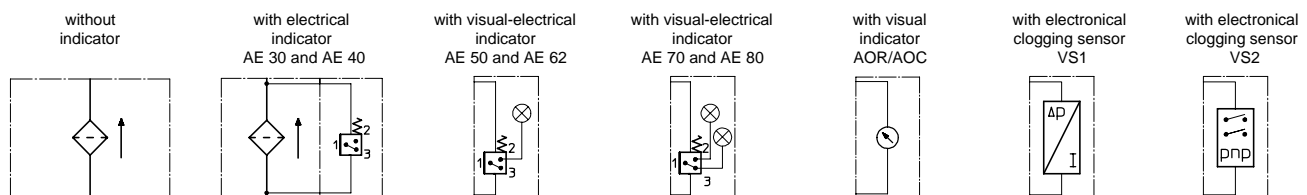
4. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	2320 PSI
test pressure:	3318 PSI
connection system:	thread connection
housing material:	Al; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.02 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

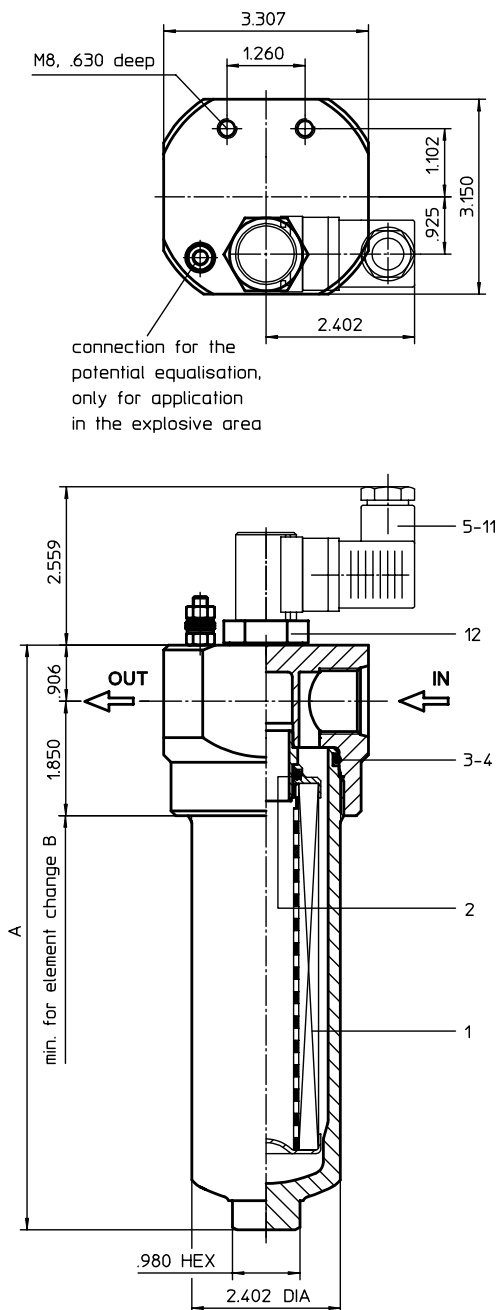
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series MNL 40 - 100 2320 PSI

Sheet No.
1427 F



2. Dimensions: inch

type	MNL 40	MNL 63	MNL100
connection	-8 SAE	-12 SAE	-16 SAE
A	7.17	9.53	13.07
B	8.26	10.62	14.17
weight lbs.	4.41	5.51	7.28
volume tank	.06 Gal.	.09 Gal.	.14 Gal.

Connection assignments as shown in the table are standard according to DIN 24 550 T1. Are the connection assignments against DIN 24 550 T1, see item 9 of the type code.

1. Type index:

1.1. Complete filter: (ordering example)

MNL. 63. 10VG. HR. E. P. -. UG. 4. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
MNL = standard in-line filter-medium pressure range according to DIN 24550 T1, T2
- nominal size:** 40, 63, 100
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
UG = thread connection
- connection size:**
3 = - 8 SAE
4 = - 12 SAE
5 = - 16 SAE
- filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM
- clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL. 63. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NL = standard filter element according to DIN 24550, T3
- nominal size:** 40, 63, 100
- 7** see type index-complete filter

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			MNL 40	MNL 63	MNL 100		
1	1	filter element	01NL.40	01NL.63	01NL.100		
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring		60 x 2,6 x 1		311779	
5	1	clogging indicator visual		AOR or AOC		see sheet-no. 1606	
6	1	clogging indicator visual-electrical		AE		see sheet-no. 1615	
7	1	clogging sensor electronical		VS1		see sheet-no. 1617	
8	1	clogging sensor electronical		VS2		see sheet-no. 1618	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series MNL 40-100 are suitable for a working pressure up to 2320 PSI and equipped with elements according to DIN 24 550 T3.

The pressure peaks are absorbed by a sufficient margin of safety. The MNL-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

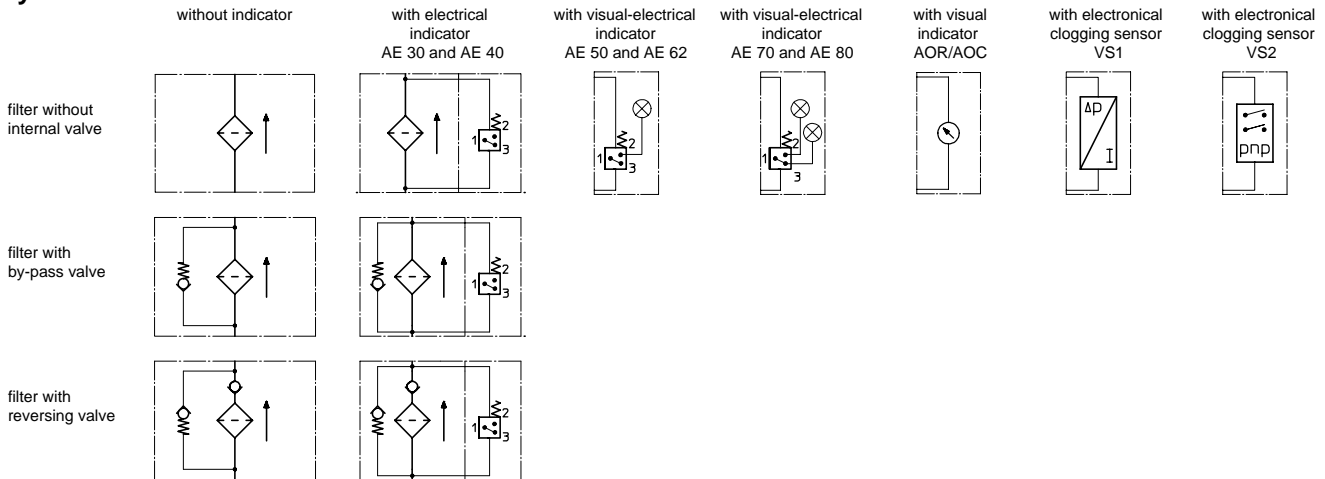
5. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	2320 PSI
test pressure:	3320 PSI
connection system:	thread connection
housing material:	aluminium forging alloy; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

8. Test methods:

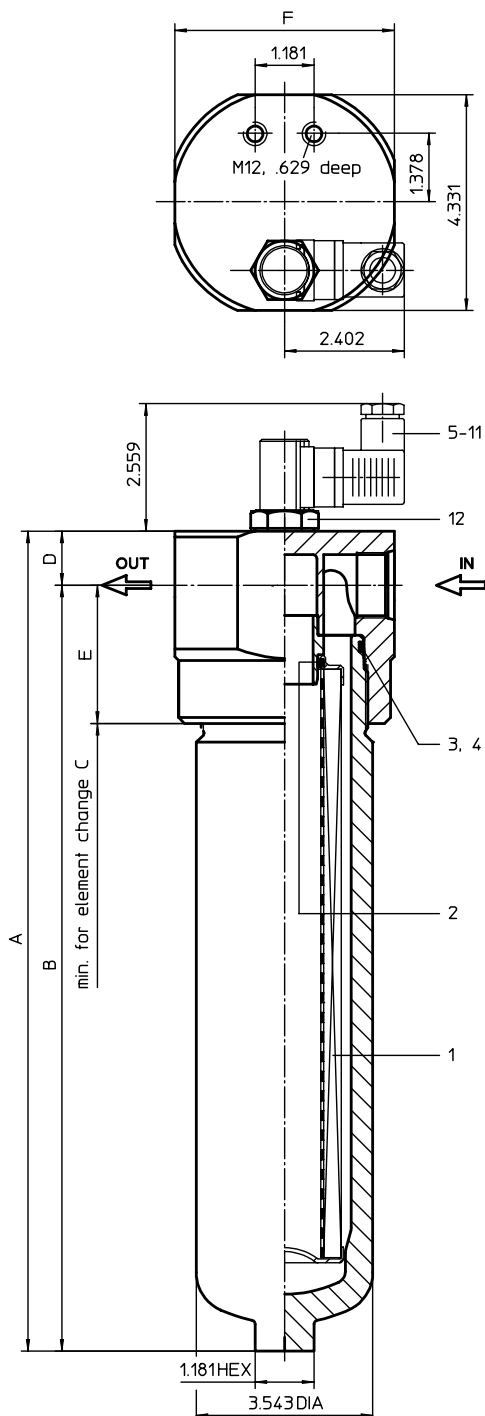
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series ML 170 - 450 2320 PSI

Sheet No.
1429 F



2. Dimensions: inch

type	ML 170		ML 240		ML 360		ML 450	
connection	-16SAE	-24SAE	-16SAE	-24SAE	-16SAE	-24SAE	-16SAE	-24SAE
A	11.33	11.81	13.30	13.77	16.45	16.92	20.59	21.06
B	10.23	10.43	12.20	12.40	15.35	15.55	19.48	19.68
C	13.77	13.77	15.74	15.74	18.89	18.89	23.03	23.03
D	1.10	1.37	1.10	1.37	1.10	1.37	1.10	1.37
E	2.76	2.95	2.76	2.95	2.76	2.95	2.76	2.95
F	4.40	4.56	4.40	4.56	4.40	4.56	4.40	4.56
weight lbs.	16.5	17.3	18.7	19.5	22.2	23.1	28.8	29.7
volume tank	.18 Gal.	.18 Gal.	.23 Gal.	.23 Gal.	.31 Gal.	.31 Gal.	.42 Gal.	.42 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

ML . 360. 10VG. HR. E. P. - . UG. 5. - . - . AE

- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
- series:**
ML = in-line filter-medium pressure range
 - nominal size:** 170, 240, 360, 450
 - filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
 - resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
 - filter element design:**
E = single-end open
 - sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
 - filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
 - connection:**
UG = thread connection
 - connection size:**
5 = -16 SAE
7 = -24 SAE
 - filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
 - internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, Q \leq 55.75 GPM
 - clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 170, 240, 360, 450
- 7** see type index-complete filter

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension				article-no.	
			ML 170	ML 240	ML 360	ML 450		
1	1	filter element	01E. 170	01E. 240	01E. 360	01E. 450		
2	1	O-ring		34 x 3,5			304338 (NBR)	304730 (FPM)
3	1	O-ring		75 x 3			302215 (NBR)	304729 (FPM)
4	1	support ring		81 x 2,6 x 1			304581	
5	1	clogging indicator visual		AOR or AOC			see sheet-no. 1606	
6	1	clogging indicator visual-electrical		AE			see sheet-no. 1615	
7	1	clogging sensor electronic		VS1			see sheet-no. 1617	
8	1	clogging sensor electronic		VS2			see sheet-no. 1618	
9	1	O-ring		15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4			309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series ML 170-450 are suitable for a working pressure up to 2320 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The ML-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

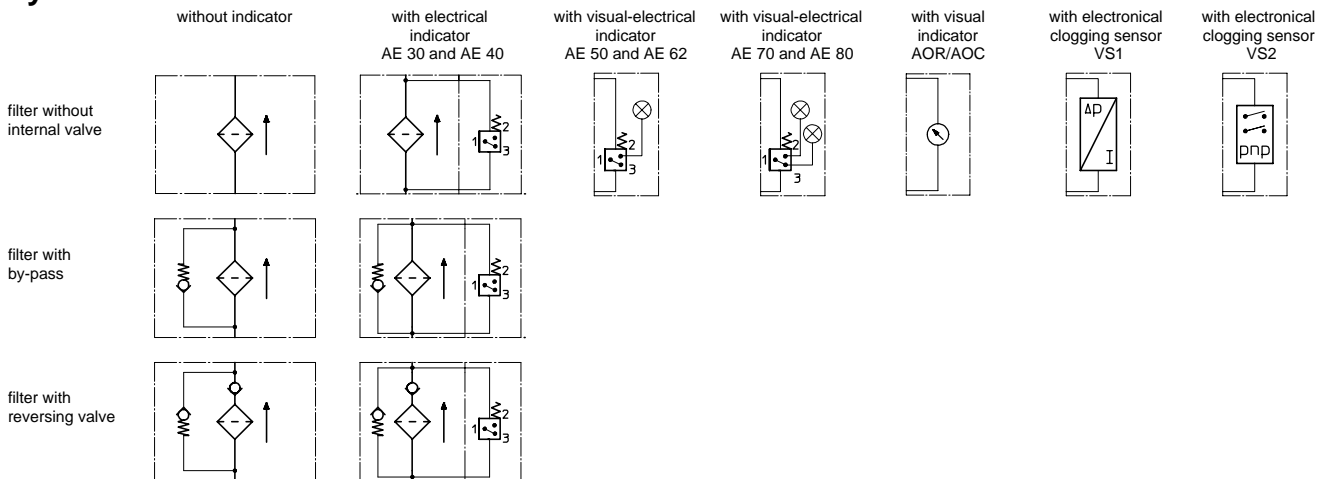
5. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	2320 PSI
test pressure:	3320 PSI
connection system:	thread connection
housing material:	Al; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



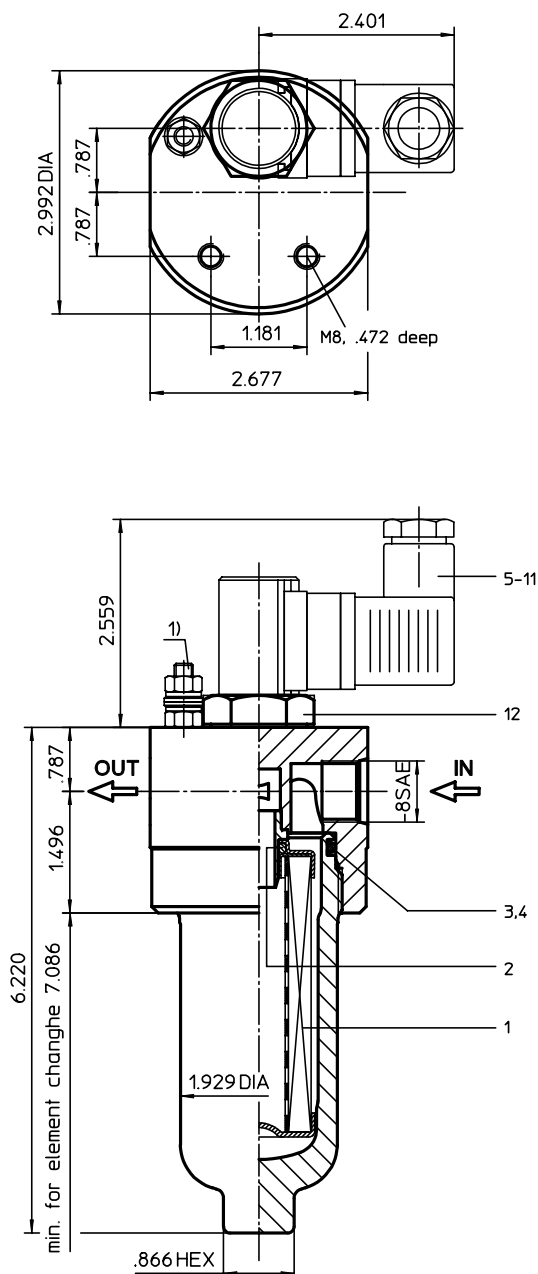
7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HP. 31. 10VG. HR. E. P. -. UG. 3. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
HP = pressure filter
- 2 | **nominal size:** 31
- 3 | **filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm
stainless stell wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- 4 | **resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 | **filter element design:**
E = single-end open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 | **connection:**
UG = thread connection
- 9 | **connection size:**
3 = -8 SAE
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 | **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electrical, see sheet-no. 1617
VS2 = electrical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | | |
|---|--|--|
| 1 | | series:
01E. = filter element according to INTERNORMEN factory specification |
| 2 | | nominal size: 30 |
| 3 | | - 7 see type index-complete filter |

weight: approx. 7 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
4	1	support ring	48 x 2,6 x 1	305391	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4	309817	

item 12 execution only without clogging indicator or clogging sensor

3. Description:

The pressure filters of the series HP 31 are suitable for a working pressure up to 6000 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

4. Technical data:

temperature range:

+14°F to + 176°F (for a short time + 212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

6000 PSI

test pressure:

8580 PSI

connection system:

thread connection

housing material:

C-steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

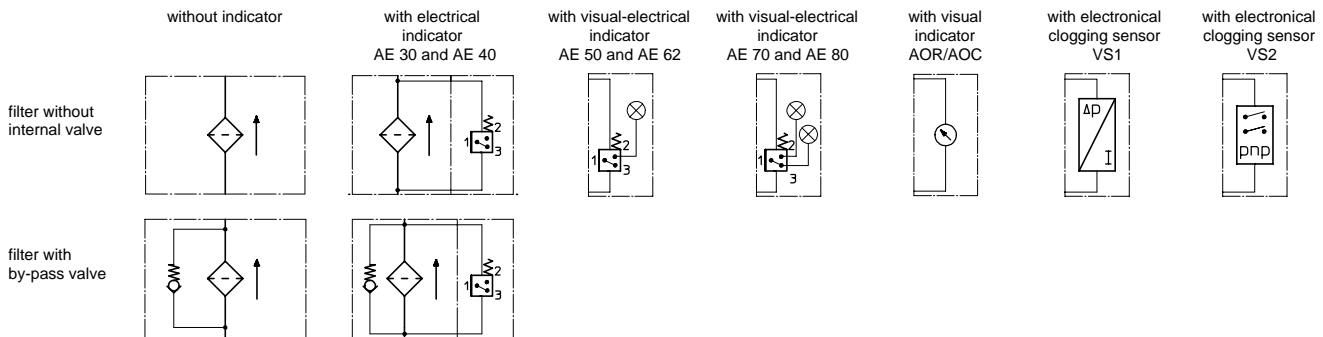
volume tank:

.02 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

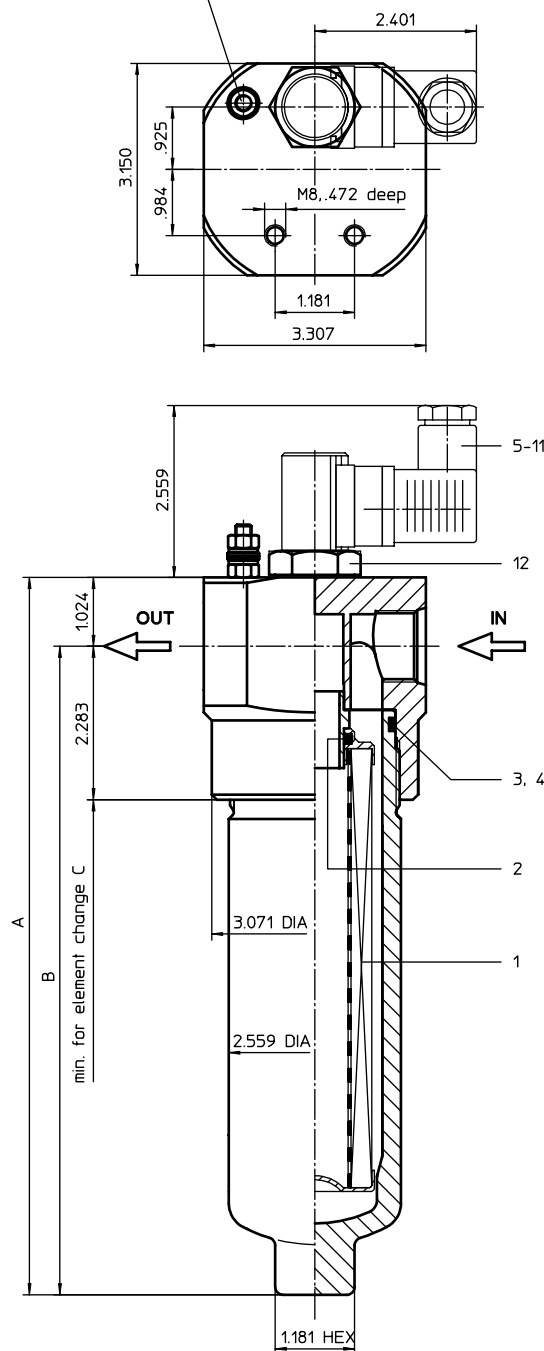
- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series HP 61 - 151 6000 PSI

Sheet No.
1477 F

connection for the potential equalisation,
only for application in the explosive area



2. Dimensions: inch

type	HP 61	HP 91	HP 151
connection	- 8 SAE	-12 SAE	-16 SAE
A	8.11	10.66	14.96
B	7.08	9.64	13.93
C	10.63	13.19	17.52
weight lbs.	8.80	9.90	12.10
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

Connection assignments as shown in the table are standard. To exchange connections see item 9 in type index.

1. Type index:

1.1. Complete filter: (ordering example)

HP. 91. 10VG. HR. E. P. -. UG. 4. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
1	series:	HP	=	pressure filter							
2	nominal size:	61, 91, 151									
3	filter-material and filter-fineness:	80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh 25 VG = 20 μ m _(c) , 16 VG = 15 μ m _(c) , 10 VG = 10 μ m _(c) , 6 VG = 7 μ m _(c) , 3 VG = 5 μ m _(c) Interpor fleece (glass fiber)									
4	resistance of pressure difference for filter element:	30 = Δ p 435 PSI HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)									
5	filter element design:	E = single-end open									
6	sealing material:	P = Nitrile (NBR) V = Viton (FPM)									
7	filter element specification: (see catalog)	- = standard VA = stainless steel IS06 = see sheet-no. 31601									
8	connection:	UG = thread connection									
9	connection size:	3 = -8 SAE 4 = -12 SAE 5 = -16 SAE									
10	filter housing specification: (see catalog)	- = standard IS06 = see sheet-no. 31605									
11	internal valve:	- = without S1 = with by-pass valve Δ p 51 PSI S2 = with by-pass valve Δ p 102 PSI R = reversing valve, Q \leq 18.50 GPM									
12	clogging indicator or clogging sensor:	- = without AOR = visual, see sheet-no. 1606 AOC = visual, see sheet-no. 1606 AE = visual-electrical, see sheet-no. 1615 VS1 = electronical, see sheet-no. 1617 VS2 = electronical, see sheet-no. 1618									

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
1	series:	01E.	=	filter element according to INTERNORMEN factory specification		
2	nominal size:	60, 90, 150				
3	-	7				see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension HP 61 - 151	article-no.	
1	1	filter element	01E. 60 - 150		
2	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
4	1	support ring	61 x 2,6 x 1	304660	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4	309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

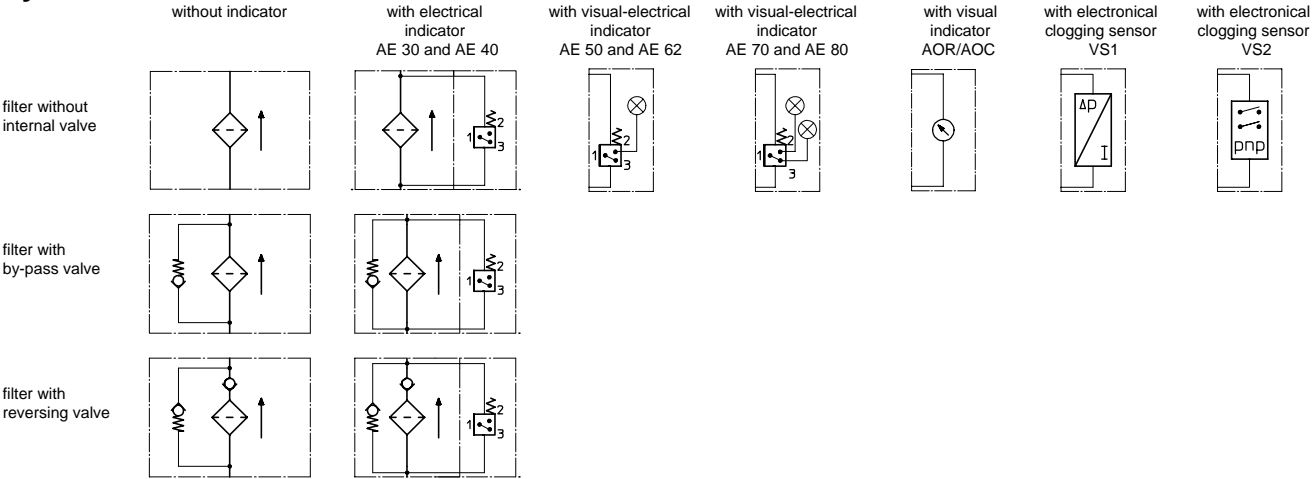
The pressure filters of the series HP 61-151 are suitable for a working pressure up to 6000 PSI.
The pressure peaks are absorbed by a sufficient margin of safety. The HP-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 µm_(c).
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range: +14°F to + 176°F (for a short time + 212°F)
operating medium: mineral oil, other media on request
max. operating pressure: 6000 PSI
test pressure: 8580 PSI
connection system: thread connection
housing material: C-steel
sealing material: Nitrile (NBR) or Viton (FPM), other materials on request
installation position: vertical

Classified under the Pressure Equipmentz Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

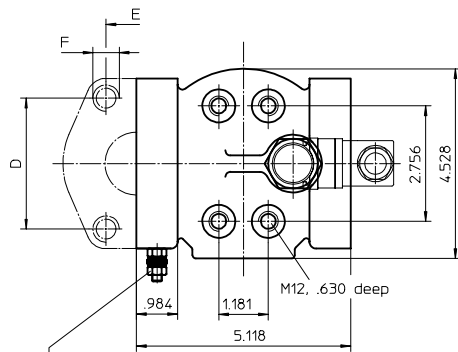
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

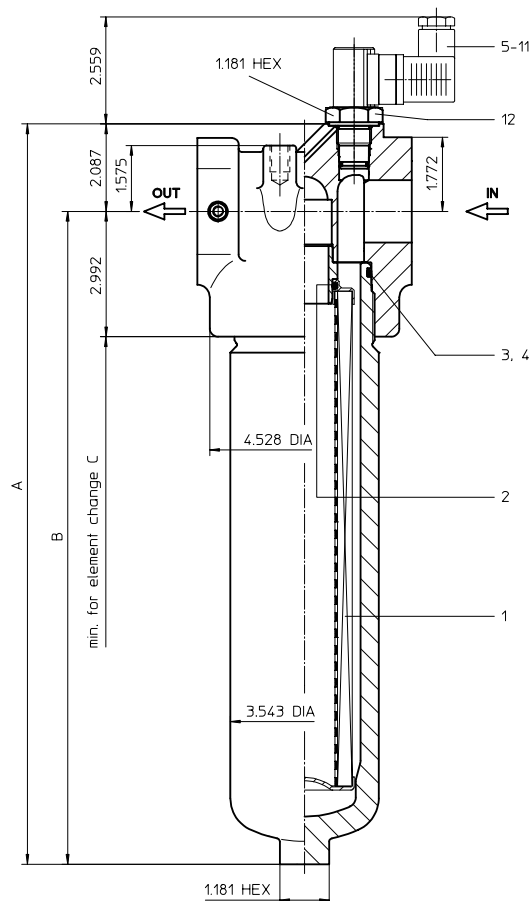
PRESSURE FILTER

Series HP 170 - 450 6000 PSI

Sheet No.
1462 O



connection for the potential equalisation,
only for application in the explosive area



2. Dimensions: inch

type	HP 170	HP 240	HP 360	HP 450
connection	1 1/2" SAE			
A	12.56	14.49	17.68	21.81
B	10.47	12.44	15.59	19.72
C	13.78	15.75	18.90	23.03
D	3.13			
E	1.45			
F	M16, .79 deep			
weight lbs.	28.6	30.8	35.2	41.8
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HP . 170. 10VG. HR. E. P. - . FS. 7. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
HP = pressure filter
- nominal size:** 170, 240, 360, 450
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
FS = SAE-flange connection 6000 PSI
- connection size:**
7 = 1 1/2"
- filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, Q \leq 55.75 GPM
- clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 170. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 170, 240, 360, 450
- 7** see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HP 170	HP 240	HP 360	HP 450		
1	1	filter element	01E. 170	01E. 240	01E. 360	01E. 450		
2	1	O-ring		34 x 3,5			304338 (NBR)	304730 (FPM)
3	1	O-ring		75 x 3			302215 (NBR)	304729 (FPM)
4	1	support ring		81 x 2,6 x 1			304581	
5	1	clogging indicator visual		AOR or AOC			see sheet-no. 1606	
6	1	clogging indicator visual-electrical		AE			see sheet-no. 1615	
7	1	clogging sensor electronical		VS1			see sheet-no. 1617	
8	1	clogging sensor electronical		VS2			see sheet-no. 1618	
9	1	O-ring		15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4			309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

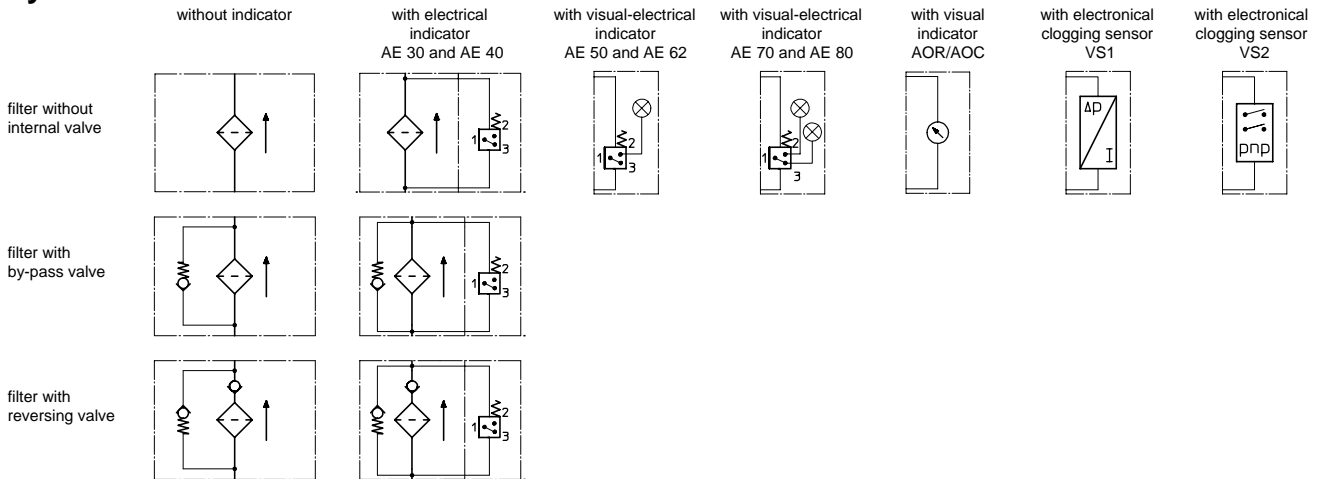
The pressure filters of the series HP 170-450 are suitable for a working pressure up to 6000 PSI. The pressure peaks are absorbed by a sufficient margin of safety. The HP-filters are flange mounted to the hydraulic system. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of $4 \mu\text{m}_{(0)}$. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI. The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range: +14°F to + 176°F (for a short time + 212°F)
operating medium: mineral oil, other media on request
max. operating pressure: 6000 PSI
test pressure: 8580 PSI
connection system: SAE-flange connection 6000 PSI
housing material: EN-GJS-400-18-LT; C-steel
sealing material: Nitrile (NBR) or Viton (FPM), other materials on request
installation position: vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

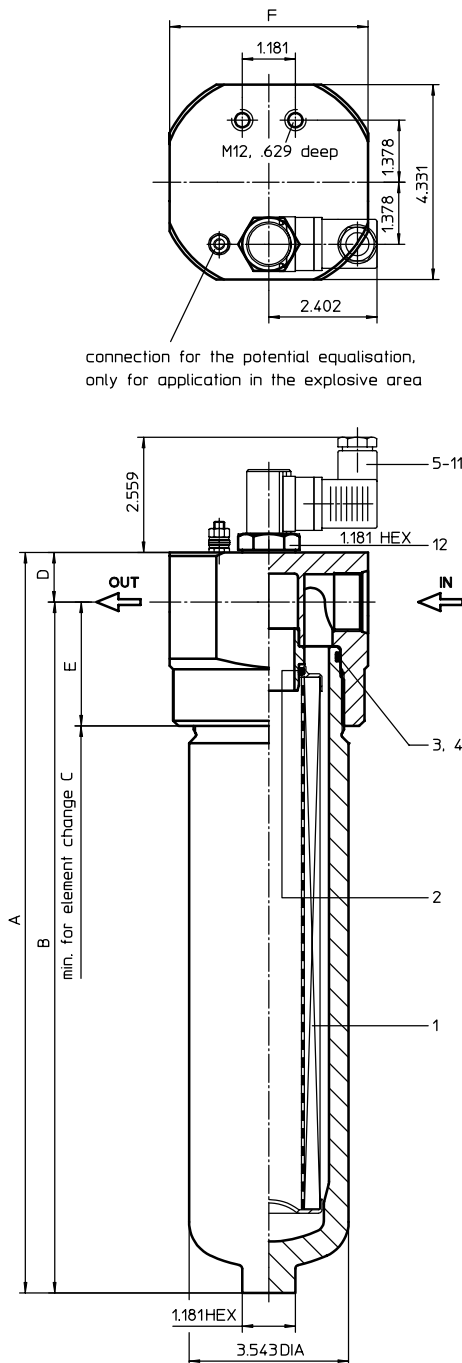
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series HP 171 - 451 6000 PSI

Sheet No.
1468 E



connection for the potential equalisation,
only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HP . 361. 10VG. HR. E. P. - . UG. 5. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HP = pressure filter

2 nominal size: 171, 241, 361, 451

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c),
3 VG = 5 μ m Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δ p 435 PSI

HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR) V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

ISO6 = see sheet-no. 31601

8 connection:

UG = thread connection

9 connection size:

5 = -16 SAE 6 = -20 SAE 7 = -24 SAE

10 filter housing specification: (see catalog)

- = standard

ISO6 = see sheet-no. 31605

11 internal valve:

- = without

S1 = with by-pass valve Δ p 51 PSI

S2 = with by-pass valve Δ p 102 PSI

R = reversing valve, Q \leq 55.75 GPM

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN
factory specification

2 nominal size: 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions: inch

type	HP 171			HP 241			HP 361			HP 451		
connection	-16SAE	-20SAE	-24SAE	-16SAE	-20SAE	-24SAE	-16SAE	-20SAE	-24SAE	-16SAE	-20SAE	-24SAE
A	11.33	11.61	11.81	13.30	13.58	13.77	16.45	16.73	16.92	20.59	20.86	21.06
B	10.23	10.35	10.43	12.20	12.32	12.40	15.35	15.47	15.55	19.48	19.60	19.68
C	13.77	13.77	13.77	15.74	15.74	15.74	18.89	18.89	18.89	23.03	23.03	23.03
D	1.10	1.25	1.37	1.10	1.25	1.37	1.10	1.25	1.37	1.10	1.25	1.37
E	2.75	2.87	2.95	2.75	2.87	2.95	2.75	2.87	2.95	2.75	2.87	2.95
F	4.40	4.56	4.56	4.40	4.56	4.56	4.40	4.56	4.56	4.40	4.56	4.56
weight lbs.	24	25	26	27	28	29	31	32	33	36	38	39
volume tank	.18 Gal.			.23 Gal.			.31 Gal.			.42 Gal.		

Connection assignments as shown in the table are standard. To exchange connections see item 9 in type index.

3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HP 171 01E. 170	HP 241 01E. 240	HP 361 01E. 360	HP 451 01E. 450		
1	1	filter element						
2	1	O-ring			34 x 3,5		304338 (NBR)	304730 (FPM)
3	1	O-ring			75 x 3		302215 (NBR)	304729 (FPM)
4	1	support ring			81 x 2,6 x 1		304581	
5	1	clogging indicator visual			AOR or AOC		see sheet-no. 1606	
6	1	clogging indicator visual-electrical			AE		see sheet-no. 1615	
7	1	clogging sensor electronical			VS1		see sheet-no. 1617	
8	1	clogging sensor electronical			VS2		see sheet-no. 1618	
9	1	O-ring			15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring			22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring			14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug			20913-4		309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HP 171-451 are suitable for a working pressure up to 6000 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:

+14°F to + 176°F (for a short time + 212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

6000 PSI

test pressure:

8580 PSI

connection system:

thread connection

housing material:

C-steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

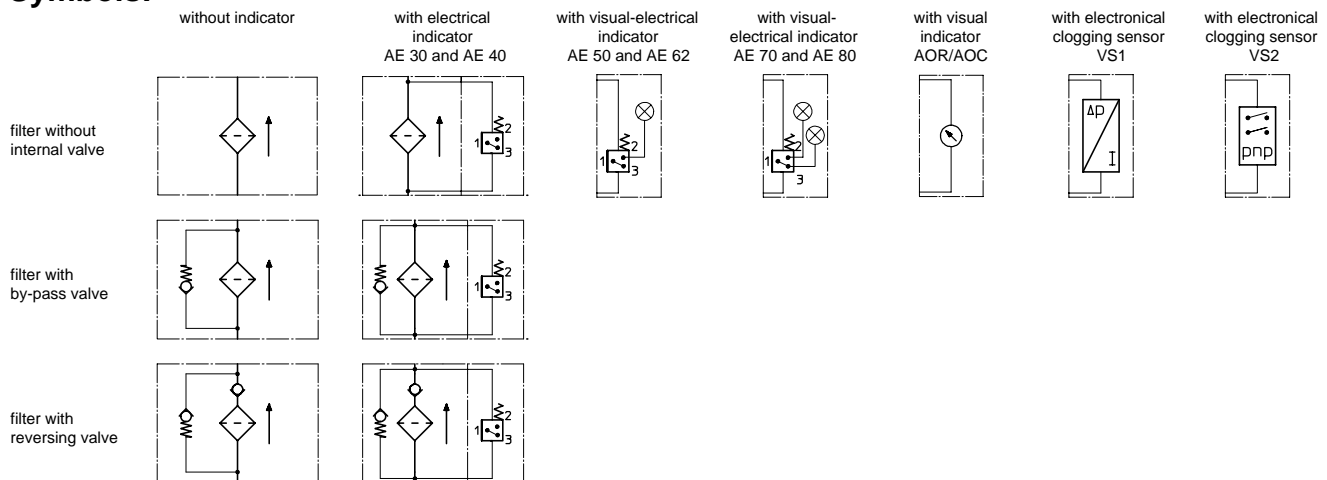
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance

ISO 2942 Verification of fabrication integrity

ISO 2943 Verification of material compatibility with fluids

ISO 3723 Method for end load test

ISO 3724 Verification of flow fatigue characteristics

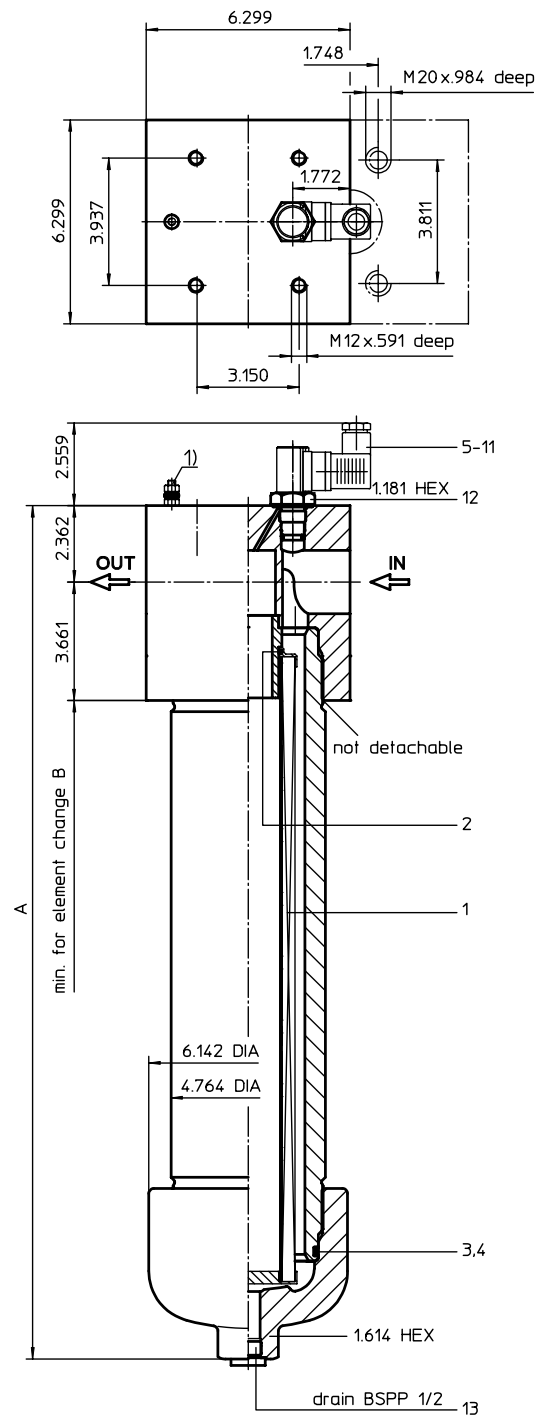
ISO 3968 Evaluation of pressure drop versus flow characteristics

ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series HP 601-1351 6000 PSI

Sheet No.
1465 K



1) connection for the potential equalisation, only for the application in the explosive area.

2. Dimensions: inch

type	HP 601	HP 901	HP 1351
connection	SAE 2"		
A	20.47	26.37	36.14
B	31.10	37.00	56.70
weight lbs.	108	123	150
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HP . 901. 10VG. HR. E. P. - . FS. 8. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
HP = pressure filter
- nominal size:** 601, 901, 1351
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
FS = SAE-flange connection 6000 PSI
- connection size:**
8 = 2"
- filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
R = reversing valve, $Q \leq 122.94$ GPM
- clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 600, 900, 1350
- 7** see type index-complete filter

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HP 601	HP 901	HP 1351		
1	1	filter element	01E. 600	01E. 900	01E. 1350		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
6	1	clogging indicator, visual-electrical		AE		see sheet no. 1615	
7	1	clogging sensor, electronic		VS1		see sheet no. 1617	
8	1	clogging sensor, electronic		VS2		see sheet no. 1618	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817	
13	1	screw plug		G ½		304678	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HP 601-1351 are suitable for a working pressure up to 6000 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HP-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

6000 PSI

test pressure:

8580 PSI

connection system:

SAE-flange connection 6000 PSI

housing material:

EN-GJS-400-18-LT, C-steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

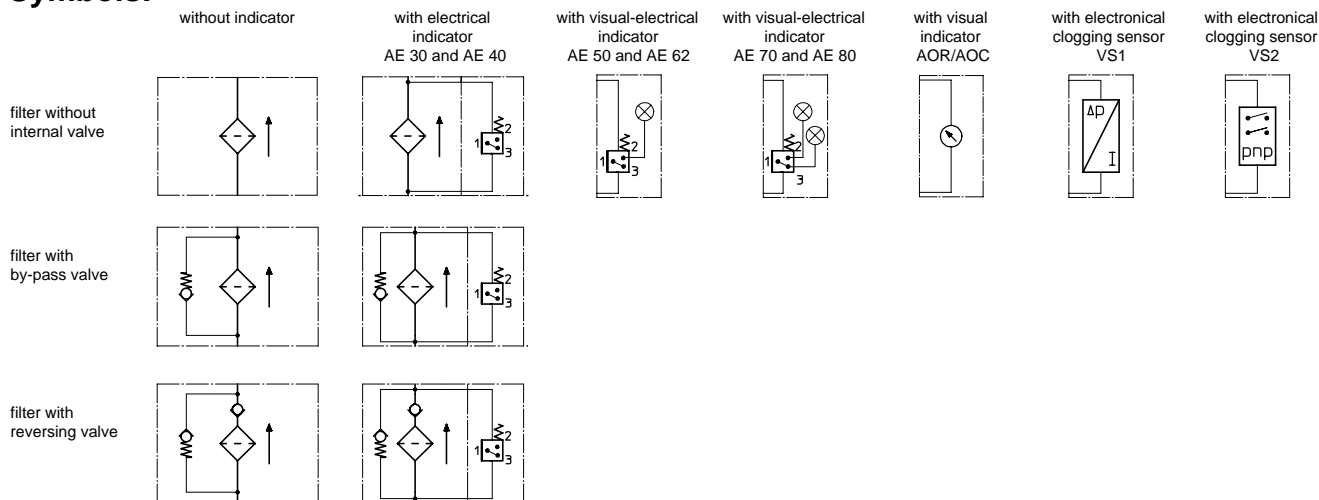
installation position:

vertical

Classified under the PressureEquipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

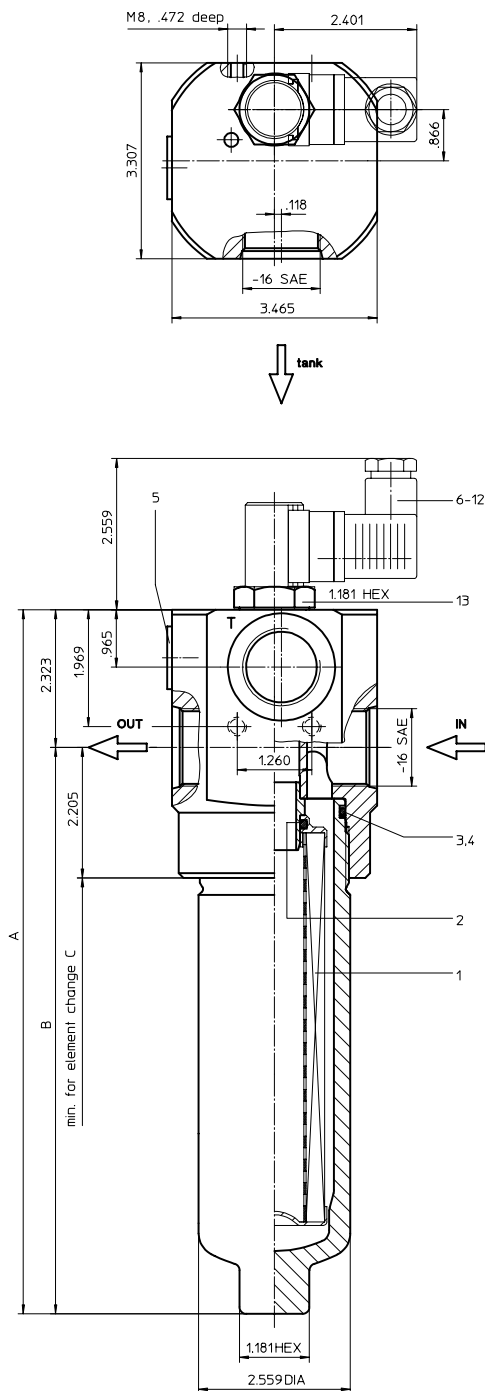
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series HPV 60-150 6000 PSI

Sheet No.
1478 D



1. Type index:

1.1. Complete filter: (ordering example)

HPV. 90. 10VG. HR. E. P. -. UG. 5. -. D2. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
HPV = pressure filter with differential pressure-valve
- 2 **nominal size:** 60, 90, 150
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
5 = - 16 SAE
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
D1 = differential pressure-valve Δ p 51 PSI
D2 = differential pressure-valve Δ p 102 PSI
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual see sheet-no. 1606
AOC = visual see sheet-no. 1606
AE = visual-electrical see sheet-no. 1615
VS1 = electronical see sheet-no. 1617
VS2 = electronical see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN specification
- 2 **nominal size:** 60, 90, 150
- 3 - 7 see type index-complete filter

2. Dimensions: inch

type	HPV 60	HPV 90	HPV 150
connection	-16 SAE		
A	9.33	11.88	16.18
B	7.00	9.56	13.85
C	10.63	13.19	17.52
weight lbs.	14.30	15.40	17.60
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	HPV 60 -150		
2	1	O-ring	01E. 60-150		
3	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	1	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
4	1	support ring	61 x 2,6 x 1	304660	
5	1	screw plug	½ BSPP	304678	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4	309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

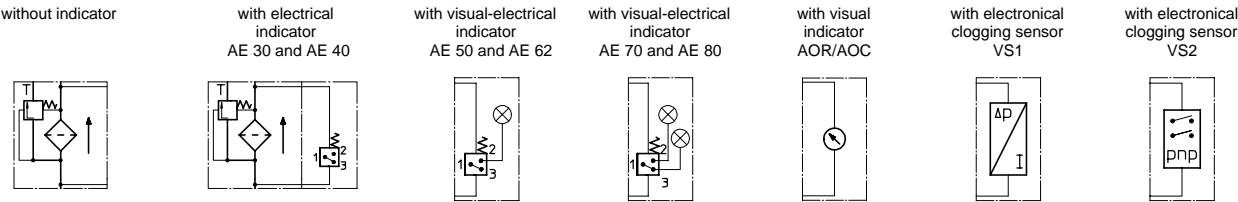
The pressure filters of the series HPV 60-150 are suitable for a working pressure up to 6000 PSI. The pressure peaks are absorbed by a sufficient margin of safety. The HPV-filter is in-line mounted. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 µm_(c). INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI. The differential pressure-valve opens independently of the operating pressure at a chosen differential pressure-valve between IN and OUT and leaves an unfiltered partial-flow flowing from „IN“ to the tank.

5. Technical data:

temperature range: + 14°F to + 176°F (for a short time + 212°F)
operating medium: mineral oil, other media on request
max. operating pressure: 6000 PSI
test pressure: 8580 PSI
connection system: thread connection
housing material: C-steel
sealing material: Nitrile (NBR) or Viton (FPM), other materials on request
installation position: vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

8. Test methods:

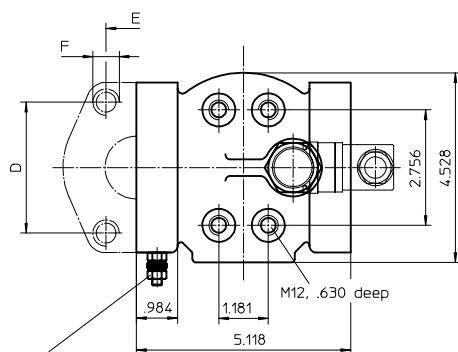
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

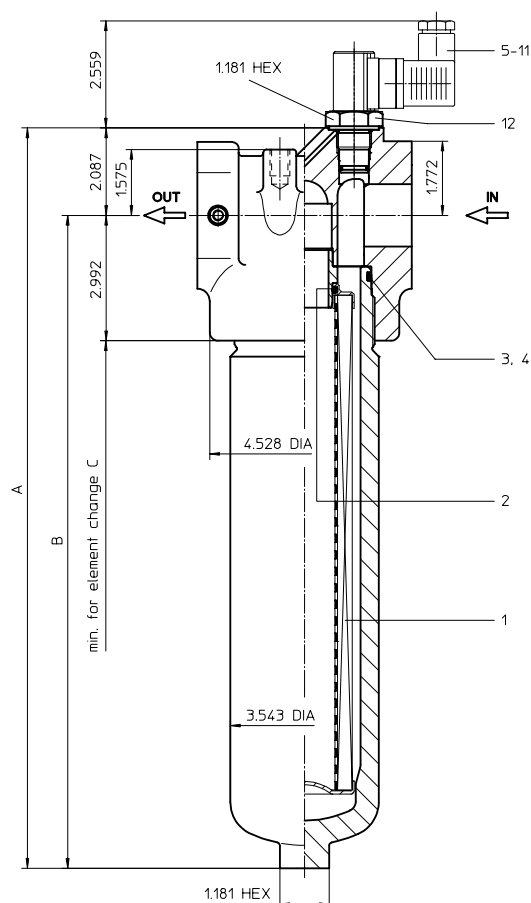
PRESSURE FILTER

Series HP 170 - 450 6000 PSI

Sheet No.
1462 O



connection for the potential equalisation,
only for application in the explosive area



2. Dimensions: inch

type	HP 170	HP 240	HP 360	HP 450
connection	1 1/2" SAE			
A	12.56	14.49	17.68	21.81
B	10.47	12.44	15.59	19.72
C	13.78	15.75	18.90	23.03
D	3.13			
E	1.45			
F	M16, .79 deep			
weight lbs.	28.6	30.8	35.2	41.8
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HP . 170. 10VG. HR. E. P. - . FS. 7. - . - . AE

- 1 **series:**
HP = pressure filter
- 2 **nominal size:** 170, 240, 360, 450
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
FS = SAE-flange connection 6000 PSI
- 9 **connection size:**
7 = 1 1/2"
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, Q \leq 55.75 GPM
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 170. 10VG. HR. E. P. -

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 170, 240, 360, 450
- 3 **- 7** see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HP 170	HP 240	HP 360	HP 450		
1	1	filter element	01E. 170	01E. 240	01E. 360	01E. 450		
2	1	O-ring		34 x 3,5			304338 (NBR)	304730 (FPM)
3	1	O-ring		75 x 3			302215 (NBR)	304729 (FPM)
4	1	support ring		81 x 2,6 x 1			304581	
5	1	clogging indicator visual		AOR or AOC			see sheet-no. 1606	
6	1	clogging indicator visual-electrical		AE			see sheet-no. 1615	
7	1	clogging sensor electronical		VS1			see sheet-no. 1617	
8	1	clogging sensor electronical		VS2			see sheet-no. 1618	
9	1	O-ring		15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4			309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

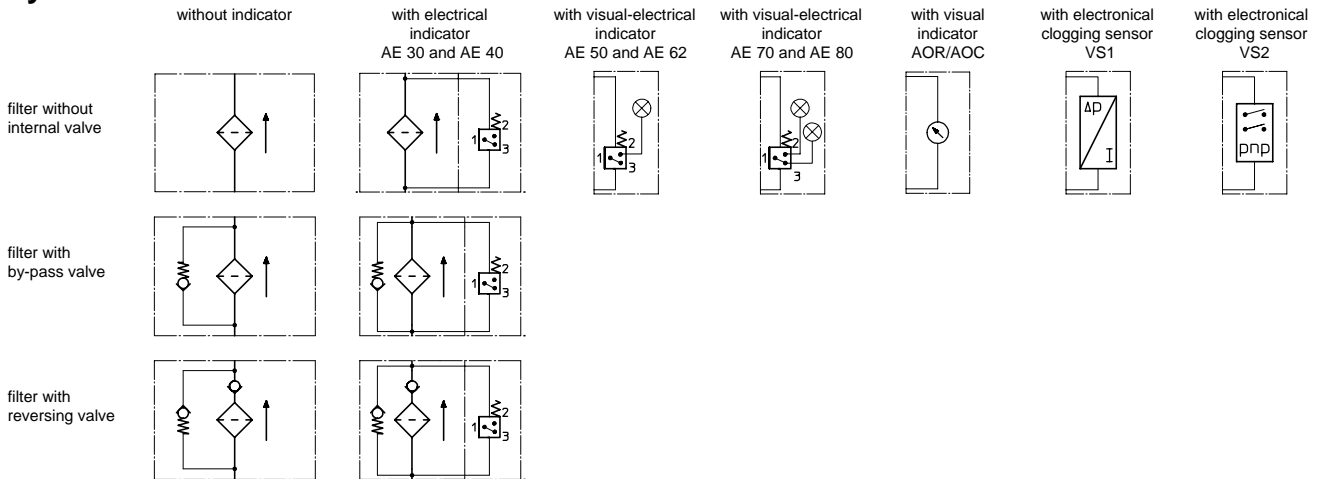
The pressure filters of the series HP 170-450 are suitable for a working pressure up to 6000 PSI. The pressure peaks are absorbed by a sufficient margin of safety. The HP-filters are flange mounted to the hydraulic system. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of $4 \mu\text{m}_{(0)}$. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI. The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range: +14°F to + 176°F (for a short time + 212°F)
operating medium: mineral oil, other media on request
max. operating pressure: 6000 PSI
test pressure: 8580 PSI
connection system: SAE-flange connection 6000 PSI
housing material: EN-GJS-400-18-LT; C-steel
sealing material: Nitrile (NBR) or Viton (FPM), other materials on request
installation position: vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

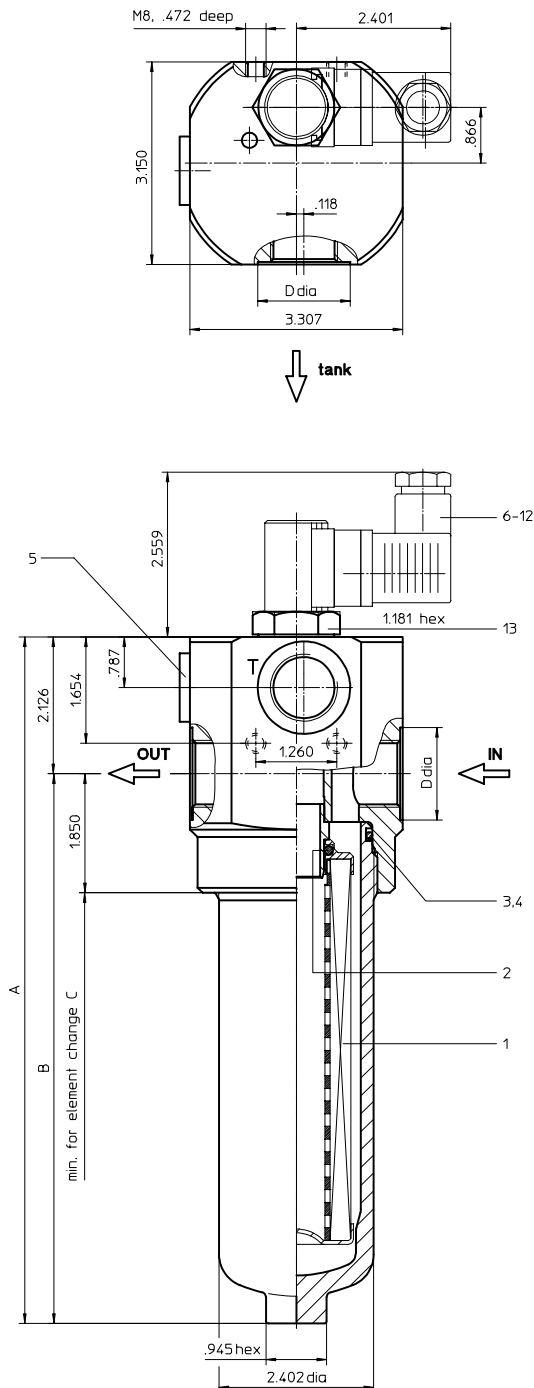
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series MDV 40-63 2900 PSI

Sheet No.
1419 D



1. Type index:

1.1. Complete filter: (ordering example)

MDV. 40. 10VG. HR. E. P. -. UG. 3. -. D2. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
MDV = medium pressure filter with differential pressure-valve
- 2 **nominal size:** 40, 63
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
3 = - 8 SAE
4 = - 12 SAE
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
D1 = differential pressure-valve Δ p 51 PSI
D2 = differential pressure-valve Δ p 102 PSI
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual see sheet-no. 1606
AOC = visual see sheet-no. 1606
AE = visual-electrical see sheet-no. 1615
VS1 = electronical see sheet-no. 1617
VS2 = electronical see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL. 40. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NL = standard filter element according to DIN 24550, T3
- 2 **nominal size:** 40, 63
- 3 - 7 see type index-complete filter

2. Dimensions: inch

type	connection	A	B	C	weight lbs.	volume tank
MDV 40	- 8 SAE	8.30	6.18	10.43	5.94	.06 Gal.
MDV 63	- 12 SAE	10.67	8.54	12.80	7.04	.09 Gal.

Connection assignments as shown in the table are standard according to DIN 24 550 T1. Are the connection assignments against DIN 24 550 T1, see item 9 of the type code.

3. Spare parts:

item	qty.	designation	dimension		article-no.	
			MDV 40	MDV 63		
1	1	filter element	01NL.40	01NL.63		
2	1	O-ring	22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring	60 x 2,6 x 1		311779	
5	1	screw plug	1/2 BSPP		304678	
6	1	clogging indicator visual	AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator visual-electrical	AE		see sheet-no. 1615	
8	1	clogging sensor electrical	VS1		see sheet-no. 1617	
9	1	clogging sensor electrical	VS2		see sheet-no. 1618	
10	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4		309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series MDV are suitable for a working pressure up to 2900 PSI and equipped with elements according to DIN 24 550 T3.

The pressure peaks are absorbed by a sufficient margin of safety. The MDV-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

The differential pressure-valve opens independently of the operating pressure at a chosen differential pressure-valve between IN and OUT and leaves an unfiltered partial-flow flowing from „IN“ to the tank.

5. Technical data:

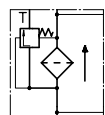
temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral,oil, other media on request
max. operating pressure:	2900 PSI
test pressure:	4147 PSI
connection system:	thread connection
housing material:	aluminium forging alloy; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

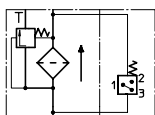
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

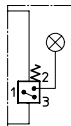
without indicator



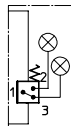
with electrical indicator
AE 30 and AE 40



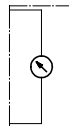
with visual-electrical indicator
AE 50 and AE 62



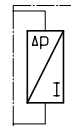
with visual-electrical indicator
AE 70 and AE 80



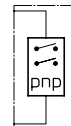
with visual indicator
AOR/AOC



with electronic clogging sensor
VS1



with electronic clogging sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp -curves ; depending on filter fineness and viscosity.

8. Test methods:

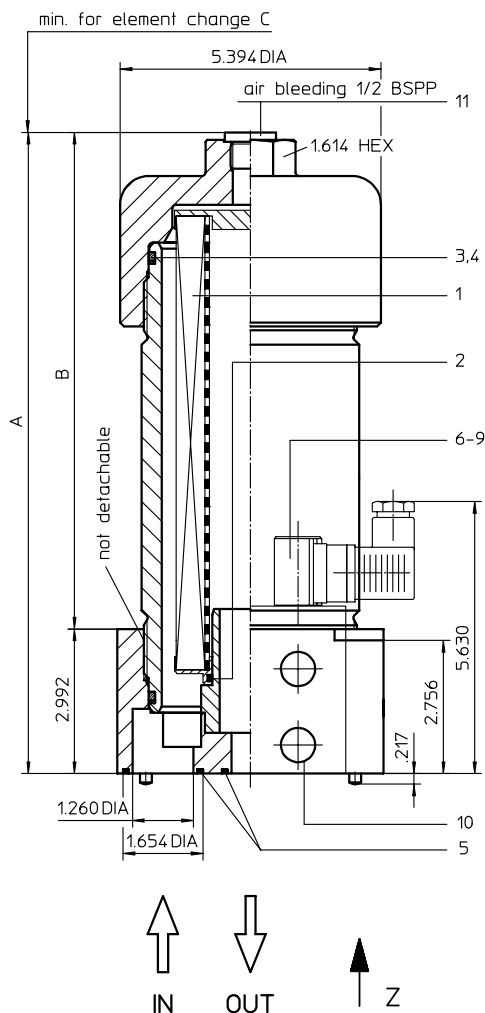
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

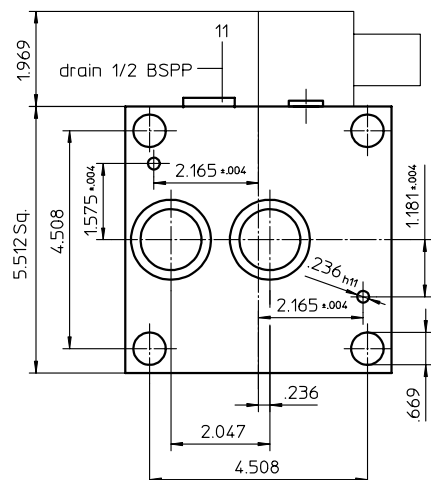
PRESSURE FILTER, manifold mounted

Series MNU 250 - 400 3600 PSI

Sheet No.
1428 J



view "Z"



1. Type index:

1.1. Complete filter: (ordering example)

MNU.250.10VG.30.E.P.-.P.6.-.-.AE

1	2	3	4	5	6	7	8	8	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
MNU = medium pressure standard filter for manifold mounted
- 2 **nominal size:** 250, 400
- 3 **filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fibre)
- 4 **resistance of pressure difference for filter element :**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
P = manifold mounted
- 9 **connection size:**
6 = 1 1/4"
- 10 **filter element specification:**
- = standard
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
- 12 **clogging indicator or clogging sensor :**
- = without
AE = visual-electrical, see sheet-no. 1609
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL.250.10VG.30.E.P.-

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NL. = standard filter element according to DIN 24 550, T3
- 2 **nominal size:** 250, 400
- 3 **- 7** see type index-complete filter

2. Dimensions: inch

type	connection	A	B	C	weight lbs.	volume tank
MNU 250	1 1/4"	13.27	10.28	8.27	44	.42 Gal.
MNU 400	1 1/4"	19.18	16.18	14.17	53	.68 Gal.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension		article-no.	
			MNU 250	MNU 400		
1	1	filter element	01NL. 250	01NL. 400		
2	1	O-ring	40 x 3		304389 (NBR)	304391 (FPM)
3	1	O-ring	98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring	107 x 3,5 x 1,5		317663	
5	2	O-ring	36 x 3		304358 (NBR)	313900 (FPM)
6	1	clogging indicator,visual-electrical	AE		see sheet-no. 1609	
7	1	clogging sensor,electronical	VS1		see sheet-no. 1607	
8	1	clogging sensor,electronical	VS2		see sheet-no. 1608	
9	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
10	2	screw plug	1/8 BSPP		304791	
11	2	screw plug	1/2 BSPP		304678	

item 10 execution only without clogging indicator and clogging sensor

4. Description:

Pressure filters of the series MNU are suitable for a working pressure up to 3600 PSI and equipped with filter elements according to DIN 24550, T3. The pressure peaks are absorbed by a sufficient margin of safety. The MNU-filters are flange-mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive.

The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

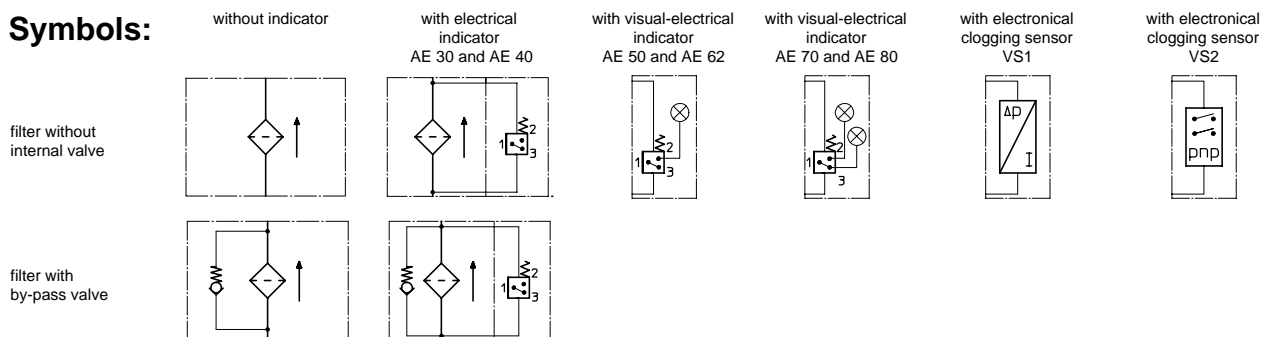
5. Technical data:

temperature range:	+14°F to 176°F (for a short time 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	3600 PSI
test pressure:	5200 PSI
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

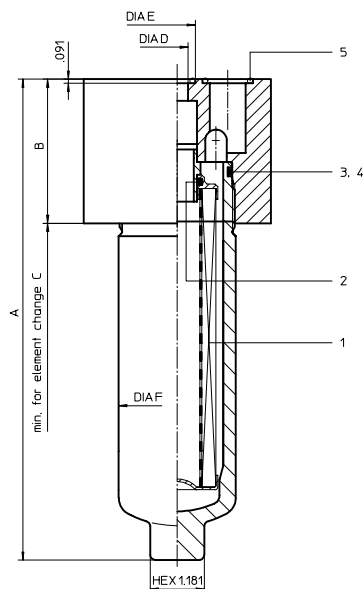
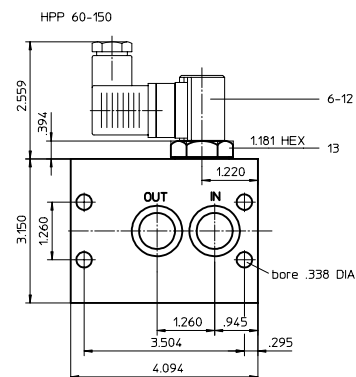
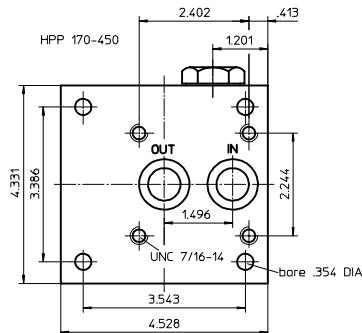
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted

Series HPP 60 - 450 4568 PSI

Sheet No.
1471 O



2. Dimensions: inch

type	HPP 60	HPP 90	HPP 150	HPP 170	HPP 240	HPP 360	HPP 450
connection	¾"			1"			
A	7.95	10.51	14.80	11.22	13.18	16.33	20.55
B	3.15	3.15	3.15	3.74	3.74	3.74	3.74
C	10.63	13.19	17.52	13.78	15.75	18.90	23.03
D	.79	.79	.79	.87	.87	.87	.87
E	1.10	1.10	1.10	1.18	1.18	1.18	1.18
F	2.56	2.56	2.56	3.54	3.54	3.54	3.54
weight lbs.	11	12	14	33	35	39	44
volume tank	.08 Gal.	.10 Gal.	.16 Gal.	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HPP. 90. 10VG. HR. E. P. -. P. 4. -. -. AE

- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
- series:**
HPP = pressure filter, manifold mounted
 - nominal size:** 60, 90, 150, 170, 240, 360, 450
 - filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm
stainless steel wire mesh
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c),
6 VG = 7 µm_(c), 3 VG = 5 µm Interpor fleece (glass fiber)
 - resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
 - filter element design:**
E = single-end open
 - sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
 - filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
 - connection:**
P = manifold mounted
 - connection size:**
4 = ¾" (HPP 60-150)
5 = 1" (HPP 170-450)
 - filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
 - internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, Q ≤ 18.50 GPM (HPP 60-150)
Q ≤ 55.75 GPM (HPP 170-450)
 - clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 60, 90, 150, 170, 240, 360, 450
- 7 see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension and article-no.	
			HPP 60-150	HPP 170-450
1	1	filter element	01E. 60 - 01E. 150	01E. 170 - 01E.450
2	1	O-ring	22 x 3,5 304341 (NBR) 304392 (FPM)	34 x 3,5 304338 (NBR) 304730 (FPM)
3	1	O-ring	54 x 3 304657 (NBR) 304720 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)
4	1	support ring	61 x 2,6 x 1 304660	81 x 2,6 x 1 304581
5	2	O-ring	22 x 3 304387 (NBR) 304931 (FPM)	24 x 3 303038 (NBR) 304397 (FPM)
6	1	clogging indicator, visual	AOR or AOC see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1 see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2 see sheet-no. 1618	
10	1	O-ring	15 x 1,5 315357 (NBR) 315427 (FPM)	
11	1	O-ring	22 x 2 304708 (NBR) 304721 (FPM)	
12	1	O-ring	14 x 2 304342 (NBR) 304722 (FPM)	
13	1	screw plug	20913-4	309817

item 13 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filter of the series HPP 60-450 are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HPP-filters are flanged to the mounting-surface.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

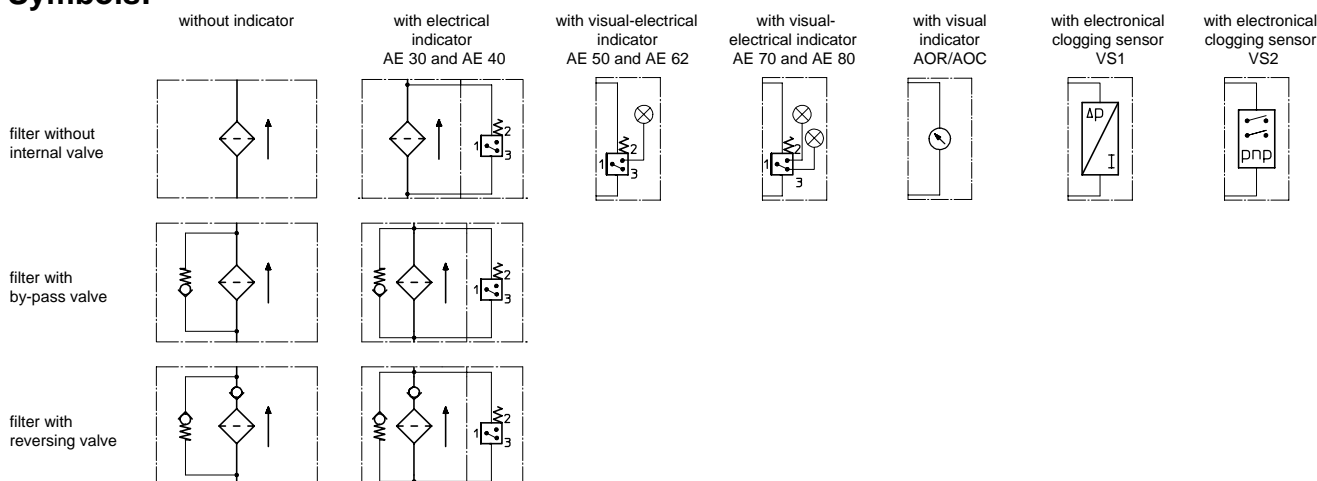
5. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

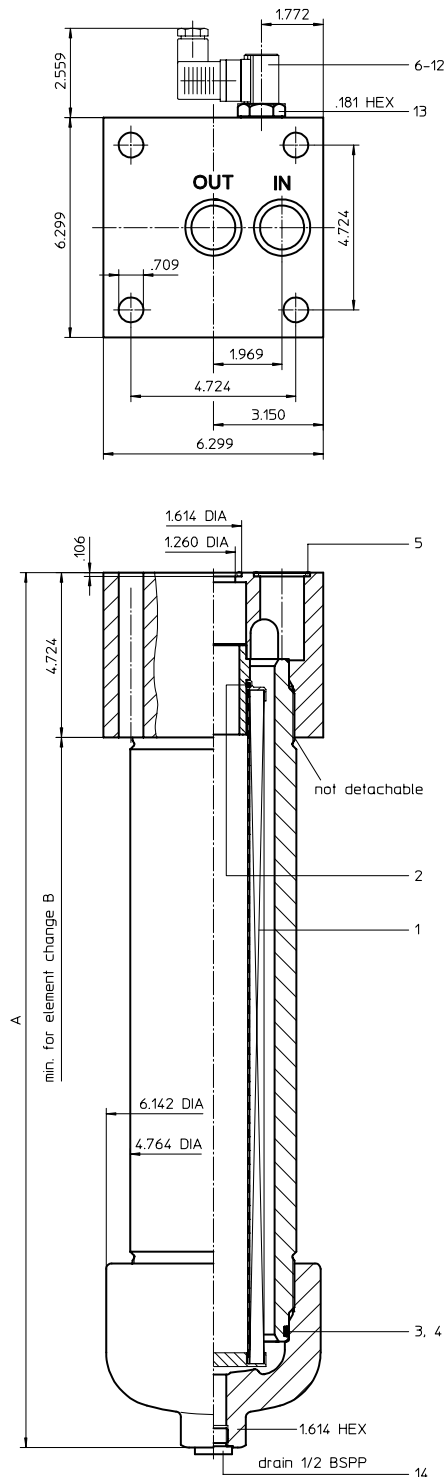
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted

Series HPP 601-1351 4568 PSI

Sheet No.
1470 J



2. Dimensions: inch

type	HPP 601	HPP 901	HPP 1351
connection	1 1/4"	1 1/4"	1 1/4"
A	19.17	25.07	34.84
B	31.10	37.00	56.70
weight lbs.	86	101	128
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HPP. 901. 10VG. HR. E. P. -. P. 6. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPP = pressure filter, manifold mounted

2 nominal size: 601, 901, 1351

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
 25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI

HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

P = manifold mounted

9 connection size:

6 = 1 1/4"

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

11 internal valve:

- = without

S1 = with by-pass valve Δp 51 PSI

S2 = with by-pass valve Δp 102 PSI

R = reversing valve, Q \leq 122.94 GPM

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 600, 900, 1350

3 - 7 see type index-complete filter

3. Spare parts:

item	qty.	designation	HPP 601	dimension HPP 901	HPP 1351	article-no.	
1	1	filter element	01E.600	01E.900	01E.1350		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	O-ring		34 x 3,5		304338 (NBR)	304730 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
7	1	clogging indicator, visual-electrical		AE		see sheet no. 1615	
8	1	clogging sensor, electronical		VS1		see sheet no. 1617	
9	1	clogging sensor, electronical		VS2		see sheet no. 1618	
10	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug		20913-4		309817	
14	1	screw plug		½ BSPP		304678	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPP 601-1351 are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HPP-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

4568 PSI

test pressure:

6525 PSI

connection system:

manifold mounted

housing material:

C-steel; EN-GJS-400-18-LT

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

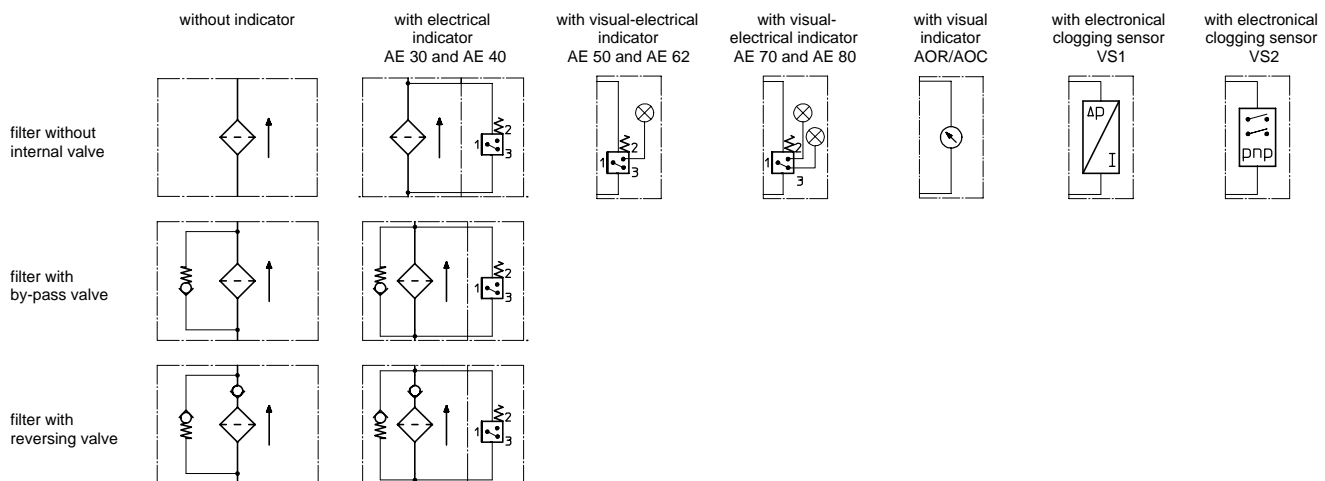
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

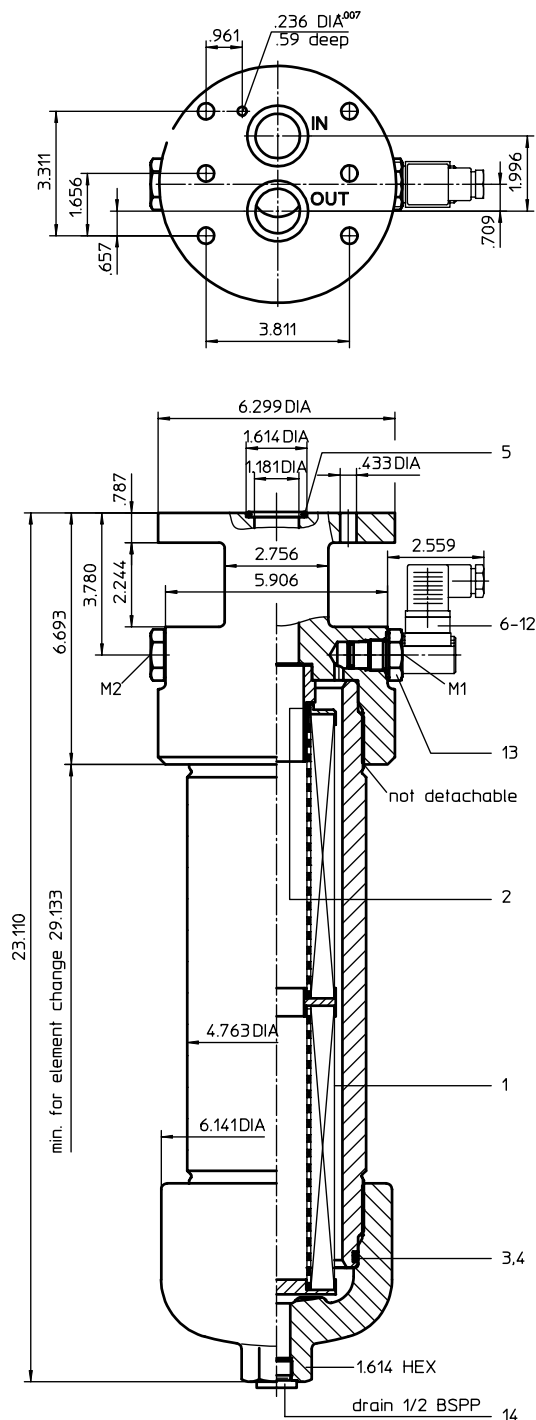
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted

Series HNU 401 4568 PSI

Sheet No.
1476 F



1. Type index:

1.1. Complete filter: (ordering example)

HNU. 401. 10VG. HR. E. P. - . P. 6. - . - . AE. -

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 **series:**
HNU = pressure filter, manifold mounted
- 2 **nominal size:** 401
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
P = manifold mounted
- 9 **connection size:**
6 = 1 1/4"
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
- 12 **clogging indicator at M1:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618
- 13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01NL. 400. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NL = standard filter element according to DIN 24550, T3
- 2 **nominal size:** 400
- 3 - 7 see type index-complete filter

weight: approx. 88 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NL 400		
2	1	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2	304802	
5	2	O-ring	34 x 3,5	304338 (NBR)	304730 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet no. 1615	
8	1	clogging sensor, electronic	VS1	see sheet no. 1617	
9	1	clogging sensor, electronic	VS2	see sheet no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
13	2	screw plug	20913-4	309817	
14	1	screw plug	½ BSPP	304678	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

The pressure filters of the series HNU 401 are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HNU-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

4. Technical data:

temperature range:

+14°F to + 176°F (for a short time + 212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

4568 PSI

test pressure:

6532 PSI

connection system:

manifold mounted

housing material:

EN-GJS-400-18-LT; C-steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

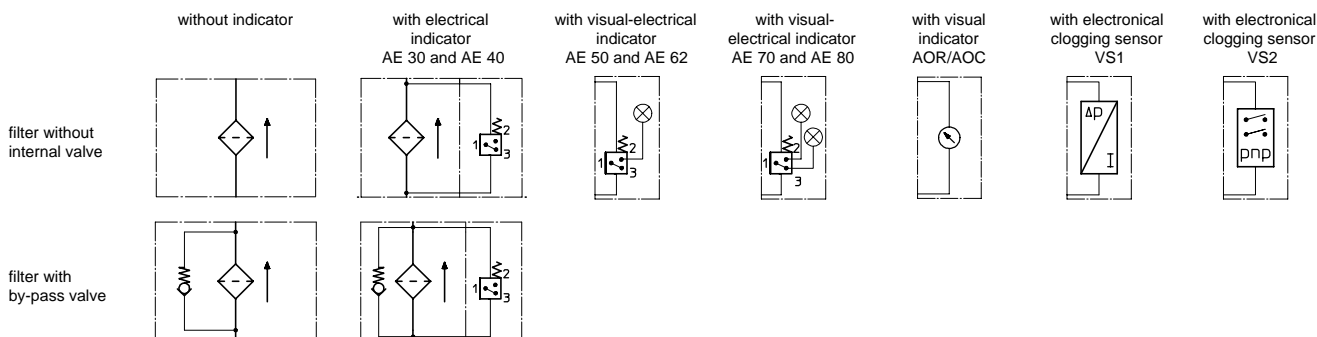
volume tank:

.66 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

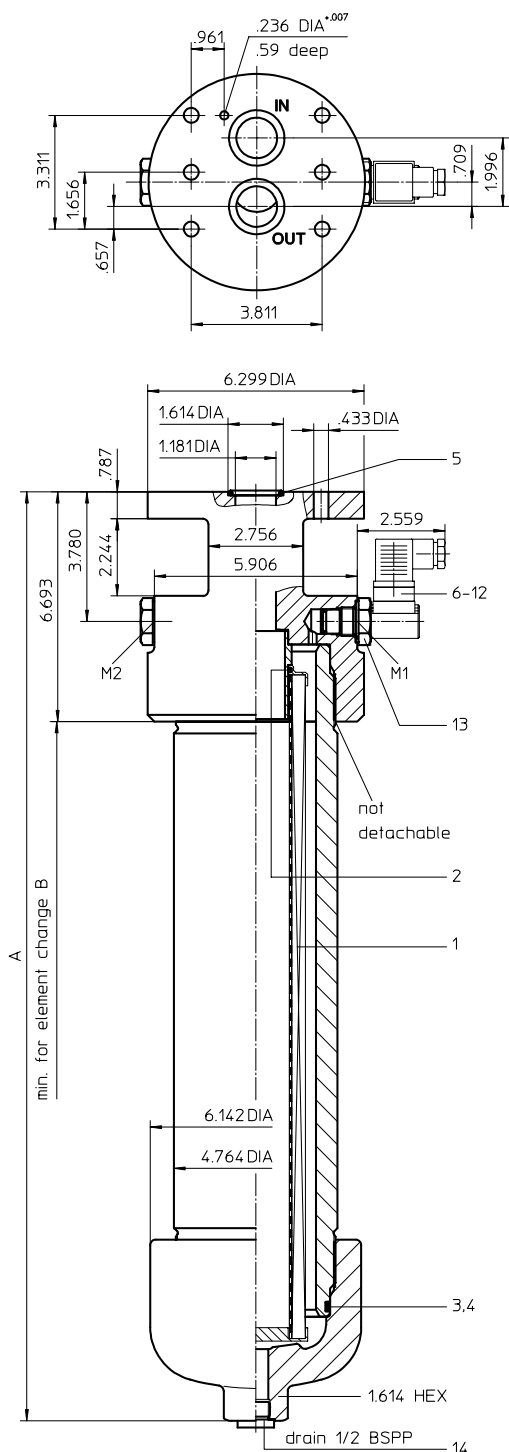
Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

Sheet No.
1480 E



2. Dimensions:

type	HPU 601	HPU 901	HPU 1351
connection	1 1/4 "		
A	21.14	27.05	36.81
B	31.10	37.00	56.70
weight lbs.	83	101	130
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HPU. 901. 10VG. HR. E. P. -. P. 6. -. -. AE. -												
1	2	3	4	5	6	7	8	9	10	11	12	13

- | | |
|----|--|
| 1 | series:
HPU = pressure filter, manifold mounted |
| 2 | nominal size: 601, 901, 1351 |
| 3 | filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 µm _(c) , 16 VG = 15 µm _(c) , 10 VG = 10 µm _(c) ,
6 VG = 7 µm _(c) , 3 VG = 5 µm _(c) Interpor fleece (glass fiber) |
| 4 | resistance of pressure difference for filter element:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601 |
| 8 | connection:
P = manifold mounted |
| 9 | connection size:
6 = 1 ¼" |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605 |
| 11 | internal valve:
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, Q ≤ 122.94 GPM |
| 12 | clogging indicator at M1:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618 |
| 13 | clogging indicator at M2:
possible indicators see position 12 of the type index |

1.2. Filter element: (ordering example)

01E.	900.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

- | | |
|---|--|
| 1 | series:
01E. = filter element according to INTERNORMEN factory specification |
| 2 | nominal size: 600, 900, 1350 |
| 3 | - 7 see type index-complete filter |

2. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPU 601 01E. 600	HPU 901 01E. 900	HPU 1351 01E. 1350		
1	1	filter element					
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	O-ring		34 x 3,5		304338 (NBR)	304730 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
7	1	clogging indicator, visual-electrical		AE		see sheet no. 1615	
8	1	clogging sensor, electronical		VS1		see sheet no. 1617	
9	1	clogging sensor, electronical		VS2		see sheet no. 1618	
10	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
13	2	screw plug		20913-4		309817	
14	1	screw plug		1/4 BSPP		304678	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

The pressure filters of the series HPU 601-1351 are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HPU-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

4. Technical data:

temperature range:

+14°F to + 176°F (for a short time + 212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

4568 PSI

test pressure:

6532 PSI

connection system:

manifold mounted

housing material:

EN-GJS-400-18-LT; C-steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

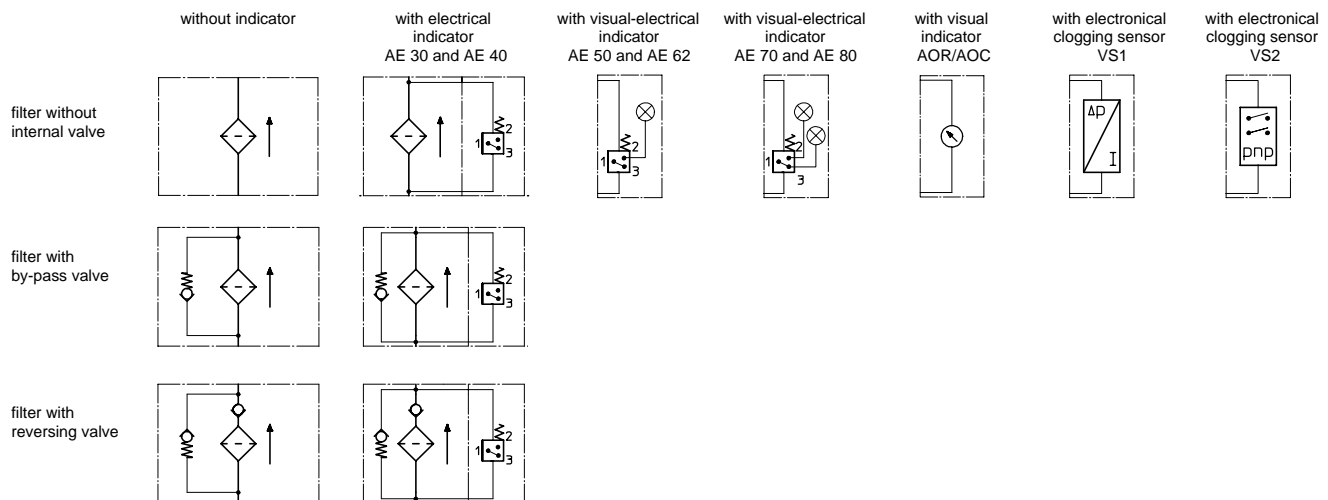
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance

ISO 2942 Verification of fabrication integrity

ISO 2943 Verification of material compatibility with fluids

ISO 3723 Method for end load test

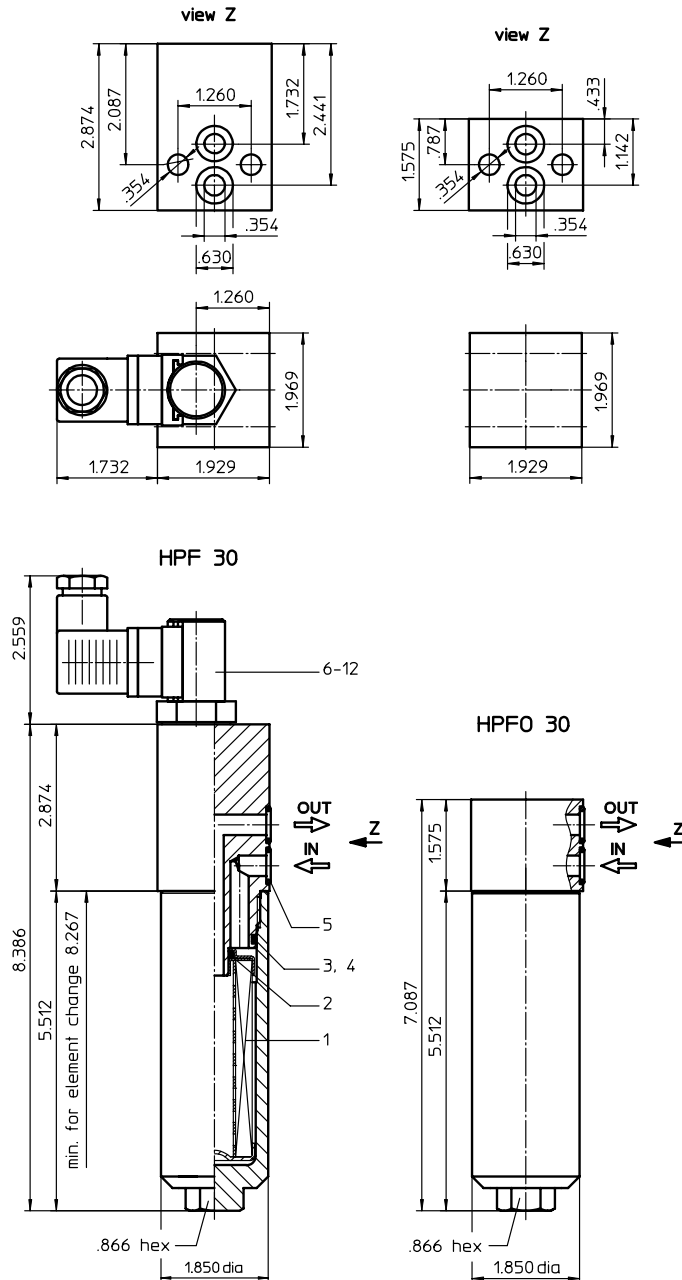
ISO 3724 Verification of flow fatigue characteristics

ISO 3968 Evaluation of pressure drop versus flow characteristics

ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted **Series HPF 30, HPFO 30 4568 PSI**

Sheet No.
1495 B



1. Type index:

1.1. Complete filter: (ordering example)

HPF. 30. 10VG. HR. E. P. - F. 2. - AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 series:**
 HPF = medium pressure filter, manifold mounted with indicator
 HPFO = medium pressure filter, manifold mounted without indicator
- 2 nominal size:** 30
- 3 filter-material and filter-fineness:**
 80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
 stainless steel wire mesh
 25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber))
- 4 resistance of pressure difference for filter element:**
 30 = Δ p 435 PSI
 HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- 5 filter element design:**
 E = single-end open
- 6 sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM)
- 7 filter element specification:** (see catalog)
 - = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
- 8 connection:**
 F = manifold mounted
- 9 connection size:**
 2 = 3/8"
- 10 filter housing specification:** (see catalog)
 - = standard
 IS06 = see sheet-no. 31605
- 11 clogging indicator or clogging sensor:**
 series HPFO:
 - = without
 series HPF:
 AOR = visual, see sheet-no. 1606
 AOC = visual, see sheet-no. 1606
 AE = visual-electrical, see sheet-no. 1615
 VS1 = electronical, see sheet-no. 1617
 VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
 01E. = filter element according to INTERNORMEN factory specification
- 2 nominal size:** 30
- 3 - 7** see type index-complete filter

weight without indicator: approx. 3.96 lbs.
 weight with indicator: approx. 5.29 lbs.

2. Spare parts:

item	qty.	designation	dimensions	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	2	O-ring	12 x 2	311014 (NBR)	310271 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electronic	VS1	see sheet-no. 1617	
9	1	clogging sensor, electronic	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

3. Description:

Pressure filter of the series HPF 30 and HPFO 30 are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

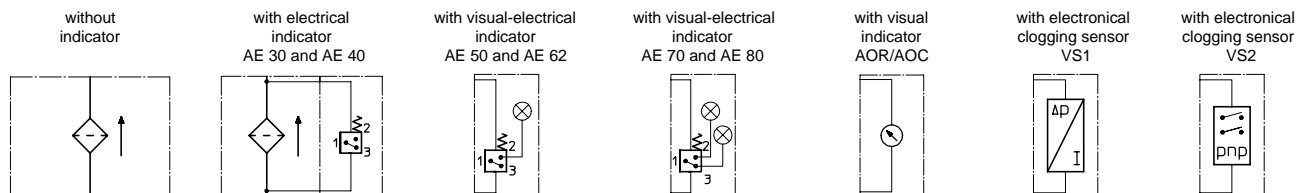
4. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.02 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

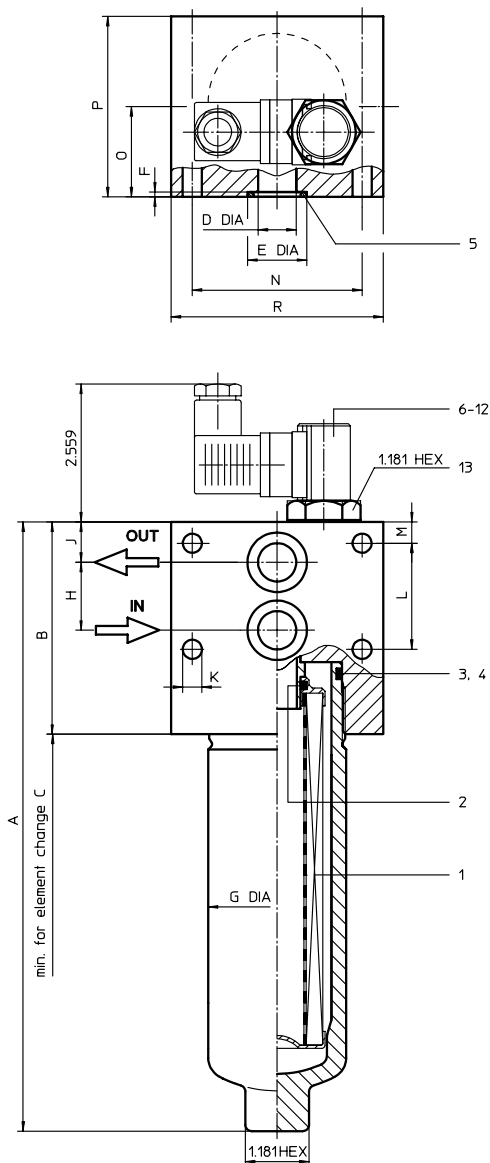
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted

Series HPF 60 - 450 4568 PSI

Sheet No.
1473 O



2. Dimensions: inch

type	HPF 60	HPF 90	HPF 150	HPF 170	HPF 240	HPF 360	HPF 450
connection	3/4"	3/4"	3/4"	1"	1"	1"	1"
A	8.58	11.14	15.43	12.99	14.96	18.11	22.24
B	3.78	3.78	3.78	5.51	5.51	5.51	5.51
C	10.63	13.19	17.52	13.78	15.75	18.90	23.03
D	0.71	0.71	0.71	1.10	1.10	1.10	1.10
E	1.10	1.10	1.10	1.50	1.50	1.50	1.50
F	0.09	0.09	0.09	0.07	0.07	0.07	0.07
G	2.55	2.55	2.55	3.54	3.54	3.54	3.54
H	1.26	1.26	1.26	1.73	1.73	1.73	1.73
J	0.75	0.75	0.75	1.10	1.10	1.10	1.10
K	0.35	0.35	0.35	0.55	0.55	0.55	0.55
L	1.97	1.97	1.97	1.73	1.73	1.73	1.73
M	0.39	0.39	0.39	1.10	1.10	1.10	1.10
N	3.15	3.15	3.15	3.15	3.15	3.15	3.15
O	1.67	1.67	1.67	2.26	2.26	2.26	2.26
P	3.35	3.35	3.35	4.52	4.52	4.52	4.52
R	3.78	3.78	3.78	4.52	4.52	4.52	4.52
weight lbs.	12.1	13.2	15.4	37.4	39.6	44.0	50.6
volume tank	.08 Gal.	.10 Gal.	.16 Gal.	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HPF. 90. 10VG. HR. E. P. - . F. 4. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
HPF = pressure filter, manifold mounted
- nominal size:** 60, 90, 150, 170, 240, 360, 450
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
ISO6 = see sheet-no. 31601
- connection:**
F = manifold mounted
- connection size:**
4 = 3/4" (HPF 60-150)
5 = 1" (HPF 170-450)
- filter housing specification:** (see catalog)
- = standard
ISO6 = see sheet-no. 31605
- internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
R = reversing valve, Q \leq 18.50 GPM (HPF 60-150)
Q \leq 55.75 GPM (HPF 170-450)
- clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 60, 90, 150, 170, 240, 360, 450
- 7 see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension and article-no.	
			HPF 60-150	HPF 170-450
1	1	filter element	01E. 60 - 01E. 150	01E. 170 - 01E.450
2	1	O-Ring	22 x 3,5 304341 (NBR) 304392 (FPM)	34 x 3,5 304338 (NBR) 304730 (FPM)
3	1	O-Ring	54 x 3 304657 (NBR) 304720 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)
4	1	support ring	61 x 2,6 x 1 304660	81 x 2,6 x 1 304581
5	2	O-Ring	22 x 3 304387 (NBR) 304931 (FPM)	33,3 x 2,4 304380 (NBR) 314706 (FPM)
6	1	clogging indicator, visual	AOR or AOC see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1 see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2 see sheet-no. 1618	
10	1	O-Ring	15 x 1,5 315357 (NBR) 315427 (FPM)	
11	1	O-Ring	22 x 2 304708 (NBR) 304721 (FPM)	
12	1	O-Ring	14 x 2 304342 (NBR) 304722 (FPM)	
13	1	screw plug	20913-4	309817

item 13 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filter of the series HPF are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HPF-filters are flanged to the mounting-surface.

The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

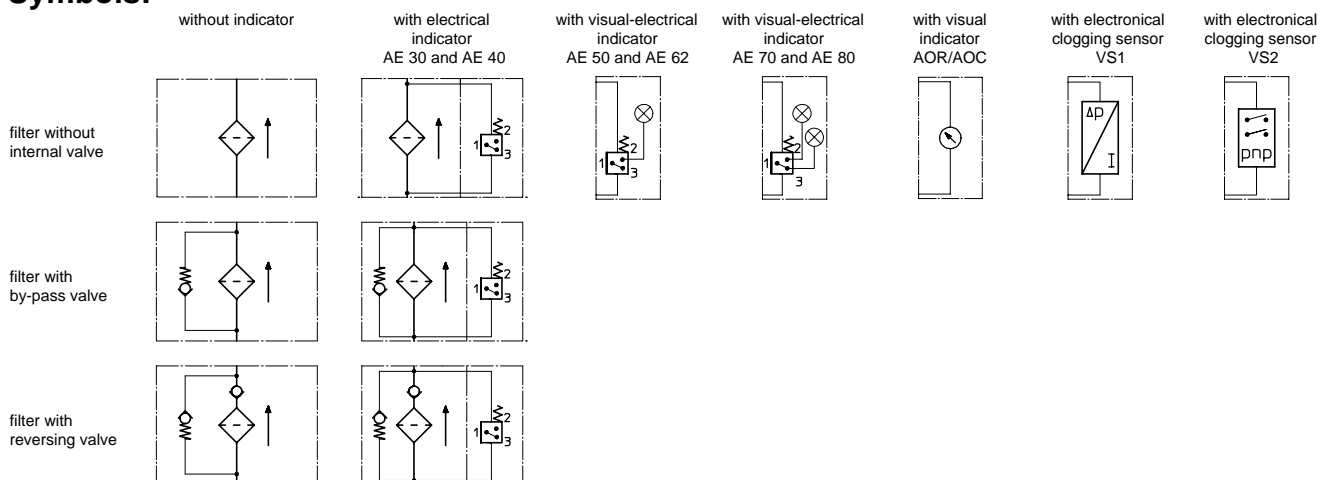
5. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

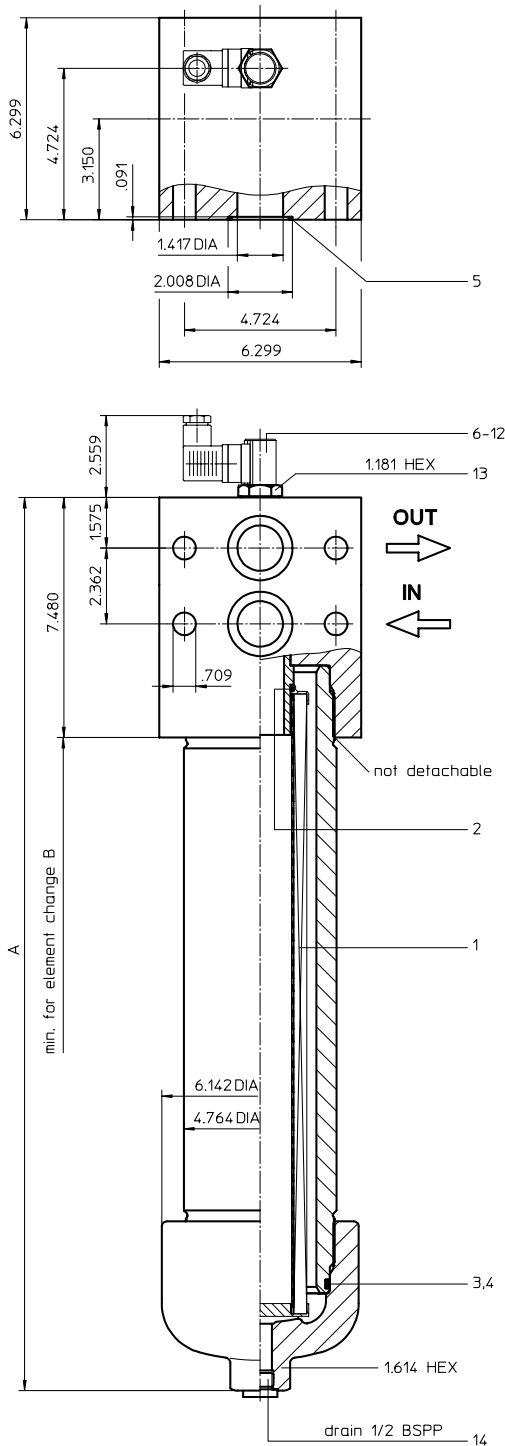
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted

Series HPF 601- 1351 4568 PSI

Sheet No.
1472 H



2. Dimensions:

type	HPF 601	HPF 901	HPF 1351
connection	1 1/4"	1 1/4"	1 1/4"
A	21.93	27.83	37.60
B	31.10	37.00	56.70
weight lbs.	103	119	145
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HPF. 901. 10VG. HR. E. P. - F. 6. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPF = pressure filter, manifold mounted

2 nominal size: 601, 901, 1351

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
 25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δ p 435 PSI

HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

F = manifold mounted

9 connection size:

6 = 1 1/4"

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

11 internal valve:

- = without

S1 = with by-pass valve Δ p 51 PSI

S2 = with by-pass valve Δ p 102 PSI

R = reversing valve, Q \leq 122.94 GPM

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 600, 900, 1350

3 - 7 see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPF 601	HPF 901	HPF 1351		
1	1	filter element	01E.600	01E.900	01E.1350		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	O-ring		45 x 3		304991 (NBR)	304997 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator, visual-electrical		AE		see sheet-no. 1615	
8	1	clogging sensor, electronical		VS1		see sheet-no. 1617	
9	1	clogging sensor, electronical		VS2		see sheet-no. 1618	
10	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug		20913-4		309817	
14	1	screw plug		½ BSPP		304678	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPF 601-1351 are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The HPF-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 µm(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

4568 PSI

test pressure:

6525 PSI

connection system:

manifold mounted

housing material:

C-steel; EN-GJS-400-18-LT

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

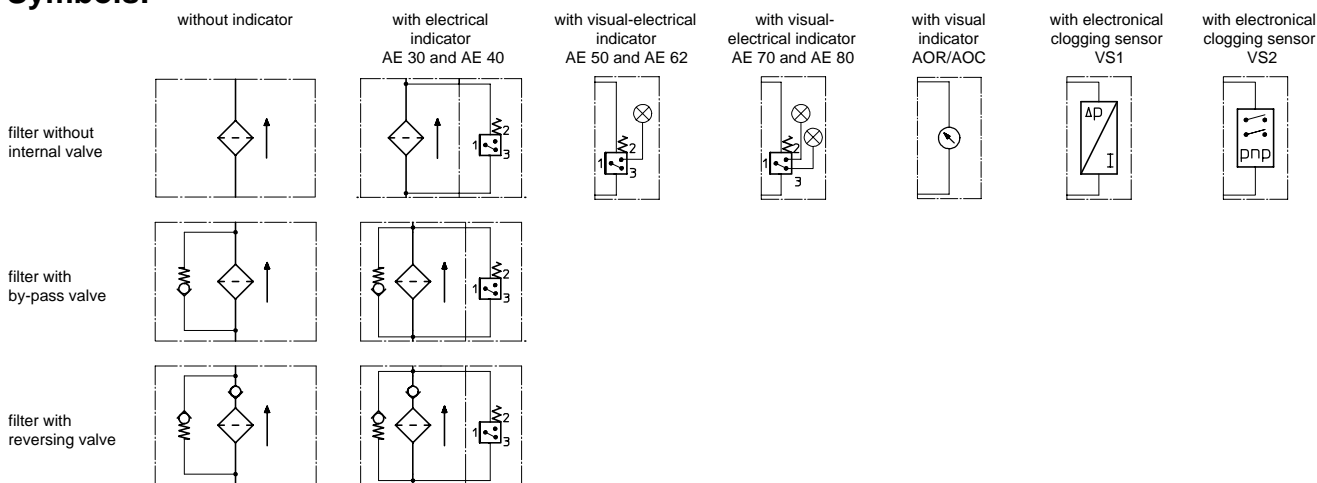
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

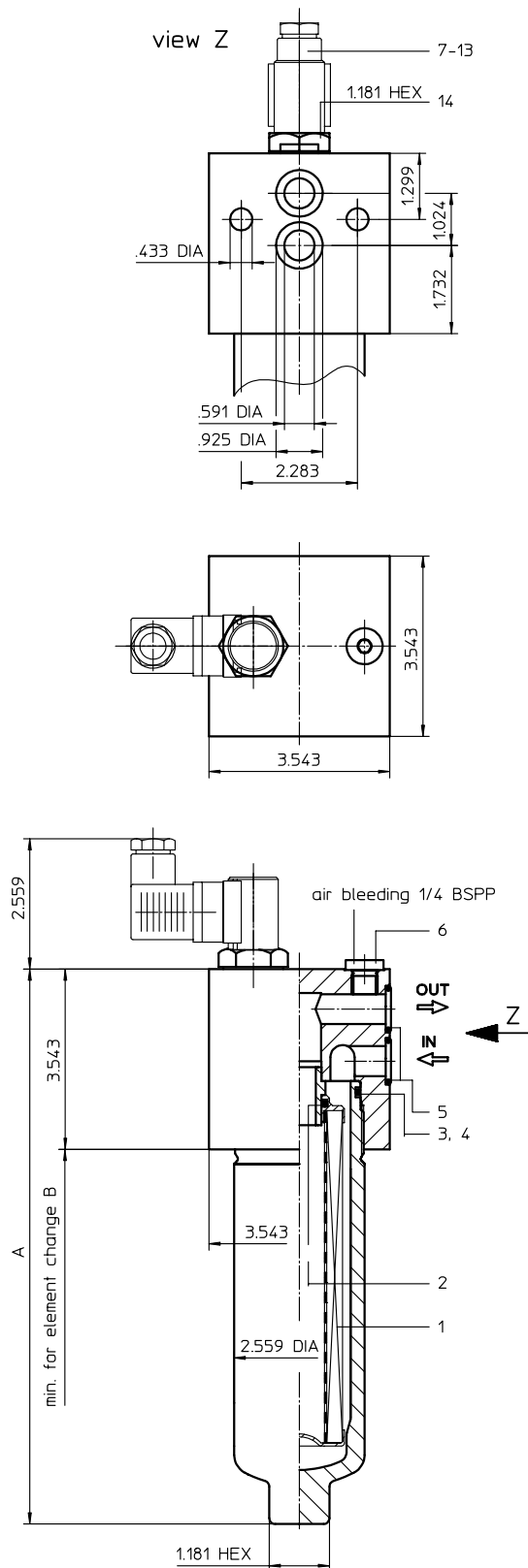
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted

Series FHP 60 - 150 3625 PSI

Sheet No.
1474 G



1. Type index:

1.1. Complete filter: (ordering example)

FHP. 90. 10VG. HR. E. P. - F. 4. - - AE

- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
- series:**
FHP = pressure filter, manifold mounted
 - nominal size:** 60, 90, 150
 - filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
 - resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
 - filter element design:**
E = single-end open
 - sealing material:**
P = Nitrile (NBR); V = Viton (FPM)
 - filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
 - connection:**
F = manifold mounted
 - connection size:**
4 = 3/4"
 - filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
 - internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
R = reversing valve, Q \leq 18.50 GPM
 - clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 60, 90, 150
- 7** see type index-complete filter

2. Dimensions: inch

type	FHP 60	FHP 90	FHP 150
connection	3/4"		
A	8.35	10.90	15.12
B	10.63	13.19	17.52
weight lbs.	11	12	14
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

3. Spare parts:

item	qty.	designation	dimensions			article-no.	
			FHP 60 01E. 60	FHP 90 01E. 90	FHP 150 01E. 150		
1	1	filter element					
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring		61 x 2,6 x 1		304660	
5	2	O-ring		18 x 2,5		304371 (NBR)	
6	1	screw plug		¼ BSPP		305003	
7	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
8	1	clogging indicator, visual-electrical		AE		see sheet-no. 1615	
9	1	clogging sensor, electronic		VS1		see sheet-no. 1617	
10	1	clogging sensor, electronic		VS2		see sheet-no. 1618	
11	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
12	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
13	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
14	1	screw plug		20913-4		309817	

item 14 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filter of the series FHP are suitable for a working pressure up to 3625 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The FHP-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Filter elements are available down to 4 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:

+14°F to + 176°F (for a short time + 212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

3625 PSI

test pressure:

5184 PSI

connection system:

manifold mounted

housing material:

C-steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

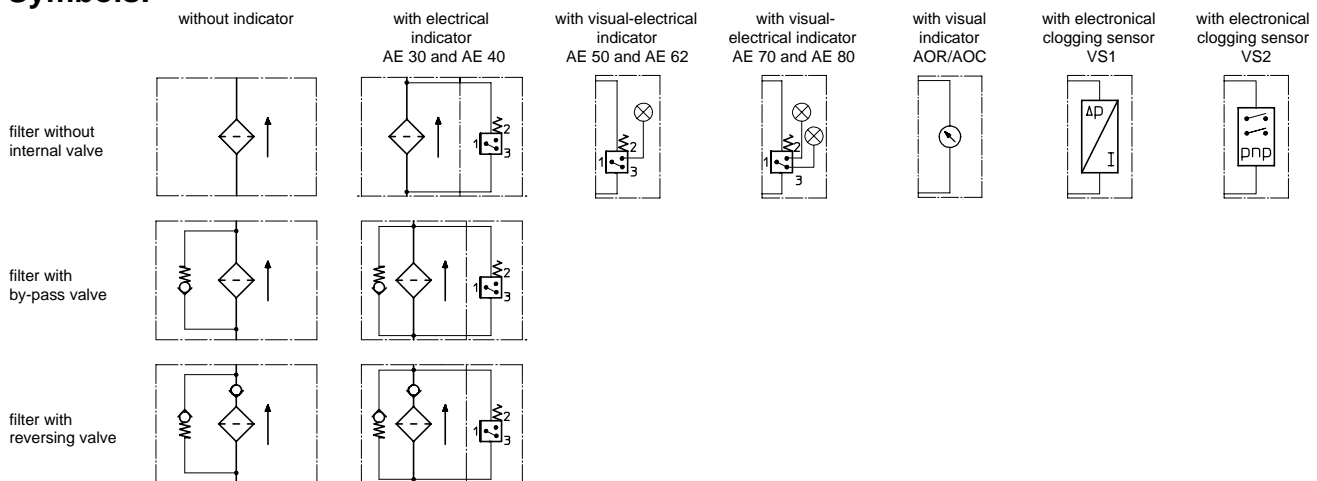
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance

ISO 2942 Verification of fabrication integrity

ISO 2943 Verification of material compatibility with fluids

ISO 3723 Method for end load test

ISO 3724 Verification of flow fatigue characteristics

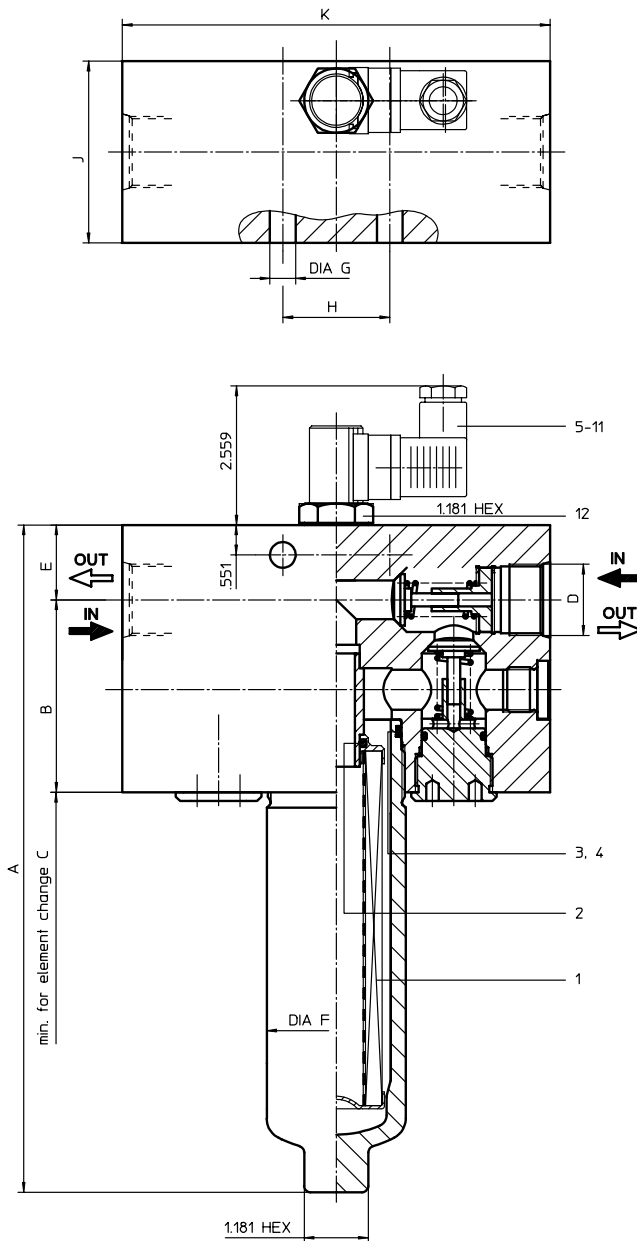
ISO 3968 Evaluation of pressure drop versus flow characteristics

ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER for reversable filtration

Series HPW 60 - 450 4568 PSI

Sheet No.
1481 K



1. Type index:

1.1. Complete filter: (ordering example)

HPW. 170. 10VG. HR. E. P. -. UG. 7. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
HPW = pressure filter for reversable filtration
- 2 **nominal size:** 60, 90, 150, 170, 240, 360, 450
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
5 = -16 SAE HPW 60-150
7 = -24 SAE HPW 170-450
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

2. Dimensions: inch

type	HPW 60	HPW 90	HPW 150	HPW 170	HPW 240	HPW 360	HPW 450
A	9.72	12.28	16.58	13.78	15.75	18.90	23.03
B	3.54	3.54	3.54	4.72	4.72	4.72	4.72
C	10.63	13.19	17.52	13.80	15.75	18.90	13.03
D	-16SAE	-16SAE	-16SAE	-24SAE	-24SAE	-24SAE	-24SAE
E	1.38	1.38	1.38	1.58	1.58	1.58	1.58
F	2.56	2.56	2.56	3.55	3.55	3.55	3.55
G	.48	.48	.48	.55	.55	.55	.55
H	1.97	1.97	1.97	2.36	2.36	2.36	2.36
J	3.35	3.35	3.35	4.53	4.53	4.53	4.53
K	7.87	7.87	7.87	10.63	10.63	10.63	10.63
weight lbs.	35.2	36.3	37.4	85.8	88.0	92.4	96.8
volume tank	.08 Gal.	.10 Gal.	.16 Gal.	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

1.2. Filter element: (ordering example)

01E. 170.10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 60, 90, 150, 170, 240, 360, 450
- 3 - 7 see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension and article-no.	
			HPW 60-150	HPW 170-450
1	1	filter element	01E. 60 - 01E. 150	01E. 170 - 01E.450
2	1	O-ring	22 x 3,5 304341 (NBR) 304392 (FPM)	34 x 3,5 304338 (NBR) 304730 (FPM)
3	1	O-ring	54 x 3 304657 (NBR) 304720 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)
4	1	support ring	61 x 2,6 x 1 304660	81 x 2,6 x 1 304581
5	1	clogging indicator visual	AOR or AOC see sheet-no. 1606	
6	1	clogging indicator visual-electrical	AE see sheet-no. 1615	
7	1	clogging sensor electrical	VS1 see sheet-no. 1617	
8	1	clogging sensor electrical	VS2 see sheet-no. 1618	
9	1	O-ring	15 x 1,5 315357 (NBR) 315427 (FPM)	
10	1	O-ring	22 x 2 304708 (NBR) 304721 (FPM)	
11	1	O-ring	14 x 2 304342 (NBR) 304722 (FPM)	
12	1	screw plug	20913-4	309817

item 12 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filter of the series HPW 60-450 are intended for fields of application, where the medium that should be filtered flows through the filter in two directions and the filter effect for both directions of flow exists.

Four check valves fitted in Graetz-position (see switching symbol) guarantee the function, that the flow against to the filter-element will be always from the same side even with changing flow direction. The HPW-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

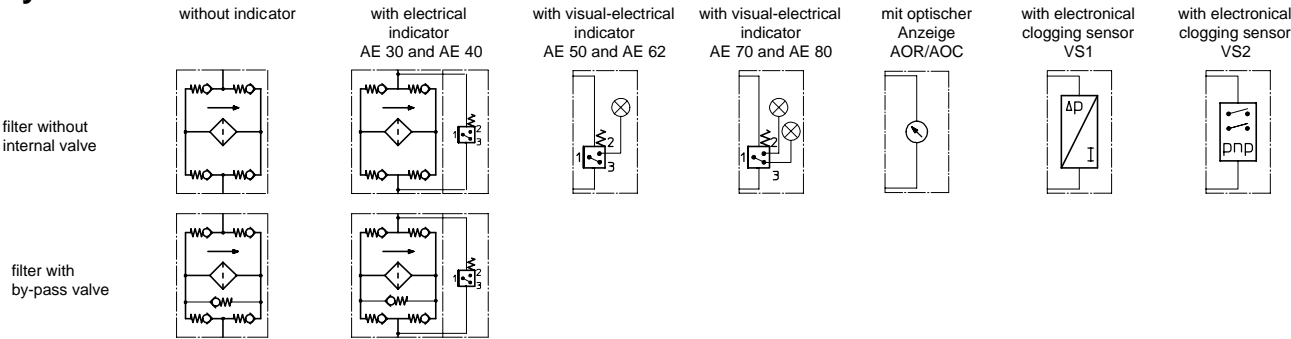
The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

5. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
connection system:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

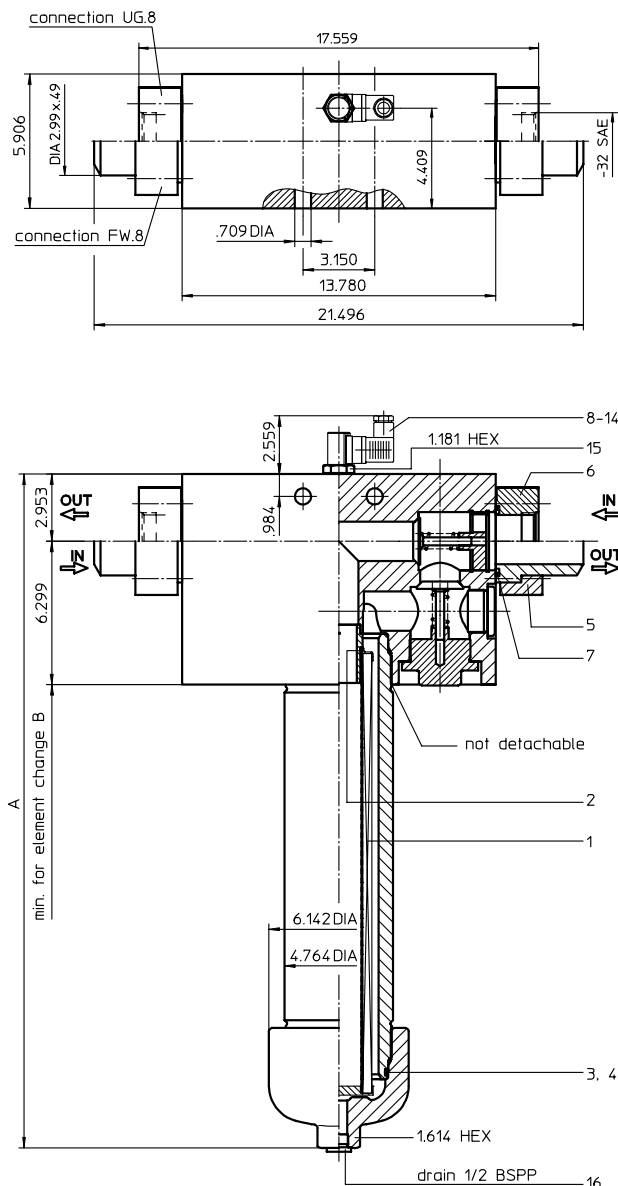
8. Test methods:

- Filter elements are tested according to the following ISO standards:
- ISO 2941 Verification of collapse/burst resistance
 - ISO 2942 Verification of fabrication integrity
 - ISO 2943 Verification of material compatibility with fluids
 - ISO 3723 Method for end load test
 - ISO 3724 Verification of flow fatigue characteristics
 - ISO 3968 Evaluation of pressure drop versus flow characteristics
 - ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER for reversable filtration

Series HPW 601 - 1351 4568 PSI

Sheet No.
1482 G



3. Dimensions: inch

type	HPW 601	HPW 901	HPW 1351
connection	2"	2"	2"
A	23.70	29.60	39.37
B	31.10	37.00	56.70
weight lbs.	253	268	295
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HPW.	901.	10VG.	HR.	E.	P.	-	FW.	8.	-	-	AE
1	2	3	4	5	6	7	8	9	10	11	12

- 1 **series:**
HPW = pressure filter for reversable filtration
- 2 **nominal size:** 601, 901, 1351
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
FW = flange connection factory specification
UG = thread connection
- 9 **connection size:**
8 = 2"
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	900.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 600, 900, 1350
- 3 - 7 see type index-complete filter

2. Accessories:

- counter flange, see sheet-no. 1654

Changes of measures and design are subject to alteration!

4. Spare parts:

item	qty.	designation	HPW 601	dimension HPW 901	HPW 1351	article-no..	
1	1	filter element	01E.600	01E.900	01E.1350		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	counter flange		FW 50-4-2.99 x .49		303717.1	
6	2	adapter		FW.8.UG.8		320556	
7	2	O-ring		68 x 5		304376 (NBR)	304394 (FPM)
8	1	clogging indicator visual		AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator visual-electrical		AE		see sheet-no. 1615	
10	1	clogging sensor electrical		VS1		see sheet-no. 1617	
11	1	clogging sensor electrical		VS2		see sheet-no. 1618	
12	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
13	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
14	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
15	1	screw plug		20913-4		309817	
16	1	screw plug		½ BSPP		304678	

item 15 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filter of the series HPW 601-1351 are intended for fields of application, where the medium that should be filtered flows through the filter in two directions and the filter effect for both directions of flow exists.

Four check valves fitted in Graetz-position (see switching symbol) guarantee the function, that the flow against to the filter-element will be always from the same side even with changing flow direction. The HPW-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

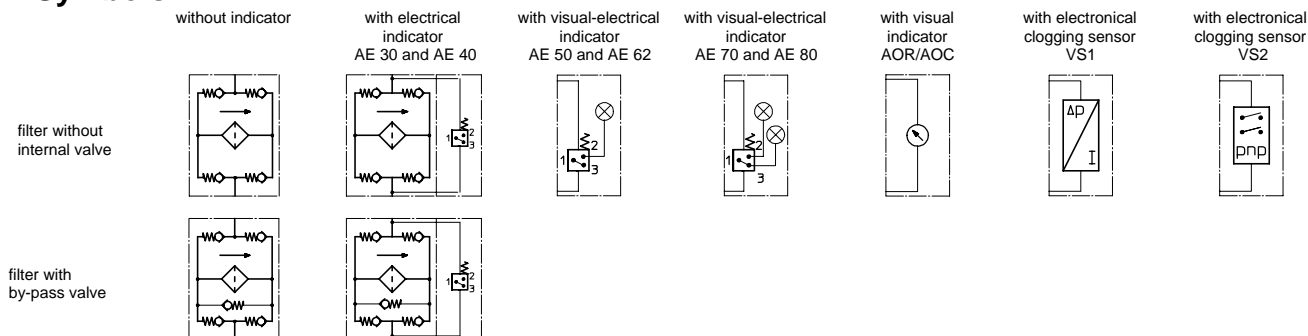
6. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
connection system:	flange connection factory specification or thread connection
housing material:	C-steel ; EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

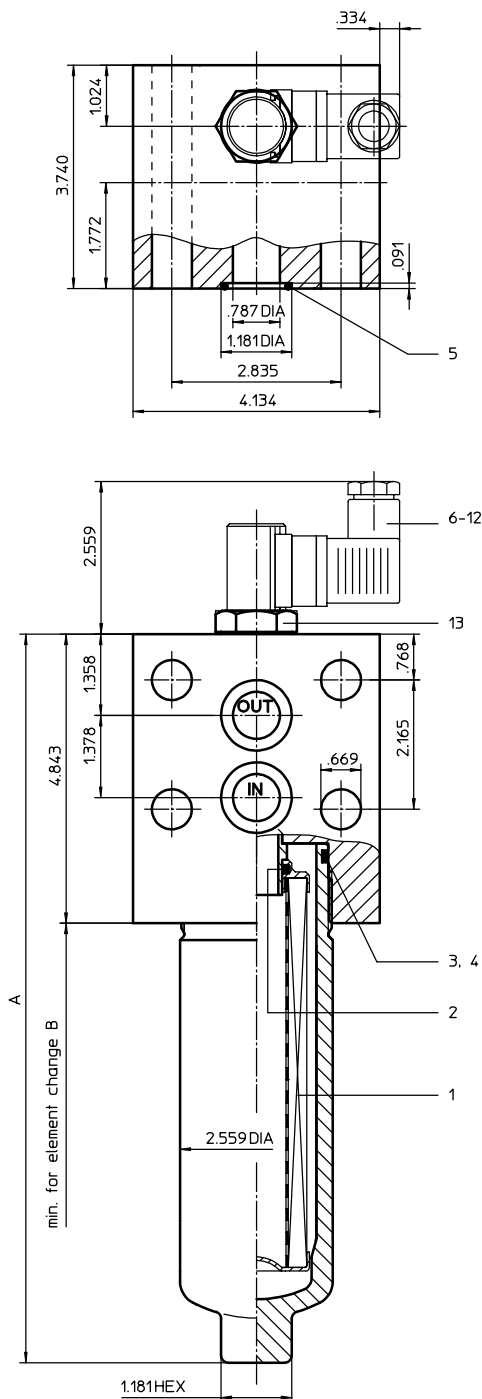
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series HPX 60 - 150 4568 PSI

Sheet No.
1483 C



2. Dimensions: inch

type	HPX 60	HPX 90	HPX 150
connection			
A	9.64	12.20	16.49
B	10.63	13.19	17.52
weight lbs.	20	21	23
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

HPX. 90. 10VG. HR. E. P. -. F. 4. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
HPX = pressure filter
- 2 **nominal size:** 60, 90, 150
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
F = manifold mounted
- 9 **connection size:**
4 = 3/4"
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, Q \leq 18.50 GPM
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 60, 90, 150
- 3 - 7 see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPX 60	HPX 90	HPX 150		
1	1	filter element	01E.60	01E.90	01E.150		
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring		61 x 2,6 x 1		304660	
5	2	O-ring		24 x 3		303038 (NBR)	304397 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator, visual-electrical		AE		see sheet-no. 1615	
8	1	clogging sensor, electronical		VS1		see sheet-no. 1617	
9	1	clogging sensor, electronical		VS2		see sheet-no. 1618	
10	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug		20913-4		309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPX 60-150 are suitable for a working pressure up to 4568 bar.

The pressure peaks are absorbed by a sufficient margin of safety. The HPX-filter are flanged to the mounting face.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(G)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

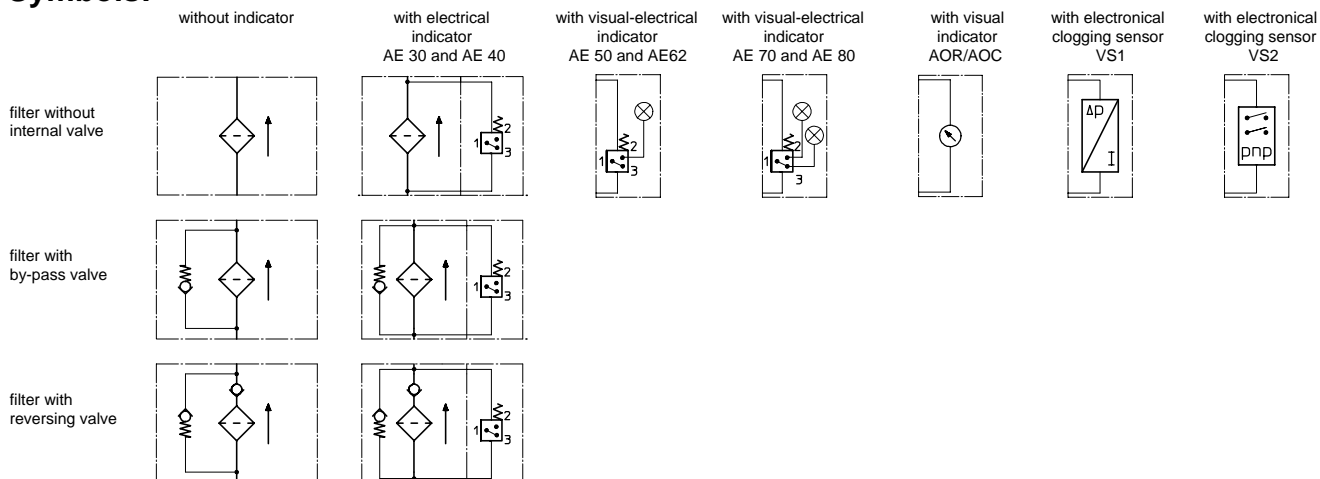
5. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'T-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

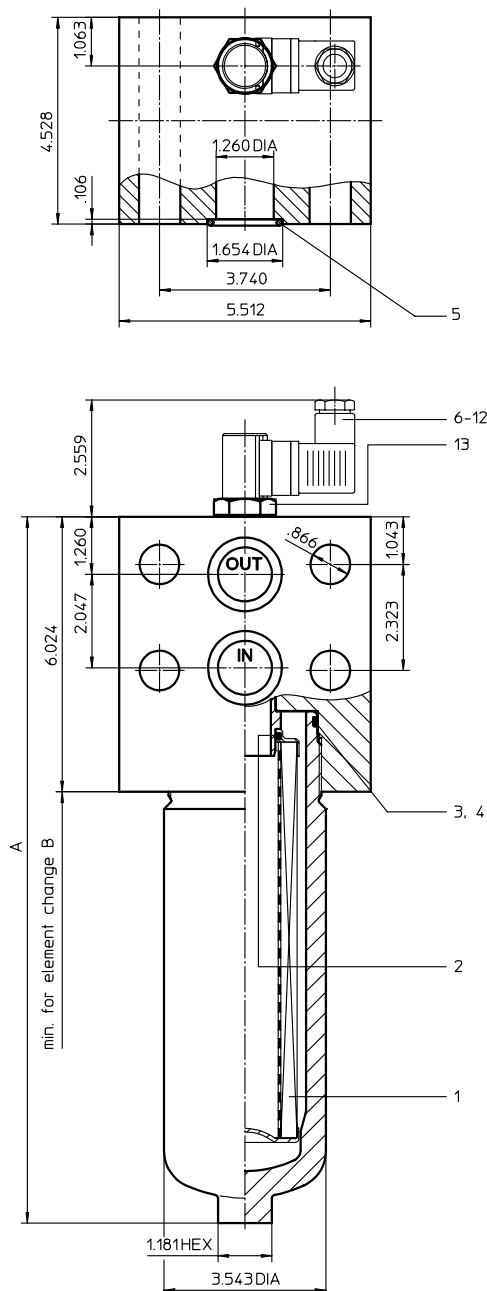
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

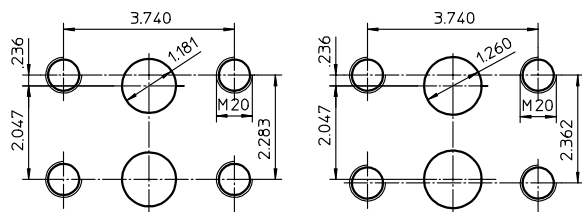
PRESSURE FILTER

Series HPX 170 - 450 4568 PSI

Sheet No.
1485 C



possible connection masses



1. Type index:

1.1. Complete filter: (ordering example)

HPX. 360. 10VG. HR. E. P. - F. 6. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPX = pressure filter

2 nominal size: 170, 240, 360, 450

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δ p 435 PSI

HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

F = manifold mounted

9 connection size:

6 = 1 1/4"

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

11 internal valve:

- = without

S1 = with by-pass valve Δ p 51 PSI

S2 = with by-pass valve Δ p 102 PSI

R = reversing valve, Q \leq 55.75 GPM

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions: inch

type	HPX 170	HPX 240	HPX 360	HPX 450
connection	1 1/4"			
A	13.50	15.47	18.62	22.83
B	13.78	15.75	18.89	23.03
weight lbs.	46	49	53	61
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HPX 170	HPX 240	HPX 360	HPX 450		
1	1	filter element	01E.170	01E.240	01E.360	01E.450		
2	1	O-ring		34 x 3,5			304338 (NBR)	304730 (FPM)
3	1	O-ring		75 x 3			302215 (NBR)	304729 (FPM)
4	1	support ring		81 x 2,6 x 1			304581	
5	2	O-ring		36 x 3			304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual		AOR or AOC			see sheet-no. 1606	
7	1	clogging indicator, visual-electrical		AE			see sheet-no. 1615	
8	1	clogging sensor, electronical		VS1			see sheet-no. 1617	
9	1	clogging sensor, electronical		VS2			see sheet-no. 1618	
10	1	O-ring		15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring		22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring		14 x 2			304342 (NBR)	304722 (FPM)
13	1	screw plug		20913-4			309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPX 170-450 are suitable for a working pressure up to 4568 bar.

The pressure peaks are absorbed by a sufficient margin of safety. The HPX-filter are flanged to the mounting face.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

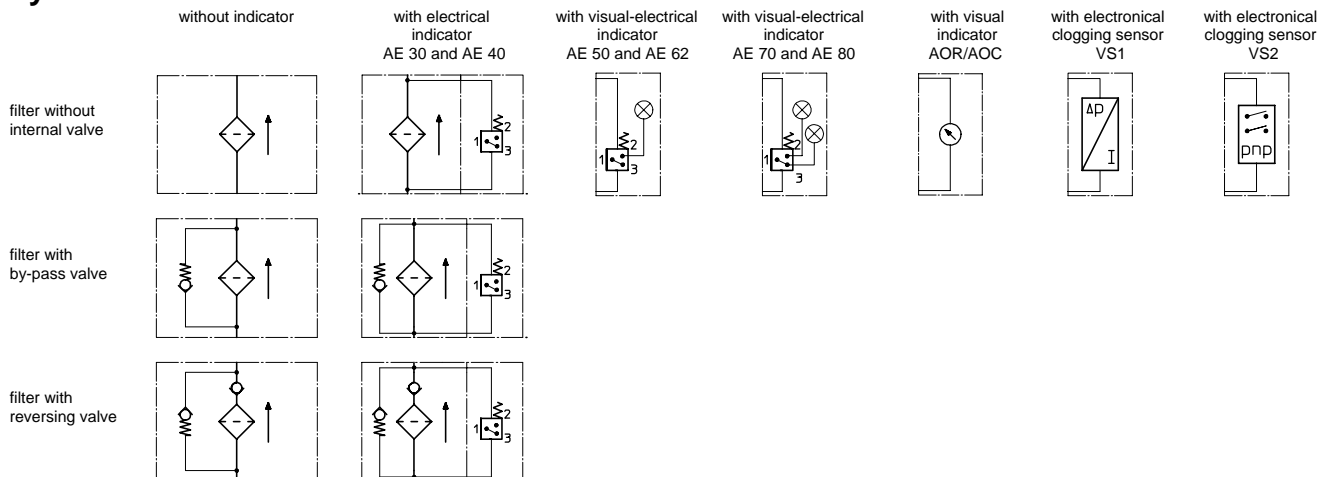
5. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

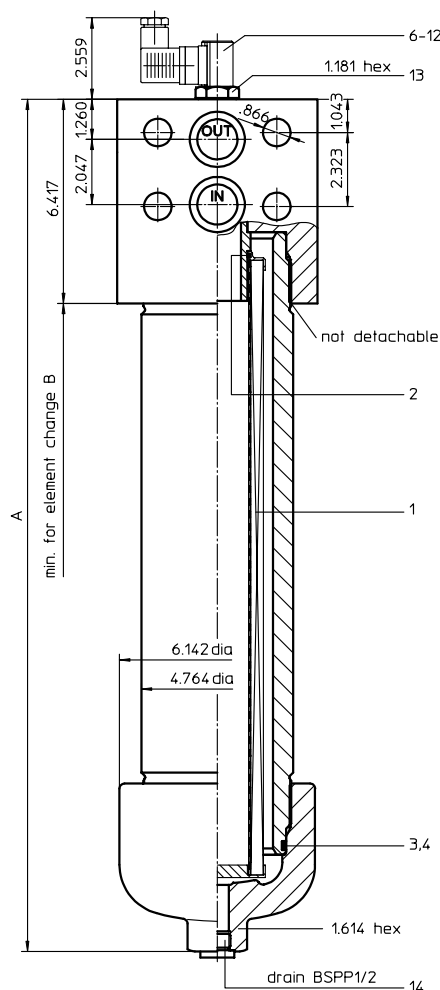
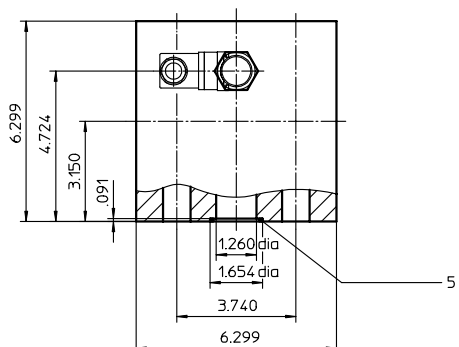
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

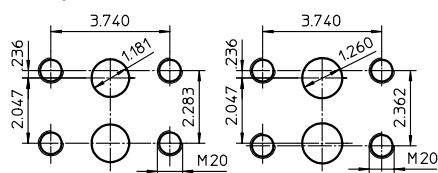
PRESSURE FILTER

Series HPX 601-1351 4568 PSI

Sheet No.
1487 A



possible connection masses



1. Type index:

1.1. Complete filter: (ordering example)

HPX. 901. 10VG. HR. E. P. - F. 6. - - AE

- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
- series:**
HPX = pressure filter
 - nominal size:** 601, 901, 1351
 - filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 - resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
 - filter element design:**
E = single-end open
 - sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
 - filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
 - connection:**
F = manifold mounted
 - connection size:**
6 = 1 $\frac{1}{4}$ "
 - filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
 - internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM
 - clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

- | | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
- series:**
01E. = filter element according to INTERNORMEN factory specification
 - nominal size:** 600, 900, 1351
 - 7** see type index-complete filter

2. Dimensions: inch

type	HPX 601	HPX 901	HPX 1351
connection	1 $\frac{1}{4}$ "		
A	20.86	26.77	36.53
B	31.10	37.00	56.70
weight lbs.	121	136	163
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPX 601	HPX 901	HPX 1351		
1	1	filter element	01E.600	01E.900	01E.1350		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	O-ring		36 x 3		304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator, visual-electrical		AE		see sheet-no. 1615	
8	1	clogging sensor, electronical		VS1		see sheet-no. 1617	
9	1	clogging sensor, electronical		VS2		see sheet-no. 1618	
10	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug		20913-4		309817	
14	1	screw plug		BSPP ½		304678	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPX 601-1351 are suitable for a working pressure up to 4568 bar.

The pressure peaks are absorbed by a sufficient margin of safety. The HPX-filter are flanged to the mounting face.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

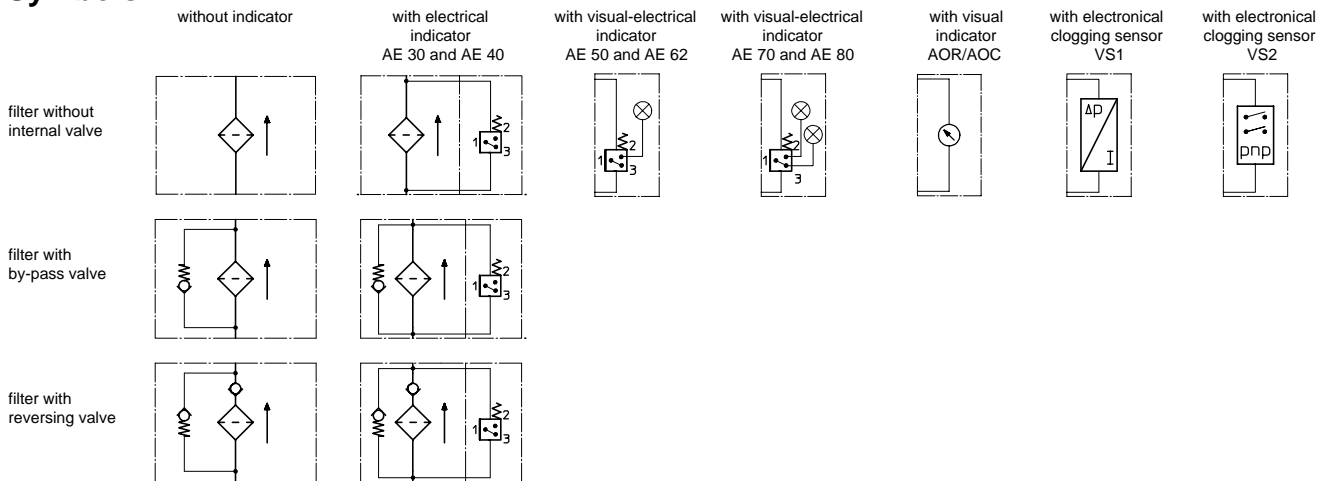
5. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

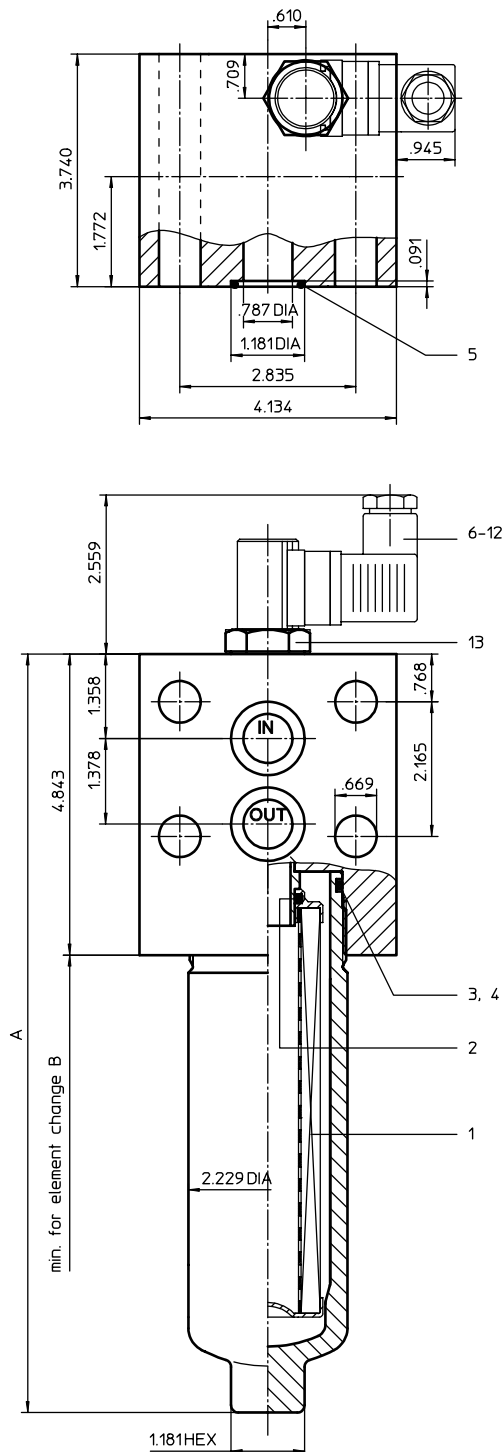
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series HPY 60 - 150 4568 PSI

Sheet No.
1484 C



1. Type index:

1.1. Complete filter: (ordering example)

HPY. 90. 10VG. HR. E. P. - F. 4. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPY = pressure filter

2 nominal size: 60, 90, 150

3 filter-material and filter-fineness:

80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI

HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 connection:

F = manifold mounted

9 connection size:

4 = $\frac{3}{4}$ "

10 filter housing specification: (see catalog)

- = standard

IS06 = see sheet-no. 31605

11 internal valve:

- = without

S1 = with by-pass valve Δp 51 PSI

S2 = with by-pass valve Δp 102 PSI

R = reversing valve, $Q \leq 55.75$ GPM

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to INTERNORMEN
factory specification

2 nominal size: 60, 90, 150

3 - 7 see type index-complete filter

2. Dimensions: inch

type	HPY 60	HPY 90	HPY 150
connection	$\frac{3}{4}$ "		
A	9.64	12.20	16.49
B	10.63	13.19	17.52
weight lbs.	20	21	23
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPY 60	HPY 90	HPY 150		
1	1	filter element	01E. 60	01E. 90	01E. 150		
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring		61 x 2,6 x 1		304660	
5	2	O-ring		24 x 3		303038 (NBR)	304397 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator, visual-electrical		AE		see sheet-no. 1615	
8	1	clogging sensor, electronical		VS1		see sheet-no. 1617	
9	1	clogging sensor, electronical		VS2		see sheet-no. 1618	
10	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug		20913-4		309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPY 60-150 are suitable for a working pressure up to 4568 bar.

The pressure peaks are absorbed by a sufficient margin of safety. The HPY-filter are flanged to the mounting face.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:

+14°F to + 176°F (for a short time + 212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

4568 PSI

test pressure:

6532 PSI

connection system:

manifold mounted

housing material:

C-steel

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

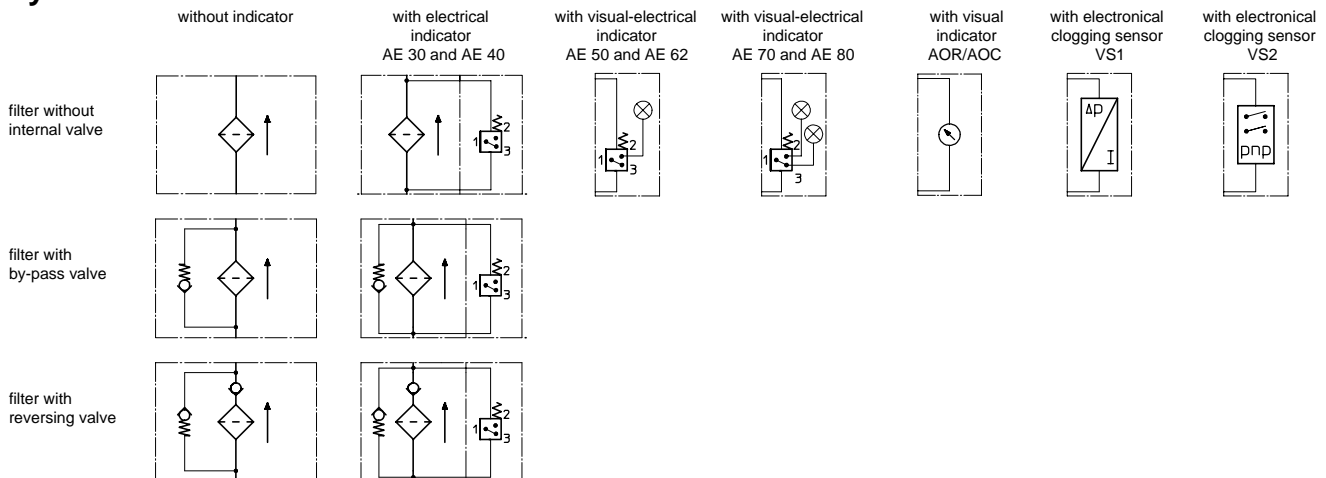
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

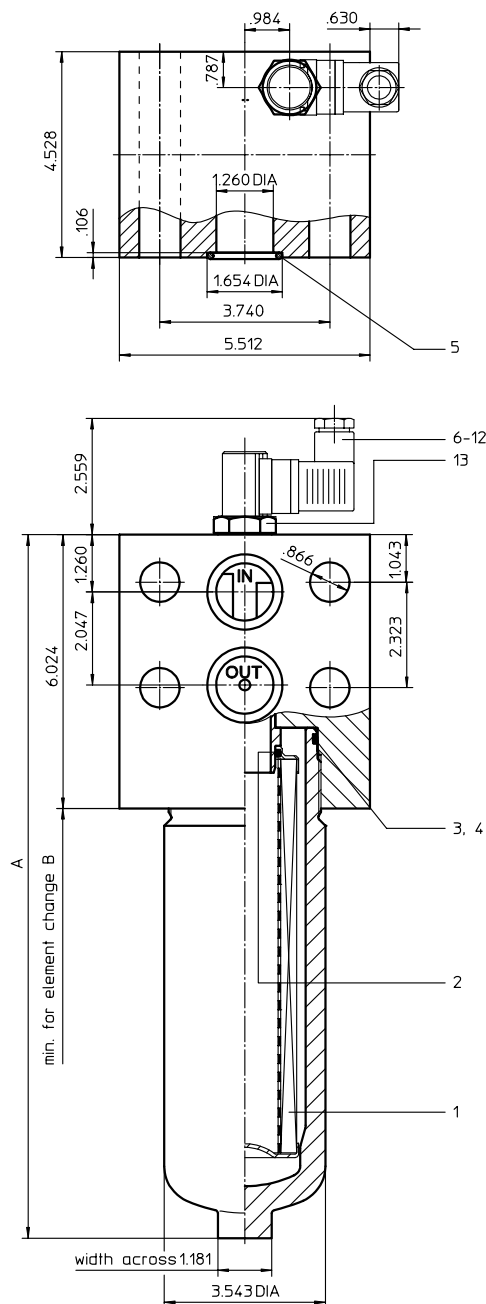
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

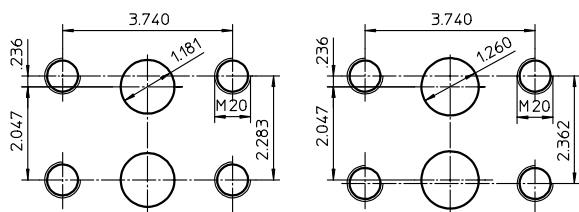
PRESSURE FILTER

Series HPY 170 - 450 4568 PSI

Sheet No.
1486 C



possible connection masses



1. Type index:

1.1. Complete filter: (ordering example)

HPY. 360. 10VG. HR. E. P. - F. 6. - - AE

- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
- series:**
HPY = pressure filter
 - nominal size:** 170, 240, 360, 450
 - filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
 - resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
 - filter element design:**
E = single-end open
 - sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
 - filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
 - connection:**
F = manifold mounted
 - connection size:**
6 = 1 1/4"
 - filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
 - internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
R = reversing valve, Q \leq 55.75 GPM
 - clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 170, 240, 360, 450
- 7** see type index-complete filter

2. Dimensions:

type	HPY 170	HPY 240	HPY 360	HPY 450
connection	1 1/4"			
A	13.50	15.47	18.62	22.83
B	13.78	15.75	18.89	23.03
weight lbs.	46	49	53	61
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HPY 170	HPY 240	HPY 360	HPY 450		
1	1	filter element	01E.170	01E.240	01E.360	01E.450		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 450				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	2	O-ring	36 x 3				304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual	AOR or AOC				see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE				see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1				see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2				see sheet-no. 1618	
10	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4				309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPY 170-450 are suitable for a working pressure up to 4568 bar.

The pressure peaks are absorbed by a sufficient margin of safety. The HPY-filter are flanged to the mounting face.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

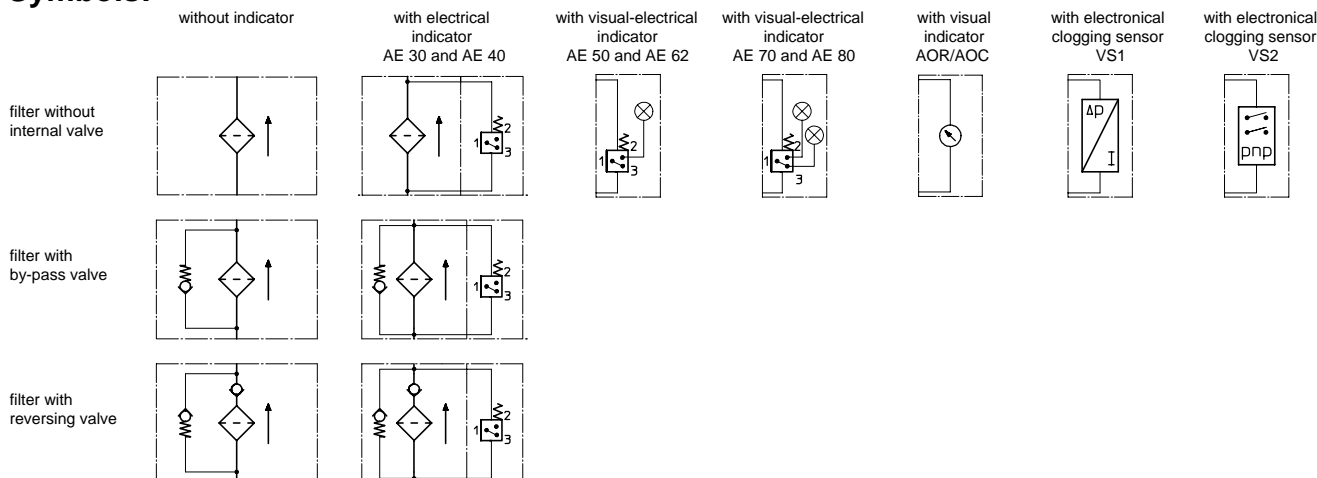
5. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

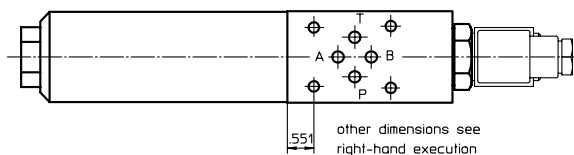
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, for sandwich stacking

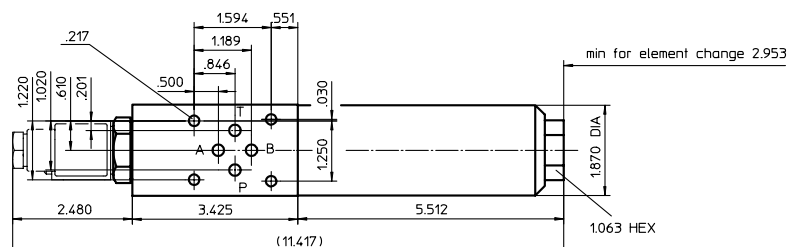
Series HPZ 32 5075 PSI

Sheet No.
1491 P

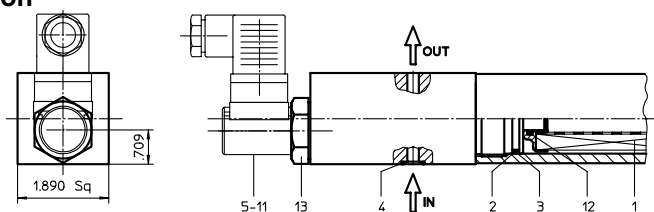
left-hand execution



right-hand execution



right-hand execution



1. Type index:

1.1. Complete filter: (ordering example)

HPZ. 32. 10VG. HR. E. P. - . Z. 1. - . R. AE

1	2	3	4	5	6	7	8	9	10	11	12
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1 series:

HPZ = pressure filter for sandwich stacking

2 nominal size: 32

3 filter-material and filter-fineness:

80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh
 25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)

4 resistance of pressure difference for filter element:

30 = Δp 435 PSI

HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR) V = Viton (FPM)

7 filter element specification:

- = standard VA = stainless steel

8 connection:

Z = sandwich stacking according to DIN 24340, T2

9 connection size:

1 = A 6 according to DIN 24340, T2

10 filter housing specification:

- = standard

11 head design:

R = right-hand execution L = left-hand execution

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electrical, see sheet-no. 1615

VS1 = electronical, see sheet-no. 1617

VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to
INTERNORMEN factory specification

2 nominal size: 30

3 - 7 see type index-complete filter

weight: 7.7 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	SRA 27 x 2,1 x 1	305466	
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	9,25 x 1,78	304354 (NBR)	310268 (FPM)
5	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
13	1	screw plug	20913-4	309817	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

Pressure filters for sandwich stacking with master gauge for holes according to DIN 24340-A6 are designed for vertical interlink mounting. The filters are placed in the pressure feed channel in front of the hydro valve that is to be protected. The filters are available in right-hand and left-hand execution - with or without clogging indicator - thus, the filters can be installed according to the corresponding mounting and service applications. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 µm_(c). INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

4. Technical data:

temperature range:

operating medium:

max. operating pressure:

test pressure:

connection system:

housing material:

sealing material:

installation position:

volume tank:

+14°F to + 176°F (for a short time + 212°F)

mineral oil, other media on request

5075 PSI

7257 PSI

(master gauge for holes) DIN 24340 - A6

EN-GJS-400-18-LT; C-steel

Nitrile (NBR) or Viton (FPM), other materials on request

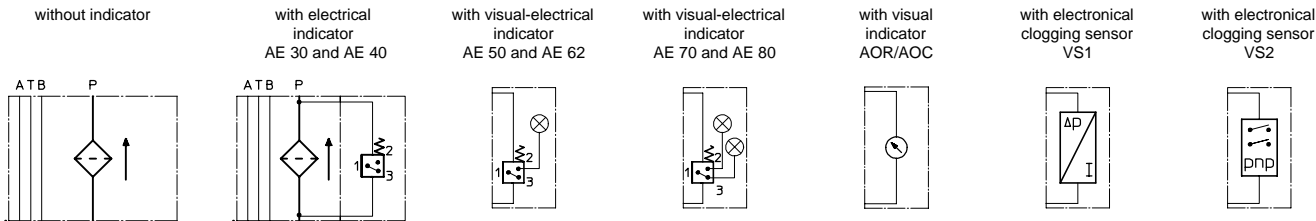
vertical (preferably)

horizontal

.02 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941

ISO 2942

ISO 2943

ISO 3723

ISO 3724

ISO 3968

ISO 16889

Verification of collapse/burst resistance

Verification of fabrication integrity

Verification of material compatibility with fluids

Method for end load test

Verification of flow fatigue characteristics

Evaluation of pressure drop versus flow characteristics

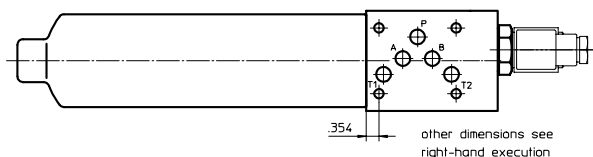
Multi-pass method for evaluating filtration performance

PRESSURE FILTER, for sandwich stacking

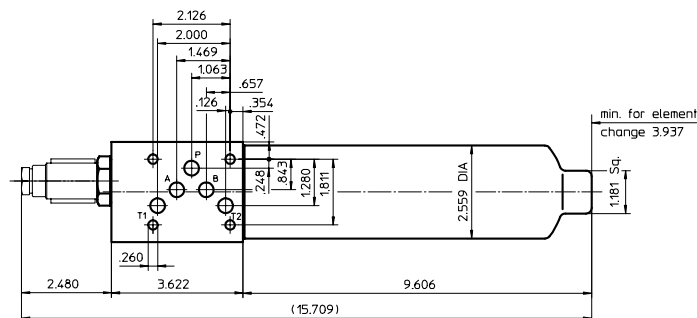
Series HPZ 90 5075 PSI

Sheet No.
1493 H

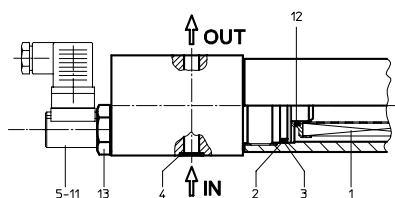
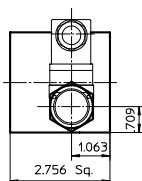
left-hand execution



right-hand execution



right-hand execution



1. Type index:

1.1. Complete filter: (ordering example)

HPZ. 90. 10VG. HR. E. P. -. Z. 2. -. R. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
HPZ = pressure filter for sandwich stacking
- 2 **nominal size:** 90
- 3 **filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)
- 7 **filter element specification:**
- = standard VA = stainless steel
- 8 **connection:**
Z = sandwich stacking according to DIN 24340, T2
- 9 **connection size:**
2 = A 10 according to DIN 24340, T2
- 10 **filter housing specification:**
- = standard
- 11 **head design:**
R = right-hand execution L = left-hand execution
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606; VS1 = electronical, see sheet-no. 1617
AOC = visual, see sheet-no. 1606; VS2 = electronical, see sheet-no. 1618
AE = visual-electrical, see sheet-no. 1615

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 90
- 3 - 7 see type index-complete filter

weight: 14.3 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.90		
2	1	support ring	SRA 52 x 2,6 x 1	311013	
3	1	O-ring	45 x 3	304991 (NBR)	304997 (FPM)
4	1	O-ring	12 x 2	311014 (NBR)	310271 (FPM)
5	1	clogging indicator, visual	AOR OR aoc	see sheet no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
13	1	screw plug	20913-4	309817	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

Pressure filters for sandwich stacking with master gauge for holes according to DIN 24340-A10 are designed for vertical interlink mounting. The filters are placed in the pressure feed channel in front of the hydro valve that is to be protected.

The filters are available in right-hand and left-hand execution - with or without clogging indicator - thus, the filters can be installed according to the corresponding mounting and service applications.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

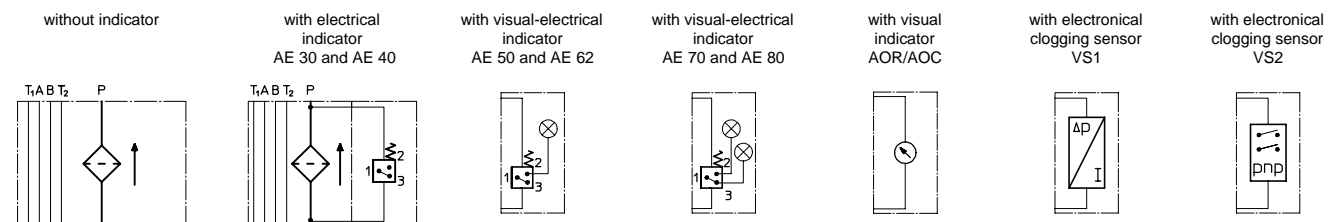
4. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	5075 PSI
test pressure:	7257 PSI
connection system:	(master gauge for holes) DIN 24340 - A10
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical (preferably) horizontal
volume tank:	.10 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

INTERNORMEN

Edelstahlfilter

Stainless Steel Filters



Wir schaffen Reinheit in Ihrem System

- **Optimierte Baureihen**
- **Modulare Bauweise**
- **Komfortable Bedienung und einfache Wartung**
- **Qualitativ hochwertige Elemente**

We generate cleanliness in your system

- ***Optimised efficiency ranges***
- ***Modular construction***
- ***Comfortable operation and easy service***
- ***High-quality elements***



internormen 
 *filter technology*

Filterbaureihen

Filter Types

Beschreibung

Edelstahl-Filter von **INTERNORMEN Technology** sind geeignet für den Einsatz der Medien Wasser und Emulsionen in der Offshore-Technik, der Chemieindustrie, der Lebensmittelindustrie und in Fällen extremer Außen- und Umweltbedingungen.

Description

*Stainless steel filters from **INTERNORMEN Technology** are applicable for water and emulsions in the offshore technology, chemical industry, the food industry and in cases of extreme outdoor and environmental conditions.*

Edelstahlfilter zum Einbau in die Druckleitung Stainless steel filters for mounting in pressure lines

Baugröße	Anschluß	Nenndruck in bar	Filterfläche in cm ²		Maßblatt- Nr.
			Edelstahl- Gewebe	Glasfaser	
<i>model No.</i>	<i>port size</i>	<i>working pressure</i>	<i>filtration area cm²</i>		<i>data sheet No.</i>
		<i>bar</i>	<i>stainless steel wire mesh</i>	<i>glass fibre</i>	
EH 31	G 1/2	420	410	490	1435
EH 60	G 1/2	420	520	800	1430
EH 90	G 3/4	420	860	1330	1430
EH 150	G 1	420	1440	2229	1430
EH 240	G 1 1/2, SAE 1 1/2"	420	1600	2581	1431
EH 450	G 1 1/2, SAE 1 1/2"	420	2980	4795	1431
EH 601	SAE 2"	315	3440	5606	1434
EH 901	SAE 2"	315	4980	8079	1434
EH 1351	SAE 2"	315	7410	12939	1434

Edelstahlfilter, umschaltbar

Bestehend aus 2 Kammern, von denen sich eine Kammer in Funktion befindet, während die andere abgeschaltet ist. Dadurch kann das verschmutzte Filterelement ohne Betriebsunterbrechung ausgetauscht werden. Der Einbau kann in eine Saug-, Druck- oder Rücklaufleitung erfolgen.

Stainless steel filter, change-over

Flow path through the filter can be changed to either of the two chambers. The dirty element can be serviced/changed while in the "off" position without interrupting the operation. Can be mounted in suction, pressure or return lines.

Baugröße	Anschluß	Nenndruck in bar	Filterfläche * in cm ²		Maßblatt- Nr.
			Edelstahl- Gewebe	Glasfaser	
<i>model No.</i>	<i>port size</i>	<i>working pressure</i>	<i>filtration area cm²</i>		<i>data sheet No.</i>
		<i>bar</i>	<i>stainless steel wire mesh</i>	<i>glass fibre</i>	
EHD 91	G 1	315	860	1330	2530
EHD 151	G 1	315	1440	2229	2530
EHD 241	SAE 1 1/2"	315	1600	2581	2533
EHD 451	SAE 1 1/2"	315	2980	4795	2533

* Filterfläche: je Filterseite
filtration area: per each filter side



EH-Gruppe / EH group



EHD 241

Filterprüfung und Qualitätskontrolle nach ISO

Filter testing and quality control according to ISO standards.

Edelstahlfilter, umschaltbar Stainless steel filter, change-over

Baugröße	Anschluß	Nennndruck in bar	Filterfläche * in cm ²		Maßblatt- Nr.
			Edelstahl- Gewebe	Glasfaser	
model No.	port size	working pressure	filtration area cm ²		data sheet No.
		bar	stainless steel wire mesh	glass fibre	
EDU 251	SAE 2"	25	3070	4672	2124
EDU 401	SAE 2"	25	5020	7612	2124
EDU 635	SAE 2 1/2"	25	6000	9978	2150
EDA 100/101	SAE 1", ANSI 1"	40/20	1490	2920	2159/2168
EDA 250/251	SAE 2", ANSI 2"	40/20	3070	4672	2157/2169
EDA 400/401	SAE 2", ANSI 2"	40/20	5020	7612	2157/2169
EDA 630/631	SAE 3", ANSI 3"	40/20	6000	9978	2158/2170
EDA 1000/1001	SAE 3", ANSI 3"	40/20	8050	15760	2158/2170
EDSF 1201	DN 50, 65, 80, 100	16	11160	18018	2161
EDSF 2001	DN 65, 80, 100, 125	16	17570	29630	
EDSF 2401	DN 65, 80, 100, 125, 150	16	22320	36036	
EDSF 3601	DN 80, 100, 125, 150	16	33480	54054	
EDSF 4001	DN 65, 80, 100, 125	16	35140	59262	
EDSF 4801	DN 100, 125, 150, 200	16	44640	72072	
EDSF 6001	DN 100, 125, 150, 200	16	52710	88890	
EDSF 10001	DN 125, 150, 200, 250	16	87850	148150	

Edelstahl-Filterbatterie

Hohe Filterleistung bei großen Volumenströmen

Stainless steel filter battery

High filter efficiency at high volume flows

Baugröße	Anschluß	Nennndruck in bar	Filterfläche * in cm ²		Maßblatt- Nr.
			Edelstahl- Gewebe	Glasfaser	
model No.	port size	working pressure	filtration area cm ²		data sheet No.
		bar	stainless steel wire mesh	glass fibre	
EBHDD 2 x 901	AVIT 2"	315	2 x 4980	2 x 8079	2526
EBHDD 3 x 901	AVIT 2 1/2"	315	3 x 4980	3 x 8079	
EBHDD 4 x 901	AVIT 3"	315	4 x 4980	4 x 8079	

* Filterfläche: je Filterseite
filtration area: per each filter side

Weitere Baureihen auf Anfrage
Other ranges on request!

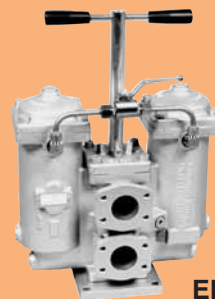
Edelstahlfilter

Zum Einbau in die Saug-, Druck- und Rücklaufleitung

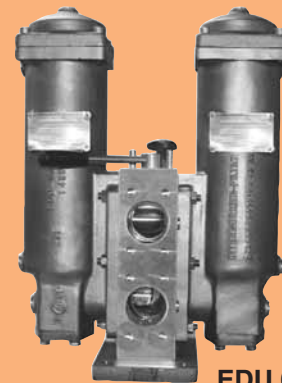
Stainless Steel Filter

For mounting in suction, pressure and return lines

Baugröße	Anschluß	Nennndruck in bar	Filterfläche in cm ²		Maßblatt- Nr.
			Edelstahl- Gewebe	Glasfaser	
model No.	port size	working pressure	filtration area cm ²		data sheet No.
		bar	stainless steel wire mesh	glass fibre	
ELF 1201	DN 50, 65, 80, 100	16	11160	18018	1130
ELF 2001	DN 65, 80, 100, 125	16	17570	29630	
ELF 2401	DN 65, 80, 100, 125	16	22320	36036	
ELF 3601	DN 80, 100, 125, 150	16	33480	54054	
ELF 4801	DN 100, 125, 150, 200	16	44640	72072	
ELF 6001	DN 100, 125, 150, 200	16	52710	88890	
ELF 10001	DN 125, 150, 200, 250	16	87850	148150	



EDU 251



EDU 635



Filterbatterie
Filter battery
BEHD 4 x 901



ELF 2001

Vertrauen ist gut, Kontrolle ist besser!
Reinheitsklassenermittlung mit unserem CCS 2.

Reliance is good, control is better!
Contamination determination with our CCS 2.

Edelstahlfilter im Einsatz für Wasserhydraulik

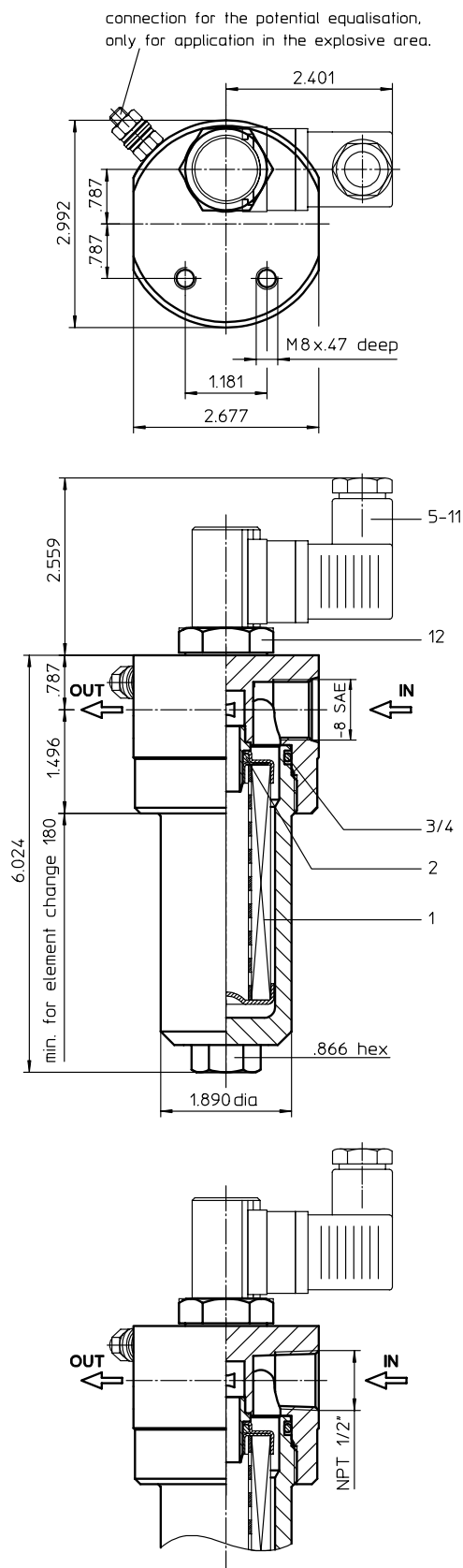
Stainless steel filters in use in water hydraulics



STAINLESS STEEL-PRESSURE FILTER

Series EH 31 6000 PSI

Sheet No.
1435 C



1. Type index:

1.1. Complete filter: (ordering example)

EH. 31. 10VG. HR. E. P. VA. UG. 3. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
EH = stainless steel-pressure filter
- 2 **nominal size:** 31
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m
stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- 4 **resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
UG = thread connection
NPT = thread connection
- 9 **connection size:**
3 = -8 SAE or 1/2" NPT
- 10 **filter housing specification:**
VA = stainless steel
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01E. = filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 30
- 3 - 7 see type index-complete filter

weight: approx. 7 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
4	1	support ring	48 x 2,6 x 1	305391	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4	314442	

item 12 execution only without clogging indicator or clogging sensor

3. Description:

The pressure filters of the series EH 31 are suitable for a working pressure up to 6000 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The EH-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter

4. Technical data:

temperature range:

+14°F to + 176°F (for a short time + 212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

6000 PSI

test pressure:

7917 PSI

connection system:

thread connection

housing material:

DIN 17440 - 1.4571 (316 Ti according to AISI)

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

vertical

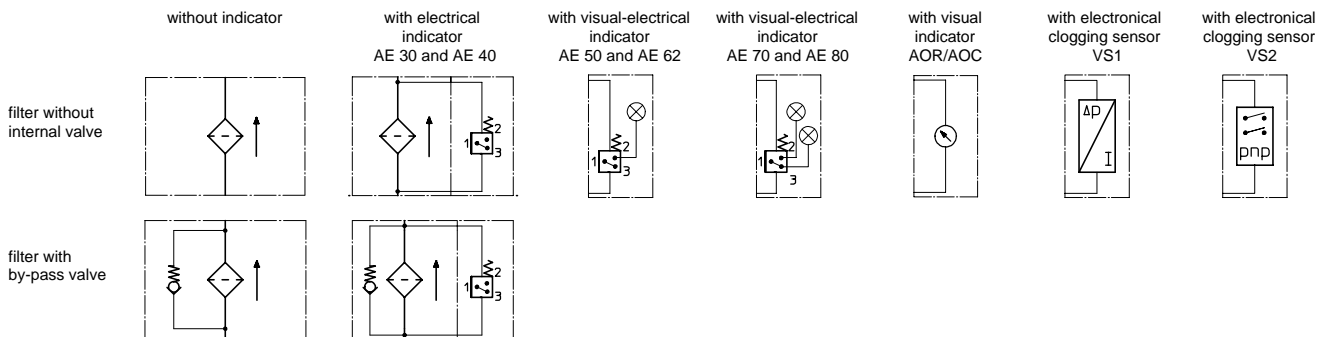
volume tank:

.03 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

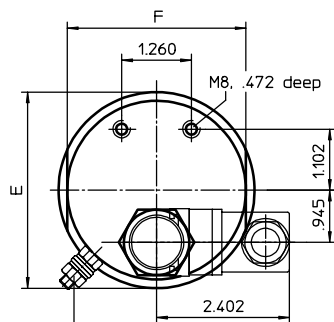
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

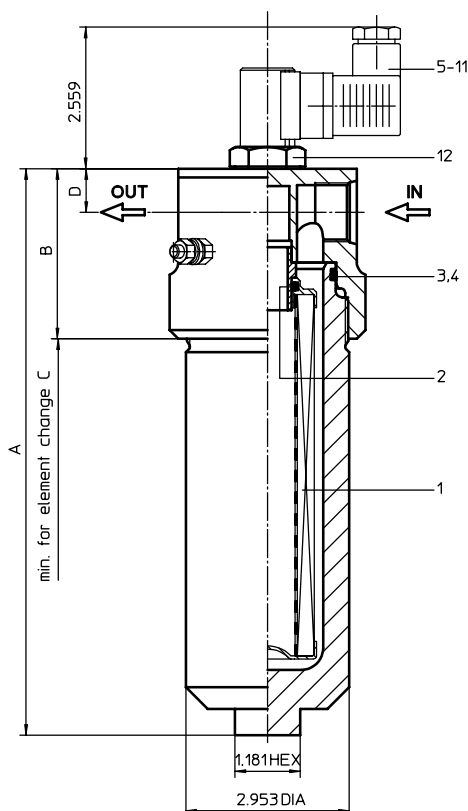
STAINLESS STEEL - PRESSURE FILTER

Series EH 60 - 150 6000 PSI

Sheet No.
1430 L



connection for the
potential equalisation,
only for application
in the explosive area



1. Type index:

1.1. Complete filter: (ordering example)

EH. 90. 10VG. HR. E. P. VA. UG. 4. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
EH = stainless steel-pressure filter
- nominal size:** 60, 90 150
- filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm , 25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
ISO6 = see sheet-no. 31601
- connection:**
UG = thread connection
NPT = thread connection according to ANSI B1.20.1
- connection size:**
3 = -8 SAE or NPT $\frac{1}{2}$ "
4 = -12 SAE or NPT $\frac{3}{4}$ "
5 = -16 SAE or NPT 1"
- filter housing specification:**
VA = stainless steel
- internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM
- clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 60, 90, 150
- 7** see type index-complete filter

2. Dimensions: inch

type	connection	A	B	C	D	E	F	weight lbs.	volume tank
EH 60	-8 SAE or NPT $\frac{1}{2}$ "	7.67	3.07	8.46	.78	3.54	3.22	18.70	.08 Gal.
EH 90	-12 SAE or NPT $\frac{3}{4}$ "	10.23	3.07	11.02	.78	3.54	3.22	20.95	.10 Gal.
EH 150	-16 SAE or NPT 1"	14.56	3.30	15.35	.90	3.74	3.30	27.55	.16 Gal.

Connection assignments as shown in the table are standard. To exchange connections see item 9 in type index.

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			EH 60	EH 90	EH 150		
1	1	filter element	01E.60	01E.90	01E.150		
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		56 x 3		305072 (NBR)	305322 (FPM)
4	1	support ring		63 x 2,6 x 1		312309	
5	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
6	1	clogging indicator, visual-electrical		AE		see sheet no. 1615	
7	1	clogging sensor, electrical		VS1		see sheet no. 1617	
8	1	clogging sensor, electrical		VS2		see sheet no. 1618	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		314442	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series EH are suitable for a working pressure up to 6000 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The EH-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

6000 PSI

test pressure:

7917 PSI

connection system:

thread connection or ANSI B1.20.1

housing material:

DIN 17440 - 1.4571 (316 Ti according to AISI)

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

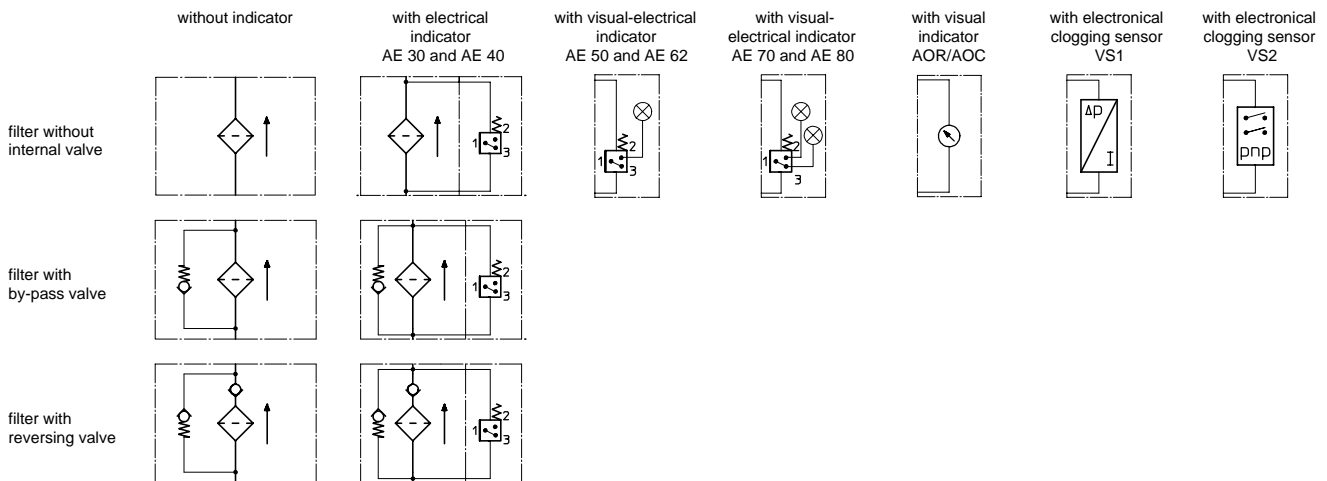
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

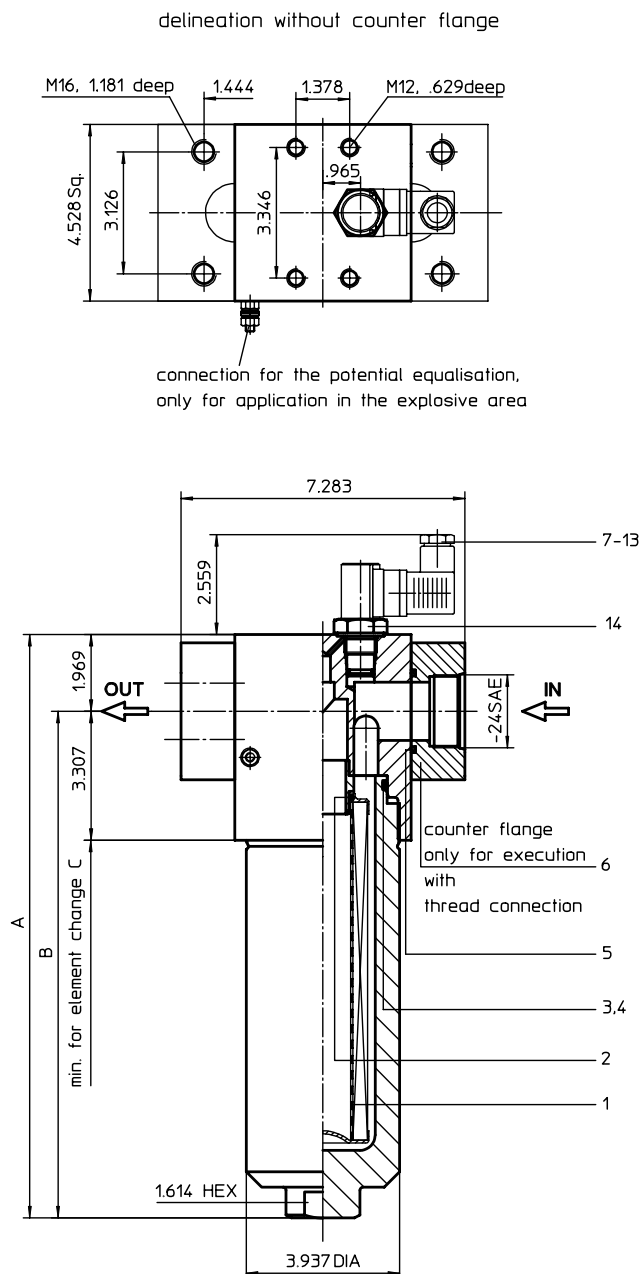
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

STAINLESS STEEL - PRESSURE FILTER

Series EH 240 - 450 6000 PSI

Sheet No.
1431 H



2. Dimensions: inch

type	connection	A	B	C	weight lbs.	volume tank
EH 240	-24 SAE or	14.96	12.90	12.59	48	.22 Gal.
EH 450	SAE 1 1/2"	22.24	20.27	19.68	66	.40 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

EH. 240. 10VG. HR. E. P. VA. FS. 7. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
EH = stainless steel-pressure filter
- nominal size:** 240, 450
- filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm ,
25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
UG = thread connection (only with counter flange)
FS = SAE-flange connection 6000 PSI
- connection size:**
7 = 1 1/2"
- filter housing specification:**
VA = stainless steel
- internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM
- clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 240. 10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 240, 450
- 7** see type index-complete filter

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension		article-no.	
			EH 240	EH 450		
1	1	filter element	01E. 240	01E. 450		
2	1	O-ring	34 x 3,5		304338 (NBR)	304730 (FPM)
3	1	O-ring	76 x 4		305599 (NBR)	310291 (FPM)
4	1	support ring	84 x 3,2 x 1,5		312307	
5	2	O-ring (only with counter flange)	47,22 x 3,53		305078 (NBR)	310269 (FPM)
6	2	counter flange 6000 PSI	SAE 1 1/2"		322274	
7	1	clogging indicator, visual	AOR or AOC		see sheet no. 1606	
8	1	clogging indicator, visual-electrical	AE		see sheet no. 1615	
9	1	clogging sensor, electronical	VS1		see sheet no. 1617	
10	1	clogging sensor, electronical	VS2		see sheet no. 1618	
11	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
12	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
13	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
14	1	screw plug	20913-4		314442	

item 14 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series EH are suitable for a working pressure up to 6000 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The EH-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 4 $\mu\text{m}_{(c)}$.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

6000 PSI

test pressure:

7917 PSI

connection system:

thread connection or SAE-flange connection 6000 PSI

housing material:

DIN 17440 - 1.4571 (316 Ti according to AISI)

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

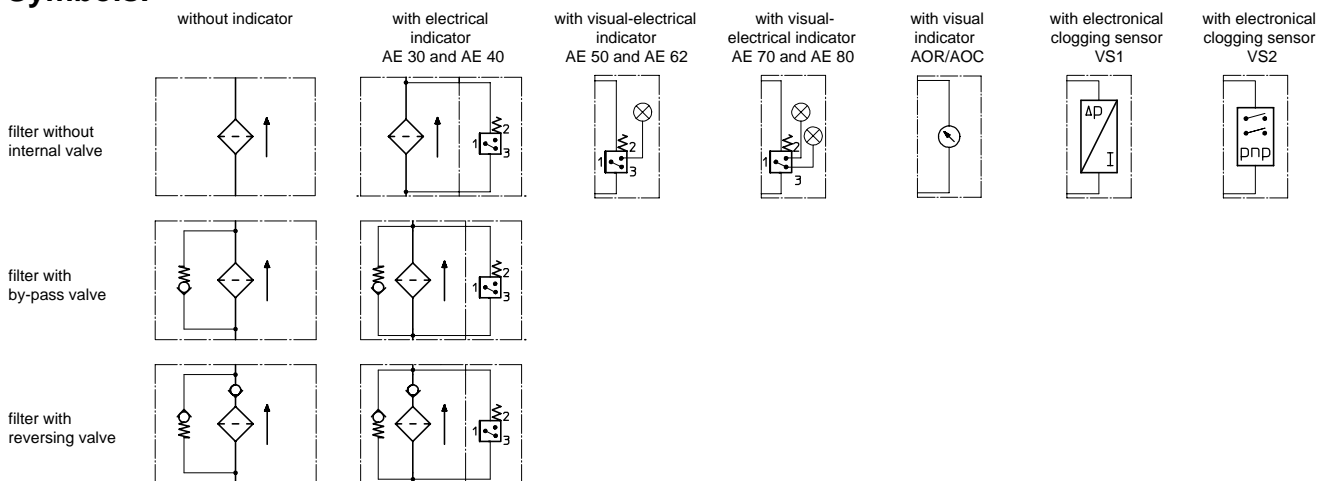
installation position:

vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

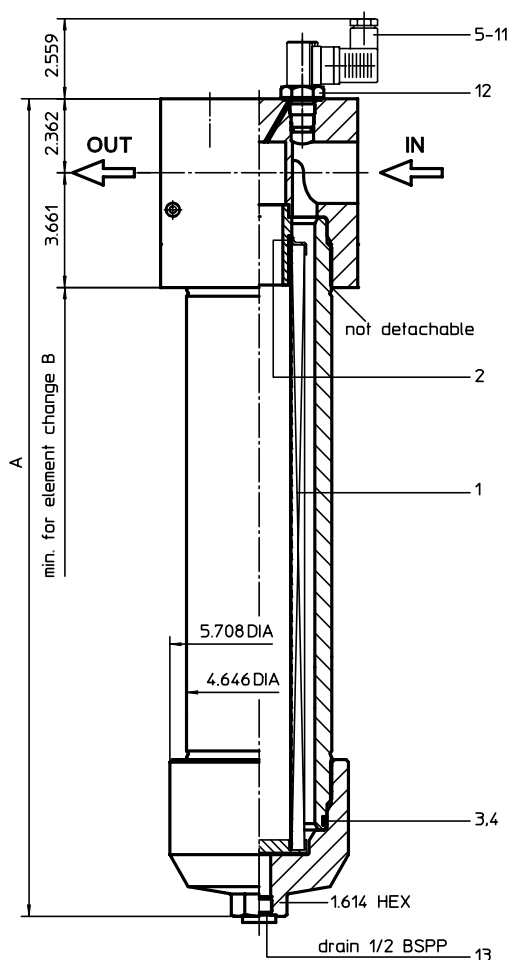
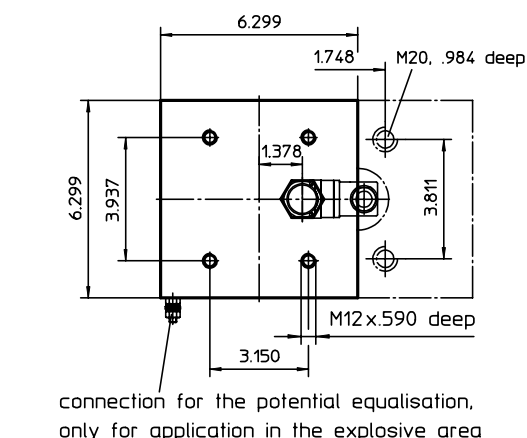
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

STAINLESS STEEL - PRESSURE FILTER

Series EH 601-1351 4568 PSI

Sheet No.
1434 F



2. Dimensions: inch

type	EH 601	EH 901	EH 1351
connection	SAE 2"	SAE 2"	SAE 2"
A	20.47	26.37	36.14
B	31.10	37.00	56.70
weight lbs.	108	123	150
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

EH. 901.10VG. HR. E. P. VA. FS. 8. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
EH = stainless steel-pressure filter
- nominal size:** 601, 901, 1351
- filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm ,
25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
FS = SAE-flange connection 6000 PSI
- connection size:**
8 = 2"
- filter housing specification:**
VA = stainless steel
- internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 122.94$ GPM
- clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 900.10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 600, 900, 1350
- 7** see type index-complete filter

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			EH 601 01E. 600	EH 901 01E. 900	EH 1351 01E.1350		
1	1	filter element					
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
6	1	clogging indicator, visual-electrical		AE		see sheet no. 1615	
7	1	clogging sensor, electronical		VS1		see sheet no. 1617	
8	1	clogging sensor, electronical		VS2		see sheet no. 1618	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		314442	
13	1	screw plug		½ BSPP		306966	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

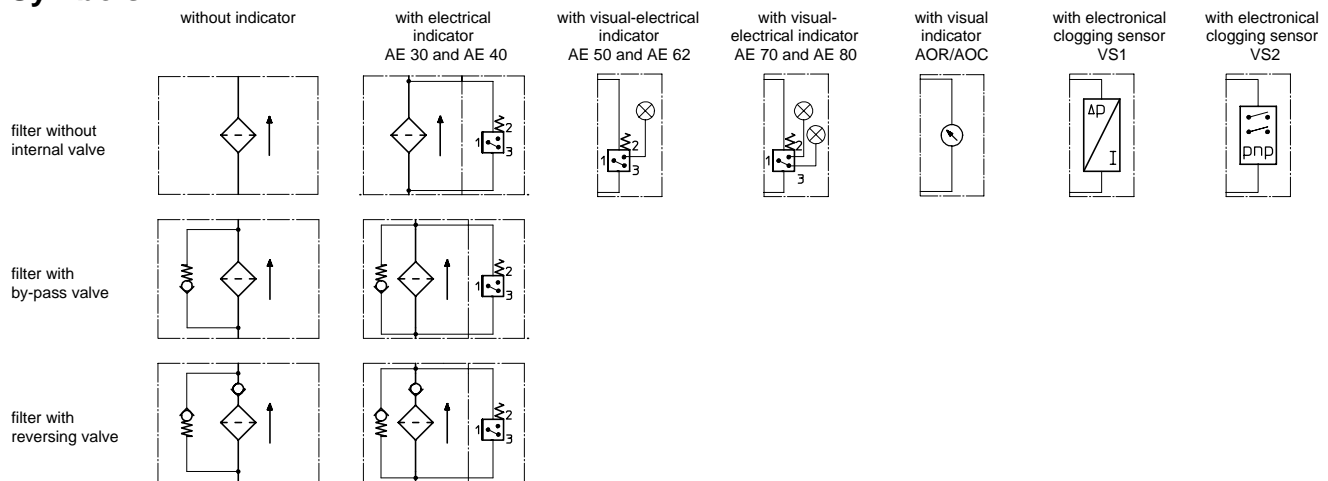
The pressure filters of the series EH are suitable for a working pressure up to 4568 PSI. The pressure peaks are absorbed by a sufficient margin of safety. The EH-filters are flange mounted to the hydraulic system. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 µm_(c). INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI. The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range: +14°F to + 176°F (for a short time + 212°F)
operating medium: mineral oil, other media on request
max. operating pressure: 4568 PSI
test pressure: 5945 PSI
connection system: SAE-flange connection 6000 PSI
housing material: DIN 17440 - 1.4571 (316 Ti according to AISI)
sealing material: Nitrile (NBR) or Viton (FPM), other materials on request
installation position: vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

3. Spare parts:

item	qty.	designation	dimension		article-no.	
			EHP 60	EHP 90		
1	1	filter element	01E. 60	01E. 90		
2	1	O-ring	22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring	45 x 3		304991 (NBR)	304997 (FPM)
4	1	support ring	52 x 2,6 x 1		311013	

4. Description:

The pressure filters of the series EHP are suitable for a working pressure up to 10150 respectively 20300 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The EHP-filter is in-line mounted

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 1µm.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

5. Technical data:

temperature range:

+14°F to +176°F (for a short time +212°F)

operating medium:

mineral oil, other media on request

max. operating pressure:

10150 PSI	20300 PSI
14500 PSI	29000 PSI

test pressure:

connection system:

thread connection

housing material:

EN10088-3 - 1.4418 + QT900

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

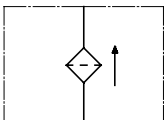
vertical

Pressure stage 10150: Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para 3.

Pressure stage 20300: Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para 1.1.b) Category I (Modul A)

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbol:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance

ISO 2942 Verification of fabrication integrity

ISO 2943 Verification of material compatibility with fluids

ISO 3723 Method for end load test

ISO 3724 Verification of flow fatigue characteristics

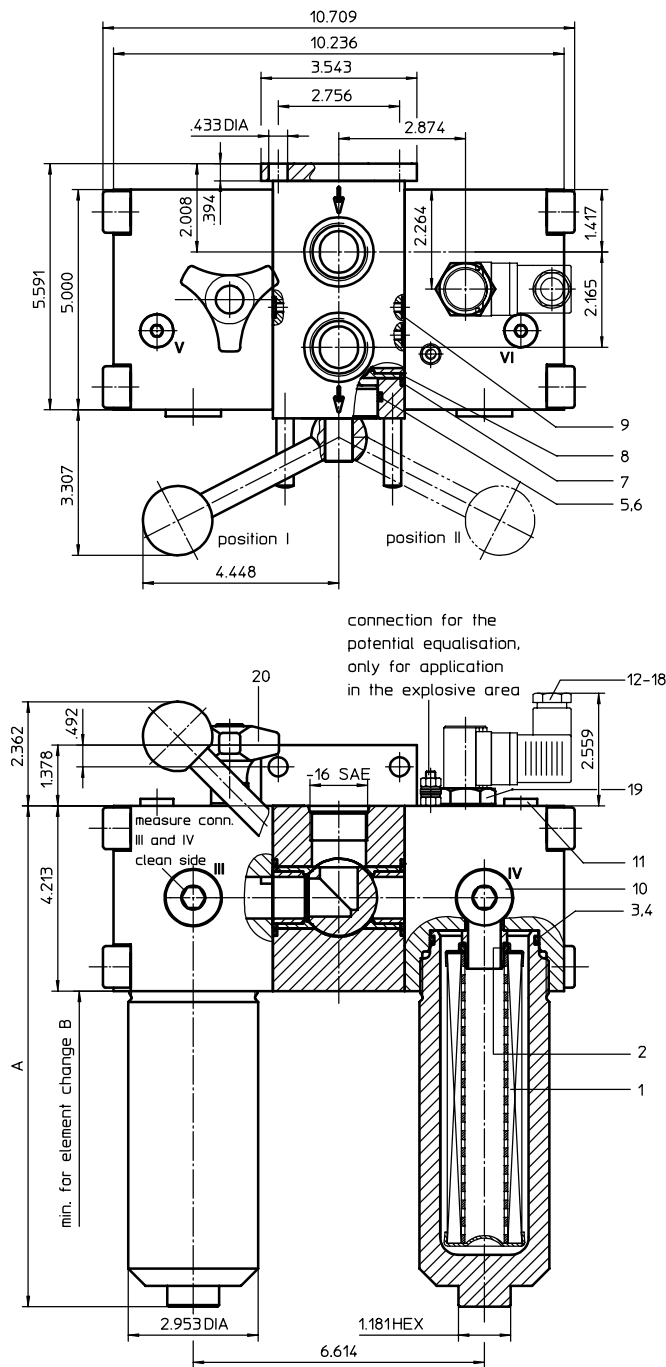
ISO 3968 Evaluation of pressure drop versus flow characteristics

ISO 16889 Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over

Series EHD 61 - 151 4568 PSI

Sheet No.
2530 E



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection V and VI to be used to bleed filter or to relieve pressure

3. Dimensions: inch

type	connection	A	B	weight lbs.	volume tank
EHD 61	-16 SAE	8.81	8.26	66	2x .06 Gal.
EHD 91		11.37	13.38	70	2x .10 Gal.
EHD 151		15.70	17.71	77	2x .16 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

EHD. 91. 10VG. HR. E. P. VA. UG. 5. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
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- series:**
EHD = stainless steel-pressure filter, change-over
- nominal size:** 61, 91, 151
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification: (see catalog)**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
UG = thread connection
- connection size:**
5 = -16 SAE
- filter housing specification:**
VA = stainless steel
- internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
R = reversing valve, Q \leq 18.50 GPM
- clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 60, 90, 150
- 7** see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650

Changes of measures and design are subject to alteration!

4. Spare parts:

item	qty.	designation	dimension			article-no.
			EHD 61	EHD 91	EHD 151	
1	2	filter element	01E.60	01E.90	01E.150	
2	2	O-ring		22 x 3,5		304341 (NBR) 304392 (FPM)
3	2	O-ring		56 x 3		305072 (NBR) 305322 (FPM)
4	2	support ring		63 x 2,6 x 1		312309
5	3	O-ring		45 x 3		304991 (NBR) 304997 (FPM)
6	2	support ring		49,7 x 2,4 x 1		317709
7	4	O-ring		38 x 3		304340 (NBR) 317013 (FPM)
8	4	O-ring		28 x 3		316778 (NBR) 318366 (FPM)
9	4	O-ring		8 x 2		310004 (NBR) 316530 (FPM)
10	2	screw plug		¼ BSPP		313815
11	2	screw plug		¼ BSPP		306968
12	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606
13	1	clogging indicator, visual-electrical		AE		see sheet-no. 1615
14	1	clogging sensor, electronical		VS1		see sheet-no. 1617
15	1	clogging sensor, electronical		VS2		see sheet-no. 1618
16	1	O-ring		15 x 1,5		315357 (NBR) 315427 (FPM)
17	1	O-ring		22 x 2		304708 (NBR) 304721 (FPM)
18	1	O-ring		14 x 2		304342 (NBR) 304722 (FPM)
19	1	screw plug		20913-4		314442
20	1	pressure balance valve				

item 19 execution only without clogging indicator or clogging sensor

5. Description:

Duplex pressure filters with change-over valve type EHD are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve is to be closed again. The closed filter-side has to be air-bled by vent V respectively by vent VI. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 µm₀.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 2320 PSI and a rupture strength up to Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

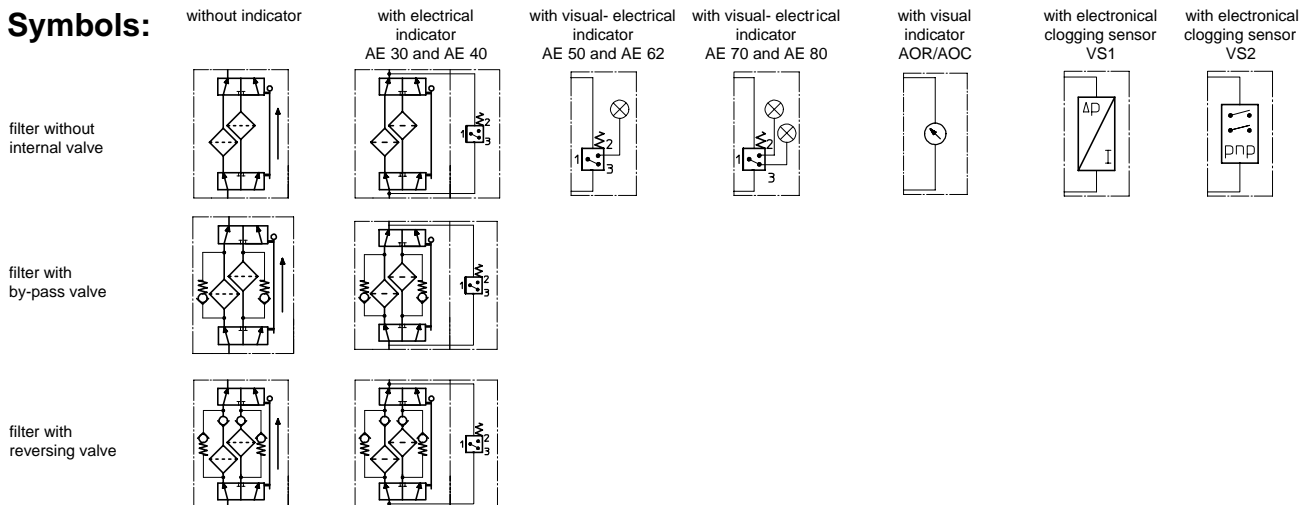
6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	5945 PSI
connection system:	thread connection
housing material:	DIN 17440 - 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connections dirt side:	¼ BSPP
measuring connections clean side:	¾ BSPP

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

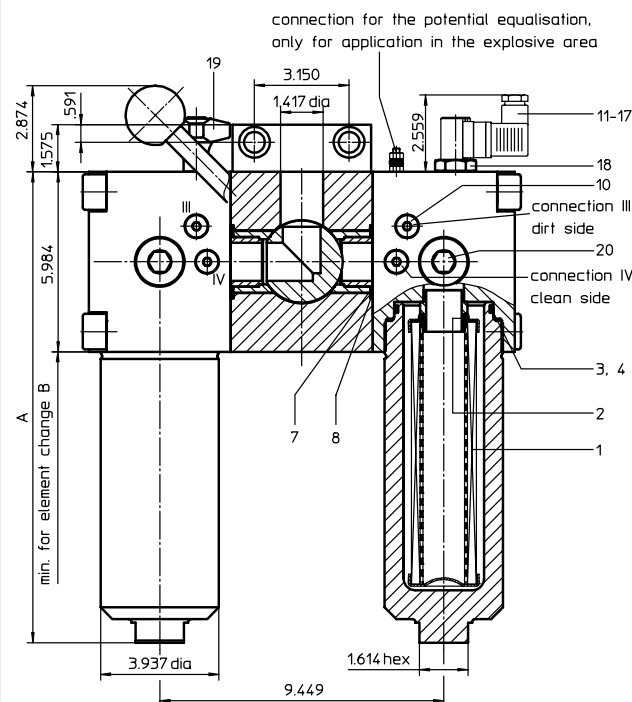
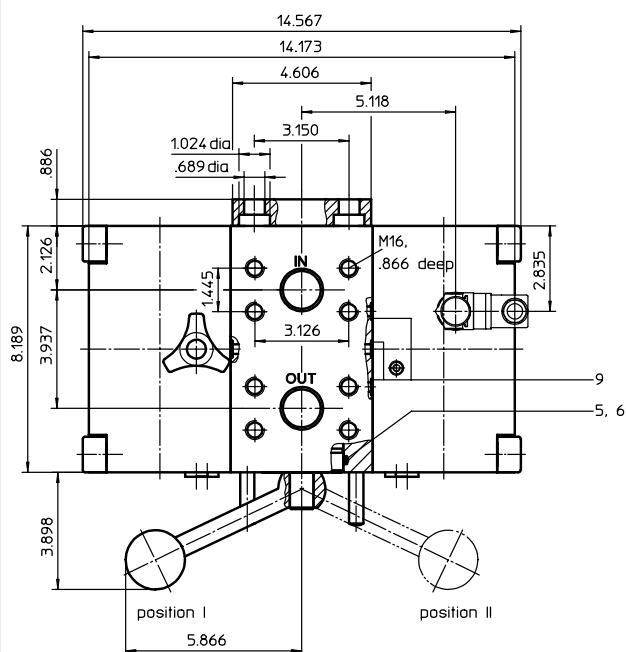
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL- PRESSURE FILTER, change-over

Series EHD 241 - 451 4568 PSI

Sheet No.
2533 D



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection III and IV to be used to bleed filter or to relieve pressure.

3. Dimensions: inch

type	connection	A	B	weight lbs.	volume tank
EHD 241	SAE	15.67	13.38	224	2x .22 Gal.
EHD 451	1 1/2"	22.95	20.67	255	2x .40 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

EHD. 241. 10VG. HR. E. P. VA. FS. 7. VA. - AE

	1	2	3	4	5	6	7	8	9	10	11	12
1	series: EHD = stainless steel-pressure filter, change-over											
2	nominal size: 241, 451											
3	filter-material and filter-fineness: 80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh 25 VG = 20 μ m _(c) , 16 VG = 15 μ m _(c) , 10 VG = 10 μ m _(c) , 6 VG = 7 μ m _(c) , 3 VG = 5 μ m _(c) Interpor fleece (glass fiber)											
4	resistance of pressure difference for filter element: 30 = Δp 435 PSI HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)											
5	filter element design: E = single-end open											
6	sealing material: P = Nitrile (NBR) V = Viton (FPM)											
7	filter element specification: (see catalog) - = standard VA = stainless steel IS06 = see sheet-no. 31601											
8	connection: FS = SAE-flange connection 6000 PSI											
9	connection size: 7 = 1 1/2"											
10	filter housing specification: VA = stainless steel											
11	internal valve: - = without S1 = with by-pass valve Δp 51 PSI S2 = with by-pass valve Δp 102 PSI R = reversing valve, Q \leq 55.75 GPM											
12	clogging indicator or clogging sensor: - = without AOR = visual, see sheet-no. 1606 AOC = visual, see sheet-no. 1606 AE = visual-electrical, see sheet-no. 1615 VS1 = electronical, see sheet-no. 1617 VS2 = electronical, see sheet-no. 1618											

1.2. Filter element: (ordering example)

01E. 240. 10VG. HR. E. P. VA

	1	2	3	4	5	6	7
--	---	---	---	---	---	---	---

1	series: 01E. = filter element according to INTERNORMEN factory specification						
2	nominal size: 240, 450						
3	-	7	see type index-complete filter				

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			EHD 241	EHD 451		
1	2	filter element	01E. 240	01E. 450		
2	2	O-ring	34 x 3,5		304338 (NBR)	304730 (FPM)
3	2	O-ring	76 x 4		305599 (NBR)	310291 (FPM)
4	2	support ring	84 x 3,2 x 1,5		312307	
5	3	O-ring	70 x 4		306253 (NBR)	310280 (FPM)
6	2	sliding ring	076 x70 x 45°		318070	
7	4	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
8	4	O-ring	42,52 x 2,62		304352 (NBR)	304393 (FPM)
9	4	O-ring	10 x 2		309998 (NBR)	310272 (FPM)
10	4	screw plug	1/4 BSPP		306968	
11	1	clogging indicator visual	AOR or AOC		see sheet-no. 1606	
12	1	clogging indicator visual-electrical	AE		see sheet-no. 1615	
13	1	clogging sensor electronical	VS1		see sheet-no. 1617	
14	1	clogging sensor electronical	VS2		see sheet-no. 1618	
15	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
16	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
17	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
18	1	screw plug	20913-4		314442	
19	1	pressure balance valve	nominal size 10		310316	
20	4	screw plug	1 BSPP		308498	

item 18 execution only without clogging indicator or clogging sensor

5. Description:

Duplex pressure filters with change-over valve type EHD are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve has to be closed again. The closed filter-side has to be air-bled by vent III respectively by vent IV. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled.

Filter elements are available down to a filter fineness of 4 $\mu\text{m}_{(0)}$. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 2320 PSI and a rupture strength up to Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
connection system:	SAE-flange connection 6000 PSI
housing material:	EN10088 - 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connection:	1/4 BSPP

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

	without indicator	with electrical indicator AE 30 and AE 40	with visual-electrical indicator AE 50 and AE 62	with visual-electrical indicator AE 70 and AE 80	with visual indicator AOR/AOC	with electronical clogging sensor VS1	with electronical clogging sensor VS2
filter without internal valve							
filter with by-pass valve							
filter with reversing valve							

8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

9. Test methods:

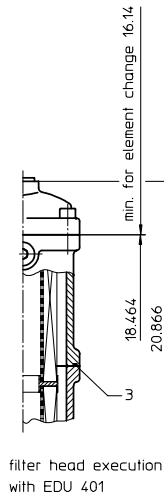
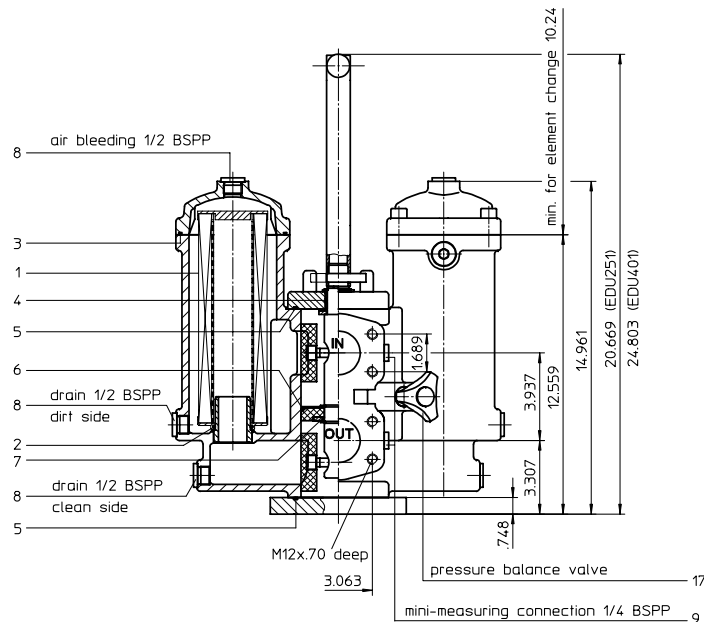
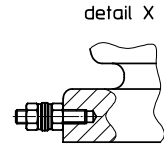
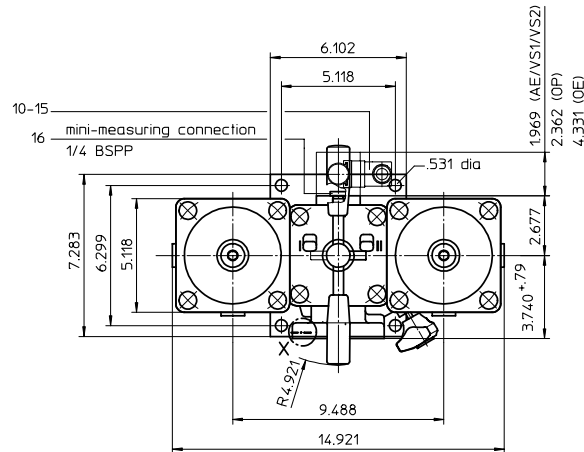
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDU 251-401 363 PSI

Sheet No.
2124 H

Pos. I: left filter-side in operation
 Pos. II: right filter-side in operation



1. Type index:

1.1. Complete filter: (ordering example)

EDU. 251. 10VG. 30. E. P. VA. FS. 8. VA. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 series:
EDU = stainless steel-pressure filter, change-over
- 2 nominal size: 251, 401
- 3 filter-material and filter-fineness:
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG = 20 μ m_(G), 16 VG = 15 μ m_(G), 10 VG = 10 μ m_(G), 6 VG = 7 μ m_(G), 3 VG = 5 μ m_(G) Interpor fleece (glass fiber)
- 4 resistance of pressure difference for filter element:
30 = Δp 435 PSI
- 5 filter element design:
E = single-end open
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no.31601
- 8 connection:
FS = SAE-flange connection 3000 PSI
- 9 connection size:
8 = 2"
- 10 filter housing specification:
VA = stainless steel
- 11 clogging indicator or clogging sensor:
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 250. 10VG. 30. E. P. VA

1	2	3	4	5	6	7
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- 1 series:
01NL = standard filter element according to DIN 24550, T3
- 2 nominal size: 250, 400
- 3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder-connections, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

weight EDU 251: approx.88 lbs.
 weight EDU 401: approx.110 lbs.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	designation	qty.	dimension EDU 251	qty.	dimension EDU 401	article-no.	
1	filter element	2	01NL. 250...VA	2	01NL. 400...VA		
2	O-ring	2	40 x 3			304389 (NBR)	304391 (FPM)
3	O-ring	2	115 x 3	4	115 x 3	303963 (NBR)	307762 (FPM)
4	O-ring	1	24 x 3			303038 (NBR)	304397 (FPM)
5	O-ring	2	95 x 3			305808 (NBR)	304828 (FPM)
6	O-ring	1	76 x 4			305599 (NBR)	310291 (FPM)
7	O-ring	1	32 x 2,5			306843 (NBR)	308268 (FPM)
8	screw plug	8	BSPP ½	10	BSPP ½	306966	
9	screw plug	2	BSPP ¼			306968	
10	clogging indicator, visual	1	OP			see sheet-no. 1628	
11	clogging indicator, visual-electrical	1	OE			see sheet-no. 1628	
12	clogging indicator, visual-electrical	1	AE			see sheet-no. 1609	
13	clogging sensor, electronical	1	VS1			see sheet-no. 1607	
14	clogging sensor, electronical	1	VS2			see sheet-no. 1608	
15	O-ring	2	14 x 2			304342 (NBR)	304722 (FPM)
16	screw plug	2	BSPP ¼			306968	
17	pressure balance valve	1					

item 16 execution only without clogging indicator or clogging sensor

4. Description:

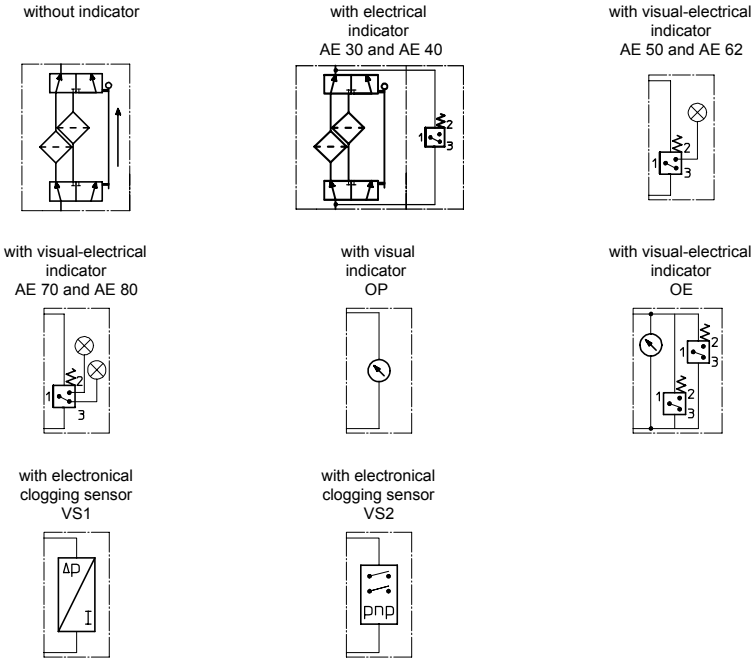
Stainless steel-pressure filter of the series EDU 251-401 are suitable for a working pressure up to 363 PSI. The pressure peaks are absorbed by a sufficient margin of safety. Rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction-filters. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throw-away elements made of Interpor fleece (glass fiber). Filter elements as fine as 5 µm_{eq} are available; finer filter elements on request. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Approvals according to TÜV, and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

5. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	363 PSI
test pressure:	479 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	DIN17445 -1.4581
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	BSPP ¼
evacuation-or bleeder connections:	BSPP ½
volume tank EDU 251:	2x .66 Gal
EDU 401:	2x .97 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3. Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

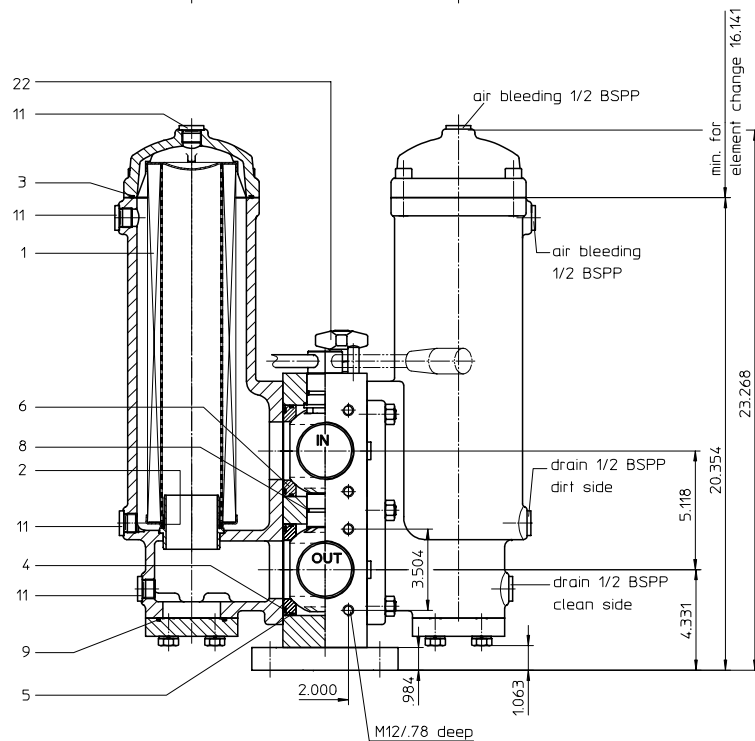
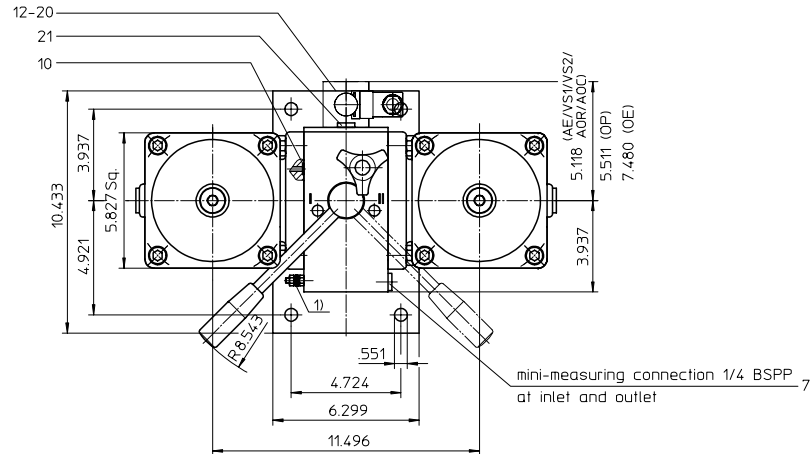
Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over **Series EDU 635 363 PSI**

Sheet No
2150 A

1) connection for the potential equilisation,
 at outlet, only for application in the
 explosive area

Pos. I: left filter-side in operation
 Pos. II: right filter-side in operation



1. Type index:

1.1. Complete filter: (ordering example)

EDU. 635. 10VG. 30. E. P. VA. FS. 9. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
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- 1 **series:**
EDU = stainless steel-pressure filter, change-over
- 2 **nominal size:** 635
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m stainless steel wire mesh,
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
30 = Δp 435 PSI
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 5 **filter element design:**
E = single-end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
9 = 2 1/2 "
- 10 **filter housing specification:**
VA = stainless steel
- 11 **internal valve:**
- = without
- 12 **clogging indicator or clogging sensor:**
- = without,
AOR = visual, see sheet-no. 1606,
AOC = visual, see sheet-no. 1606,
AE = visual-electrical, see sheet-no. 1609,
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. VA

1	2	3	4	5	6	7
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- 1 **series:**
01NL. = standard filter element according to DIN 24550, T3
- 2 **nominal size:** 630
- 3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-connections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

weight: approx. 200 lbs.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL 630...VA		
2	2	O-ring	60 x 3,5	304377 (NBR)	304398 (FPM)
3	2	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	4	O-ring	85 x 4	305685 (NBR)	310285 (FPM)
5	4	O-ring	95 x 3	305808 (NBR)	304828 (FPM)
6	4	gasket		317651	
7	2	screw plug	¼ BSPP	306968	
8	2	O-ring	32 x 3	304368 (NBR)	311020 (FPM)
9	2	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
10	4	O-ring	8 x 2	310004 (NBR)	316530 (FPM)
11	8	screw plug	¼ BSPP	306966	
12	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606	
13	1	clogging indicator, visual	OP	see sheet no. 1628	
14	1	clogging indicator, visual-electrical	OE	see sheet no. 1628	
15	1	clogging indicator, visual-electrical	AE	see sheet no. 1609	
16	1	clogging sensor, electronical	VS1	see sheet no. 1607	
17	1	clogging sensor, electronical	VS2	see sheet no. 1608	
18	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
19	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
20	2	O-ring	14 x2	304342 (NBR)	304722 (FPM)
21	2	screw plug	¼ BSPP	306968	
22	1	pressure balance valve			

item 21 execution only without clogging indicator or clogging sensor

4. Description:

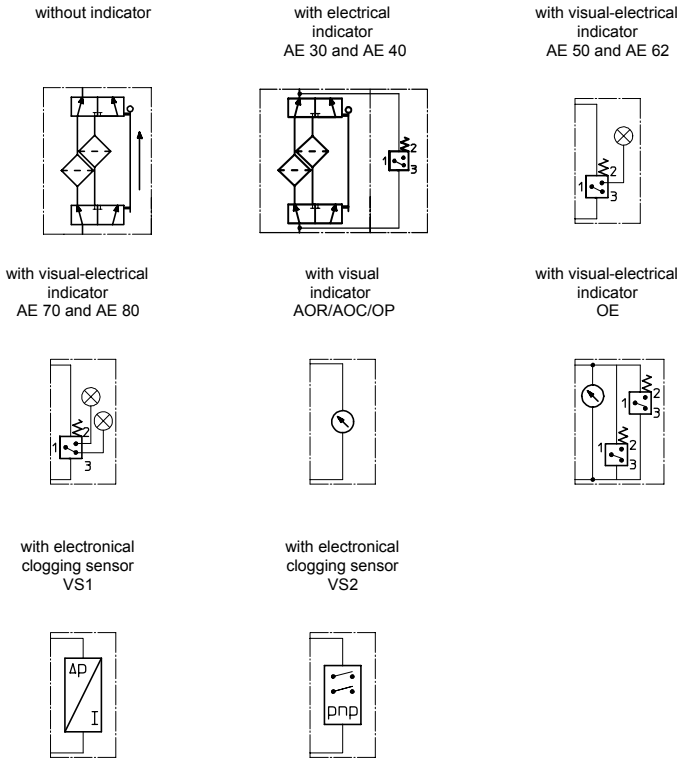
Stainless steel-pressure filters, change-over series EDU 635 are suitable for operating pressure up to 363 PSI. Pressure peaks can be absorbed with a sufficient margin of safety. Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suction filters. For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

5. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	363 PSI
test pressure:	479 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	DIN17445 - 1.4581
switching housing -material:	DIN17440 - 1.4571(316 TI according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	¼ BSPP
evacuation-or bleeder connections:	½ BSPP
volume tank:	2x 1.5 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

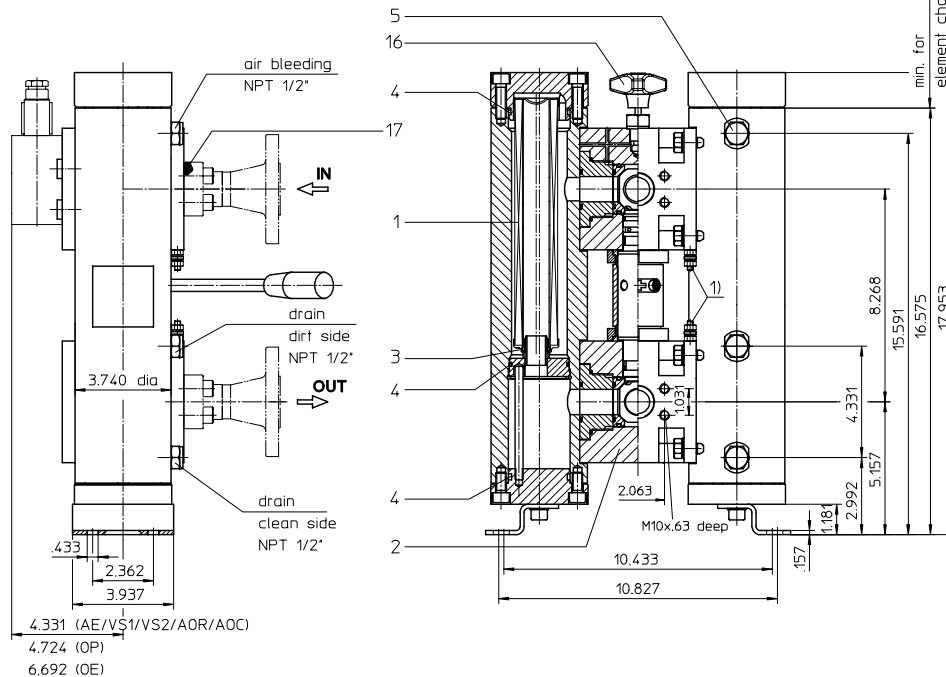
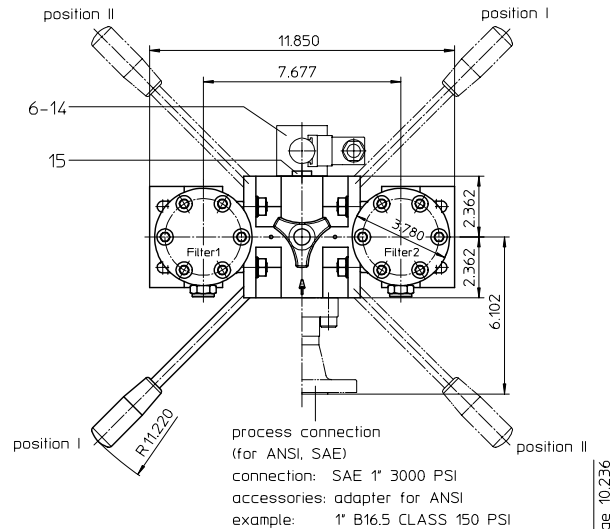
STAINLESS STEEL-PRESSURE FILTER, change-over

Series EDA 101 NPS 1" CLASS 150 PSI

Sheet No.
2168 B

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



1. Type index:

1.1. Complete filter: (ordering example)

EDA. 101. 10VG. 30. E. P. VA. FS. 5. IS30. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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- series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
- nominal size:** 101
- filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API
25 P = 25 µm, 10 P = 10 µm paper
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
- filter element design:**
E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
- sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- filter element specification:**
- = standard, VA = stainless steel
- process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind 1600-3600 µin
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind < 640 µin
- process connection size:**
5 = 1"
- filter housing specification: (material) see sheet-no. 55050**
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
- internal valve:**
- = without
- clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronic, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronic, see sheet-no. 1608
- shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 100. 10VG. 30. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NL. = standard filter element according to DIN 24550, T3
- nominal size:** 100
- 7** see type index complete filter

weight: approx. 132 lbs.

Changes of measures and design are subject to alteration!

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.100...		
2	1	change over UKK	1"		
3	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	6	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
5	6	screw plug	NPT ½	307766	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	BSPPT ¼	306968	
16	1	pressure balance valve	3/8"	310316	
17	2	O-ring (only for execution with ANSI-flange)	32,9 x 3,53	318850 (NBR)	338231 (FPM)

item 15 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 101 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

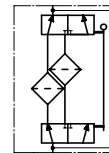
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼"
drain connection dirt side :	NPT ¼"
drain connection clean side :	NPT ¼"
volume tank :	2x .24 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

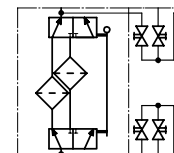
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

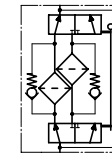
without indicator



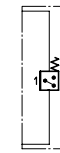
with shut-off valve



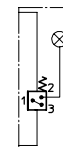
with by-pass valve



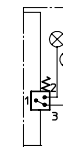
with electrical indicator
AE 30 and AE 40



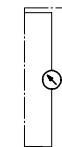
with visual-electrical indicator
AE 50 and AE 62



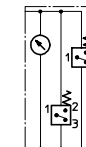
with visual-electrical indicator
AE 70 and AE 80



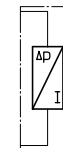
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

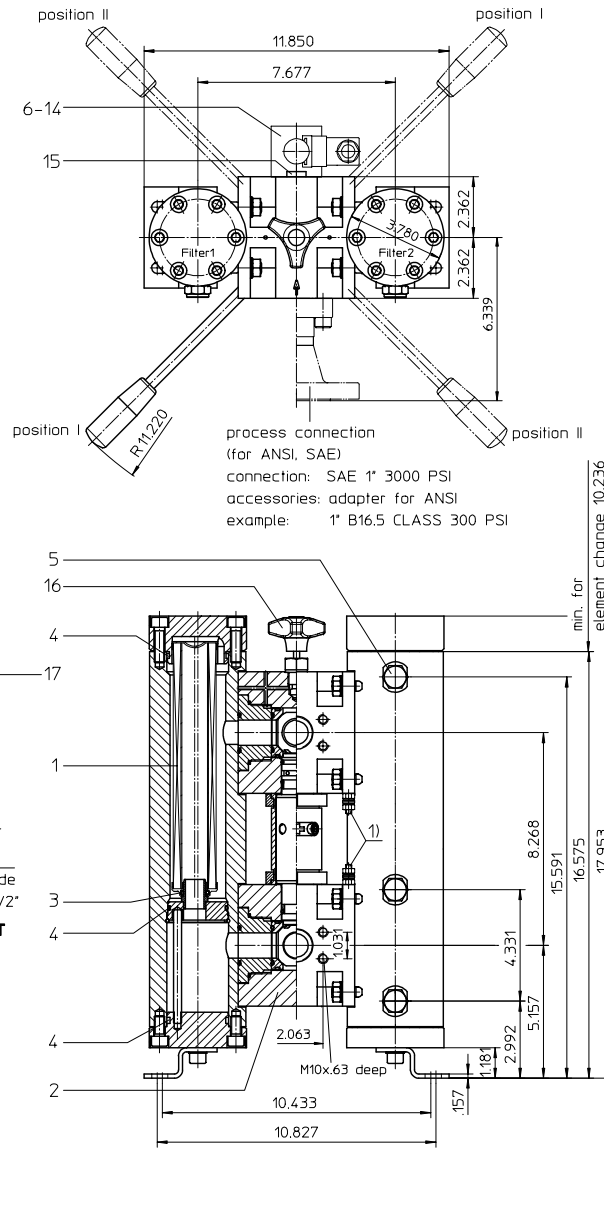
STAINLESS STEEL-PRESSURE FILTER, change-over

Series EDA 100 NPS 1" CLASS 300 PSI

Sheet No.
2159 C

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



1. Type index:

1.1. Complete filter: (ordering example)

EDA. 100. 10VG. 30. E. P. VA. FS. 5. IS30. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
- nominal size:** 100
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m, 10 G = 10 μ m stainless steel wire mesh
25 VG = 20 μ m_(G), 16 VG = 15 μ m_(G), 10 VG = 10 μ m_(G), 6 VG = 7 μ m_(G), 3 VG = 5 μ m_(G) Interpor fleece (glass fiber)
25 API = 20 μ m, 10 API = 10 μ m Interpor fleece (glass fiber) according to API
25 P = 25 μ m, 10 P = 10 μ m paper
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
- filter element design:**
E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
- sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- filter element specification:**
- = standard, VA = stainless steel
- process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 μ m
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 μ m
- process connection size:**
5 = 1"
- filter housing specification: (material) see sheet-no. 55050**
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
- internal valve:**
- = without
- clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronic, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronic, see sheet-no. 1608
- shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 100. 10VG. 30. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NL. = standard filter element according to DIN 24550, T3
- nominal size:** 100
- 7 -** see type index complete filter

weight: approx. 132 lbs.

Changes of measures and design are subject to alteration!

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.100...		
2	1	change over UKK	1"		
3	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	6	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
5	6	screw plug	NPT ½	307766	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	BSPP ¼	306968	
16	1	pressure balance valve	3/8"	310316	
17	2	O-ring (only for execution with ANSI-flange)	32,9 x 3,53	318850 (NBR)	338231 (FPM)

item 15 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 100 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

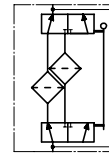
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼"
drain connection dirt side :	NPT ¼"
drain connection clean side :	NPT ¼"
volume tank :	2x .24 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

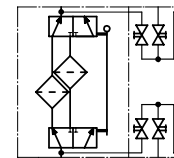
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

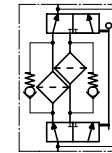
without indicator



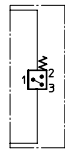
with shut-off valve



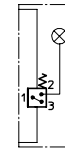
with by-pass valve



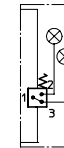
with electrical indicator
AE 30 and AE 40



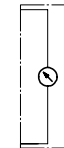
with visual-electrical indicator
AE 50 and AE 62



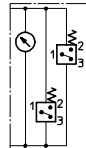
with visual-electrical indicator
AE 70 and AE 80



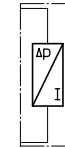
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Sheet No.
2169 B

EDV 05/10

3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			EDA 251	EDA 401		
1	2	filter element	01NL. 250...	01NL. 400...		
2	1	change over UKK	2"			
3	2	O-ring	40 x 3		304389(NBR)	305482(FPM)
4	6	O-ring	100 x 5		327063 (NBR)	327064 (FPM)
5	8	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
6	6	screw plug	NPT ½		307766	
7	2	mini-measuring connection	MA.1.VA		320128	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	BSPP ¼		306968	
18	1	pressure balance valve	3/8"		310316	
19	2	O-ring (only for execution with ANSI-flange)	56,75 x 3,53		306035 (NBR)	310264 (FPM)

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Stainless steel-pressure filters, change-over series EDA 251-401 are suitable for operating pressure up to 580 bar.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

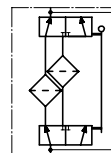
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼" and SAE ¼" 3000 PSI
drain connection dirt side :	NPT ¼" and SAE ¼" 3000 PSI
drain connection clean side :	NPT ¼"
volume tank EDA 251:	2x .79 Gal.
EDA 401:	2x 1.13 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

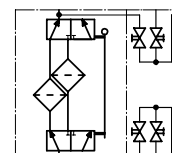
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

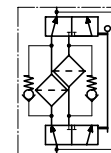
without indicator



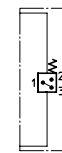
with shut-off valve



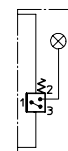
with by-pass valve



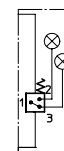
with electrical indicator
AE 30 and AE 40



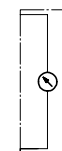
with visual-electrical indicator
AE 50 and AE 62



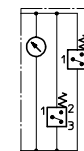
with visual-electrical indicator
AE 70 and AE 80



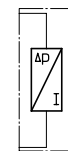
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

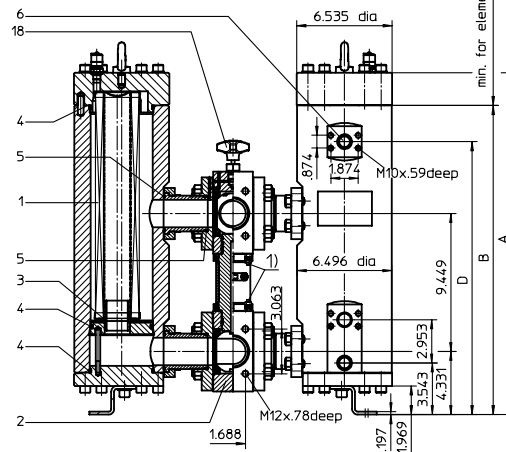
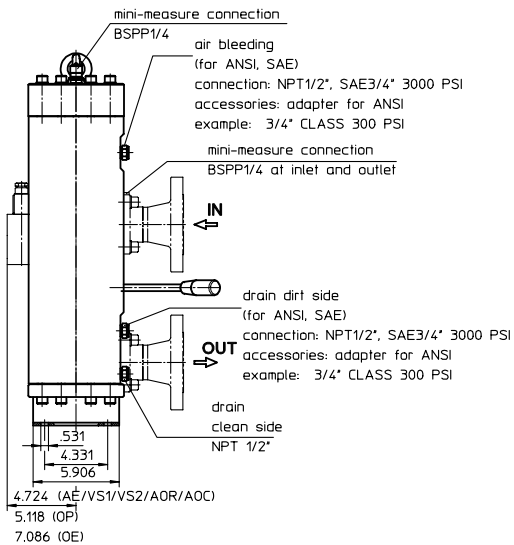
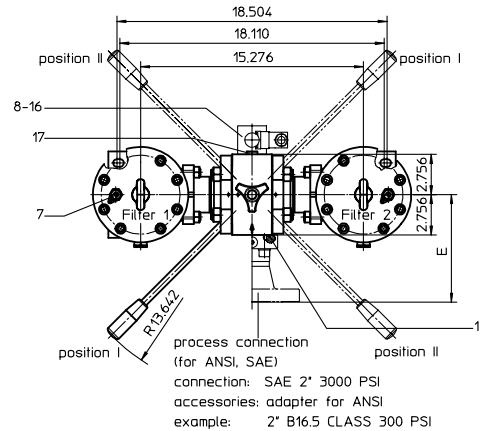
STAINLESS STEEL-PRESSURE FILTER, change-over

Series EDA 250-400 NPS 2" CLASS 300 PSI

Sheet No.
2157 C

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



2. Dimensions: inch

type	connection	A	B	C	D	E	weight lbs.
EDA 250	SAE 2"	17.91	15.66	10.23	14.27	-	approx. 287
	ANSI 2"					7.36	
	ANSI 1 1/2"					7.78	
EDA 400	SAE 2"	23.42	21.18	16.14	17.76	-	approx. 353
	ANSI 2"					7.36	
	ANSI 1 1/2"					7.78	

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 400. 10VG. 30. E. P. VA. FS. 8. IS30. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
- nominal size:** 250, 400
- filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API
25 P = 25 µm, 10 P = 10 µm paper
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
- filter element design:**
E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
- sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- filter element specification:**
- = standard, VA = stainless steel
- process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 µin
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 µin
- process connection size:**
7 = 1 1/2" (only with adapter),
8 = 2"
- filter housing specification: (material) see sheet-no. 55050**
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
- internal valve:**
- = without
- clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608
- shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 400. 10VG. 30. E. P. VA

1	2	3	4	5	6	7
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- series:**
01NL. = standard filter element according to DIN 24550, T3
- nominal size:** 250, 400
- 7** see type index complete filter

Changes of measures and design are subject to alteration!

3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			EDA 250	EDA 400		
1	2	filter element	01NL. 250...	01NL. 400...		
2	1	change over UKK	2"			
3	2	O-ring	40 x 3		304389(NBR)	305482(FPM)
4	6	O-ring	100 x 5		327063 (NBR)	327064 (FPM)
5	8	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
6	6	screw plug	NPT ½		307766	
7	2	mini-measuring connection	MA.1.VA		320128	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	BSPP ¼		306968	
18	1	pressure balance valve	3/8"		310316	
19	2	O-ring (only for execution with ANSI-flange)	56,75 x 3,53		306035 (NBR)	310264 (FPM)

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Stainless steel-pressure filters, change-over series EDA 250-400 are suitable for operating pressure up to 580 bar.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

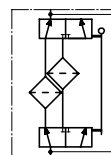
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼" and SAE ¼" 3000 PSI
drain connection dirt side :	NPT ¼" and SAE ¼" 3000 PSI
drain connection clean side :	NPT ¼"
volume tank EDA 250:	2x .79 Gal.
EDA 400:	2x 1.13 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

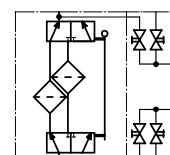
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

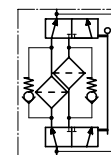
without indicator



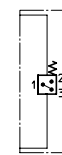
with shut-off valve



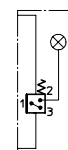
with by-pass valve



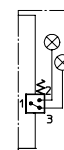
with electrical indicator
AE 30 and AE 40



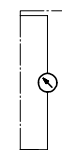
with visual-electrical indicator
AE 50 and AE 62



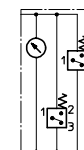
with visual-electrical indicator
AE 70 and AE 80



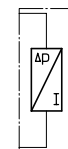
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over **Series EDA 631-1001 NPS 3" CLASS 150 PSI**

Sheet No.
2170 B

1. Type index:

1.1. Complete filter: (ordering example)

EDA.1001.10VG.30. E. P. VA. FS. A. IS30. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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- series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
- nominal size:** 631, 1001
- filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 µm_(c), 16 VG = 15 µm_(c), 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c) Interpor fleece (glass fiber)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fiber) according to API
25 P = 25 µm, 10 P = 10 µm paper
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
- filter element design:**
E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
- sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- filter element specification:**
- = standard, VA = stainless steel
- process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind 1600-3600 µin
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind < 640 µin
- process connection size:**
A = 3"
- filter housing specification: (material) see sheet-no. 55050**
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
- internal valve:**
- = without
- clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronic, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronic, see sheet-no. 1608
- shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

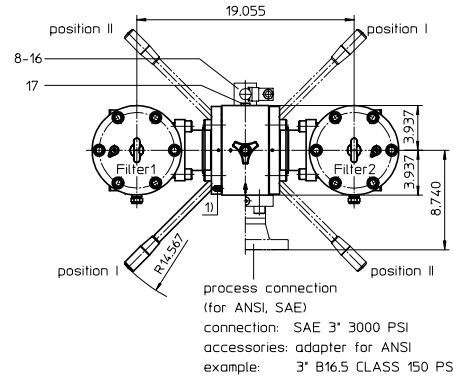
1.2. Filter element: (ordering example)

01NL. 1000. 10VG. 30. E. P. VA

1	2	3	4	5	6	7
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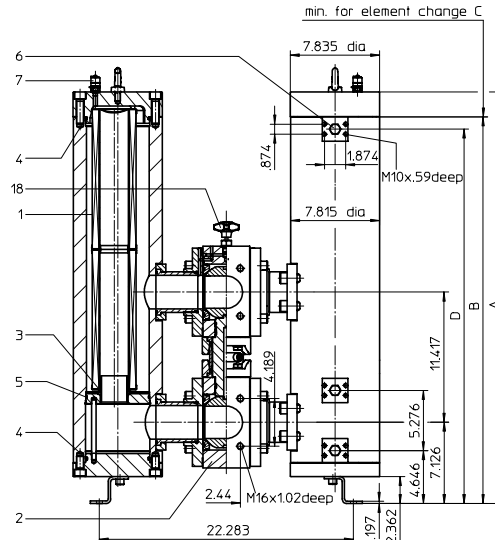
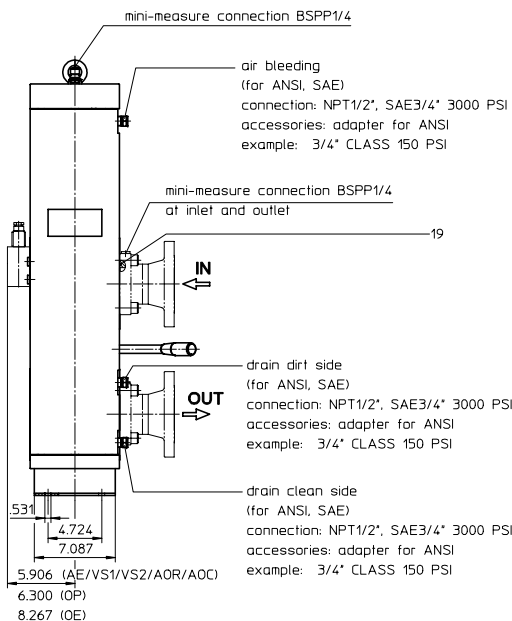
- series:**
01NL. = standard filter element according to DIN 24550, T3
- nominal size:** 1000
- 7 -** see type index complete filter

Changes of measures and design are subject to alteration



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Dimensions: inch

type	connection size	A	B	C	D	weight lbs.
EDA 631	SAE or ANSI 3"	27.04	24.84	16.14	23.77	approx. 639
EDA 1001	SAE or ANSI 3"	36.10	33.89	25.19	32.83	approx. 771

3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			EDA 631	EDA 1001		
1	2	filter element	01NL.630	01NL.1000		
2	1	change over UKK	3"			
3	2	O-ring	60 x 3,5		304377 (NBR)	304398 (FPM)
4	4	O-ring	135 x 4,75		326348 (NBR)	326349 (FPM)
5	2	O-ring	136,12 x 3,53		320162 (NBR)	320163 (FPM)
6	6	screw plug	NPT ½		307766	
7	2	mini-measuring connection	MA.1.VA		320128	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	BSPP ¼		306968	
18	1	pressure balance valve	3/8"		310316	
19	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53		305590 (NBR)	306308 (FPM)

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Stainless steel-pressure filters, change-over series EDA 631-1001 are suitable for operating pressure up to 580 PSI

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

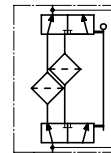
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼" and SAE ¼" 3000 PSI
drain connection dirt side :	NPT ¼" and SAE ¼" 3000 PSI
drain connection clean side :	NPT ¼"
volume tank EDA 631:	2x 2.20 Gal.
EDA 1001:	2x 3.12 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

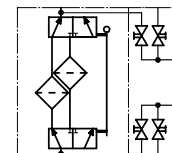
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

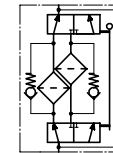
without indicator



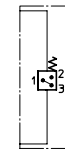
with shut-off valve



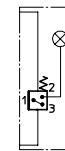
with by-pass valve



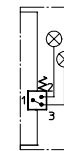
with electrical indicator
AE 30 and AE 40



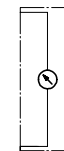
with visual-electrical indicator
AE 50 and AE 62



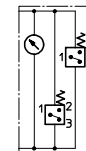
with visual-electrical indicator
AE 70 and AE 80



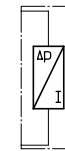
with visual indicator
AOR/AOC/OP



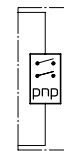
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

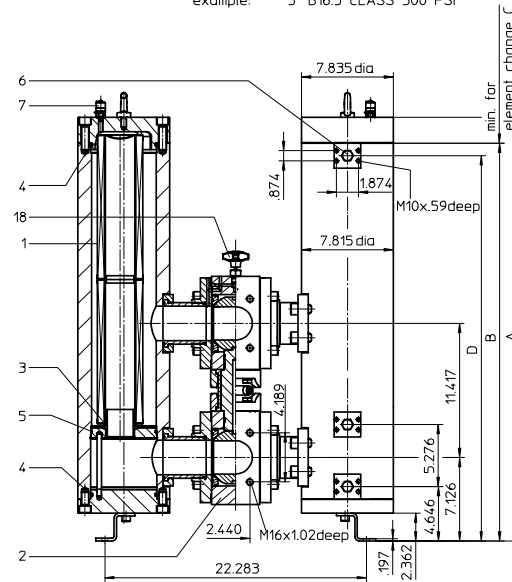
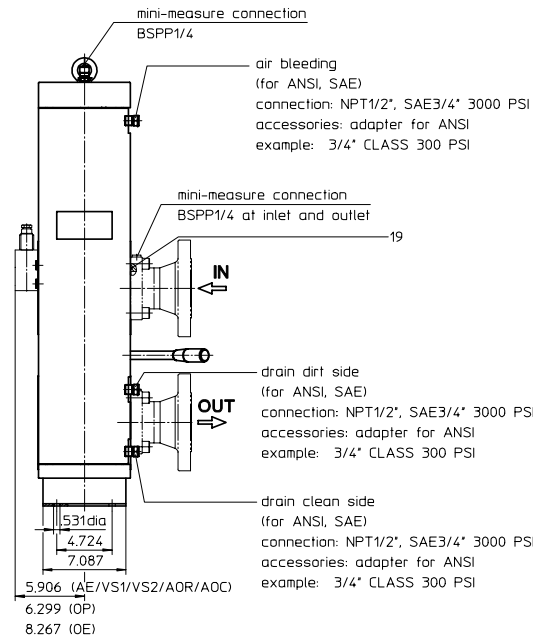
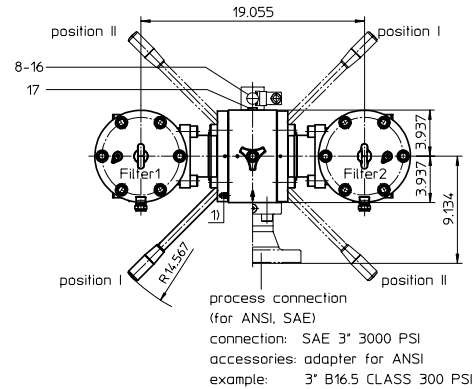
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over **Series EDA 630-1000 NPS 3" CLASS 300 PSI**

Sheet No.
2158 C

1) Connection for the potential equalisation
 at inlet and outlet, only for application
 in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Dimensions: inch

type	connection size	A	B	C	D	weight lbs.
EDA 630	SAE 3"	27.04	24.84	16.14	23.77	approx. 639
EDA 1000	SAE 3"	36.10	33.89	25.19	32.83	approx. 771

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 1000. 10VG. 30. E. P. VA. FS. A. IS30. -. AE. AV. IS21. F. F

- | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
- series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
 - nominal size:** 630, 1000
 - filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m, 10 G = 10 μ m stainless steel wire mesh
25 VG = 20 μ m_(cl), 16 VG = 15 μ m_(cl), 10 VG = 10 μ m_(cl), 6 VG = 7 μ m_(cl), 3 VG = 5 μ m_(cl) Interpor fleece (glass fiber)
25 API = 20 μ m, 10 API = 10 μ m Interpor fleece (glass fiber) according to API
25 P = 25 μ m, 10 P = 10 μ m paper
 - resistance of pressure difference for filter element:**
30 = Δp 435 PSI
 - filter element design:**
E = single-end open, S = with by-pass valve Δp 29 PSI, S1 = with by-pass valve Δp 51 PSI
 - sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
 - filter element specification:**
- = standard, VA = stainless steel
 - process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 μ m
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 μ m
 - process connection size:**
A = 3"
 - filter housing specification: (material)** see sheet-no. 55050
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
 - internal valve:**
- = without
 - clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608
 - shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
 - specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
 - switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
 - air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 1000. 10VG. 30. E. P. VA

- | | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
- series:**
01NL = standard filter element according to DIN 24550, T3
 - nominal size:** 630, 1000
 - 7 see type index complete filter

Changes of measures and design are subject to alteration

3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			EDA 630	EDA 1000		
1	2	filter element	01NL 630...	01NL.1000...		
2	1	change over UKK	3"			
3	2	O-ring	60 x 3,5		304377 (NBR)	304398 (FPM)
4	4	O-ring	135 x 4,75		326348 (NBR)	326349 (FPM)
5	2	O-ring	136,12 x 3,53		320162 (NBR)	320163 (FPM)
6	6	screw plug	NPT ½		307766	
7	2	mini-measuring connection	MA.1.VA		320128	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	BSPP ¼		306968	
18	1	pressure balance valve	3/8"		310316	
19	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53		305590 (NBR)	306308 (FPM)

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Stainless steel-pressure filters, change-over series EDA 630-1000 are suitable for operating pressure up to 580 bar.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm₀ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

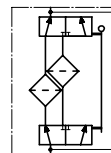
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

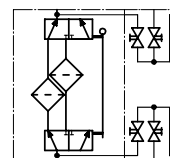
temperature ranges	
- calculation temperature (pressure vessel):	+14°F to +212°F
- medium temperature:	+14°F to +176°F
- ambient temperature:	- 40°F to +140°F
- survival temperature:	- 40°F to +212°F (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	580 PSI
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 827 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 754 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 870 PSI
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼" and SAE ¼" 3000 PSI
drain connection dirt side :	NPT ¼" and SAE ¼" 3000 PSI
drain connection clean side :	NPT ¼" and SAE ¼" 3000 PSI
volume tank EDA 630:	2x 2.19 Gal.
EDA 1000:	2x 3.11 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.	
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)	

7. Symbols:

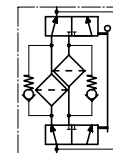
without indicator



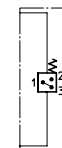
with shut-off valve



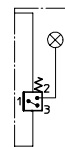
with by-pass valve



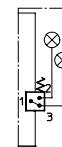
with electrical indicator
AE 30 and AE 40



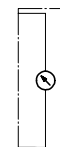
with visual-electrical indicator
AE 50 and AE 62



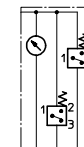
with visual-electrical indicator
AE 70 and AE 80



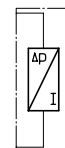
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	3"		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.VA	320128	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼	306968	
20	1	pressure balance valve	3/8"	310316	
21	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53	305590 (NBR)	306308 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 1004 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

stainless steel, see sheet-no. 55050

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 5.02 Gal.

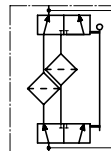
according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

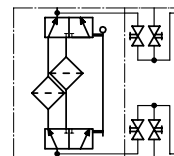
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

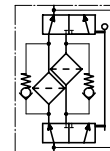
without indicator



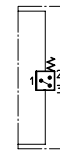
with shut-off valve



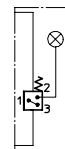
with by-pass valve



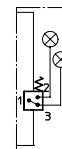
with electrical indicator
AE 30 and AE 40



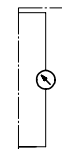
with visual-electrical indicator
AE 50 and AE 62



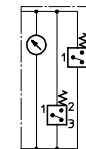
with visual-electrical indicator
AE 70 and AE 80



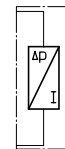
with visual indicator
AOR/AOC/OP



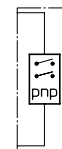
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	4"		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.VA	320128	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼	306968	
20	1	pressure balance valve	3/8"	310316	
21	2	O-ring (only for execution with ANSI-flange)	110,72 x 3,53	316355 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 1005 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

stainless steel, see sheet-no. 55050

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 5.02 Gal.

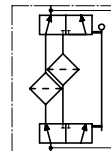
according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

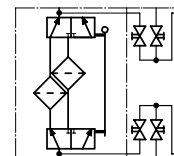
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

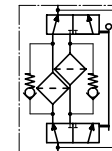
without indicator



with shut-off valve



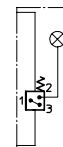
with by-pass valve



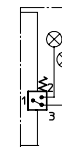
with electrical indicator
AE 30 and AE 40



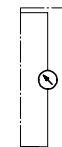
with visual-electrical indicator
AE 50 and AE 62



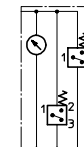
with visual-electrical indicator
AE 70 and AE 80



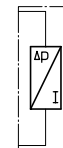
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively
Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over **Series EDA 1014 NPS 3" CLASS 150 PSI**

Sheet No.
2175 A

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 1014. 10VG. 10. B. P. VA. FS. A. IS30. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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- 1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
- 2 **nominal size:** 1014
- 3 **filter-material and filter- fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m, 10 G = 10 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 API = 20 μ m, 10 API = 10 μ m Interpor fleece (glass fiber) according to API
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both-sides open
- 6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- 7 **filter element specification:**
- = standard, VA = stainless steel
- 8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind 1600-3600 μ m
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind < 640 μ m
- 9 **process connection size:**
A = 3"
- 10 **filter housing specification: (material) see sheet-no. 55050**
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
- 11 **internal valve:**
- = without, S1 = with by-pass valve Δp 51 PSI
- 12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608
- 13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- 14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- 15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- 16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7
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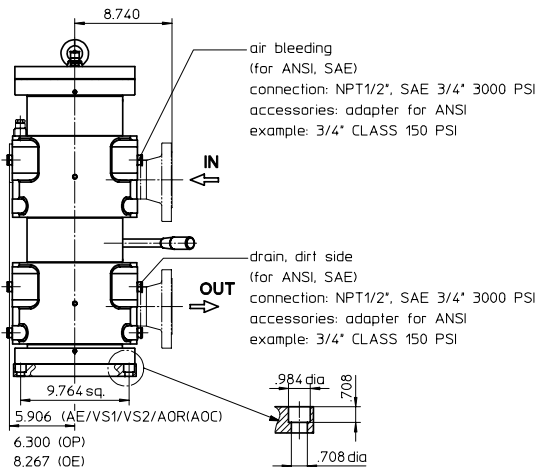
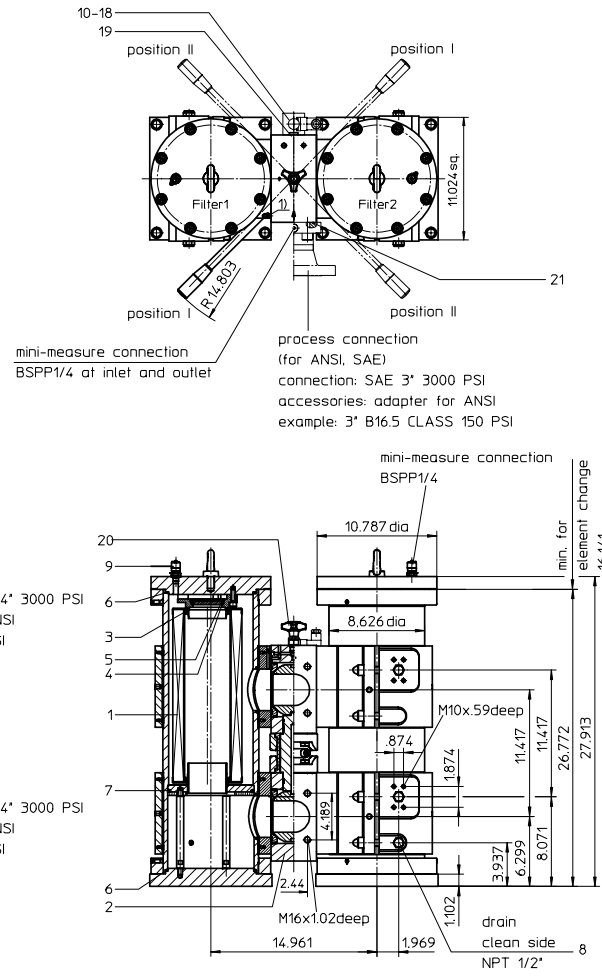
- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index complete filter

weight: approx. 816 lbs.

Changes of measures and design are subject to alteration!

¹⁾ Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	3"		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½"	307766	
9	2	mini-measuring connection	MA.1.VA	320128	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼"	306968	
20	1	pressure balance valve	3/8"	310316	
21	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53	305590 (NBR)	306308 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 1014 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

stainless steel, see sheet-no. 55050

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 5.02 Gal.

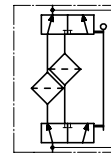
according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

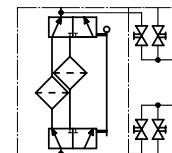
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

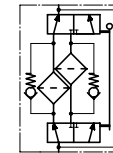
without indicator



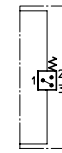
with shut-off valve



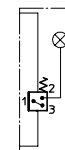
with by-pass valve



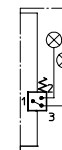
with electrical indicator
AE 30 and AE 40



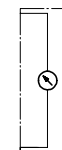
with visual-electrical indicator
AE 50 and AE 62



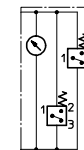
with visual-electrical indicator
AE 70 and AE 80



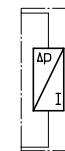
with visual indicator
AOR/AOC/OP



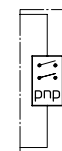
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over

Series EDA 1015 NPS 4" CLASS 150 PSI

Sheet No.
2171 A

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 1015. 10VG. 10. B. P. VA. FS. B. IS30. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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- series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
- nominal size:** 1015
- filter-material and filter- fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m, 10 G = 10 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 API = 20 μ m, 10 API = 10 μ m Interpor fleece (glass fiber) according to API
25 P = 25 μ m, 10 P = 10 μ m paper
- resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- filter element design:**
B = both-sides open
- sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- filter element specification:**
- = standard, VA = stainless steel
- process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind 1600-3600 μ m
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind < 640 μ m
- process connection size:**
B = 4"
- filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
- internal valve:**
- = without, S1 = with by-pass valve Δp 51 PSI
- clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608
- shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

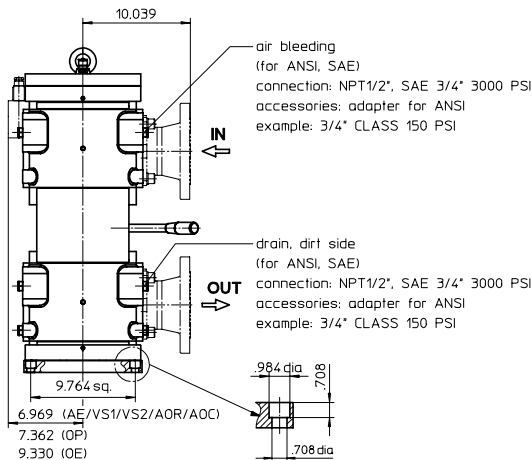
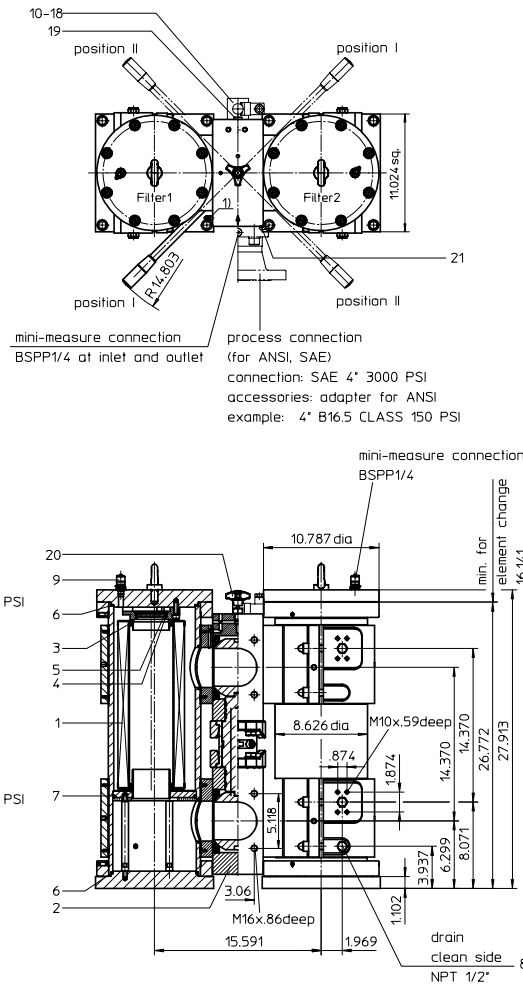
- series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- nominal size:** 1000
- 7 see type index complete filter

weight: approx. 915 lbs.

Changes of measures and design are subject to alteration

¹⁾ Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	4"		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.VA	320128	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼	306968	
20	1	pressure balance valve	3/8"	310316	
21	2	O-ring (only for execution with ANSI-flange)	110,72 x 3,53	316355 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 1015 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

stainless steel, see sheet-no. 55050

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 5.02 Gal.

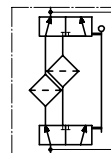
according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

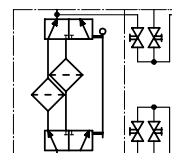
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

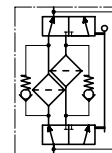
without indicator



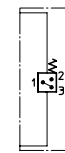
with shut-off valve



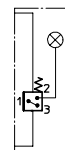
with by-pass valve



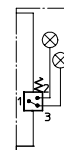
with electrical indicator
AE 30 and AE 40



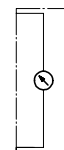
with visual-electrical indicator
AE 50 and AE 62



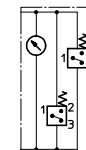
with visual-electrical indicator
AE 70 and AE 80



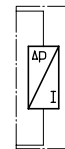
with visual indicator
AOR/AOC/OP



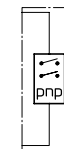
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Sheet No.
2179

EDV 05/10

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	3"		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.VA	320128	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼	306968	
20	1	pressure balance valve	3/8"	310316	
21	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53	305590 (NBR)	306308 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 2204 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

stainless steel, see sheet-no. 55050

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 7.92 Gal.

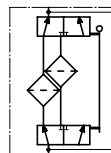
according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

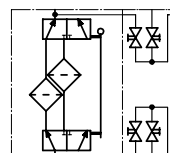
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

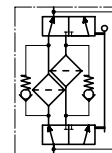
without indicator



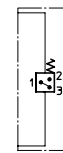
with shut-off valve



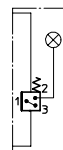
with by-pass valve



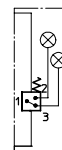
with electrical indicator
AE 30 and AE 40



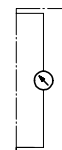
with visual-electrical indicator
AE 50 and AE 62



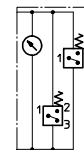
with visual-electrical indicator
AE 70 and AE 80



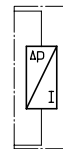
with visual indicator
AOR/AOC/OP



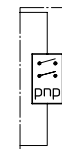
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

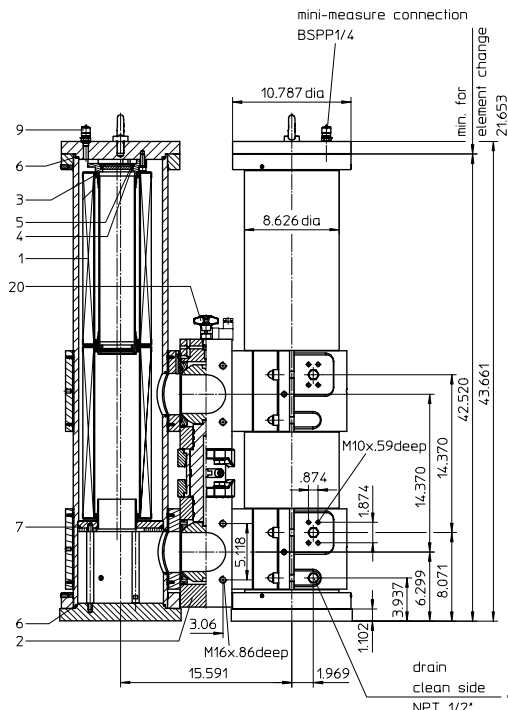
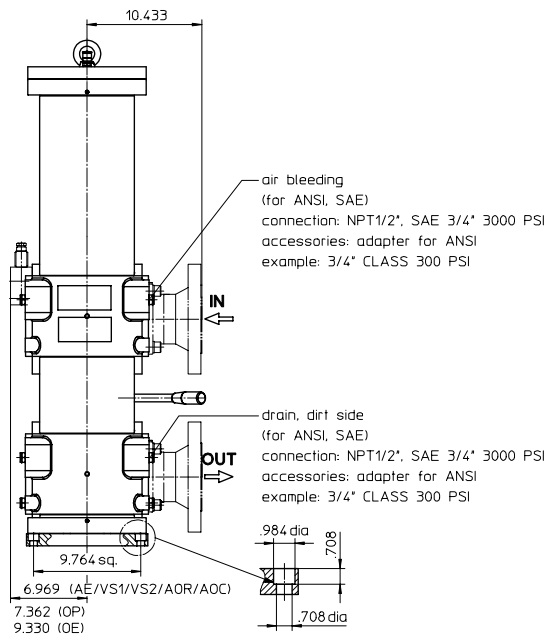
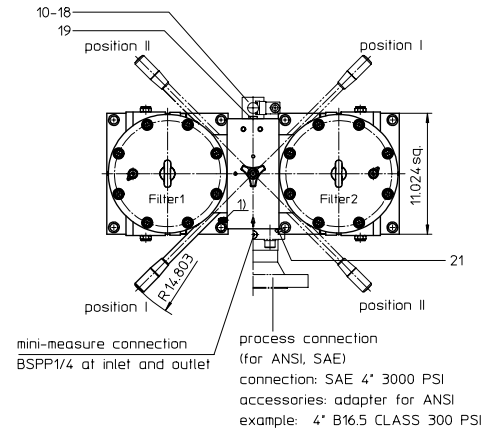
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over **Series EDA 2205 NPS 4" CLASS 300 PSI**

Sheet No.
2178 A

1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



1. Type index:

1.1. Complete filter: (ordering example)

EDA. 2205. 10VG. 10. B. P. VA. FS. B. IS30. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
- nominal size:** 2205
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m, 10 G = 10 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 API = 20 μ m, 10 API = 10 μ m Interpor fleece (glass fiber) according to API
25 P = 25 μ m, 10 P = 10 μ m paper
- resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- filter element design:**
B = both-sides open
- sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- filter element specification:**
- = standard, VA = stainless steel
- process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind 1600-3600 μ m
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface rough grind < 640 μ m
- process connection size:**
B = 4"
- filter housing specification: (material) see sheet-no. 55050**
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
- internal valve:**
- = without; S1 = with by-pass valve Δp 51 PSI
- clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608
- shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- nominal size:** 1000
- 7 see type index complete filter

weight: approx. 1102 lbs.

Changes of measures and design are subject to alteration!

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	4"		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.VA	320128	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼	306968	
20	1	pressure balance valve	3/8"	310316	
21	2	O-ring (only for execution with ANSI-flange)	110,72 x 3,53	316355 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 2205 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

stainless steel, see sheet-no. 55050

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 7.92 Gal.

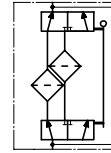
according to B16.5 CLASS 300 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

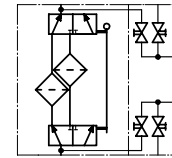
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

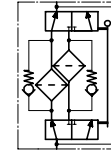
without indicator



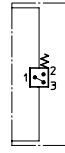
with shut-off valve



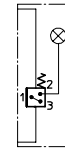
with by-pass valve



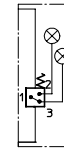
with electrical indicator
AE 30 and AE 40



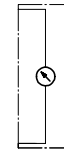
with visual-electrical indicator
AE 50 and AE 62



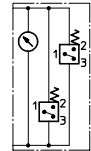
with visual-electrical indicator
AE 70 and AE 80



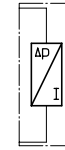
with visual indicator
AOR/AOC/OP



with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over **Series EDA 2214 NPS 3" CLASS 150 PSI**

Sheet No.
2167

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 2214. 10VG. 10. B. P. VA. FS. A. IS30. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

- 1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code
- 2 **nominal size:** 2214
- 3 **filter-material and filter- fineness:**
80 G = 80 μ m, 40 G = 40 μ m, 25 G = 25 μ m, 10 G = 10 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c), 6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 API = 20 μ m, 10 API = 10 μ m Interpor fleece (glass fiber) according to API
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both-sides open
- 6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- 7 **filter element specification:**
- = standard, VA = stainless steel
- 8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind 1600-3600 μ m
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface rough grind < 640 μ m
- 9 **process connection size:**
A = 3"
- 10 **filter housing specification: (material) see sheet-no. 55050**
- = standard, per according to specification pressure vessel DGLR/ASME, 1.4571/type 304-316L
IS30 = only type 316, see sheet-no. 55219
- 11 **internal valve:**
- = without; S1 = with by-pass valve Δp 51 PSI
- 12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electrical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electrical, see sheet-no. 1608
- 13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655
- 14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218
- 15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT
- 16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

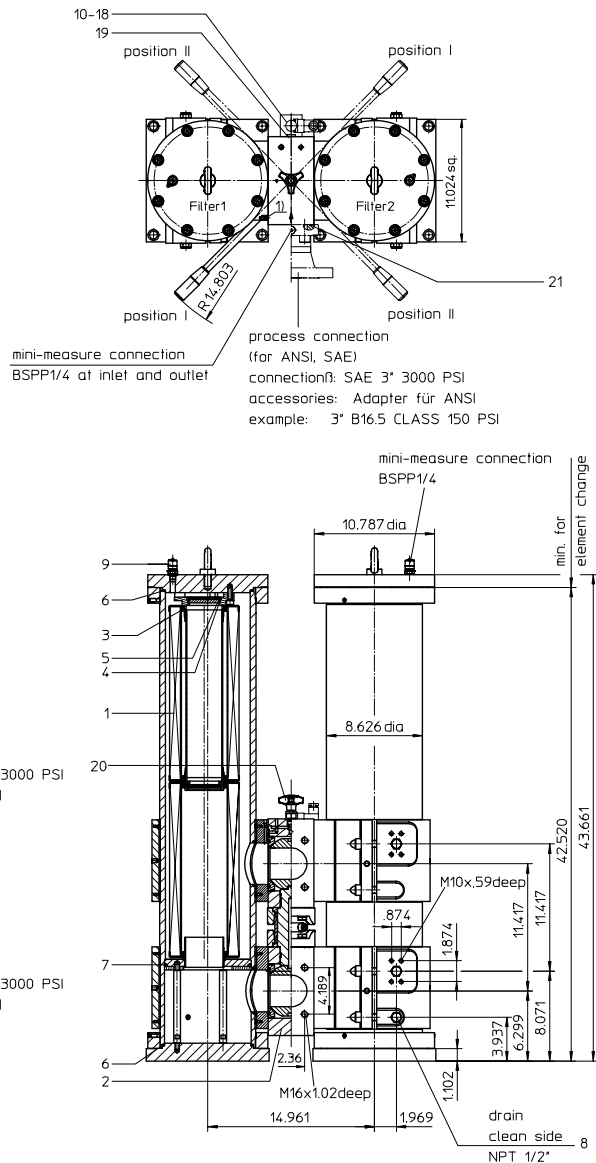
01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index complete filter

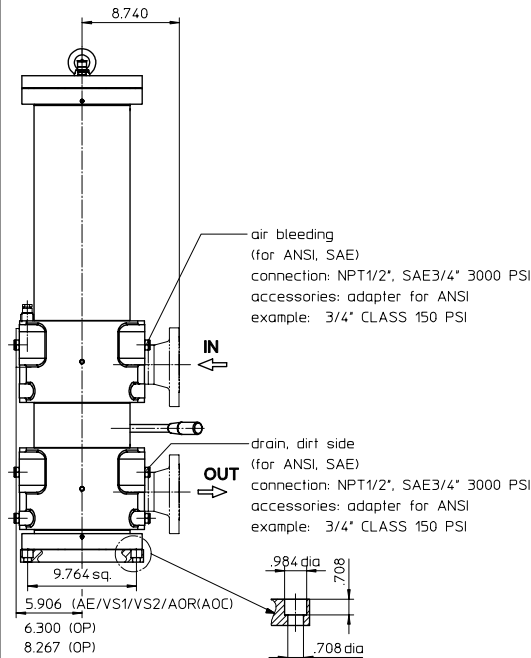
weight: approx. 1080 lbs.

Changes of measures and design are subject to alteration!



¹⁾ Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
 Position II: Filter 2 in operation



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	3"		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½"	307766	
9	2	mini-measuring connection	MA.1.VA	320128	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼"	306968	
20	1	pressure balance valve	3/8"	310316	
21	2	O-ring (only for execution with ANSI-flange)	85,32 x 3,53	305590 (NBR)	306308 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 2214 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

stainless steel, see sheet-no. 55050

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 7.92 Gal.

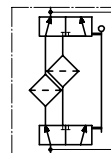
according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

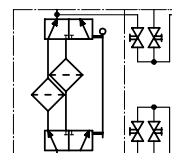
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

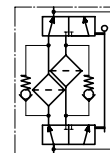
without indicator



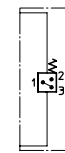
with shut-off valve



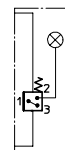
with by-pass valve



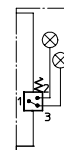
with electrical indicator
AE 30 and AE 40



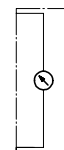
with visual-electrical indicator
AE 50 and AE 62



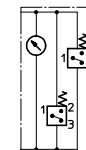
with visual-electrical indicator
AE 70 and AE 80



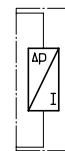
with visual indicator
AOR/AOC/OP



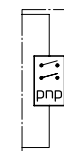
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

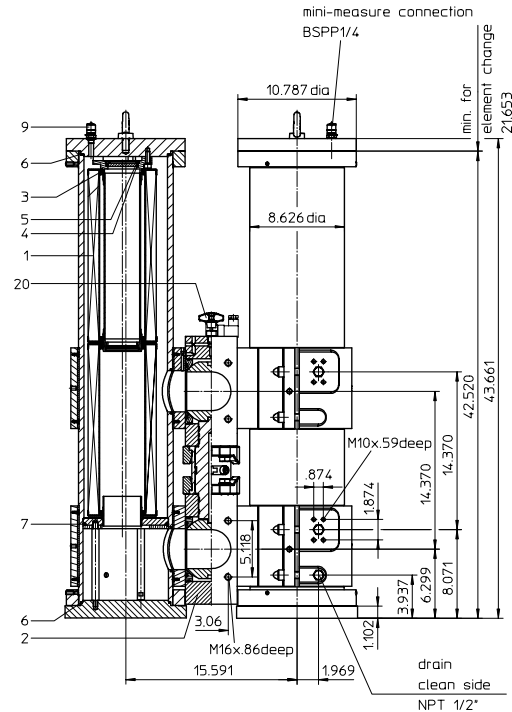
Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Sheet No.
2172 B



2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	4"		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½"	307766	
9	2	mini-measuring connection	MA.1.VA	320128	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	BSPP ¼"	306968	
20	1	pressure balance valve	3/8"	310316	
21	2	O-ring (only for execution with ANSI-flange)	110,72 x 3,53	316555 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 2215 are suitable for operating pressure up to 580 PSI.

Pressure peaks can be absorbed with a sufficient margin of safety.

Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.

These filters can be installed as suction filters.

For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.

Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 µm_(e) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyards Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

temperature ranges

- calculation temperature (pressure vessel):

- medium temperature:

- ambient temperature:

- survival temperature:

operating medium:

max. operating pressure:

test pressure acc. to PED 97/23/EC:

test pressure acc. to ASME VIII Div. 1:

test pressure acc. to API 614, Chapter 1:

connection system:

housing material:

sealing material:

installation position:

bleeder connection :

drain connection dirt side :

drain connection clean side :

volume tank :

operating pressure adapter flanges:

+14°F to +212°F

+14°F to +176°F

- 40°F to +140°F

- 40°F to +212°F (short-time)

mineral oil, other media on request

580 PSI

1,43 x operating pressure = 827 PSI

1,3 x operating pressure = 754 PSI

1,5 x operating pressure = 870 PSI

SAE-flange connection 3000 PSI

stainless steel, see sheet-no. 55050

Nitrile (NBR) or Viton (FPM), other materials on request

vertical

NPT ½" and SAE ¾" 3000 PSI

NPT ½" and SAE ¾" 3000 PSI

NPT ½"

2x 7.92 Gal.

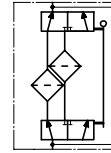
according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

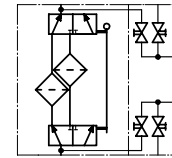
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

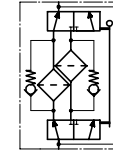
without indicator



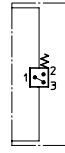
with shut-off valve



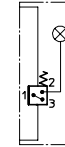
with by-pass valve



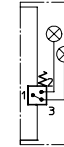
with electrical indicator
AE 30 and AE 40



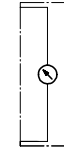
with visual-electrical indicator
AE 50 and AE 62



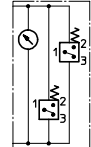
with visual-electrical indicator
AE 70 and AE 80



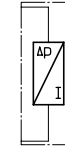
with visual indicator
AOR/AOC/OP



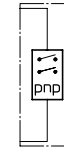
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

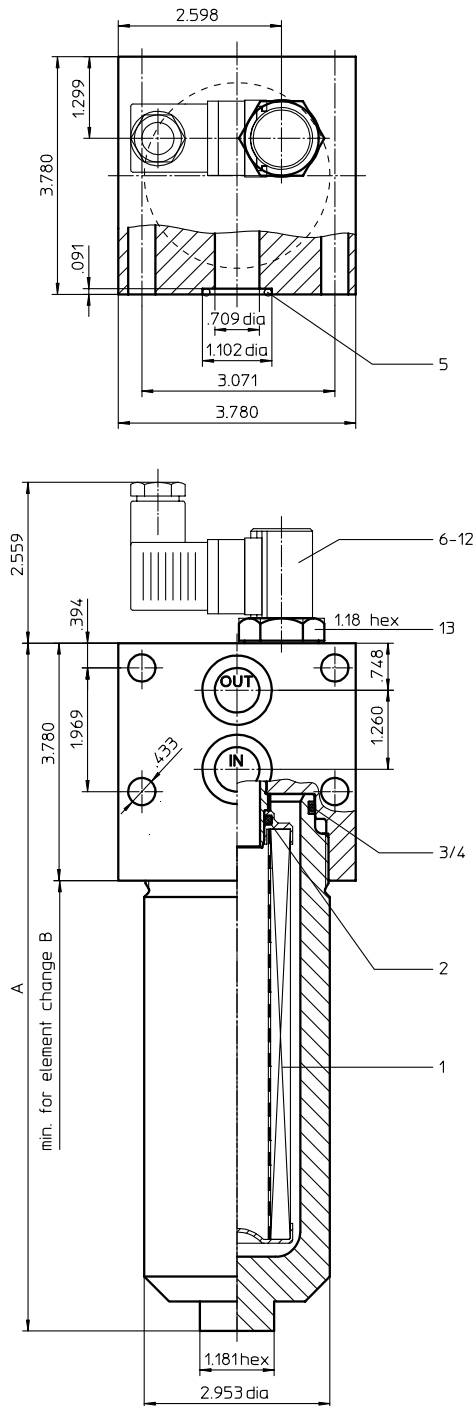
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL - PRESSURE FILTER

Series EHPF 60 - 150 4568 PSI

Sheet No.
1440



2. Dimensions: inch

type	connection	A	B	weight kg	volume tank
EHPF 60	3/4"	8.38	8.50	22	.08 Gal.
EHPF 90		10.95	11.00	24	.10 Gal.
EHPF 150		12.27	15.35	27	.16 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

EHPF. 90. 10VG. HR. E. P. VA. F. 4. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
EHPF = stainless steel-pressure filter, manifold mounted
- nominal size:** 60, 90 150
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
F = manifold mounted
- connection size:**
4 = 3/4"
- filter housing specification:**
VA = stainless steel
- internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
R = reversing valve, Q \leq 55.75 GPM
- clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to
INTERNORMEN factory specification
- nominal size:** 60, 90, 150
- 7** see type index-complete filter

3. Spare parts:

item	qty.	designation	dimension			article-no.	
			EHPF 60	EHPF 90	EHPF 150		
1	1	filter element	01E.60	01E.90	01E.150		
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	56 x 3			305072 (NBR)	305322 (FPM)
4	1	support ring	63 x 2,6 x 1			312309	
5	2	O-ring	22 x 3			304387 (NBR)	304931 (FPM)
6	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
7	1	clogging indicator, visual-electrical	AE			see sheet no. 1615	
8	1	clogging sensor, electronical	VS1			see sheet no. 1617	
9	1	clogging sensor, electronical	VS2			see sheet no. 1618	
10	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
13	1	screw plug	40171-4			314442	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

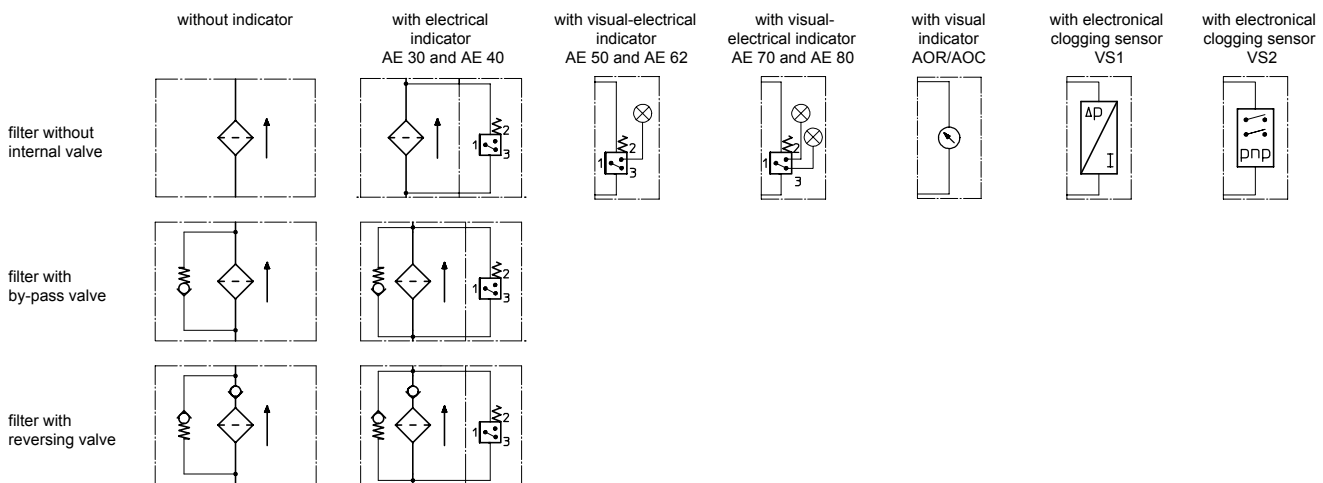
The stainless steel pressure filters of the series EHPF are suitable for a working pressure up to 4568 PSI. The pressure peaks are absorbed by a sufficient margin of safety. The EHPF-filters are flanged to the mounting-surface. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 4 $\mu\text{m}_{(c)}$. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI. The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range: +14°F to +176°F (for a short time +212°F)
operating medium: mineral oil, other media on request
max. operating pressure: 4568 PSI
test pressure: 6525 PSI
connection system: manifold mounted
housing material: EN10088 - 1.4571 (316 Ti according to AISI)
sealing material: Nitrile (NBR) or Viton (FPM), other materials on request
installation position: vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

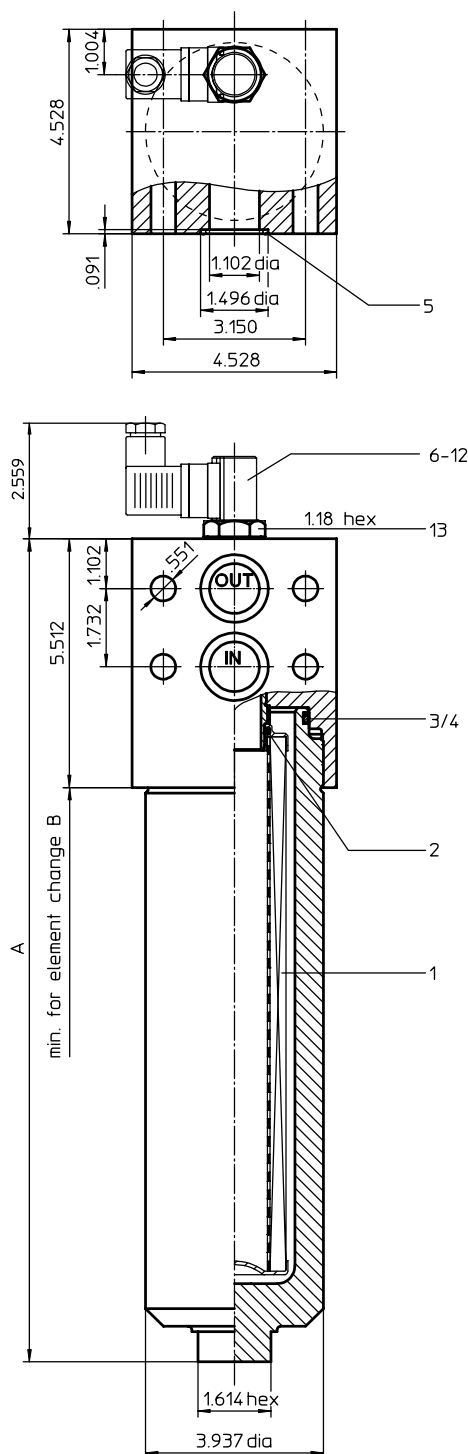
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

STAINLESS STEEL - PRESSURE FILTER

Series EHPF 170 - 450 4568 PSI

Sheet No.

1441



2. Dimensions: inch

type	connection	A	B	weight lbs.	volume tank
EHPF 170	1"	13.11	13.00	48	.18 Gal.
EHPF 240		15.07	14.00	53	.23 Gal.
EHPF 360		18.22	18.00	57	.31 Gal.
EHPF 450		22.36	22.00	66	.42 Gal.

1. Type index:

1.1. Complete filter: (ordering example)

EHPF. 360. 10VG. HR. E. P. VA. F. 5. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- series:**
EHPF = stainless steel-pressure filter, manifold mounted
- nominal size:** 170, 240, 360, 450
- filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 VG = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δ p 435 PSI
HR = Δ p 2320 PSI (rupture strength Δ p 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- connection:**
F = manifold mounted
- connection size:**
5 = 1"
- filter housing specification:**
VA = stainless steel
- internal valve:**
- = without
S1 = with by-pass valve Δ p 51 PSI
S2 = with by-pass valve Δ p 102 PSI
R = reversing valve, Q \leq 55.75 GPM
- clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to
INTERNORMEN factory specification
- nominal size:** 170, 240, 360, 450
- 7** see type index-complete filter

3. Spare parts:

item	qty.	designation	dimensions				article-no.	
			EHPF 170	EHPF 240	EHPF 360	EHPF 450		
1	1	filter element	01E.170	01E.240	01E.360	01E.450		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	76 x 4				305599 (NBR)	310291 (FPM)
4	1	support ring	84 x 3,2 x 1,5				312307	
5	2	O-ring	32 x 3				304368 (NBR)	311020 (FPM)
6	1	clogging indicator, visual	AOR or AOC				see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE				see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1				see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2				see sheet-no. 1618	
10	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
13	1	screw plug	40171-4				314442	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series EHPF are suitable for a working pressure up to 4568 PSI.

The pressure peaks are absorbed by a sufficient margin of safety. The EHPF-filters are flanged to the mounting-surface..

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 4 µm_(c).

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element.

After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

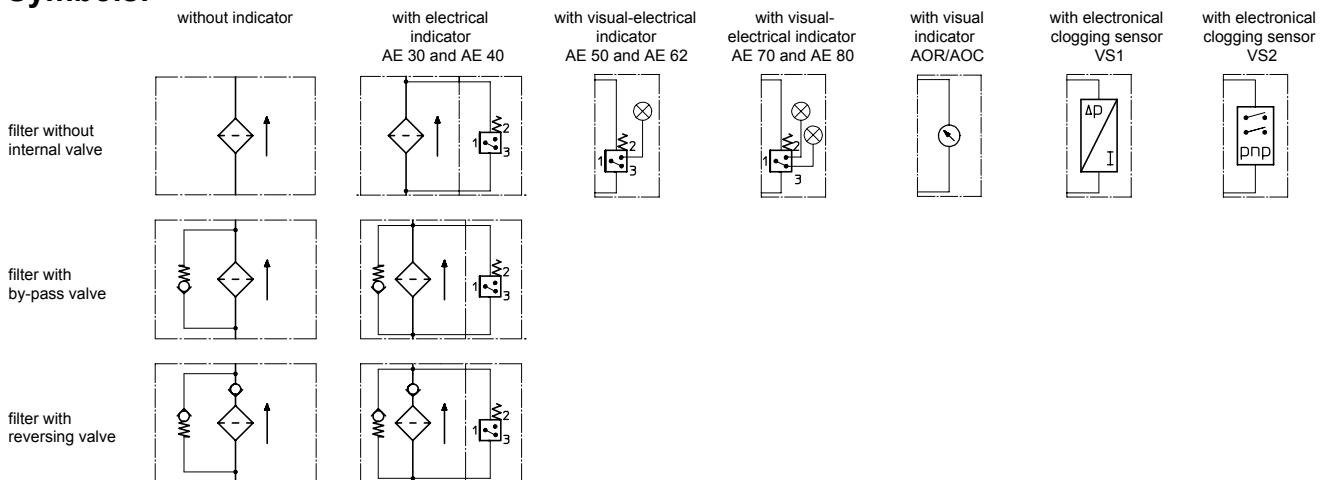
5. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
connection system:	manifold mounted
housing material:	DIN 17440 - 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

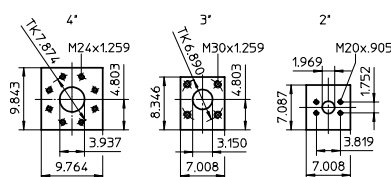
Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

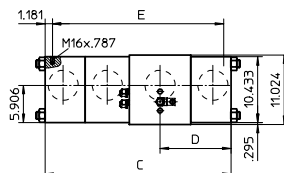
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

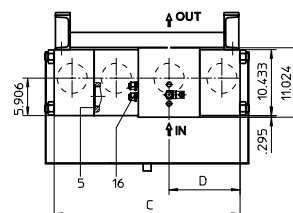
dimensions for inlet and outlet



execution with threaded bores

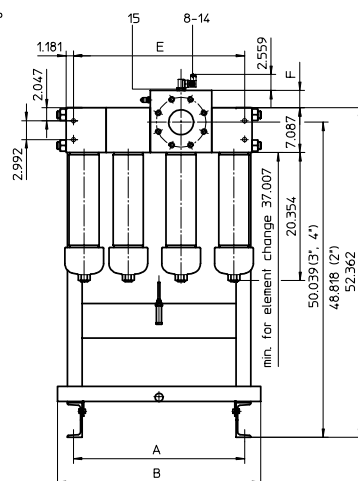
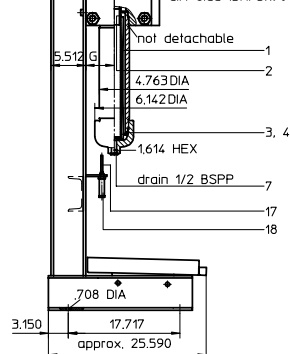


with supporting frame



TK=reference circle

mini-measuring connection 1/4 BSPP clean side (BHP3x901-7x901)
air bleeding connections 1/4 BSPP for BHP2x901 also mini-measuring conn. 1/4 BSPP
mini-measuring connection 1/4 BSPP dirt side (BHP3x901-7x901)



2. Dimensions: inch

filter-battery	connection	A	B	C	D	E	F	G	weight lbs.	
									without supporting frame	with supporting frame
	3"	10.63	15.75	12.99	6.50	10.63	1.26	3.86	374	462
	2"	10.63	15.75	12.99	6.50	10.63	-	3.86	374	462
	4"	20.16	25.28	22.52	11.26	20.16	2.76	4.53	620	763
	3", 2"	17.40	22.52	19.80	9.88	17.40	1.26	4.53	535	678
	4"	27.17	32.30	29.53	11.26	27.17	2.76	4.53	792	942
	3", 2"	24.40	29.52	26.77	9.88	24.40	1.26	4.53	706	856
	4"	34.20	39.30	36.53	18.27	34.20	2.76	4.53	966	1122
	3", 2"	31.42	36.53	33.78	16.89	31.42	1.26	4.53	880	1036
	4"	41.20	46.30	43.54	18.27	41.20	2.76	4.53	1137	1300
	3", 2"	38.43	43.54	40.79	16.89	38.43	1.26	4.53	1052	1214
	4"	48.20	53.31	50.55	25.28	48.20	2.76	4.53	1310	1476
	3", 2"	45.43	50.55	47.80	23.90	45.43	1.26	4.53	1223	1390

FILTER-BATTERY

Series BHP 2x901-7x901

4568 PSI

Sheet No.

1467 E

1.1. Complete filter: (ordering example)

BHP.4x901.10VG. HR. E. P. -. FV. A. -. -. AE. T

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- series:**
BHP = battery-pressure filter
- nominal size:**
2x901; 5x901
3x901; 6x901
4x901; 7x901
- filter-material and filter-fineness:**
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- filter element design:**
E = single-end open
- sealing material:**
P = Nitrile (NBR); V = Viton (FPM)
- filter element specification:**
- = standard; VA = stainless steel
- connection:**
FS = SAE-flange connection 6000 PSI
FV = AVIT-flange connection 4640 PSI
- connection size:**
8 = 2" with FS (up to BHP 3x901 preferably)
= or with FV (only BHP 2x901)
A = 3" with FV (up to BHP 5x901 preferably)
B = 4" with FV (BHP 3x901 up to 7x901 preferably)
- filter housing specification:**
- = standard
- internal valve:**
- = without
S1 = with by-pass valve, Δp 51 PSI
S2 = with by-pass valve, Δp 102 PSI
R = reversing valve, $Q \leq 122.94$ GPM
- clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electrical, see sheet-no. 1617
VS2 = electrical, see sheet-no. 1618
- fixing:**
- = without supporting frame with fastening bores
T = with supporting frame

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01E. = filter element according to INTERNORMEN factory specification
- nominal size:** 900
- 7** see type index-complete filter

Changes of measures and design are subject to alteration!

3. Accessories:

- Counter flange see sheet-no. 1654

4. Spare parts:

item	qty. BHP2x901	qty. BHP3x901	qty. BHP4x901	qty. BHP5x901	qty. BHP6x901	qty. BHP7x901	designation	dimension	article-no.	
1	2	3	4	5	6	7	filter element	01E.900		
2	2	3	4	5	6	7	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
3	2	3	4	5	6	7	O-ring	98 x 4	301914 (NBR)	304754 (FPM)
4	2	3	4	5	6	7	support ring	110 x 3,5 x 2	304802	
5	-	4	6	8	10	12	O-ring	85 x 3,5	311309 (NBR)	317033 (FPM)
6	2	2	2	2	2	2	screw plug	¼ BSPP	305003	
7	2	3	4	5	6	7	screw plug	¼ BSPP	304678	
8	1	1	1	1	1	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
9	1	1	1	1	1	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
10	1	1	1	1	1	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
11	1	1	1	1	1	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
12	1	1	1	1	1	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	1	1	1	1	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
14	1	1	1	1	1	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
15	1	1	1	1	1	1	screw plug	20913-4	314442	
16	2	2	2	2	2	2	mini-measuring conn.	MA.1.St	305453	
17	1	1	1	1	1	1	high pressure hose	M16.2000	see sheet-no. 1650	
18	1	1	1	1	1	1	spray protection	M16	see sheet-no. 1650	

5. Description:

The filter-batteries of the series BHP are suitable for the filtration of large flow volumes up to a working pressure of 4568 PSI and are stressing a high filter efficiency. The filters of the filter-battery consist of spheroidal graphite cast iron (EN-GJS-400-18-LT) respectively of C-steel.

For changing the filter elements the filter tubes have to be opened at the tube plug (bottom part of the filter). Filter elements are available down to a filter fineness of 4 µm_(c).

INTERNORMEN-Filter elements consist of filter materials with a high intrinsic stability, an excellent particle retention, respectively a high dirt holding capacity and provide a long service life.

INTERNORMEN-Filters can be used for mineral oil based fluids, HW-emulsions, water glycols, most synthetic hydraulic fluids and lubrication fluids.

INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 2320 PSI and a rupture strength up to Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element. After reaching the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter.

The reverse flow will not be filtered.

6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	5945 PSI
connection system:	SAE-flange connection 6000 PSI, AVIT-flange connection 4640 PSI
air bleeding and mini-measuring connection:	¼ BSPP
contents:	BHP2x901 = 2.1 gal., BHP5x901 = 7.9 gal. BHP3x901 = 4.8 gal., BHP6x901 = 9.5 gal. BHP4x901 = 6.3 gal., BHP7x901 = 11.1 gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Pressure drop flow rates:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

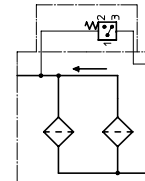
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

9. Symbols:

with electrical
indicator
AE30 and AE40

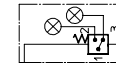


with visual-
electrical indicator
AE50 and AE62

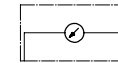


filter without
internal valve

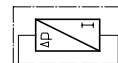
with visual-
electrical indicator
AE70 and AE80



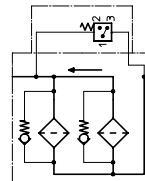
with visual
clogging indicator
AOR/AOC



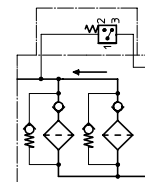
with electronical
clogging sensor
VS1



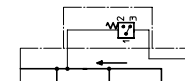
with electronical
clogging sensor
VS2



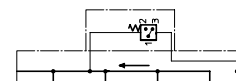
filter with
by-pass valve



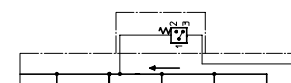
filter with
reversing valve



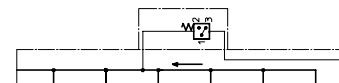
BHP 3x 901



BHP 4x 901



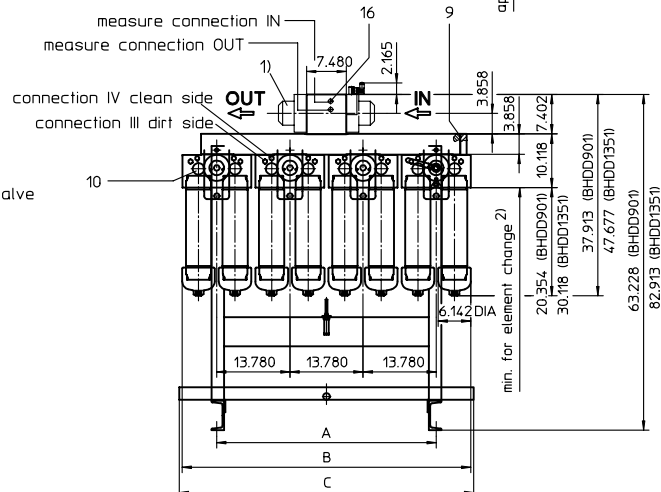
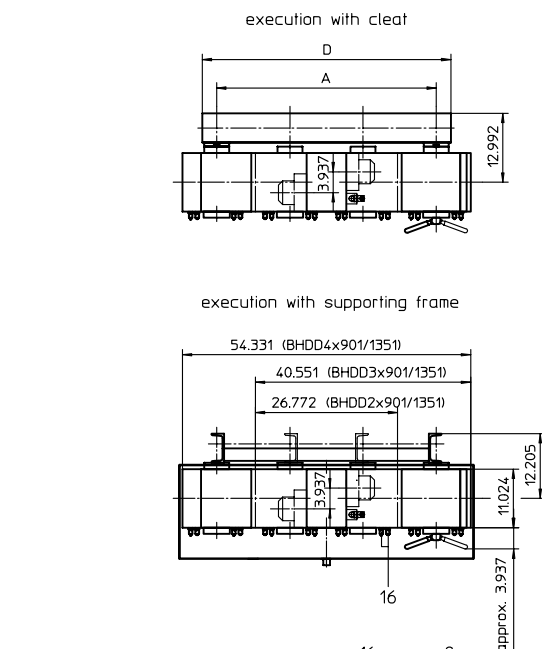
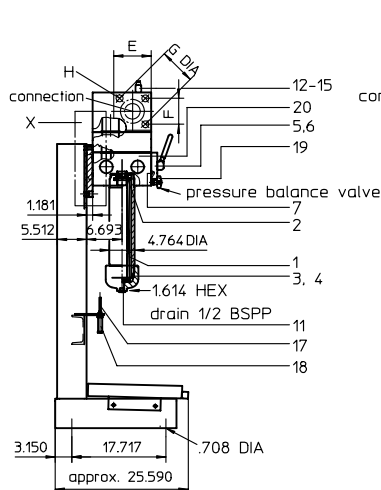
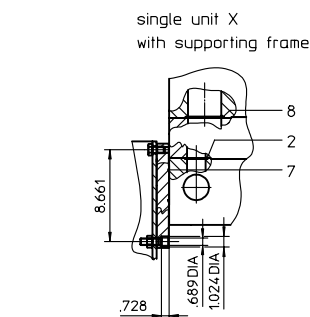
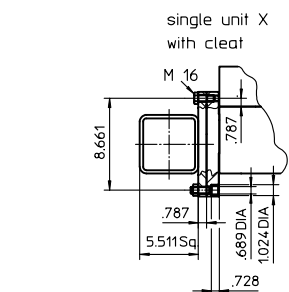
BHP 5x 901



BHP 6x 901



BHP 7x 901



Measuring connections III and IV to be used to bleed filter or to relieve pressure.

1) Flanges are not part of the connecting block. If required they have to be ordered separately.

filter-battery	A	B	C	D
BHDD 2x901/1351	13.37	26.77	27.95	19.29
BHDD 3x901/1351	27.55	40.55	41.73	33.07
BHDD 4x901/1351	41.33	54.33	55.51	46.85

2) min. for element change: 37.00 (BHDD901)
56.70 (BHDD1351)

connection	E	F	G	H
2"	4.72	3.28	4.64	M20 x .98 deep
2 1/2"	5.90	4.03	5.70	M24 x 1.18 deep
3"	7.08	4.87	6.88	M30 x 1.26 deep

FILTER-BATTERY, change-over

Series BHDD 2x901/1351- 4x901/1351 4568 PSI

Sheet No.

2526 J

1. Type index:

1.1. Complete filter: (ordering example)

BHDD.4x901.10VG. HR. E. P. -. FV. A. -. -. AE. T

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- series:
BHDD = battery-pressure filter, change-over
- nominal size:
2x901, 2x1351
3x901, 3x1351
4x901, 4x1351
- filter-material and filter-fineness:
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
- resistance of pressure difference for filter element:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- filter element design:
E = single-end open
- sealing material:
P = Nitrile (NBR)
V = Viton (FPM)
- filter element specification:
- = standard
VA = stainless steel
- connection:
FV = AVIT-flange connection 4640 PSI
- connection size:
8 = 2"
9 = 2 1/2"
A = 3"
- filter housing specification:
- = standard
- internal valve:
- = without
S1 = with by-pass valve, Δp 51 PSI
S2 = with by-pass valve, Δp 102 PSI
R = reversing valve, Q \leq 122.94 GPM
- clogging indicator or clogging sensor:
- = without
AE = visual-electrical, see sheet-no. 1609
VS1 = electronic, see sheet-no. 1607
VS2 = electronic, see sheet-no. 1608
- fixing:
- = without supporting frame with fastening bores
B = with cleat
T = with supporting frame

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:
01E. = filter element according to INTERNORMEN factory specification
- nominal size: 900, 1350
- 7 see type index-complete filter

Changes of measures and design are subject to alteration!

2. Accessories:

- counter flange see sheet-no. 1654

3. Spare parts:

item	qty. BHDD 2x901/1351	qty. BHDD 3x901/1351	qty. BHDD 4x901/1351	designation	dimension	article-no.
1	4	6	8	filter element (BHDD 2-4x901)	01E.900	
				filter element (BHDD 2-4x1351)	01E.1350	
2	8	12	16	O-ring	48 x 3	304357 (NBR) 304404 (FPM)
3	4	6	8	O-ring	98 x 4	301914 (NBR) 304754 (FPM)
4	4	6	8	support ring	110 x 3,5 x 2	304802
5	4	6	8	O-ring	18 x 3	304359 (NBR) 304399 (FPM)
6	4	6	8	support ring	25 x 2,5 x 0,5	311311
7	4	6	8	O-ring	71 x 3	306451 (NBR) 306897 (FPM)
8	2	2	2	O-ring	85 x 3,5	310785 (NBR)
9	2	2	2	O-ring	69,45 x 3,53	305868 (NBR) 307357 (FPM)
10	16	24	32	screw plug	1 ½ BSPP	311475
11	4	6	8	screw plug	½ BSPP	304678
12	1	1	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
13	1	1	1	clogging sensor, electronical	VS1	see sheet-no. 1607
14	1	1	1	clogging sensor, electronical	VS2	see sheet-no. 1608
15	2	2	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
16	10	14	18	mini-measuring connection	MA.1.St	305453
17	1	1	1	high pressure hose	M16.2000	see sheet-no. 1650
18	1	1	1	spray protection	M16	see sheet-no. 1650
19	2	3	4	pressure balance valve	NG 10	305000
20	2	3	4	pressure filter, change-over	HDD 901 resp. HDD 1351	see sheet-no. 2524

4. Description:

The filter-batteries of the series BHDD are suitable for the filtration of large flow volumes up to a working pressure of 4568 PSI and are stressing a high filter efficiency. The duplex pressure filters, of the filter-batteries consist of high quality spheroidal graphite cast iron (GGG 40.3). The intrinsic joint plate is made out of high-tensile aluminium alloy.

Duplex filters can be maintained without interruption of operation, as the change-over device allows to change-over the flow from the dirt filter-side to the clean filter-side after opening of pressure balance valve. For changing the filter elements the filter tubes have to be opened at the tube plug (bottom part of the filter). Filter elements are available down to a filter fineness of 5µm_(G).

INTERNORMEN-Filter elements consist of filter materials with a high intrinsic stability, an excellent particle retention, respectively a high dirt holding capacity and provide a long service life.

INTERNORMEN-Filters can be used for mineral oil based fluids, HW-emulsions, water glycols, most synthetic hydraulic fluids and lubrication fluids.

INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 2320 PSI and a rupture strength up to Δp 3625 PSI.

The internal valves are integrated into the centering pivot for the filter element. After reaching the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

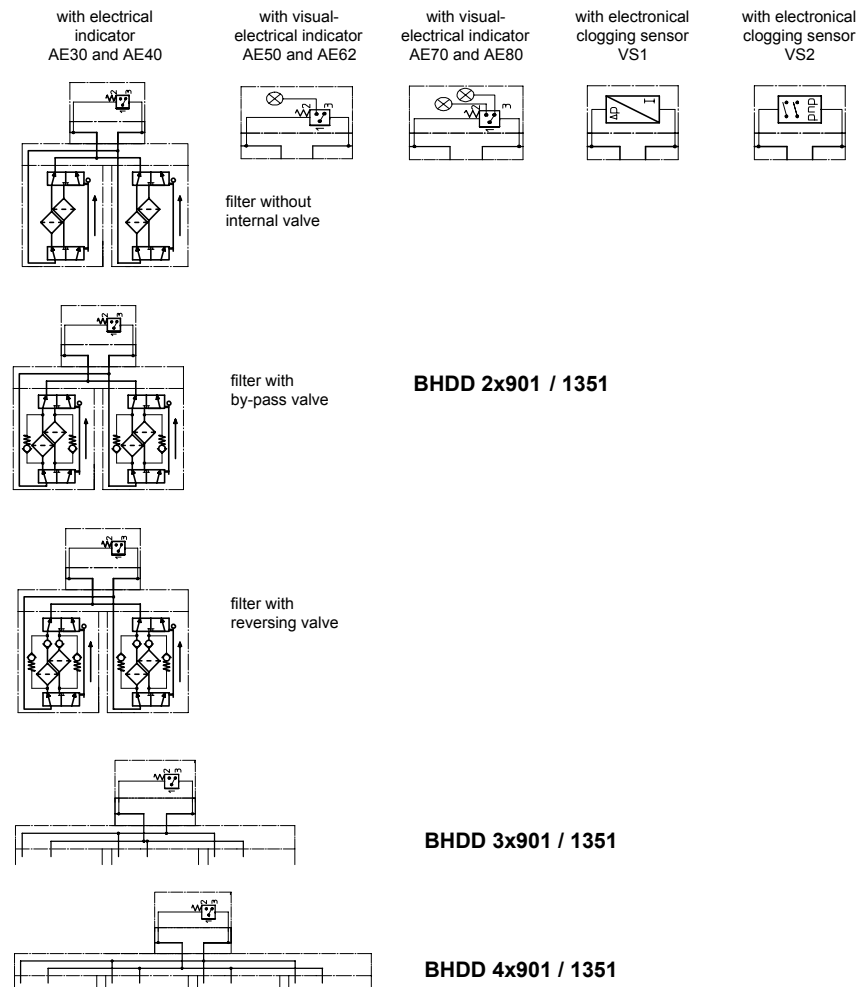
5. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	5945 PSI
connection system:	AVIT-flange connection 4640 PSI
air bleeding and mini-measuring connection:	½ BSPP
contents:	BHDD 2x901 = 6.6 gal. BHDD 2x1351 = 9 gal. BHDD 3x901 = 9.5 gal. BHDD 3x1351 = 13 gal. BHDD 4x901 = 12.6 gal. BHDD 4x1351 = 17.5 gal. BHDD 2x901 = 1025 lbs. BHDD 2x1351 = 1054 lbs. BHDD 3x901 = 1466 lbs. BHDD 3x1351 = 1534 lbs. BHDD 4x901 = 1907 lbs. BHDD 4x1351 = 1995 lbs.
weight:	

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow rates: Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

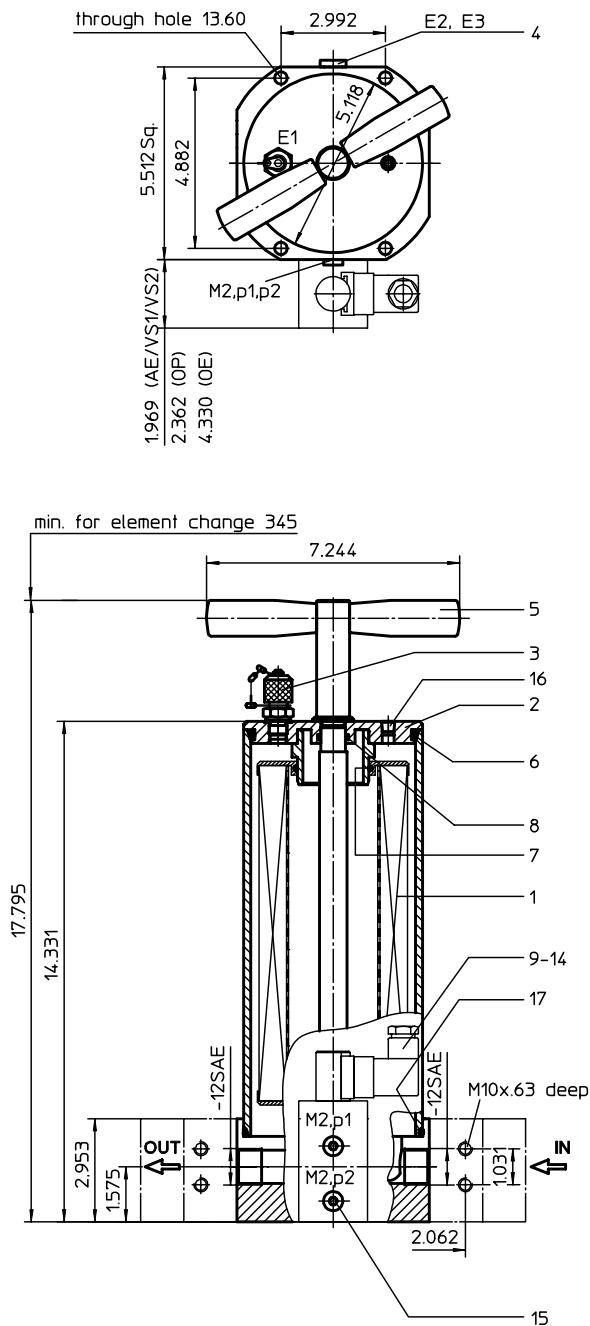
8. Test methods: Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PARTIAL FLOW FILTER

Series NF 250 232 PSI

Sheet No.
1100 D



M2,p1 = measure connection dirt-side
M2,p2 = measure connection clean-side
E1 = air bleeding dirt-side
E2 = drain dirt-side
E3 = drain clean-side

1. Type index:

1.1. Complete filter: (ordering example)

NF. 250. 10VG. 10. B. P. -. FS. 5. -. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
NF = partial flow filter
 - 2 **nominal size:** 250
 - 3 **filter-material and filter-fineness:**
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
 - 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
 - 5 **filter element design:**
B = both sides open
 - 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
 - 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
 - 8 **connection:**
FS = SAE-flange connection 3000 PSI ¹⁾
 - 9 **connection size:**
5 = 1" ¹⁾
 - 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
 - 11 **clogging indicator or clogging sensor :**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electrical, see sheet-no. 1607
VS2 = electrical, see sheet-no. 1608
- ¹⁾ in addition available
thread -12 SAE according to DIN 3852 T2, design Z

1.2. Filter element: (ordering example)

01NR. 250. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard return line filter element
according to DIN 24550, part 4
- 2 **nominal size:** 250
- 3 **- 7** see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651

weight : approx. 16 lbs.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01NR. 250	
2	1	filter cover	30615-3	315437
3	1	mini-measuring connection	MA.1.St	305453
4	2	screw plug	1/4 BSPP	305003
5	1	straining screw	30631-3	316404
6	1	O-ring	110 x 6	337001 (NBR) 337002 (FPM)
7	2	O-ring	52 x 3	314206 (NBR) 316698 (FPM)
8	1	O-ring	18 x 3	304359 (NBR) 304399 (FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628
10	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628
11	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
12	1	clogging sensor, electronical	VS1	see sheet-no. 1607
13	1	clogging sensor, electronical	VS2	see sheet-no. 1608
14	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
15	2	screw plug	1/8 BSPP	304791
16	1	screw plug	1/8 BSPP	305496
17	1	O-ring	123 x 4	337003 (NBR) 337004 (FPM)

item 15 execution only without clogging indicator or clogging sensor

4. Description:

The partial flow filter NF is foreseen for the fine filtration of hydraulic and lubrication circuits additionally to the main filter. The big filtration area in comparison to the nominal size is the premise for a high dirt-retaining capacity even in case of small filter-fineness. The filter NF is flanged mounted to the line.

Filter elements as fine as 5 $\mu\text{m}_{(c)}$ are available; finer filter elements on request. Element change without tools is possible. After release of the straining screw and removal of the cover the elements are accessible and could be changed. The filter elements were delivered completely inclusive seals. Cleaning of the elements not possible therefore the user should have enough spare elements on stock.

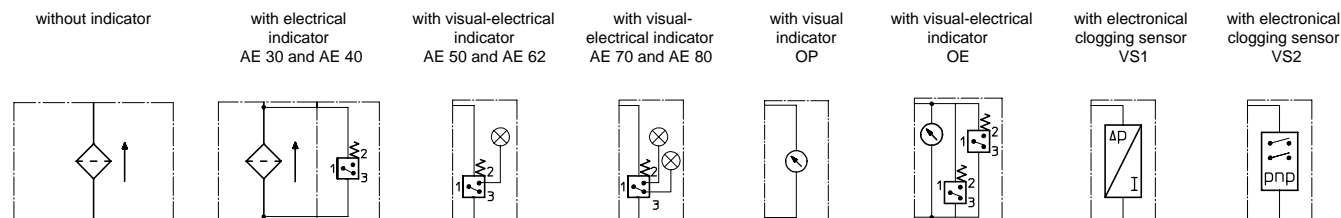
5. Technical data:

temperature range:	+14°F to +176°F (for a short time + 212 °F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	333 PSI
connection:	SAE-flange connection 3000 PSI
housing material:	aluminium forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation-position:	vertical
measure connection:	1/8 BSPP
evacuation- or bleeder connection:	1/4 BSPP
volume tank:	.87 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

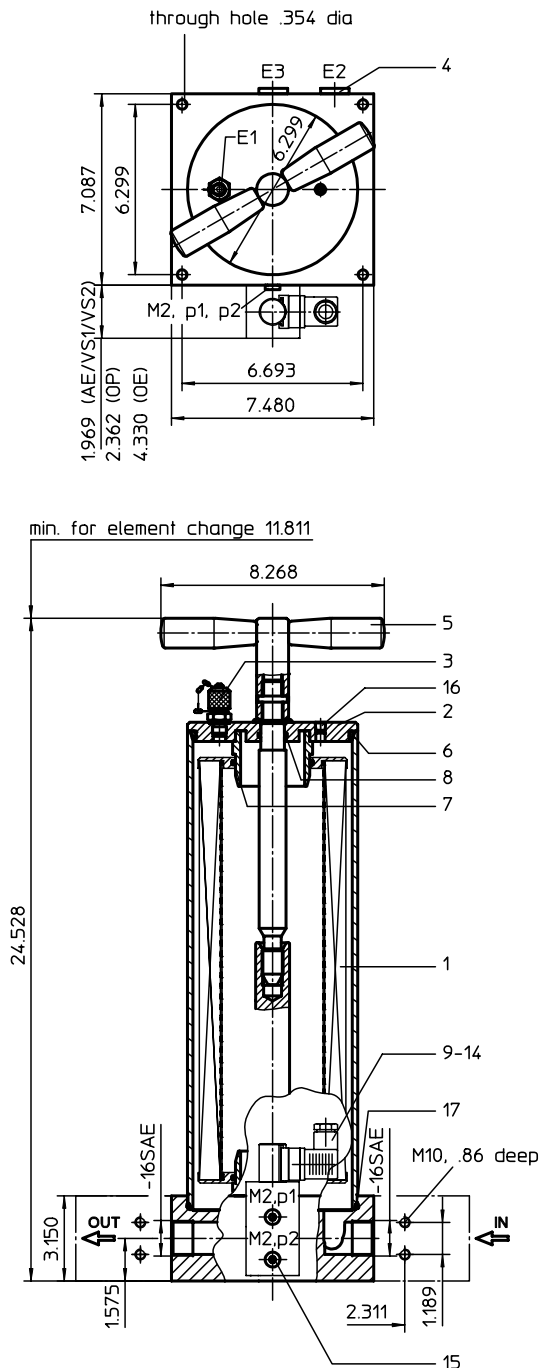
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PARTIAL FLOW FILTER

Series NF 631 232 PSI

Sheet No.
1115 J



M2,p1 = measure connection dirt-side
M2,p2 = measure connection clean-side
E1 = air bleeding dirt-side
E2 = drain dirt-side
E3 = drain clean-side

1. Type index:

1.1. Complete filter: (ordering example)

NF. 631. 10VG. 10. B. P. - FS. 6. - AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
NF = partial flow filter
- 2 **nominal size:** 631
- 3 **filter-material and filter-fineness:**
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
FS = SAE-flange connection 3000 PSI ¹⁾
- 9 **connection size:**
6 = 1 $\frac{1}{4}$ " ¹⁾
- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **clogging indicator or clogging sensor :**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electrical, see sheet-no. 1607
VS2 = electrical, see sheet-no. 1608

¹⁾ in addition available
thread -16 SAE according to DIN 3852 T2, design Z

1.2. Filter element: (ordering example)

01NR. 630. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard return line filter element
according to DIN 24550, part4
- 2 **nominal size:** 630
- 3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- counter flange, see sheet-no. 1652

weight : approx. 37 lbs.

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01NR. 630	
2	1	filter cover	30600-3	315492
3	1	mini-measuring connection	MA.1.St	305453
4	2	screw plug	½ BSPP	304678
5	1	straining screw	30595-3	316312
6	1	O-ring	140 x 6	315392 (NBR) 316322 (FPM)
7	2	O-ring	70 x 4	306253 (NBR) 310280 (FPM)
8	1	O-ring	22 x 3	304387 (NBR) 304931 (FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628
10	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628
11	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609
12	1	clogging sensor, electronical	VS1	see sheet-no. 1607
13	1	clogging sensor, electronical	VS2	see sheet-no. 1608
14	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
15	2	screw plug	1/8 BSPP	304791
16	1	screw plug	1/8 BSPP	305496
17	1	O-ring	153 x 4	320763 (NBR) 322368 (FPM)

item 15 execution only without clogging indicator or clogging sensor

4. Description:

The partial flow filter NF is foreseen for the fine filtration of hydraulic and lubrication circuits additionally to the main filter. The big filtration area in comparison to the nominal size is the premise for a high dirt-retaining capacity even in case of small filter-fineness. The filter NF is flanged mounted to the line.

Filter elements as fine as 5 µm_(c) are available; finer filter elements on request. Element change without tools is possible. After release of the straining screw and removal of the cover the elements are accessible and could be changed. The filter elements were delivered completely inclusive seals. Cleaning of the elements not possible therefore the user should have enough spare elements on stock.

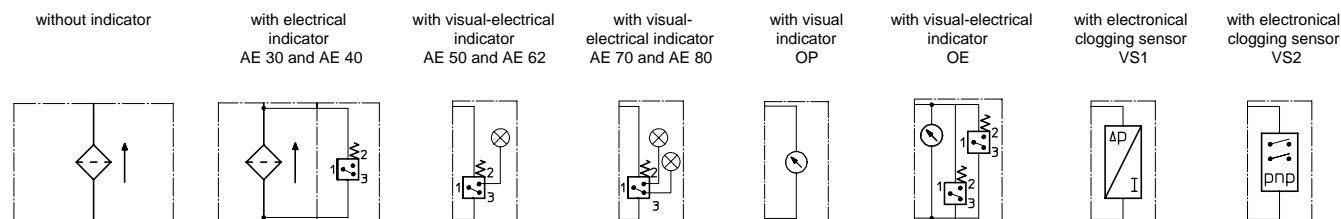
5. Technical data:

temperature range:	+14°F to +176°F (for a short time + 212 °F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	333 PSI
connection:	SAE-flange connection 3000 PSI
housing material:	aluminium forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation-position:	vertical
measure connection:	¼ BSPP
evacuation- or bleeder connection:	½ BSPP
volume tank:	1.9 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

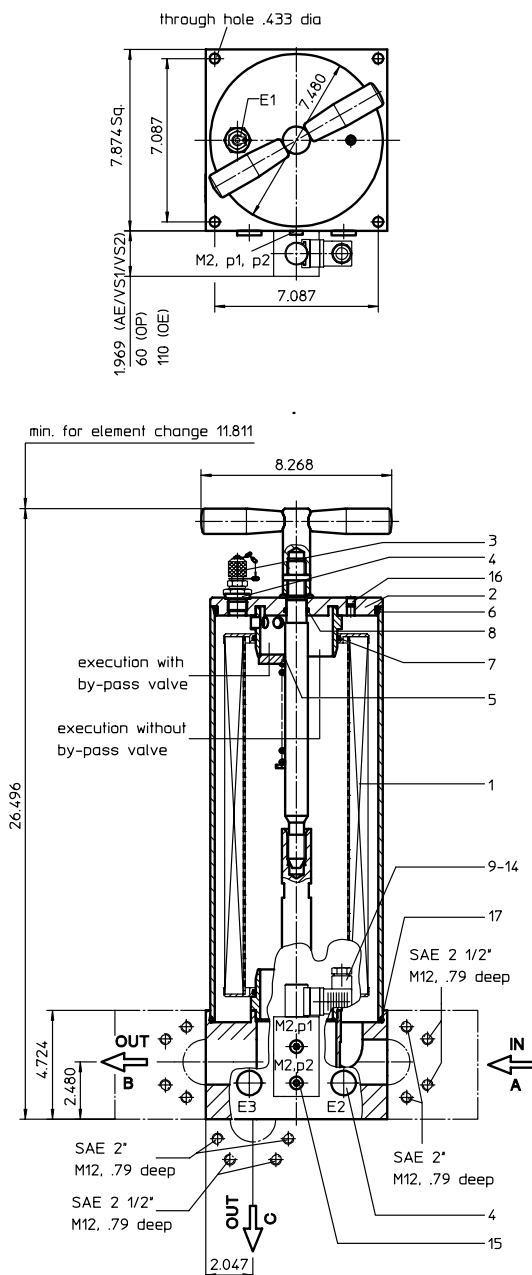
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

PARTIAL FLOW FILTER

Series NF 1000 232 PSI

Sheet No.
1116 J



M2, p1 = measure connection dirt side
M2, p2 = measure connection clean side
E1 = air bleeding dirt side
E2 = drain dirt side
E3 = drain clean side

1. Type index:

1.1. Complete filter: (ordering example)

NF. 1000. 10VG. 10. B. P. -. FS. 3. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
NF = partial flow filter
- 2 **nominal size:** 1000
- 3 **filter-material and filter-fineness:**
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)
- 7 **filter element specification:** (see catalog)
- = standard, VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **no. of version:**

version	A connection size	connection B connection size	C connection size
1	8	8	-
2	8	8	8
3	9	9	-
4	9	9	9

connection size: 8 = 2", 9 = 2 1/2",
- = without connection

- 10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
- 12 **clogging indicator or clogging sensor :**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electrical, see sheet-no. 1607
VS2 = electrical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard return line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- counter flange, see sheet-no. 1652

weight: approx. 50.60 lbs.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NR. 1000		
2	1	filter cover without by-pass valve	31065-3		
	1	filter cover with by-pass valve S1	31461-3		
3	1	mini-measuring connection	MA.3 St	308630	
4	3	screw plug	1/2 BSPP	304678	
5	1	O-ring (only with by-pass valve)	22 x 3	304387 (NBR)	304931 (FPM)
6	1	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	2	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
8	1	O-ring	22 x 3	304387 (NBR)	304931 (FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	1/8 BSPP	304791	
16	1	screw plug	1/8 BSPP	305496	
17	1	O-ring	183 x 4	3337005 (NBR)	337006 (FPM)

item 15 execution only without clogging indicator or clogging sensor

4. Description:

The partial flow filter NF is foreseen for the fine filtration of hydraulic and lubrication circuits additionally to the main filter. The big filtration area in comparison to the nominal size is the premise for a high dirt-retaining capacity even in case of small filter-fineness. Filter elements as fine as $5 \mu\text{m}_{(c)}$ are available; finer filter elements on request. To protect the filter elements and the filter housing equipment with by-pass valve is foreseen. Element change without tools is possible. After release of the straining screw and removal of the cover the elements are accessible and could be changed. The filter elements were delivered completely inclusive seals. Cleaning of the elements not possible therefore the user should have enough spare elements on stock.

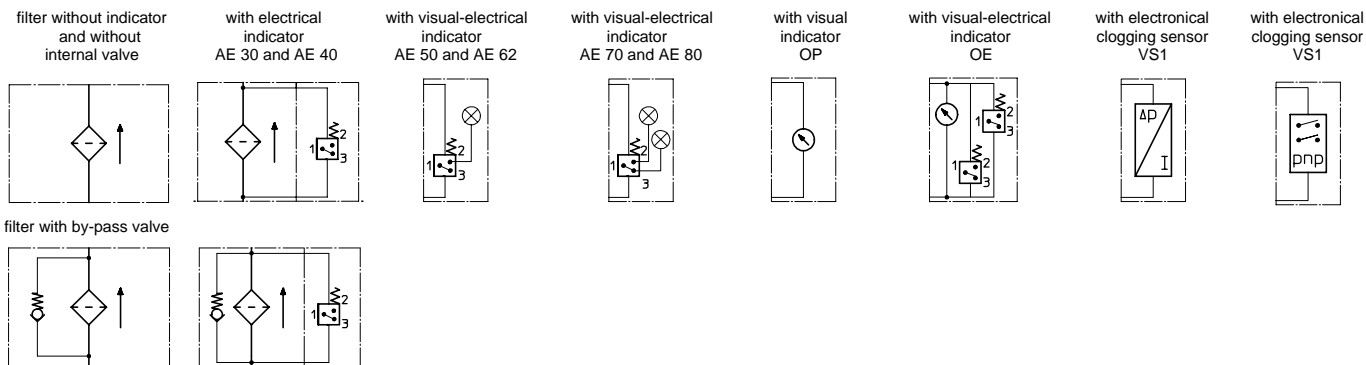
5. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	333 PSI
connection:	SAE-flange connection 3000 PSI
housing material:	aluminium forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation-position:	vertical
measure connection:	BSPP 1/4
evacuation- or bleeder connection:	BSPP 1/2
volume tank:	3.0 Gal

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

INTERNORMEN

Watersorp - Waterabsorption



Watersorp

field of application:

- hydraulic oils on mineral oil basis
- lubrication oils on mineral oil basis
- organic ester oils
- poly-alpha-olefines
- vegetable based oils
- heating oils and diesel fuels

Type code:

01.WS. 250. 3WVG.10.B.P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 01.WS = finefilter-watersorp combination
- 2 nominal size: 250, 630, 1000
- 3 filter fineness:
3WVG = 5µm(c) / 10WVG = 10µm(c)
- 4 pressure drop resistance: 145 PSI
- 5 B = both sides open
- 6 P = buna N
- 7 - = standard

These elements may be used in following filters and filter units:

nominal size	data sheet N°	element size
NF250	1100	1x 01.WS.250
NF 631	1115	1x 01.WS.630
NF 1000	1116	1x 01.WS.1000
US 20/ UM 20/ USP 20	4008/4013/4020	1x 01.WS.250
US 40/ UM 40/ USP 41	4011/4014/4021	1x 01.WS.630
US 80/ UM 80/ USP 81	4009/4015/4022	1x 01.WS.630
US 161/ USP 161/	4010/4023	1x 01.WS.630
US 320/ USP 320	4012/4024	1x 01.WS.1000

We recommend to use the watersorp elements only in off-line filtration.

Calculation of the necessary amount of watersorp elements (at 139 sus):

$$\frac{\text{system volume (gal)}}{100\%} \times \text{H}_2\text{O} \% = \text{quantity of elements}$$

water absorption capacity (gal)

INTERNORMEN Fluid Purifier Systems



The INTERNORMEN - IFPM / IFPS fluid purification systems are userfriendly to operate and self contained systems that will:

- Remove free, dissolved and emulsified water
- Remove free and dissolved gases
- Remove particulate contamination down to 1 micron
- Reduce machine equipment / System downtimes
- Reduce component failures
- Less fluid changes
- Increased equipment reliability / improved productivity



NF 1000



US 40



UM 40



UM 80

Watersorp

filter elements for water absorption:

Technical data:

elements:	01.WS250	01.WS630	01.WS1000
Art.Nr. 3WVG	322233	320911	322223
Art.Nr. 10WVG	322225	319982	322220

filter surface:	1139 in ²	1628 in ²	1938 in ²
------------------------	----------------------	----------------------	----------------------

water absorbing capacity at $\Delta p = 87$ PSI		1,045 ml/in ²	
---	--	--------------------------	--

spec.water absorbing capacity	615ml	875ml	1045ml
at $\Delta p = 29; 58; 87$ PSI	925ml	1320ml	1575ml
	1190ml	1700ml	2025ml

retention rate according to ISO 16889	$\beta_{5(c)} \geq 200$		
3WVG	$\beta_{10(c)} \geq 200$		
10WVG			

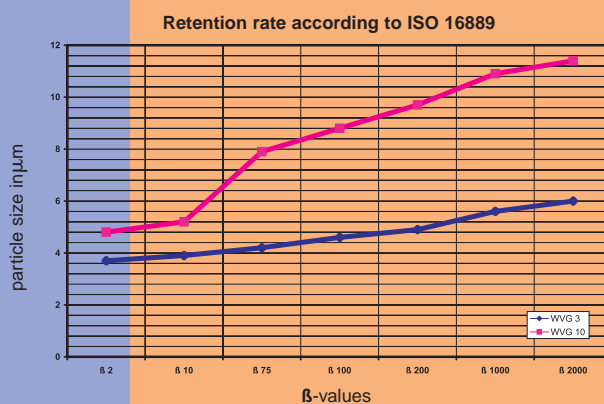
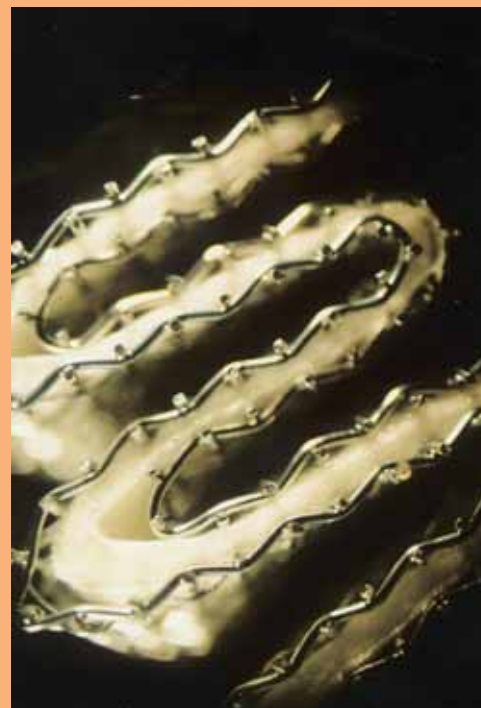
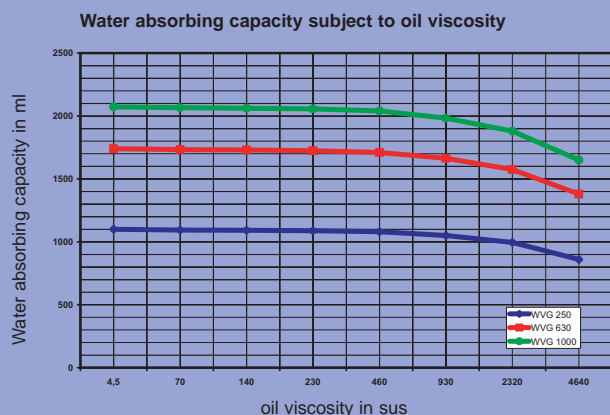
dirt-holding capacity according to ISO 16889 at $\Delta p_{end} = 87$ PSI		3WVG = 45 mg/in ²	
		10WVG = 55,5 mg/in ²	

spec.dirt-holding capacity 3WVG	34g	49g	58g
at $\Delta p = 29; 58; 87$ PSI	43g	61g	73g
Testdust ISO-MTD	51g	74g	88g

spec.dirt-holding capacity 10WVG	42g	60g	71g
at $\Delta p = 29; 58; 87$ PSI	52g	75g	89g
Testdust ISO-MTD	63g	90g	108g

max. accepted pressure difference (referring to water absorbing):	$\Delta p_{max} = 87$ PSI
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Collapse pressure resistance according to ISO 2941	$\Delta p_{max} = 145$ PSI
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Sampling and Oil Analysis-Set

PAS 01/WAS 01



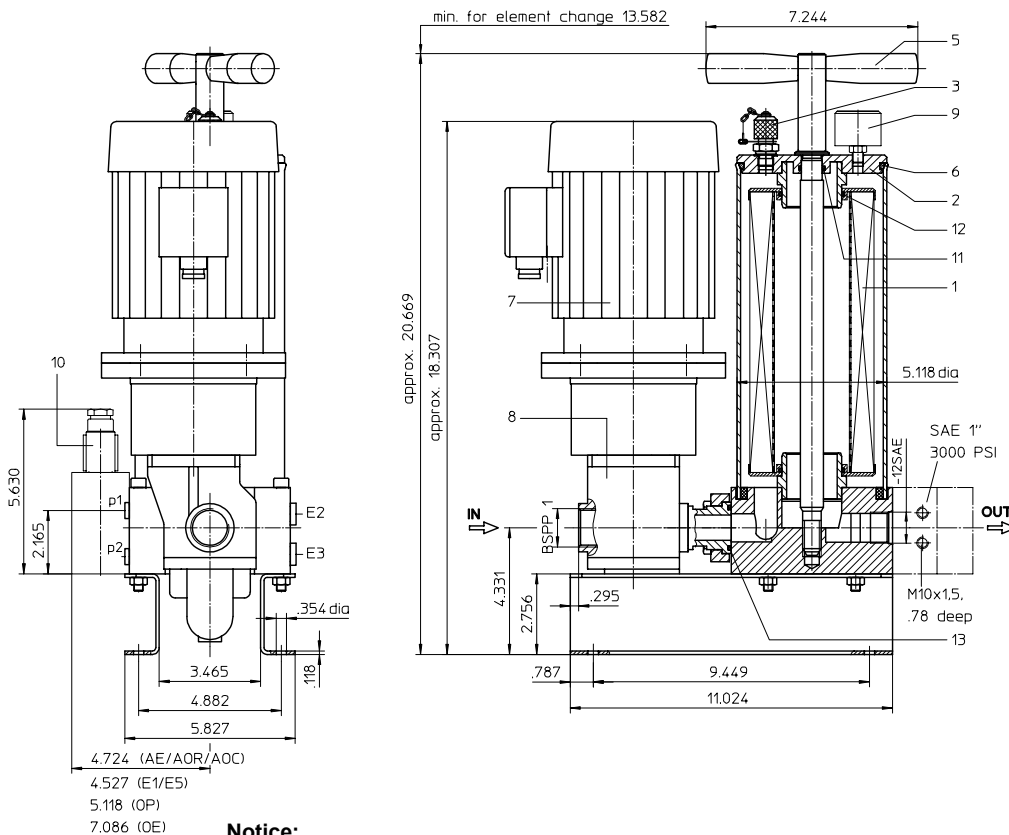
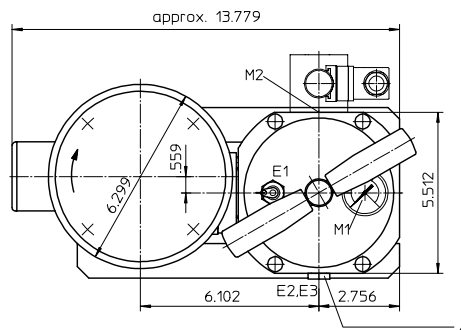
For professional

- vendor inspection
- condition control of the operating fluid at site

- preference version -

Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St,
see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p₁ = dirt side
p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 20

Sheet No.
4008.1 G
Sheet 1/3

1. Type index:

1.1. Filter unit: (ordering example)

US. 20. 6VG. 10. B. P. -. P01. D03. O. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- series:**
US = filter unit, stationary
- nominal size:** 20
- filter-material and filter-fineness:**
10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)
10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c) Watersorp-filter element
- resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- filter element design:**
B = both sides open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- pump unit:**
P01 = pump unit 01, NG 20.16 (standard-pump unit / setting range 14.5 - 218 PSI)

9	motor:	(D = rotary current motor / W = alternating current motor)								
motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.			
D03 ¹⁾	230/400V 50Hz	6.9 GPM	46-1860 SUS	58 PSI	-	-	42742-4			
D03 ¹⁾	265/460V 60Hz	7.2 GPM	46-1860 SUS	58 PSI	-	-	42742-4			
D34	230/400V 50Hz	6.9 GPM	46-1860 SUS	58 PSI	S	K				
D34	265/460V 60Hz	7.2 GPM	46-1860 SUS	58 PSI	S	K				
W01 ¹⁾	110V 60Hz	7.2 GPM	46-1860 SUS	58 PSI	-	-	43066-4			
W03	230V 50Hz	6.9 GPM	46-1860 SUS	58 PSI	S	K	43044-4			
W07	110V 60Hz	7.2 GPM	46-1860 SUS	58 PSI	S	K	43045-4			

¹⁾ standard motor

- clogging indicator at M1:**
- = without
O = visual, 36 PSI
- clogging indicator at M2:**
- = without
AOR = AOR 2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
AOC = AOC 2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
OP = OP 2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
OE = OE 2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
E1 = E1 2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
E5 = E5 2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- nominal size:** 250
- 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	¼ BSPP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3.Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element. The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

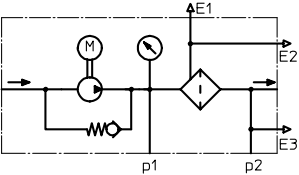
4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 62 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

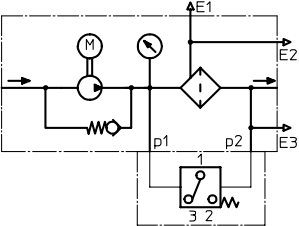
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

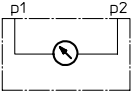
Filter unit without clogging indicator



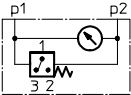
Filter unit with electrical clogging indicator AE30



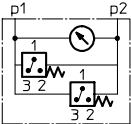
Filter unit with visual clogging indicator AOR, AOC, OP



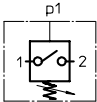
Filter unit with visual-electrical clogging indicator OE1



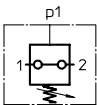
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

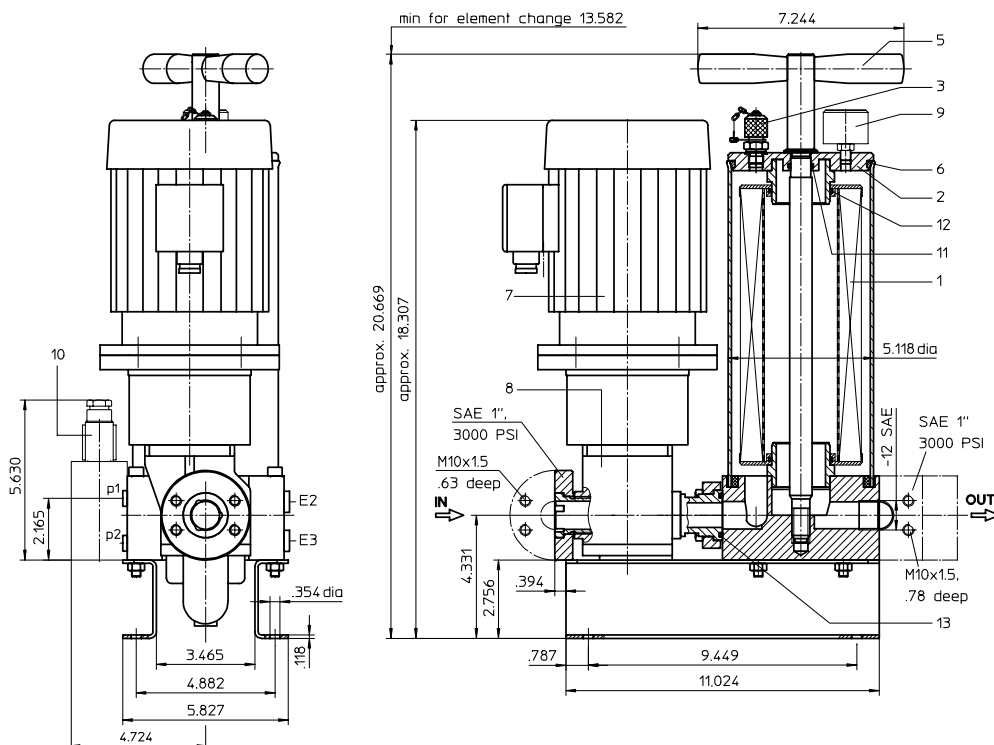
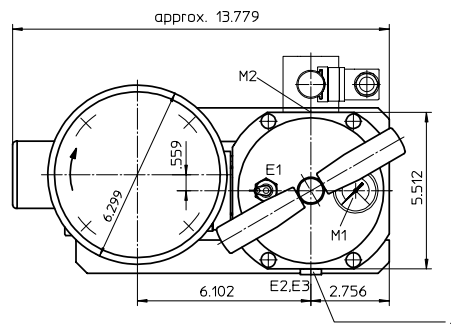
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p_1 = dirt side
 p_2 = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 21 58 PSI

Sheet No.
4008.2 G
Sheet 2/3

1. Type index:

1.1. Filter unit: (ordering example)

US. 21. 6VG. 10. B. P. - P08. D03. O. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
 US = filter unit, stationary
- 2 **nominal size:** 21
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
- 8 **pump unit:**
 P08 = pump unit 08, NG 20.16 (standard-pump unit / setting range 14.5 - 218 PSI)
- 9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D03 ¹⁾	230/400V	50Hz	6.9 GPM	46-1860 SUS	58 PSI	-	42742-4
D03 ¹⁾	265/460V	60Hz	7.2 GPM	46-1860 SUS	58 PSI	-	42742-4
D34	230/400V	50Hz	6.9 GPM	46-1860 SUS	58 PSI	S	K
D34	265/460V	60Hz	7.2 GPM	46-1860 SUS	58 PSI	S	K
W01 ¹⁾	110V	60Hz	7.2 GPM	46-1860 SUS	58 PSI	-	43066-4
W03	230V	50Hz	6.9 GPM	46-1860 SUS	58 PSI	S	K
W07	110V	60Hz	7.2 GPM	46-1860 SUS	58 PSI	S	K

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
- 11 **clogging indicator at M2:**
 - = without
 AOR = AOR.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p_1 and p_2 , 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 250
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA 1.St	305453
4	screw plug	2	¼ BSP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P08	1	NG 20.16	317378
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu\text{m}_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

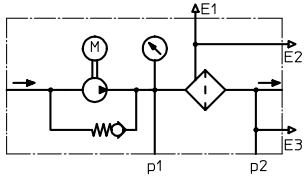
filter-fineness:	4, 5, 7 or 10 $\mu\text{m}_{(c)}$
weight:	approx. 62 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

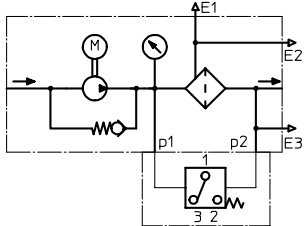
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

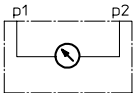
Filter unit without
clogging indicator



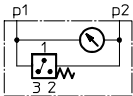
Filter unit with electrical
clogging indicator
AE30



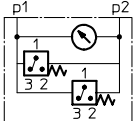
Filter unit with visual
clogging indicator
AOR, AOC, OP



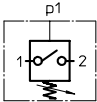
Filter unit with visual-electrical
clogging indicator
OE1



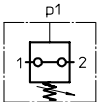
Filter unit with visual-electrical
clogging indicator
OE2



Filter unit with electrical
clogging indicator
contact maker E1



Filter unit with electrical
clogging indicator
contact breaker E5



6. Test methods:

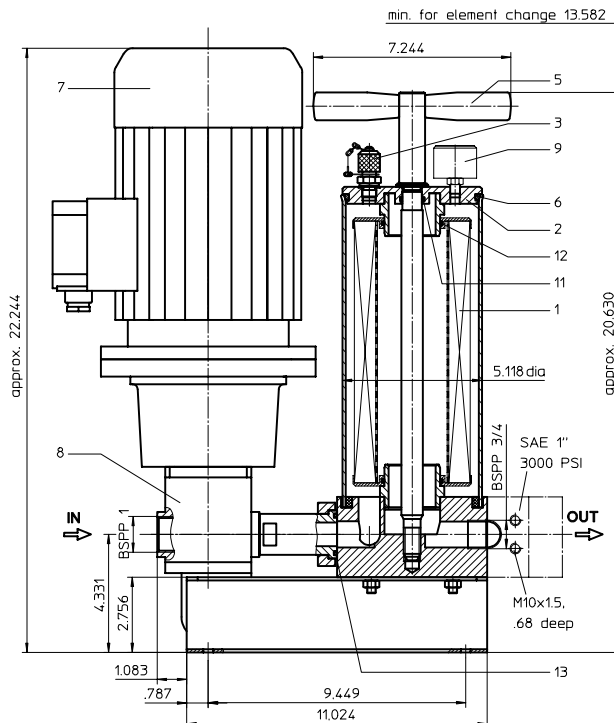
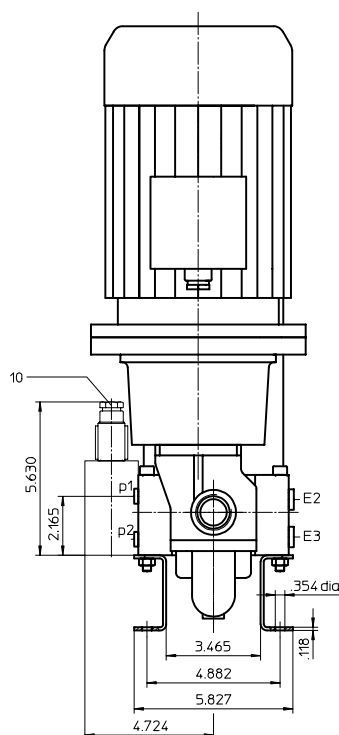
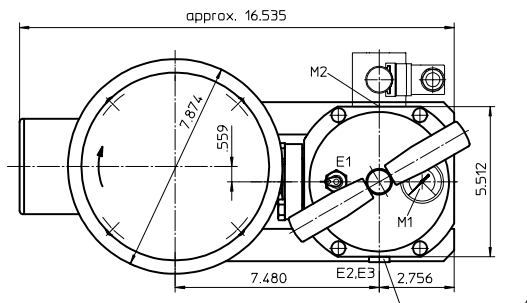
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p_1 = dirt side
 p_2 = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary
Series US 22

Sheet No.
4008.3 H
 Sheet 3/3

1. Type index:

1.1. Filter unit: (ordering example)

US. 22. 6VG. 10. B. P. -. P14. D13. O. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
 US = filter unit, stationary
- 2 **nominal size:** 22
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
- 8 **pump unit:**
 P14 = pump unit 14 NG 20.16 (standard-pump unit / setting range 14.5 - 218 PSI)

9 **motor: (D = rotary current motor)**

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D12	230/400V 50Hz	3.0 GPM	46-5580 SUS	218 PSI	S	K	42743-4
D12	265/460V 60Hz	3.6 GPM	46-4650 SUS	218 PSI	S	K	42743-4
D13 ¹⁾	230/400V 50Hz	3.0 GPM	46-14000 SUS	102 PSI	-	-	43656-4
D13 ¹⁾	265/460V 60Hz	3.6 GPM	46-11600 SUS	102 PSI	-	-	43656-4
D26	400/690V 50Hz	3.0 GPM	46-5580 SUS	102 PSI	-	-	44908-4
D26	460/790V 60Hz	3.6 GPM	46-4650 SUS	102 PSI	-	-	44908-4

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
- 11 **clogging indicator at M2:**
 - = without
 AOR = AOR.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p_1 and p_2 , 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p_1 and p_2 , 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p_1 , 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 250
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	1/4 BSPP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P14	1	NG 20.16	319735
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3.Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

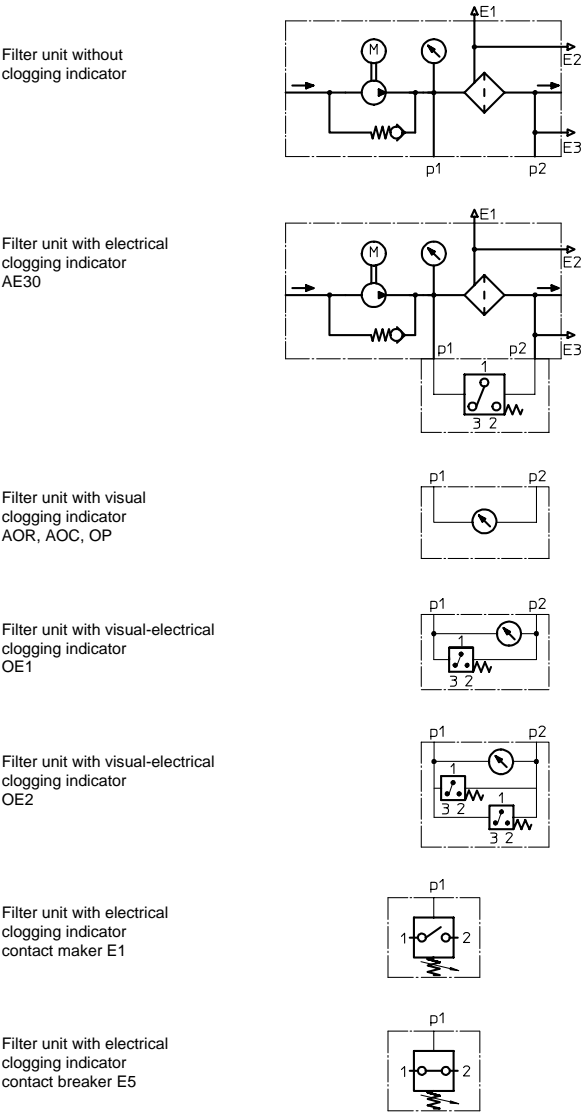
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element. The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 77 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Test methods:

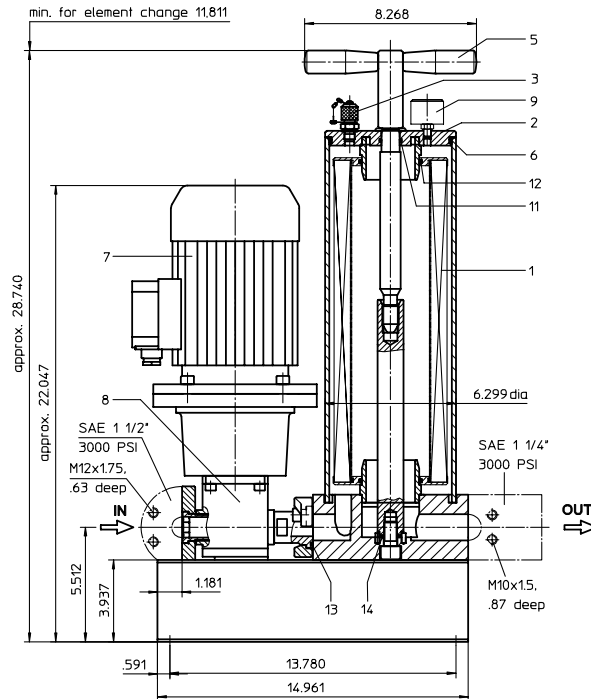
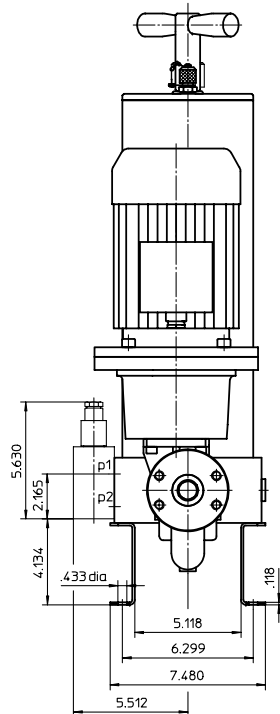
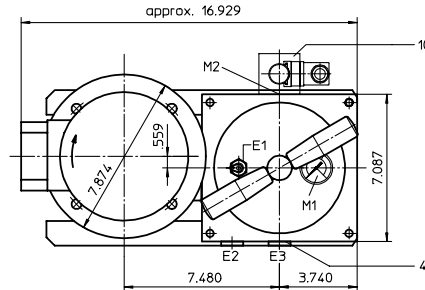
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 40

Sheet No.
4011.1 F
Sheet 1/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 40. 6VG. 10. B. P. -. P05. D05. O. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
 US = filter unit, stationary
- 2 **nominal size:** 40
- 3 **filter-material and filter-finness:**
 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)
 10 WVVG = 10 µm_(c), 3 WVVG = 5 µm_(c) Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 IS06 = see sheet-no. 31601
 VA = stainless steel
- 8 **pump unit:**
 P05 = pump unit 05, NG 40.25 (standard pump unit / setting range 14.5 to 218 PSI)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D05 ¹⁾	230/400V 50Hz	9.37 GPM	46-1860 SUS	87 PSI	-	-	42549-4
D05 ¹⁾	265/460V 60Hz	11.2 GPM	46-1860 SUS	87 PSI	-	-	42549-4
W10	230V 50Hz	9.37 GPM	46-1860 SUS	87 PSI	S	K	42754-4
W11	110V 60Hz	11.2 GPM	46-1860 SUS	87 PSI	S	K	42877-4

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
- 11 **clogging indicator at M2:**
 - = without
 AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	1/2 BSP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P05	1	NG 40.25	316292
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	1	37,69 x 3,53	304353 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu\text{m}_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch "A", cable "A" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

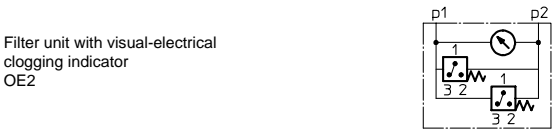
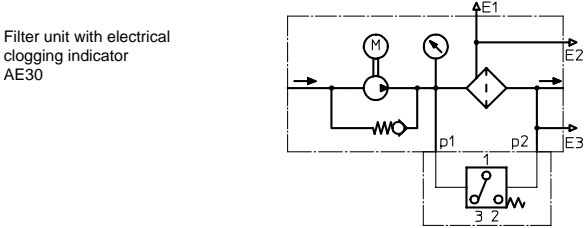
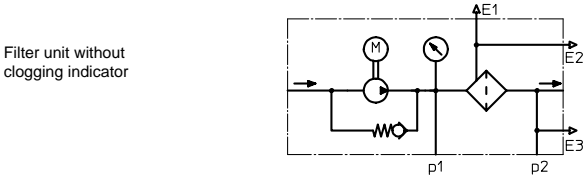
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 $\mu\text{m}_{(c)}$
weight: approx. 84 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Test methods:

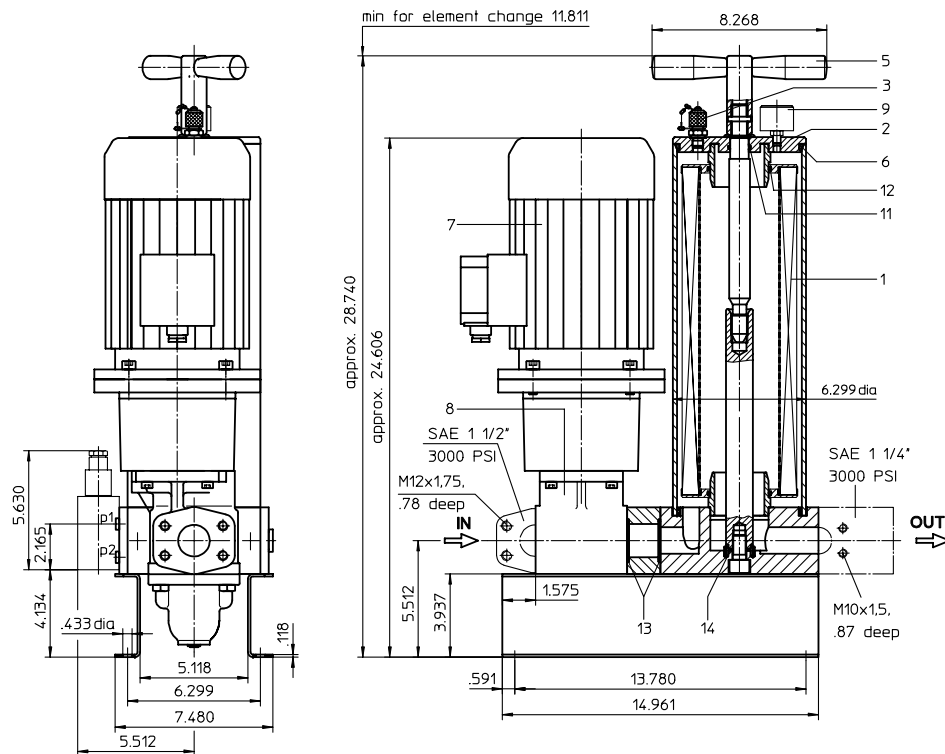
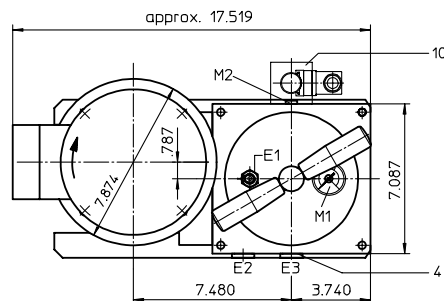
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 80

Sheet No.
4009.1 E
Sheet 1/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 80. 6VG. 10. B. P. -. P04. D01. O. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
 US = filter unit, stationary
 2 **nominal size:** 80
 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
 5 **filter element design:**
 B = both sides open
 6 **sealing material:**
 P = Nitrile (NBR), V = Viton (FPM), by agreement
 7 **filter element specification:**
 - = standard, VA = stainless steel, IS06 = see sheet-no. 31601
 8 **pump unit:**
 P04 = pump unit 04, NG 80.50 (standard-pump unit / setting range 14.5 -218 PSI)
 9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D01 ¹⁾	230/400V	50Hz	18.75 GPM	46-1860 SUS	72 PSI	-	41969-4
D01 ¹⁾	265/460V	60Hz	22.45 GPM	46-1860 SUS	72 PSI	-	41969-4
D17	230/400V	50Hz	18.75 GPM	46-1860 SUS	130 PSI	S	K
D17	265/460V	60Hz	22.45 GPM	46-1860 SUS	116 PSI	S	K
D18	230/400V	50Hz	12.54 GPM	46-3720 SUS	58 PSI	-	-
D18	265/460V	60Hz	15.05 GPM	46-3022 SUS	58 PSI	-	-
D31	230/400V	50Hz	18.75 GPM	46-1860 SUS	218 PSI	-	-
D31	265/460V	60Hz	22.45 GPM	46-1860 SUS	218 PSI	-	-
W06	230V	50Hz	18.75 GPM	46-1860 SUS	72 PSI	S	K
W09	110V	60Hz	22.45 GPM	46-1860 SUS	58 PSI	S	K
W12 ¹⁾	110V	60Hz	22.45 GPM	46-1860 SUS	58 PSI	-	-
W18	230V	50Hz	18.75 GPM	46-1860 SUS	130 PSI	S	K

¹⁾ standard motor

- 10 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI
 11 **clogging indicator at M2:**
 - = without
 AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
 2 **nominal size:** 630
 3 - 7 | see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P04	1	NG 80.50	317139
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

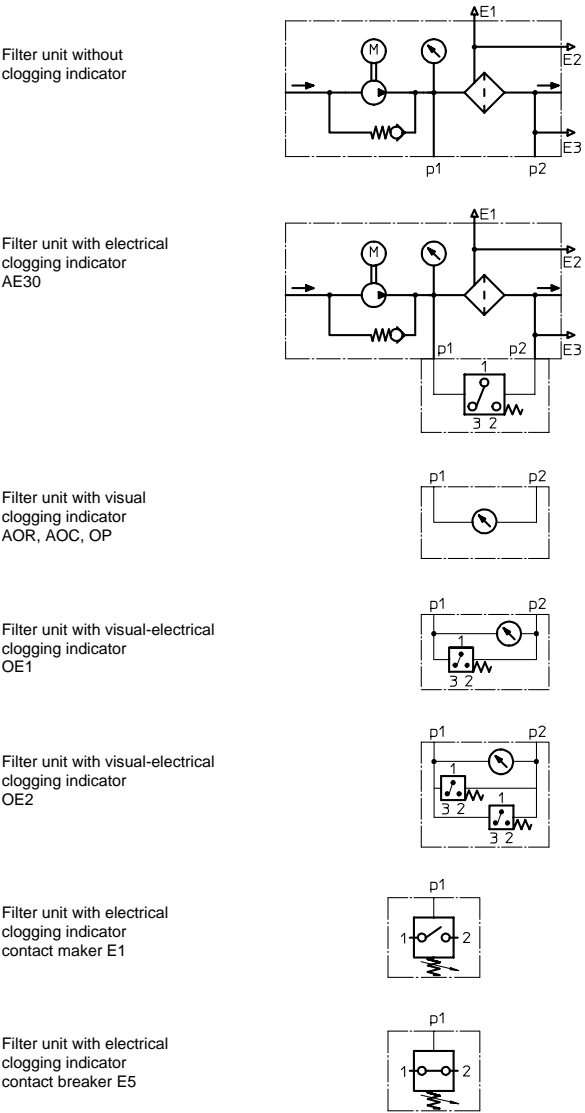
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm _(c)
weight:	approx. 130 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Test methods:

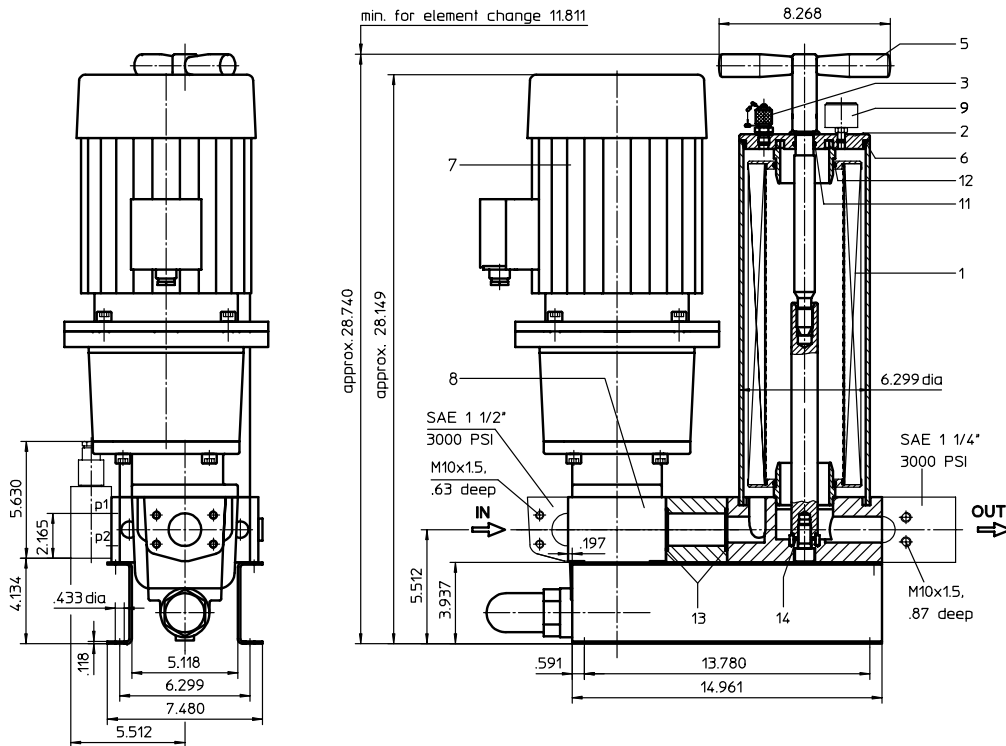
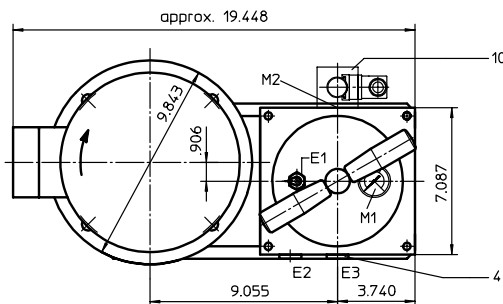
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St, see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 160

Sheet No.
4010.1 G
Sheet 1/3

1. Type index:

1.1. Filter unit: (ordering example)

US. 160. 6VG. 10. B. P. -. P03. D04. O. AE

1	2	3	4	5	6	7	8	9	10	11
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1 series:

US = filter unit, stationary

2 nominal size: 160

3 filter-material and filter-fineness:

10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)

10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c) Watersorp-filter element

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM), by agreement

7 filter element specification:

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 pump unit:

P03 = pump unit 03, NG 160.100 (standard-pump unit / setting range 58 -116 PSI)

9 motor: (D = rotary current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D04 ¹⁾	230/400V 50Hz	37.50 GPM	46-1860 SUS	58 PSI	-	-	42485-4
D04 ¹⁾	265/460V 60Hz	44.90 GPM	46-1860 SUS	58 PSI	-	-	42485-4
D06	110/190V 50Hz	37.50 GPM	46-1860 SUS	58 PSI	-	-	-
D08	400/690V 50Hz	37.50 GPM	46-1860 SUS	116 PSI	-	-	42744-4
D08	460/790V 60Hz	44.90 GPM	46-1860 SUS	116 PSI	-	-	42744-4
D19	400/690V 50Hz	25.10 GPM	46-2790 SUS	58 PSI	-	-	34374-4
D19	460/790V 60Hz	30.11 GPM	46-2790 SUS	58 PSI	-	-	34374-4
D24	400/690V 50Hz	37.50 GPM	46-1860 SUS	116 PSI	-	-	48816-4
D24	460/790V 60Hz	44.90 GPM	46-1860 SUS	116 PSI	-	-	48816-4

¹⁾ standard motor

10 clogging indicator at M1:

- = without

O = visual, 36 PSI

11 clogging indicator at M2:

- = without

AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,

AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,

AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609

OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628

OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628

E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
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1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 630

3 - 7 | see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P03	1	NG 160.100	316275
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

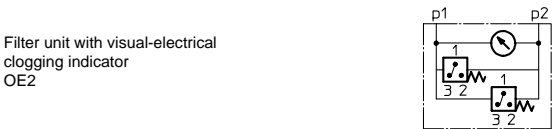
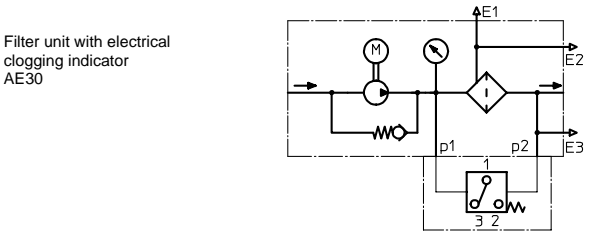
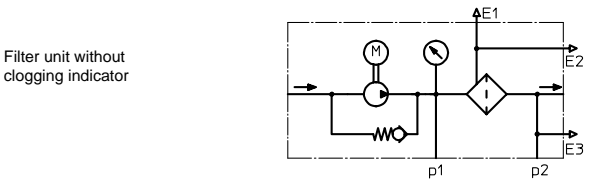
4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm _(c)
weight:	approx. 210 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Test methods:

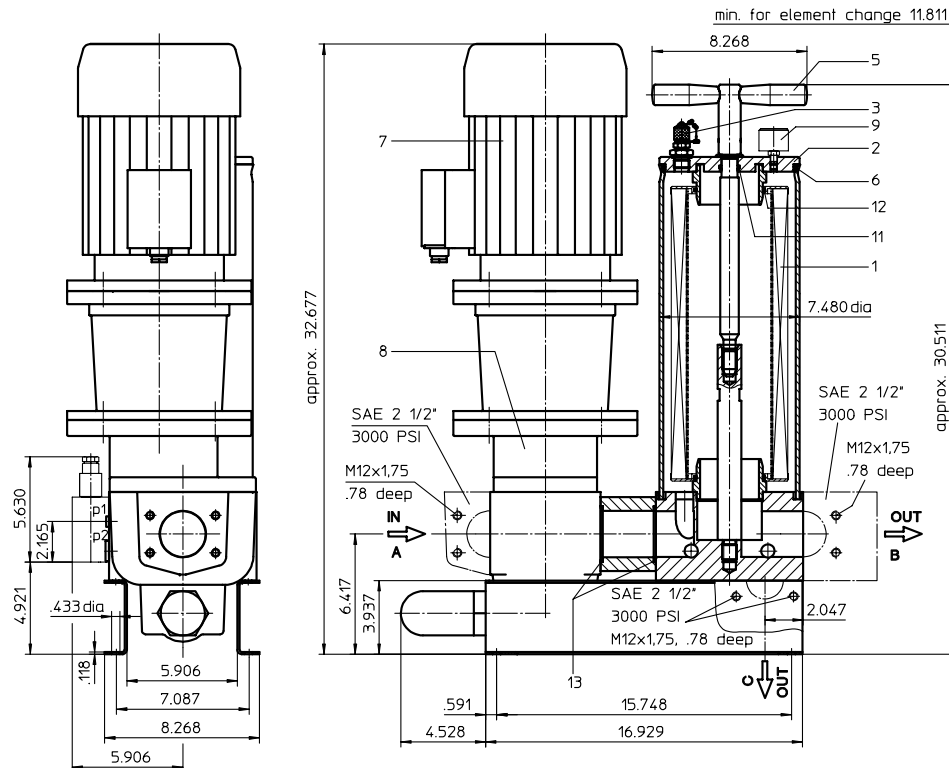
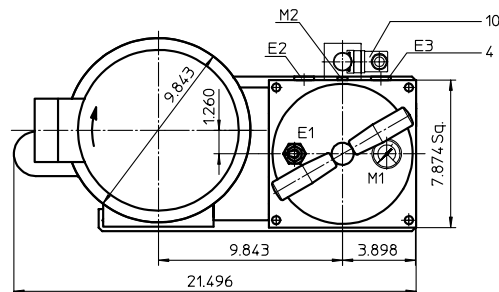
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 320

Sheet No.
4012.1 E
Sheet 1/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 320. 6VG. 10. B. P. -. P06. D08. 3. O. AE

1	2	3	4	5	6	7	8	9	10	11	12
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- 1 **series:**
US = filter unit, stationary
- 2 **nominal size:** 320
- 3 **filter-material and filter-fineness:**
10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)
10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c) Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601
- 8 **pump unit:**
P06 = pump unit 06, NG 320.200 (standard-pump-unit / setting range 58-116 PSI)
- 9 **motor:** (D = rotary current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D08 ¹⁾	400/690V	50Hz	75 GPM	46-460 SUS	58 PSI	-	42744-4
D08 ¹⁾	460/790V	60Hz	90 GPM	46-460 SUS	58 PSI	-	42744-4
D24	400/690V	50Hz	75 GPM	46-460 SUS	58 PSI	-	48816-4
D24	460/790V	60Hz	90 GPM	46-460 SUS	58 PSI	-	48816-4

¹⁾ standard motor

10 connection variant:

variant	connection A type	size	connection B type	size	connection C type	size
3	FS	9	FS	9	-	-
4	FS	9	FS	9	FS	9

type: FS = flange SAE 3000 PSI

size: 9 = 2 1/2"

- = no connection

11 clogging indicator at M1:

- = without

O = visual, 36 PSI

12 clogging indicator at M2:

- = without

AOR = AOR.2,5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,

AOC = AOC.2,5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,

AE = AE30.2,5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609

OP = OP.2,5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628

OE = OE.2,5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628

E1 = E1.2,5 electrical at p₁, 36 PSI, see sheet-no. 1616

E5 = E5.2,5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22496-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P06	1	NG 320.200	316838
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	2	69,45 x 3,53	305868 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

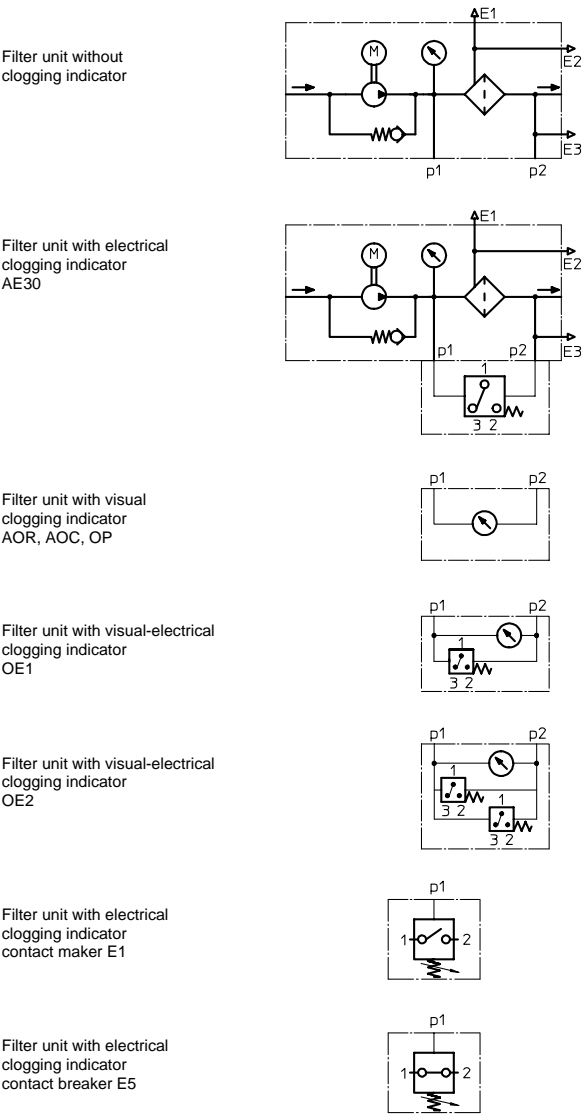
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm(c)
weight:	approx. 243 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



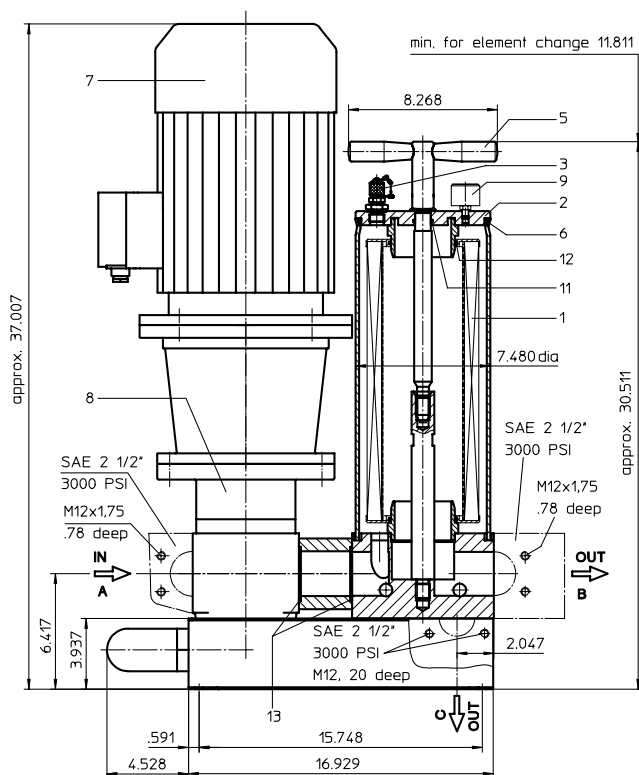
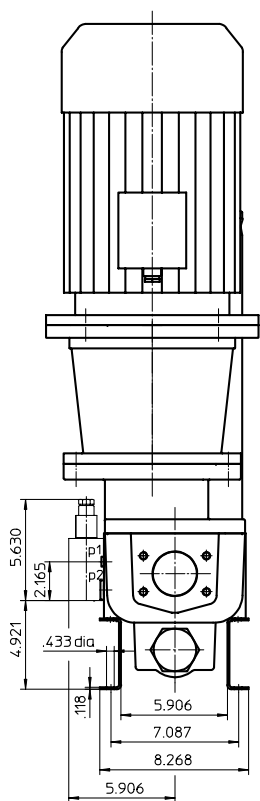
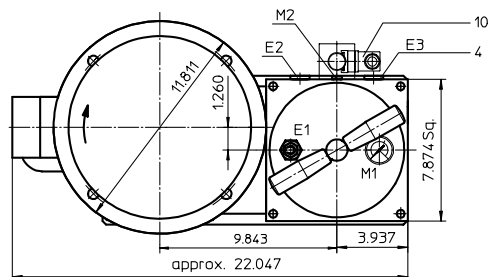
6. Test methods:

Filter elements are tested according to the following ISO standards:	
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

FILTER UNIT, stationary Series US 321

Sheet No.
4012.2 E
Sheet 2/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 321. 6VG. 10. B. P. -. P07. D07. 3. O. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
 US = filter unit, stationary
- 2 **nominal size:** 321
- 3 **filter-material and filter-fineness:**
 10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c) Interpor fleece (glass fiber)
 10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c) Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR), V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard, VA = stainless steel, IS06 = see sheet-no. 31601
- 8 **pump unit:**
 P07 = pump unit 07, NG 320.200 (standard-pump-unit / setting range 58-116 PSI)
- 9 **motor:** (D = rotary current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D07 ¹⁾	400/690V 50Hz	75 GPM	46-1860 SUS	58 PSI	-	-	34378-4
D07 ¹⁾	460/790V 60Hz	90 GPM	46-1860 SUS	58 PSI	-	-	34378-4
D22	400/690V 50Hz	50 GPM	46-3720 SUS	87 PSI	-	-	34486-4
D22	460/790V 60Hz	60 GPM	46-3720 SUS	87 PSI	-	-	34486-4

¹⁾ standard motor

10 connection variant:

variant	connection A type	connection A size	connection B type	connection B size	connection C type	connection C size
3	FS	9	FS	9	-	-
4	FS	9	FS	9	FS	9

type: FS = flange SAE 3000 PSI
size: 9 = 2 1/2"
 - = no connection

11 clogging indicator at M1:

- = without
 O = visual, 36 PSI

12 clogging indicator at M2:

- = without
 AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
 AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
 OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
 E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
 E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22496-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P07	1	NG 320.200	316908
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	2	69,45 x 3,53	305868 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump unit in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

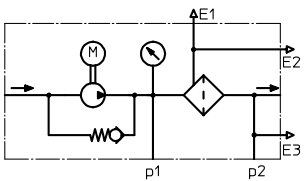
4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm _(c)
weight:	approx. 275 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 SUS, other media on request

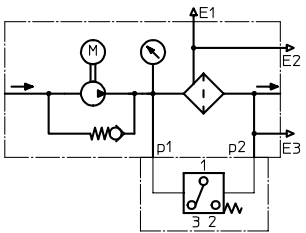
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

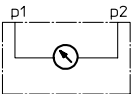
Filter unit without
clogging indicator



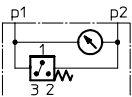
Filter unit with electrical
clogging indicator
AE30



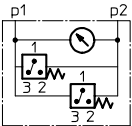
Filter unit with visual
clogging indicator
AOR, AOC, OP



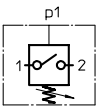
Filter unit with visual-electrical
clogging indicator
OE1



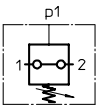
Filter unit with visual-electrical
clogging indicator
OE2



Filter unit with electrical
clogging indicator
contact maker E1



Filter unit with electrical
clogging indicator
contact breaker E5



6. Test methods:

Filter elements are tested according to the following ISO standards:

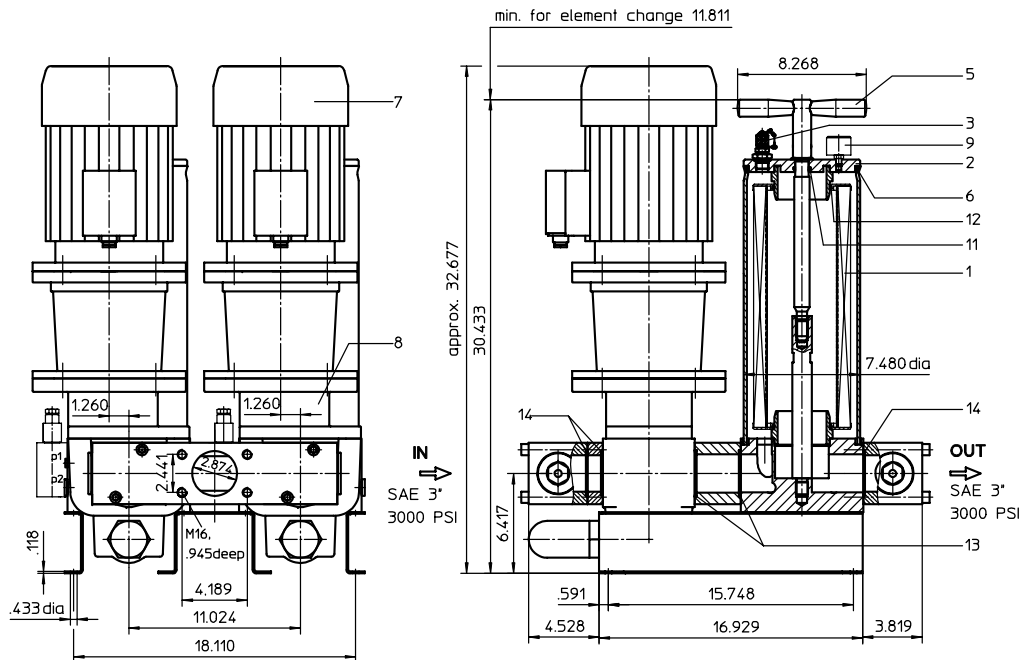
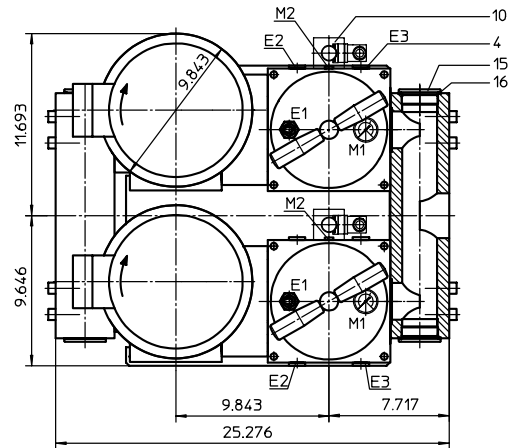
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary Series US 640

Sheet No.
4062 B

Assignment of connections and functions:

- E1: venting mini-measuring connection,
MA.1.ST see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in
the housing cover, dirt side
M2: measure connection at filter housing
p₁ = dirt side
p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

US. 640. 6VG. 10. B. P. -. P06. D08. O. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
US = filter unit, stationary
2 **nominal size:** 640
3 **filter-material and filter-fineness:**
10 VG = 10 µm_(G), 6 VG = 7 µm_(G), 3 VG = 5 µm_(G), 1 VG = 4 µm_(G) Interpor fleece (glass fiber)
10 WVG = 10 µm_(G), 3 WVG = 5 µm_(G) Watersorp-filter element
4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
5 **filter element design:**
B = both sides open
6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
8 **pump unit:**
P06 = pump unit 06, NG 320.200 (standard-pump-unit / setting range 58-116 PSI)
9 **motor:** (D = rotary current motor)

motor	electrical connection	volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D08 ¹⁾	400/690V	50Hz	2x 75 GPM	46-460 SUS	58 PSI	-	42744-4
D08 ¹⁾	460/790V	60Hz	2x 90 GPM	46-460 SUS	58 PSI	-	42744-4
D24	400/690V	50Hz	2x 75 GPM	46-460 SUS	58 PSI	-	48816-4
D24	460/790V	60Hz	2x 90 GPM	46-460 SUS	58 PSI	-	48816-4

¹⁾ standard motor

- 10 **clogging indicator at M1:**
- = without
O = visual, 36 PSI
11 **clogging indicator at M2:**
- = without
AOR = AOR.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
AOC = AOC.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1606,
AE = AE30.2.5..., electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
OP = OP.2.5..., visual, at p₁ and p₂, 36 PSI, see sheet-no. 1628
OE = OE.2.5..., visual-electrical, at p₁ and p₂, 36 PSI, see sheet-no. 1628
E1 = E1.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616
E5 = E5.2.5 electrical at p₁, 36 PSI, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
2 **nominal size:** 1000
3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	2	01NR. 1000	
2	housing cover	2	22496-3	313837
3	mini-measuring connection	2	MA.1.ST	305453
4	screw plug	4	½ BSPP	304678
5	straining screw	2	31067-3	316893
6	O-ring	2	170 x 6	304799 (NBR)
7	electric motor	2	according to type index	
8	pump unit P06	2	NG 320.200	316838
9	clogging indicator (series)	2	visual 1.57 dia	315452
10	clogging indicator	2	according to type index	
11	O-ring	2	22 x 3	304387 (NBR)
12	O-ring	4	90 x 4	306941 (NBR)
13	O-ring	4	69,45 x 3,53	305868 (NBR)
14	O-ring	6	65,09 x 3,53	317621 (NBR)
15	screw plug	4	2 BSPP	310958
16	gasket	4	A 60 x 68	310959

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with two gear pumps driven by two electric-motors. The flow conveyed by the gear pumps is fed over two filter elements according to DIN 24550, T4, nominal size 1000.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response pressure with respect to the set pressure range of the pump units in the plain text when ordering.

Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected electric-motor and if the switch-off function of the electric-motor of the electrical clogging indicator is disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

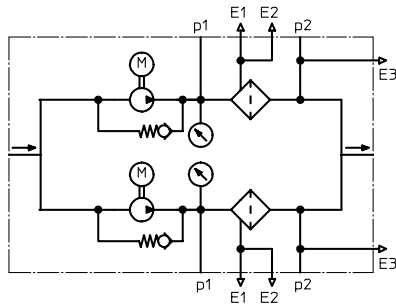
4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 507 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

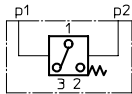
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

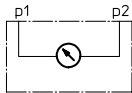
Filter unit without clogging indicator



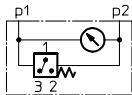
Filter unit with electrical clogging indicator AE30



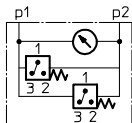
Filter unit with visual clogging indicator AOR, AOC, OP



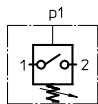
Filter unit with visual-electrical clogging indicator OE1



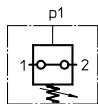
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

Filter elements are tested according to the following ISO standards:

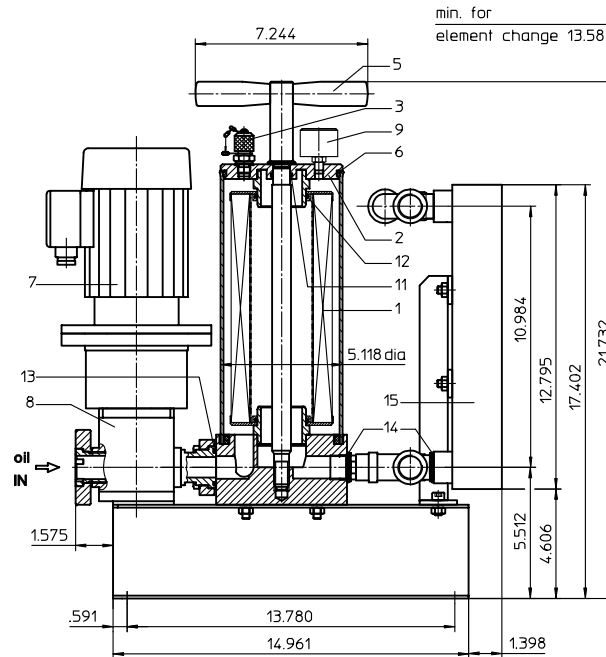
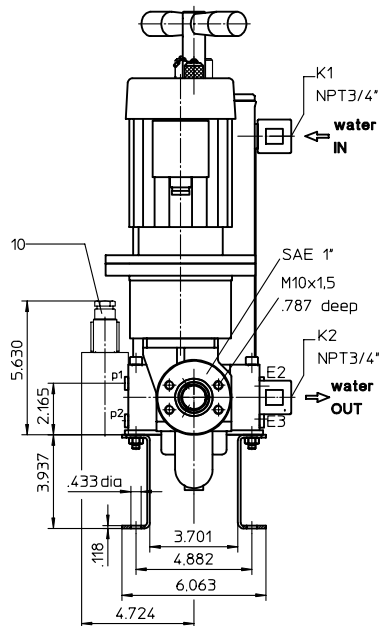
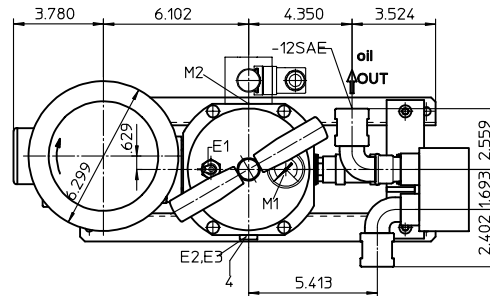
- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger **Series USP 20 87 PSI**

Sheet No.
4020 C

Assignment of connections and functions:

E1: venting mini-measuring connection,
 MA.1.St see sheet-no. 1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 manometer 0-232 PSI
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side
 K1: cooling water IN
 K2: cooling water OUT



1. Type index:

1.1. Filter unit: (ordering example)

USP. 20. 6VG. 10. B. P. -. P08. W01. CP12. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- series:**
USP = filter unit, stationary with plate-exchanger
- nominal size:** 20
- filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- filter element design:**
B = both sides open
- sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- filter element specification:**
- = standard
VA = stainless steel
- pump unit:**
P08 = pump unit 08, NG 20.16
- motor:**
W01 = B5/71/4.0.37.1800.110.W.60.1.L.-.- alternating current motor 110V, 60 Hz, approx. 1700 RPM, 0.5 HP, type of protection IP 54
D03 = B5/71/4.0.44.1800.265/460.D.60.1.-.-.- rotary current motor 265/460V, 60 Hz, approx. 1700 RPM, 0.6 HP, type of protection IP 54
- plate-exchanger unit:**
CP12 = plate-exchanger unit CP12
- clogging indicator at M2:**
- = without
AE = AE30.2.5.P.-.B electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
AOR = AOR.2.5.P.- visual, 36 PSI, see sheet-no. 1606
AOC = AOC.2.5.P.- visual, 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- nominal size:** 250
- 7** see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	¼ BSPP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	E-motor D03	1	0.6 HP, 265/460 V	316257
8	pump unit P08	1	NG 20.16	317378
9	manometer (series)	1	1.57 dia	
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)
14	gasket	2	A 27 x 32	308536
15	plate-exchanger unit	1	CP12	

3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250 and is led afterwards over a plate cooler.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 87 PSI.

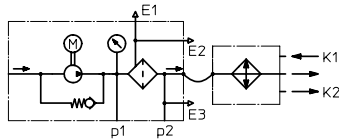
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.

Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator



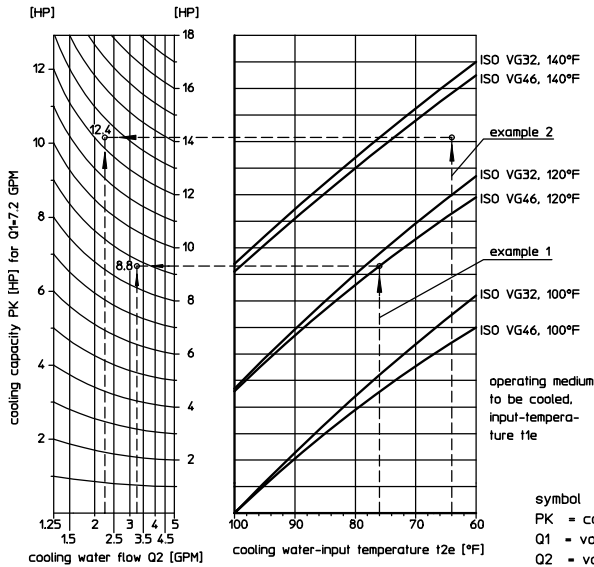
with electrical
clogging indicator AE30



with visual
clogging indicator
AOR, AOC



5. Cooling capacity graph:



operating medium-output temperature t1a [°F] $t1a = t1e - \frac{PK \cdot 12.4}{Q1}$

cooling water-output temperature t2a [°F] $t2a = t2e + \frac{PK \cdot 5.1}{Q2}$

example 1, operating medium ISO VG46

t1e = 120°F, t2e = 76°F,
Q1 = 7.2 GPM, Q2 = 3.25 GPM
cooling capacity PK from the graph = 8.8 HP

t1a = $120 - \frac{8.8 \cdot 12.4}{7.2} = 104.8^\circ\text{F}$

t2a = $76 + \frac{8.8 \cdot 5.1}{3.25} = 89.8^\circ\text{F}$

example 2, operating medium ISO VG32

t1e = 130°F, t2e = 64°F,
Q1 = 7.2 GPM, Q2 = 2.25 GPM
cooling capacity PK from the graph = 12.4 HP
(data linear interpolated)

t1a = $130 - \frac{12.4 \cdot 12.4}{7.2} = 108.6^\circ\text{F}$

t2a = $64 + \frac{12.4 \cdot 5.1}{2.25} = 96.1^\circ\text{F}$

symbol	units
PK = cooling capacity	HP
Q1 = volume flow-operating medium	GPM
Q2 = volume flow-cooling water	GPM
t1e = operating medium-input temperature	°F
t1a = operating medium-output temperature	°F
t2e = cooling water-input temperature	°F
t2a = cooling water-output temperature	°F

6. Technical data:

pump-volume flow :	7.2 GPM at 1700 RPM
E-motor:	0.6 HP, approx. 1700 RPM
rotary current:	265/460 V, 60 Hz
operating pressure:	max. 87 PSI
filter-fineness:	4, 5, 7 or 10 µm _(c)
weight:	approx. 77 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 up to 464 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Test methods:

Filter elements are tested according to the following ISO standards:

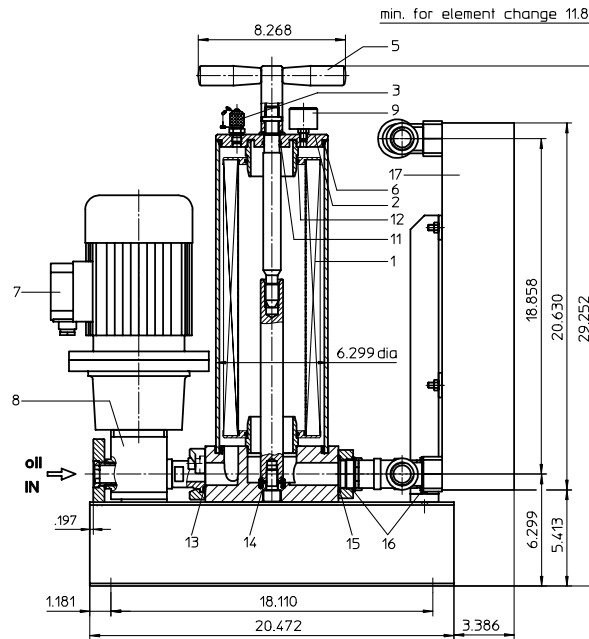
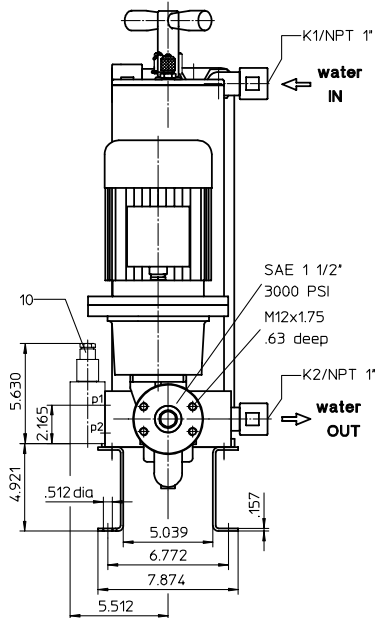
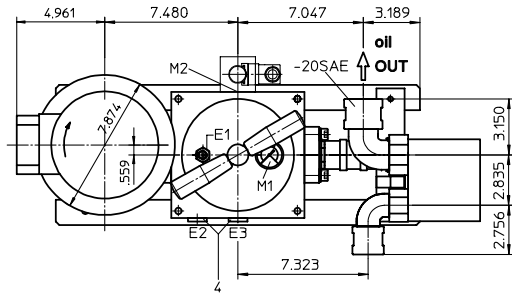
- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger **Series USP 41 87 PSI**

Sheet No.
4021 E

Assignment of connections and functions:

E1: venting mini-measuring connection,
 MA.1.St see sheet-no. 1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 manometer 0-232 PSI
 M2: measure connection at filter housing
 p₁ = dirt side
 p₂ = clean side
 K1: cooling water IN
 K2: cooling water OUT



1. Type index:

1.1. Filter unit: (ordering example)

USP. 41. 6VG. 10. B. P. - . P05. D05. CP16. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
 USP = filter unit, stationary with plate-exchanger
- 2 **nominal size:** 41
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
- 8 **pump unit:**
 P05 = pump unit 05, NG 40.25
- 9 **motor:**
 D05 = B5/80/4.0.9.1800.265/460.D.60.1.-.- rotary current motor 265/460V, 60 Hz, approx. 1700 RPM, 1.2 HP, type of protection IP 54
- 10 **plate-exchanger unit:**
 CP16 = plate-exchanger unit CP16
- 11 **clogging indicator at M2:**
 - = without
 AE = AE30.2.5.P.-.B electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
 AOR = AOR.2.5.P.- visual, 36 PSI, see sheet-no. 1606
 AOC = AOC.2.5.P.- visual, 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	E-motor D05	1	1.2 HP, 265/460 V	311537
8	pump unit P01	1	NG 40.25	316292
9	manometer (series)	1	1.57 dia	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	1	37,69 x 3,53	304353 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	plate-exchanger unit	1	CP16	

3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems. The area of application comprises:

- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm (ø).

At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 87 PSI.

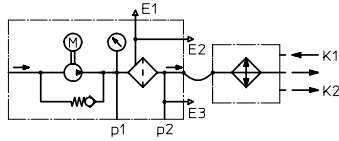
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.

Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator



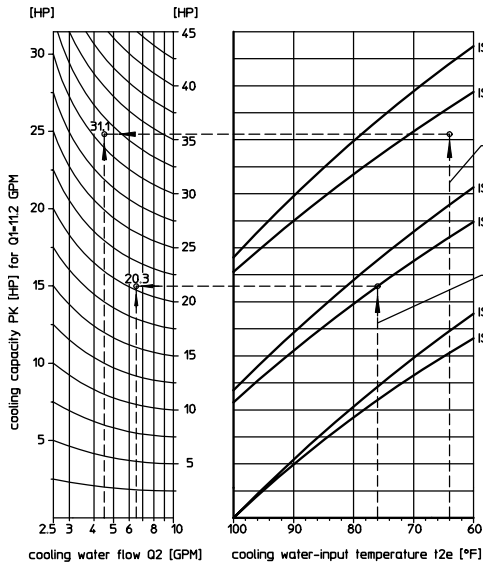
with electrical
clogging indicator AE30



with visual
clogging indicator
AOR, AOC



5. Cooling capacity graph:



$$\text{operating medium-output temperature } t1a \text{ [°F]} \quad t1a = t1e - \frac{PK \cdot 12.4}{Q1}$$
$$\text{cooling water-output temperature } t2a \text{ [°F]} \quad t2a = t2e + \frac{PK \cdot 5.1}{Q2}$$

example 1. operating medium ISO VG46

t1e = 120°F, t2e = 76°F,
Q1 = 11.2 GPM, Q2 = 6.5 GPM

cooling capacity PK from the graph = 20.3 HP

$$t1a = 120 - \frac{20.3 \cdot 12.4}{11.2} = 97.5^\circ\text{F}$$

$$t2a = 76 + \frac{20.3 \cdot 5.1}{6.5} = 91.9^\circ\text{F}$$

example 2. operating medium ISO VG32

t1e = 130°F, t2e = 64°F,
Q1 = 11.2 GPM, Q2 = 4.5 GPM

cooling capacity PK from the graph = 31.1 HP
(data linear interpolated)

$$t1a = 130 - \frac{31.1 \cdot 12.4}{11.2} = 95.6^\circ\text{F}$$

$$t2a = 64 + \frac{31.1 \cdot 5.1}{4.5} = 99.2^\circ\text{F}$$

symbol	units
PK = cooling capacity	HP
Q1 = volume flow-operating medium	GPM
Q2 = volume flow-cooling water	GPM
t1e = operating medium-input temperature	°F
t1a = operating medium-output temperature	°F
t2e = cooling water-input temperature	°F
t2a = cooling water-output temperature	°F

6. Technical data:

pump-volume flow :	11.2 GPM at 1700 RPM
E-motor:	1.2 HP, approx. 1700 RPM
rotary current:	265/460 V, 60 Hz
operating pressure:	max. 87 PSI
filter-fineness:	4, 5, 7 or 10 µm (ø)
weight:	approx. 128 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 up to 464 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Test methods:

Filter elements are tested according to the following ISO standards:

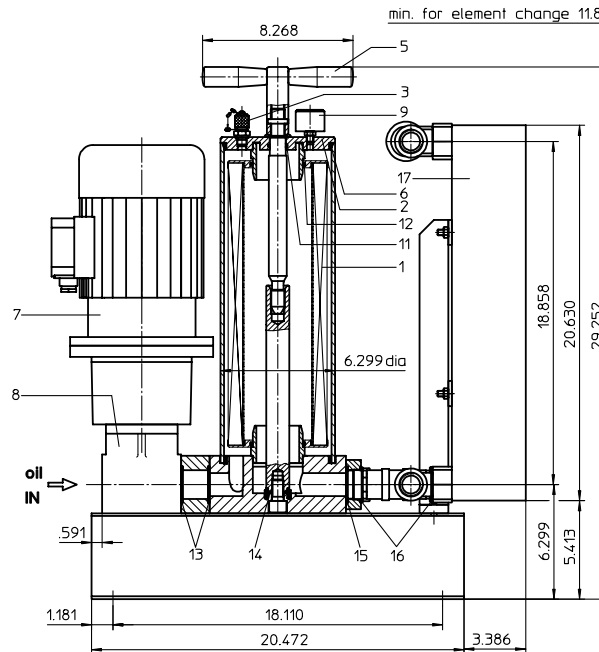
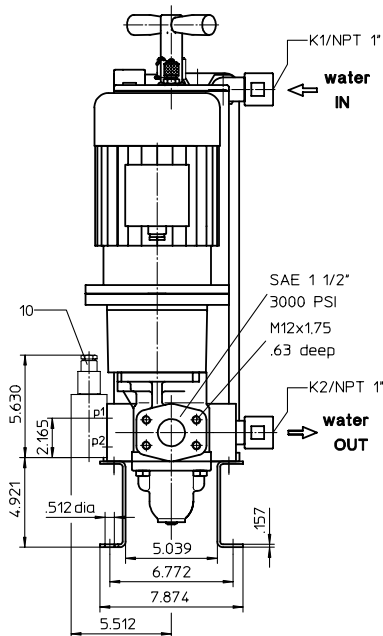
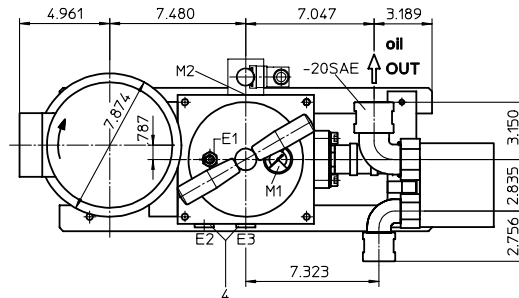
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger **Series USP 81 87 PSI**

Sheet No.
4022 E

Assignment of connections and functions:

E1: venting mini-measuring connection,
MA.1.St see sheet-no. 1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
manometer 0-232 PSI
M2: measure connection at filter housing
p₁ = dirt side
p₂ = clean side
K1: cooling water IN
K2: cooling water OUT



1. Type index:

1.1. Filter unit: (ordering example)

USP. 81. 6VG. 10. B. P. -. P04. D01. CP18. AE

1	2	3	4	5	6	7	8	9	10	11
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- 1 **series:**
USP = filter unit, stationary with plate-exchanger
- 2 **nominal size:** 81
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **pump unit:**
P04 = pump unit 04, NG 80.50
- 9 **motor:**
D01 = B5/90L/4.1.8.1800.265/460.D.60.1.-.-.- rotary current motor 265/460V, 60 Hz, approx. 1700 RPM, 2.4 HP, type of protection IP 54
- 10 **plate-exchanger unit:**
CP18 = plate-exchanger unit CP18
- 11 **clogging indicator at M2:**
- = without
AE = AE30.2.5.P.-B electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
AOR = AOR.2.5.P.- visual, 36 PSI, see sheet-no. 1606
AOC = AOC.2.5.P.- visual, 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
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- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	E-motor D01	1	2.4 HP, 265/460 V	313465
8	pump unit P04	1	NG 80.50	317139
9	manometer (series)	1	1.57 dia	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	plate-exchanger unit	1	CP18	

3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems. The area of application comprises:

- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 87 PSI.

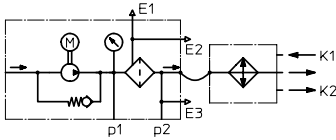
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.

Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator



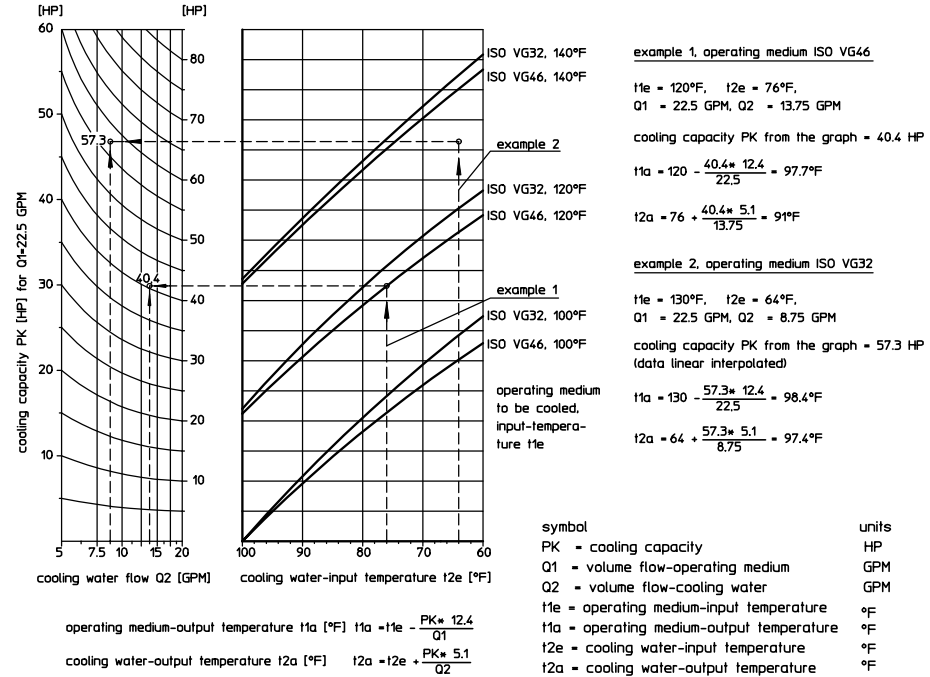
with electrical
clogging indicator AE30



with visual
clogging indicator
AOR, AOC



5. Cooling capacity graph:



6. Technical data:

pump-volume flow : 22.5 GPM at 1700 RPM
E-motor: 2.4 HP, approx. 1700 RPM
rotary current: 265/460 V, 60 Hz
operating pressure: max. 87 PSI
filter-fineness: 4, 5, 7 or 10 µm_(c)
weight: approx. 176 lbs.
operating medium: hydraulic oil based on mineral oil from 46 up to 464 SUS,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

Sheet No.
4023 E

1	2	3	4	5	6	7	8	9	10	11
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|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|

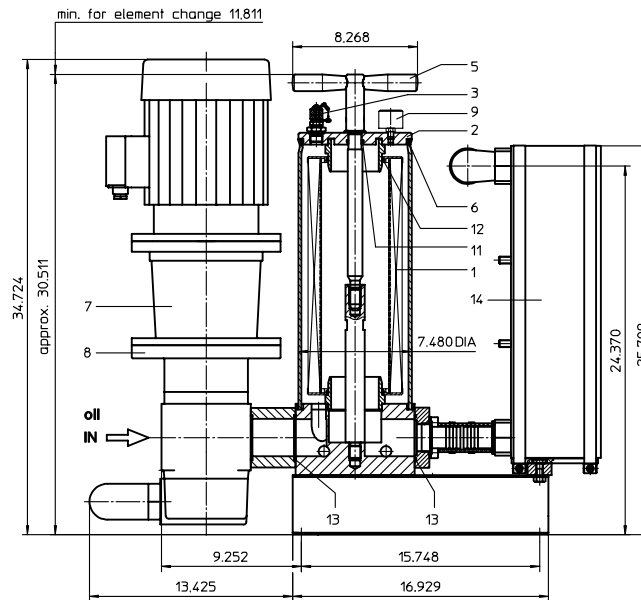
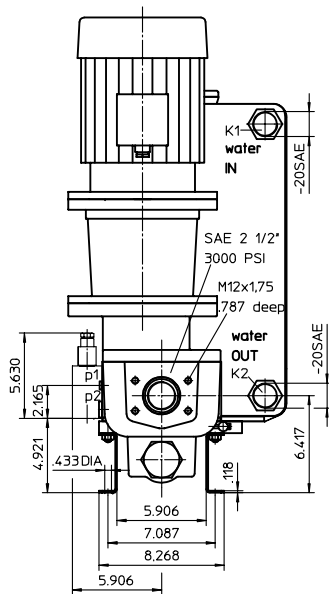
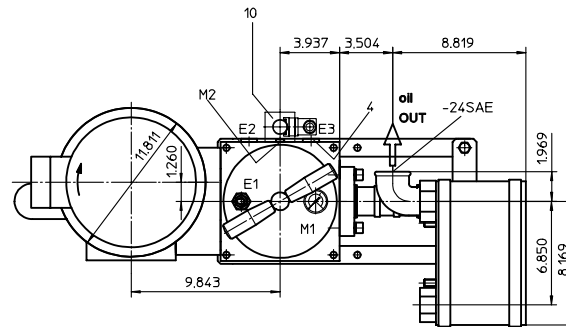
- EDV 10/03

FILTER UNIT, stationary with plate-exchanger **Series USP 320 87 PSI**

Sheet No.
4024 B

Assignment of connections and functions:

E1: venting mini-measuring connection,
MA.1.St see sheet-no. 1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the
housing cover, dirt side
manometer 0-232 PSI
M2: measure connection at filter housing
p₁ = dirt side
p₂ = clean side
K1: cooling water IN
K2: cooling water OUT



1. Type index:

1.1. Filter unit: (ordering example)

USP. 320. 6VG. 10. B. P. -. P07. D07. CP30. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 **series:**
USP = filter unit, stationary with plate-exchanger
- 2 **nominal size:** 320
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$, Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **pump unit:**
P07 = pump unit 07, NG 320.200
- 9 **motor:**
D07 = B5/132S/4.6.3.1800.460/790.D.60.1.-.- rotary current motor 460/790V, 60 Hz, approx. 1700 RPM, 6.3 HP, type of protection IP 5
- 10 **plate-exchanger unit:**
CP30 = plate-exchanger unit CP30
- 11 **clogging indicator at M2:**
- = without
AE = AE30.2.5.P.-B electrical at p₁ and p₂, 36 PSI, see sheet-no. 1609
AOR = AOR.2.5.P.- visual, 36 PSI, see sheet-no. 1606
AOC = AOC.2.5.P.- visual, 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 1000
- 3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22694-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	170 x 6	304799 (NBR)
7	E-motor D01	1	6.3 HP, 460/790 V	316821
8	pump unit P04	1	NG 320.200	316908
9	manometer (series)	1	1.57 dia	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	3	69,45 x 3,53	305868 (NBR)
14	plate-exchanger unit	1	CP30	

3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems. The area of application comprises:

- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.

The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000 and is led afterwards over a plate cooler.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 87 PSI.

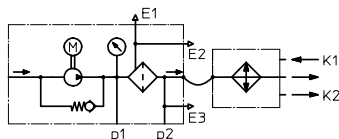
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.

Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 36 PSI.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator



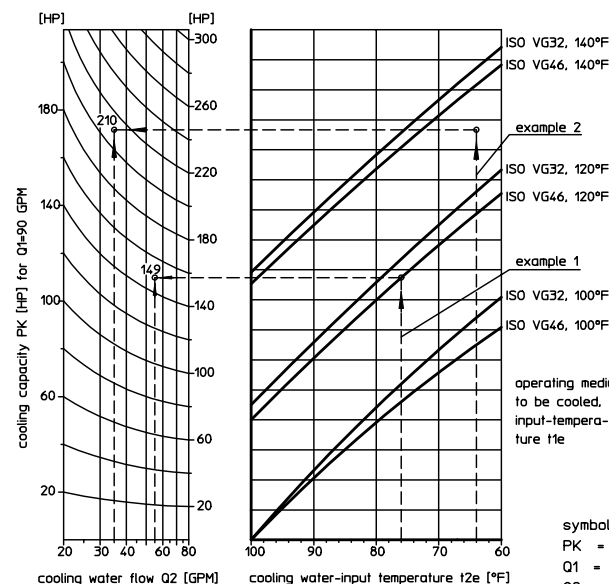
with electrical
clogging indicator AE30



with visual
clogging indicator
AOR, AOC



5. Cooling capacity graph:



example 1, operating medium ISO VG46

t1e = 120°F, t2e = 76°F,
Q1 = 90 GPM, Q2 = 55 GPM

cooling capacity PK from the graph = 149 HP

t1a = 120 - $\frac{149 \times 12.4}{90}$ = 99.5°F

t2a = 76 + $\frac{149 \times 5.1}{55}$ = 89.8°F

example 2, operating medium ISO VG32

t1e = 130°F, t2e = 64°F,
Q1 = 90 GPM, Q2 = 35 GPM

cooling capacity PK from the graph = 210 HP
(data linear interpolated)

t1a = 130 - $\frac{210 \times 12.4}{90}$ = 101.1°F

t2a = 64 + $\frac{210 \times 5.1}{35}$ = 94.6°F

symbol	units
PK = cooling capacity	HP
Q1 = volume flow-operating medium	GPM
Q2 = volume flow-cooling water	GPM
t1e = operating medium-input temperature	°F
t1a = operating medium-output temperature	°F
t2e = cooling water-input temperature	°F
t2a = cooling water-output temperature	°F

$$\text{operating medium-output temperature } t1a [^{\circ}\text{F}] \quad t1a = t1e - \frac{PK \times 12.4}{Q1}$$

$$\text{cooling water-output temperature } t2a [^{\circ}\text{F}] \quad t2a = t2e + \frac{PK \times 5.1}{Q2}$$

6. Technical data:

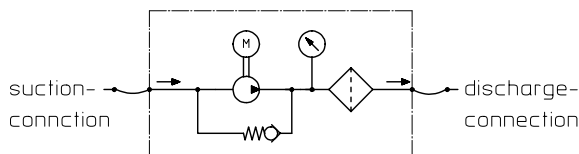
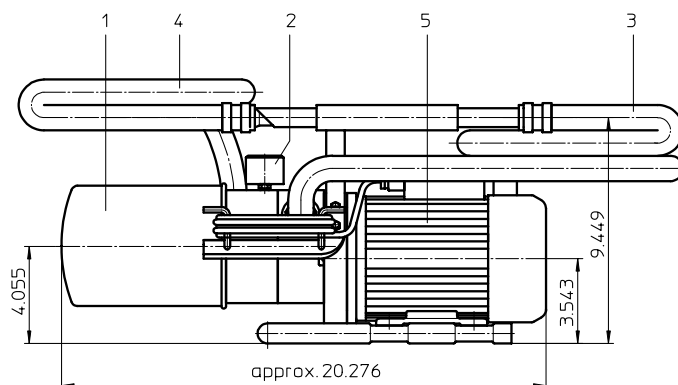
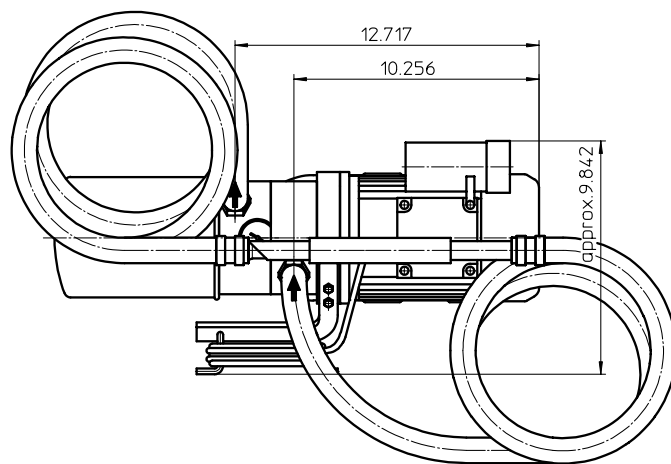
pump-volume flow :	90 GPM at 1700 RPM
E-motor:	6.3 HP, approx. 1700 RPM
rotary current:	460/790 V, 60 Hz
operating pressure:	max. 87 PSI
filter-fineness:	4, 5, 7 or 10 µm _(c)
weight:	approx. 341 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 up to 464 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



4. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design satisfies the prerequisites for small dimensions and high reliability.

As the filtration unit is portable and small, there is easy access even to difficult accessible points. Leaking oil from the suction respectively discharge hose is prevented by lances connected with the carrying handle.

The suction hose 3/4" and the discharge hose 3/4" are approximately 59 inch long inclusive of the lance.

The device is equipped with a gear pump driven by an electric motor. The flow conveyed by the geared pump is fed over a spin-on cartridge.

The filter fineness is 10 $\mu\text{m}_{(c)}$. The contamination level of the filter element can be read off from a pressure display.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 72.5 PSI.

The filter unit can be operated without supervision, since the unit switches off automatically after about 5 minutes when an operating pressure of > 87 PSI is reached. This pressure range is marked in red on the scale field of the pressure display.

The filter element can be changed without tools.

The filter elements are supplied including seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

1. Type index:

1.1. Filter unit: (ordering example)

UFM. 15. 10VG. E. P. W16

1	2	3	4	5	6
1	series:				
	UFM = filter unit, mobile				
2	nominal size: 15				
3	filter-material and filter-fineness:				
	10 VG = 10 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)				
	10 P = 10 μm paper				
4	filter element design:				
	E = single-end open				
5	sealing material:				
	P = Nitrile (NBR)				
6	motor:				
	W16 = B3-B14/71/4.0,25.1500/1800.230.W.50/60.1.R.S.K alternating current motor 230V, 50/60Hz, approx. 1300/1550 RPM, .34 HP, type of protection IP 54				
	W17 = B3-B14/71/4.0,25.1800.110.W.60.1.R.S.K alternating current motor 110V, 60Hz, approx. 1550 RPM, .34 HP, type of protection IP 54				

1.2. Filter element: (ordering example)

01WP. 90. 10VG. E. P

1	2	3	4	5
1	series:			
	01WP = spin-on cartridge			
2	nominal size: 90			
3	-	5	see type index-filter unit	

2. Technical data:

pump capacity:	3.7/4.8 GPM at 1300/1550 RPM
electric motor:	.34 HP
alternating current:	230 V, 50/60 Hz
alternating current:	110 V, 60 Hz
pressure load capacity:	max. 72.5 PSI
filter-fineness:	10 $\mu\text{m}_{(c)}$
weight:	approx. 26 lbs.
operating medium:	hydraulic oil based on mineral oil 46 to 1860 SUS other media on request

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	spin-on cartridge	01WP.90...	
2	1	clogging indicator	visual	315452
3	1	suction hose 3/4"	21938-3	
4	1	discharge hose 3/4"	21946-3	
5	1	electric motor W16	.34 HP, 230V	312053
	1	electric motor W17	34 HP, 110V	313095

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
9	clogging indicator (series)	1	visual Ø 40	315452
10	O-ring	1	18 x 3	304359 (NBR)
11	O-ring	2	52 x 3	314206 (NBR)
12	O-ring	1	32 x 3,5	304378 (NBR)
13	O-ring	1	32,9 x 3,53	318850 (NBR)
14	suction hose 1"	1	according to type index	
15	discharge hose 1"	1	according to type index	

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose DN 25 and the discharge hose DN 25 are approximately 2700 mm long inclusive of the lance.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 4 bar.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 4 bar, the motor-protection-switch cuts the E-motor out.

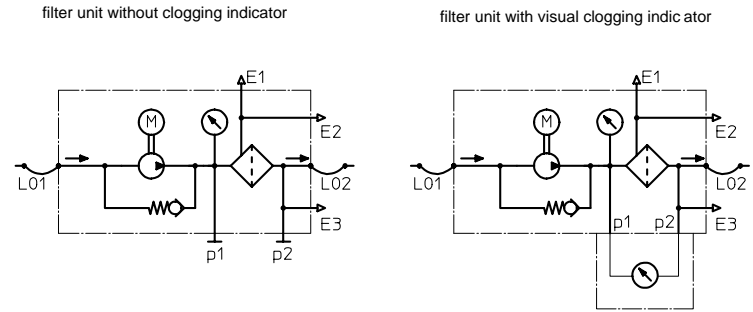
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
oil temperature: -5°C to +60°C
weight: approx. 42 kg
operating medium: hydraulic oil based on mineral oil from 10 mm²/s,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Test methods:

Filter elements are tested according to the following ISO standards:

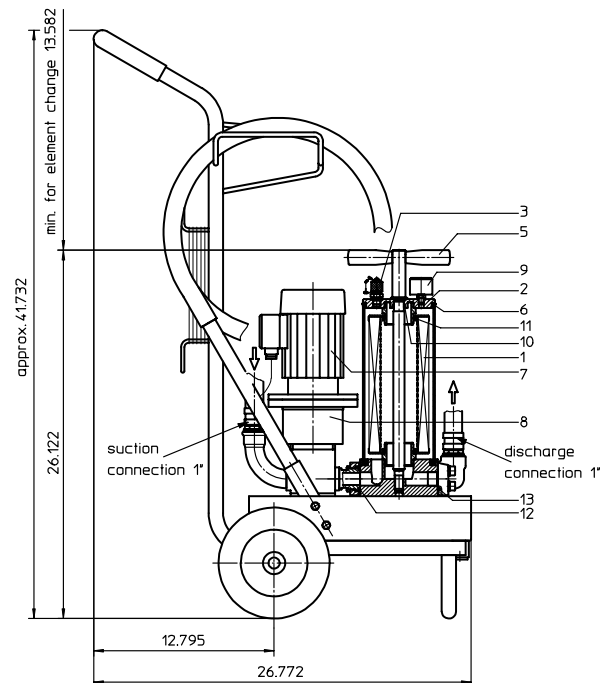
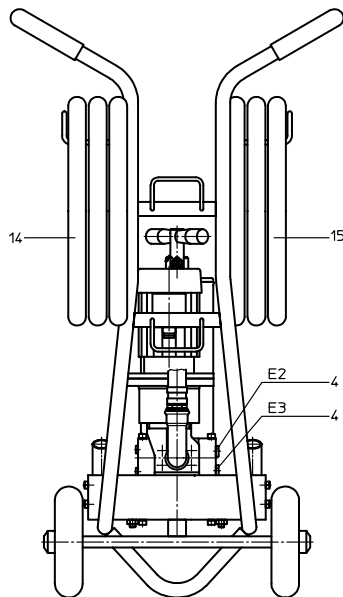
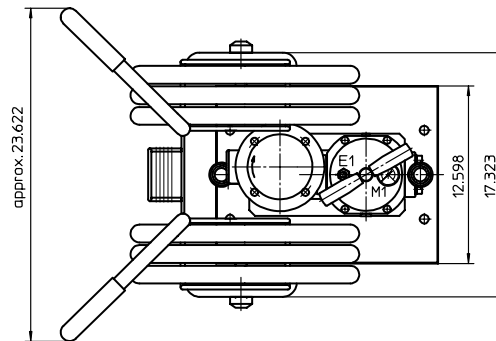
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile **Series UM 20 58 PSI**

Sheet No.
4013 F

Assignment of connections and functions:

- E1: venting mini-measuring connection
MA.1.ST, see sheet-no.1650
- E2: drainage of filter, dirt side
- E3: drainage of filter, clean side
- M1: measure connection in the housing cover,
dirt side



1. Type index:

1.1. Filter unit: (ordering example)

UM. 20. 6VG. 10. B. P. -. P01. W07. L07. L11. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
UM = filter unit, mobile
- 2 **nominal size:** 20
- 3 **filter-material and filter-fineness:**
10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **pump unit:**
P01 = pump unit 01, NG 20.16 (standard-pump unit)

9 motor: (W = alternating current motor)

motor	electrical connection	volume flow	max. capacity	doc.-no.
W03 ¹⁾	230V	50Hz	6.0 GPM	43044-4
W07 ¹⁾	110V	60Hz	7.2 GPM	43045-4

¹⁾ standard-motor

10 suction connection 1" : (see sheet-no. 31992-4)

- L07 = hose-lance
- L08 = hose-fitting-lance
- L09 = hose-lance-protective filter
- L10 = hose-fitting-lance-protective filter

11 discharge connection 1" : (see sheet-no. 31992-4)

- L11 = hose-lance
- L12 = hose-fitting-lance

12 clogging indicator at M1:

- = without
- O = visual, 36 PSI

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 250
- 3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	1/4 BSPP	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	O-ring	1	18 x 3	304359 (NBR)
11	O-ring	2	52 x 3	314206 (NBR)
12	O-ring	1	32 x 3,5	304378 (NBR)
13	O-ring	1	32,9 x 3,53	318850 (NBR)
14	suction hose 1"	1	according to type index	
15	discharge hose 1"	1	according to type index	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises: - secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose 1" and the discharge hose 1" are approximately 106 inch long inclusive of the lance.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element. The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 58 PSI.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 58 PSI, the motor-protection-switch cuts the E-motor out.

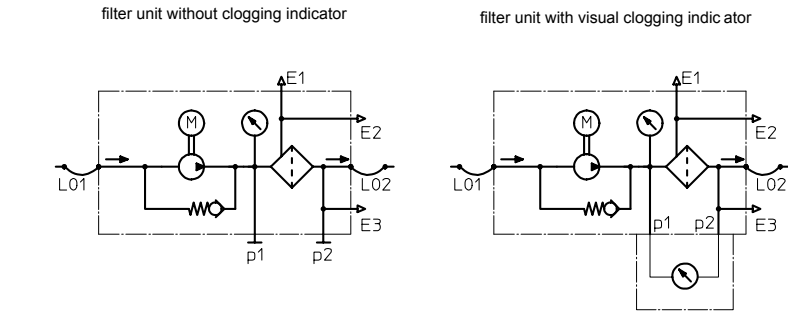
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm _(c)
oil temepature:	+23°F to +140°F
weight:	approx. 92 lbs.
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



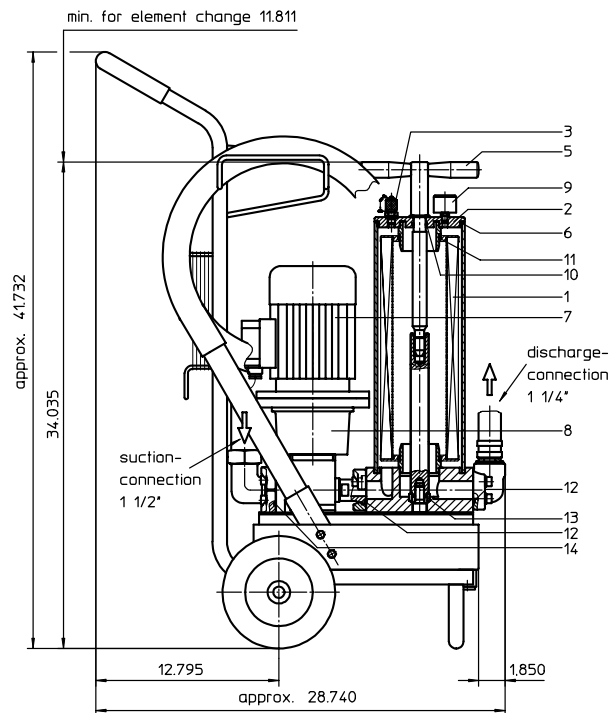
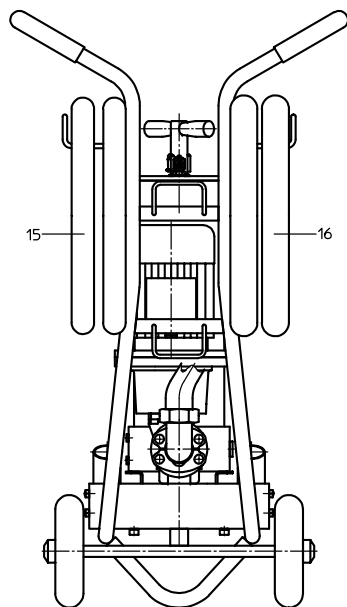
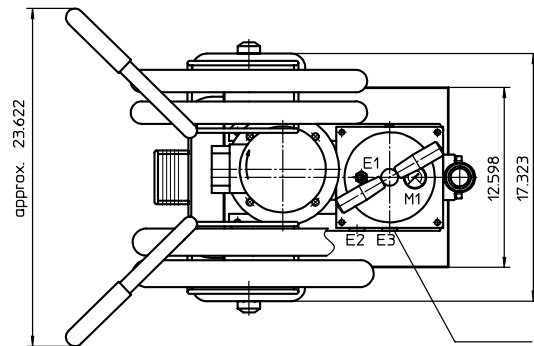
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side



FILTER UNIT, mobile

Series UM 40 58 PSI

Sheet No.
4014 E

1. Type index:

1.1. Filter unit: (ordering example)

UM. 40. 6VG. 10. B. P. -. P05. W11. L01. L05. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
 UM = filter unit, mobile
- 2 **nominal size:** 40
- 3 **filter-material and filter-fineness:**
 10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
 10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
 10 = Δp 145 PSI
- 5 **filter element design:**
 B = both sides open
- 6 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM), by agreement
- 7 **filter element specification:**
 - = standard
 VA = stainless steel
 IS06 = see sheet-no. 31601
- 8 **pump unit:**
 P05 = pump unit 05, NG 40.25 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection	volume flow	max. viscosity	doc.-no.	
W10 ¹⁾	230V	50Hz	9.4 GPM	46-1860 SUS	42754-4
W11 ¹⁾	110V	60Hz	11.2 GPM	46-1860 SUS	42877-4
W30 (CSA-motor)	110V	60Hz	11.2 GPM	46-930 SUS	44567-4

¹⁾ standard-motor

- 10 **suction connection 1 1/2 " :** (see sheet-no. 31961-4)
 L01 = hose-lance
 L02 = hose-fitting-lance
 L03 = hose-lance-protective filter
 L04 = hose-fitting-lance-protective filter
 L22 = hose-fitting
- 11 **discharge connection 1 1/4 " :** (see sheet-no. 31961-4)
 L05 = hose-lance
 L06 = hose-fitting-lance
 L21 = hose-fitting
- 12 **clogging indicator at M1:**
 - = without
 O = visual, 36 PSI

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
 01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

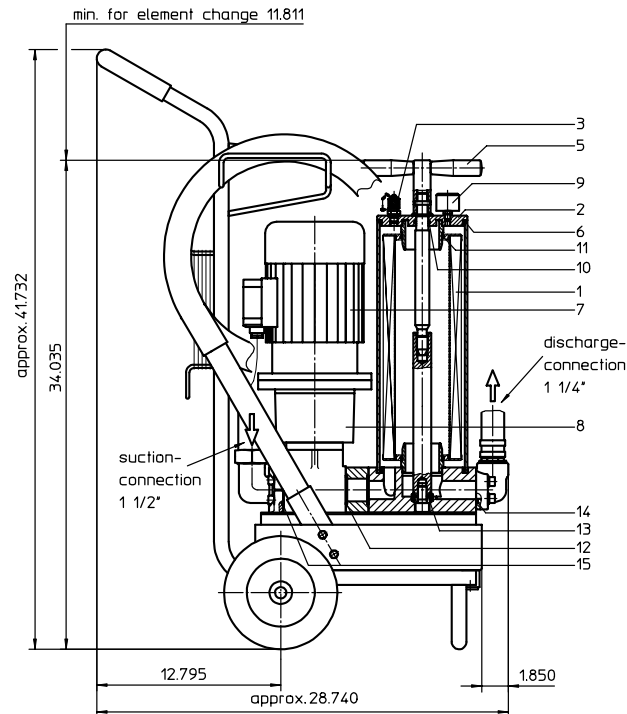
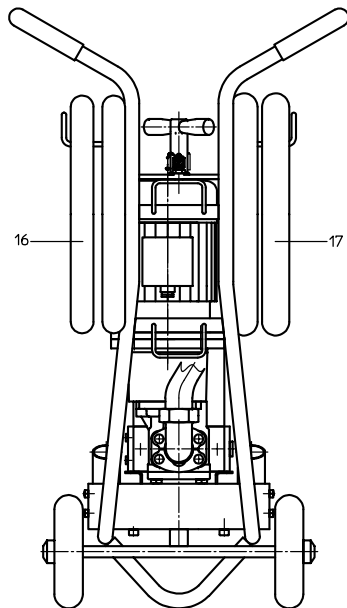
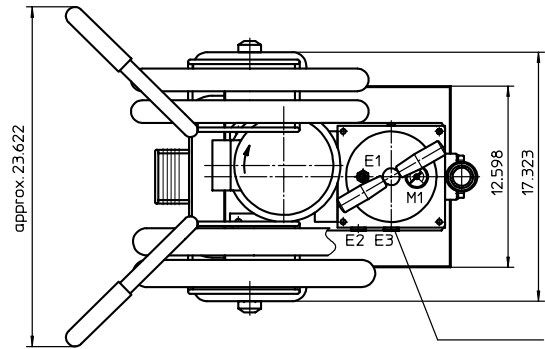
Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side



FILTER UNIT, mobile Series UM 80 58 PSI

Sheet No.
4015 E

1. Type index:

1.1. Filter unit: (ordering example)

UM. 80. 6VG. 10. B. P. -. P04. W09. L01. L05. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

UM = filter unit, mobile

2 nominal size: 80

3 filter-material and filter-fineness:

10 VG = 10 $\mu\text{m}_{(G)}$, 6 VG = 7 $\mu\text{m}_{(G)}$, 3 VG = 5 $\mu\text{m}_{(G)}$, 1 VG = 4 $\mu\text{m}_{(G)}$ Interpor fleece (glass fiber)

10 WVG = 10 $\mu\text{m}_{(G)}$, 3 WVG = 5 $\mu\text{m}_{(G)}$ Watersorp-filter element

4 resistance of pressure difference for filter element:

10 = Δp 10 bar

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM), by agreement

7 filter element specification:

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 pump unit:

P04 = pump unit 04, NG 80.50 (standard-pump unit)

9 motor: (W = alternating current motor)

motor		electrical connection	volume flow	max. viscosity	doc.-no.
W06 ¹⁾	230V	50Hz	18.75 GPM	46-1860 SUS	43056-4
W09 ¹⁾	110V	60Hz	22.45 GPM	46-1860 SUS	43057-4

¹⁾ standard-motor

10 suction connection 1 1/2 " : (see sheet-no. 31961-4)

L01 = hose-lance

L02 = hose-fitting-lance

L03 = hose-lance-protective filter

L04 = hose-fitting-lance-protective filter

11 discharge connection 1 1/4 " : (see sheet-no. 31961-4)

L05 = hose-lance

L06 = hose-fitting-lance

12 clogging indicator at M1:

- = without

O = visual, 36 PSI

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	½ BSPP	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P04	1	NG 80.50	317139
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	37,69 x 3,53	304353 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½ "	1	according to type index	
17	discharge hose 1 ¼ "	1	according to type index	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises: - secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose 1 ½ " and the discharge hose 1 ¼ " are approximately 106 inch long inclusive of the lance.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c). The contamination level of the filter element can be read off from a pressure display in the cover of the filter.

At a pressure >36 PSI (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element. The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 58 PSI.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 58 PSI, the motor-protection-switch cuts the E-motor out.

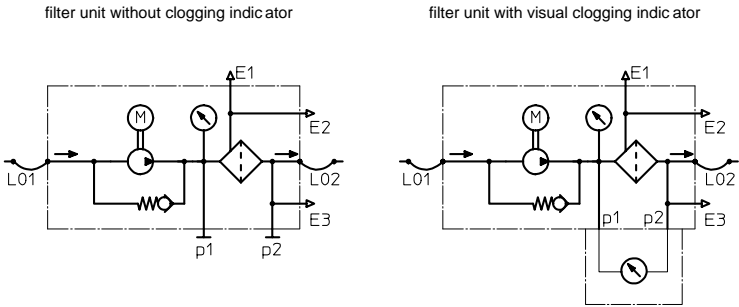
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
oil temperature: +23°F to +140°F
weight: approx. 161 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS,
other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



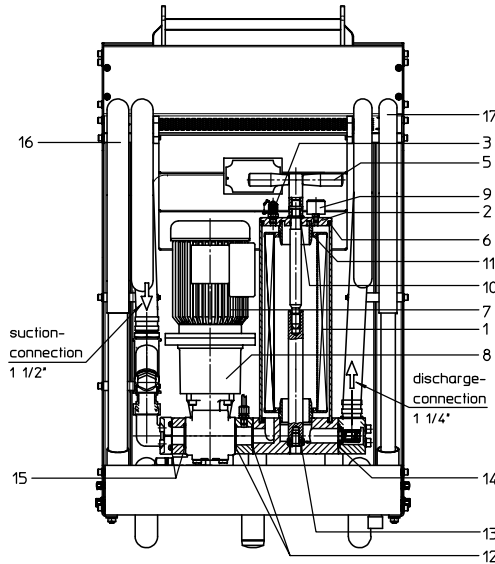
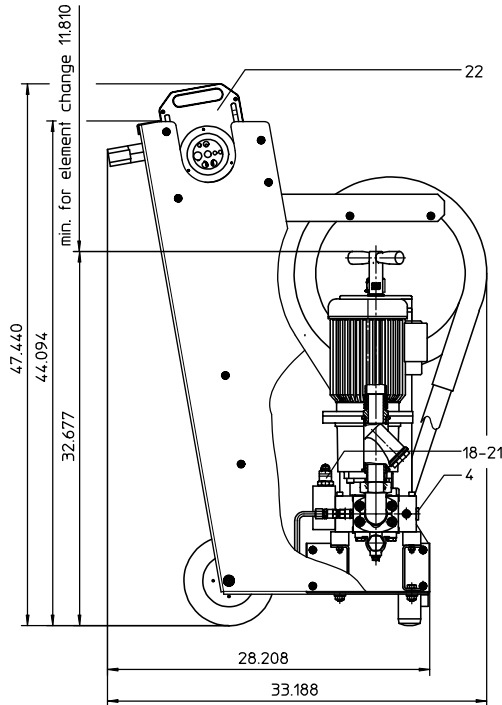
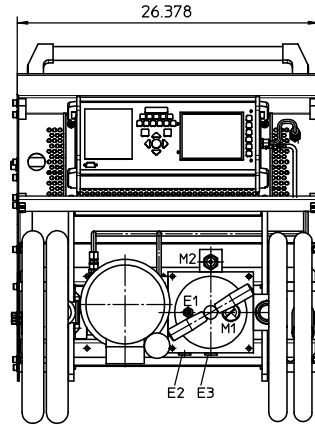
6. Test methods:

Filter elements are tested according to the following ISO standards:

- | | |
|-----------|---|
| ISO 2941 | Verification of collapse/burst resistance |
| ISO 2942 | Verification of fabrication integrity |
| ISO 2943 | Verification of material compatibility with fluids |
| ISO 3723 | Method for end load test |
| ISO 3724 | Verification of flow fatigue characteristics |
| ISO 3968 | Evaluation of pressure drop versus flow characteristics |
| ISO 16889 | Multi-pass method for evaluating filtration performance |

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-232 PSI
M2: measure connection at filter housing, dirt side
 p_1 = dirt side
 p_2 = clean side



FILTER UNIT, mobile for contamination control

Series UMCC 40 116 PSI

Sheet No.
4033

1. Type index:

1.1. Filter unit: (ordering example)

UMCC. 40. 6VG. 10. B. P. -. P30. W09. L03. L28. AOR. CCS2

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

1 series:

UMCC = filter unit, mobile for contamination control

2 nominal size: 40

3 filter-material and filter- fineness:

10 VG = 10 $\mu\text{m}_{(c)}$, 6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$, 1 VG = 4 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu\text{m}_{(c)}$, 3 WVG = 5 $\mu\text{m}_{(c)}$ Watersorp-filter element

4 resistance of pressure difference for filter element:

10 = Δp 145 PSI

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM), by agreement

7 filter element specification:

- = standard

VA = stainless steel

IS06 = see sheet-no. 31601

8 pump unit:

P30 = pump unit 30, NG 40.25 (standard-pump unit)

9 motor: (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W06 ¹⁾	230V	50Hz	9.4 GPM	1860 SUS	43056-4
W09 ¹⁾	110V	60Hz	11.2 GPM	1860 SUS	43057-4

¹⁾ standard-motor

10 suction connection 1 1/2" : (see sheet-no. 31961-4)

L03 = hose-lance-protective filter

L04 = hose-fitting-lance-protective filter

11 discharge connection 1 1/4" : (see sheet-no. 40572-4)

L28 = hose-lance

L29 = hose-fitting-lance

12 clogging indicator at M2:

AOR = visual, Δp 36 PSI, see sheet-no. 1606

AOC = visual, Δp 36 PSI, see sheet-no. 1606

13 contamination control system:

- = without

CCS2 = with contamination control system CCS2

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	BSP 1/2	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P30	1	NG 40.25	326584
9	manometer	1	visual Ø 40	317847
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	2	47,22 x 3,53	305078 (NBR)
16	suction hose 1 1/2"	1	according to type index	
17	discharge hose 1 1/2"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control system	1	CCS2	320595

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm_(c).

At a pressure difference 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 8 bar.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 116 PSI, the motor-protection-switch cuts the E-motor out.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

In order to measure the contamination class of the oil taken in, there is a connection for the electronic particle counter CCS 2 ahead the filter. The CCS 2 is supplied complete with case and extra connection hoses and can also be used separately. When measuring at the mobile filter unit please consider that a change of the measured contamination classes is shown after an adequate operation time only, depending on the total oil volume and its mixing with the filtered oil.

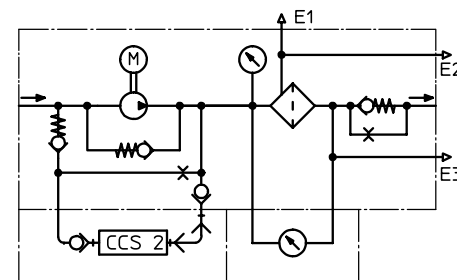
To protect the pump a cleanable coarse filter made of metal wire mesh with mesh size 250 µm is being placed in the suction hose.

4. Technical data:

filter-fineness: 4, 5, 7 or 10 µm_(c)
oil temperature: +23°F to +140°F
weight: approx. 249 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

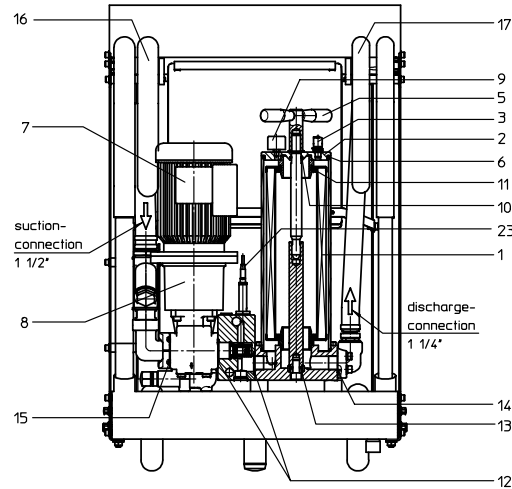
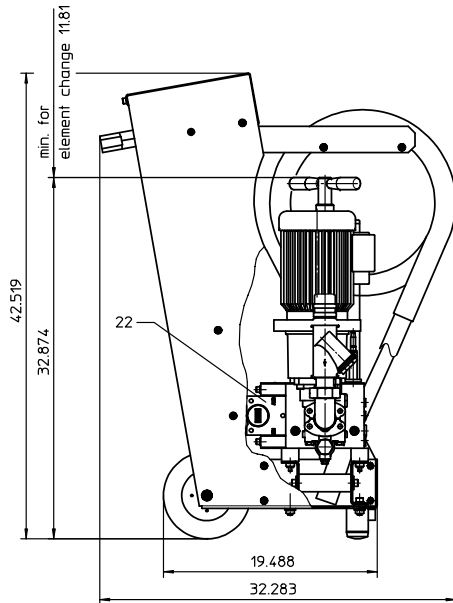
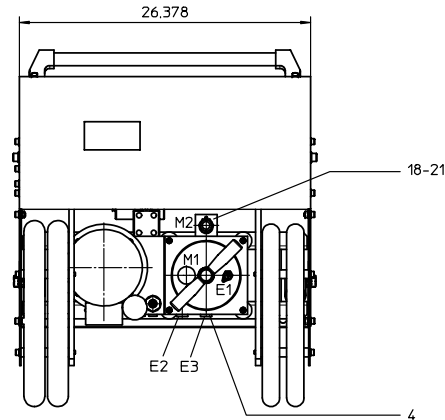
**UMCC 80
not available
for USA**

FILTER UNIT, mobile with fluid control **Series UMFC 41 87 PSI**

Sheet No.
4052

Assignment of connections and functions:

- E1: venting mini-measuring connection, MA.1.ST
see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing, dirt side
p₁ = dirt side
p₂ = clean side



1. Type index:

1.1. Filter unit: (ordering example)

UMFC. 41. 6VG. 10. B. P. -. P44. W04. L03. L05. AOR

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
UMFC = filter unit, mobile with fluid control
- 2 **nominal size:** 41
- 3 **filter-material and filter-fineness:**
10 VG = 10 µm_(G), 6 VG = 7 µm_(G), 3 VG = 5 µm_(G), 1 VG = 4 µm_(G), Interpor fleece (glass fiber)
10 WVG = 10 µm_(G), 3 WVG = 5 µm_(G), Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **pump unit:**
P44 = pump unit 44, NG 40.25 (standard-pump unit)
- 9 **motor: (W = alternating current motor)**

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W27 ¹⁾	230V	50Hz	9.4 GPM	1860 SUS	43412-4
W04 ¹⁾	110V	60Hz	11.2 GPM	1860 SUS	43411-4

¹⁾ standard-motor

- 10 **suction connection 1 1/2" with protective filter:** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter
- 11 **discharge connection 1 1/4" :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting
- 12 **clogging indicator at M2:**
- = without
AOR = visual, Δp 36 PSI, see sheet-no. 1606
AOC = visual, Δp 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	BSPF 1/2	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P44	1	NG 40.25	327963
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 1/2"	1	according to type index	
17	discharge hose 1 1/2"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control sensor	1	PFS 01	327213
23	water analysis- and temperature sensor	1	WSPS 03	326211

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu\text{m}_{(c)}$.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 87 PSI.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 87 PSI, the motor-protection-switch cuts the E-motor out.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

In case of the drawn-off oil the contamination classes can be determined in front of the filter with the contamination control sensor PFS01, with help of the water analysis- and temperature sensor WSPS03 the saturation of the water. With choice of the different operating modes the running filter unit can be switched off manually or, after reaching the given limits for the contamination classes and / or through saturation of the water.

For the protection of the pump there is a cleanable coarse filter made of metal with a mesh size of 250 μm in the suction line.

In order to protect the sensors the unit is being automatically stopped at an oil temperature of approx. 158°F. Measurement of the contamination class with PFS01 can be done at oil temperatures up to 122°F only. Otherwise the sensor will be overheated

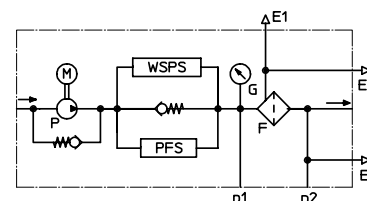
4. Technical data:

filter-fineness: 4, 5, 7 or 10 $\mu\text{m}_{(c)}$
oil temperature: 32°F to 158°F (122°F)
weight: approx. 231 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS, other media on request

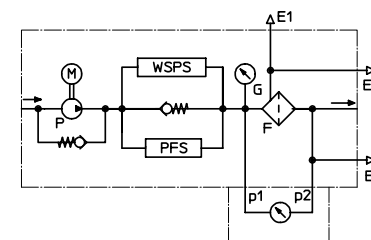
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:

filter unit without clogging indicator



filter unit with clogging indicator
AOR or AOC



6. Test methods:

Filter elements are tested according to the following ISO standards:

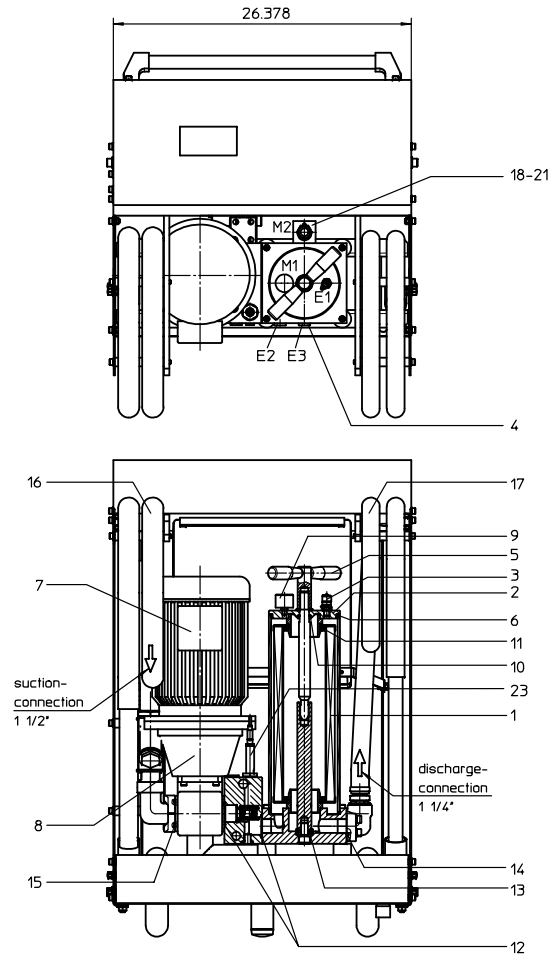
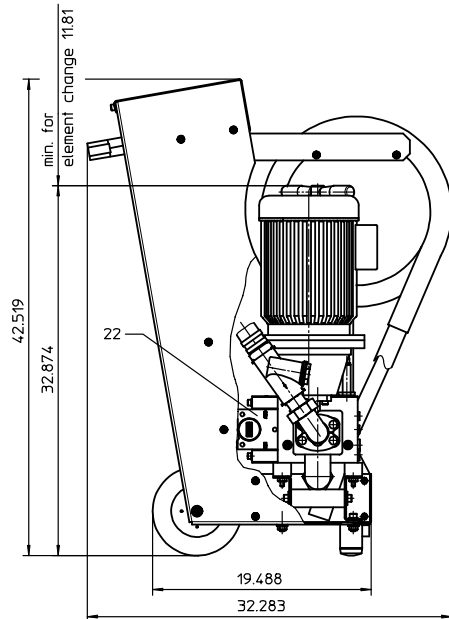
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with fluid control
Series UMFC 81 145 PSI

Sheet No.
4053

Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.ST
 see sheet-no.1650
 E2: drainage of filter, dirt side
 E3: drainage of filter, clean side
 M1: measure connection in the housing cover, dirt side
 M2: measure connection at filter housing, dirt side
 p₁ = dirt side
 p₂ = clean side



Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

UMFC. 81. 6VG. 10. B. P. -. P42. D63. L03. L05. AOR

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 **series:**
UMFC = filter unit, mobile with fluid control
- 2 **nominal size:** 81
- 3 **filter-material and filter-fineness:**
10 VG = 10 µm_(c), 6 VG = 7 µm_(c), 3 VG = 5 µm_(c), 1 VG = 4 µm_(c), Interpor fleece (glass fiber)
10 WVG = 10 µm_(c), 3 WVG = 5 µm_(c), Watersorp-filter element
- 4 **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
- 7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 **pump unit:**
P42 = pump unit 42, NG 80.50 (standard-pump unit)
- 9 **motor: (D = rotary current motor)**

motor	electrical connection	50Hz	volume flow	max. viscosity	doc.-no.
D63 ¹⁾	230/400V	50Hz	9.4 GPM	3720 SUS	43408-4
	230/400V	50Hz	18.7 GPM	1860 SUS	
	265/460V	60Hz	11.2 GPM	3720 SUS	
	265/460V	60Hz	22.5 GPM	1860 SUS	

¹⁾ standard-motor

- 10 **suction connection 1 1/2" with protective filter:** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter
- 11 **discharge connection 1 1/4" :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting
- 12 **clogging indicator at M2:**
- = without
AOR = visual, Δp 36 PSI, see sheet-no. 1606
AOC = visual, Δp 36 PSI, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 **nominal size:** 630
- 3 - 7 see type index-filter unit

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	BSP 1/2	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P42	1	NG 80.50	327962
9	clogging indicator (series)	1	visual 1.57 dia	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 1/2"	1	according to type index	
17	discharge hose 1 1/2"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control sensor	1	PFS 01	327213
23	water analysis- and temperature sensor	1	WSPS 03	326211

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.

The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.

Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu\text{m}_{(c)}$.

At a pressure difference > 36 PSI, the element is polluted and has to be removed with a new element.

The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 145 PSI.

The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 145 PSI, the motor-protection-switch cuts the E-motor out.

The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

In case of the drawn-off oil the contamination classes can be determined in front of the filter with the contamination control sensor PFS01, with help of the water analysis- and temperature sensor WSPS03 the saturation of the water. With choice of the different operating modes the running filter unit can be switched off manually or, after reaching the given limits for the contamination classes and / or through saturation of the water. With changing over of the pole the motor of the unit can be run either with half or full speed, which results in the given working data of item 9 in the order example.

For the protection of the pump there is a cleanable coarse filter made of metal with a mesh size of 250 μm in the suction line.

In order to protect the sensors the unit is being automatically stopped at an oil temperature of approx. 158°F. Measurement of the contamination class with PFS01 can be done at oil temperatures up to 122°F only. Otherwise the sensor will be overheated.

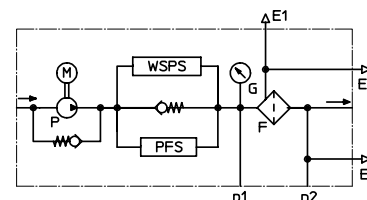
4. Technical data:

filter-fineness: 4, 5, 7 or 10 $\mu\text{m}_{(c)}$
oil temperature: 32°F to 158°F (122°F)
weight: approx. 275 lbs.
operating medium: hydraulic oil based on mineral oil from 46 SUS, other media on request

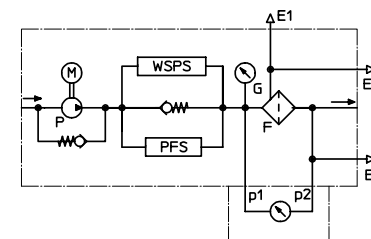
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:

filter unit without clogging indicator



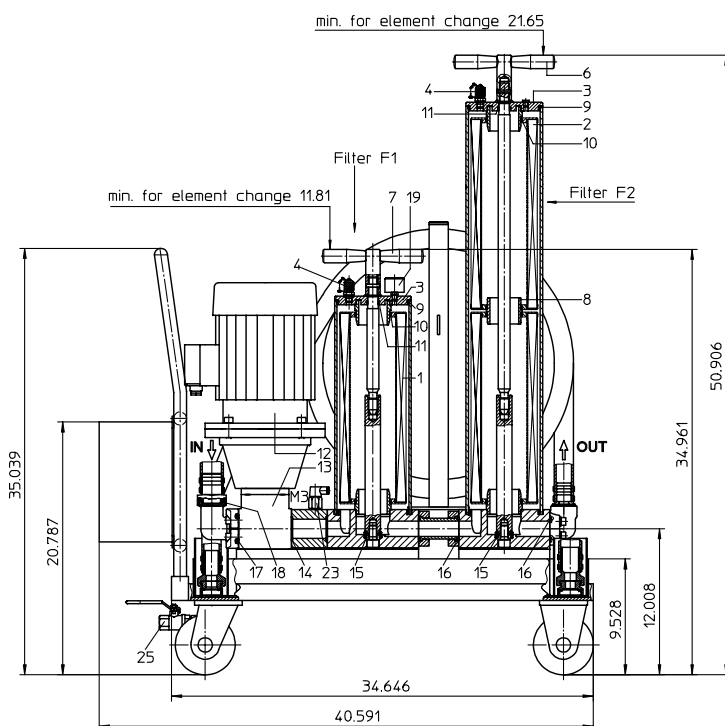
filter unit with clogging indicator
AOR or AOC



6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance



2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630...	
2	watersorp-filter element	2	01NR. 630...	
3	housing cover	2	30600-3	315492
4	mini-measuring connection	2	MA.1.ST	305453
5	screw plug	2	½ BSPP	304678
6	straining screw	1	31078-3	
7	straining screw	1	30595-3	316312
8	Verbindungszapfen	1	20899-4	308842
9	O-ring	2	140 x 6	315392 (NBR)
10	O-ring	2	70 x 4	306253 (NBR)
11	O-ring	2	22 x 3	304387 (NBR)
12	E-motor D 04	1	3.5 HP, 265/460 V	316276
13	pump unit P 09	1	NG 80.50	320268
14	O-ring	2	45 x 3	304991 (NBR)
15	O-ring	2	18 x 3	304359 (NBR)
16	O-ring	3	37,69 x 3,53	304353 (NBR)
17	O-ring	1	47,22 x 3,53	305078 (NBR)
18	O-ring	2	35 x 2,5	308893 (NBR)
19	clogging indicator visual	1	O	304907
20	clogging indicator visual	2	AOR.2.5.P.-	316431
21	O-ring	2	15 x 1,5	315357 (NBR)
22	O-ring	2	22 x 2	304708 (NBR)
23	pressure switch	1	E5.5	306165
24	evacuation connection	2	EE.3.G.ST	310449
25	evacuation connection	1	EE.3.W.ST	310534
26	suction tube 1 ½"	1	31090-4	
27	discharge hose 1 ¼"	1	31108-4	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.

The area of application comprises:

- secondary flow filtration and water separation in addition to the existing operating filter
- secondary flow filtration and water separation without the action of the operating filter
- filtration and water separation when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability. The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.

Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction tube 1 ½" and the discharge hose 1 ¼" are approximately 118 inch long inclusive of the hose coupling.

The device is equipped with a gear pump driven by an electric motor. The flow conveyed by the geared pump is fed over a filter elements to DIN 24550, T4, nominal size 630.

Oil maintenance takes place in two stages via two in-line filters. The filter element in filter F1 ensures removal of the contamination. Depending on the customer requirements, the filter mesh in filter F1 is either 4, 5, 7 or 10µm_(c). Water is separated in filter F2 by means of two parallel-acting water absorption filter elements.

The degree of filter element contamination is indicated on the 4 measurement points M1 to M4.

If the permissible pressure difference of $\Delta p_1 = 36$ PSI is exceeded, the pressure difference is measured via the filter element in filter F1 and the degree of contamination is displayed at measurement point M1.

If the permissible pressure difference of $\Delta p_1 = 36$ PSI is exceeded, the pressure difference is measured via the filter element in filter F2 and the degree of contamination is displayed at measurement point M2.

The sum resulting from pressures $\Delta p_1 + \Delta p_2$ + the discharge pressure is measured at points M3 and M4.

The red sector of the gauge fitted to M4 indicates $p \leq 87$ PSI and so the opening of the bypass valve between the pressure and suction connection of the gear pump.

The pressure switch on M3 operates the electric control which ensures that, when the operating pressure of $p = 73$ PSI is exceeded, the electric motor of the gear pump is switched off.

The filter unit can be operated without supervision, because operational safety is guaranteed by the switching-off function of the pressure switch fitted to M3, the overload protection of the electric motor and the bypass valve in the gear pump. After independent switching off of the filter unit by the pressure switch fitted to M3, the display condition of the pressure switch at M1 and M2 is retained, which indicates that the filter elements must be changed.

After the filter element has been changed, the contamination display at M1 and M2 must be reset manually (see data sheet 1606 for reset function).

The filter element can be changed without tools. After removing the tensioning nut and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

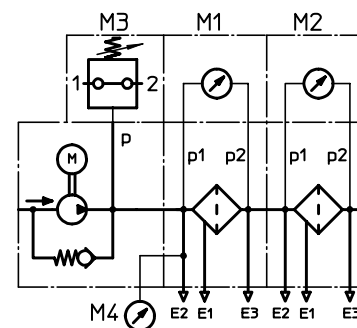
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

pumping capacity:	22.5 GPM at 1700 RPM
E-motor:	3.5 HP, approx. 1700 RPM
rotary current	265/460 V, 60 Hz
pressure load capacity:	max. 87 PSI
filter-fineness:	4, 5, 7 or 10µm _(c)
weight:	approx. 275 lbs.
operating medium:	hydraulic oil based on mineral oil from 46 up to 1860 SUS, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, P ara. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

ASF 25-257

Suction Filter

internormen 
 *technology*



Please contact us for further information

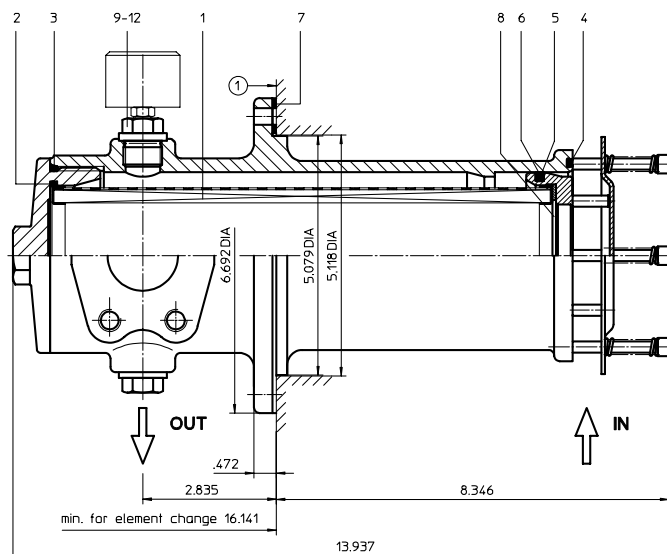
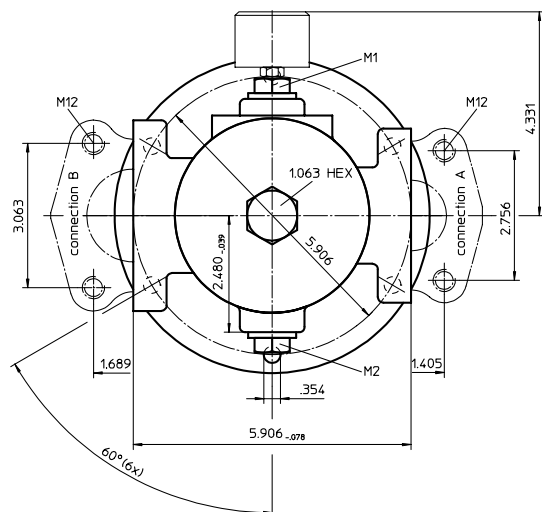
INTERNORMEN *Technology* Inc.

900 Air Park Drive
Zanesville, Ohio 43701

SUCTION FILTER

Series AS 220

Sheet No.
1903 G



1. Type index:

1.1. Complete filter: (ordering example)

AS. 220. 40G. - . B. P. - . FS. 8. - . O1. -

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

AS = suction filter

2 nominal size: 220

3 filter-material and filter-fineness:

80 G = 80 μ m, 40 G = 40 μ m stainless steel wire mesh, other materials on request

4 resistance of pressure difference for filter

- = not specified

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR); V = Viton (FPM)

7 filter element specification:

- = standard; VA = stainless steel

8 connection:

FS = SAE-flange connection 3000 PSI

9 no. of version:

version	7	4	8
connection A type size	-	FS 7	FS 7
connection B type size	FS 8	-	FS 8

type: FS = SAE-flange 3000 PSI

size: - = no connection

7 = 1 1/2"

8 = 2"

10 filter housing specification:

- = standard

11 clogging indicator at M1:

- = without

O1 = visual, see sheet-no. 1616

E4.-0,25 = pressure switch, see sheet-no. 1616

12 clogging indicator at M2:

possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01AS. 220. 40G. - . B. - . -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01AS. = suction filter element according to INTERNORMEN factory specification

2 nominal size: 220

3 - 5, 7 see type index-complete filter

6 sealing material:

- = without

2. Accessories:

- counter flanges, see sheet-no. 1652

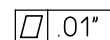
mounting surface



surface quality



flatness tolerance



weight: approx. 10 lbs.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01AS.220		
2	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
3	1	O-ring	88 x 3	304417 (NBR)	310266 (FPM)
4	1	O-ring	96 x 4	305190 (NBR)	308148 (FPM)
5	1	O-ring	78 x 3,5	311610 (NBR)	314696 (FPM)
6	1	sliding ring	20165-4	305194	
7	1	gasket	2 thick	305135	
8	1	sliding ring	20164-4	305199	
9	2	screw plug	½ BSPP	309730	
10	2	gasket	A 21 x 26	309815	
11	1	clogging indicator, visual	O1	see sheet-no. 1616	
12	1	clogging indicator, electrical	E4.-0,25	see sheet-no. 1616	

4. Description:

The filter housing consists of high quality aluminium material.

The filter element consists of a star-shaped pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

The AS-filters are horizontally or vertically mounted to the reservoir and connected directly to the suction-line.

Due to its practical design the suction filter is easy to service. When releasing the filter lid a plate valve closes the suction-inlet of the filter and prevents the return flow of dirt oil to the reservoir, respectively when mounted horizontally the drain of the reservoir is prevented.

After the servicing respectively after changing the element the filter is again ready for operation.

According to the operating condition the filter could be equipped with different accessories (clogging indicators, counter flange etc.).

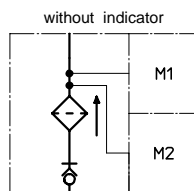
5. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
connection system:	SAE-flange connection 3000 PSI
installation position:	optional
housing material:	G-AlSi10Mgwa DIN 1725 (3.2381.61)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
usable for following fluids:	petroleum-based fluids, lubrication fluids; HW-emulsions and synthetic hydraulic fluids on request
volume tank:	.42 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



visual O1



electrical E4.-0,25



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

8. Test methods:

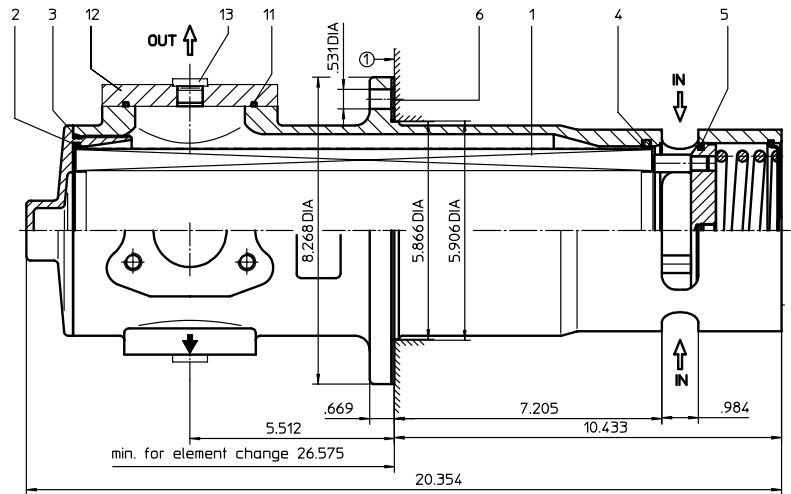
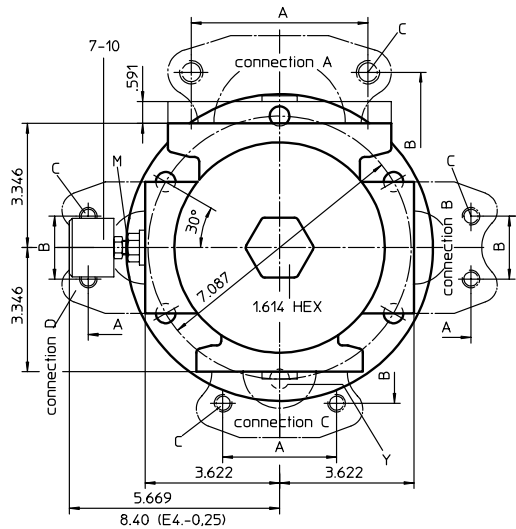
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER

Series AS 632

Sheet No.
1909 F



1. Type index:

1.1. Complete filter: (ordering example)

AS. 632. 40G. -. B. P. -. FS. 11. -. O1

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

1 series:

AS = suction filter

2 nominal size: 632

3 filter-material and filter-fineness:

80 G = 80 µm, 40 G = 40 µm stainless steel wire mesh, other materials on request

4 resistance of pressure difference for filter element:

- = not specified

5 filter element design:

B = both sides open

6 sealing material:

P = Nitrile (NBR); V = Viton (FPM)

7 filter element specification:

- = standard; VA = stainless steel

8 connection:

FS = SAE-flange connection 3000 PSI

9 no. of version:

version	1	5	6	10	11	12	14	21
connection A type size	XY	XY	XY	FS A1	FS A1	FS A1	-	FS A
connection B type size	Y	M	M	FS 8	FS 9	-	FS 8	Y
connection C type size	FS 8	FS 9	FS 9	Y	Y	Y	FS 8	Y
connection D type size	FS 8	FS 9	-	Y	M	M	FS 8	FS 8

type: FS = SAE-flange 3000 PSI

size: 8 = 2"

M = adapter M18 x 1,5 - R 1/8

9 = 2 1/2"

Y = drain M18 x 1,5

A = 3"

X = adapter SAE 3" - M18 x 1,5

A1 = 3 1/2"

- = no connection

10 filter housing specification:

- = standard

11 clogging indicator:

- = without

O1 = visual, see sheet-no. 1616

E4-.025 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01AS. 631. 40G. -. B -. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01AS. = suction filter element according to INTERNORMEN factory specification

2 nominal size: 631

3 - 5, 7 see type index complete filter

6 sealing material:

- = without

2. Dimensions: inch

connection size	2"	2 1/2"	3"	3 1/2"
dimension A	3.07	3.50	4.18	4.76
dimension B	1.69	2.01	2.44	2.76
thread C	M12, .71 deep	M12, .71 deep	M16, .87 deep	M16, .87 deep

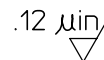
3. Accessories:

- counter flanges, see sheet-no. 1652

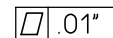
mounting surface



surface quality



flatness tolerance



weight: approx. 26 lbs.

Changes of measures and design are subject to alteration!

4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01AS.631		
2	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
3	1	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	1	O-ring	115 x 5	306640 (NBR)	310287 (FPM)
5	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
6	1	gasket	.078 thick	305160	
7	1	adapter M18 x 1,5 - 1/8 BSPP	30505-4	317114	
8	2	gasket	A18 x 24x1,5	305136	
9	1	clogging indicator, visual	O1	301722	
10	1	clogging indicator, electrical	E4.-0,25	301725	
11	1	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
12	1	adapter SAE 3" - M18 x 1,5	30294-3	317048	
13	1	screw plug	M18 x 1,5	305193	

5. Description:

The filter element consists of a star-shaped pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

The AS-filters are horizontally or vertically mounted to the reservoir and connected directly to the suction-line.

Due to its practical design the suction filter is easy to service. When releasing the filter lid a plate valve closes the suction-inlet of the filter and prevents the return flow of dirt oil to the reservoir, respectively when mounted horizontally the flow out of the reservoir is prevented.

After the servicing respectively after changing the element the filter is again ready for operation.

According to the operating condition the filter could be equipped with different accessories (clogging indicators, counter flange etc.).

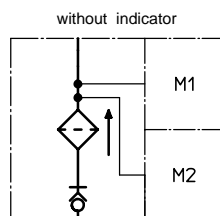
6. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
connection system:	SAE-flange connection 3000 PSI
installation position:	optional
housing material:	AlSi10Mg wa DIN 1725 (3.2381.61)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
usable for following fluids:	petroleum-based fluids, lubrication fluids; HW-emulsions and synthetic hydraulic fluids on request
volume tank:	1.6 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



visual O1



electrical E4



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

9. Test methods:

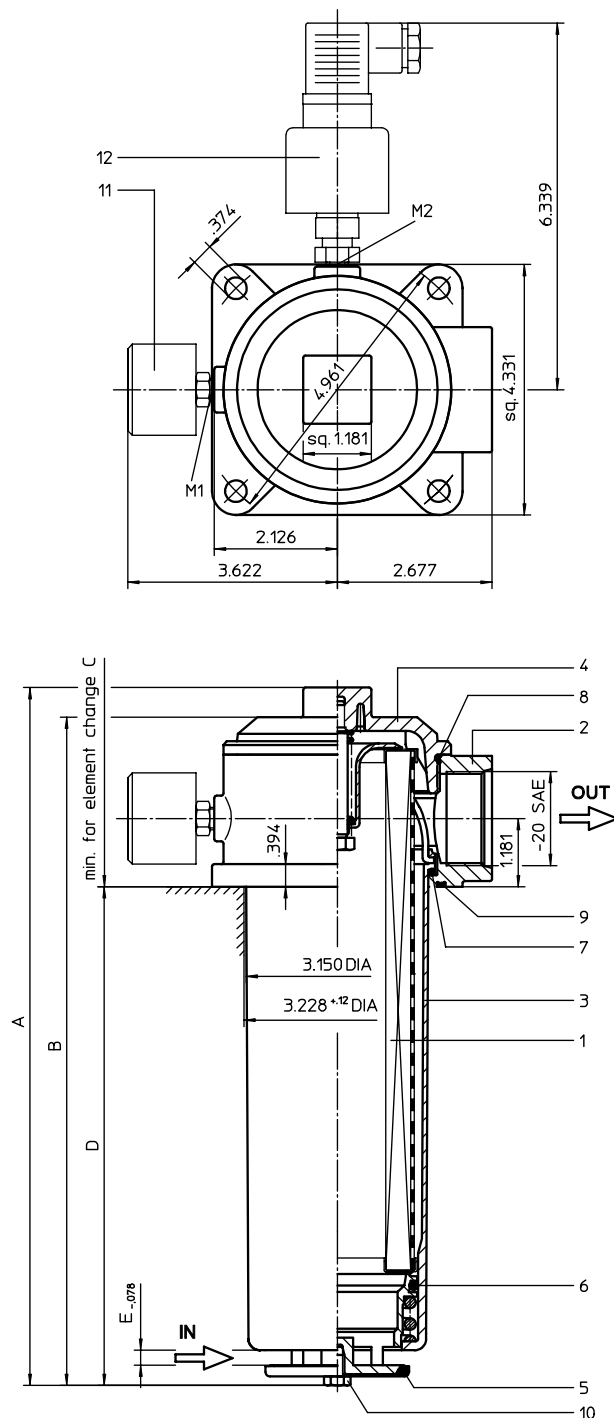
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

SUCTION FILTER, for vertical tank-mounting

Series TS 210 - 310

Sheet No.
1904 H



1. Type index:

1.1. Complete filter: (ordering example)

TS. 210. 10VG. -. B. P. -. UG. 6. -. -. O1. E4

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 **series:**
TS = suction filter for vertical tank-mounting
- 2 **nominal size:** 210, 310
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
- = not specified
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
6 = -20 SAE
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
- 13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS. 210. 10VG. -. B. -. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01TS. = suction filter element according to
INTERNORMEN factory specification
- 2 **nominal size:** 210, 310
- 3 **- 5 , 7** see type index-complete filter
- 6 **sealing material:**
- = without

2. Dimensions: inch

type	connection	A	B	C	D	E	weight lbs.
TS 210	-20 SAE	12.09	11.57	11.42	8.62	.26	5.10
TS 310	-20 SAE	15.47	14.96	14.76	12.00	.30	6.60

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension		article-no.
			TS 210	TS 310	
1	1	filter element	01TS. 210	01TS. 310	
2	1	filter head			304423
3	1	filter bowl			304518.1
4	1	filter cover	M 90 x 2		
5	1	O-ring	53 x 4		309143 (NBR) - (FPM)
6	1	O-ring	62 x 4		308045 (NBR) 311472 (FPM)
7	1	O-ring	75 x 3		302215 (NBR) 304729 (FPM)
8	1	O-ring	82 x 3		305191 (NBR) 305298 (FPM)
9	1	O-ring	88 x 3		304417 (NBR) 310266 (FPM)
10	1	sheet metal screw	B 6,3 x 13		316641
11	1	clogging indicator, visual	O1		301722
12	1	pressure switch, electrical	E4		311016

4. Description:

The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction-area „IN“ must be below the oil level. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents the return flow of dirt oil into the reservoir. For cleaning, the filter bowl together with the filter element can be taken out of the filter head.

5. Technical data:

temperature range:

operating medium:

connection system:

housing material:

sealing material:

installation position:

volume tank TS 210:

TS 310:

+14°F to + 176°F (for a short time + 212°F)

mineral oil, other media on request

thread connection

Al-casting; glass fiber reinforced polyamide

Nitrile (NBR) or Viton (FPM), other materials on request

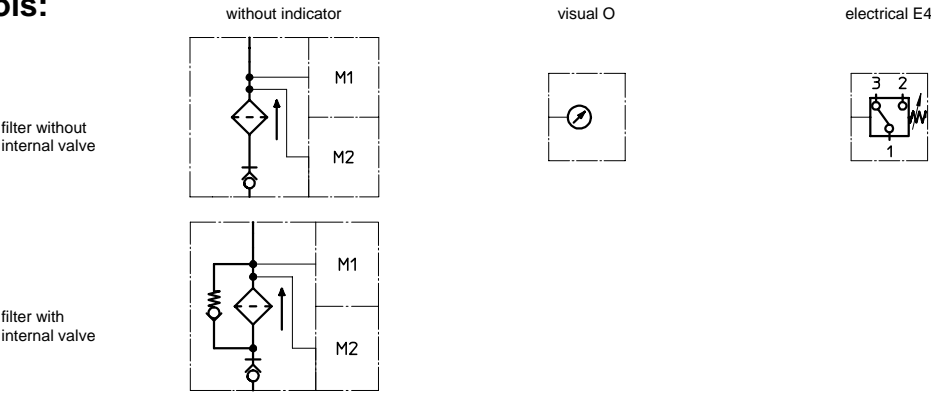
vertical

.30 Gal.

.40 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

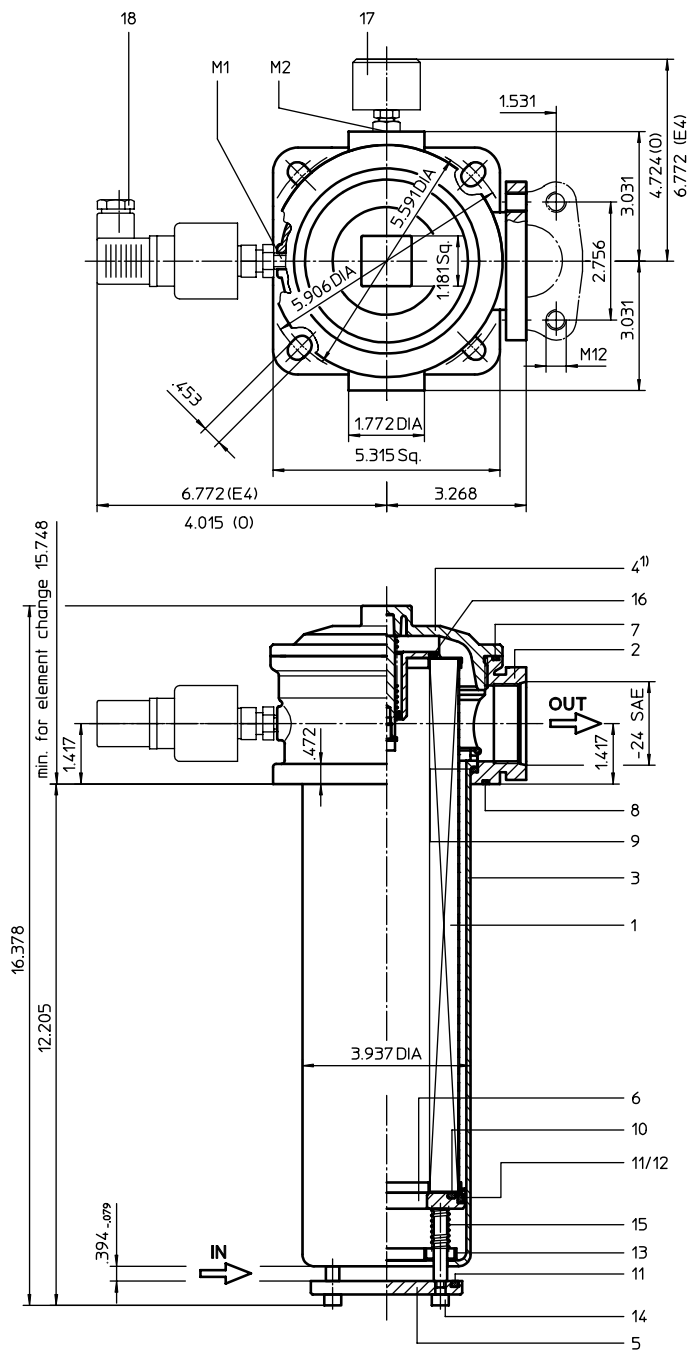
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for vertical tank-mounting

Series TS 426

Sheet No.
1908 D



¹⁾ The bypass valve is integrated in the screw plug. For the filter without a by-pass valve the opening function is raised up to $\Delta p > 14.5 \text{ PSI}$.

1. Type index:

1.1. Complete filter: (ordering example)

TS.426.10VG. -. B. P. -. UG. 7. -. -. E4. 01

1	2	3	4	5	6	7	8	9	10	11	12	13
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- 1 **series:**
TS = suction filter for vertical tank-mounting
- 2 **nominal size:** 426
- 3 **filter-material and filter-fineness:**
80 G = 80 μm , 40 G = 40 μm ,
25 G = 25 μm stainless steel wire mesh
25 VG = 20 $\mu\text{m}_{(c)}$, 16 VG = 15 $\mu\text{m}_{(c)}$, 10 VG = 10 $\mu\text{m}_{(c)}$,
6 VG = 7 $\mu\text{m}_{(c)}$, 3 VG = 5 $\mu\text{m}_{(c)}$ Interpor fleece (glass fiber)
25 P = 25 μm , 10 P = 10 μm paper
- 4 **resistance of pressure for filter element:**
- = not specified
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
UG = thread connection
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
7 = -24 SAE or 1 1/2" SAE
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
- 13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS.425.10VG. -. B. -. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01TS. = suction filter element according to
INTERNORMEN factory specification
- 2 nominal size:** 425
- 3 - 5 , 7** see type index-complete filter
- 6 sealing material:**
- = without

weight: 12.5 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS. 425		
2	1	filter head	NG 426		
3	1	filter bowl	NG 426		
4	1	screw plug with by-pass	M 120 x 3		
	1	screw plug without by-pass	M 120 x 3		
5	1	valve disc		311892	
6	1	valve bushing		307548	
7	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
8	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
10	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
11	2	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
12	1	sliding ring		307547	
13	1	pressure ring		307549	
14	1	fillister head cap screw	M 6 x 60	307534	
15	1	spring	1,6 x 10 x 53 x 12,5	311847	
16	1	O-ring	50 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	O1	301722	
18	1	clogging indicator, electrical	E4	311016	

3. Description:

The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction-area „IN“ must be below the oil level. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents the return flow of dirt oil into the reservoir. For cleaning, the filter bowl together with the filter element can be taken out of the filter head.

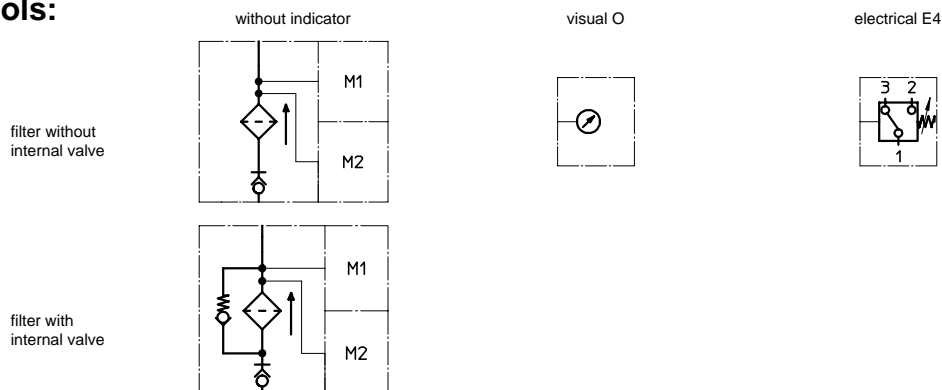
4. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
connection system:	thread connection or SAE-flange connection 3000 PSI
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.70 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

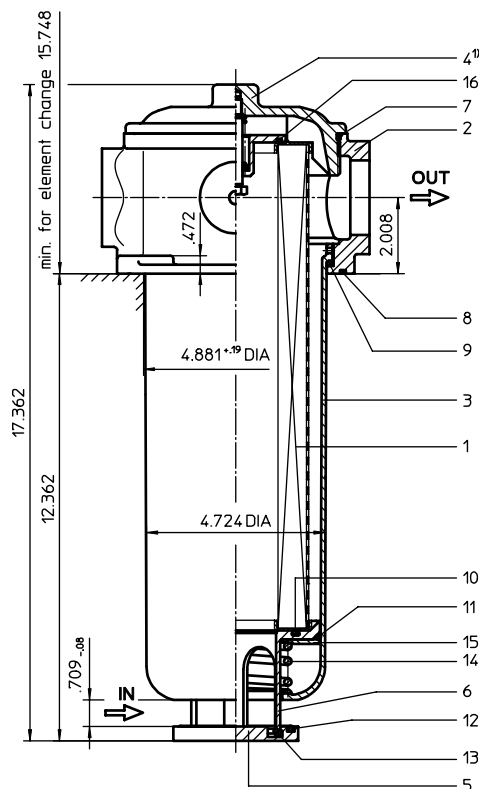
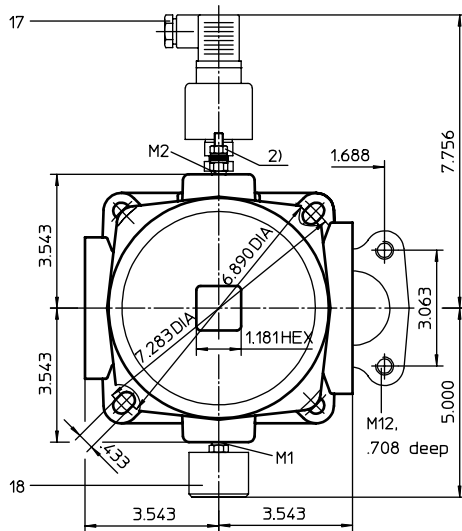
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for vertical tank-mounting

Series TS 625

Sheet No.
1910 C



- 1) The by-pass valve is integrated in the screw plug. For the filter without a by-pass-valve the opening function is raised up to $\Delta p > 14.5$ PSI.
- 2) Connection for the potential equalisation, only for application in the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

TS.625.10VG. - . B. P. - . FS. 8. - . - . O1. E4

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 **series:**
TS = suction filter for vertical tank-mounting
- 2 **nominal size:** 625
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
- = not specified
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
8 = 2"
- 10 **filter housing specification:**
- = standard
IS11 = see sheet-no. 40530
- 11 **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 **measure connection at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
PA = potential equalisation
- 13 **measure connection at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS.625.10VG. - . B. - . -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01TS = suction filter element according to INTERNORMEN factory specification
- 2 **nominal size:** 625
- 3 - 5, 7 see type index-complete filter
- 6 **sealing material:**
- = without

weight: approx. 12 lbs.

Changes of measures and design are subject to alteration!

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS. 625		
2	1	filter head	NG 625		
3	1	filter bowl	NG 625		
4	1	screw plug with by-pass valve	M 140 x 3		
	1	screw plug without by-pass valve	M 140 x 3		
5	1	valve disc		318740	
6	1	valve bushing		318739	
7	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
9	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
10	1	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
11	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
12	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
13	1	snap ring	B 55	311976	
14	1	spring	5,0 x 70 x 117 x 3,5	318742	
15	1	disc		318741	
16	1	O-ring	56 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	E4	311016	
18	1	clogging indicator, electrical	O1	301722	

3. Description:

The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction-area „IN“ must be below the oil level. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents the return flow of dirt oil into the reservoir. For cleaning, the filter bowl together with the filter element can be taken out of the filter head.

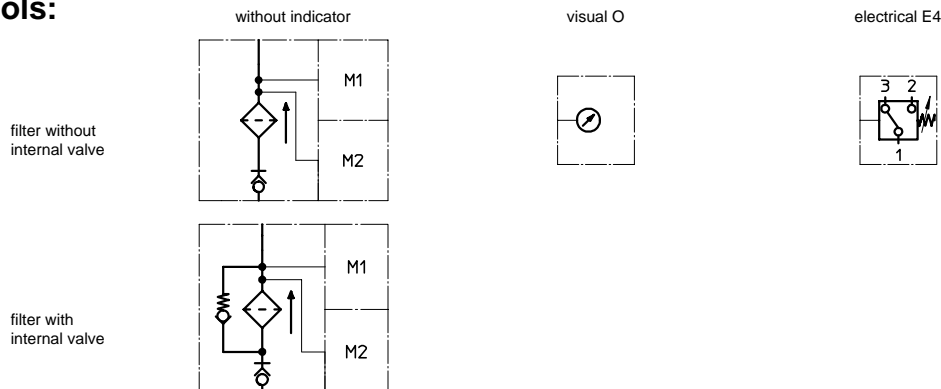
4. Technical data:

temperature range:	+ 14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
connection system:	SAE-flange connection 3000 PSI
housing material:	filter head / screw plug AL, filter bowl glass fiber reinforced polyamide (standard)
	filter head / screw plug GG, filter bowl carbon fiber reinforced polyamide (IS11)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	1.0 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp -curves; depending on filter fineness and viscosity.

7. Test methods:

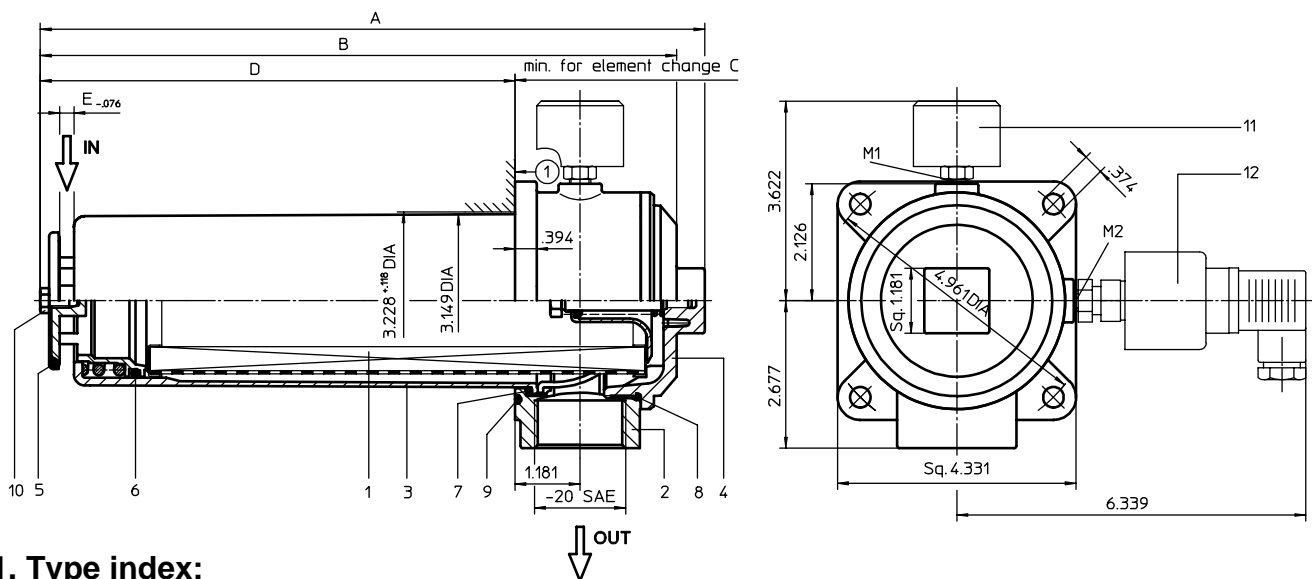
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for horizontal tank-mounting

Series TSW 210 - 310

Sheet No.
1905 G



1. Type index:

1.1. Complete filter: (ordering example)

TSW. 210. 10VG. -. B. P. -. UG. 6. -. -. O1. E4

1	2	3	4	5	6	7	8	9	10	11	12	13
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- 1 **series:**
TSW = suction filter for horizontal tank-mounting
- 2 **nominal size:** 210, 310
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
- not specified
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)
- 7 **filter element specification:**
- = standard VA = stainless steel
- 8 **connection:**
UG = thread connection
- 9 **connection size:**
6 = -20 SAE
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
- 13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS. 210. 10VG. -. B. -. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01TS = suction filter element according to
INTERNORMEN factory specification
- 2 **nominal size:** 210, 310
- 3 - 5, 7 see type index complete filter
- 6 **sealing material:**
- = without

2. Dimensions: inch

type	connection	A	B	C	D	E	weight lbs.
TSW 210	-20 SAE	12.09	11.57	11.42	8.62	.26	5.10
TSW 310	-20 SAE	15.47	14.96	14.76	12.00	.30	6.60

mounting surface $\textcircled{1}$

surface quality $.12 \mu\text{in}$

flatness tolerance $\square .01''$

weight: approx. 6.00 lbs.

Changes of measures and design are subject to alteration!

3. Spare parts:

item	qty.	designation	dimension		article-no.
			TSW 210	TSW 310	
1	1	filter element	01TS. 210	01TS. 310	
2	1	filter head			304423
3	1	filter bowl			304518.1
4	1	filter cover	M 90 x 2		
5	1	O-ring	53 x 4		309143 (NBR) - (FPM)
6	1	O-ring	62 x 4		308045 (NBR) 311472 (FPM)
7	1	O-ring	75 x 3		302215 (NBR) 304729 (FPM)
8	1	O-ring	82 x 3		305191 (NBR) 305298 (FPM)
9	1	O-ring	88 x 3		304417 (NBR) 310266 (FPM)
10	1	sheet metal screw	B 6,3 x 13		316641
11	1	clogging indicator, visual	O1		301722
12	1	pressure switch, electrical	E4		311016

4. Description:

The TSW-filters are directly mounted to the reservoir and connected to the suction-line. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

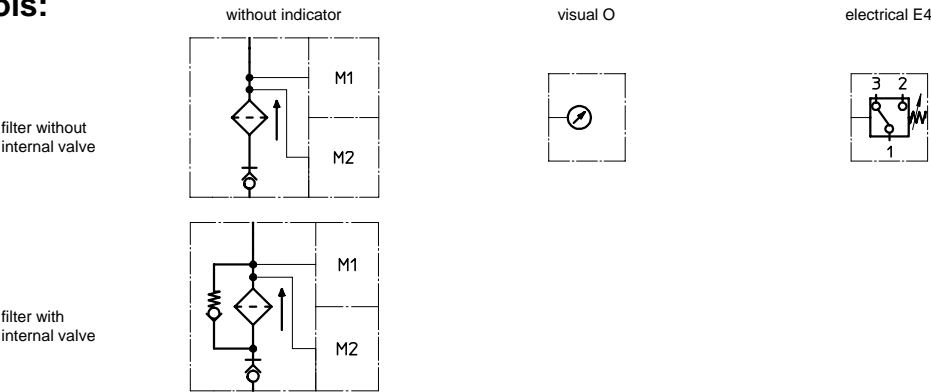
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents the return flow of dirt oil into the reservoir. For cleaning, the filter bowl together with the filter element can be taken out of the filter head.

5. Technical data:

temperature range:	+14°F to + 176°F (for a short time + 212°F)
operating medium:	mineral oil, other media on request
connection system:	thread connection
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank TSW 210:	.30 Gal.
TSW 310:	.40 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves: Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

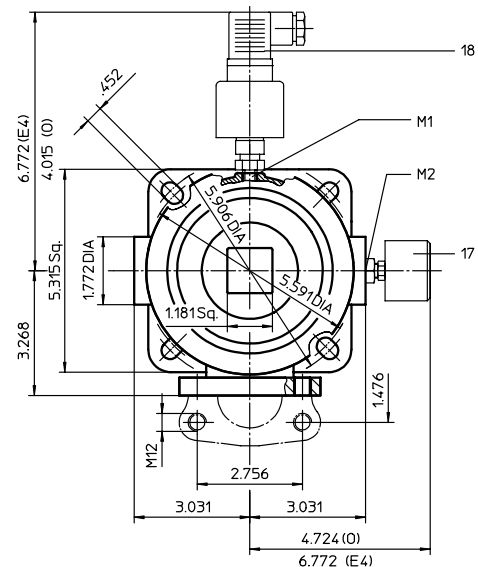
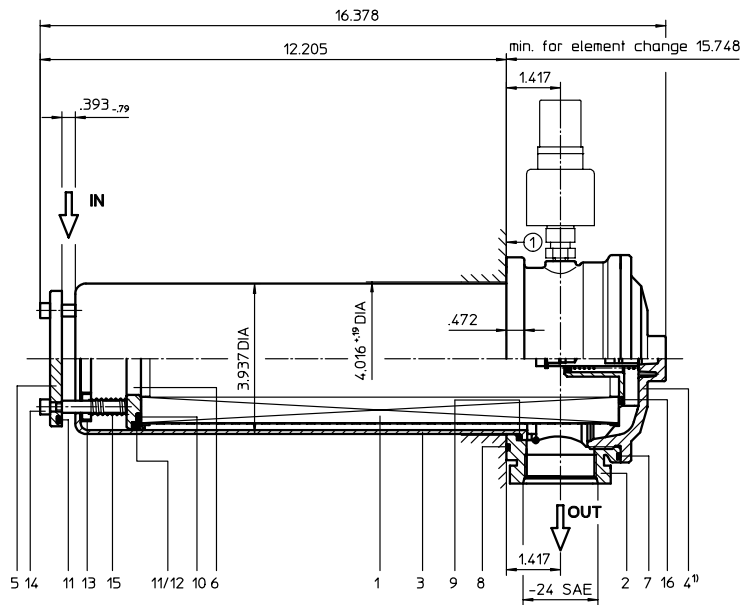
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for horizontal tank-mounting

Series TSW 426

Sheet No.
1906 D



1. Type index:

1.1. Complete filter: (ordering example)

TSW.426.10VG. -. B. P. -. UG. 7. -. -. E4. O1

1	2	3	4	5	6	7	8	9	10	11	12	13
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- 1 **series:**
TSW = suction filter for horizontal tank-mounting
- 2 **nominal size:** 426
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 25 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
- = not specified
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR); V = Viton (FPM)
- 7 **filter element specification:**
- = standard; VA = stainless steel
- 8 **connection:**
UG = thread connection
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
7 = -24 SAE or 1 1/2" SAE
- 10 **filter element specification:**
- = standard
- 11 **internal valve:**
- = without; S = with by-pass valve Δp 4.1 PSI
- 12 **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
- 13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS.425.10VG. -. B. -. -

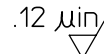
1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01TS. = suction filter element according to
INTERNORMEN factory specification
- 2 **nominal size:** 425
- 3 - 5, 7 see type index complete filter
- 6 **sealing material:**
- = without

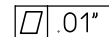
mounting surface



surface quality



flatness tolerance



¹⁾ The by-pass valve is integrated in the screw plug. For the filter without a by-pass-valve the opening function is raised up to $\Delta p > 14.5$ PSI.

weight: 12.5 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS. 425		
2	1	filter head	NG 426		
3	1	filter bowl	NG 426	303732	
4	1	screw plug with by-pass	M 120 x 3	313455	
	1	screw plug without by-pass	M 120 x 3	313649	
5	1	valve disc		311892	
6	1	valve bushing		307548	
7	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
8	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
10	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
11	2	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
12	1	sliding ring		307547	
13	1	pressure ring		307549	
14	1	fillister head cap screw	M 6 x 60	307534	
15	1	spring	1,6 x 10 x 53	311847	
16	1	O-ring	50 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	O1	301722	
18	1	clogging indicator, electrical	E4	311016	

3. Description:

The TSW-filters are directly mounted to the reservoir and connected to the suction-line. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils. Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents leakage of fluid out of the tank. Filter element can removed from filter pot for cleaning purposes.

4. Technical data:

temperature range:

+14°F to +80°F (for a short time + 212°F)

operating medium:

mineral oil, other media on request

connection system:

thread connection or SAE-flange connection 3000 PSI

housing material:

Al-casting; glass fibre reinforced polyamide

sealing material:

Nitrile (NBR) or Viton (FPM), other materials on request

installation position:

horizontal

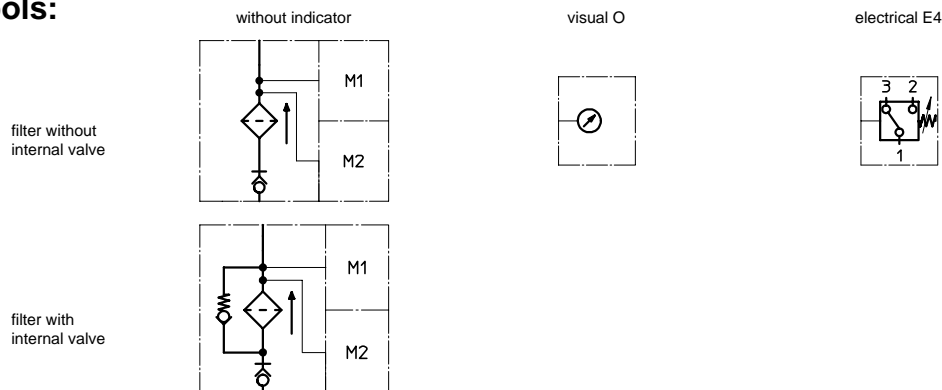
volume tank:

.70 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp -curves ; depending on filter fineness and viscosity.

7. Test methods:

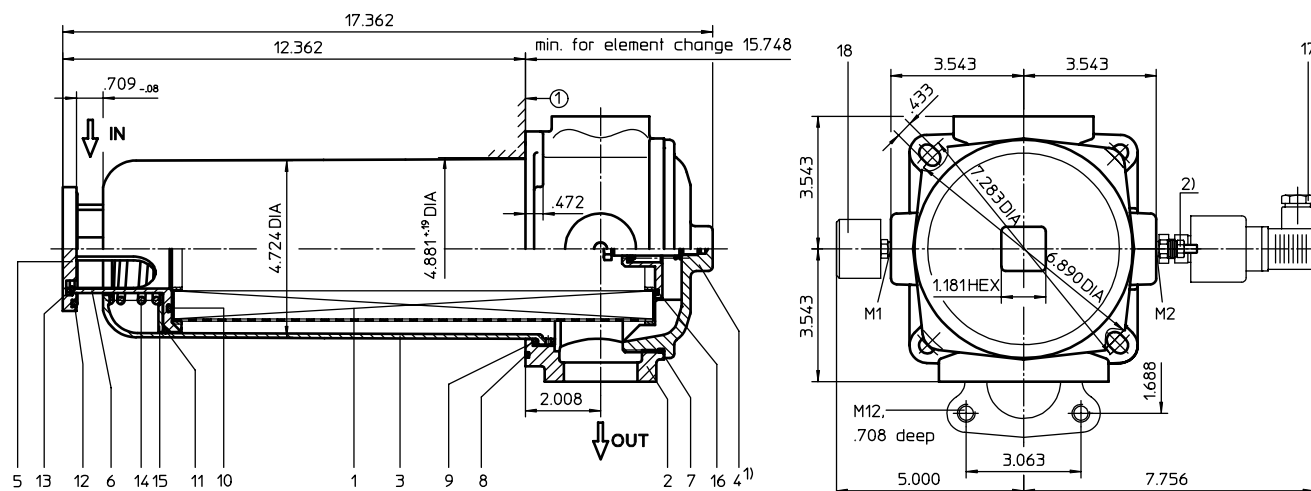
Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for horizontal tank-mounting

Series TSW 625

Sheet No.
1911 C



1. Type index:

1.1. Complete filter: (ordering example)

TSW. 625. 10VG. -. B. P. -. FS. 8. -. -. O1. E4

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 **series:**
TSW = suction filter for horizontal tank-mounting
- 2 **nominal size:** 625
- 3 **filter-material and filter-fineness:**
80 G = 80 μ m, 40 G = 40 μ m,
25 G = 25 μ m stainless steel wire mesh
25 VG = 20 μ m_(c), 16 VG = 15 μ m_(c), 10 VG = 10 μ m_(c),
6 VG = 7 μ m_(c), 3 VG = 5 μ m_(c) Interpor fleece (glass fiber)
25 P = 25 μ m, 10 P = 10 μ m paper
- 4 **resistance of pressure difference for filter element:**
- = not specified
- 5 **filter element design:**
B = both sides open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **connection:**
FS = SAE-flange connection 3000 PSI
- 9 **connection size:**
8 = 2"
- 10 **filter element specification:**
- = standard
IS11 = see sheet-no. 40530
- 11 **internal valve:**
- = without;
S = with by-pass valve Δp 4.1 PSI
- 12 **measure connection at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
PA = potential equalisation
- 13 **measure connection at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS. 625. 10VG. -. B. -. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
01TS. = suction filter element according to
INTERNORMEN factory specification
- 2 **nominal size:** 625
- 3 - 5, 7 see type index complete filter
- 6 **sealing material:**
- = without

mounting surface ①

surface quality $\sqrt{12 \mu\text{in}}$

flatness tolerance $\square .01''$

1) The by-pass valve is integrated in the screw plug. For the filter without a by-pass-valve the opening function is raised up to $\Delta p > 14.5$ PSI.

2) Connection for the potential equalisation, only for application in the explosive area.

weight: approx. 12 lbs.

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS.625		
2	1	filter head	NG 625		
3	1	filter bowl	NG 625		
4	1	screw plug with by-pass valve	M 140 x 3		
	1	screw plug without by-pass valve	M 140 x 3		
5	1	valve disc		318740	
6	1	valve bushing		318739	
7	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
9	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
10	1	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
11	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
12	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
13	1	snap ring	B 55	311976	
14	1	spring	5,0 x 70 x 117 x 3,5	318742	
15	1	disc		318741	
16	1	O-ring	56 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	E4	311016	
18	1	clogging indicator, electrical	O1	301722	

3. Description:

The TSW-filters are directly mounted to the reservoir and connected to the suction-line. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 µm_(c) are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents leakage of fluid out of the tank. Filter element can removed from filter pot for cleaning purposes.

4. Technical data:

temperature range:

operating medium:

connection system:

housing material:

sealing material:

installation position:

volume tank:

+ 14°F to + 176°F (for a short time + 212°F)

mineral oil, other media on request

SAE-flange connection 3000 PSI

filter head / screw plug AL, filter bowl glass fiber reinforced polyamide (standard)

filter head / screw plug GG, filter bowl carbon fiber reinforced polyamide (IS11)

Nitrile (NBR) or Viton (FPM), other materials on request

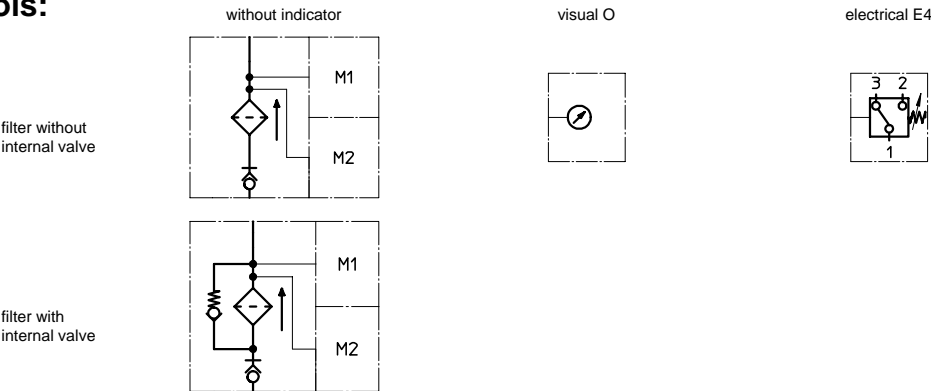
horizontal

1.0 Gal.

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.

Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

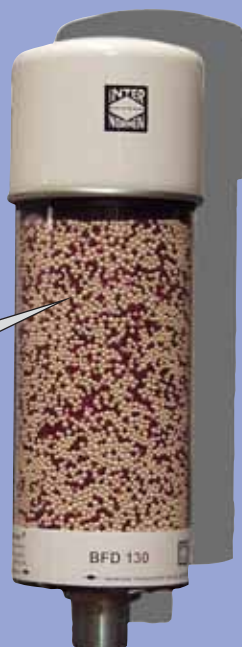
- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

INTERNORMEN

Desiccant Air Breathers



available with
indicator FMI



Monitoring by



colour change

Characteristics

- Available in 4 sizes
- Refillable with drying agent
- Available with adapter and filter minder (contamination indicator)
- Replacement spin-on air filter separately available
- Seal and plastic plug to prevent moisture entering before installation

Advantages

Protects expensive equipment, increase operation efficiency and reduces maintenance cost by:

- Eliminating corrosion
- Extending life of hydraulic lubrication and process fluids
- Minimizing component wear, downtime and repairs
- Eliminating oil oxidation, additive depletion and freezing
- Extending oil filter life

Unique filtration process

Moisture and particulate accumulation are major factors of oil contamination in industrial equipment. Neglected, these detriments restrict equipment efficiency, causing machine downtime and significant expense in replacement oil, parts and repair labour.

INTERNORMEN BFD series breathers incorporate a proven, field tested design. They prevent water and contaminants from entering fluid reservoirs as differential pressures occur through thermal expansion and contraction of the fluid, or during the filling or emptying process.

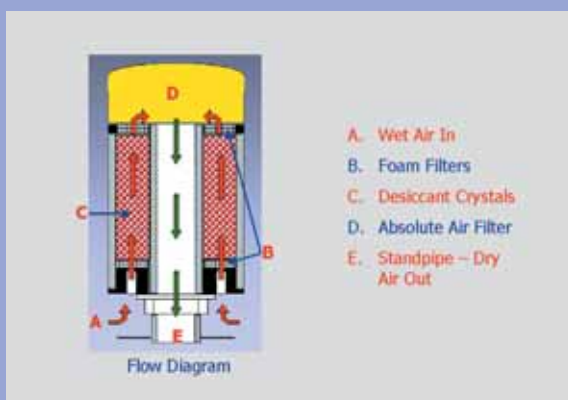
Manufactured with a hygroscopic agent, *INTERNORMEN* BFD series breathers utilize the entire filter area, and have the capability of extracting water vapor from the air as it is drawn through the unit.

Accompanying solid particulate is then removed by a 3µm absolute glass filter, allowing only clean, dry air to enter the system.

Applications

- Hydraulic Systems – all types
- Bearing Circulating Systems
- Mobile Earthmoving Equipment
- Gearboxes
- Robotic Hydraulic Equipment
- Mobile Tanksystems
- Diesel Fuel Storage Tanks
- Transformer with Oil Cooled Design
- Vacuum- and Welding Chambers
- Agricultural Equipment

Principle of function



Fluid Purifier IFPM 31 with
Desiccant Air Breather BFD 95



Technical Data

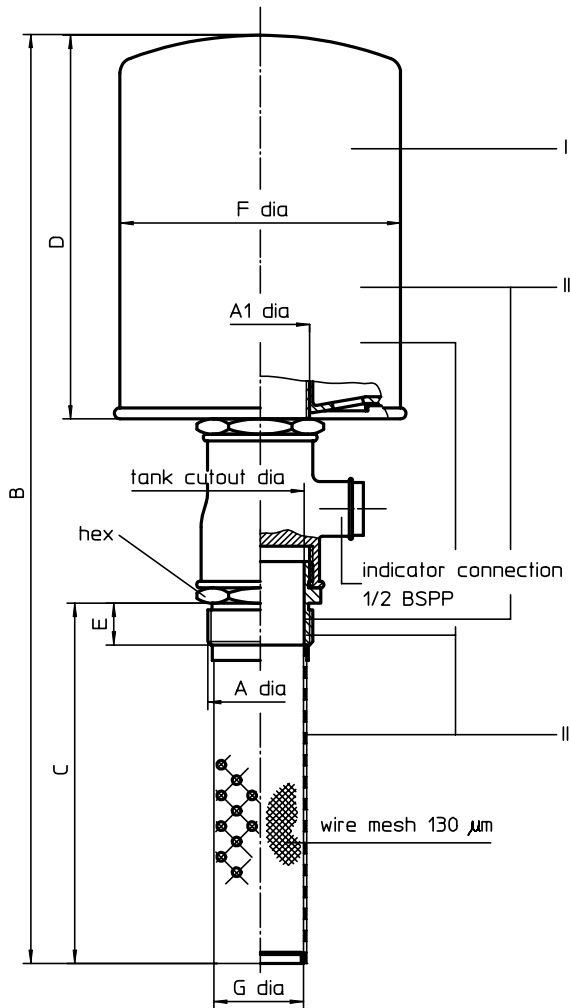
Data sheet no.: 6003

	BFD-95	BFD-100	BFD-125	BFD-130
Max. rate of air flow (m ³ /min)	0.5	0.5	1.25	1.25
Air filter micron rating (µm)	3	3	3	3
Weight (g)	1000	1320	2950	4300
Connection thread (BSP)	G ¾	G ¾	G 1 ¼	G 1 ¼
Silicagel filling weight (g)	225	450	750	1500
Max hygroscopicity (g)	86,5	173	288	576

FILLER-BREATHER FILTER

Series BF-WP 45-90

Sheet No.
6000 O1



1. Type index:

1.1. Complete filter: (ordering example)

BF-WP.90. 10P. P. G. 7. III. C

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

- 1 **series:**
BF-WP = air filter, filler breather
- 2 **nominal size:** 45, 90
- 3 **filter-material and filter-fineness:**
10P = 10μm paper
- 4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 5 **connection:**
G = thread connection
- 6 **connection size:**
5 = 1 BSPP; (size 45)
7 = 1 ½ BSPP; (size 90)
- 7 **execution:**
I = only air filter
II = only air filter with double nipple
III = complete as shown with filler filter 130 μm
- 8 **tank weld coupling:**
- = without
C = with tank weld coupling (only for assemblies with clogging indicator consult factory)

1.2. Filter element: (ordering example)

01WP. 90. 10P. P

1	2	3	4
---	---	---	---

- 1 **series:**
WP = spin-on cartridge
- 2 - 4 see type index-complete filter

2. Technical data/Performance:

filler wire screen = 130μm

type	air flow in GPM
	10P
BF-WP 45	120
BF-WP 90	300

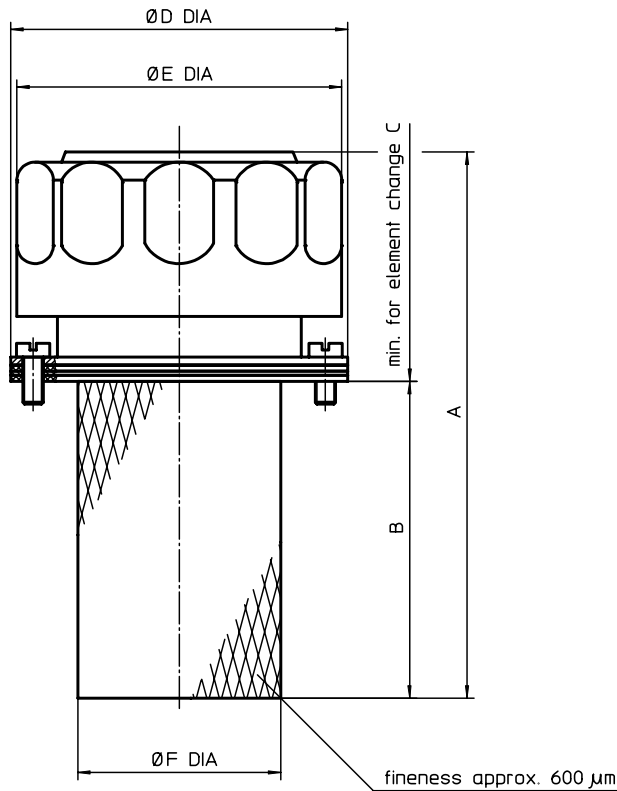
3. Dimensions: inch

type	hex	A	A1	tank cutout DIA	B	C	D	E	F	G	weight lbs.
BF-WP 45	1.61	1 BSPP	¾ BSPP	1.62	13.18	4.72	5.70	.70	3.62	1.10	1.76
BF-WP 90	2.16	1 ½ BSPP	1 ¼ BSPP	2.18	16.14	6.49	6.88	.78	5.03	1.65	2.20

BREATHER FILTER

Series EBF 30 and 50 - Bayoner Design

Sheet No.
6002 C



1. Type index:

1.1. Complete filter: (ordering example)

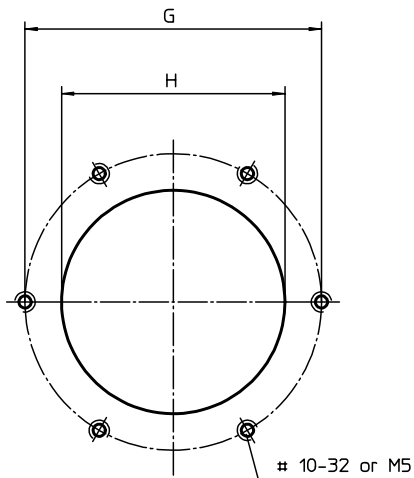
EBF. 50. 10P. V1

1	2	3	4
---	---	---	---

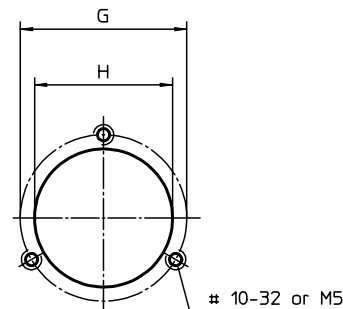
- 1 **series:**
EBF = breather filter
- 2 **nominal size:** 30, 50
- 3 **filter-material and filter-fineness:**
10 P = 10 µm paper
- 4 **internal valve:**
- = without
V1 = preload valve 5 PSI ± 10 %, only for nominal size 50 available

Material:

filter cap: steel, nickel plated
filter flange: steel, nickel plated
filter screen: steel, galvanized



reservoir cutout EBF 50



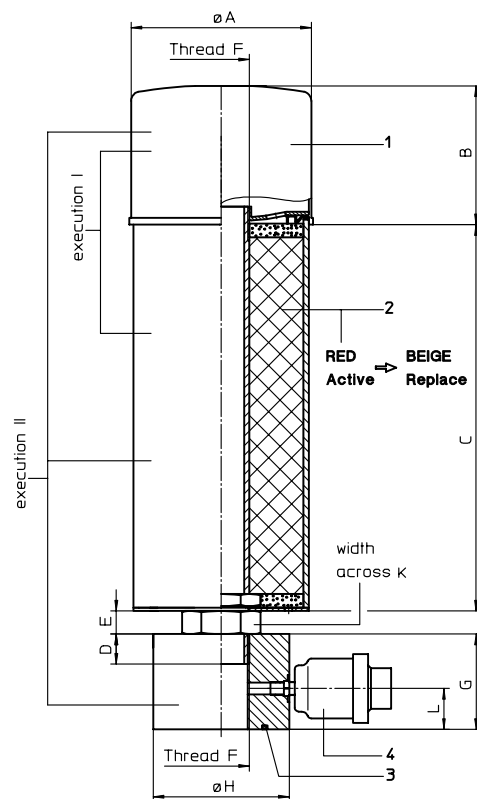
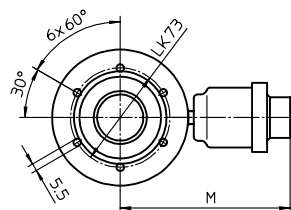
reservoir cutout EBF 30

2. Dimensions: inch

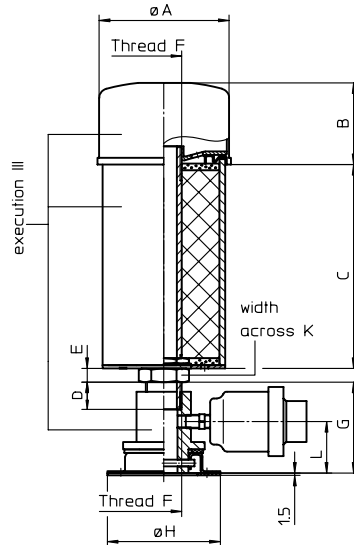
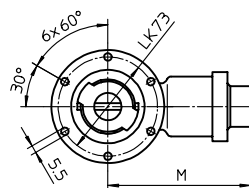
type	A	B	C	D	E	F	G	H	Q1	Q2	weight lbs.
EBF 30	4.37	2.48	3.14	2.04	1.81	1.14	1.61	1.34	52	80	.22
EBF 50	5.28	3.07	3.94	3.26	3.14	1.96	2.87	2.16	158	265	.66

Q1 = Gallon at Δp of .145 PSI
Q2 = Gallon at Δp of .435 PSI

BFD 95, 100, 125, 130 execution II



BFD 95, 100 execution III



2. Dimensions:

Type	execution	A	B	C	D	E	F	G	H	K	L	M	weight (g)
BFD 95	I	95	60	90	20	10	G ¾	-	-	32	-	-	1150
BFD 100	I	125	102	150	30	10	G 1 ¼	-	-	50	-	-	1400
BFD 125	I			145									3400
BFD 130	I			255									4300
BFD 95	II	95	60	90	20	10	G ¾	50	88	32	30	119	1350
BFD 100	II			150									1600
BFD 125	II	125	102	145	30	10	G 1 ¼	70	100	50	30	125	4600
BFD 130	II			255									5500
BFD 95	III	95	60	90	20	10	G ¾	67	83	32	38	105	1450
BFD 100	III			150									1700

BREATHER FILTER

Series BFD 95-130

Sheet No.
6003 C

1. Type index:

1.1. Complete filter: (ordering example)

BFD. 95. 3VL. P. G. 4. II. FMI

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

- 1 **series:**
BFD = Silicagel Desiccant breather
- 2 **nominal size:** 95, 100, 125, 130
- 3 **filter-material and filter-fineness:**
3VL = filtration efficiency D 100 = 3
- 4 **sealing material:**
P = Nitrile (NBR)
- 5 **connection:**
G = threaded connection (BSPP)
- 6 **connection size:**
4 = G ¾ (size 95, 100)
6 = G 1 ¼ (size 125, 130)
- 7 **execution:**
I = without adapter
II = with adapter AP1 (only for size 95, 100) or
with adapter AP2 (only for size 125, 130)
III = with adapter AP3 to retrofit EBF.50 (only for size 95, 100)
- 8 **clogging indicator:**
- = without
FMI = filter minder (only for execution II and III)

1.2. Filter element: (ordering example)

01WP. 95/100. 3VL. P

1	2	3	4
---	---	---	---

- 1 **series:**
01WP = spin-on cartridge
- 2 **nominal size:** WP 95/100 (for BFD 95, 100)
WP 125/130 (for BFD 125, 130)
- 3 - 4 see Type index-complete filter

1.3. Replacement Gel: (ordering example)

RG. 95

1	2
---	---

- 1 **series:**
RG = Replacement Gel
- 2 **nominal size:** 95, 100, 125, 130

Changes of measures and design are subject to alteration!

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	spin-on cartridge	1	01WP....	
2	replacement gel	1	RG....	
3	O-ring	1	47,22 x 3,53	305078 (NBR)
4	clogging indicator	1	FMI	

3. Description:

3.1 Condensation in reservoirs:

When the reservoir breathers, air containing water vapor is ingested into the system. Temperature fluctuations will cause the water vapor to condense. This condensed Water will speed up the oxidation of the oil and lead to damage in the machine. The Catalytic action of metal particles present in the contamination process speeds up Both these processes. The air conditioner first dries the air as it passes through the Silica gel granules and the dry air passes through a 3 micron rated synthetic Media element to remove any solid contamination particles.

The expelled air reaches the atmosphere via the same route but in the opposite direction.

Air Driver - As moisture is absorbed, the silica gel granules will gradually change color from a deep red to beige. When the granules are beige, replace the silica gel.

3.2 Mounting:

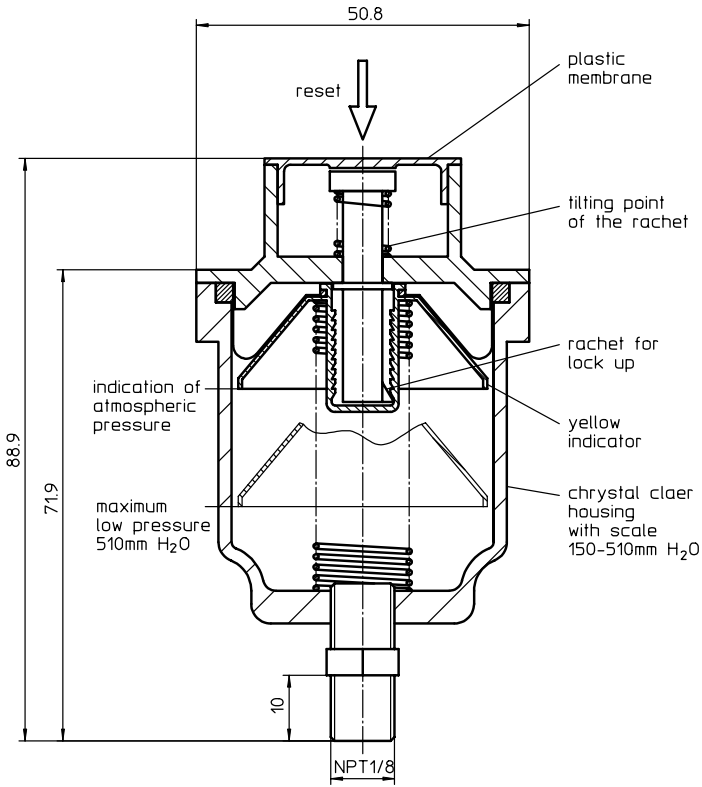
Direct mount onto the reservoir or use an adaptor plate which fits the standard 6-bolt pattern for filler breathers. Remove protective covering from silica gel inlet holes before installation.

4. Technical data:

Type	max. Volume flow (m³/min)	max. hygroscapacity (g)	Silica gel filling weight (g)
BFD 95	0,5	86,5	225
BFD 100	0,5	173	450
BFD 125	1,25	288	750
BFD 130	1,25	576	1500

5. Filter minder: (ordering example)

FMI = filter minder



5.1 Description:

Air Filter -The adaptor plate has a connection for the „filter minder“. This gives a static indic ation of the air breather. The unit can be reset when the element is Changed.

Retrofitting Filter Systems for Permanent Off-Line Filtration at Wind Power Gears



**US 10 with
control unit**



**US 10 without
control unit**



INTERNORMEN

The Twinfil-Filter System



World Wide Competence

The best is just good enough.



The Twinfil-Filter System



Experimental trial of the cold start course for a lubrication system of a windpower gear at *INTERNORMEN Technology GmbH*

The lubrication systems for gears in mechanical energy transfer systems have to accomplish the following functions :

- Reliable supply of all lubricating points of the gear
- Low external energy demand of the lubrication system
- Proper reduction of the heat energy generated in the gear
- Reliable filtration of the contamination mainly due to wear by friction within the gear
- Deaeration of the lubrication system, specially during start-up and also during normal operation
- Low noise emission of the lubrication system
- Simple service
- Indication of the state of operation

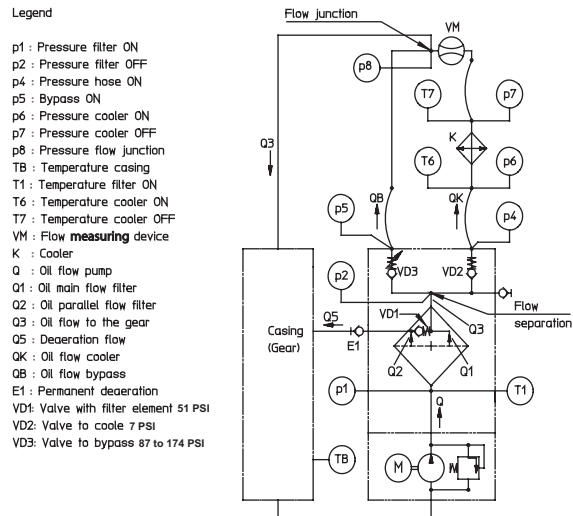
The essential components of the lubrication systems are:

- the generator of the volume flow
- the filter
- the cooler
- the tube system
- the valve system
- and the indication system

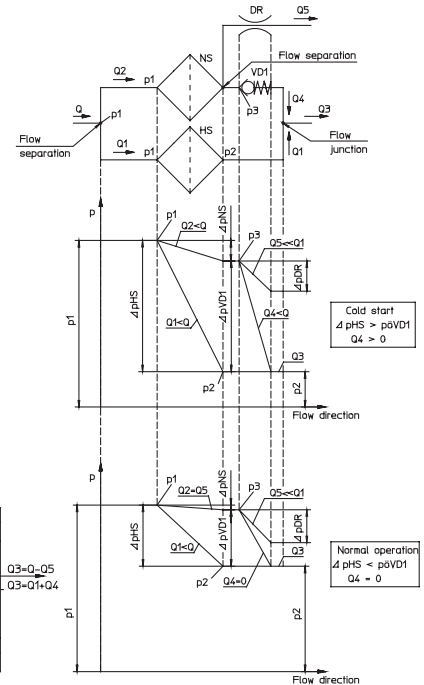
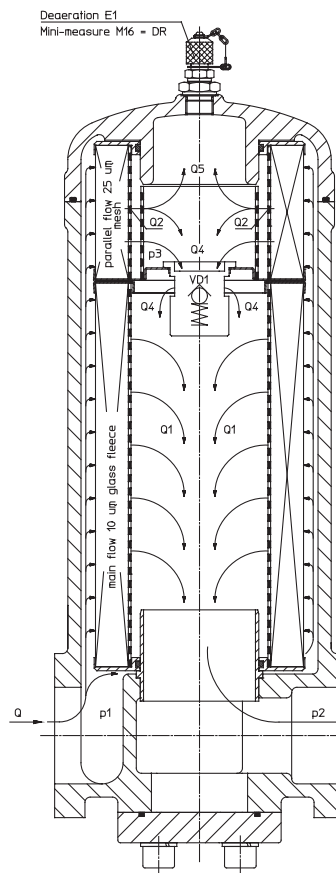
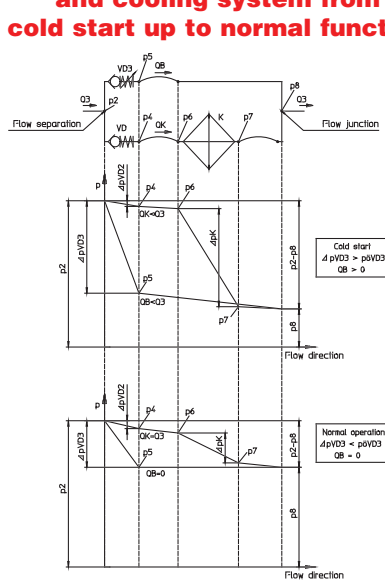
The different versions of mechanical energy transfer systems, the loss in performance of the gear and the climatical and environmental conditions have an influence to be considered for the general conception of the lubrication system. A 100 % reliability of the lubrication system under all operation states can only be achieved, if well-proved components which are known in their detailed function are combined to a system. To consider the minimum of cost of the lubrication system in the foreground and to choose components whose special system function is not experimentally proved, would cause the risk of failure cost which are in an unjustifiable proportion to the surplus price of a properly running system.

In cooperation with various projects of wind power plants, the gear manufacturer Eickhoff, the pump manufacturer Rickmeier and the cooler manufacturer ASA-Hydraulik, the company *INTERNORMEN Technology* developed a co-ordinated conception for the lubrication system of gears in wind power plants. This conception can be particularly adapted to the special versions and stages of performance of the wind power plants. Uncomplicated components from the manufacturers' standard range which are properly running and easy-to-service are the essential factors for a reliable function of the system and a quick service to be maintained in long-term.

Total lubrication system

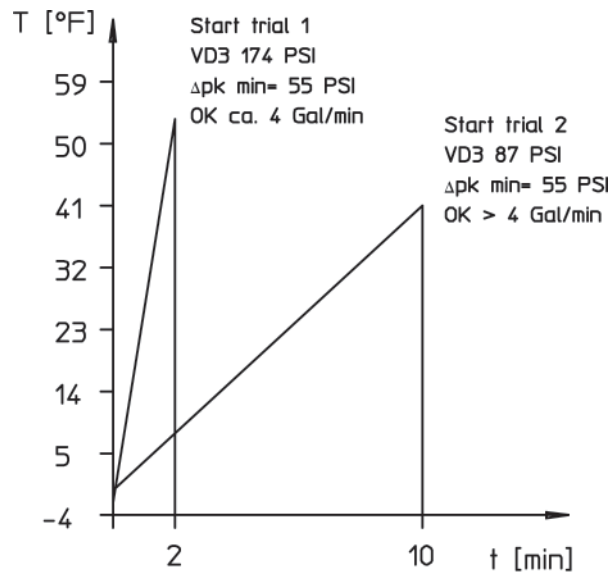


Function course of the valve- and cooling system from cold start up to normal function



Function course of the filter from cold start up to normal function

The lubrication system developed by *INTERNORMEN Technology* and coordinated with the users and cooperating partners mentioned before has proven its general functionality by special experiments. Cold start conditions up to -4°F ambient temperature were simulated, and a special gear oil was used. The oil cross-flow of the air-oil-cooler cooled down to -4°F could be achieved after 2 minutes. The time until an evident increase of temperature T_7 at the cooler outlet, respectively until an oil cross-flow Q_K of about 20% of the total flow Q , in the range of set pressures from 87 to 174 PSI and from 10 to 2 minutes, could be influenced by an adjustable pressure difference valve VD3. All system components such as the pump, the filter, the valve system of the filters as well as the tube system worked properly from the cold start up to the maximum temperature of 158°F without any negative effects on the total function of the oil supply to the gear. At any time the oil flow Q was filtered 100 %, and the oil flow was conducted in full extent - except of the deaeration flow Q_5 - through the main element HS, (filter fineness $10\text{ }\mu\text{m}$ glass fibre fleece at oil viscosities $< 4635\text{ SUS}$). To indicate the respective states of operation *INTERNORMEN Technology* offers electric, electronic and visual pressure difference indicators which are connected with the filter without any tubes. For the protection of the pump a further combined protective filter with mesh width of 250, respectively $500\text{ }\mu\text{m}$, and a permanent magnet is being prepared as a supplement to the proved lubrication system.



Evaluation of the start trials



SPIN-ON FILTER

Series WPL 45-260 145 PSI

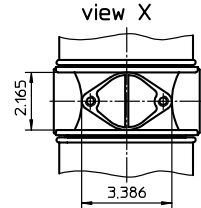
Sheet No.
9000 N

measuring connection M1/M2/M3/M4 = thread NPT 1/8"

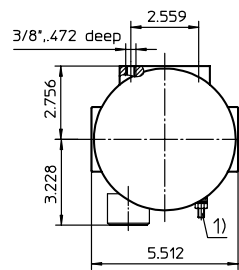
- 1) connection for the potential equalisation, only for application in the explosive area

Dimensions: inch

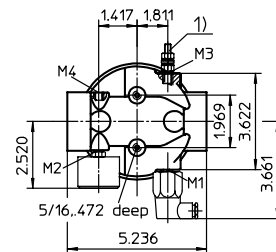
type	A	B	C	D	weight lbs.
WPL 90	9.25	6.89	7.68	5.07	3.75
WPL 130	11.22	8.86	9.65	10.04	4.63
WPL 180	16.50	6.89	7.68	-	7.16
WPL 260	20.43	8.86	9.65	-	8.81



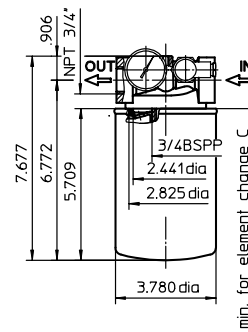
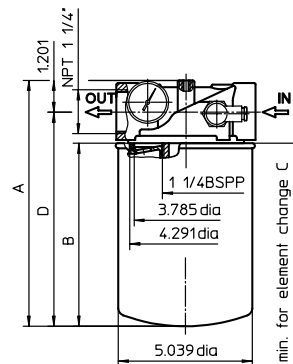
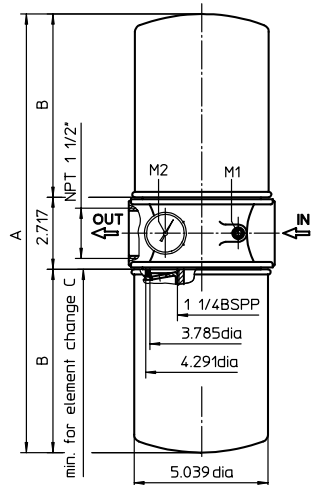
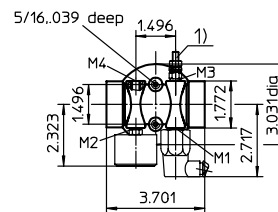
WPL 180/260



WPL 90/130



WPL 45



1. Type index:

1.1. Complete filter: (ordering example)

WPL. 90. 10P. R. E1. - . - . -
1 2 3 4 5 6 7 8

- series:
WPL = spin-on filter
- nominal size: 45, 90, 130, 180, 260
- filter-material and filter-fineness:
10 P = 10 µm paper
10 VG = 10 µm_(c) Interpor fleece (glass fiber), WPL 45/90/180
- internal valve:
- = without (WPL 45/90/130)
S = by-pass valve suction filter Δp 4 PSI
R = by-pass valve pressure filter Δp 29 PSI
- measuring connection M1:
- = without clogging indicator
O = visual, see sheet-no. 1616 ;
E1 = pressure, switch see sheet-no. 1616
E2 = pressure, switch see sheet-no. 1616
E5 = pressure, switch see sheet-no. 1616
PA = potential equalisation
- measuring connection M2:
- = without clogging indicator
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
PA = potential equalisation
- measuring connection M3:
possible indicators see position 5 of the type index (WPL 45/90/130)
- measuring connection M4:
possible indicators see position 6 of the type index (WPL 45/90/130)

1.2. Filter element: (ordering example)

WP. 90. 10P
1 2 3

- series:
WP = spin-on cartridge for in-lin filter
- nominal size: 45, 90, 130
WPL 180 = 2x NG 90
WPL 260 = 2x NG 130
- filter-material and filter-fineness:
10 P = 10 µm paper
10 VG = 10 µm_(c) Interpor fleece (glass fiber), WPL 45/90/180

2. Description:

In-line filter series WPL and WP-spin-on-cartridges are suitable for an operating pressure up to 145 PSI. They are appointed for mounting into pressure lines and return lines. the spin-on-cartridges, e.g. are directly screwed to hydrostatic drives. These series allow an easy maintaining with short operating interruption. After pollution the complete spin-on-cartridges has to be changed. The WPL-filter can alternatively be equipped with pressure switch and/or pressure gauge. The serie can be used for all mineral oils (hydraulic- and lubrication oils).

3. Technical data:

temperature range: +14°F to 230°F
operating medium: mineral oil, other media on request
max. operating pressure: 145 PSI
test pressure: 188 PSI
opening pressure by-pass valve for pressure filter: Δp 29 PSI
opening pressure by-pass valve for suction filter: Δp 4 PSI
pressure switch: Δp 22 PSI see sheet-no. 1616
pressure switch: Δp 3.6 PSI see sheet-no. 1616
gaskets: Nitrile (NBR)
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

4. Pressure drop flow curves:

Precise flow rates see 'INF-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

5. Test methods:

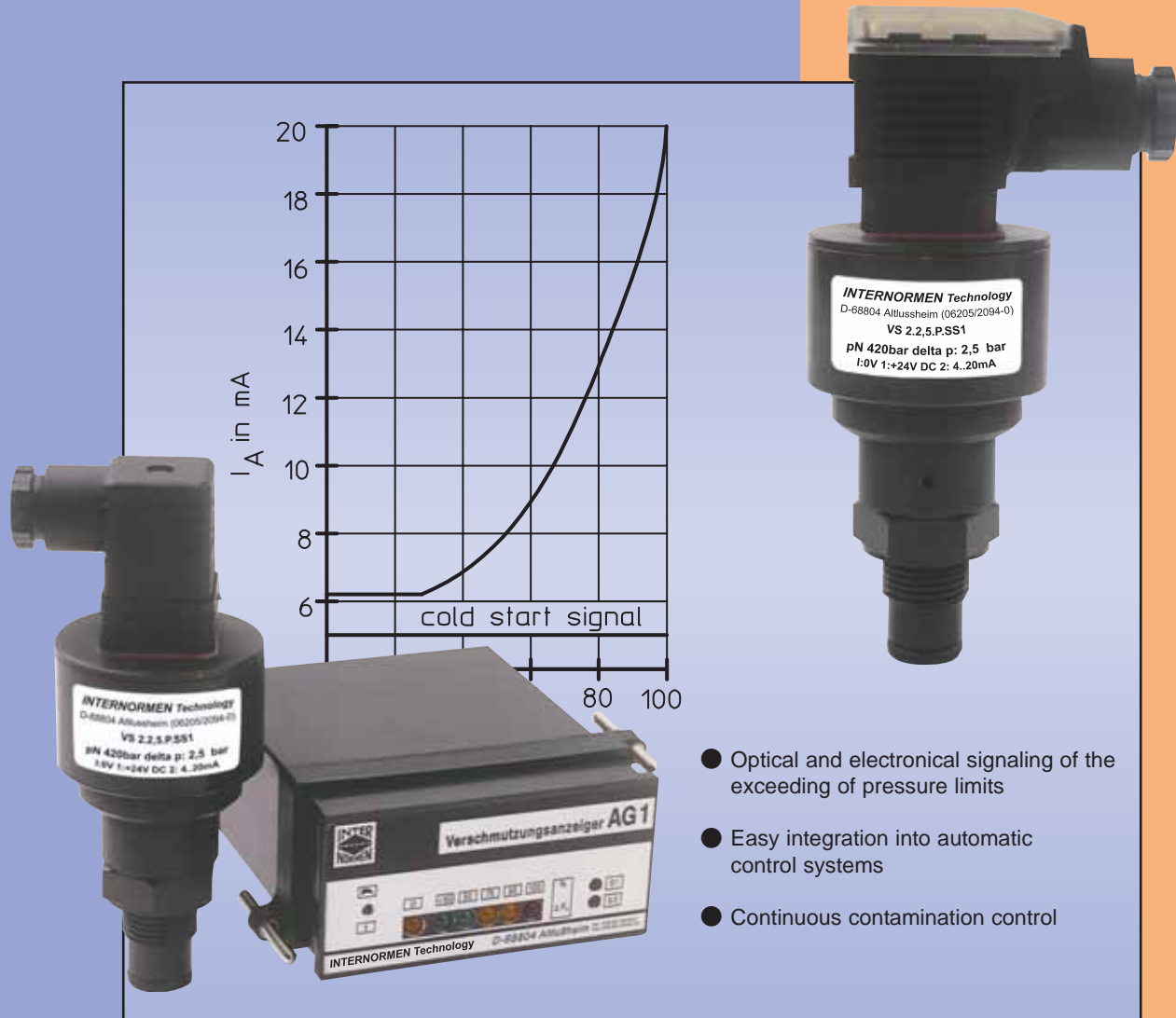
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance	ISO 3724	Verification of flow fatigue characteristics
ISO 2942	Verification of fabrication integrity	ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 2943	Verification of material compatibility with fluids	ISO 16889	Multi-pass method for evaluating filtration performance
ISO 3723	Method for end load test		

Changes of measures and design are subject to alteration!

INTERNORMEN

Intelligent Filter Control by Electronics



Electronical Clogging Sensors and
Indicating Systems for Hydraulic
and Lubricating Oil Filters

Electronical Clogging Sensor VS 1

- Continuous pressure difference measuring
- Optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- Early identification of increased contamination inside the system
- Cold start indication up to approx. 77°F
- Suppression of pressure peaks
- Dust-proof and splash-proof aluminium or stainless steel housing
- Interference-free signal transmission over longer distances
- Interchangeable with clogging indicators type AE and type AO

Type code (ordering example):

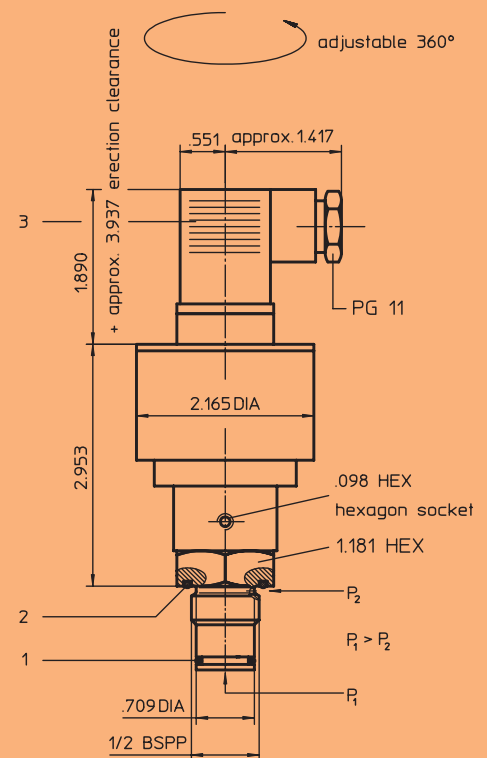
VS1.	1,5.	P.	-.	GS	-.	E
1	2	3	4	5	6	7

- 1] VS 1 = electronical clogging sensor with analog 4...20mA output signal
- 2] 1,5 = pressure difference 22 PSI range
2,5 = pressure difference 36 PSI range
5,0 = pressure difference 73 PSI range
6,0 = pressure difference 87 PSI range } Δp -nominal
- 3] Sealing material:
P = Nitrile (NBR)
V = Viton (FPM)
- 4] VA = stainless steel
- = standard version
- 5] GS = line adapter DIN 43650-A, three channel plug
- 6] - = standard
- 7] E = 0 volt free of grounding
G = 0 volt grounded

Technical Data:

max. operating pressure: 6000 PSI
screw thread: G 1/2
distribution voltage: 24V DC \pm 20%;
residual ripple: < 10%
temperature range: +14°F...+212°F (fluids)
+14°F...+176°F (electronics)
connection: according to DIN 43650-A
three-channel plug
line adapter: GDM 3011
output signal: 4...20mA; max. load: 400 Ohm
error of measurement: \pm 5% of the final value (Δp -nominal)
system of protection: IP 65 according to DIN 40050

Clogging Sensors VS 1 ... VS 2 ... GS



Indicating System AG 1 (control panel set)

- Evaluation set for current signals emitted by VS 1
- Pressure difference indication by LED-band
- 2 x relay switching contacts (75% und 100% of the Δp -nominal range)
- Indication of switching position by LED
- Cold start indication by LED
- Adjustable pressure peak suppression

Technical Data:

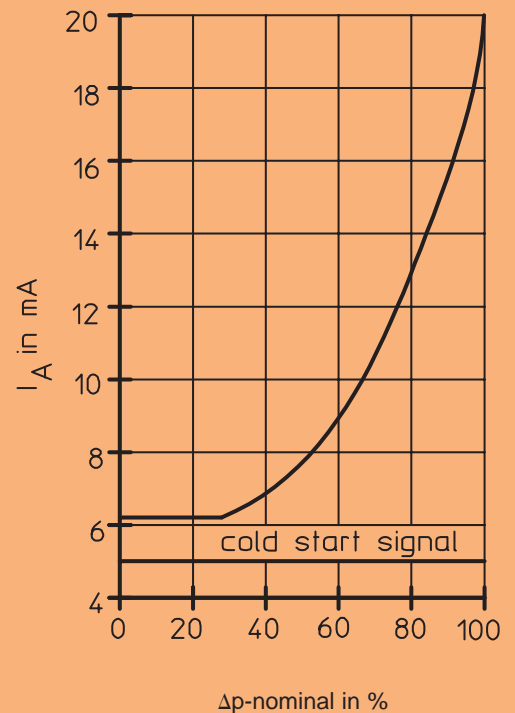
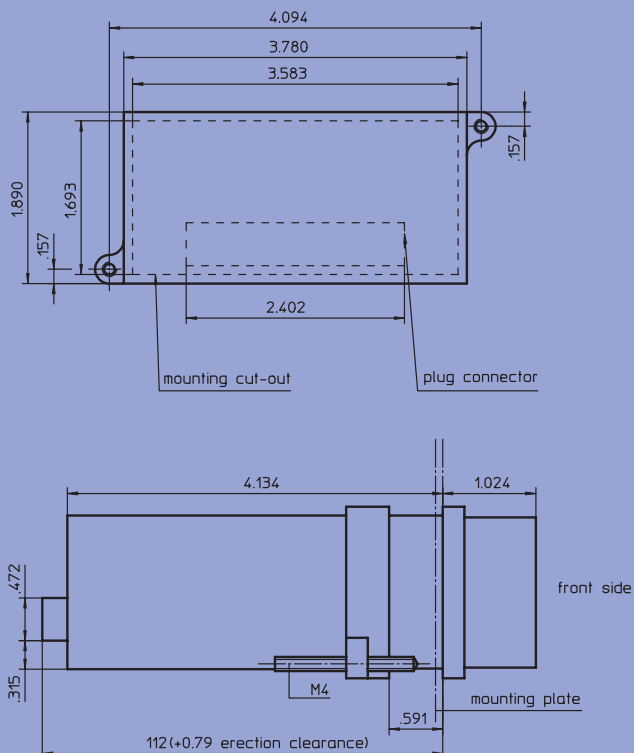
distribution voltage:	24V DC \pm 20%; residual ripple: < 10%
contacts:	2 x contact maker; U_{max} : 240V AC I_{max} : 0,5A P_{max} : 10 Watt
temperature range:	32°F...158°F
system of protection:	IP 53 (only front side with transparent protection cap)
housing dimensions:	according to DIN 43700 (see illustration)

Type code (ordering example):

AG 1
1

- 1 AG 1 = electronic display unit with clear protective cover
mounts remote in control cabinets to be used
with electronic clogging sensor VS 1

Indicating system AG 1



REQUEST DATA SHEETS NO.1617 FOR
VS 1/AG 1 AND NO.1618 FOR VS 2/SS 1
FOR FURTHER DETAILS.

MODERN LABORATORIES WITH UP-TO-DATE
TEST EQUIPMENT GUARANTEE BEST QUALITY.

Electronical Clogging Sensor VS 2

- Discrete control of the filter contamination by means of two PNP-switching contacts (75% and 100% of the Δp -nominal range)
- Indication of switching position by LED immediately at the sensor in connection with the signal plug SS 1
- Cold start suppression up to approx. 77°F
- Suppression of pressure peaks
- Interchangeable with clogging indicators type AE and type AO

Type code (ordering example):

VS2 . 1,5 . P . - . GS				
1	2	3	4	5

- 1] VS 2 = electronic clogging sensor with
2 x PNP-switching contacts
(75% and 100% of the Δp -nominal range)
- 5] GS = connector plug (type of plug: GDM 3011)
SS 1 = signal plug to indicate the actual switching
position at the VS 2 by 3 LED
(plug type: GDME 311)

2; 3; 4 see VS 1

Technical Data:

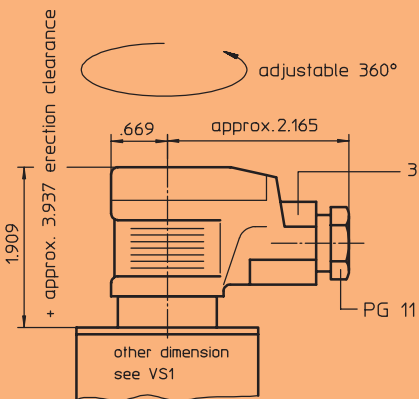
max. operating pressure: 6000 PSI
screw thread: G 1/2
distribution voltage: 24V DC \pm 20%;
residual ripple: < 10%
temperature range: +14°F...+212°F (fluids)
+14°F...+176°F (electronics)
connection: according to DIN 43650-A
three channel plug
PNP-switching contacts: contact-maker;
 $I_{max.} = 200mA$ with 24 V
system of protection: IP 65 according to DIN 40050

Spare Parts VS 1, VS 2

item	qty.	designation	dimension	article-no.	
1	1	O-ring	14x2	304342 (NBR)	304722(FPM)
2	1	O-ring	22x2	304708 (NBR)	304721(FPM)
3	1	GS	DIN 43650-A	312492	
4	1	SS1	DIN 43650-A	310403	

Request data sheets no. 1617 for VS 1/AG 1 and
no. 1618 for VS 2/SS 1 for further details.

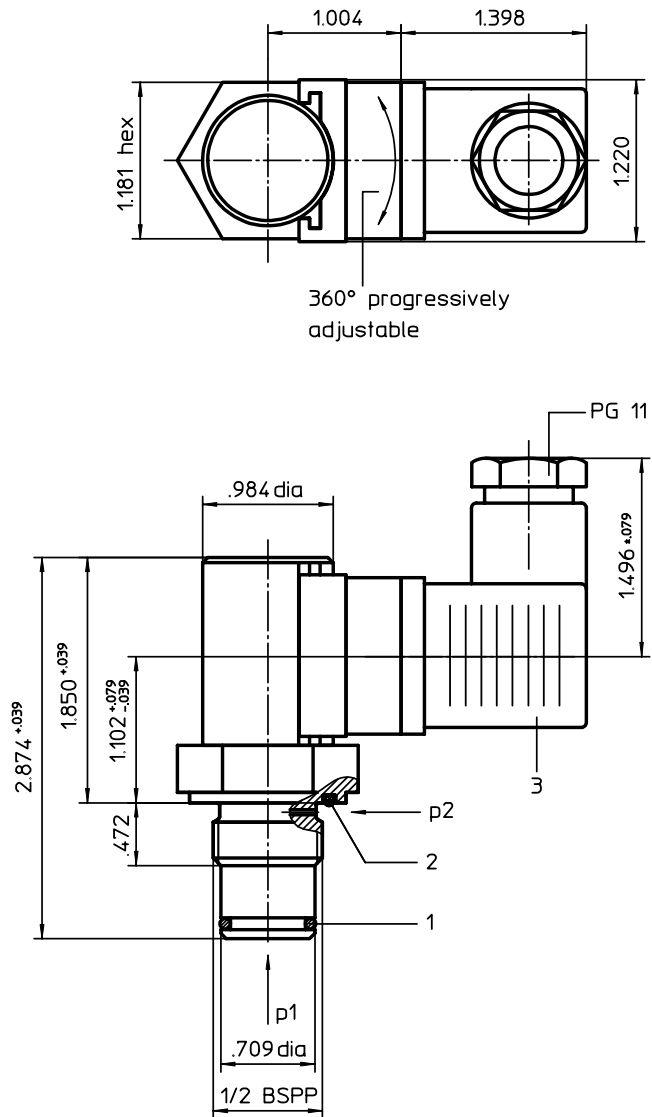
Signal Plug SS 1



CLOGGING INDICATOR

Series AE (electrical / visual-electrical, thread execution)

Sheet No.
1615 J



1. Clogging indicator AE

1.1. Type index: (ordering example)

AE. 30. 1,5. P. - . - .

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

AE = clogging indicator, electrical / visual-electrical

2 version:

30-80 = see table below

3 indicator-pressure difference: Δp-nominal

1,5 = 22 PSI

2,5 = 36 PSI

5,0 = 73 PSI

4 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

5 material:

- = standard

VA = stainless steel

6 execution:

- = standard

7 damper:

- = standard with hydraulic damper

1 = without hydraulic damper

2. Technical data:

temperature ranges

- operating temperature: + 14°F to +176° F
(for a short time +212°F)

- resistant to compression: -22°F to +212°F

- survival temperature: -40°F to +212°F

max. operating pressure: 6000 PSI

max. pressure difference: 2320 PSI

Clogging indicator AE with redundant switches,
see data sheet-no. 40968-4

version	luminous indication	contact	voltage	max. rupturing capacity (resistive load)	max. switching current (resistive load)	connection protection
30	-	contact maker and contact breaker 175V DC	3 VA	0,25 A	line adapter according to DIN 43650-designA/ISO4400
40	-	 125V AC	3 Watt	0,25 A	
50	1x LED ¹⁾	 175V DC	20 VA	1,0 A	
62	1x LED	 230V AC	10 Watt	0,5 A	
70	2x LED		120V AC/DC	3 Watt/VA	0,025 A with 120V AC/DC	
80	2x LED		110....230V AC/DC	20 Watt/VA	0,180 A with 110V AC/DC 0,090 A with 230V AC/DC	
			24V DC	3 VA	0,080 A with 24V DC	IP 65 according to DIN EN 60529
			24V DC	20 VA	0,750 A with 24V DC	

¹⁾ LED = light emitting diode

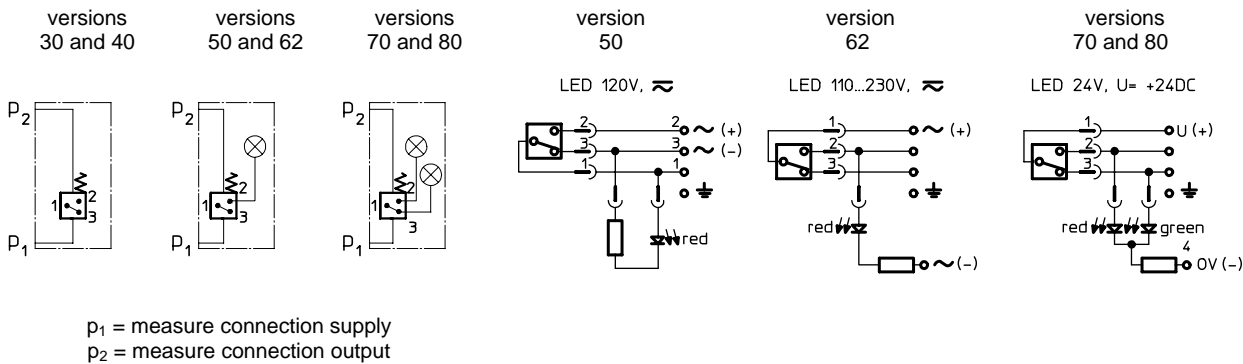
3. Spare parts:

item	qty.	designation	dimension	article-no.	type
1	1	O-ring	14 x 2	304342 (NBR)	versions 30 - 80
				304722 (FPM)	
2	1	O-ring	22 x 2	304708 (NBR)	
				304721 (FPM)	
3	1	line adapter	DIN 43650-designA/ISO4400	312492	versions 30 and 40
	1	line adapter with LED 24V		315012	versions 70 and 80
	1	line adapter with LED 120V		315010	version 50
	1	line adapter with LED 110...230V		332235	version 62

4. Symbols:

hydraulic-electrical symbol

connection configuration for LED



5. Description:

The AE 30 and AE 40 pollution indicators are electrical differential pressure indicators.

The AE 50 to AE 80 pollution indicators are combined optical and electrical differential pressure indicators. These differential pressure indicators can be fitted to all pressure filters $p \leq 6000$ PSI for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p_1 and the exit pressure p_2 of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, in the pollution indicators

- AE 30 and AE 40, two electrical signals (contact maker/contact breaker) are triggered
- AE 50 and AE 62, two electrical signals (contact maker/contact breaker) are triggered and one optical signal is formed
- AE 70 and AE 80, two electrical signals (contact maker/contact breaker) are triggered and two optical signals are formed.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical and optical indication is effected as a digital signal at the given switching pressure. Versions 50 to 80 of the pollution indicator are fitted with additional LED displays. The optical LED signal becomes visible according to the selected version in the translucent cover plate of the line box on the pollution indicator.

In the pollution indicators

- AE 50 and AE 62, the red LED signal that the filter element needs to be changed
- AE 70 and AE 80, the red LED signal the normal operating state (filter element not yet polluted to an unacceptable level), while the red LED signal that the filter element needs to be changed.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging indicator into the bare hole (starting torque 92.18 lb.-ft.)

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2 and
- O-ring 14 x 2

as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

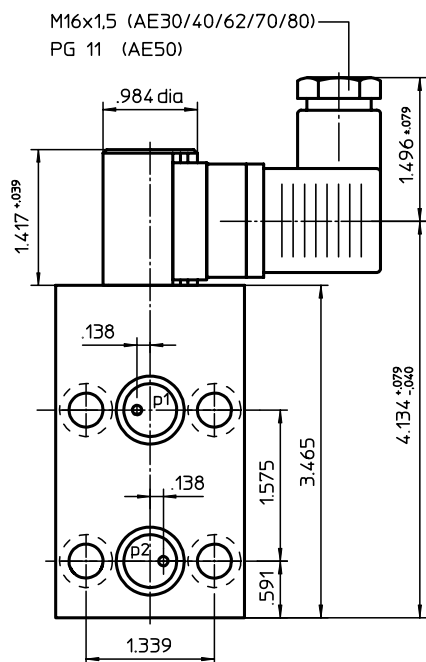
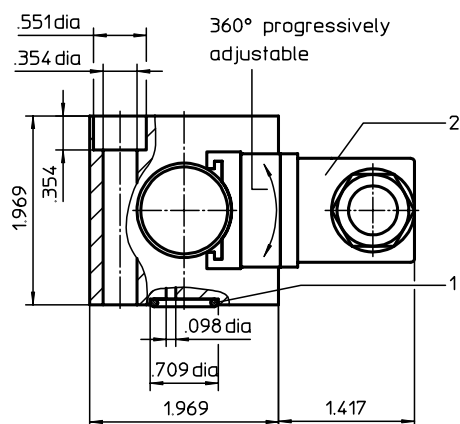
7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the transparent cap of the optical indicator.

CLOGGING INDICATOR

Series AE (electrical / visual-electrical, block execution)

Sheet No.
1609 H



1. Clogging indicator AE

1.1. Type index: (ordering example)

AE. 30. 1,5. P. - . B. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**
AE = clogging indicator, electrical / visual-electrical
- 2 **version:**
30-80 = see table below
- 3 **indicator-pressure difference:** Δp -nominal
1,5 = 22 PSI
2,5 = 36 PSI
5,0 = 73 PSI
- 4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 5 **material:** (block)
- = standard
VA = stainless steel
- 6 **execution:**
B = block execution
- 7 **damper:**
- = standard with hydraulic damper
1 = without hydraulic damper

2. Technical data:

temperature ranges
- operating temperature: + 14°F to +176° F
(for a short time +212°F)
- resistant to compression: -22°F to +212°F
- survival temperature: -40°F to +212°F
max. operating pressure: 6000 PSI
max. pressure difference: 2320 PSI

version	luminous indication	contact	voltage	max. rupturing capacity (resistive load)	max. switching current (resistive load)	connection protection
30	-	contact maker and contact breaker 175V DC 125V AC	3 VA 3 Watt	0,25 A 0,25 A	line adapter according to DIN 43650-designA/ISO4400
40	-	 175V DC 230V AC	20 VA 10 Watt	1,0 A 0,5 A	
50	1x LED ¹⁾		120V AC/DC	3 Watt/VA	0,025 A with 120V AC/DC	
62	1x LED		110....230V AC/DC	20 Watt/VA	0,180 A with 110V AC/DC 0,090 A with 230V AC/DC	
70	2x LED		24V DC	3 VA	0,080 A with 24V DC	
80	2x LED		24V DC	20 VA	0,750 A with 24V DC	

¹⁾ LED = light emitting diode

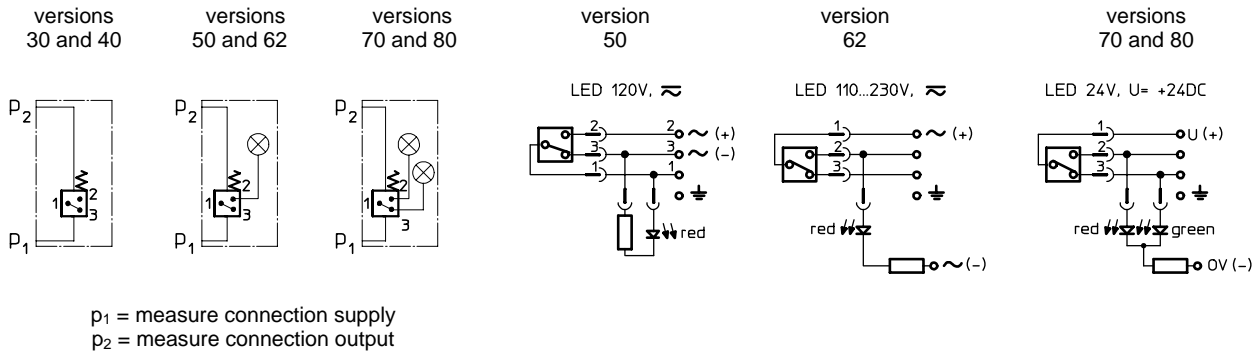
3. Spare parts:

item	qty.	designation	dimension	article-no.	type
1	2	O-ring	14 x 2	304342 (NBR)	versions 30 - 80
				304722 (FPM)	
2	1	line adapter	DIN 43650-designA/ISO4400	312492	versions 30 and 40
	1	line adapter with LED 24V		315012	versions 70 and 80
	1	line adapter with LED 120V		315010	version 50
	1	line adapter with LED 110...230V		332235	version 62

4. Symbols:

hydraulic-electrical symbol

connection configuration for LED



5. Description:

The AE 30 and AE 40 pollution indicators are electrical differential pressure indicators.

The AE 50 and AE 62 pollution indicators are combined optical and electrical differential pressure indicators. These differential pressure indicators can be fitted to all pressure filters $p \leq 6000$ PSI for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p_1 and the exit pressure p_2 of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, in the pollution indicators

- AE 30 and AE 40, two electrical signals (contact maker/contact breaker) are triggered
- AE 50 and AE 62, two electrical signals (contact maker/contact breaker) are triggered and one optical signal is formed
- AE 70 and AE 80, two electrical signals (contact maker/contact breaker) are triggered and two optical signals are formed.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path, a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical and optical indication is effected as a digital signal at the given switching pressure. Versions 50 to 80 of the pollution indicator are fitted with additional LED displays. The optical LED signal becomes visible according to the selected version in the translucent cover plate of the line box on the pollution indicator.

In the pollution indicators

- AE 50 and AE 62, the red LED signals that the filter element needs to be changed
- AE 70 and AE 80, the green LED signals the normal operating state (filter element not yet polluted to an unacceptable level), while the red LED signals that the filter element needs to be changed.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicators.

It is necessary to make sure the availability and the right positioning of sealing parts O-ring 14 x 2 as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

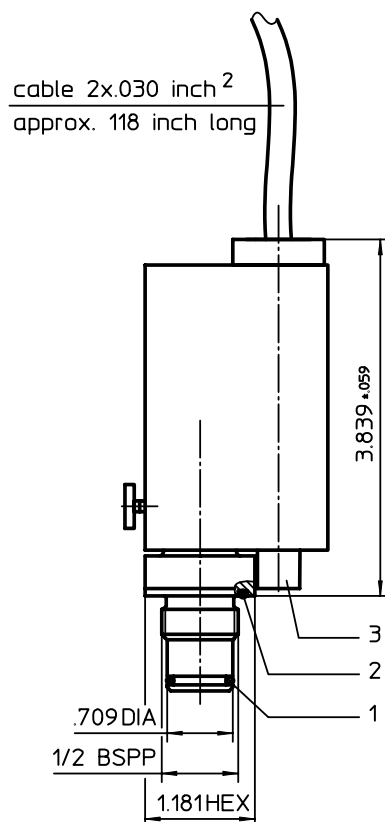
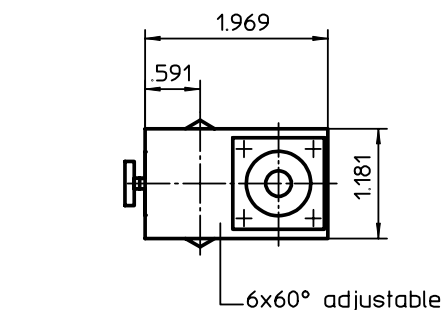
7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the transparent cap of the optical indicator.

CLOGGING INDICATOR

Series AE (electrical) explosion-proof

Sheet No.
1625 B



1. Type index: (ordering example)

AE. 10. 1,5. P. VA. Ex

1	2	3	4	5	6
---	---	---	---	---	---

- 1 **series:**
AE = clogging indicator electrical
- 2 **contact:**
10 = contact maker
- 3 **indicator-pressure difference: Δp nominal**
1,5 = 22 PSI; 2,5 = 36 PSI; 5,0 = 73 PSI
- 4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 5 **material:**
VA = stainless steel
- 6 **execution:**
Ex = explosion-proof

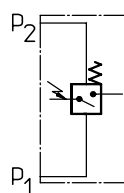
2. Technical data:

temperature range:	+14°F to +176°F (for a short time +212°F)
max. operating pressure:	6000 PSI
max. pressure difference:	2320 PSI

3. Electrical limit facts:

execution:	V DC/V AC 200/250 V, max. 30 Watt
switch contact:	contact maker
protection:	EEx m II T6

4. Symbol:



contact maker

5. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
3	1	switch explosion-proof		315461

5. Description:

The AE 10 pollution indicator is an electrical differential pressure indicator.

The differential pressure indicator can be fitted to all pressure filters $p \leq 6000$ PSI for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p_1 and the exit pressure p_2 of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, an electrical signal on the AE 10 pollution indicator will be released.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical indication is effected as a digital signal at the given switching pressure.

At the AE 10 pollution indicator the closed condition signalizes that the change of the filter element is necessary.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator

- screw in the clogging indicator into the bare hole (starting torque 92.18 lb.-ft.).

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2 and

- O-ring 14 x 2

as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

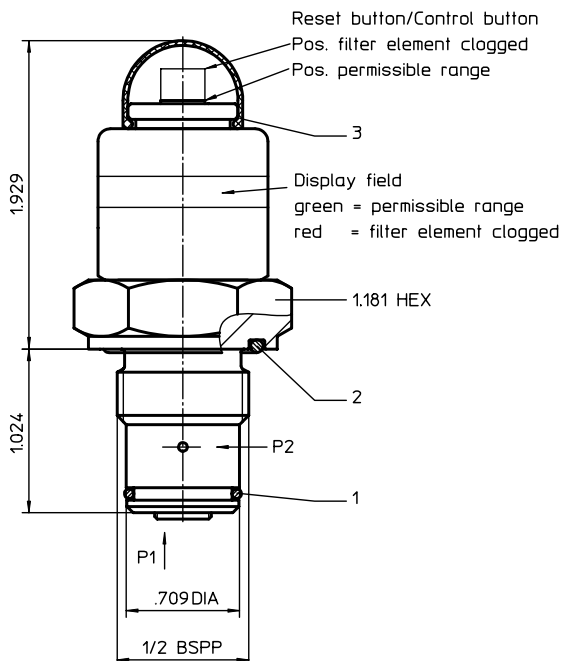
7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the housing and the cable of the switch.

CLOGGING INDICATOR

Series AOR, AOC (thread execution)

Sheet No.
1606 B



1. Clogging indicator AOR, AOC

1.1. Type index: (ordering example)

AOR. 1,5. P. -			
1	2	3	4

- 1 **series:**
 AOR = clogging indicator, visual with reset function
 AOC = clogging indicator, visual with control function
- 2 **indicator-pressure difference: Δp -nominal**
 1,5 = 22 PSI
 2,5 = 36 PSI
 5,0 = 73 PSI
- 3 **sealing material:**
 P = Nitrile (NBR)
 V = Viton (FPM)
- 4 **material:**
 - = standard
 VA = stainless steel

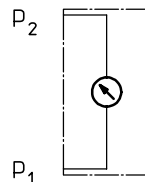
2. Technical data:

temperature ranges	
- operating temperature:	+ 14°F to +176°F (for a short time +212°F)
- resistant to compression:	-22°F to +212°F
- survival temperature:	-40°F to +212°F
max. operating pressure:	6000 PSI
max. pressure difference:	2320 PSI
reset condition:	< 60% Δp -nominal
control condition:	< 80% Δp -nominal
max. display error:	± 10%

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	15 x 1,5	315357 (NBR) 315427 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
3	1	cap		315325 (PUR)

4. Symbol:



p_1 = measure connection supply
 p_2 = measure connection output

5. Description:

The clogging indicators with designation AOR and AOC are visual pressure difference indicators with a reset function or control function.

These pressure difference indicators can be built on to all pressure filters where $p \leq 6000$ PSI, and for which a corresponding allocation is provided on the respective dimension sheet. As the filter element becomes increasingly clogged, the difference between the inflow pressure p_1 and the outflow pressure p_2 of the filter will become larger. The display function is triggered at the switching pressure difference: this depends on the pressure difference just mentioned, and is independent of the operating pressure.

A measuring piston which is subject to the inflow and outflow pressure moves against a measuring spring in a manner which depends on the pressure difference. The tractive force between two magnets in the measuring piston and in the display cylinder changes according to the distance moved. At the switching point, the tractive force between the magnets and the force of the spring on the display cylinder are equally large, and are opposed.

In the range $\pm 10\%$ of the set switching pressure, the spring on the display cylinder causes the display cylinder to move suddenly into the „filter element clogged“ display position. This means that the colour in the display field changes from green to red.

In the case of the clogging indicator AOR the display position „filter element clogged“ is fixed, and continues to be maintained even if the pressure difference returns to permissible values, dependent on the viscosity or the rate of flow. The fixed „element clogged“ display position can be canceled by operating the reset button, provided that the reset condition is satisfied.

In the case of the clogging indicator AOC the display position „filter element clogged“ is only fixed in the pressure difference range $\geq 30 \pm 10\%$ of the switching pressure difference. In the range $< 30 \pm 10\%$ of the switching pressure difference occurs a self-instructed shift down to the display position „permissible range“. In the range $> 30\%, < 80\%$ of the switching pressure difference, the display position „filter element clogged“ can be restored for control functions with the control button.

The reset- or control button is located in a position where it is protected from dirt, underneath the elastic cap, item 3, and should be operated with slight manual pressure $< 10\text{N}$.

Note on functional behaviour:

The „filter element clogged“ display will also be triggered if the pressure difference exceeds the switching pressure difference for only a brief period ($> 100\text{ms}$).

The „filter element clogged“ display is triggered in the event of oscillatory or impulse excitations $> 1\text{g}$ at values $< 90\%$ of the switching pressure difference.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging indicator into the bare hole (starting torque 92 lb.-ft.)

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2 and
- O-ring 15 x 1,5

as well as a dirt-free mounting.

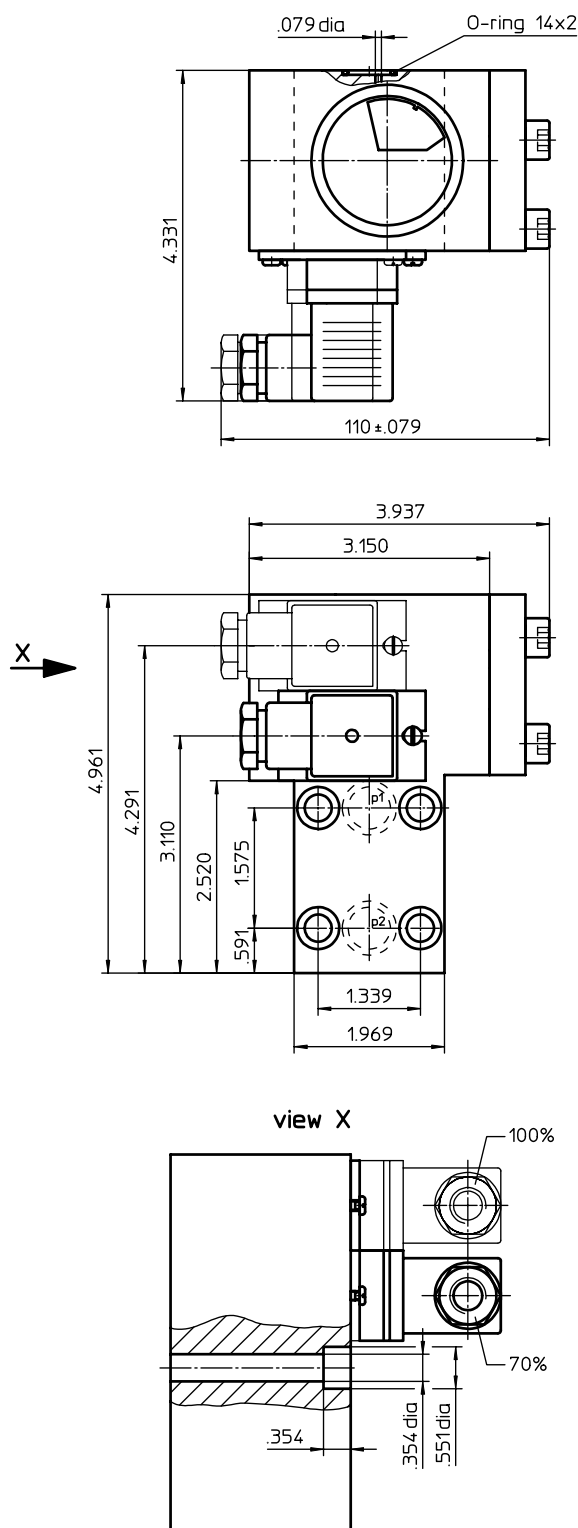
7. Maintenance:

This device is maintenance-free; however, care should be taken to ensure that no cleaning agent or solvents reach the transparent hood and the elastic cap over the reset button or control button.

CLOGGING INDICATOR

Series OP (visual), OE (visual-electrical) block execution

Sheet No.
1628 E



1. Clogging indicator OP-OE

1.1. Type index: (ordering example)

OE1.1,2. B. -. P. -. 1

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

- OE1 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% switching pressure difference
- OE2 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% and 100% switching pressure difference
- OE3 = clogging indicator, visual-electrical with 2 contacts maker and contacts breaker with 70% switching pressure difference
- OP = clogging indicator, visual
(according to series OE without switching contacts)

2 indicator-pressure difference: Δp -nominal

0,3 = 4 PSI; 0,8 = 12 PSI; 1,2 = 17 PSI; 2,5 = 36 PSI; 4,5 = 65 PSI

3 connection:

B = block execution with flange connection

4 connection size:

- = standard

5 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

6 material:

- = standard

VA = stainless steel

7 execution:

- 1 = execution 1 (electrical limit facts see item 3)
- 2 = execution 2 (electrical limit facts see item 3)

2. Technical data:

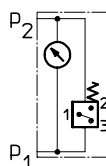
permissible operating pressure: 914 PSI
 permissible operating temperature: +176°F
 permissible pressure difference: $p_1 - p_2 \leq 232$ PSI
 indicator-pressure difference: 4; 12; 17; 36; 65 PSI

3. Electrical limit facts:

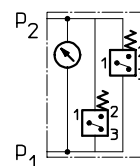
execution 1: 175V DC, 0,25A, 3 VA
 125V AC, 0,25A, 3 Watt
 execution 2: 175V DC, 1A, 20 VA
 230V AC, 0,5A, 10 Watt
 switch-over contact: contact maker and contact breaker
 protection: IP 65

4. Symbols:

execution OE1



execution OE2, OE3



1+2 contact maker
 1+3 contact breaker

Changes of measures and design are subject to alteration!

5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 914 PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

A pressure difference dependent measuring piston, charged with supply pressure and output pressure, moves towards a measuring spring.

Concerning the OE1 a permanent magnet which is integrated in the measuring piston switches - depending on the gauge length - a Reed-contact (magnetic-switch) and releases electrical control signals upon reaching a pressure difference of 70%.

The OE2 is equipped with two magnetic switches which release electrical control signals in a sequence of 70% and 100% of the switching pressure.

The OE3 is equipped with two magnetic switches triggering electrical control signals at 70% of the switching pressure (redundance of the switches).

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

Note: Consider data and connecting conditions mentioned in items 2 to 4.

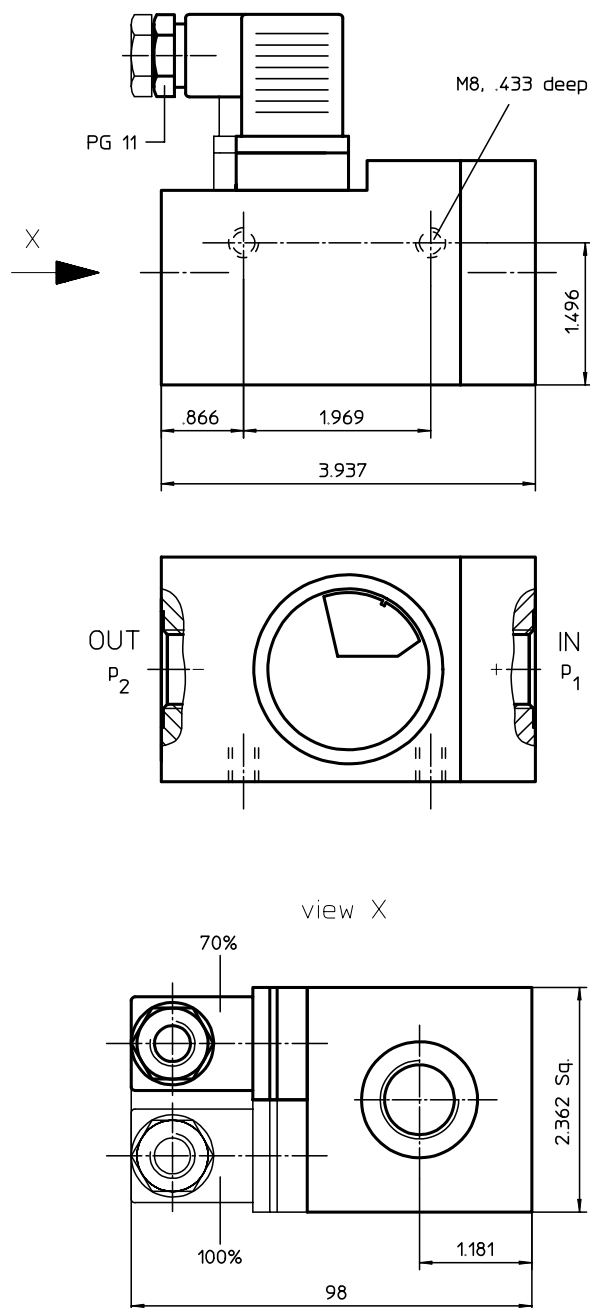
7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

CLOGGING INDICATOR

Series OP (visual), OE (visual-electrical)

Sheet No.
1614 D1



1. Clogging indicator OP-OE

1.1. Type index: (ordering example)

OE1. 1,2. G. 1. P. -. 1

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

- OE1 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% switching pressure difference
- OE2 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% and 100% switching pressure difference
- OP = clogging indicator, visual (according to series OE without switching contacts)

2 indicator-pressure difference: Δp -nominal

0,8 = 12 PSI; 1,2 = 17 PSI; 2,5 = 36 PSI; 4,5 = 65 PSI

3 connection:

G = thread connection

4 connection size:

1 = $\frac{1}{4}$ BSPP

3 = $\frac{1}{2}$ BSPP

5 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

6 material:

- = standard

VA = stainless steel

7 execution:

1 = execution 1 (electrical limit facts see item 3)

2 = execution 2 (electrical limit facts see item 3)

2. Technical data:

permissible operating pressure: 914 PSI

permissible operating temperature: +176°F

temperature:

permissible pressure difference: $p_1 - p_2 \leq 232$ PSI

indicator-pressure difference: 12; 17; 36; 65 PSI

The electrical signal takes place at 70% of the switching pressure difference using the design with two contacts the second signal takes place at 100% of the switching pressure difference.

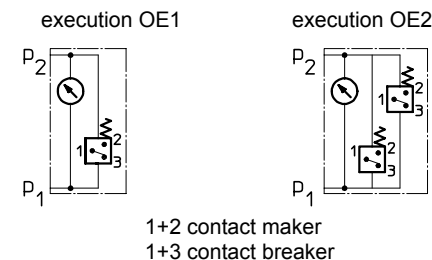
3. Electrical limit facts:

execution 1: 175V DC, 0,25A, 3 VA
125V AC, 0,25A, 3 Watt

execution 2: 175V DC, 1A, 20 VA
230V AC, 0,5A, 10 Watt

switch-over contact: contact maker and contact breaker
protection: IP 65

4. Symbols:



5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 914 PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

A pressure difference dependent measuring piston, charged with supply pressure and output pressure, moves towards a measuring spring.

Concerning the OE1 a permanent magnet which is integrated in the measuring piston switches - depending on the gauge length - a Reed-contact (magnetic-switch) and releases electrical control signals upon reaching a pressure difference of 70%.

The OE2 is equipped with two magnetic switches which release electrical control signals in a sequence of 70% and 100% of the switching pressure.

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

- Connection

Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).

Note: Consider data and connecting conditions mentioned in items 2 to 4.

7. Maintenance:

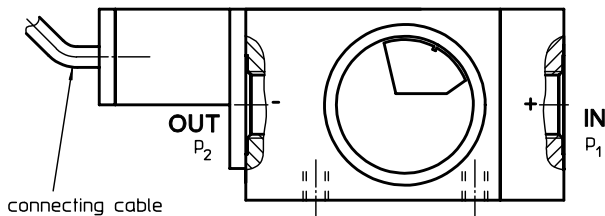
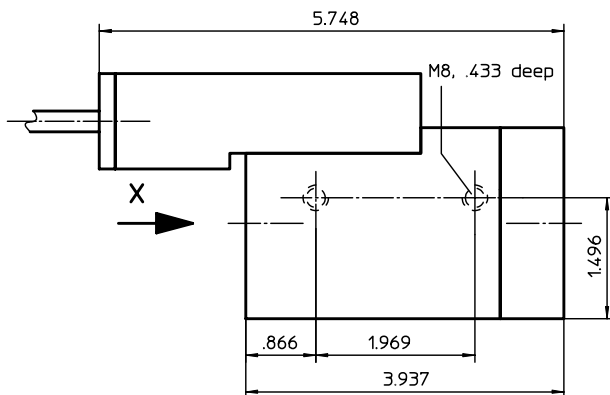
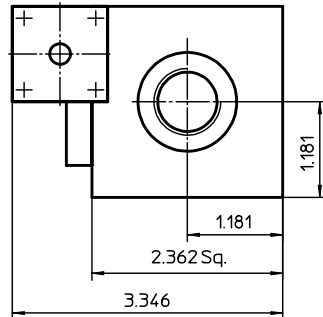
The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

CLOGGING INDICATOR

Series OE (electrical) explosion-proof

Sheet No.
1624 E

view X



connecting cable

1. Type index: (ordering example)

OE. 1,2. G. 1. P. VA. Ex

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

OE = clogging indicator, visual-electrical with 1 contact maker with 70% switching pressure difference

2 indicator-pressure difference: Δp -nominal

0,3 = 4 PSI
0,8 = 12 PSI
1,2 = 17 PSI
2,5 = 36 PSI
4,5 = 65 PSI

3 connection:

G = thread connection

4 connection size:

1 = 1/4 BSPP
3 = 1/2 BSPP

5 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

6 material:

VA = stainless steel

7 execution:

EX = explosion-proof

2. Technical data:

permissible operating pressure: 914 PSI
permissible fluid temperature: -40°F to +176°F
permissible ambient temperature: -40°F to +140°F
permissible pressure difference: $p_1 - p_2 \leq 232$ PSI
indicator-pressure difference Δp : 4; 12; 17; 36; 65 PSI

The electrical signal takes place at 70% of the switching pressure difference.

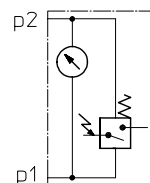
3. Electrical data switching contact:

contact design: reed contact - normally open
max. switching voltage: 200V DC
250V AC peak - peak
max. switching current: 1 A
max. breaking capacity: 30 Watt
type of protection: **Ex** II 2 GD EEx

m II T6
KEMA 00ATEX 1112
IP 65

certificated
operating temperature range: -40°F to +140°C
connecting cable: H05RN 2x .03 inch
length connecting cable: max. 196 inch

4. Symbol:



1+2 normally open

5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 914 PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

- Connection

Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).

Note: Consider data and connecting conditions mentioned in items 2 to 4.

7. Maintenance:

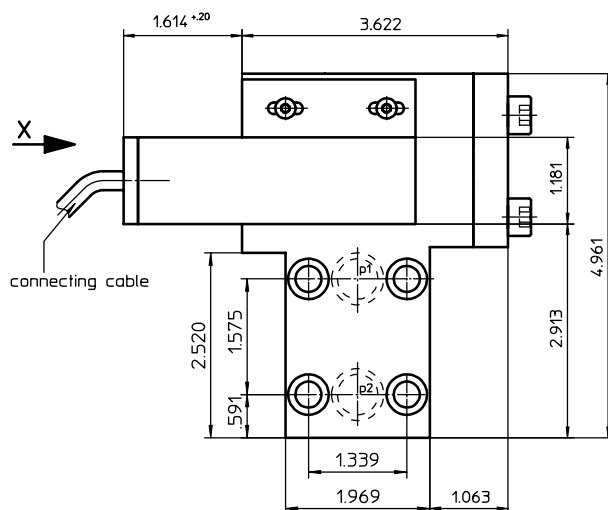
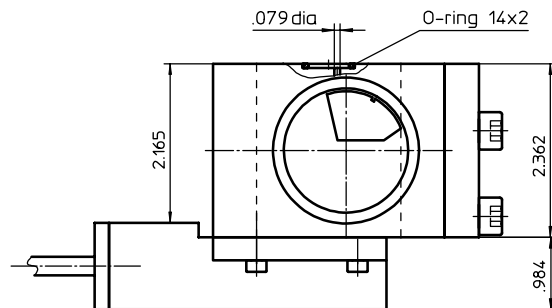
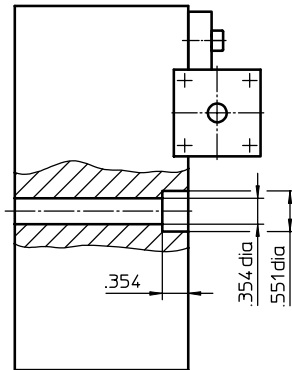
The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

CLOGGING INDICATOR

Series OE (visual-electrical, block execution) explosion-proof

Sheet No.
1629 C

view X



1. Type index: (ordering example)

OE. 1,2. B. - P. VA. Ex

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

OE = clogging indicator, visual-electrical with 1 contact maker with 70% switching pressure difference

2 indicator-pressure difference: Δp -nominal

0,8 = 12 PSI
1,2 = 17 PSI
2,5 = 36 PSI
4,5 = 65 PSI

3 connection:

B = block execution with flange connection

4 connection size:

- = standard

5 sealing material:

P = Nitile (NBR)
V = Viton (FPM)

6 material:

VA = stainless steel

7 execution:

EX = explosion-proof

2. Technical data:

permissible operating pressure: 914 PSI
permissible fluid temperature: -40°F to +176°F
permissible ambient temperature: -40°F to +140°F
permissible pressure difference: $p_1 - p_2 \leq 232$ PSI
indicator-pressure difference Δp : 12; 17; 36; 65 PSI

The electrical signal takes place at 70% of the switching pressure difference.

3. Electrical data switching contact:

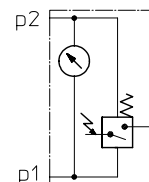
contact design: reed contact - normally open
max. switching voltage: 200V DC
250V AC peak - peak
max. switching current: 1 A
max. breaking capacity: 30 Watt
type of protection:

Ex II 2 GD EEx

m II T6
KEMA 00ATEX 1112
IP 65

certificated
operating temperature range: -40°F to +140°C
connecting cable: H05RN 2x .03 inch
length connecting cable: max. 196 inch

4. Symbol:



1+2 normally open

5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 914 PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

- Connection

Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).

Note: Consider data and connecting conditions mentioned in items 2 to 4.

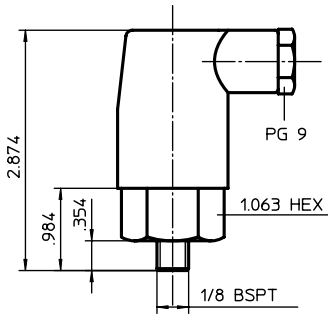
7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

CLOGGING INDICATOR

Series E (electrical), O (visual)

Sheet No.
1616 H



1. Type index: (ordering example)

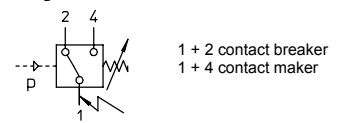
E2.0,3 = pressure switch, change over contacts, switching pressure 4.35 PSI
E2.1,5 = pressure switch, change over contacts, switching pressure 22 PSI
E2.2,5 = pressure switch, change over contacts, switching pressure 36 PSI

2. Technical data:

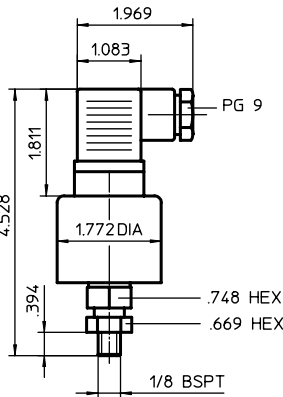
max. pressure to 1450 PSI
temperature range:
max. contact load:
protection:

-4°F to +176°F
max.250 V \equiv /2A
IP 55

3. Symbol:



The functions contact making, contact breaking or contact making and breaking refer to the increasing pressure.



1. Type index: (ordering example)

E4.-0,25 = pressure switch, change over contacts, switching pressure -3.62 PSI

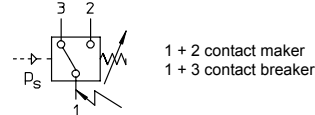
2. Technical data:

max. pressure to 1160 PSI
temperature range:
max. contact load:
protection:

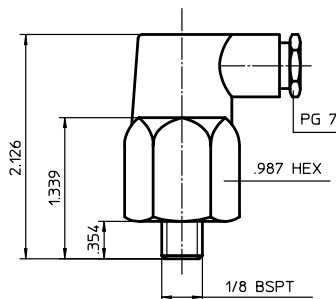
-4°F to +176°F
max.250 V \equiv /5A
IP 65

For the electrical connection please use only enclosed utensil socket. Other utensil sockets have a longer fixing screw which can destroy the inside micro switch.
The screw of an available utensil socket should have a max. thread reach of 1.10 inch. Do not forget the shaped packing by sticking up the utensil and tighten the fixing screw moderately.

3. Symbol:



The functions contact making, contact breaking or contact making and breaking refer to the increasing pressure (0 PSI \rightarrow -.01 PSI).



1. Type index: (ordering example)

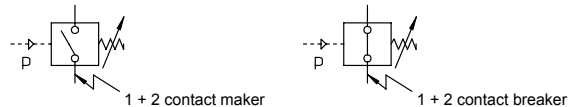
E1.1,5 = pressure switch, normally open contacts, switching pressure 22 PSI
E1.2,5 = pressure switch, normally open contacts, switching pressure 36 PSI
E5.1,5 = pressure switch, normally closed contacts, switching pressure 22 PSI
E5.2,5 = pressure switch, normally closed contacts, switching pressure 36 PSI
E5.5,0 = pressure switch, normally closed contacts, switching pressure 72 PSI

2. Technical data:

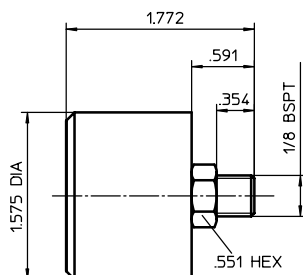
max. pressure to 4350 PSI
temperature range:
max. contact load:
protection:

-4°F to +212°F
max.250 V \equiv /2A
IP 55

3. Symbol:



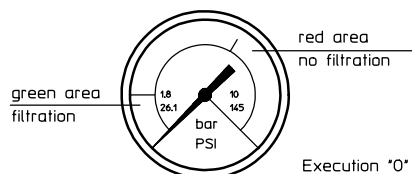
The function contact making or contact breaking refer to the increasing pressure.



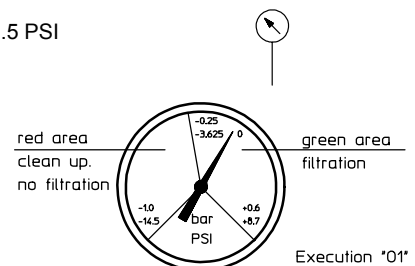
1. Type index: (ordering example)

O = clogging indicator visual, 0 to 145 PSI
O1 = clogging indicator visual, +8.7 PSI to -14.5 PSI

2. Symbol:



Execution 'O'



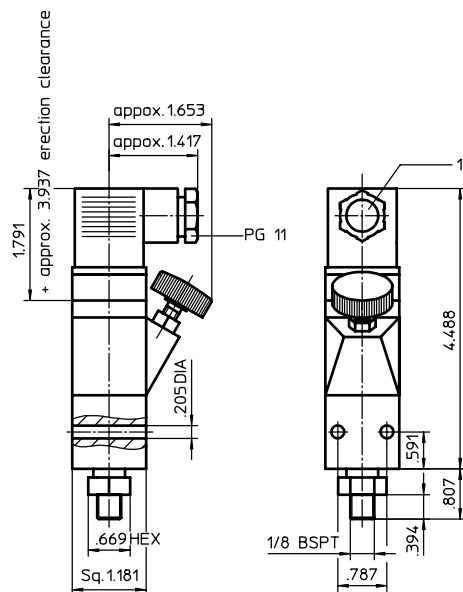
Execution 'O1'

CLOGGING INDICATOR

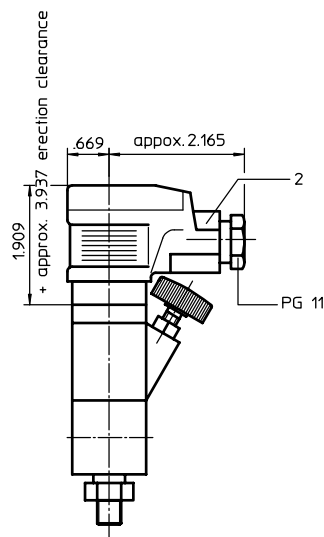
Series E6

Sheet No.
1600 A

Clogging indicator E6 ... GS



Clogging indicator E6 ... SS3



1. Type index: (ordering example)

E 6. 1,5. GS

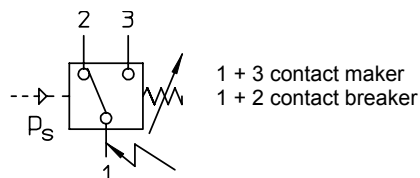
1	2	3
---	---	---

- 1 **series:**
E6 = pressure switch, contact maker and contact breaker
- 2 **switching pressure:**
1,5 = 22 PSI
2,5 = 36 PSI
- 3 **connection:**
GS = line adapter DIN 43650-A, three-channel plug
SS3 = line adapter DIN 43650-A, three-channel plug
with LED indication of switching position

2. Technical data:

max. pressure:	to 1450 PSI
temperature range:	- 4°F to + 176°F
type of protection:	IP 55
connection of cable:	PG 11
max. contact load with GS-line adapter:	U _{max} = 250 V AC I _{max} = 2 A P _{max} = 500 VA
distribution voltage with SS3-line adapter:	U _{max} = 24 V DC
max. contact load with SS3-line adapter:	I _{max} = 2 A P _{max} = 48 VA

3. Symbol:



4. Spare parts:

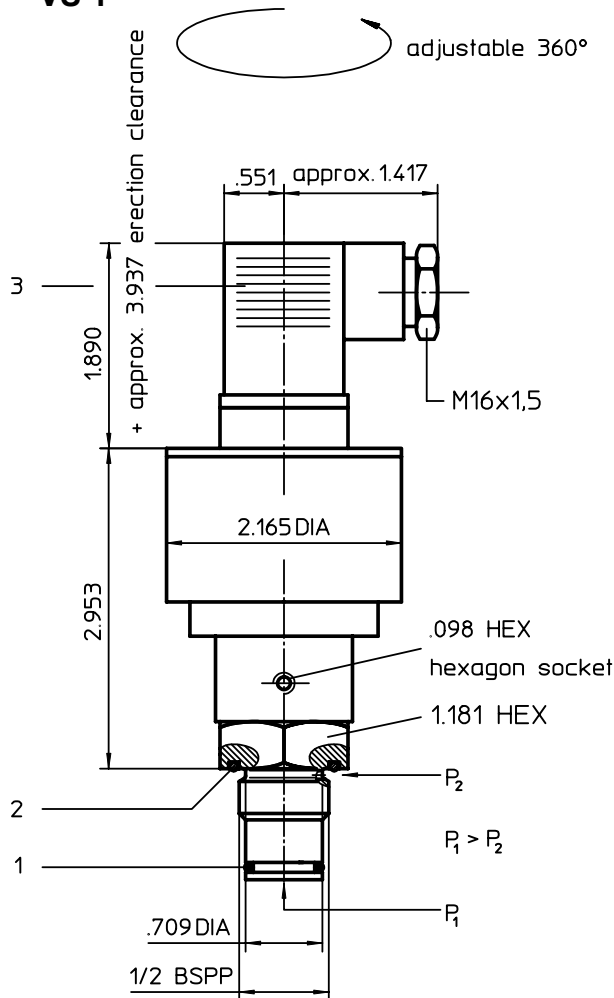
item	qty.	designation	dimension	article-no.
1	1	GS	DIN 43650-A	312492
2	1	SS3	DIN 43650-A	312478

ELECTRONICAL CLOGGING SENSOR

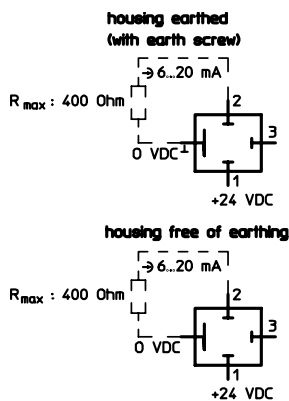
Series VS 1 and Indicating System AG 1 (thread execution)

Sheet No.
1617 F

Clogging Sensor VS 1



Connection Configuration



4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
2	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
3	1	GS	DIN 43650-designA/ISO4400	312492	

1. Type index:

VS 1. 1,5. P. -. GS. -. E						
1	2	3	4	5	6	7

1 series:

VS 1 = electronical clogging sensor with analog
6... 20mA output signal

2 indicator-pressure difference: Δp -nominal

1,5 = 22 PSI 5,0 = 73 PSI
2,5 = 36 PSI 6,0 = 87 PSI

3 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

4 material: (screw-in-housing)

- = standard
VA = stainless steel

5 connection:

GS = line adapter acc. to DIN 43650-designA/ISO4400,
three-channel plug

6 execution:

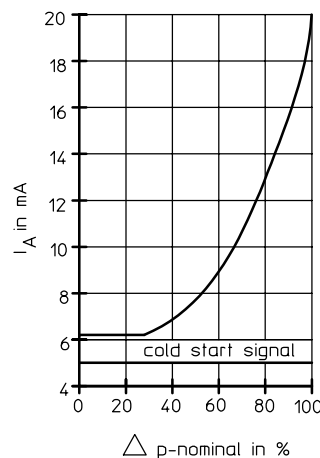
- = standard

7 grounding:

E = 0 volt free of grounding
G = 0 volt grounded

2. Technical data:

max. operating pressure: 6000 PSI
max. pressure difference: 2320 PSI
distribution voltage: 24 V DC \pm 20%
residual ripple: < 10%
temperature range: +14°F to +212°F (fluids)
+14°F to +176°F (electronics)
output signal: 6...20mA
cold start: 5mA
max. load: 400 Ohm
error of measurement: \pm 5% v. Δp -nominal



3. Functions:

- Continuous pressure difference measuring
- Cold start indication up to approx. + 77°F
- Suppression of pressure peaks
- Dust-proof and splash-proof aluminium or stainless steel housing
- Interference-free signal transmission over longer distances
- Optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- Interchangeable with clogging indicator type AE (INT)

Changes of measures and design are subject to alteration!

Indicating System AG 1

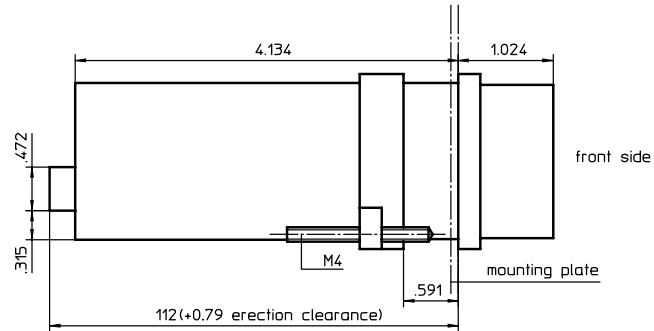
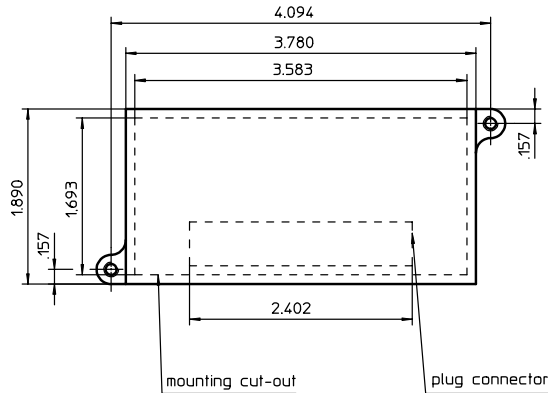
1. Type index: (ordering example)

AG1.

1

1 series:

AG 1 = electronic display unit with clear protective cover,
mounts remote in control cabinets
to be used with electronic clogging sensor VS1



2. Technical data:

distribution voltage: 24 V DC \pm 20%
residual ripple: < 10%
contacts: 2 x contact maker; U_{max} : 240 V AC
(K1/K2) I_{max} : 0,5 A
 P_{max} : 10 Watt
temperature range: 32°F to 158°F
system of protection: IP 53 with transparent protection cap
housing dimensions: according to DIN 43700
(see illustration)

3. Functions:

- Evaluation set for current signals emitted by VS1
- Pressure difference indication by LED - band
- 2 x relay switching contacts
(75% and 100% of the Δp -nominal range)
- Indication of switching position by LED
- Cold start indication by LED
- Adjustable pressure peak suppression up to 60 seconds

4. Connection configuration:

24V_		K1		K2						4...20 mA		24V_
⊥	+	1	2	1	2						+	⊥
1	2	3	4	5	6	7	8	9	10	11	12	

1, 2 = distribution voltage
10, 11, 12 = VS1 - connection

LED-Indicating scheme

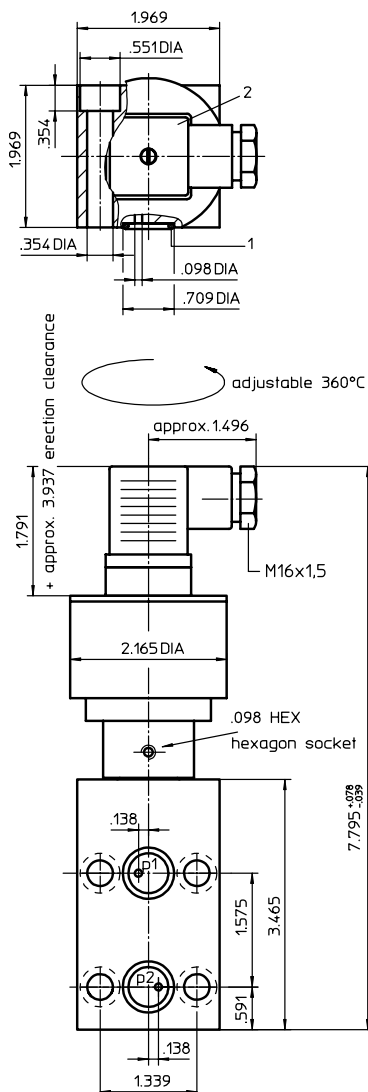
I_A -VS1 in mA	[v]	[< 50]	[50]	[75]	[90]	[100]	[S1]	[S2]	filter element - contamination level
	(ye)	(gr)	(gr)	(ye)	(ye)	(rd)	(rd)	(rd)	
4...6	x	x							- cold start indication (fluid temperature < 77°F) no information about the contamination level
6...8		x							- filter element unused pressure difference: < 50% Δp -nominal
8...12		x	x						- initial contamination pressure difference: \geq 50% Δp -nominal
12...16		x	x	x			x		- moderate contamination pressure difference: \geq 75% Δp -nominal warning contact 1 switched
16...20		x	x	x	x		x		- heavy contamination pressure difference: \geq 90% Δp -nominal
20		x	x	x	x		x	x	- filter element used up pressure difference: \geq 100% Δp -nominal warning contact 2 switched

ELECTRONICAL CLOGGING SENSOR

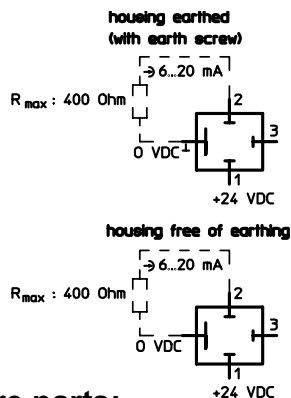
Series VS 1 and Indicating System AG 1 (block execution)

Sheet No.
1607 D

Clogging Sensor VS 1



Connection Configuration



4. Spare parts:

item	qty.	designation	dimension	article-no.
1	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
2	1	GS	DIN 43650-designA/ ISO4400	312492

EDV 02/10

1. Type index:

VS 1. 1,5. P. -. GS. B. E

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

VS 1 = electronical clogging sensor with analog 6... 20mA output signal

2 indicator-pressure difference: (Δp -nominal)

1,5 = 22 PSI 5,0 = 73 psi
2,5 = 36 PSI 6,0 = 87 PSI

3 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

4 material: (block)

- = standard
VA = stainless steel

5 connection:

GS = line adapter acc. to DIN 43650-designA/ISO4400, three-channel plug

6 execution:

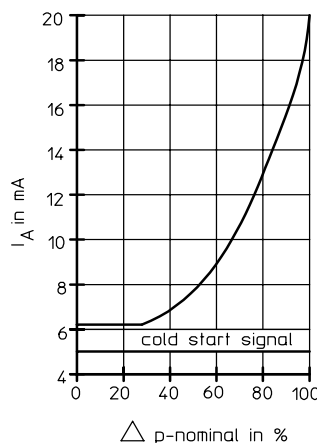
B = block execution

7 grounding:

E = 0 volt free of grounding
G = 0 volt grounded

2. Technical data:

max. operating pressure: 6000 PSI
max. pressure difference: 2320 PSI
distribution voltage: 24 V DC \pm 20%
residual ripple: < 10%
temperature range: +14°F to +212°F (fluids)
+14°F to +176°F (electronics)
output signal: 6...20mA
cold start: 5mA
max. load: 400 Ohm
error of measurement: \pm 5% v. Δp -nominal



3. Functions:

- Continuous pressure difference measuring
- Cold start indication up to approx. + 77°F
- Suppression of pressure peaks
- Dust-proof and splash-proof aluminium or stainless steel housing
- Interference-free signal transmission over longer distances
- Optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- Interchangeable with clogging indicator type AE (INT)

Changes of measures and design are subject to alteration!

Indicating System AG 1

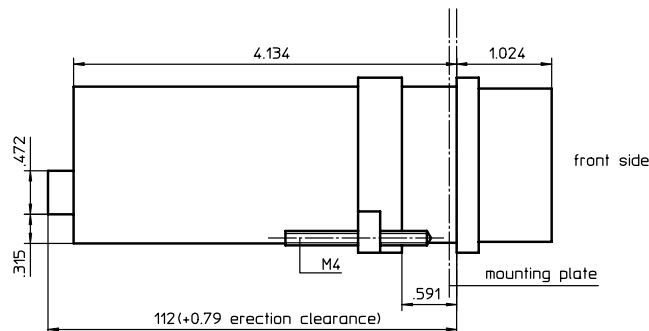
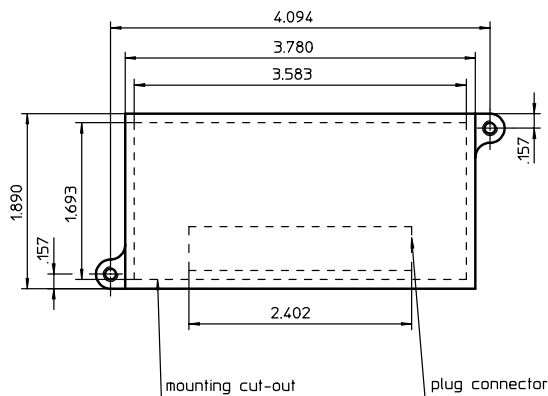
1. Type index: (ordering example)

AG1.

1

1 series:

AG 1 = electronic display unit with clear protective cover,
mounts remote in control cabinets
to be used with electronic clogging sensor VS1



2. Technical data:

distribution voltage: 24 V DC \pm 20%
residual ripple: < 10%
contacts: 2 x contact maker; U_{max} : 240 V AC
(K1/K2) I_{max} : 0,5 A
 P_{max} : 10 Watt
temperature range: 32°F to 158°F
system of protection: IP 53 with transparent protection cap
housing dimensions: according to DIN 43700
(see illustration)

3. Functions:

- Evaluation set for current signals emitted by VS1
- Pressure difference indication by LED - band
- 2 x relay switching contacts
(75% and 100% of the Δp -nominal range)
- Indication of switching position by LED
- Cold start indication by LED
- Adjustable pressure peak suppression up to 60 seconds

4. Connection configuration:

24V ₋			K1		K2					4...20 mA		24V ₋
⊥	+		1	2	1	2					+	⊥
1	2	3	4	5	6	7	8	9	10	11	12	

1, 2 = distribution voltage
10, 11, 12 = VS1 - connection

LED-Indicating scheme

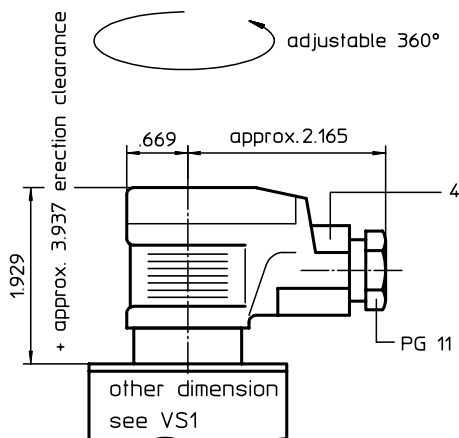
I_A -VS1 in mA	[V]	[< 50]	[50]	[75]	[90]	[100]	[S1]	[S2]	filter element - contamination level
	(ye)	(gr)	(gr)	(ye)	(ye)	(rd)	(rd)	(rd)	
4...6	x	x							- cold start indication (fluid temperature < 77°F) no information about the contamination level
6...8		x							- filter element unused pressure difference: < 50% Δp -nominal
8...12		x	x						- initial contamination pressure difference: \geq 50% Δp -nominal
12...16		x	x	x			x		- moderate contamination pressure difference: \geq 75% Δp -nominal warning contact 1 switched
16...20		x	x	x	x		x		- heavy contamination pressure difference: \geq 90% Δp -nominal
20		x	x	x	x		x	x	- filter element used up pressure difference: \geq 100% Δp -nominal warning contact 2 switched

ELECTRONICAL CLOGGING SENSOR

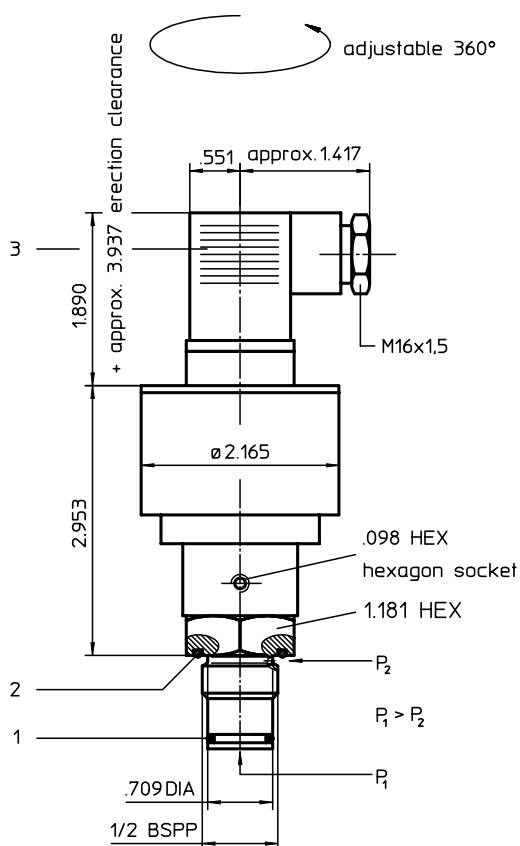
Series VS 2 (thread execution)

Sheet No.
1618 E

Clogging sensor VS 2 ... SS1



Clogging sensor VS 2 ... GS



1. Type index: (ordering example)

VS 2. 1,5. P. -. GS. -. E

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

VS2 = electronic clogging sensor with
2x PNP-switching contacts (75% and 100% of the Δp -nominal range)

2 indicator-pressure difference: (Δp -nominal)

1,5 = 22 PSI
2,5 = 36 PSI
5,0 = 73 PSI
6,0 = 87 PSI

3 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

4 material: (screw-in-housing)

- = standard
VA = stainless steel

5 connection:

GS = line adapter acc. to DIN 43650-designA/ISO4400,
three-channel plug
SS1 = line adapter acc. to DIN 43650-designA/ISO4400,
three-channel plug with LED switch-position indicator for VS

6 execution:

- = standard

7 grounding:

E = 0 volt free of grounding
G = 0 volt grounded

2. Technical data:

max. operating pressure: 6000 PSI
max. pressure difference: 2320 PSI
distribution voltage: 24 V DC \pm 20%
residual ripple: < 10%
temperature range: + 14 °F to + 212°F (fluid)
+ 14 °F to + 176°F (electronics)
PNP-switching contacts: contact maker; I_{max} = 200 mA with 24V
protection: IP65 acc. to DIN EN 60529

3. Functions:

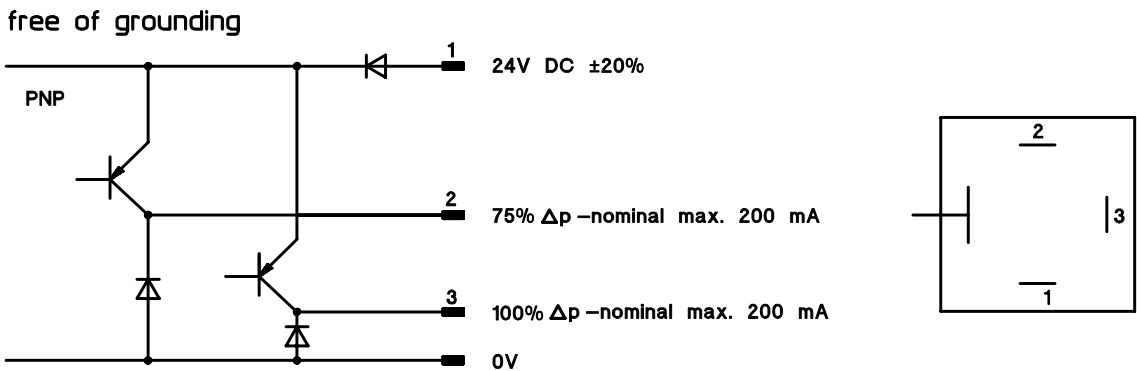
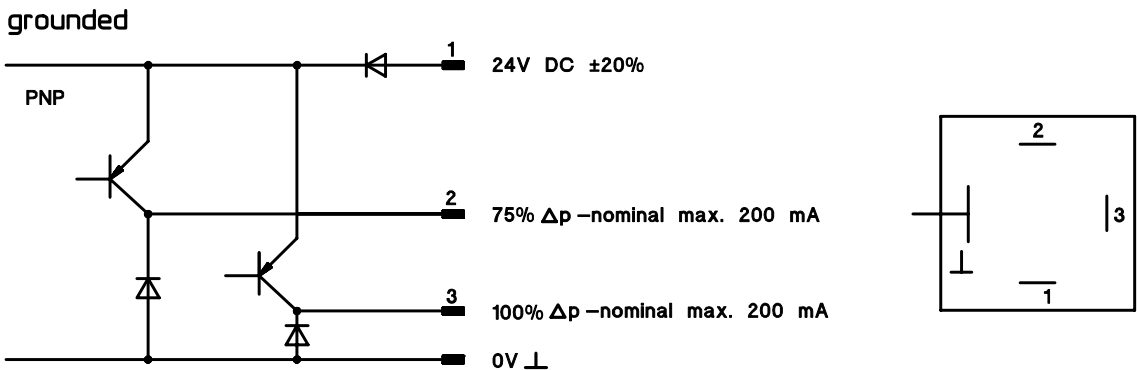
- Discrete control of the filter contamination by means of two PNP-switching contacts (75% and 100% of the Δp -nominal range)
- Indication of switching position by LED immediately at the sensor in connection with the signal plug SS1
- Cold start suppression up to approx. + 77°F
- Suppression of pressure peaks
- Interchangeable with clogging indicator type AE (INT)

4. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	14x2	304342 (NBR) 304722 (FPM)
2	1	O-ring	22x2	304708 (NBR) 304721 (FPM)
3	1	GS	DIN 43650-designA/ISO4400	312492
4	1	SS1	DIN 43650-designA/ISO4400	310403

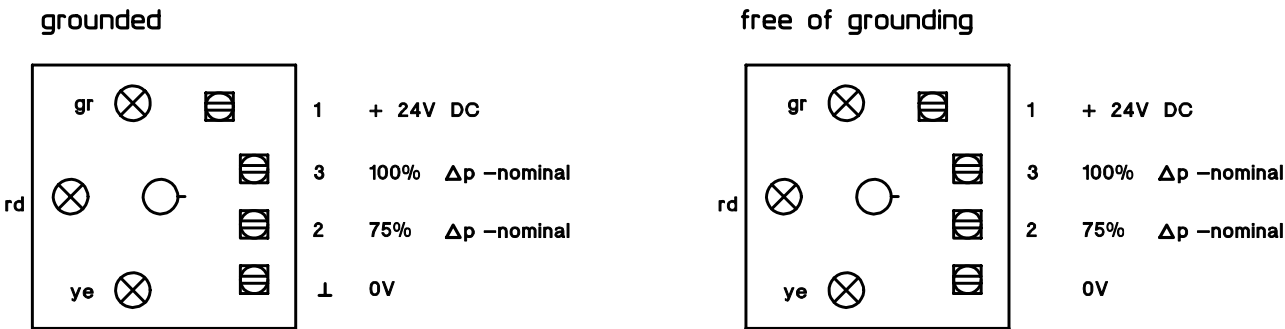
5. Connection configuration:

Connection configuration VS 2



Connection configuration SS 1

The signal plug SS1 is used to indicate the actual switching position at the VS2.



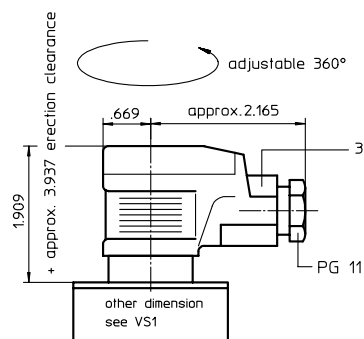
- LED - green - on: operating pressure in on-position
- LED - yellow - on: switching contact 75% Δp-nominal switched
- LED - red - on: switching contact 100% Δp-nominal switched

ELECTRONICAL CLOGGING SENSOR

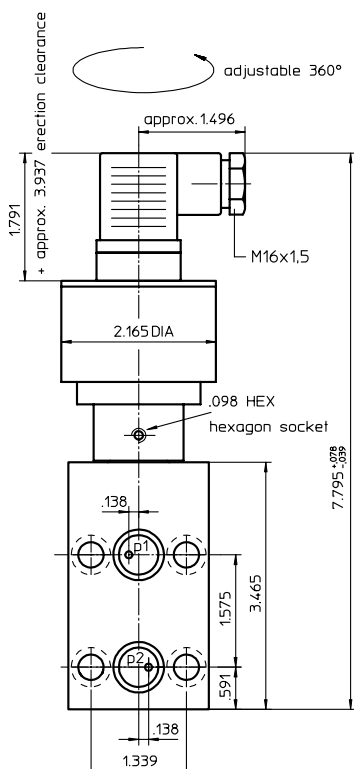
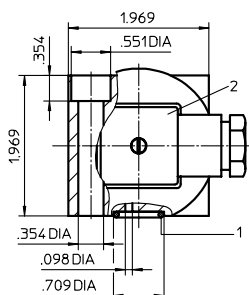
Series VS 2 (block execution)

Sheet No.
1608 C

Clogging sensor VS 2 ... SS1



Clogging sensor VS 2 ... GS



1. Type index: (ordering example)

VS 2. 1,5. P. -. GS. B. E

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

VS2 = electronic clogging sensor with
2x PNP-switching contacts (75% and 100% of the Δp -nominal range)

2 indicator-pressure difference: (Δp -nominal)

1,5 = 22 PSI
2,5 = 36 PSI
5,0 = 73 PSI
6,0 = 87 PSI

3 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

4 material: (block)

- = standard
VA = stainless steel

5 connection:

GS = line adapter acc. to DIN 43650-designA/ISO4400,
three-channel plug
SS1 = line adapter acc. to DIN 43650-designA/ISO4400,
three-channel plug with LED switch-position indicator for VS 2

6 execution:

B = block execution

7 grounding:

E = 0 volt free of grounding
G = 0 volt grounded

2. Technical data:

max. operating pressure: 6000 PSI
max. pressure difference: 2320 PSI
distribution voltage: 24 V DC \pm 20%
residual ripple: < 10%
temperature range: + 14 °F to + 212°F (fluid)
+ 14 °F to + 176°F (electronics)
PNP-switching contacts: contact maker; I_{max} = 200 mA with 24V
protection: IP65 acc. to DIN EN 60529

3. Functions:

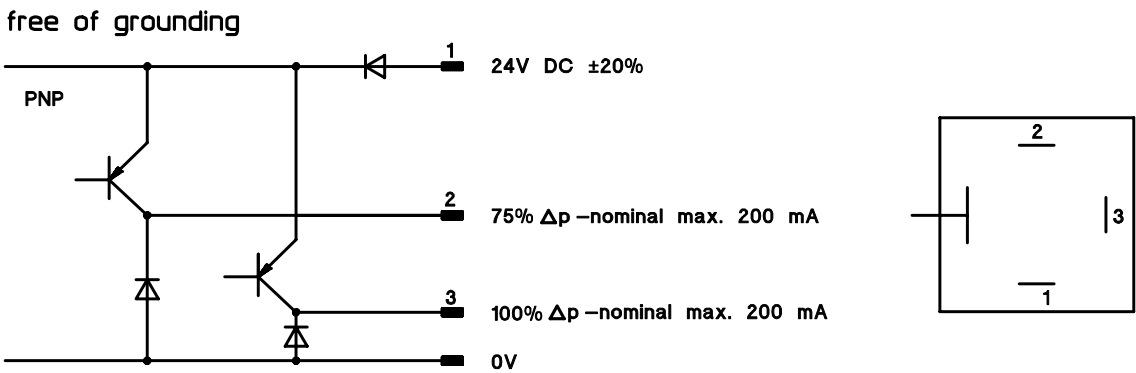
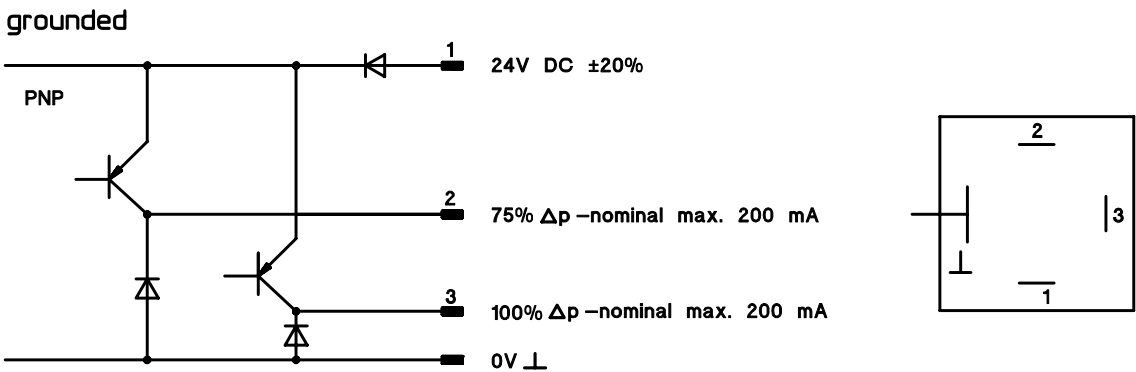
- Discrete control of the filter contamination by means of two PNP-switching contacts (75% and 100% of the Δp -nominal range)
- Indication of switching position by LED immediately at the sensor in connection with the signal plug SS1
- Cold start suppression up to approx. + 77°F
- Suppression of pressure peaks
- Interchangeable with clogging indicator type AE (INT)

4. Spare parts:

item	qty.	designation	dimension	article-no.
1	2	O-ring	14x2	304342 (NBR) 304722 (FPM)
2	1	GS	DIN 43650-designA/ISO4400	312492
3	1	SS1	DIN 43650-designA/ISO4400	310403

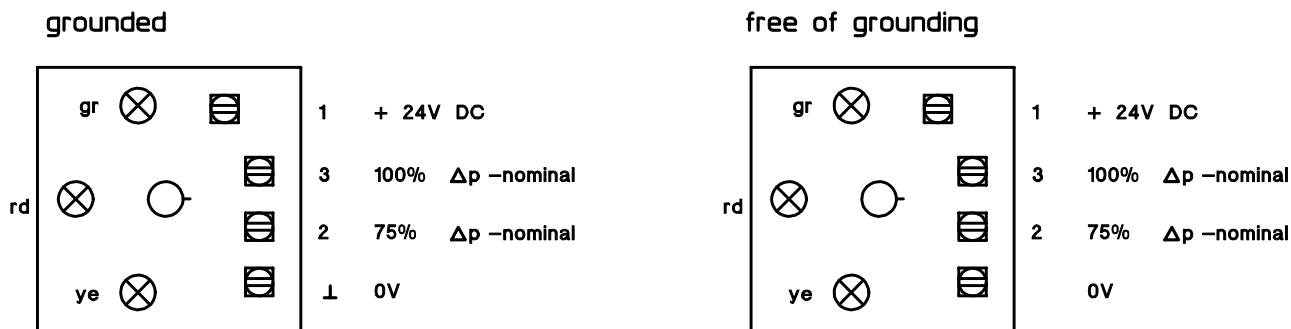
5. Connection configuration:

Connection configuration VS 2



Connection configuration SS 1

The signal plug SS1 is used to indicate the actual switching position at the VS2.



LED - green - on: operating pressure in on-position
LED - yellow - on: switching contact 75% Δp-nominal switched
LED - red - on: switching contact 100% Δp-nominal switched

SHUT-OFF VALVE

Series AV 6000 PSI (3000 PSI)

Sheet No.
1655 C

1. Type index: (ordering example)

AV. G. 1. - . P. VA

1	2	3	4	5	6
---	---	---	---	---	---

- 1 series:
AV = shut-off valve
- 2 connection:
G = thread connection
- 3 connection size:
1 = G 1/4
- 4 execution:
- = cannot be interlinked (R3 and S3 not present)
Z = intermediate plate interlinking, interlinked with clogging indicators according to sheet-no. 1609, 1628, 1629 or clogging sensors according to sheet-no. 1607, 1608
- 5 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)
- 6 housing material:
- = standard
VA = stainless steel

2. Technical data:

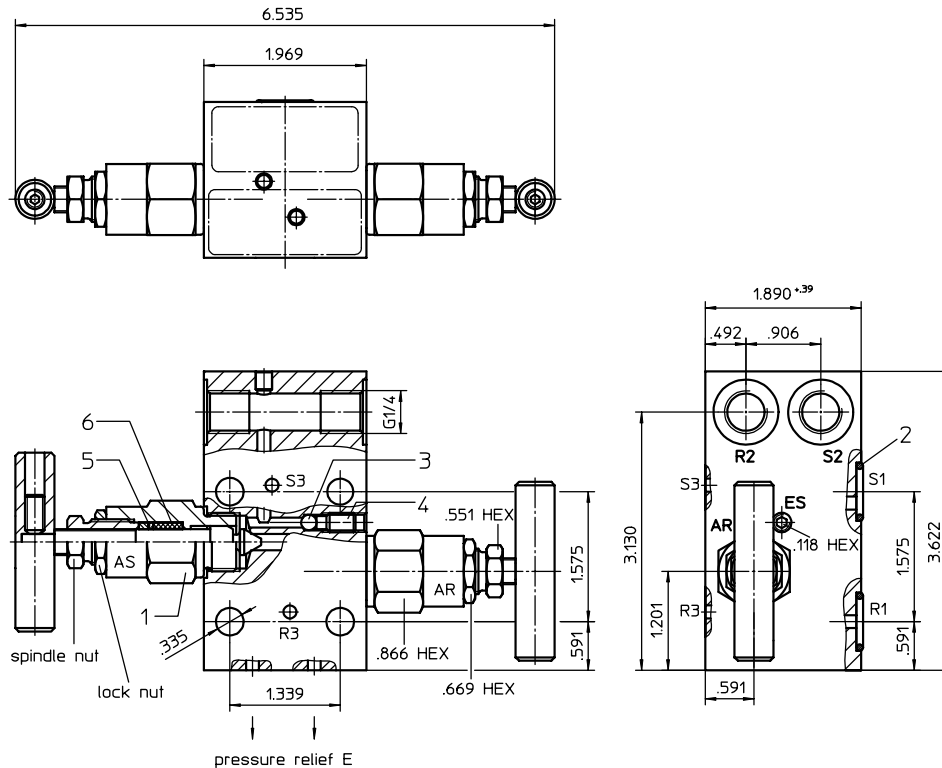
temperature range: +14°F to +176°F (for a short time +212°F)
max. operating pressure: 6000 PSI (cannot be interlinked)
3000 PSI (interlinked, execution Z)
max.pressure difference: 2320 PSI

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	2	valve	AV.DN5	316344
2	2	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
3	2	ball	4.762	316377
4	2	set screw	M6 x 12	316368
5	2	annular becel		316371
6	2	packing		316370

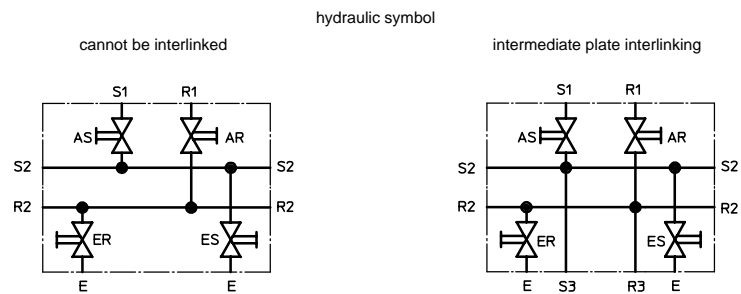
weight: approx. 4.0 lbs.

Changes of measures and design are subject to alteration!



connections S3 and R3 only for
intermediate plate construction

4. Symbols:



5. Connection configuration:

description of the connection	equipment connection		pressure
S1	filter connection	dirt side	p ₁
R1	filter connection	clean side	p ₂
S2	indicator pipe connection	dirt side	p ₁
		test connection	
R2	indicator pipe connection	clean side	p ₂
S3	indicator intermediate plate connection	dirt side	p ₁
R3	indicator intermediate plate connection	clean side	p ₂
E	relieving connections		p = 0

6. Description:

The AV shut-off valves, intended for use in double filters with change-over valve, that can be serviced during operation and are fitted with a contamination indicator.

To check or exchange the contamination indicator, it is necessary to shut off the pressure feed pipes S1 (contaminated side) and R1 (clean side) between the contamination indicator. Valves AS and AR meet this shut-off requirement.

The pressure relief valves ES and ER are used to relieve the pressure of the connected contamination indicator. Pipes to the contamination indicator and external test equipment can be fitted to connections S2 and R2.

7. Operating instructions:

Depending on the order, filters are normally fitted with the shut-off valve before delivery. During retrofitting care must be exercised to ensure that the sealing elements, O-ring 14x2 are there and seated correctly and that there is cleanliness during installation.

Operation depends on the operational condition:

- a) Operating condition of the shut-off valve
- Valves AS and AR open, p₁ and p₂ operate the contamination indicator.
 - Valves ES and ER closed.
- b) Cutting-off operation of the shut-off valve
- Close valves AS and AR, turn the valve spindle clockwise up to the stop, torque approx. .73-1.47 lb.-ft., p₁ and p₂ remain active on the indicator.
 - Open valves ES and ER 1 turn anti-clockwise on the M6x .47 stud (tool, .118 inch Allen key), p₁ and p₂ on the indicator go to 0, which means that the existing pressure is released through relief connections E.
 - Dismantling or exchange of the connected contamination indicator is possible.
- c) Test operation
- Close valves AS and AR (see point 7b)
 - Open valves ES and ER (see point 7b)
 - Close valve ES (see point 7d)
 - Connect external test equipment to S2
 - Provide the test pressure to S2 and check the operation of the connected indicator. Test pressure = switching pressure differential.
 - Release the test pressure, remove the external test equipment and seal connection S2.
- d) Establishing the operating condition
- After an exchange or test of the connected contamination indicator the operating condition must be re-established.
- Clock valves ES and ER, turn the M6x .47 stud clockwise up to the end stop, tighten to approx. .36-.73 lb.-ft.
 - Open valves AS and AR (see point 7b)

Warning!

With valves AS and AR closed and valves ES and/or ER open, the valves AS and AR will not shut off if there is a constant leak at connections E.

The connected contamination indicator or the seal at connection S2 must not be dismantled if it is impossible to establish the closing operation of valves AS and AR.

8. Maintenance:

Maintenance of the shut-off valve should only be undertaken if the valve is de-pressurized.

Maintenance includes:

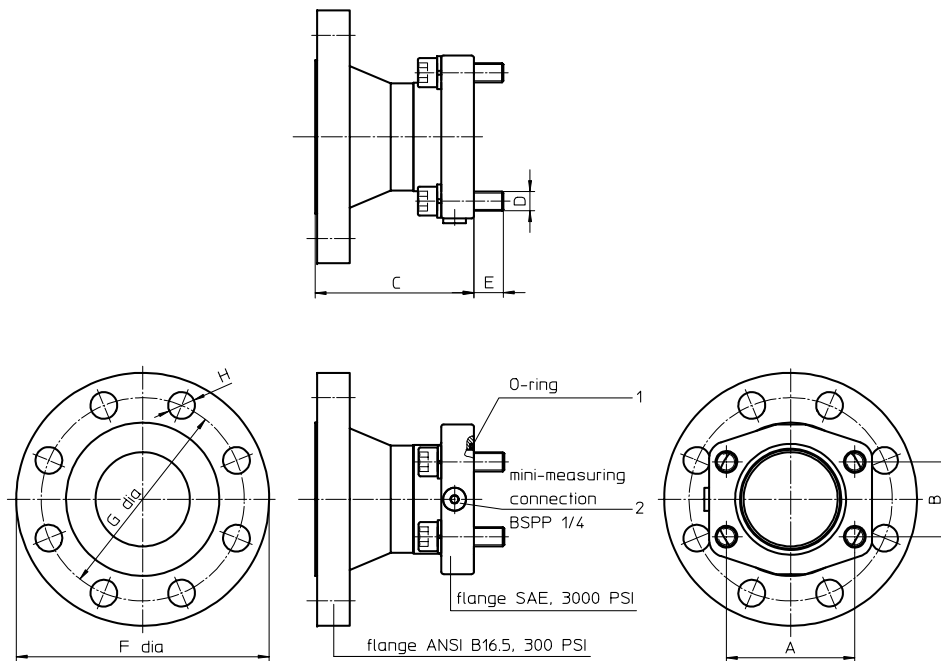
- Exchange of replacement parts, item 1 to 7.
- Tightening of the packing of the valve, item 1
- Exchange of complete shut-off valve

In the case of a leak on the valve spindle of the valve, item 1, first tighten the packing. Only if this does not stop the leak should the packing, item 6, and the annular bezel, item 5, or the whole valve, item 1 be replaced. The following torque pressures must be observed when tightening the packing or exchanging the packing and annular bezel or valve or exchanging the complete shut-off valve.

- Spindle nut .551 hex 7.37 to 14.74 lb.-ft.
- Lock nut .669 hex 29.48 lb.-ft.
- Valve .866 hex 58.96 lb.-ft.
- Screws M8-8.8 20.74 lb.-ft.

ADAPTOR, SAE-ANSI Series ASA

Sheet No.
1658 B



Dimensions: inch

connection	A	B	C	D	E	F	G	H	O-ring according to AS 568A/BS 1806
3/4"	1.87	.87	3.75	M10	.63	4.61	3.24	.75	-214 (24,99 x 3,53)
2"	3.06	1.68	4.60	M12	.71	6.50	5.00	.75	-228 (56,75 x 3,53)
2 1/2"	3.50	2.00	5.04	M12	.71	7.50	5.88	.87	-232 (69,45 x 3,53)
3"	4.18	2.44	5.17	M16	.98	8.25	6.62	.87	-237 (85,32 x 3,53)
4"	5.11	3.06	5.42	M16	.98	10.00	7.88	.87	-245 (110,72 x 3,53)
5"	6.00	3.62	5.92	M16	.98	11.00	9.25	.87	-253 (136,12 x 3,53)

1. Type index: (ordering example)

ASA. FS. A. FA1. A. P. ST

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

ASA = adaptor SAE-ANSI

2 connection 1:

FS = flange SAE-J518c, 3000 PSI

3 connection size 1:

4 = 3/4"
8 = 2"
9 = 2 1/2"
A = 3"
B = 4"
C = 5"

4 connection 2:

FA1 = ANSI-flange 300 PSI, sealing surface rough grind 1600-3600 µin
FA2 = ANSI-flange 300 PSI, sealing surface rough grind < 640 µin

5 connection size 2:

4 = 3/4"
8 = 2"
9 = 2 1/2"
A = 3"
B = 4"
C = 5"

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 flange material:

ST = steel
VA = stainless steel

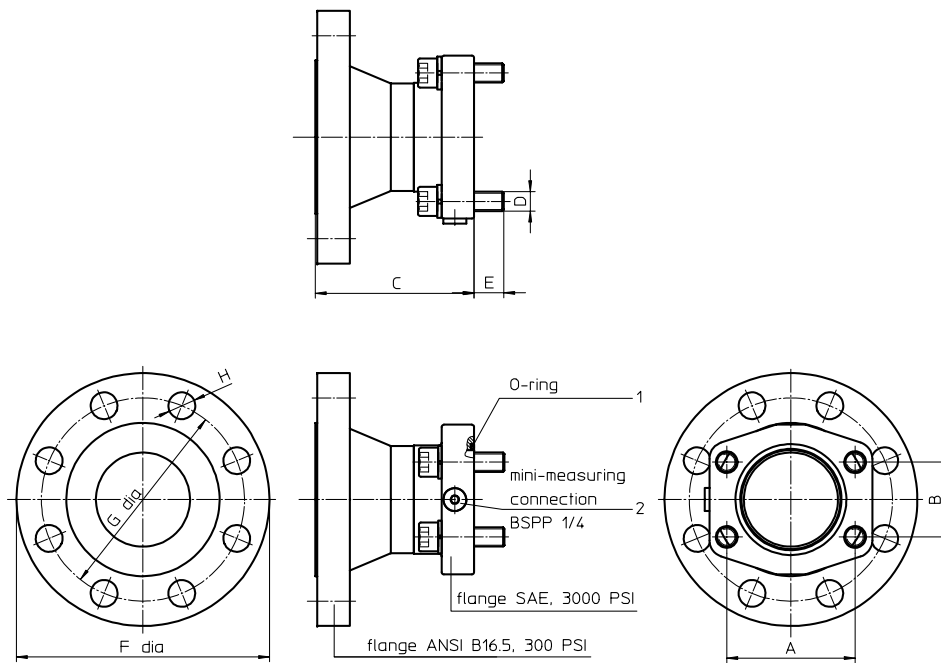
2. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	24,99 x 3,53	304381 (NBR) 305784 (FPM)
	1	O-ring	56,75 x 3,53	306035 (NBR) 310264 (FPM)
	1	O-ring	69,45 x 3,53	305868 (NBR) 307357 (FPM)
	1	O-ring	85,32 x 3,53	305590 (NBR) 306308 (FPM)
	1	O-ring	110,72 x 3,53	316355 (NBR) 316356 (FPM)
	1	O-ring	136,12 x 3,53	320162 (NBR) 320163 (FPM)
2	1	screw plug (at 2" - 5")	BSPP 1/4	305003

Changes of measures and design are subject to alteration!

ADAPTOR, SAE-ANSI Series ASA

Sheet No.
1658



1. Type index: (ordering example)

ASA. FS. A. FA. A. P. ST

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:
ASA = adaptor SAE-ANSI
- 2 connection 1:
FS = flange SAE-J518c, 3000 PSI
- 3 connection size 1:
8 = 2"
9 = 2 1/2"
A = 3"
B = 4"
C = 5"
- 4 connection 2:
FA = ANSI-flange 300 PSI
- 5 connection size 2:
8 = 2"
9 = 2 1/2"
A = 3"
B = 4"
C = 5"
- 6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)
- 7 flange material:
ST = steel
VA = stainless steel

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	56,75 x 3,53	306035 (NBR)	310264 (FPM)
	1	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
	1	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
	1	O-ring	110,72 x 3,53	316355 (NBR)	316356 (FPM)
	1	O-ring	136,12 x 3,53	320162 (NBR)	320163 (FPM)
2	1	screw plug	BSPP 1/4	305003	

Dimensions: inch

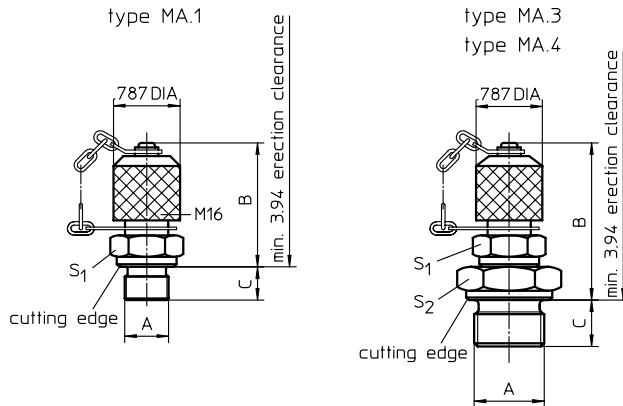
connection	A	B	C	D	E	F	G	H	O-ring according to AS 568A/BS 1806
2"	3.06	1.68	4.60	M12	.71	6.50	5.00	.75	-228 (56,75 x 3,53)
2 1/2"	3.50	2.00	5.04	M12	.71	7.50	5.88	.87	-232 (69,45 x 3,53)
3"	4.18	2.44	5.17	M16	.98	8.25	6.62	.87	-237 (85,32 x 3,53)
4"	5.11	3.06	5.42	M16	.98	10.00	7.88	.87	-245 (110,72 x 3,53)
5"	6.00	3.62	5.92	M16	.98	11.00	9.25	.87	-253 (136,12 x 3,53)

Changes of measures and design are subject to alteration!

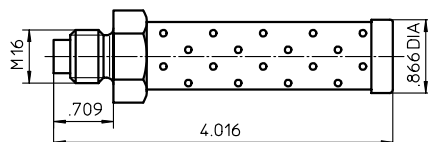
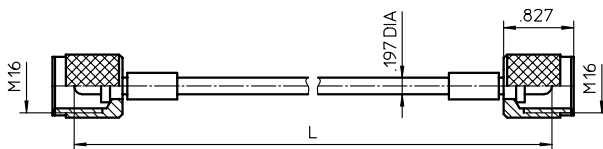
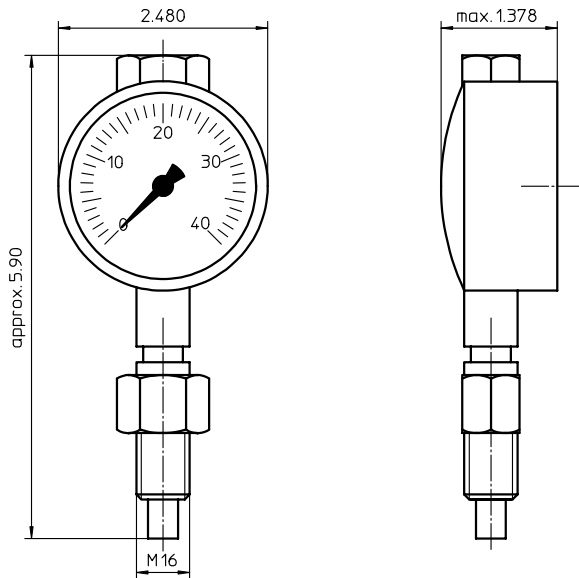
MEASURE- and BLEEDER-CONNECTIONS

Series MA 7250 PSI

Sheet No.
1650 D



sealing material: viton (FPM)



Mini-measuring connection

1. Type index: (ordering example)

MA. 1. ST

1	2	3
---	---	---

1 series:

MA = mini-measuring connection

2 screwed plug:

1 = 1/4 BSPP

3 = 1/2 BSPP

4 = 3/4 BSPP

3 material:

ST = steel

VA = stainless steel

2. Dimensions:

type	A	B	C	S ₁	S ₂
MA.1	1/4 BSPP	1.42	.04	.75	-
MA.3	1/2 BSPP	1.80	.55	.75	1.06
MA.4	3/4 BSPP	1.80	.63	.75	1.26

Pressure gauge

1. Type index: (ordering example)

Pressure gauge. 16

1	2
---	---

1 series:

pressure gauge

2 pressure range:

16 = 0 - 232 PSI

40 = 0 - 580 PSI

100 = 0 - 1450 PSI

250 = 0 - 3625 PSI

600 = 0 - 8700 PSI

High pressure hose

1. Type index: (ordering example)

High pressure hose. M 16. 630

1	2	3
---	---	---

1 series:

high pressure hose

2 threaded connection: M 16

3 length:

630 = 25 inch

2000 = 79 inch

Spray protection M 16

(ordering example)

Changes of measures and design are subject to alteration!

Description:

The measuring-connection and spray protection are designed for filters up to PN 7250 PSI. The measuring-connection has to be mounted tightly to the foreseen measure connection- and spray protection spots.

It is possible to connect the pressure gauge by means of high-pressure hose with the screw coupling M16 without interrupting operation.

The high-pressure hose is to be deaerated before the first measuring.

A capillary effect prevents a drain off of the operating fluid.

The spray protection must be used in connection with the high-pressure hose and is designed for filters with a capacity of approx. 2.65 GPM.

Note!

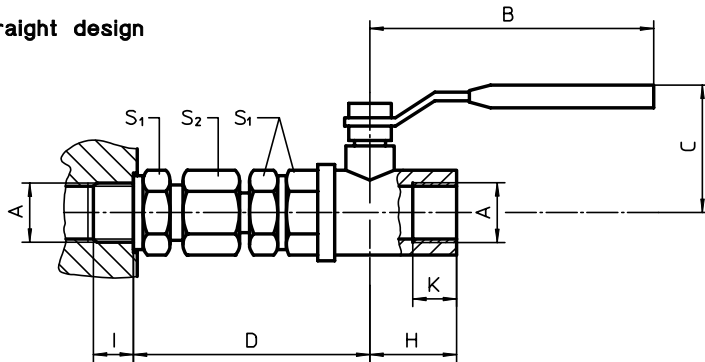
The deaeration is only to be executed with operating pressure up to max. 464 PSI. A flow of approx. .32 GPM of operating fluid is given at a pressure of 464 PSI and a viscosity of 125 SUS. It is inadmissible to connect the high-pressure hose with the measuring-connection without spray protection respectively without connected pressure gauge. (risk of injury)

EVACUATION- and BLEEDER-CONNECTIONS

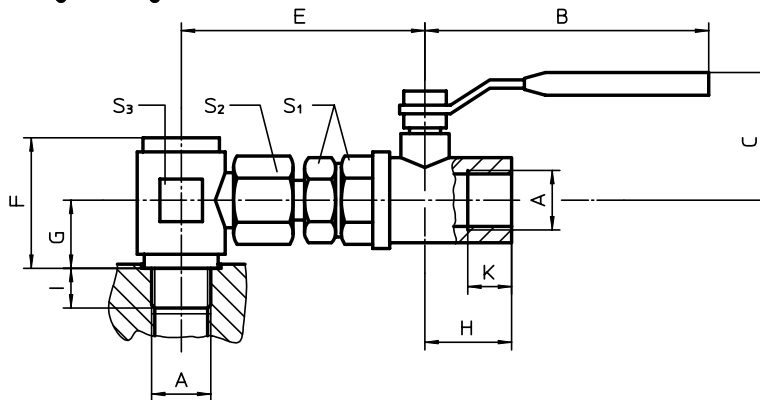
Series EE

Sheet No.
1651 C

straight design



angle-design



1. Type index: (ordering example)

EE. 3. W. ST

1	2	3	4
---	---	---	---

1 series:

EE = evacuation- and bleeder-connection

2 connection size:

3 = ½ BSPP

5 = 1 BSPP

7 = 1 ½ BSPP

3 design:

G = straight design

W = angle design

4 material:

ST = steel

VA = stainless steel

2. Dimensions:

connection size A	B	C	D	E	F	G	H	I	K	S ₁	S ₂	S ₃
½ BSPP	3.94	1.77	3.39	3.54	1.65	.83	1.20	.55	.61	1.06	1.06	1.26
1 BSPP	4.72	2.24	3.86	4.41	2.52	1.26	1.80	.70	.83	1.61	1.61	1.97
1 ½ BSPP	6.30	3.23	4.88	5.70	3.35	1.65	2.30	.90	.10	2.17	2.36	2.76

3. Technical data:

temperature range:

+14°F to +80°F (for a short time + 212°F)

max. operating pressure:

464 PSI

installation position:

any

fluid:

mineral oils, lubricating oils,
synthetic hydraulic fluids, emulsions

4. Description:

When maintaining and servicing filters the drain-plugs and air-bleed connections are used to drain and to bleed the fluid inside the filter. This applies to filters with a operating pressure of PN ≤ 464 PSI. The connection size is to be chosen according to the corresponding connections of the filter housing.

During operation of the filter, the connection has to remain closed.

Changes of measures and design are subject to alteration!

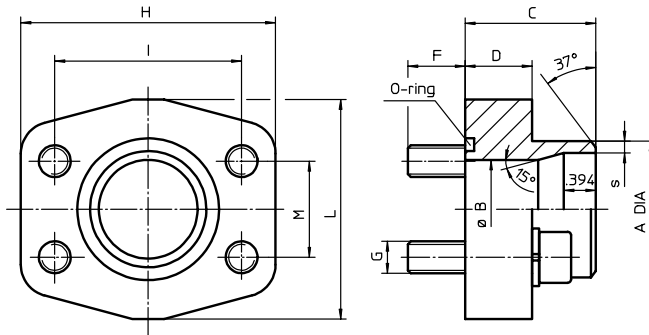
MATING FLANGES

Master Gauge for Holes SAE J518c 3000 PSI

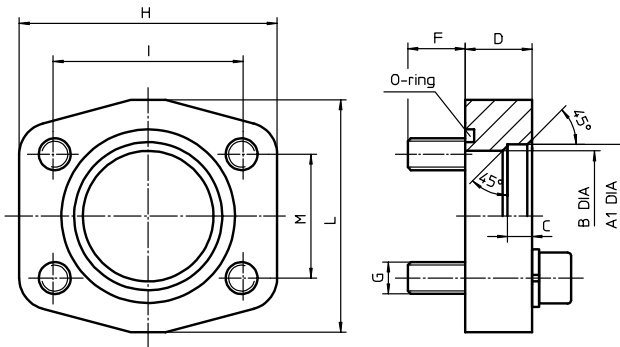
Sheet No.
1652 F

Flanges are offered as complete unit, i. e. including cylinder screws, spring ring and O-ring and are used to connect the filter to the pipe-system.

welded flange socket



welded flange



Type index: (ordering example)

BFS. 8. A. 2.37 x .11. St. P. 3000

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

BFS = flange with master gauge for holes according to SAE-J518c

2 connection size:

6 = 1 1/4"
7 = 1 1/2"
8 = 2"
9 = 2 1/2"
A = 3"
A1 = 3 1/2"
B = 4"
C = 5"

3 design:

A = welded flange socket
E = welded flange

4 size of connection pipes of the flange:

outside diameter A of pipe x pipe-wall thickness s (see table below)

5 flange material:

St = steel (C 22, St 52-3)
VA = stainless steel (X 5 Cr Ni 1810)

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 master gauge for holes according to SAE-J518c

3000 = 3000 PSI

welded flange: design A

SAE-connection 3000 PSI	pipe-dimension A x s	PN ¹⁾ PSI	B	C	D	F	G	H	I	L	M	O-ring acc. to AS 568A/BS 1806	sheet-no.
1 1/4"	1.32 x .10 1.66 x .10	914	.98 1.22	1.61	.82	.70	M 10	3.14	2.31	2.71	1.18	-222	21111-3 21111-3
1 1/2"	1.90 x .10	914	1.49	1.73	.98	.70	M 12	3.70	2.75	3.03	1.40	-225	21112-3
2"	1.90 x .15 1.90 x .10 2.37 x .11	914	1.49 1.49 1.96	1.77	.98	.70	M 12	4.05	3.06	3.50	1.68	-228	21113-3 21113-3 21113-3
2 1/2"	2.99 x .11	580	2.48	1.96	.98	.70	M 12	4.52	3.50	3.97	2.00	-232	21114-3
3"	3.50 x .12	580	2.87	1.96	1.06	.90	M 16	5.31	4.18	4.88	2.44	-237	21115-3
3 1/2"	4.50 x .14	580	3.50	1.88	1.06	.90	M 16	6.02	4.75	5.39	2.75	-241	22746-3
5"	4.50 x .14	580	4.21	1.96	1.06	.98	M16	7.24	6.00	6.50	3.62	-253	-
5"	5.50 x .16	580	5.16	1.96	1.10	.98	M16	7.24	6.00	6.50	3.62	-253	-

welded flange: design E

SAE-connection 3000 PSI	pipe-dimension A x s	PN ¹⁾ PSI	A1	B	C	D	F	G	H	I	L	M	O-ring acc. to AS 568A/BS 1806	sheet-no.
4"	2.99 x .14 3.50 x .12 4.50 x .14	580	3.03 3.54 4.52	2.71 3.22 3.93	.39	.98	.98	M 16	6.37	5.11	5.74	3.06	-245	21123-3
5"	4.50 x .14	580	4.52	3.93	.47	.98	.74	M16	7.24	6.00	6.50	3.62	-253	32508-3
5"	5.50 x .16	580	5.60	5.12	.47	.98	.74	M16	7.24	6.00	6.50	3.62	-253	32557-3

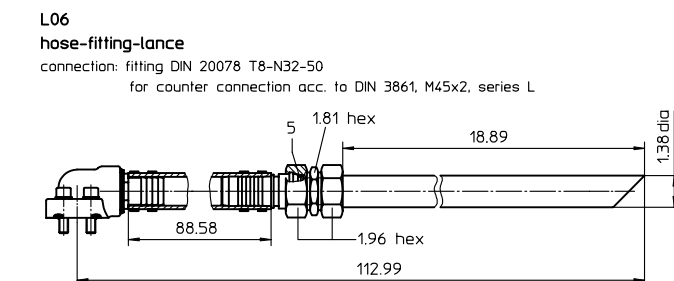
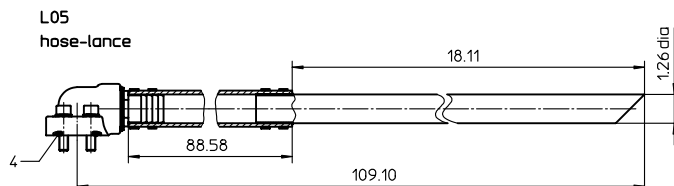
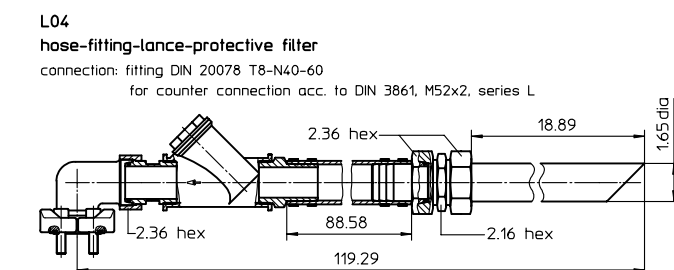
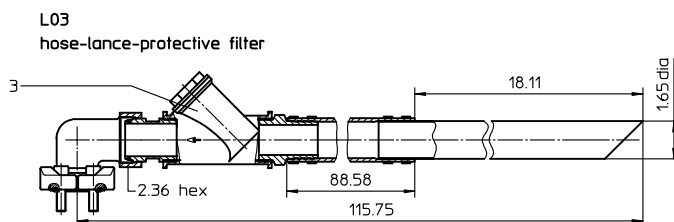
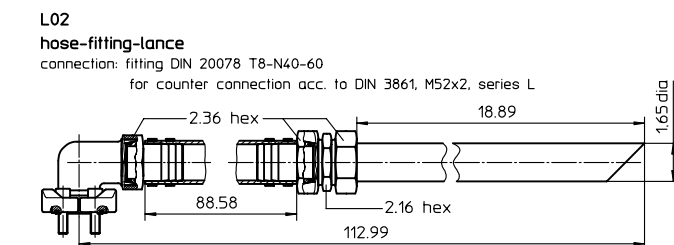
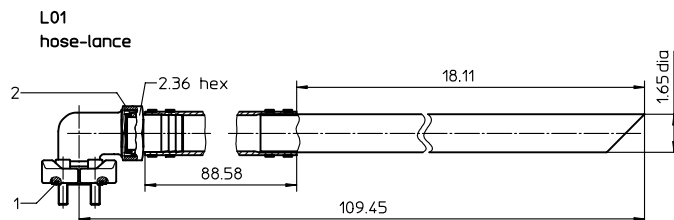
pipe-dimension A = outside diameter
s = pipe-wall thickness

¹⁾ maximum permissible pressure for pipe connection

HOSE LINE

Series L01-L22

Sheet No.
31961-4A



1. Type index: (ordering example)

Hose line

L01. FS. 7. P

1	2	3	4
---	---	---	---

1 series:

- L01 = hose-lance
- L02 = hose-fitting-lance
- L03 = hose-lance-protective filter
- L04 = hose-fitting-lance-protective filter
- L05 = hose-lance
- L06 = hose-fitting-lance
- L21 = hose-fitting
- L22 = hose-fitting

2 connection:

FS = SAE J518c, 3000 PSI

3 connection size:

- 6 = 1 1/4" L05-L06, L21
- 7 = 1 1/2" L01-L04, L22

4 sealing material:

- P = Nitrile (NBR)
- V = Viton (FPM)

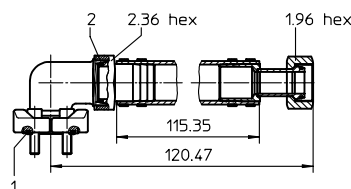
2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	47,22 x 3,53	305078 (NBR)	310269 (FPM)
2	1	O-ring	35 x 2,5	308893 (NBR)	- (FPM)
3	1	strainer insert	SF6.250G	318663	
4	1	O-ring	37,69 x 3,53	305078 (NBR)	310269 (FPM)
5	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)

L22

hose-fitting

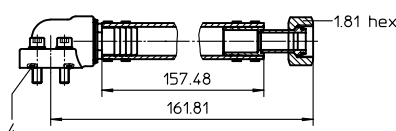
connection: fitting DIN 20078 T9-P25-50
for counter connection acc. to DIN 3861, M42x2, series S



L21

hose-fitting

connection: fitting DIN 20078 T9-P20-46
for counter connection acc. to DIN 3861, M36x2, series S



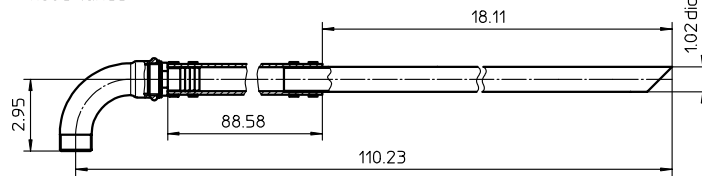
Changes of measures and design are subject to alteration!

HOSE LINE

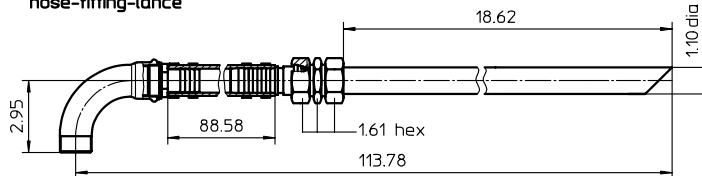
Series L07-12

Sheet No.
31992-4

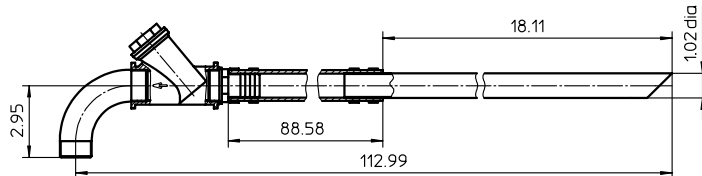
L07
hose-lance



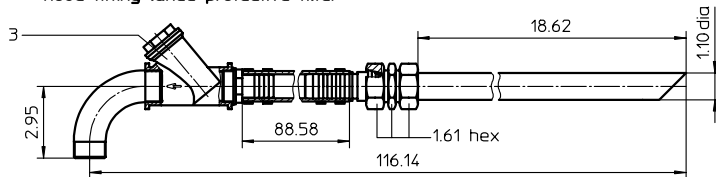
L08
hose-fitting-lance



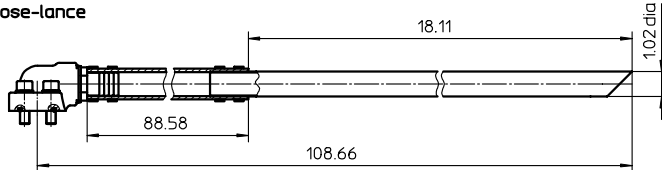
L09
hose-lance-protective filter



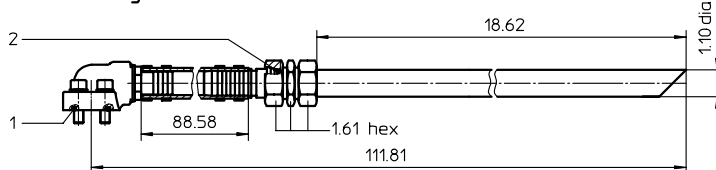
L10
hose-fitting-lance-protective filter



L11
hose-lance



L12
hose-fitting-lance



EDV 12/99

1. Type index: (ordering example)

Hose line

L07. UG. 5. P

1	2	3	4
---	---	---	---

1 series:

- L07 = hose-lance
- L08 = hose-fitting-lance
- L09 = hose-lance-protective filter
- L10 = hose-fitting-lance-protective filter
- L11 = hose-lance
- L12 = hose-fitting-lance

2 connection:

- UG = thread L07-L10
- FS = SAE J518c, 3000 PSI L11-L12

3 connection size:

- 5 = -16 SAE or SAE 1"

4 sealing material:

- P = Nitrile (NBR)
- V = Viton (FPM)

2. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	32.9 x 3.53	318850 (NBR) - (FPM)
2	1	O-ring	26 x 2	311950 (NBR) - (FPM)
3	1	strainer insert	SF4.250G	318906

Changes of measures and design are subject to alteration!



DATA SHEET

Oil sample analysis / Element check

Customer : _____ Customer-no : _____ Tank sample : _____
Address : _____ On-line sample : _____
Contact : _____ Other sample : _____
Department : _____ Viscosity : _____
Machine : _____ Temperature : _____
Filter : _____ Operating time : _____
Element : _____ Environment : _____
Fluid : _____ Order-no : _____

nominal	Oil sample analysis	EDV-no.	nominal	Filter element check	EDV-no.
	Particle cleanliness determination acc. to ISO 4406 and NAS 1638	304 969		Bubble point test acc. to ISO 2942	304 973
	Microscopical particel counting according to ISO 4407	314 579		Collaps pressure resistance acc. to ISO 2941	314 563
	Gravimetric analysis according to ISO 4405	314 557		Multi Pass Test acc. to ISO16889 (new element)	314 564
	Microscopical contamination analysis	304 970		Δ p/Q - curve acc. to ISO 3968 (new element)	304 974
	Determination of the water content hydride-method	304 971		Compatibility with hydraulic fluids acc. to ISO 2943	314 565
	Determination of the water content KF-method only for mineral oils	317 688		Analysis of the filter element structure	304 975
	Viscosity - temperature diagram	314 559		Pore size + spectrum - filter material	314 566
	Center viscosity (+ 40° C)	314 558		Kind of contamination, microscopical	314 567
	Aging, chemical (TAN / TBN)	314 560		Determination of the contamination weight, gravimetric	317 691
	Element spectral analysis (ICP)	314 561		Determination of the contamination weight	314 568
	Infrared spectral analysis (FTIR)	317 689		Manometric method - INF element as well as actual	
	PH-value-measurement (only aqueous fluids)	314 562		flow rate needed	
	Others			Determination of the contamination weight	314 569
	Sample - bottles - set 1 (2 pieces) acc. to ISO 3722	313 427		Manometric method - element of other brand	
	Sample - bottles - set 2 (12 pieces) acc. to ISO 3722	314 781		+ housing as well as actual flow rate	
	Hand - pump, with adapter for sample bottles	313 426		Element spectral analysis (ICP) (filter contermination)	317 692
	Spare hose 3.4 ft (1,2 m)	313 323		Infrared spectral analysis (FTIR) (filter contermination)	317 693
	One - way - pipette, complete	312 950			
	Photo documentation for the oil sample analysis	317 690		Photo documentation	304 972

Remarks :

_____ date

_____ responsible engineer

Bei pulsierender Belastung wie z.B. bei Kunststoffspritzmaschinen, Druckgussmaschinen, Schmiedepressen ect. reduzieren sich die max. zulässigen Betriebsdrücke je nach Filterbaureihe auf folgende Daten:

(Ermüdungsfestigkeit ca. 1 Mio. Lastwechsel)

Bei der Filterbaureihe bis 160 bar z.B. MNL, ML
(Filtergehäusematerial Al-Speziallegierung / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 120 bar
Berstdruck: 480 bar

bei der Filterbaureihe bis 315 bar HDD, HPF, HPP
(Filtergehäusematerial GGG40.3 / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 250 bar
Berstdruck: 945 bar

bei der Filterbaureihe bis 420 bar HP, HPV
(Filtergehäusematerial GGG40.3 / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 340 bar
Berstdruck: 1344 bar

At pulsating loading like by injection moulding machines, diecasting machines, forging pressure etc. the max. admissible accumulator pressures reduce according to the line of filters to following facts:

(fatigue resistance appr. 1 million change of load)

At the line of filters up to 160 bar e.g. MNL, ML
(filter housing material Al-special alloy / C-steel) the admissible accumulator pressure reduces to 120 bar
burst pressure: 480 bar

At the line of filters up to 315 bar e.g. HDD, HPF, HPP
(filter housing material GGG 40.3 / C-steel) the admissible accumulator pressure reduces to 250 bar
burst pressure: 945 bar

At the line of filters up to 420 bar e.g. HP, HPV
(filter housing material GGG 40.3 / C-steel) the admissible accumulator pressure reduces to 340 bar
burst pressure: 1344 bar

1. General

The ATEX analysis is required when products are intended to be used in, or in connection with, a potentially explosive atmosphere.

Potentially explosive atmospheres within the meaning of Directive 94/9/EC are atmospheres which could become explosive due to local and/or operational conditions.

Products for whose use special regulations apply (e.g. seagoing vessels and their equipment, which are covered by the IMO Convention) are excluded from Directive 94/9/EC.

Standards of explosion safety are classified according to Directive 94/9/EC point 4.4.

2. Classification

The application-specific degree of protection must be indicated by the customer (please mark as applicable).

The type of explosive atmosphere: ☐ G (Gas) ☐ D (Dust)

Equipment group I		Equipment group II		
Category M1	Category M2	Category 1	Category 2	Category 3
		Zone 0 (G)	Zone 1 (G)	Zone 2 (G)
		Zone 20 (D)	Zone 21 (D)	Zone 22 (D)

Temperature class (Maximum permissible surface temperature)

T1	T2	T3	T4	T5	T6
850°F	570°F	392°F	275°F	212°F	185°F

Explanations regarding assignation of appliance groups and categories (zones).

Equipment group I (potentially explosive atmospheres in underground operations)

Degree of protection	Category	Guarantee of protection	Operating conditions ¹⁾
Very high	M 1	Two independent protective means, or safe even if two faults occur independently of each other.	Equipment remains operational and continues to be operated in the event of a potentially explosive atmosphere.
High	M 2	Suitable for normal operation and difficult operating conditions.	Equipment is disconnected in the event of a potentially explosive atmosphere.

Equipment group II (potentially explosive atmospheres in the other areas)

Degree of protection	Category	Guarantee of protection	Operating conditions ¹⁾
Very high	1	Two independent protective means, or safe even if two faults occur independently of each other.	Equipment remains operational and continues to be operated in zones 0, 1, 2 (G) and 20, 21, 22 (D).
High	2	Safe in normal operation and if the usual faults occur.	Equipment remains operational and continues to be operated in zones 1, 2 (G) and/or 21, 22 (D).
Normal	3	Safe in normal operation.	Equipment remains operational and continues to be operated in zone 2 (G) and/or 22 (D).

¹⁾ Note: See also Directive 1999/92/EC on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

3. Documentation and marking

The documentation on equipment for which Directive 94/9/EC applies is produced according to the specific application and equipment.

The documentation shows the classification of the equipment/combination of equipment according to Directive 94/9/EC in a declaration of conformity.

The rating plate(s) indicate the explosion protection symbol, the equipment group, the equipment category and the potentially explosive atmosphere for which the protective system is suitable.

ATEX- Directive

Questionnaire to the ATEX- Analysis of electrical clogging indicators

Sheet No.
41767-4

1. General

The ATEX analysis is required when products are intended to be used in, or in connection with, a potentially explosive atmosphere.

Potentially explosive atmospheres within the meaning of Directive 94/9/EC are atmospheres which could become explosive due to local and/or operational conditions.

Products for whose use special regulations apply (e.g. seagoing vessels and their equipment, which are covered by the IMO Convention) are excluded from Directive 94/9/EC.

Standards of explosion safety are classified according to Directive 94/9/EC point 4.4.

2. Classification

The application-specific degree of protection must be indicated by the customer (please mark as applicable).

Type of explosive atmosphere: ☐ G (Gas) ☐ D (Dust)

Equipment group I	
Category M1	Category M2

Equipment group II		
Category 1	Category 2	Category 3
Zone 0 (G)	Zone 1 (G)	Zone 2 (G)
Zone 20 (D)	Zone 21 (D)	Zone 22 (D)

Temperature class (Maximum permissible surface temperature)

T1	T2	T3	T4	T5	T6
850°F	570°F	392°F	275°F	212°F	185°F

Is the clogging indicator operated in an intrinsically safe circuit: yes ☐ no ☐

If yes: How much cable is approximately needed? _____ inch

Explanations regarding assignation of appliance groups and categories (zones).

Equipment group I (potentially explosive atmospheres in underground operations)

Degree of protection	Category	Guarantee of protection	Operating conditions ¹⁾
Very high	M 1	Two independent protective means, or safe even if two faults occur independently of each other.	Equipment remains operational and continues to be operated in the event of a potentially explosive atmosphere.
High	M 2	Suitable for normal operation and difficult operating conditions.	Equipment is disconnected in the event of a potentially explosive atmosphere.

Equipment group II (potentially explosive atmospheres in the other areas)

Degree of protection	Category	Guarantee of protection	Operating conditions ¹⁾
Very high	1	Two independent protective means, or safe even if two faults occur independently of each other.	Equipment remains operational and continues to be operated in zones 0, 1, 2 (G) and 20, 21, 22 (D).
High	2	Safe in normal operation and if the usual faults occur.	Equipment remains operational and continues to be operated in zones 1, 2 (G) and/or 21, 22 (D).
Normal	3	Safe in normal operation.	Equipment remains operational and continues to be operated in zone 2 (G) and/or 22 (D).

¹⁾ Note: See also Directive 1999/92/EC on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

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The rating plate(s) indicate the explosion protection symbol, the equipment group, the equipment category and the potentially explosive atmosphere for which the protective system is suitable.

SPECIFICATION IS06

for filter elements

Sheet No.
31601-4 A

<u>glue:</u>	standard
<u>by-pass valve:</u>	plastic, stainless steel-spring 1.4310
<u>seal:</u>	P, V (nitrile, viton)
<u>filter-material:</u>	VG, G, M (no P)
<u>plait:</u>	stainless steel-support wire
<u>metal parts:</u>	aluminium anodized, steel tinned

SPECIFICATION IS06

for filter housing and indicator for HFC-use

Sheet No.
31605-4 B

1. aluminium parts:

all aluminium parts are to be anodized

2. steel parts:

standard design

3. cast parts (GGG):

standard design

4. plastic parts:

standard design

5. galvanized parts:

galvanized parts **must not** be used!

6. bowls, deep-drawn pieces:

standard design phosphate treated

7. switching shaft at DU-filters:

surface chemical-nickel, tempered

DU 40: steel, nitrated

8. switching shaft at HDD- filters:

surface chemical-nickel, tempered

HDD 61-151: steel, nitrated

9. by-pass valves:

- plastic: standard design

- metal: standard design

10. clogging indicator:

- return-line filter: standard design aluminium anodized or complete stainless steel 1.4571

- indicator AE: standard design aluminium anodized or complete stainless steel 1.4571

- indicator AOR/AOC: standard design aluminium anodized or complete stainless steel 1.4571

- indicator OP/OE: standard design aluminium anodized or complete stainless steel 1.4571

- indicator VS1/VS2: standard design aluminium anodized

11. seals:

< 70 °C = NBR (Nitrile)

> 70 °C = FPM (Viton)

12. change-over ball valve DU:

standard design, aluminium anodized

13. intertank transfer stations/filter units:

Attention! special design with separate specification

14. applicable centering pivots:

steel: standard design

aluminium: anodized

SPECIFICATION IS07

for filter elements used with Oil/Ammonia-mixtures (NH₃)

Permanent working temperature $\leq +176^{\circ}\text{F}$

Sheet No.

31602-4C

1. Filter element

Adhesive:	Article No. 305540
Sealing gaskets:	N (Neoprene (CR))
Filtration material:	VG, G, M
Bellow:	Support fleece PS 315
Metal parts:	Zincd

2. Regular design is applied for housing and branch pipes

Caution!

This specification IS07 is intended only for oil/ammonia-mixtures with a maximum gas portion of 10%. This specification is not applicable for 100% ammonia atmospheres as well as watery ammonia. Due to the oil content of more than 80% no EPDM sealing gaskets shall be used.

SPECIFICATION IS12

for change-over filter,
internal parts of change-over armature stainless steel

Sheet No.
41028-4

1. Filter element:

Standard execution

2. Sealing material:

Standard execution

3. Housing (Filter- and change-over housing):

Standard execution

3.1 Internal parts of the change-over:

3.1.1 Flap change-over :

Change-over flap: stainless steel (304, 316 Ti)
Change-over shaft: stainless steel (304, 316 Ti)

3.1.2 Shaft change-over:

Change-over shaft: stainless steel (316 Ti)
Surface chromed, dressed to fit size

3.1.3 Segment change-over:

Change-over segment: standard execution
Change-over shaft:: stainless steel (316 Ti)
Screws: A2, A4
Springs: stainless steel (301)
Distance socket: stainless steel (316 Ti)
Retaining ring in steel, chemically nickel-plated 30 µm

3.1.4 Ball change-over:

Sealing ring: standard execution
Support case : stainless steel (316 Ti)
Snap ring: stainless steel (301)
Attachment: stainless steel (316 Ti)
Ball: stainless steel (316 Ti)

SPECIFICATION IS21

for pressure vessel parts according to ASME VIII Div. 1

Sheet No.

43415-4

1. scope:

This specification concerns all pressure vessel parts effected by ASME VIII Div. 1.

2. choice of material:

Only valid ASME – material shall be used for pressure vessel parts (see ASME VIII Div. 1).

3. design and calculation:

The design and calculation of pressure vessel parts shall be done according to the valid Edition and Addenda of ASME VIII Div. 1.

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Die Preise verstehen sich zuzüglich der gesetzlichen MwSt.
Der Mindestauftragswert beträgt 100 EUR.

V.A.T. has to be added to the prices.
Minimum order value: 100 EUR.

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E1
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
1. Abmessungen/Sizes INTERNORMEN		
1.1 Filterelemente/Filter Elements 01.E 30...1350		
303061	01.E 30.3VG.30.E.P.-	
303064	01.E 30.3VG.HR.E.P.-	
303062	01.E 30.6VG.30.E.P.-	
300070	01.E 30.6VG.HR.E.P.-	
300064	01.E 30.10VG.30.E.P.-	
300065	01.E 30.10VG.HR.E.P.-	
303063	01.E 30.16VG.30.E.P.-	
305710	01.E 30.16VG.HR.E.P.-	
300067	01.E 30.25VG.30.E.P.-	
300068	01.E 30.25VG.HR.E.P.-	
300596	01.E 30.25G.30.E.P.-	
311829	01.E 30.25G.HR.E.P.-	
300069	01.E 30.40G.30.E.P.-	
300597	01.E 30.40G.HR.E.P.-	
310991	01.E 30.80G.30.E.P.-	
313658	01.E 30.80G.HR.E.P.-	
333359	01.E 30.130G.30.E.P.-	
324139	01.E 30.130G.HR.E.P.-	
1) 01.E 30 MEHRPREIS VITON DICHTUNG		
2) 01.E 30 MEHRPREIS AUSF. KPL. EDELSTAHL		
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
318778	01.E 60.3VG.30.E.P.-	
300072	01.E 60.3VG.HR.E.P.-	
302185	01.E 60.6VG.30.E.P.-	
300084	01.E 60.6VG.HR.E.P.-	
300073	01.E 60.10VG.30.E.P.-	
300074	01.E 60.10VG.HR.E.P.-	
300612	01.E 60.16VG.30.E.P.-	
303099	01.E 60.16VG.HR.E.P.-	
300077	01.E 60.25VG.30.E.P.-	
300078	01.E 60.25VG.HR.E.P.-	
301823	01.E 60.25G.30.E.P.-	
300080	01.E 60.25G.HR.E.P.-	
301994	01.E 60.40G.30.E.P.-	
300082	01.E 60.40G.HR.E.P.-	
301917	01.E 60.80G.30.E.P.-	
300609	01.E 60.80G.HR.E.P.-	
320136	01.E 60.130G.30.E.P.-	
304941	01.E 60.130G.HR.E.P.-	
1) 01.E 60 MEHRPREIS VITON DICHTUNG		
2) 01.E 60 MEHRPREIS AUSF. KPL. EDELSTAHL		
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E2
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
<hr/>		
304114	01.E 90.3VG.30.E.P.-	
300103	01.E 90.3VG.HR.E.P.-	
303108	01.E 90.6VG.30.E.P.-	
300117	01.E 90.6VG.HR.E.P.-	
300104	01.E 90.10VG.30.E.P.-	
300106	01.E 90.10VG.HR.E.P.-	
300631	01.E 90.16VG.30.E.P.-	
300118	01.E 90.16VG.HR.E.P.-	
300108	01.E 90.25VG.30.E.P.-	
300110	01.E 90.25VG.HR.E.P.-	
304488	01.E 90.25G.30.E.P.-	
300111	01.E 90.25G.HR.E.P.-	
300114	01.E 90.40G.30.E.P.-	
300115	01.E 90.40G.HR.E.P.-	
300627	01.E 90.80G.30.E.P.-	
300628	01.E 90.80G.HR.E.P.-	
303104	01.E 90.130G.30.E.P.-	
332999	01.E 90.130G.HR.E.P.-	
	1) 01.E 90 MEHRPREIS VITON DICHTUNG	
	2) 01.E 90 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
316513	01.E 150.3VG.30.E.P.-	
300135	01.E 150.3VG.HR.E.P.-	
303111	01.E 150.6VG.30.E.P.-	
300145	01.E 150.6VG.HR.E.P.-	
300136	01.E 150.10VG.30.E.P.-	
300138	01.E 150.10VG.HR.E.P.-	
300657	01.E 150.16VG.30.E.P.-	
300658	01.E 150.16VG.HR.E.P.-	
300141	01.E 150.25VG.30.E.P.-	
300142	01.E 150.25VG.HR.E.P.-	
303112	01.E 150.25G.30.E.P.-	
300143	01.E 150.25G.HR.E.P.-	
300651	01.E 150.40G.30.E.P.-	
300144	01.E 150.40G.HR.E.P.-	
300653	01.E 150.80G.30.E.P.-	
300655	01.E 150.80G.HR.E.P.-	
302220	01.E 150.130G.30.E.P.-	
303088	01.E 150.130G.HR.E.P.-	
	1) 01.E 150 MEHRPREIS VITON DICHTUNG	
	2) 01.E 150 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
1) Surplus price: viton sealing 2) Surplus price: execution complete stainless steel		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E3
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
318583	01.E 170.3VG.30.E.P.-	
300146	01.E 170.3VG.HR.E.P.-	
303070	01.E 170.6VG.30.E.P.-	
300153	01.E 170.6VG.HR.E.P.-	
300147	01.E 170.10VG.30.E.P.-	
300148	01.E 170.10VG.HR.E.P.-	
300662	01.E 170.16VG.30.E.P.-	
303065	01.E 170.16VG.HR.E.P.-	
300150	01.E 170.25VG.30.E.P.-	
300151	01.E 170.25VG.HR.E.P.-	
303068	01.E 170.25G.30.E.P.-	
300660	01.E 170.25G.HR.E.P.-	
303066	01.E 170.40G.30.E.P.-	
303513	01.E 170.40G.HR.E.P.-	
300661	01.E 170.80G.30.E.P.-	
302191	01.E 170.80G.HR.E.P.-	
	01.E 170.130G.30.E.P.-	
313929	01.E 170.130G.HR.E.P.-	
	1) 01.E 170 MEHRPREIS VITON DICHTUNG	
	2) 01.E 170 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
319965	01.E 240.3VG.30.E.P.-	
300186	01.E 240.3VG.HR.E.P.-	
303089	01.E 240.6VG.30.E.P.-	
300196	01.E 240.6VG.HR.E.P.-	
300187	01.E 240.10VG.30.E.P.-	
300188	01.E 240.10VG.HR.E.P.-	
300686	01.E 240.16VG.30.E.P.-	
303090	01.E 240.16VG.HR.E.P.-	
300190	01.E 240.25VG.30.E.P.-	
300191	01.E 240.25VG.HR.E.P.-	
302214	01.E 240.25G.30.E.P.-	
300192	01.E 240.25G.HR.E.P.-	
302217	01.E 240.40G.30.E.P.-	
300685	01.E 240.40G.HR.E.P.-	
300194	01.E 240.80G.30.E.P.-	
300195	01.E 240.80G.HR.E.P.-	
302300	01.E 240.130G.30.E.P.-	
311420	01.E 240.130G.HR.E.P.-	
	1) 01.E 240 MEHRPREIS VITON DICHTUNG	
	2) 01.E 240 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing

2) Surplus price: execution complete stainless steel

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E4
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
314530	01.E 360.3VG.30.E.P.-		
300229	01.E 360.3VG.HR.E.P.-		
301952	01.E 360.6VG.30.E.P.-		
300243	01.E 360.6VG.HR.E.P.-		
300231	01.E 360.10VG.30.E.P.-		
300232	01.E 360.10VG.HR.E.P.-		
300705	01.E 360.16VG.30.E.P.-		
303093	01.E 360.16VG.HR.E.P.-		
300702	01.E 360.25VG.30.E.P.-		
300235	01.E 360.25VG.HR.E.P.-		
300237	01.E 360.25G.30.E.P.-		
300238	01.E 360.25G.HR.E.P.-		
300240	01.E 360.40G.30.E.P.-		
300703	01.E 360.40G.HR.E.P.-		
300704	01.E 360.80G.30.E.P.-		
	01.E 360.80G.HR.E.P.-		
303092	01.E 360.130G.30.E.P.-		
305267	01.E 360.130G.HR.E.P.-		
	1) 01.E 360 MEHRPREIS VITON DICHTUNG		
	2) 01.E 360 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
317318	01.E 450.3VG.30.E.P.-		
302093	01.E 450.3VG.HR.E.P.-		
303094	01.E 450.6VG.30.E.P.-		
300263	01.E 450.6VG.HR.E.P.-		
300255	01.E 450.10VG.30.E.P.-		
300256	01.E 450.10VG.HR.E.P.-		
300722	01.E 450.16VG.30.E.P.-		
300264	01.E 450.16VG.HR.E.P.-		
300710	01.E 450.25VG.30.E.P.-		
300258	01.E 450.25VG.HR.E.P.-		
300715	01.E 450.25G.30.E.P.-		
300717	01.E 450.25G.HR.E.P.-		
300719	01.E 450.40G.30.E.P.-		
300261	01.E 450.40G.HR.E.P.-		
300720	01.E 450.80G.30.E.P.-		
300721	01.E 450.80G.HR.E.P.-		
303096	01.E 450.130G.30.E.P.-		
	01.E 450.130G.HR.E.P.-		
	1) 01.E 450 MEHRPREIS VITON DICHTUNG		
	2) 01.E 450 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
	1) Surplus price: viton sealing		
	2) Surplus price: execution complete stainless steel		
	3) Surplus price: element execution IS 06		
	4) Surplus price: element execution IS 08		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E5
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
319967	01.E 600.3VG.30.E.P.-	
300723	01.E 600.3VG.HR.E.P.-	
303097	01.E 600.6VG.30.E.P.-	
300730	01.E 600.6VG.HR.E.P.-	
300265	01.E 600.10VG.30.E.P.-	
300266	01.E 600.10VG.HR.E.P.-	
300731	01.E 600.16VG.30.E.P.-	
300732	01.E 600.16VG.HR.E.P.-	
300727	01.E 600.25VG.30.E.P.-	
300728	01.E 600.25VG.HR.E.P.-	
305725	01.E 600.25G.30.E.P.-	
303748	01.E 600.25G.HR.E.P.-	
329443	01.E 600.40G.30.E.P.-	
303747	01.E 600.40G.HR.E.P.-	
300729	01.E 600.80G.30.E.P.-	
	01.E 600.80G.HR.E.P.-	
303098	01.E 600.130G.30.E.P.-	
	01.E 600.130G.HR.E.P.-	
	1) 01.E 600 MEHRPREIS VITON DICHTUNG	
	2) 01.E 600 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
317518	01.E 900.3VG.30.E.P.-	
300735	01.E 900.3VG.HR.E.P.-	
303150	01.E 900.6VG.30.E.P.-	
300295	01.E 900.6VG.HR.E.P.-	
300736	01.E 900.10VG.30.E.P.-	
300290	01.E 900.10VG.HR.E.P.-	
300739	01.E 900.16VG.30.E.P.-	
303152	01.E 900.16VG.HR.E.P.-	
300737	01.E 900.25VG.30.E.P.-	
300291	01.E 900.25VG.HR.E.P.-	
305728	01.E 900.25G.30.E.P.-	
300293	01.E 900.25G.HR.E.P.-	
	01.E 900.40G.30.E.P.-	
300738	01.E 900.40G.HR.E.P.-	
	01.E 900.80G.30.E.P.-	
304649	01.E 900.80G.HR.E.P.-	
303153	01.E 900.130G.30.E.P.-	
305400	01.E 900.130G.HR.E.P.-	
	1) 01.E 900 MEHRPREIS VITON DICHTUNG	
	2) 01.E 900 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
1) Surplus price: viton sealing 2) Surplus price: execution complete stainless steel 3) Surplus price: element execution IS 06 4) Surplus price: element execution IS 08		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E6
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
328368	01.E 1350.3VG.30.E.P.-	
325646	01.E 1350.3VG.HR.E.P.-	
326652	01.E 1350.6VG.30.E.P.-	
320899	01.E 1350.6VG.HR.E.P.-	
324007	01.E 1350.10VG.30.E.P.-	
319629	01.E 1350.10VG.HR.E.P.-	
329744	01.E 1350.16VG.30.E.P.-	
320557	01.E 1350.16VG.HR.E.P.-	
323251	01.E 1350.25VG.30.E.P.-	
	01.E 1350.25VG.HR.E.P.-	
334187	01.E 1350.25G.30.E.P.-	
	01.E 1350.25G.HR.E.P.-	
329356	01.E 1350.40G.30.E.P.-	
	01.E 1350.40G.HR.E.P.-	
	01.E 1350.80G.30.E.P.-	
	01.E 1350.80G.HR.E.P.-	
	01.E 1350.130G.30.E.P.-	
	01.E 1350.130G.HR.E.P.-	
	1) 01.E 1350 MEHRPREIS VITON DICHTUNG	
	2) 01.E 1350 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
1.2 Filterelemente/Filter Elements 01.E 41...3001		
304306	01.E 41.10P.16.S.P.-	
305406	01.E 41.25P.16.S.P.-	
322478	01.E 41.3VG.16.S.P.-	
305748	01.E 41.6VG.16.S.P.-	
305749	01.E 41.10VG.16.S.P.-	
305750	01.E 41.16VG.16.S.P.-	
305752	01.E 41.25VG.16.S.P.-	
305751	01.E 41.25G.16.S.P.-	
305753	01.E 41.40G.16.S.P.-	
305754	01.E 41.80G.16.S.P.-	
305755	01.E 41.130G.16.S.P.-	
	1) 01.E 41 MEHRPREIS VITON DICHTUNG	
	2) 01.E 41 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300086	01.E 70.10P.16.E.P.-	
300087	01.E 70.10P.16.S.P.-	
300091	01.E 70.25P.16.E.P.-	
300092	01.E 70.25P.16.S.P.-	
305627	01.E 70.3VG.16.E.P.-	
	1) Surplus price: viton sealing	2) Surplus price: execution complete stainless steel
	3) Surplus price: element execution IS 06	4) Surplus price: element execution IS 08

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E7
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
305628	01.E 70.3VG.16.S.P.-	
300615	01.E 70.6VG.16.E.P.-	
300616	01.E 70.6VG.16.S.P.-	
300088	01.E 70.10VG.16.E.P.-	
300089	01.E 70.10VG.16.S.P.-	
300099	01.E 70.16VG.16.E.P.-	
300100	01.E 70.16VG.16.S.P.-	
300093	01.E 70.25VG.16.E.P.-	
300094	01.E 70.25VG.16.S.P.-	
300095	01.E 70.25G.16.E.P.-	
300096	01.E 70.25G.16.S.P.-	
300097	01.E 70.40G.16.E.P.-	
300098	01.E 70.40G.16.S.P.-	
300613	01.E 70.80G.16.E.P.-	
305630	01.E 70.80G.16.S.P.-	
305772	01.E 70.130G.16.E.P.-	
305773	01.E 70.130G.16.S.P.-	
	1) 01.E 70 MEHRPREIS VITON DICHTUNG	
	2) 01.E 70 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300120	01.E 120.10P.16.E.P.-	
300121	01.E 120.10P.16.S.P.-	
300125	01.E 120.25P.16.E.P.-	
300126	01.E 120.25P.16.S.P.-	
300632	01.E 120.3VG.16.E.P.-	
303263	01.E 120.3VG.16.S.P.-	
300132	01.E 120.6VG.16.E.P.-	
300640	01.E 120.6VG.16.S.P.-	
300122	01.E 120.10VG.16.E.P.-	
300123	01.E 120.10VG.16.S.P.-	
303115	01.E 120.16VG.16.E.P.-	
300133	01.E 120.16VG.16.S.P.-	
300127	01.E 120.25VG.16.E.P.-	
300128	01.E 120.25VG.16.S.P.-	
300129	01.E 120.25G.16.E.P.-	
300130	01.E 120.25G.16.S.P.-	
300131	01.E 120.40G.16.E.P.-	
300637	01.E 120.40G.16.S.P.-	
300638	01.E 120.80G.16.E.P.-	
300639	01.E 120.80G.16.S.P.-	
305631	01.E 120.130G.16.E.P.-	
305632	01.E 120.130G.16.S.P.-	
	1) 01.E 120 MEHRPREIS VITON DICHTUNG	
	2) 01.E 120 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300154	01.E 175.10P.16.E.P.-	
300155	01.E 175.10P.16.S.P.-	
300158	01.E 175.25P.16.E.P.-	
	1) Surplus price: viton sealing	
	2) Surplus price: execution complete stainless steel	
	3) Surplus price: element execution IS 06	
	4) Surplus price: element execution IS 08	

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E8
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
300668	01.E 175.25P.16.S.P.-		
300663	01.E 175.3VG.16.E.P.-		
305633	01.E 175.3VG.16.S.P.-		
300671	01.E 175.6VG.16.E.P.-		
303072	01.E 175.6VG.16.S.P.-		
300156	01.E 175.10VG.16.E.P.-		
300157	01.E 175.10VG.16.S.P.-		
300169	01.E 175.16VG.16.E.P.-		
303073	01.E 175.16VG.16.S.P.-		
300159	01.E 175.25VG.16.E.P.-		
300160	01.E 175.25VG.16.S.P.-		
300161	01.E 175.25G.16.E.P.-		
300163	01.E 175.25G.16.S.P.-		
300164	01.E 175.40G.16.E.P.-		
300166	01.E 175.40G.16.S.P.-		
300167	01.E 175.80G.16.E.P.-		
300168	01.E 175.80G.16.S.P.-		
301892	01.E 175.130G.16.E.P.-		
302074	01.E 175.130G.16.S.P.-		
	1) 01.E 175 MEHRPREIS VITON DICHTUNG		
	2) 01.E 175 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300173	01.E 210.10P.16.E.P.-		
300174	01.E 210.10P.16.S.P.-		
300178	01.E 210.25P.16.E.P.-		
300179	01.E 210.25P.16.S.P.-		
305635	01.E 210.3VG.16.E.P.-		
305636	01.E 210.3VG.16.S.P.-		
303119	01.E 210.6VG.16.E.P.-		
303123	01.E 210.6VG.16.S.P.-		
300175	01.E 210.10VG.16.E.P.-		
300176	01.E 210.10VG.16.S.P.-		
300676	01.E 210.16VG.16.E.P.-		
300677	01.E 210.16VG.16.S.P.-		
300180	01.E 210.25VG.16.E.P.-		
300181	01.E 210.25VG.16.S.P.-		
300673	01.E 210.25G.16.E.P.-		
300182	01.E 210.25G.16.S.P.-		
300183	01.E 210.40G.16.E.P.-		
300674	01.E 210.40G.16.S.P.-		
300675	01.E 210.80G.16.E.P.-		
303120	01.E 210.80G.16.S.P.-		
304689	01.E 210.130G.16.E.P.-		
305638	01.E 210.130G.16.S.P.-		
	1) 01.E 210 MEHRPREIS VITON DICHTUNG		
	2) 01.E 210 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
1) Surplus price: viton sealing 2) Surplus price: execution complete stainless steel 3) Surplus price: element execution IS 06 4) Surplus price: element execution IS 08			

01.02.2009		Preisliste Filterelemente Pricelist Filter-Elements		E9
Artikelnr.	Artikelbezeichnung	Netto-Preis		
Ident.no.	Designation	Unit-Price		
<hr/>				
300198	01.E 320.10P.16.E.P.-			
300199	01.E 320.10P.16.S.P.-			
300202	01.E 320.25P.16.E.P.-			
300203	01.E 320.25P.16.S.P.-			
305639	01.E 320.3VG.16.E.P.-			
316541	01.E 320.3VG.16.S.P.-			
300209	01.E 320.6VG.16.E.P.-			
303124	01.E 320.6VG.16.S.P.-			
300200	01.E 320.10VG.16.E.P.-			
300201	01.E 320.10VG.16.S.P.-			
305640	01.E 320.16VG.16.E.P.-			
300689	01.E 320.16VG.16.S.P.-			
300204	01.E 320.25VG.16.E.P.-			
300205	01.E 320.25VG.16.S.P.-			
300206	01.E 320.25G.16.E.P.-			
300207	01.E 320.25G.16.S.P.-			
300688	01.E 320.40G.16.E.P.-			
300208	01.E 320.40G.16.S.P.-			
303121	01.E 320.80G.16.E.P.-			
305642	01.E 320.80G.16.S.P.-			
305643	01.E 320.130G.16.E.P.-			
305644	01.E 320.130G.16.S.P.-			
1) 01.E 320 MEHRPREIS VITON DICHTUNG				
2) 01.E 320 MEHRPREIS AUSF. KPL. EDELSTAHL				
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%		
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%		
300212	01.E 330.10P.16.E.P.-			
300213	01.E 330.10P.16.S.P.-			
300216	01.E 330.25P.16.E.P.-			
300217	01.E 330.25P.16.S.P.-			
300210	01.E 330.3VG.16.E.P.-			
304119	01.E 330.3VG.16.S.P.-			
300227	01.E 330.6VG.16.E.P.-			
303086	01.E 330.6VG.16.S.P.-			
301797	01.E 330.10VG.16.E.P.-			
300690	01.E 330.10VG.16.S.P.-			
303729	01.E 330.16VG.16.E.P.-			
300228	01.E 330.16VG.16.S.P.-			
300218	01.E 330.25VG.16.E.P.-			
300219	01.E 330.25VG.16.S.P.-			
<div>1) Surplus price: viton sealing</div> <div>2) Surplus price: execution complete stainless steel</div> <div>3) Surplus price: element execution IS 06</div> <div>4) Surplus price: element execution IS 08</div>				

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E10
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
300220	01.E 330.25G.16.E.P.-	
300221	01.E 330.25G.16.S.P.-	
300222	01.E 330.40G.16.E.P.-	
300224	01.E 330.40G.16.S.P.-	
300225	01.E 330.80G.16.E.P.-	
300226	01.E 330.80G.16.S.P.-	
302221	01.E 330.130G.16.E.P.-	
302017	01.E 330.130G.16.S.P.-	
	1) 01.E 330 MEHRPREIS VITON DICHTUNG	
	2) 01.E 330 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300244	01.E 425.10P.16.E.P.-	
300245	01.E 425.10P.16.S.P.-	
300248	01.E 425.25P.16.E.P.-	
300249	01.E 425.25P.16.S.P.-	
305645	01.E 425.3VG.16.E.P.-	
303755	01.E 425.3VG.16.S.P.-	
304504	01.E 425.6VG.16.E.P.-	
303125	01.E 425.6VG.16.S.P.-	
300246	01.E 425.10VG.16.E.P.-	
300247	01.E 425.10VG.16.S.P.-	
300252	01.E 425.16VG.16.E.P.-	
300253	01.E 425.16VG.16.S.P.-	
300250	01.E 425.25VG.16.E.P.-	
300251	01.E 425.25VG.16.S.P.-	
300707	01.E 425.25G.16.E.P.-	
300708	01.E 425.25G.16.S.P.-	
303122	01.E 425.40G.16.E.P.-	
300709	01.E 425.40G.16.S.P.-	
305646	01.E 425.80G.16.E.P.-	
327665	01.E 425.80G.16.S.P.-	
305648	01.E 425.130G.16.E.P.-	
305649	01.E 425.130G.16.S.P.-	
	1) 01.E 425 MEHRPREIS VITON DICHTUNG	
	2) 01.E 425 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E11
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
	01.E 625.10P.10.B.P.-		
	01.E 625.25P.10.B.P.-		
321118	01.E 625.3VG.10.B.P.-		
319427	01.E 625.6VG.10.B.P.-		
318415	01.E 625.10VG.10.B.P.-		
331694	01.E 625.16VG.10.B.P.-		
321029	01.E 625.25VG.10.B.P.-		
	01.E 625.25G.10.B.P.-		
	01.E 625.40G.10.B.P.-		
	01.E 625.80G.10.B.P.-		
	01.E 625.130G.10.B.P.-		
	1) 01.E 625 MEHRPREIS VITON DICHTUNG		
	2) 01.E 625 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
312087	01.E 631.10P.16.E.P.-		
311191	01.E 631.10P.16.S.P.-		
312495	01.E 631.25P.16.E.P.-		
312065	01.E 631.25P.16.S.P.-		
312518	01.E 631.3VG.16.E.P.-		
312066	01.E 631.3VG.16.S.P.-		
312424	01.E 631.6VG.16.E.P.-		
312389	01.E 631.6VG.16.S.P.-		
312239	01.E 631.10VG.16.E.P.-		
311275	01.E 631.10VG.16.S.P.-		
311546	01.E 631.16VG.16.E.P.-		
311828	01.E 631.16VG.16.S.P.-		
312466	01.E 631.25VG.16.E.P.-		
311589	01.E 631.25VG.16.S.P.-		
312441	01.E 631.25G.16.E.P.-		
311436	01.E 631.25G.16.S.P.-		
311831	01.E 631.40G.16.E.P.-		
300282	01.E 631.40G.16.S.P.-		
312436	01.E 631.80G.16.E.P.-		
312684	01.E 631.80G.16.S.P.-		
312606	01.E 631.130G.16.E.P.-		
312686	01.E 631.130G.16.S.P.-		
	1) 01.E 631 MEHRPREIS VITON DICHTUNG		
	2) 01.E 631 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
* Preise auf Anfrage / prices on request 1) Surplus price: viton sealing 2) Surplus price: execution complete stainless steel 3) Surplus price: element execution IS 06 4) Surplus price: element execution IS 08			

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E12
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
300297	01.E 950.10P.10.E.P.-	
300298	01.E 950.10P.10.S.P.-	
300302	01.E 950.25P.10.E.P.-	
300303	01.E 950.25P.10.S.P.-	
300740	01.E 950.3VG.10.E.P.-	
300296	01.E 950.3VG.10.S.P.-	
300314	01.E 950.6VG.10.E.P.-	
302335	01.E 950.6VG.10.S.P.-	
300299	01.E 950.10VG.10.E.P.-	
300300	01.E 950.10VG.10.S.P.-	
305652	01.E 950.16VG.10.E.P.-	
300742	01.E 950.16VG.10.S.P.-	
300304	01.E 950.25VG.10.E.P.-	
300306	01.E 950.25VG.10.S.P.-	
300307	01.E 950.25G.10.E.P.-	
300308	01.E 950.25G.10.S.P.-	
300310	01.E 950.40G.10.E.P.-	
300311	01.E 950.40G.10.S.P.-	
300312	01.E 950.80G.10.E.P.-	
300313	01.E 950.80G.10.S.P.-	
300315	01.E 950.130G.10.E.P.-	
305481	01.E 950.130G.10.S.P.-	
	1) 01.E 950 MEHRPREIS VITON DICHTUNG	
	2) 01.E 950 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
310898	01.E 1201.10P.10.E.P.-	
310867	01.E 1201.10P.10.S.P.-	
310899	01.E 1201.25P.10.E.P.-	
310900	01.E 1201.25P.10.S.P.-	
307926	01.E 1201.3VG.10.E.P.-	
311103	01.E 1201.3VG.10.S.P.-	
310868	01.E 1201.6VG.10.E.P.-	
300744	01.E 1201.6VG.10.S.P.-	
309619	01.E 1201.10VG.10.E.P.-	
310869	01.E 1201.10VG.10.S.P.-	
308028	01.E 1201.16VG.10.E.P.-	
309375	01.E 1201.16VG.10.S.P.-	
309655	01.E 1201.25VG.10.E.P.-	
310391	01.E 1201.25VG.10.S.P.-	
310870	01.E 1201.25G.10.E.P.-	
310871	01.E 1201.25G.10.S.P.-	
310748	01.E 1201.40G.10.E.P.-	
310872	01.E 1201.40G.10.S.P.-	
310873	01.E 1201.80G.10.E.P.-	
<div> <div>1) Surplus price: viton sealing</div> <div>2) Surplus price: execution complete stainless steel</div> <div>3) Surplus price: element execution IS 06</div> <div>4) Surplus price: element execution IS 08</div> </div>		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E13
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
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310874	01.E 1201.80G.10.S.P.-	
310875	01.E 1201.130G.10.E.P.-	
310876	01.E 1201.130G.10.S.P.-	
	1) 01.E 1201 MEHRPREIS VITON DICHTUNG	
	2) 01.E 1201 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
310902	01.E 2001.10P.10.E.P.-	
305655	01.E 2001.10P.10.S.P.-	
310901	01.E 2001.25P.10.E.P.-	
310881	01.E 2001.25P.10.S.P.-	
305654	01.E 2001.3VG.10.E.P.-	
314498	01.E 2001.3VG.10.S.P.-	
307925	01.E 2001.6VG.10.E.P.-	
307954	01.E 2001.6VG.10.S.P.-	
306631	01.E 2001.10VG.10.E.P.-	
310882	01.E 2001.10VG.10.S.P.-	
310570	01.E 2001.16VG.10.E.P.-	
310883	01.E 2001.16VG.10.S.P.-	
310253	01.E 2001.25VG.10.E.P.-	
310884	01.E 2001.25VG.10.S.P.-	
329351	01.E 2001.10G.10.E.P.-	
300333	01.E 2001.25G.10.E.P.-	
310885	01.E 2001.25G.10.S.P.-	
307485	01.E 2001.40G.10.E.P.-	
318926	01.E 2001.40G.10.S.P.-	
304818	01.E 2001.80G.10.E.P.-	
310887	01.E 2001.80G.10.S.P.-	
310889	01.E 2001.130G.10.E.P.-	
310888	01.E 2001.130G.10.S.P.-	
	1) 01.E 2001 MEHRPREIS VITON DICHTUNG	
	2) 01.E 2001 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
318503	01.E 3001.10P.10.E.P.-	
	01.E 3001.10P.10.S.P.-	
327484	01.E 3001.25P.10.E.P.-	
	01.E 3001.25P.10.S.P.-	
328977	01.E 3001.3VG.10.E.P.-	
323171	01.E 3001.3VG.10.S.P.-	
<div> <div>1) Surplus price: viton sealing</div> <div>2) Surplus price: execution complete stainless steel</div> </div>		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E14
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
	333644 01.E 3001.6VG.10.E.P.-	
	323170 01.E 3001.6VG.10.S.P.-	
	318499 01.E 3001.10VG.10.E.P.-	
	311476 01.E 3001.10VG.10.S.P.-	
	327642 01.E 3001.16VG.10.E.P.-	
	332130 01.E 3001.16VG.10.S.P.-	
	318500 01.E 3001.25VG.10.E.P.-	
	332292 01.E 3001.25VG.10.S.P.-	
	318502 01.E 3001.25G.10.E.P.-	
	01.E 3001.25G.10.S.P.-	
	311033 01.E 3001.40G.10.E.P.-	
	01.E 3001.40G.10.S.P.-	
	307360 01.E 3001.80G.10.E.P.-	
	326933 01.E 3001.80G.10.S.P.-	
	01.E 3001.130G.10.E.P.-	
	01.E 3001.130G.10.S.P.-	
	1) 01.E 3001 MEHRPREIS VITON DICHTUNG	
	2) 01.E 3001 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
	01.E 4001.10P.10.E.P.-	
	01.E 4001.10P.10.S.P.-	
	01.E 4001.25P.10.E.P.-	
	01.E 4001.25P 10.S.P.-	
	322241 01.E 4001.3VG.10.E.P.-	
	323172 01.E 4001.3VG.10.S.P.-	
	328976 01.E 4001.6VG.10.E.P.-	
	323168 01.E 4001.6VG.10.S.P.-	
	321321 01.E 4001.10VG.10.E.P.-	
	332001 01.E 4001.10VG.10.S.P.-	
	01.E 4001.16VG.10.E.P.-	
	01.E 4001.16VG.10.S.P.-	
	333010 01.E 4001.25VG.10.E.P.-	
	332677 01.E 4001.25VG.10.S.P.-	
	321371 01.E 4001.25G.10.E.P.-	
	01.E 4001.25G.10.S.P.-	
	01.E 4001.40G.10.E.P.-	
	01.E 4001.40G.10.S.P.-	
	01.E 4001.80G.10.E.P.-	
	01.E 4001.80G.10.S.P	
	01.E 4001.130G.10.E.P.-	
	01.E 4001.130G.10.S.P.-	
	1) Mehrpreis E 4001 für Viton-Dichtung	
	2) Mehrpreis E 4001 Ausf. Kompl. VA	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
	1) Surplus price: viton sealing	
	2) Surplus price: execution complete stainless steel	
	3) Surplus price: element execution IS 06	
	4) Surplus price: element execution IS 08	

Artikelnr.	Artikelbezeichnung	Netto-Preis
Ident.no.	Designation	Unit-Price
302797	01.FE 200.10P.16.E.P.-	
300763	01.FE 200.10P.16.S.P.-	
303292	01.FE 200.25P.16.E.P.-	
300347	01.FE 200.25P.16.S.P.-	
302795	01.FE 200.3VG.16.E.P.-	
301803	01.FE 200.3VG.16.S.P.-	
303160	01.FE 200.6VG.16.E.P.-	
300767	01.FE 200.6VG.16.S.P.-	
300344	01.FE 200.10VG.16.E.P.-	
300345	01.FE 200.10VG.16.S.P.-	
305704	01.FE 200.16VG.16.E.P.-	
305705	01.FE 200.16VG.16.S.P.-	
300348	01.FE 200.25VG.16.E.P.-	
300765	01.FE 200.25VG.16.S.P.-	
300349	01.FE 200.25G.16.E.P.-	
300351	01.FE 200.25G.16.S.P.-	
303166	01.FE 200.40G.16.E.P.-	
300352	01.FE 200.40G.16.S.P.-	
300353	01.FE 200.80G.16.E.P.-	
304877	01.FE 200.80G.16.S.P.-	
302173	01.FE 200.130G.16.E.P.-	
300768	01.FE 200.130G.16.S.P.-	
1)	01.FE 200 MEHRPREIS VITON DICHTUNG	
2)	01.FE 200 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing

2) Surplus price: execution complete stainless steel

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E16
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
1.3 Filterelemente/Filter Elements 01.N, NL, NR		
306802	01.N 100.3VG.16.E.P.-	
304583	01.N 100.6VG.16.E.P.-	
300360	01.N 100.10VG.16.E.P.-	
303266	01.N 100.16VG.16.E.P.-	
302108	01.N 100.25VG.16.E.P.-	
300362	01.N 100.25G.16.E.P.-	
300363	01.N 100.40G.16.E.P.-	
300364	01.N 100.80G.16.E.P.-	
300777	01.N 100.130G.16.E.P.-	
	1) 01.N 100 MEHRPREIS VITON DICHTUNG	
	2) 01.N 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
312621	01.NL 40.3VG.30.E.P.-	
313873	01.NL 40.3VG.HR.E.P.-	
312623	01.NL 40.6VG.30.E.P.-	
312884	01.NL 40.6VG.HR.E.P.-	
311433	01.NL 40.10VG.30.E.P.-	
312299	01.NL 40.10VG.HR.E.P.-	
312211	01.NL 40.16VG.30.E.P.-	
311520	01.NL 40.16VG.HR.E.P.-	
312542	01.NL 40.25VG.30.E.P.-	
314169	01.NL 40.25VG.HR.E.P.-	
312624	01.NL 40.25G.30.E.P.-	
319349	01.NL 40.25G.HR.E.P.-	
	1) 01.NL 40 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 40 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
* Preise auf Anfrage / prices on request		
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E17
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
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312636	01.NL 63.3VG.30.E.P.-	
316536	01.NL 63.3VG.HR.E.P.-	
312637	01.NL 63.6VG.30.E.P.-	
317323	01.NL 63.6VG.HR.E.P.-	
311365	01.NL 63.10VG.30.E.P.-	
311487	01.NL 63.10VG.HR.E.P.-	
312482	01.NL 63.16VG.30.E.P.-	
314423	01.NL 63.16VG.HR.E.P.-	
311571	01.NL 63.25VG.30.E.P.-	
315123	01.NL 63.25VG.HR.E.P.-	
312638	01.NL 63.25G.30.E.P.-	
325068	01.NL 63.25G.HR.E.P.-	
312639	01.NL 63.40G.30.E.P.-	
	01.NL 63.40G.HR.E.P.-	
312640	01.NL 63.80G.30.E.P.-	
	01.NL 63.80G.HR.E.P.-	
312641	01.NL 63.130G.30.E.P.-	
	01.NL 63.130G.HR.E.P.-	
	1) 01.NL 63 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 63 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
312649	01.NL 100.3VG.30.E.P.-	
312797	01.NL 100.3VG.HR.E.P.-	
312651	01.NL 100.6VG.30.E.P.-	
313670	01.NL 100.6VG.HR.E.P.-	
311574	01.NL 100.10VG.30.E.P.-	
312301	01.NL 100.10VG.HR.E.P.-	
312652	01.NL 100.16VG.30.E.P.-	
314446	01.NL 100.16VG.HR.E.P.-	
312653	01.NL 100.25VG.30.E.P.-	
301752	01.NL 100.25VG.HR.E.P.-	
312654	01.NL 100.25G.30.E.P.-	
333415	01.NL 100.25G.HR.E.P.-	
312655	01.NL 100.40G.30.E.P.-	
333570	01.NL 100.40G.HR.E.P.-	
312656	01.NL 100.80G..30.E.P.-	
	01.NL 100.80G..HR.E.P.-	
312657	01.NL 100.130G.30.E.P.-	
	01.NL 100.130G.HR.E.P.-	
	1) 01.NL 100 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
* Preise auf Anfrage / prices on request 1) Surplus price: viton sealing 2) Surplus price: execution complete stainless steel 3) Surplus price: element execution IS 06 4) Surplus price: element execution IS 08		

Preisliste Filterelemente

Pricelist Filter-Elements

E18

Artikelnr.	Artikelbezeichnung	Netto-Preis
Ident.no.	Designation	Unit-Price

331299	01.NL 160.6VG.30.E.P.-	
326145	01.NL 160.10VG.30.E.P.-	
326205	01.NL 160.10VG.HR.E.P.-	
*	01.NL 160.16VG.30.E.P.-	
*	01.NL 160.16VG.HR.E.P.-	
324128	01.NL 160.25VG.30.E.P.-	
	1) 01.NL 160 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 160 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

300784	01.NL 250.3VG.30.E.P.-	
300790	01.NL 250.6VG.30.E.P.-	
300367	01.NL 250.10VG.30.E.P.-	
306809	01.NL 250.16VG.30.E.P.-	
301900	01.NL 250.25VG.30.E.P.-	
300368	01.NL 250.25G.30.E.P.-	
300789	01.NL 250.40G.30.E.P.-	
300370	01.NL 250.80G.30.E.P.-	
303040	01.NL 250.130G.30.E.P.-	
	1) 01.NL 250 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 250 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

307250	01.NL 400.3VG.30.E.P.-	
311449	01.NL 400.3VG.HR.E.P.-	
307251	01.NL 400.6VG.30.E.P.-	
311448	01.NL 400.6VG.HR.E.P.-	
307252	01.NL 400.10VG.30.E.P.-	
312800	01.NL 400.10VG.HR.E.P.-	
307253	01.NL 400.16VG.30.E.P.-	
319969	01.NL 400.16VG.HR.E.P.-	
307255	01.NL 400.25VG.30.E.P.-	
314880	01.NL 400.25VG.HR.E.P.-	
307254	01.NL 400.25G.30.E.P.-	
	01.NL 400.25G.HR.E.P.	
307256	01.NL 400.40G.30.E.P.-	
307257	01.NL 400.80G.30.E.P.-	
307258	01.NL 400.130G.30.E.P.-	
	1) 01.NL 400 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 400 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

- 1) Surplus price: viton sealing 2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06 4) Surplus price: element execution IS 08

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E19
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
300371	01.NL 630.3VG.30.E.P.-	
300795	01.NL 630.6VG.30.E.P.-	
300791	01.NL 630.10VG.30.E.P.-	
305010	01.NL 630.16VG.30.E.P.-	
300792	01.NL 630.25VG.30.E.P.-	
300373	01.NL 630.25G.30.E.P.-	
300374	01.NL 630.40G.30.E.P.-	
300794	01.NL 630.80G.30.E.P.-	
300798	01.NL 630.130G.30.E.P.-	
	1) 01.NL 630 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 630 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
332285	01.NL 1000.3VG.30.E.P.-	
333730	01.NL 1000.6VG.30.E.P.-	
329301	01.NL 1000.10VG.30.E.P.-	
	01.NL 1000.16VG.30.E.P.-	
329942	01.NL 1000.25VG.30.E.P.-	
	01.NL 1000.10G.30.E.P.-	
327855	01.NL 1000.25G.30.E.P.-	
	01.NL 1000.40G.30.E.P.-	
	01.NL 1000.80G.30.E.P.-	
	01.NL 1000.130G.30.E.P.-	
	1) 01.NL 1000 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 1000 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
325921	01.NR 40.10VG.10.B.P.-	
331789	01.NR 40.16VG.10.B.P.-	
324901	01.NR 40.25VG.10.B.P.-	
	1) 01.NR 40 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 40 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
	* Preise auf Anfrage / prices on request	
	1) Surplus price: viton sealing	2) Surplus price: execution complete stainless steel
	3) Surplus price: element execution IS 06	4) Surplus price: element execution IS 08

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E20
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
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317483	01.NR 63.3VG.10.B.P.-	
317484	01.NR 63.6VG.10.B.P.-	
314218	01.NR 63.10VG.10.B.P.-	
313876	01.NR 63.16VG.10.B.P.-	
312792	01.NR 63.25VG.10.B.P.-	
	1) 01.NR 63 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 63 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
317487	01.NR 100.3VG.10.B.P.-	
316886	01.NR 100.6VG.10.B.P.-	
313167	01.NR 100.10VG.10.B.P.-	
314015	01.NR 100.16VG.10.B.P.-	
312504	01.NR 100.25VG.10.B.P.-	
	1) 01.NR 100 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
314485	01.NR 160.3VG.10.B.P.-	
314486	01.NR 160.6VG.10.B.P.-	
314220	01.NR 160.10VG.10.B.P.-	
314448	01.NR 160.16VG.10.B.P.-	
314449	01.NR 160.25VG.10.B.P.-	
	1) 01.NR 160 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 160 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
315444	01.NR 250.1VG.10.B.P.-	
314491	01.NR 250.3VG.10.B.P.-	
314492	01.NR 250.6VG.10.B.P.-	
314191	01.NR 250.10VG.10.B.P.-	
314453	01.NR 250.16VG.10.B.P.-	
314454	01.NR 250.25VG.10.B.P.-	
319214	01.NR 250.25G.10.B.P.-	
322204	01.NR 250.40G.10.B.P.-	
327737	01.NR 250.80G.10.B.P.-	
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
317489	01.NR 400.3VG.10.B.P.-	
314817	01.NR 400.6VG.10.B.P.-	
314870	01.NR 400.10VG.10.B.P.-	
	1) Surplus price: viton sealing	2) Surplus price: execution complete stainless steel
	3) Surplus price: element execution IS 06	4) Surplus price: element execution IS 08

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E21
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
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317491	01.NR 400.16VG.10.B.P.-	
317492	01.NR 400.25VG.10.B.P.-	
319373	01.NR 400.25G.10.B.P.-	
327541	01.NR 400.80G.10.B.P.-	
	1) 01.NR 400 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 400 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
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315136	01.NR 630.1VG.10.B.P.-	
304533	01.NR 630.3VG.10.B.P.-	
304534	01.NR 630.6VG.10.B.P.-	
304535	01.NR 630.10VG.10.B.P.-	
306650	01.NR 630.16VG.10.B.P.-	
305036	01.NR 630.25VG.10.B.P.-	
304916	01.NR 630.25G.10.B.P.-	
306601	01.NR 630.40G.10.B.P.-	
306602	01.NR 630.80G.10.B.P.-	
306603	01.NR 630.130G.10.B.P.-	
	1) 01.NR 630 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
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317272	01.NR 1000.1VG.10.B.P.-	
306604	01.NR 1000.3VG.10.B.P.-	
305449	01.NR 1000.6VG.10.B.P.-	
306605	01.NR 1000.10VG.10.B.P.-	
306607	01.NR 1000.16VG.10.B.P.-	
306606	01.NR 1000.25VG.10.B.P.-	
319414	01.NR 1000.25VG.10.B.N.IS07	
306608	01.NR 1000.25G.10.B.P.-	
306609	01.NR 1000.40G.10.B.P.-	
306610	01.NR 1000.80G.10.B.P.-	
306611	01.NR 1000.130G.10.B.P.-	
	1) 01.NR 1000 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
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1.4 Filterelemente/Filter Elements 01.FEK, FEKS		
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300339	01.FEK 60.25G.4.E.O.-	
300340	01.FEKS 60.25G.16.E. O.VA	
300341	01.FEKS 60.80G.16.E. O.VA	
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1.5 Filterelemente/Filter Elements 01.DSF		
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300356	01.DSF 150.25G.16.E.P.-	
300357	01.DSF 150.40G.16.E.P.-	
300772	01.DSF 300.25G.16.E.P.-	
306056	01.DSF 300.40G.16.E.P.-	
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1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements	E22
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
1.6 Filterelemente/Filter Elements 01.NBF		
312425	01.NBF 25-40.3VL.B.P	
300033	01.NBF 25-40.10P.B.O	
312426	01.NBF 55-85.3VL.B.P	
300035	01.NBF 55-85.10P.B.O	
1.7 Filterelemente/Filter Elements 01.AS		
312237	01.AS 220.25G.-B.-	
314166	01.AS 220.40G.-B.-	
305032	01.AS 220.80G.-B.-	
311175	01.AS 631.25G.-B.-	
311176	01.AS 631.40G.-B.-	
311178	01.AS 631.80G.-B.-	
1.8 Filterelemente/Filter Elements 01.TS		
305214	01.TS 210.10P.-B.-	
308052	01.TS 210.25P.-B.-	
308049	01.TS 210.3VG.-B.-	
308050	01.TS 210.6VG.-B.-	
307697	01.TS 210.10VG.-B.-	
308053	01.TS 210.16VG.-B.-	
308055	01.TS 210.25VG.-B.-	
308056	01.TS 210.25G.-B.-	
308057	01.TS 210.40G.-B.-	
310858	01.TS 210.80G.-B.-	
331219	01.TS 210.130G.-B.-	
305926	01.TS 310.10P.-B.-	
305771	01.TS 310.25P.-B.-	
308058	01.TS 310.3VG.-B.-	
308059	01.TS 310.6VG.-B.-	
307233	01.TS 310.10VG.-B.-	
308060	01.TS 310.16VG.-B.-	
308061	01.TS 310.25VG.-B.-	
308062	01.TS 310.25G.-B.-	
308063	01.TS 310.40G.-B.-	
318170	01.TS 310.80G.-B.-	
321931	01.TS 310.130G.-B.-	
308067	01.TS 425.10P.-B.-	
308068	01.TS 425.25P.-B.-	
308064	01.TS 425.3VG.-B.-	
308066	01.TS 425.6VG.-B.-	
307478	01.TS 425.10VG.-B.-	
308069	01.TS 425.16VG.-B.-	
306592	01.TS 425.25VG.-B.-	

Artikelnr.	Artikelbezeichnung	Netto-Preis
Ident.no.	Designation	Unit-Price
308070	01.TS 425.25G.-.B.-.	
308072	01.TS 425.40G.-.B.-.	
322341	01.TS 425.80G.-.B.-.	
322342	01.TS 425.130G.-.B.-.	
322440	01.TS 625.10P.-.B.-.	
323030	01.TS 625.25P.-.B.-.	
	01.TS 625.3VG.-.B.-.	
	01.TS 625.6VG.-.B.-.	
321951	01.TS 625.10VG.-.B.-.	
327407	01.TS 625.16VG.-.B.-.	
318706	01.TS 625.25VG.-.B.-.	
326764	01.TS 625.25G.-.B.-.	
321955	01.TS 625.40G.-.B.-.	
323028	01.TS 625.80G.-.B.-.	
330203	01.TS 625.130G.-.B.-.	
1.9 Filterelemente/Filter Elements 01.RS...		
314539	01.RS 175.10VG.10.B.P.-	
314686	01.RS 175.16VG.10.B.P.-	
	01.RS 175.25VG.10.B.P.-	
314540	01.RS 225.10VG.10.B.P.-	
317199	01.RS 225.16VG.10.B.P.-	
316976	01.RS 225.25VG.10.B.P.-	
1.10 Filterelemente/Filter Elements 01.WSNR...		
322233	01.WSNR 250.3WVG.10.B.P.-	
326676	01.WSNR 250.3WVG.10.B.V.-	
322225	01.WSNR 250.10WVG.10.B.P.-	
323529	01.WSNR 250.10WVG.10.B.V.-	
324003	01.WSNR 250.10WVG.10.B.V.IS06	
320911	01.WSNR 630.3WVG.10.B.P.-	
327113	01.WSNR 630.3WVG.10.B.V.-	
319982	01.WSNR 630.10WVG.10.B.P.-	
326121	01.WSNR 630.10WVG.10.B.V.-	
322223	01.WSNR 1000.3WVG.10.B.P.-	
322220	01.WSNR 1000.10WVG.10.B.P.-	
1.11 Kombielemente/Combi Elements		
	01.NL 630.32760.6VG.25G.30.B.V.-.S1	
	01.NL 630.32760.10VG.25G.30.B.V.-.S1	
321284	01.NR 1000.32227.6VG.25G.25.B.V.-.S1	
319435	01.NR 1000.32227.10VG.25G.25.B.V.-.S1	

Preisliste Filterelemente

Pricelist Filter-Elements

E24

Artikelnr. Artikelbezeichnung
Ident.no. Designation

Netto-Preis
Unit-Price

2. Abmessungen/Sizes Hydac

2.1 Filterelemente/Filter Elements 02.R..HC

323181	02.0060 R.3VG.30.HC.S.P	0060 R 003 BN HC
324829	02.0060 R.6VG.30.HC.S.P	0060 R 005 BN HC
322642	02.0060 R.10VG.30.HC.S.P	0060 R 010 BN HC
322087	02.0060 R.20VG.30.HC.S.P	0060 R 020 BN HC
323103	02.0060 R.25G.30.HC.S.P	0060 R 025 W HC

1) 02.0060 R MEHRPREIS VITON DICHUNG

324832	02.0110 R.3VG.30.HC.S.P	0110 R 003 BN HC
324834	02.0110 R.6VG.30.HC.S.P	0110 R 005 BN HC
322668	02.0110 R.10VG.30.HC.S.P	0110 R 010 BN HC
322085	02.0110 R 20VG.30.HC.S.P	0110 R 020 BN HC
322409	02.0110 R.25G.30.HC.S.P	0110 R 025 W HC

1) 02.0110 R MEHRPREIS VITON DICHUNG

310581	02.0160 R.3VG.30.HC.S.P	0160 R 003 BN HC
310584	02.0160 R.6VG.30.HC.S.P	0160 R 005 BN HC
310585	02.0160 R.10VG.30.HC.S.P	0160 R 010 BN HC
310586	02.0160 R.20VG.30.HC.S.P	0160 R 020 BN HC
311039	02.0160 R.25G.30.HC.S.P	0160 R 025 W HC

1) 02.0160 R MEHRPREIS VITON DICHUNG

325671	02.0165 R.3VG.30.HC.S.P	0165 R 003 BN HC
324389	02.0165 R.6VG.30.HC.S.P	0165 R 005 BN HC
320121	02.0165 R.10VG.30.HC.S.P	0165 R 010 BN HC
319506	02.0165 R.20VG.30.HC.S.P	0165 R 020 BN HC
324697	02.0165 R.25G.30.HC.S.P	0165 R 025 W HC

1) 02.0165 R MEHRPREIS VITON DICHUNG

310591	02.0240 R.3VG.30.HC.S.P	0240 R 003 BN HC
310592	02.0240 R.6VG.30.HC.S.P	0240 R 005 BN HC
310593	02.0240 R.10VG.30.HC.S.P	0240 R 010 BN HC
310594	02.0240 R.20VG.30.HC.S.P	0240 R 020 BN HC
311041	02.0240 R.25G.30.HC.S.P	0240 R 025 W HC

1) 02.0240 R MEHRPREIS VITON DICHUNG

307308	02.0330 R.3VG.30.HC.S.P	0330 R 003 BN HC
307309	02.0330 R.6VG.30.HC.S.P	0330 R 005 BN HC
307302	02.0330 R.10VG.30.HC.S.P	0330 R 010 BN HC
307310	02.0330 R.20VG.30.HC.S.P	0330 R 020 BN HC
311043	02.0330 R.25G.30.HC.S.P	0330 R 025 W HC

1) 02.0330 R MEHRPREIS VITON DICHUNG

1) Surplus price: viton sealing

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E25
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
307311	02.0500 R.3VG.30.HC.S.P	0500 R 003 BN HC	
307312	02.0500 R.6VG.30.HC.S.P	0500 R 005 BN HC	
307215	02.0500 R.10VG.30.HC.S.P	0500 R 010 BN HC	
307313	02.0500 R.20VG.30.HC.S.P	0500 R 020 BN HC	
311045	02.0500 R.25G.30.HC.S.P	0500 R 025 W HC	
	1) 02.0500 R MEHRPREIS VITON DICHTUNG		
307617	02.0660 R.3VG.30.HC.S.P	0660 R 003 BN HC	
307618	02.0660 R.6VG.30.HC.S.P	0660 R 005 BN HC	
307620	02.0660 R.10VG.30.HC.S.P	0660 R 010 BN HC	
307621	02.0660 R.20VG.30.HC.S.P	0660 R 020 BN HC	
311047	02.0660 R.25G.30.HC.S.P	0660 R 025 W HC	
326614	02.0660 R.50G.30.HC.S.P	0660 R 050 W HC	
	1) 02.0660 R MEHRPREIS VITON DICHTUNG		
307622	02.0850 R.3VG.30.HC.S.P	0850 R 003 BN HC	
307623	02.0850 R.6VG.30.HC.S.P	0850 R 005 BN HC	
307624	02.0850 R.10VG.30.HC.S.P	0850 R 010 BN HC	
307625	02.0850 R.20VG.30.HC.S.P	0850 R 020 BN HC	
311049	02.0850 R.25G.30.HC.S.P	0850 R 025 W HC	
	1) 02.0850 R MEHRPREIS VITON DICHTUNG		
310573	02.0950 R.3VG.30.HC.S.P	0950 R 003 BN HC	
310574	02.0950 R.6VG.30.HC.S.P	0950 R 005 BN HC	
310575	02.0950 R.10VG.30.HC.S.P	0950 R 010 BN HC	
310576	02.0950 R.20VG.30.HC.S.P	0950 R 020 BN HC	
311051	02.0950 R.25G.30.HC.S.P	0950 R 025 W HC	
	1) 02.0950 R MEHRPREIS VITON DICHTUNG		
310557	02.1300 R.3VG.30.HC.S.P	1300 R 003 BN HC	
310558	02.1300 R.6VG.30.HC.S.P	1300 R 005 BN HC	
310559	02.1300 R.10VG.30.HC.S.P	1300 R 010 BN HC	
310560	02.1300 R.20VG.30.HC.S.P	1300 R 020 BN HC	
311053	02.1300 R.25G.30.HC.S.P	1300 R 025 W HC	
	1) 02.1300 R MEHRPREIS VITON DICHTUNG		
322897	02.1700 R.3VG.30.HC.S.P	1700 R 003 BN HC	
322363	02.1700 R.6VG.30.HC.S.P	1700 R 005 BN HC	
319011	02.1700 R 10VG.30.HC.S.P	1700 R 010 BN HC	
319012	02.1700 R 20VG.30.HC.S.P	1700 R 020 BN HC	
	02.1700 R 25G.30.HC.S.P	1700 R 025W HC	
	1) 02.1700 R MEHRPREIS VITON DICHTUNG		
322788	02.2600 R.3VG.30.HC.S.P	2600 R 003 BN HC	
322789	02.2600 R.6VG.30.HC.S.P	2600 R 005 BN HC	
315502	02.2600 R.10VG.30.HC.S.P	2600 R 010 BN HC	
323912	02.2600 R.20VG.30.HC.S.P	2600 R 020 BN HC	
319469	02.2600 R.25G.30.HC.S.P	2600 R 025 W HC	
	1) 02.2600 R MEHRPREIS VITON DICHTUNG		
1) Surplus price: viton sealing			

Preisliste Filterelemente

Pricelist Filter-Elements

E26

Artikelnr. Artikelbezeichnung
Ident.no. Designation

Netto-Preis
Unit-Price

2.2 Filterelemente/Filter Elements 02.D..HC

	02.0055 D.3VG.30.HC.E.P	0055 D 003 BN HC
333977	02.0055 D.6VG.30.HC.E.P	0055 D 005 BN HC
330089	02.0055 D.10VG.30.HC.E.P	0055 D 010 BN HC
	02.0055 D.20VG.30.HC.E.P	0055 D 020 BN HC
	02.0055 D MEHRPREIS VITON DICHTUNG	

305276	02.0060 D.3VG.30.HC.E.P	0060 D 003 BN HC
306002	02.0060 D.3VG.HR.HC.E.P	0060 D 003 BH HC
300400	02.0060 D.6VG.30.HC.E.P	0060 D 005 BN HC
300833	02.0060 D.6VG.HR.HC.E.P	0060 D 005 BH HC
300398	02.0060 D.10VG.30.HC.E.P	0060 D 010 BN HC
300399	02.0060 D.10VG.HR.HC.E.P	0060 D 010 BH HC
300832	02.0060 D.20VG.30.HC.E.P	0060 D 020 BN HC
302192	02.0060 D.20VG.HR.HC.E.P	0060 D 020 BH HC
317991	02.0060 D.25G.30.HC.E.P	0060 D 025 W HC
	1) 02.0060 D MEHRPREIS VITON DICHTUNG	

	02.0075 D.3VG.30.HC.E.P	0075 D 003 BN HC
331320	02.0075 D.6VG.30.HC.E.P	0075 D 005 BN HC
330091	02.0075 D.10VG.30.HC.E.P	0075 D 010 BN HC
	02.0075 D.20VG.30.HC.E.P	0075 D 020 BN HC
	1) 02.0075 D MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing

Preisliste Filterelemente

Pricelist Filter-Elements

E27

Artikelnr. Artikelbezeichnung
Ident.no. Designation

Netto-Preis
Unit-Price

306194	02.0110 D.3VG.30.HC.E.P	0110 D 003 BN HC
300839	02.0110 D.3VG.HR.HC.E.P	0110 D 003 BH HC
303530	02.0110 D.6VG.30.HC.E.P	0110 D 005 BN HC
300405	02.0110 D.6VG.HR.HC.E.P	0110 D 005 BH HC
300403	02.0110 D.10VG.30.HC.E.P	0110 D 010 BN HC
300840	02.0110 D.10VG.HR.HC.E.P	0110 D 010 BH HC
300404	02.0110 D.20VG.30.HC.E.P	0110 D 020 BN HC
300841	02.0110 D.20VG.HR.HC.E.P	0110 D 020 BH HC
323407	02.0110 D.25G.30.HC.E.P	0110 D 25 W HC

1) 02.0110 D MEHRPREIS VITON DICHTUNG

306199	02.0140 D.3VG.30.HC.E.P	0140 D 003 BN HC
306203	02.0140 D.3VG.HR.HC.E.P	0140 D 003 BH HC
306200	02.0140 D.6VG.30.HC.E.P	0140 D 005 BN HC
306204	02.0140 D.6VG.HR.HC.E.P	0140 D 005 BH HC
303306	02.0140 D.10VG.30.HC.E.P	0140 D 010 BN HC
306334	02.0140 D.10VG.HR.HC.E.P	0140 D 010 BH HC
306202	02.0140 D.20VG.30.HC.E.P	0140 D 020 BN HC
306205	02.0140 D.20VG.HR.HC.E.P	0140 D 020 BH HC
	02.0140 D.25G.30.HC.E.P	0140 D 25 W HC

1) 02.0140 D MEHRPREIS VITON DICHTUNG

304872	02.0160 D.3VG.30.HC.E.P	0160 D 003 BN HC
300847	02.0160 D.3VG.HR.HC.E.P	0160 D 003 BH HC
300416	02.0160 D.6VG.30.HC.E.P	0160 D 005 BN HC
300417	02.0160 D.6VG.HR.HC.E.P	0160 D 005 BH HC
300848	02.0160 D.10VG.30.HC.E.P	0160 D 010 BN HC
300412	02.0160 D.10VG.HR.HC.E.P	0160 D 010 BH HC
300413	02.0160 D.20VG.30.HC.E.P	0160 D 020 BN HC
300414	02.0160 D.20VG.HR.HC.E.P	0160 D 020 BH HC
324245	02.0160 D.25G.30.HC.E.P	0160 D 025 W HC

1) 02.0160 D MEHRPREIS VITON DICHTUNG

1) Surplus price: viton sealing

Preisliste Filterelemente Pricelist Filter-Elements

E28

Artikelnr.	Artikelbezeichnung	Netto-Preis
Ident.no.	Designation	Unit-Price

306211	02.0240 D.3VG.30.HC.E.P	0240 D 003 BN HC
300853	02.0240 D.3VG.HR.HC.E.P	0240 D 003 BH HC
300426	02.0240 D.6VG.30.HC.E.P	0240 D 005 BN HC
306214	02.0240 D.6VG.HR.HC.E.P	0240 D 005 BH HC
300423	02.0240 D.10VG.30.HC.E.P	0240 D 010 BN HC
302841	02.0240 D.10VG.HR.HC.E.P	0240 D 010 BH HC
300425	02.0240 D.20VG.30.HC.E.P	0240 D 020 BN HC
304431	02.0240 D.20VG.HR.HC.E.P	0240 D 020 BH HC
325077	02.0240 D.25G.30.HC.E.P	0240 D 025 W HC
328269	02.0240 D.50G.30.HC.E.P	0240 D 050 W HC

1) 02.0240 D MEHRPREIS VITON DICHTUNG

306217	02.0280 D.3VG.30.HC.E.P	0280 D 003 BN HC
306221	02.0280 D.3VG.HR.HC.E.P	0280 D 003 BH HC
306218	02.0280 D.6VG.30.HC.E.P	0280 D 005 BN HC
306222	02.0280 D.6VG.HR.HC.E.P	0280 D 005 BH HC
306219	02.0280 D.10VG.30.HC.E.P	0280 D 010 BN HC
306223	02.0280 D.10VG.HR.HC.E.P	0280 D 010 BH HC
306220	02.0280 D.20VG.30.HC.E.P	0280 D 020 BN HC
306224	02.0280 D.20VG.HR.HC.E.P	0280 D 020 BH HC
329623	02.0280 D.25G.30.HC.E.P	0280 D 025 W HC

1) 02.0280 D MEHRPREIS VITON DICHTUNG

300431	02.0330 D.3VG.30.HC.E.P	0330 D 003 BN HC
300861	02.0330 D.3VG.HR.HC.E.P	0330 D 003 BH HC
300864	02.0330 D.6VG.30.HC.E.P	0330 D 005 BN HC
300865	02.0330 D.6VG.HR.HC.E.P	0330 D 005 BH HC
300862	02.0330 D.10VG.30.HC.E.P	0330 D 010 BN HC
300432	02.0330 D.10VG.HR.HC.E.P	0330 D 010 BH HC
300863	02.0330 D.20VG.30.HC.E.P	0330 D 020 BN HC
300433	02.0330 D.20VG.HR.HC.E.P	0330 D 020 BH HC
326 980	02.0330 D.25G.30.HC.E.P	0330 D 025 W HC

1) 02.0330 D MEHRPREIS VITON DICHTUNG

1) Surplus price: viton sealing

306230	02.0500 D.3VG.30.HC.E.P	0500 D 003 BN HC
306234	02.0500 D.3VG.HR.HC.E.P	0500 D 003 BH HC
306231	02.0500 D.6VG.30.HC.E.P	0500 D 005 BN HC
306235	02.0500 D.6VG.HR.HC.E.P	0500 D 005 BH HC
306232	02.0500 D.10VG.30.HC.E.P	0500 D 010 BN HC
306236	02.0500 D.10VG.HR.HC.E.P	0500 D 010 BH HC
306233	02.0500 D.20VG.30.HC.E.P	0500 D 020 BN HC
306237	02.0500 D.20VG.HR.HC.E.P	0500 D 020 BH HC
306229	02.0500 D.25G.30.HC.E.P	0500 D 025 W HC
1) 02.0500 D MEHRPREIS VITON DICHTUNG		

301800	02.0660 D.3VG.30.HC.E.P	0660 D 003 BN HC
303658	02.0660 D.3VG.HR.HC.E.P	0660 D 003 BH HC
306239	02.0660 D.6VG.30.HC.E.P	0660 D 005 BN HC
300441	02.0660 D.6VG.HR.HC.E.P	0660 D 005 BH HC
300438	02.0660 D.10VG.30.HC.E.P	0660 D 010 BN HC
303305	02.0660 D.10VG.HR.HC.E.P	0660 D 010 BH HC
300439	02.0660 D.20VG.30.HC.E.P	0660 D 020 BN HC
300440	02.0660 D.20VG.HR.HC.E.P	0660 D 020 BH HC
319747	02.0660 D.25G.30.HC.E.P	0660 D 025 W HC
1) 02.0660 D MEHRPREIS VITON DICHTUNG		

	02.0990 D.3VG.30.HC.E.P	0990 D 003 BN HC
333006	02.0990 D.3VG.HR.HC.E.P	0990 D 003 BH HC
	02.0990 D.6VG.30.HC.E.P	0990 D 005 BN HC
334877	02.0990 D.6VG.HR.HC.E.P	0990 D 005 BH HC
330193	02.0990 D.10VG.30.HC.E.P	0990 D 010 BN HC
330190	02.0990 D.10VG.HR.HC.E.P	0990 D 010 BH HC
	02.0990 D.20VG.30.HC.E.P	0990 D 020 BN HC
	02.0990 D.20VG.HR.HC.E.P	0990 D 020 BH HC
331976	02.0990 D.25G.30.HC.E.P	0990 D 025 W HC
1)	02.0990 D MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing
3) Surplus price: element execution IS 06

2) Surplus price: execution complete stainless steel
4) Surplus price: element execution IS 08

01.02.2009		Preisliste Filterelemente		E30
		Pricelist Filter-Elements		
Artikelnr.	Artikelbezeichnung			Netto-Preis
Ident.no.	Designation			Unit-Price
	02.1320 D.3VG.30.HC.E.P	1320 D 003 BN HC		
321741	02.1320 D.3VG.HR.HC.E.P	1320 D 003 BH HC		
332990	02.1320 D.6VG.30.HC.E.P	1320 D 005 BN HC		
	02.1320 D.6VG.HR.HC.E.P	1320 D 005 BH HC		
334557	02.1320 D.10VG.30.HC.E.P	1320 D 010 BN HC		
321740	02.1320 D.10VG.HR.HC.E.P	1320 D 010 BH HC		
	02.1320 D.20VG.30.HC.E.P	1320 D 020 BN HC		
	02.1320 D.20VG.HR.HC.E.P	1320 D 020 BH HC		
	02.1320 D.25G.30.HC.E.P	1320 D 025 W HC		
	1) 02.1320 D MEHRPREIS VITON DICHTUNG			
2.3 Filterelemente/Filter Elements 02.RN..HC				
317483	01.NR 63.3VG.10.B.P.-	0063 RN 003 BN HC		
317484	01.NR 63.6VG.10.B.P.-	0063 RN 005 BN HC		
314218	01.NR 63.10VG.10.B.P.-	0063 RN 010 BN HC		
312792	01.NR 63.25VG.10.B.P.-	0063 RN 025 BN HC		
	1) 01.NR 63 MEHRPREIS VITON DICHTUNG			
	2) 01.NR 63 MEHRPREIS AUSF. KPL. EDELSTAHL			
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06			10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08			25%
317487	01.NR 100.3VG.10.B.P.-	0100 RN 003 BN HC		
316886	01.NR 100.6VG.10.B.P.-	0100 RN 005 BN HC		
313167	01.NR 100.10VG.10.B.P.-	0100 RN 010 BN HC		
312504	01.NR 100.25VG.10.B.P.-	0100 RN 025 BN HC		
	1) 01.NR 100 MEHRPREIS VITON DICHTUNG			
	2) 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL			
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06			10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08			25%
314485	01.NR 160.3VG.10.B.P.-	0160 RN 003 BN HC		
314486	01.NR 160.6VG.10.B.P.-	0160 RN 005 BN HC		
314220	01.NR 160.10VG.10.B.P.-	0160 RN 010 BN HC		
314449	01.NR 160.25VG.10.B.P.-	0160 RN 025 BN HC		
	1) 01.NR 160 MEHRPREIS VITON DICHTUNG			
	2) 01.NR 160 MEHRPREIS AUSF. KPL. EDELSTAHL			
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06			10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08			25%
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel		
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E31
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
314491	01.NR 250.3VG.10.B.P.-	0250 RN 003 BN HC	
314492	01.NR 250.6VG.10.B.P.-	0250 RN 005 BN HC	
314191	01.NR 250.10VG.10.B.P.-	0250 RN 010 BN HC	
314454	01.NR 250.25VG.10.B.P.-	0250 RN 025 BN HC	
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
317489	01.NR 400.3VG.10.B.P.-	0400 RN 003 BN HC	
314817	01.NR 400.6VG.10.B.P.-	0400 RN 005 BN HC	
314870	01.NR 400.10VG.10.B.P.-	0400 RN 010 BN HC	
317492	01.NR 400.25VG.10.B.P.-	0400 RN 025 BN HC	
	1) 01.NR 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
304533	01.NR 630.3VG.10.B.P.-	0630 RN 003 BN HC	247,98
304534	01.NR 630.6VG.10.B.P.-	0630 RN 005 BN HC	247,98
304535	01.NR 630.10VG.10.B.P.-	0630 RN 010 BN HC	219,86
305036	01.NR 630.25VG.10.B.P.-	0630 RN 025 BN HC	219,86
	1) 01.NR 630 MEHRPREIS VITON DICHTUNG		9,20
	2) 01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL		227,01
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
306604	01.NR 1000.3VG.10.B.P.-	1000 RN 003 BN HC	
305449	01.NR 1000.6VG.10.B.P.-	1000 RN 005 BN HC	
306605	01.NR 1000.10VG.10.B.P.-	1000 RN 010 BN HC	
306606	01.NR 1000.25VG.10.B.P.-	1000 RN 025 BN HC	
	1) 01.NR 1000 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing

3) Surplus price: element execution IS 06

2) Surplus price: execution complete stainless steel

4) Surplus price: element execution IS 08

01.02.2009		Preisliste Filterelemente Pricelist Filter-Elements		E32
Artikelnr.	Artikelbezeichnung			Netto-Preis
Ident.no.	Designation			Unit-Price
2.4 Filterelemente/Filter Elements 02.DN..HC				
312621	01.NL 40.3VG.30.E.P.-	0040 DN 003 BN HC		
313873	01.NL 40.3VG.HR.E.P.-	0040 DN 003 BH HC		
312623	01.NL 40.6VG.30.E.P.-	0040 DN 005 BN HC		
312884	01.NL 40.6VG.HR.E.P.-	0040 DN 005 BH HC		
311433	01.NL 40.10VG.30.E.P.-	0040 DN 010 BN HC		
312299	01.NL 40.10VG.HR.E.P.-	0040 DN 010 BH HC		
312542	01.NL 40.25VG.30.E.P.-	0040 DN 025 BN HC		
314169	01.NL 40.25VG.HR.E.P.-	0040 DN 025 BH HC		
1) 01.NL 40 MEHRPREIS VITON DICHTUNG				
2) 01.NL 40 MEHRPREIS AUSF. KPL. EDELSTAHL				
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
312636	01.NL 63.3VG.30.E.P.-	0063 DN 003 BN HC		
316536	01.NL 63.3VG.HR.E.P.-	0063 DN 003 BH HC		
312637	01.NL 63.6VG.30.E.P.-	0063 DN 005 BN HC		
317323	01.NL 63.6VG.HR.E.P.-	0063 DN 005 BH HC		
311365	01.NL 63.10VG.30.E.P.-	0063 DN 010 BN HC		
311487	01.NL 63.10VG.HR.E.P.-	0063 DN 010 BH HC		
311571	01.NL 63.25VG.30.E.P.-	0063 DN 025 BN HC		
315123	01.NL 63.25VG.HR.E.P.-	0063 DN 025 BH HC		
1) 01.NL 63 MEHRPREIS VITON DICHTUNG				
2) 01.NL 63 MEHRPREIS AUSF. KPL. EDELSTAHL				
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
312649	01.NL 100.3VG.30.E.P.-	0100 DN 003 BN HC		
312797	01.NL 100.3VG.HR.E.P.-	0100 DN 003 BH HC		
312651	01.NL 100.6VG.30.E.P.-	0100 DN 005 BN HC		
313670	01.NL 100.6VG.HR.E.P.-	0100 DN 005 BH HC		
311574	01.NL 100.10VG.30.E.P.-	0100 DN 010 BN HC		
312301	01.NL 100.10VG.HR.E.P.-	0100 DN 010 BH HC		
312653	01.NL 100.25VG.30.E.P.-	0100 DN 025 BN HC		
301752	01.NL 100.25VG.HR.E.P.-	0100 DN 025 BH HC		
1) 01.NL 100 MEHRPREIS VITON DICHTUNG				
2) 01.NL 100 MEHRPREIS AUSF. KPL. EDELSTAHL				
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel		
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E33
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
331299	01.NL 160.6VG.30.E.P.-	0160 DN 006 BN HC	
326145	01.NL 160.10VG.30.E.P.-	0160 DN 010 BN HC	
326205	01.NL 160.10VG.HR.E.P.-	0160 DN 010 BH HC	
324128	01.NL 160.25VG.30.E.P.-	0160 DN 025 BN HC	
	1) 01.NL 160 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 160 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300784	01.NL 250.3VG.30.E.P.-	0250 DN 003 BN HC	
300790	01.NL 250.6VG.30.E.P.-	0250 DN 005 BN HC	
300367	01.NL 250.10VG.30.E.P.-	0250 DN 010 BN HC	
301900	01.NL 250.25VG.30.E.P.-	0250 DN 025 BN HC	
	1) 01.NL 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
307250	01.NL 400.3VG.30.E.P.-	0400 DN 003 BN HC	
311449	01.NL 400.3VG.HR.E.P.-	0400 DN 003 BH HC	
307251	01.NL 400.6VG.30.E.P.-	0400 DN 005 BN HC	
311448	01.NL 400.6VG.HR.E.P.-	0400 DN 005 BH HC	
307252	01.NL 400.10VG.30.E.P.-	0400 DN 010 BN HC	
312800	01.NL 400.10VG.HR.E.P.-	0400 DN 010 BH HC	
307255	01.NL 400.25VG.30.E.P.-	0400 DN 025 BN HC	
314880	01.NL 400.25VG.HR.E.P.-	0400 DN 025 BH HC	
	1) 01.NL 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300371	01.NL 630.3VG.30.E.P.-	0630 DN 003 BN HC	
300795	01.NL 630.6VG.30.E.P.-	0630 DN 005 BN HC	
300791	01.NL 630.10VG.30.E.P.-	0630 DN 010 BN HC	
300792	01.NL 630.25VG.30.E.P.-	0630 DN 025 BN HC	
	1) 01.NL 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing

2) Surplus price: execution complete stainless steel

3) Surplus price: element execution IS 06

4) Surplus price: element execution IS 08

Preisliste Filterelemente

Pricelist Filter-Elements

E34

Artikelnr. Artikelbezeichnung
Ident.no. Designation

Netto-Preis
Unit-Price

3. Abmessungen/Sizes EPE

3.1 Filterelemente/Filter Elements 03.1.56...03.1.1801

306379	03.1.56.3VG.16.B.O	1.56 H 3 SL
306380	03.1.56.6VG.16.B.O	1.56 H 6 SL
303721	03.1.56.10VG.16.B.O	1.56 H 10 SL
300448	03.1.56.25VG.16.B.O	1.56 H 20 SL
300449	03.1.56.25G.16.B.O	1.56 G 25
300884	03.1.56.40G.16.B.O	1.56 G 40
306377	03.1.56.60G.16.B.O	1.56 G 60
300450	03.1.56.100G.16.B.O	1.56 G 100
306381	03.1.90.3VG.16.B.O	1.90 H 3 SL
306382	03.1.90.6VG.16.B.O	1.90 H 6 SL
304548	03.1.90.10VG.16.B.O	1.90 H 10 SL
303736	03.1.90.25VG.16.B.O	1.90 H 20 SL
300885	03.1.90.25G.16.B.O	1.90 G 25
300451	03.1.90.40G.16.B.O	1.90 G 40
300886	03.1.90.60G.16.B.O	1.90 G 60
300887	03.1.90.100G.16.B.O	1.90 G 100
306385	03.1.140.3VG.16.B.O	1.140 H 3 SL
306386	03.1.140.6VG.16.B.O	1.140 H 6 SL
302098	03.1.140.10VG.16.B.O	1.140 H 10 SL
306387	03.1.140.25VG.16.B.O	1.140 H 20 SL
300888	03.1.140.25G.16.B.O	1.140 G 25
300452	03.1.140.40G.16.B.O	1.140 G 40
306383	03.1.140.60G.16.B.O	1.140 G 60
300453	03.1.140.100G.16.B.O	1.140 G 100
306390	03.1.225.3VG.16.B.O	1.225 H 3 SL
306391	03.1.225.6VG.16.B.O	1.225 H 6 SL
300454	03.1.225.10VG.16.B.O	1.225 H 10 SL
303275	03.1.225.25VG.16.B.O	1.225 H 20 SL
300455	03.1.225.25G.16.B.O	1.225 G 25
302229	03.1.225.40G.16.B.O	1.225 G 40
306388	03.1.225.60G.16.B.O	1.225 G 60
300889	03.1.225.100G.16.B.O	1.225 G 100
319249	03.1.361.3VG.16.B.P	1.361 H 3 SL
321246	03.1.361.6VG.16.B.P	1.361 H 6 SL
314527	03.1.361.10VG.16.B.P	1.361 H 10 SL
321206	03.1.361.25VG.16.B.P	1.361 H 20 SL
317535	03.1.361.25G.16.B.P	1.361 G 25
323658	03.1.361.40G.16.B.P	1.361 G 40
332370	03.1.361.60G.16.B.P	1.361 G 60
323086	03.1.361.100G.16.B.P	1.361 G 100

¹⁾ 03.1.361 MEHRPREIS VITON DICHTUNG

01.02.2009		Preisliste Filterelemente Pricelist Filter-Elements		E35
Artikelnr.	Artikelbezeichnung			Netto-Preis
Ident.no.	Designation			Unit-Price
323368	03.1.561.3VG.16.B.P	1.561 H 3 SL		
	03.1.561.6VG.16.B.P	1.561 H 6 SL		
323819	03.1.561.10VG.16.B.P	1.561 H 10 SL		
325169	03.1.561.25VG.16.B.P	1.561 H 20 SL		
321098	03.1.561.25G.16.B.P	1.561 G 25		
314524	03.1.561.40G.16.B.P	1.561 G 40		
321873	03.1.561.60G.16.B.P	1.561 G 60		
315407	03.1.561.100G.16.B.P	1.561 G 100		
1) 03.1.561 MEHRPREIS VITON DICHTUNG				
331228	03.1.901.3VG.16.B.P	1.901 H 3 SL		
316638	03.1.901.6VG.16.B.P	1.901 H 6 SL		
311596	03.1.901.10VG.16.B.P	1.901 H 10 SL		
317207	03.1.901.25VG.16.B.P	1.901 H 20 SL		
319450	03.1.901.25G.16.B.P	1.901 G 25		
312528	03.1.901.40G.16.B.P	1.901 G 40		
312529	03.1.901.60G.16.B.P	1.901 G 60		
312530	03.1.901.100G.16.B.P	1.901 G 100		
1) 03.1.901 MEHRPREIS VITON DICHTUNG				
322812	03.1.1401.3VG.16.B.P	1.1401 H 3 SL		
312076	03.1.1401.6VG.16.B.P	1.1401 H 6 SL		
316656	03.1.1401.10VG.16.B.P	1.1401 H 10 SL		
305404	03.1.1401.25VG.16.B.P	1.1401 H 20 SL		
317437	03.1.1401.25G.16.B.P	1.1401 G 25		
317598	03.1.1401.40G.16.B.P	1.1401 G 40		
317980	03.1.1401.60G.16.B.P	1.1401 G 60		
321591	03.1.1401.100G.16.B. P	1.1401 G 100		
1) 03.1.1401 MEHRPREIS VITON DICHTUNG				
320300	03.1.1801.3VG.16.B.P	1.1801 H 3 SL		
318820	03.1.1801.6VG.16.B.P	1.1801 H 6 SL		
316301	03.1.1801.10VG.16.B.P	1.1801 H 10 SL		
312270	03.1.1801.25VG.16.B.P	1.1801 H 20 SL		
314228	03.1.1801.25G.16.B.P	1.1801 G 25		
318837	03.1.1801.40G.16.B.P	1.1801 G 40		
322748	03.1.1801.60G.16.B.P	1.1801 G 60		
331933	03.1.1801.100G.16.B.P	1.1801 G 100		
1) 03.1.1801 MEHRPREIS VITON DICHTUNG				
3.2 Filterelemente/Filter Elements 03.2.56...03.2.900				
306338	03.2.56.3VG.16.E.P	2.56 H 3 SL		
306339	03.2.56.6VG.16.E.P	2.56 H 6 SL		
300476	03.2.56.10VG.16.E.P	2.56 H 10 SL		
304957	03.2.56.25VG.16.E.P	2.56 H 20 SL		
300477	03.2.56.25G.16.E.P	2.56 G 25		
300478	03.2.56.40G.16.E.P	2.56 G 40		
300906	03.2.56.60G.16.E.P	2.56 G 60		
300479	03.2.56.100G.16.E.P	2.56 G 100		
1) 03.2.56 MEHRPREIS VITON DICHTUNG				

Preisliste Filterelemente

Pricelist Filter-Elements

E36

Artikelnr. Artikelbezeichnung
Ident.no. Designation

Netto-Preis
Unit-Price

306340	03.2.90.3VG.16.E.P	2.90 H 3 SL
300907	03.2.90.6VG.16.E.P	2.90 H 6 SL
300480	03.2.90.10VG.16.E.P	2.90 H 10 SL
300482	03.2.90.25VG.16.E.P	2.90 H 20 SL
300483	03.2.90.25G.16.E.P	2.90 G 25
300484	03.2.90.40G.16.E.P	2.90 G 40
300485	03.2.90.60G.16.E.P	2.90 G 60
300486	03.2.90.100G.16.E.P	2.90 G 100

1) 03.2.90 MEHRPREIS VITON DICHTUNG

300908	03.2.140.3VG.16.E.P	2.140 H 3 SL
300912	03.2.140.6VG.16.E.P	2.140 H 6 SL
300487	03.2.140.10VG.16.E.P	2.140 H 10 SL
300910	03.2.140.25VG.16.E.P	2.140 H 20 SL
300488	03.2.140.25G.16.E.P	2.140 G 25
300911	03.2.140.40G.16.E.P	2.140 G 40
300491	03.2.140.60G.16.E.P	2.140 G 60
300492	03.2.140.100G.16.E.P	2.140 G 100

1) 03.2.140 MEHRPREIS VITON DICHTUNG

300493	03.2.225.3VG.16.E.P	2.225 H 3 SL
306341	03.2.225.6VG.16.E.P	2.225 H 6 SL
300913	03.2.225.10VG.16.E.P	2.225 H 10 SL
300914	03.2.225.25VG.16.E.P	2.225 H 20 SL
300495	03.2.225.25G.16.E.P	2.225 G 25
300497	03.2.225.40G.16.E.P	2.225 G 40
300498	03.2.225.60G.16.E.P	2.225 G 60
300499	03.2.225.100G.16.E.P	2.225 G 100

1) 03.2.225 MEHRPREIS VITON DICHTUNG

306342	03.2.360.3VG.16.E.P	2.360 H 3 SL
306343	03.2.360.6VG.16.E.P	2.360 H 6 SL
300500	03.2.360.10VG.16.E.P	2.360 H 10 SL
300919	03.2.360.25VG.16.E.P	2.360 H 20 SL
300502	03.2.360.25G.16.E.P	2.360 G 25
300920	03.2.360.40G.16.E.P	2.360 G 40
300921	03.2.360.60G.16.E.P	2.360 G 60
300922	03.2.360.100G.16.E.P	2.360 G 100

1) 03.2.360 MEHRPREIS VITON DICHTUNG

306349	03.2.460.3VG.16.E.P	2.460 H 3 SL
306350	03.2.460.6VG.16.E.P	2.460 H 6 SL
304958	03.2.460.10VG.16.E.P	2.460 H 10 SL
306351	03.2.460.25VG.16.E.P	2.460 H 20 SL
306347	03.2.460.25G.16.E.P	2.460 G 25
306346	03.2.460.40G.16.E.P	2.460 G 40
306345	03.2.460.60G.16.E.P	2.460 G 60
306344	03.2.460.100G.16.E.P	2.460 G 100

1) 03.2.460 MEHRPREIS VITON DICHTUNG

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E37
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
306356	03.2.560.3VG.16.E.P	2.560 H 3 SL	
306357	03.2.560.6VG.16.E.P	2.560 H 6 SL	
300503	03.2.560.10VG.16.E.P	2.560 H 10 SL	
303274	03.2.560.25VG.16.E.P	2.560 H 20 SL	
303276	03.2.560.25G.16.E.P	2.560 G 25	
305275	03.2.560.40G.16.E.P	2.560 G 40	
306353	03.2.560.60G.16.E.P	2.560 G 60	
306352	03.2.560.100G.16.E.P	2.560 G 100	
1) 03.2.560 MEHRPREIS VITON DICHTUNG			
300923	03.2.900.3VG.16.E.P	2.900 H 3 SL	
306362	03.2.900.6VG.16.E.P	2.900 H 6 SL	
305860	03.2.900.10VG.16.E.P	2.900 H 10 SL	
306363	03.2.900.25VG.16.E.P	2.900 H 20 SL	
300504	03.2.900.25G.16.E.P	2.900 G 25	
306360	03.2.900.40G.16.E.P	2.900 G 40	
306359	03.2.900.60G.16.E.P	2.900 G 60	
306358	03.2.900.100G.16.E.P	2.900 G 100	
1) 03.2.900 MEHRPREIS VITON DICHTUNG			
3.3 Filterelemente/Filter Elements 03.RL...			
306429	03.RL 65.3VG.16.E.O	RL65 H 3 SL	
306430	03.RL 65.6VG.16.E.O	RL65 H 6 SL	
306431	03.RL 65.10VG.16.E.O	RL65 H 10 SL	
306432	03.RL 65.25VG.16.E.O	RL65 H 20 SL	
300506	03.RL 65.25G.16.S.O	RL65 G 25	
300925	03.RL 65.40G.16.S.O	RL65 G 40	
300926	03.RL 65.60G.16.S.O	RL65 G 60	
300507	03.RL 65.100G.16.S.O	RL65 G 100	
306433	03.RL 85.3VG.16.E.O	RL85 H 3 SL	
306434	03.RL 85.6VG.16.E.O	RL85 H 6 SL	
306435	03.RL 85.10VG.16.E.O	RL85 H 10 SL	
300931	03.RL 85.25VG.16.E.O	RL85 H 20 SL	
300508	03.RL 85.25G.16.S.O	RL85 G 25	
300934	03.RL 85.40G.16.S.O	RL85 G 40	
300509	03.RL 85.60G.16.S.O	RL85 G 60	
303217	03.RL 85.100G.16.S.O	RL85 G 100	
306436	03.RL 125.3VG.16.E.O	RL125 H 3 SL	
306437	03.RL 125.6VG.16.E.O	RL125 H 6 SL	
302167	03.RL 125.10VG.16.E.O	RL125 H 10 SL	
306438	03.RL 125.25VG.16.E.O	RL125 H 20 SL	
300510	03.RL 125.25G.16.S.O	RL125 G 25	
300939	03.RL 125.40G.16.S.O	RL125 G 40	
300940	03.RL 125.60G.16.S.O	RL125 G 60	
300941	03.RL 125.100G.16.S.O	RL125 G 100	

01.02.2009		Preisliste Filterelemente Pricelist Filter-Elements		E38
Artikelnr. Ident.no.		Artikelbezeichnung Designation		Netto-Preis Unit-Price
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306440	03.RL 165.3VG.16.E.O	RL165 H 3 SL		
300953	03.RL 165.6VG.16.E.O	RL165 H 6 SL		
300511	03.RL 165.10VG.16.E.O	RL165 H 10 SL		
300949	03.RL 165.25VG.16.E.O	RL165 H 20 SL		
300513	03.RL 165.25G.16.S.O	RL165 G 25		
300514	03.RL 165.40G.16.S.O	RL165 G 40		
300515	03.RL 165.60G.16.S.O	RL165 G 60		
300516	03.RL 165.100G.16.S.O	RL165 G 100		
306441	03.RL 250.3VG.16.E.O	RL250 H 3 SL		
306442	03.RL 250.6VG.16.E.O	RL250 H 6 SL		
300955	03.RL 250.10VG.16.E.O	RL250 H 10 SL		
300517	03.RL 250.25VG.16.E.O	RL250 H 20 SL		
300518	03.RL 250.25G.16.S.O	RL250 G 25		
300520	03.RL 250.40G.16.S.O	RL250 G 40		
300521	03.RL 250.60G.16.S.O	RL250 G 60		
300522	03.RL 250.100G.16.S.O	RL250 G 100		
306443	03.RL 330.3VG.16.E.P	RL330 H 3 SL		
306444	03.RL 330.6VG.16.E.P	RL330 H 6 SL		
300523	03.RL 330.10VG.16.E.P	RL330 H 10 SL		
306201	03.RL 330.25VG.16.E.P	RL330 H 20 SL		
300525	03.RL 330.25G.16.S.P	RL330 G 25		
300526	03.RL 330.40G.16.S.P	RL330 G 40		
300967	03.RL 330.60G.16.S.P	RL330 G 60		
300527	03.RL 330.100G.16.S.P	RL330 G 100		
306445	03.RL 500.3VG.16.E.O	RL500 H 3 SL		
306446	03.RL 500.6VG.16.E.O	RL500 H 6 SL		
303213	03.RL 500.10VG.16.E.O	RL500 H 10 SL		
300528	03.RL 500.25VG.16.E.O	RL500 H 20 SL		
300529	03.RL 500.25G.16.S.O	RL500 G 25		
300531	03.RL 500.40G.16.S.O	RL500 G 40		
300532	03.RL 500.60G.16.S.O	RL500 G 60		
300533	03.RL 500.100G.16.S.O	RL500 G 100		
306448	03.RL 660.3VG.16.E.O	RL660 H 3 SL		
306449	03.RL 660.6VG.16.E.O	RL660 H 6 SL		
306450	03.RL 660.10VG.16.E.O	RL660 H 10 SL		
300534	03.RL 660.25VG.16.E.O	RL660 H 20 SL		
300536	03.RL 660.25G.16.S.O	RL660 G 25		
300538	03.RL 660.40G.16.S.O	RL660 G 40		
300539	03.RL 660.60G.16.S.O	RL660 G 60		
300540	03.RL 660.100G.16.S.O	RL660 G 100		
300541	03.RL 750.3VG.16.E.O	RL750 H 3 SL		
300981	03.RL 750.6VG.16.E.O	RL750 H 6 SL		
300974	03.RL 750.10VG.16.E.O	RL750 H 10 SL		
300543	03.RL 750.25VG.16.E.O	RL750 H 20 SL		
300545	03.RL 750.25G.16.S.O	RL750 G 25		
300979	03.RL 750.40G.16.S.O	RL750 G 40		
300980	03.RL 750.60G.16.S.O	RL750 G 60		
300982	03.RL 750.100G.16.S.O	RL750 G 100		

01.02.2009		Preisliste Filterelemente Pricelist Filter-Elements		E39
Artikelnr.	Artikelbezeichnung	Netto-Preis		
Ident.no.	Designation	Unit-Price		
3.4 Filterelemente/Filter Elements 03.DL...				
306415	03.DL 65.3VG.16.E.P	DL65 H 3 SL		
300984	03.DL 65.6VG.16.E.P	DL65 H 6 SL		
306416	03.DL 65.10VG.16.E.P	DL65 H 10 SL		
300988	03.DL 65.25VG.16.E.P	DL65 H 20 SL		
300943	03.DL 65.25G.16.S.P	DL65 G 25		
300552	03.DL 65.40G.16.S.P	DL65 G 40		
300553	03.DL 65.60G.16.S.P	DL65 G 60		
300555	03.DL 65.100G.16.S.P	DL65 G 100		
306417	03.DL 85.3VG.16.E.P	DL85 H 3 SL		
300998	03.DL 85.6VG.16.E.P	DL85 H 6 SL		
301845	03.DL 85.10VG.16.E.P	DL85 H 10 SL		
300993	03.DL 85.25VG.16.E.P	DL85 H 20 SL		
300556	03.DL 85.25G.16.S.P	DL85 G 25		
300996	03.DL 85.40G.16.S.P	DL85 G 40		
300557	03.DL 85.60G.16.S.P	DL85 G 60		
300558	03.DL 85.100G.16.S.P	DL85 G 100		
306419	03.DL 125.3VG.16.E.P	DL125 H 3 SL		
306420	03.DL 125.6VG.16.E.P	DL125 H 6 SL		
301001	03.DL 125.10VG.16.E.P	DL125 H 10 SL		
301002	03.DL 125.25VG.16.E.P	DL125 H 20 SL		
300560	03.DL 125.25G.16.S.P	DL125 G 25		
300561	03.DL 125.40G.16.S.P	DL125 G 40		
300562	03.DL 125.60G.16.S.P	DL125 G 60		
301006	03.DL 125.100G.16.S.P	DL125 G 100		

01.02.2009		Preisliste Filterelemente		E40	
		Pricelist Filter-Elements			
Artikelnr. Artikelbezeichnung				Netto-Preis	
Ident.no. Designation				Unit-Price	
3.5 Filterelemente/Filter Elements 03.1.0063...03.1.1000					
317483	01.NR 63.3VG.10.B.P.-	1.0063 H 3 SL			
317484	01.NR 63.6VG.10.B.P.-	1.0063 H 6 SL			
314218	01.NR 63.10VG.10.B.P.-	1.0063 H 10 SL			
312792	01.NR 63.25VG.10.B.P.-	1.0063 H 20 SL			
	1) 01.NR 63 MEHRPREIS VITON DICHTUNG				
	2) 01.NR 63 MEHRPREIS AUSF. KPL. EDELSTAHL				
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
317487	01.NR 100.3VG.10.B.P.-	1.0100 H 3 SL			
316886	01.NR 100.6VG.10.B.P.-	1.0100 H 6 SL			
313167	01.NR 100.10VG.10.B.P.-	1.0100 H 10 SL			
312504	01.NR 100.25VG.10.B.P.-	1.0100 H 20 SL			
	1) 01.NR 100 MEHRPREIS VITON DICHTUNG				
	2) 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL				
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
314485	01.NR 160.3VG.10.B.P.-	1.0160 H 3 SL			
314486	01.NR 160.6VG.10.B.P.-	1.0160 H 6 SL			
314220	01.NR 160.10VG.10.B.P.-	1.0160 H 10 SL			
314449	01.NR 160.25VG.10.B.P.-	1.0160 H 20 SL			
	1) 01.NR 160 MEHRPREIS VITON DICHTUNG				
	2) 01.NR 160 MEHRPREIS AUSF. KPL. EDELSTAHL				
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
314491	01.NR 250.3VG.10.B.P.-	1.0250 H 3 SL			
314492	01.NR 250.6VG.10.B.P.-	1.0250 H 6 SL			
314191	01.NR 250.10VG.10.B.P.-	1.0250 H 10 SL			
314454	01.NR 250.25VG.10.B.P.-	1.0250 H 20 SL			
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG				
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL				
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel			
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08			

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E41
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
317489	01.NR 400.3VG.10.B.P.-	1.0400 H 3 SL	
314817	01.NR 400.6VG.10.B.P.-	1.0400 H 6 SL	
314870	01.NR 400.10VG.10.B.P.-	1.0400 H 10 SL	
317492	01.NR 400.25VG.10.B.P.-	1.0400 H 20 SL	
	1) 01.NR 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%	
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%	

1) Surplus price: viton sealing
 3) Surplus price: element execution IS 06

2) Surplus price: execution complete stainless steel
 4) Surplus price: element execution IS 08

01.02.2009		Preisliste Filterelemente Pricelist Filter-Elements		E42
Artikelnr.	Artikelbezeichnung			Netto-Preis
Ident.no.	Designation			Unit-Price
3.6 Filterelemente/Filter Elements 03.2.0040...03.2.0630				
312621	01.NL 40.3VG.30.E.P.-	2.0040 H 3 SL		
313873	01.NL 40.3VG.HR.E.P.-	2.0040 H 3 SL.B		
312623	01.NL 40.6VG.30.E.P.-	2.0040 H 6 SL		
312884	01.NL 40.6VG.HR.E.P.-	2.0040 H 6 SL.B		
311433	01.NL 40.10VG.30.E.P.-	2.0040 H 10 SL		
312299	01.NL 40.10VG.HR.E.P.-	2.0040 H 10 SL.B		
312542	01.NL 40.25VG.30.E.P.-	2.0040 H 20 SL		
314169	01.NL 40.25VG.HR.E.P.-	2.0040 H 20 SL.B		
1) 01.NL 40 MEHRPREIS VITON DICHTUNG				
2) 01.NL 40 MEHRPREIS AUSF. KPL. EDELSTAHL				
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
312636	01.NL 63.3VG.30.E.P.-	2.0063 H 3 SL		
316536	01.NL 63.3VG.HR.E.P.-	2.0063 H 3 SL.B		
312637	01.NL 63.6VG.30.E.P.-	2.0063 H 6 SL		
317323	01.NL 63.6VG.HR.E.P.-	2.0063 H 6 SL.B		
311365	01.NL 63.10VG.30.E.P.-	2.0063 H 10 SL		
311487	01.NL 63.10VG.HR.E.P.-	2.0063 H 10 SL.B		
311571	01.NL 63.25VG.30.E.P.-	2.0063 H 20 SL		
315123	01.NL 63.25VG.HR.E.P.-	2.0063 H 20 SL.B		
1) 01.NL 63 MEHRPREIS VITON DICHTUNG				
2) 01.NL 63MEHRPREIS AUSF. KPL. EDELSTAHL				
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
312649	01.NL 100.3VG.30.E.P.-	2.0100 H 3 SL		
312797	01.NL 100.3VG.HR.E.P.-	2.0100 H 3 SL.B		
312651	01.NL 100.6VG.30.E.P.-	2.0100 H 6 SL		
313670	01.NL 100.6VG.HR.E.P.-	2.0100 H 6 SL.B		
311574	01.NL 100.10VG.30.E.P.-	2.0100 H 10 SL		
312301	01.NL 100.10VG.HR.E.P.-	2.0100 H 10 SL.B		
312653	01.NL 100.25VG.30.E.P.-	2.0100 H 20 SL		
301752	01.NL 100.25VG.HR.E.P.-	2.0100 H 20 SL.B		
1) 01.NL 100 MEHRPREIS VITON DICHTUNG				
2) 01.NL 100 MEHRPREIS AUSF. KPL. EDELSTAHL				
3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06				10%
4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08				25%
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel		
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E43
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
300784	01.NL 250.3VG.30.E.P.-	2.0250 H 3 SL	
300790	01.NL 250.6VG.30.E.P.-	2.0250 H 6 SL	
300367	01.NL 250.10VG.30.E.P.-	2.0250 H 10 SL	
301900	01.NL 250.25VG.30.E.P.-	2.0250 H 20 SL	
	1) 01.NL 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
307250	01.NL 400.3VG.30.E.P.-	2.0400 H 3 SL	
311449	01.NL 400.3VG.HR.E.P.-	2.0400 H 3 SL.B	
307251	01.NL 400.6VG.30.E.P.-	2.0400 H 6 SL	
311448	01.NL 400.6VG.HR.E.P.-	2.0400 H 6 SL.B	
307252	01.NL 400.10VG.30.E.P.-	2.0400 H 10 SL	
312800	01.NL 400.10VG.HR.E.P.-	2.0400 H 10 SL.B	
307255	01.NL 400.25VG.30.E.P.-	2.0400 H 20 SL	
314880	01.NL 400.25VG.HR.E.P.-	2.0400 H 20 SL.B	
	1) 01.NL 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300371	01.NL 630.3VG.30.E.P.-	2.0630 H 3 SL	
300795	01.NL 630.6VG.30.E.P.-	2.0630 H 6 SL	
300791	01.NL 630.10VG.30.E.P.-	2.0630 H 10 SL	
300792	01.NL 630.25VG.30.E.P.-	2.0630 H 20 SL	
	1) 01.NL 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
1) Surplus price: viton sealing 2) Surplus price: execution complete stainless steel 3) Surplus price: element execution IS 06 4) Surplus price: element execution IS 08			

01.02.2009		<div>Preisliste Filterelemente</div> <div>Pricelist Filter-Elements</div>		E45
Artikelnr.		Artikelbezeichnung		Netto-Preis
Ident.no.		Designation		Unit-Price
	04.PI 5205.6VG.HR.E.O	PI 5205 SMX VST 6		
	04.PI 5208.6VG.HR.E.O	PI 5208 SMX VST 6		
326692	04.PI 5211.6VG.HR.E.O	PI 5211 SMX VST 6		
301037	04.PI 5215.6VG.HR.E.O	PI 5215 SMX VST 6		
301038	04.PI 5230.6VG.HR.E.O	PI 5230 SMX VST 6		
319461	04.PI 5245.6VG.HR.E.O	PI 5245 SMX VST 6		
301052	04.PI 8205.25G.16.E.O	PI 8205 DRG 25		
306472	04.PI 8208.25G.16.E.O	PI 8208 DRG 25		
306485	04.PI 8211.25G.16.E.O	PI 8211 DRG 25		
304590	04.PI 8215.25G.16.E.O	PI 8215 DRG 25		
301053	04.PI 8230.25G.16.E.O	PI 8230 DRG 25		
301054	04.PI 8245.25G.16.E.O	PI 8245 DRG 25		
303309	04.PI 8305.40G.16.E.O	PI 8305 DRG 40		
306473	04.PI 8308.40G.16.E.O	PI 8308 DRG 40		
306486	04.PI 8311.40G.16.E.O	PI 8311 DRG 40		
303316	04.PI 8315.40G.16.E.O	PI 8315 DRG 40		
303580	04.PI 8330.40G.16.E.O	PI 8330 DRG 40		
302040	04.PI 8345.40G.16.E.O	PI 8345 DRG 40		
303308	04.PI 8405.60G.16.E.O	PI 8405 DRG 60		
306474	04.PI 8408.60G.16.E.O	PI 8408 DRG 60		
306487	04.PI 8411.60G.16.E.O	PI 8411 DRG 60		
303317	04.PI 8415.60G.16.E.O	PI 8415 DRG 60		
301825	04.PI 8430.60G.16.E.O	PI 8430 DRG 60		
306519	04.PI 8445.60G.16.E.O	PI 8445 DRG 60		
300824	04.PI 8505.100G.16.E.O	PI 8505 DRG 100		
306475	04.PI 8508.100G.16.E.O	PI 8508 DRG 100		
306489	04.PI 8511.100G.16.E.O	PI 8511 DRG 100		
306497	04.PI 8515.100G.16.E.O	PI 8515 DRG 100		
300825	04.PI 8530.100G.16.E.O	PI 8530 DRG 100		
306520	04.PI 8545.100G.16.E.O	PI 8545 DRG 100		
303310	04.PI 9205.25G.HR.E.O	PI 9205 DRG VST 25		
306477	04.PI 9208.25G.HR.E.O	PI 9208 DRG VST 25		
306492	04.PI 9211.25G.HR.E.O	PI 9211 DRG VST 25		
306500	04.PI 9215.25G.HR.E.O	PI 9215 DRG VST 25		
306513	04.PI 9230.25G.HR.E.O	PI 9230 DRG VST 25		
306523	04.PI 9245.25G.HR.E.O	PI 9245 DRG VST 25		
306467	04.PI 9305.40G.HR.E.O	PI 9305 DRG VST 40		
306478	04.PI 9308.40G.HR.E.O	PI 9308 DRG VST 40		
306493	04.PI 9311.40G.HR.E.O	PI 9311 DRG VST 40		
306501	04.PI 9315.40G.HR.E.O	PI 9315 DRG VST 40		
306514	04.PI 9330.40G.HR.E.O	PI 9330 DRG VST 40		
306524	04.PI 9345.40G.HR.E.O	PI 9345 DRG VST 40		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E46
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
306468	04.PI 9405.60G.HR.E.O	PI 9405 DRG VST 60	
303724	04.PI 9408.60G.HR.E.O	PI 9408 DRG VST 60	
306494	04.PI 9411.60G.HR.E.O	PI 9411 DRG VST 60	
306502	04.PI 9415.60G.HR.E.O	PI 9415 DRG VST 60	
306515	04.PI 9430.60G.HR.E.O	PI 9430 DRG VST 60	
306525	04.PI 9445.60G.HR.E.O	PI 9445 DRG VST 60	
306469	04.PI 9505.100G.HR.E.O	PI 9505 DRG VST 100	
306479	04.PI 9508.100G.HR.E.O	PI 9508 DRG VST 100	
306495	04.PI 9511.100G.HR.E.O	PI 9511 DRG VST 100	
306503	04.PI 9515.100G.HR.E.O	PI 9515 DRG VST 100	
306516	04.PI 9530.100G.HR.E.O	PI 9530 DRG VST 100	
306526	04.PI 9545.100G.HR.E.O	PI 9545 DRG VST 100	
4.2 Filterelemente/Filter Elements 04.852...			
306678	04.852 024.25G.16.B.P	852 024 DRG 25	
306679	04.852 024.60G.16.B.P	852 024 DRG 60	
306680	04.852 024.100G.16.B.P	852 024 DRG 100	
306681	04.852 034.3VG.16.E.P	852 034 SMX 3	
306682	04.852 034.3VG.HR.E.P	852 034 SMX VST 3	
303321	04.852 034.10VG.16.E.P	852 034 SMX 10	
300801	04.852 034.10VG.HR.E.P	852 034 SMX VST 10	
304485	04.852 034.25VG.16.E.P	852 034 SMX 25	
306683	04.852 034.25VG.HR.E.P	852 034 SMX VST 25	
303323	04.852 034.25G.16.E.P	852 034 DRG 25	
306686	04.852 034.25G.HR.E.P	852 034 DRG VST 25	
303324	04.852 034.60G.16.E.P	852 034 DRG 60	
306687	04.852 034.60G.HR.E.P	852 034 DRG VST 60	
306684	04.852 034.100G.16.E.P	852 034 DRG 100	
306688	04.852 034.100G.HR.E.P	852 034 DRG VST 100	
306707	04.852 059.10VG.16.B.O	852 059 SMX 10	
306708	04.852 059.25VG.16.B.O	852 059 SMX 25	
303326	04.852 059.25G.16.B.O	852 059 DRG 25	
306710	04.852 059.60G.16.B.O	852 059 DRG 60	
306711	04.852 059.100G.16.B.O	852 059 DRG 100	
306726	04.852 070.3VG.16.B.P	852 070 SMX 3	
300803	04.852 070.10VG.16.B.P	852 070 SMX 10	
303327	04.852 070.25VG.16.B.P	852 070 SMX 25	
306728	04.852 070.25G.16.B.P	852 070 DRG 25	
306729	04.852 070.60G.16.B.P	852 070 DRG 60	
306730	04.852 070.100G.16.B.P	852 070 DRG 100	
306731	04.852 087.10VG.16.B.O	852 087 SMX 10	
306732	04.852 087.25VG.16.B.O	852 087 SMX 25	
306734	04.852 087.25G.16.B.O	852 087 DRG 25	
303331	04.852 087.60G.16.B.O	852 087 DRG 60	
306735	04.852 087.100G.16.B.O	852 087 DRG 100	
303024	04.852 125.3VG.16.E.P	852 125 SMX 3	
303023	04.852 125.3VG.HR.E.P	852 125 SMX VST 3	

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E47
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
303333	04.852 125.10VG.16.E.P	852 125 SMX 10	
303050	04.852 125.10VG.HR.E.P	852 125 SMX VST 10	
306736	04.852 125.25VG.16.E.P	852 125 SMX 25	
300804	04.852 125.25VG.HR.E.P	852 125 SMX VST 25	
306737	04.852 125.25G.16.E.P	852 125 DRG 25	
306742	04.852 125.25G.HR.E.P	852 125 DRG VST 25	
306738	04.852 125.40G.16.E.P	852 125 DRG 40	
306743	04.852 125.40G.HR.E.P	852 125 DRG VST 40	
306739	04.852 125.60G.16.E.P	852 125 DRG 60	
306744	04.852 125.60G.HR.E.P	852 125 DRG VST 60	
306740	04.852 125.100G.16.E.P	852 125 DRG 100	
306745	04.852 125.100G.HR.E.P	852 125 DRG VST 100	
306746	04.852 126.3VG.16.E.P	852 126 SMX 3	
306747	04.852 126.3VG.HR.E.P	852 126 SMX VST 3	
300805	04.852 126.10VG.16.E.P	852 126 SMX 10	
300806	04.852 126.10VG.HR.E.P	852 126 SMX VST 10	
300807	04.852 126.25VG.16.E.P	852 126 SMX 25	
306749	04.852 126.25VG.HR.E.P	852 126 SMX VST 25	
306750	04.852 126.25G.16.E.P	852 126 DRG 25	
303337	04.852 126.25G.HR.E.P	852 126 DRG VST 25	
306751	04.852 126.40G.16.E.P	852 126 DRG 40	
306753	04.852 126.40G.HR.E.P	852 126 DRG VST 40	
303339	04.852 126.60G.16.E.P	852 126 DRG 60	
303338	04.852 126.60G.HR.E.P	852 126 DRG VST 60	
303340	04.852 126.100G.16.E.P	852 126 DRG 100	
300808	04.852 126.100G.HR.E.P	852 126 DRG VST 100	
303049	04.852 127.3VG.16.E.P	852 127 SMX 3	
303027	04.852 127.3VG.HR.E.P	852 127 SMX VST 3	
303342	04.852 127.10VG.16.E.P	852 127 SMX 10	
303026	04.852 127.10VG.HR.E.P	852 127 SMX VST 10	
303341	04.852 127.25VG.16.E.P	852 127 SMX 25	
306072	04.852 127.25VG.HR.E.P	852 127 SMX VST 25	
306755	04.852 127.25G.16.E.P	852 127 DRG 25	
303343	04.852 127.25G.HR.E.P	852 127 DRG VST 25	
303344	04.852 127.40G.16.E.P	852 127 DRG 40	
306758	04.852 127.40G.HR.E.P	852 127 DRG VST 40	
303345	04.852 127.60G.16.E.P	852 127 DRG 60	
306759	04.852 127.60G.HR.E.P	852 127 DRG VST 60	
306756	04.852 127.100G.16.E.P	852 127 DRG 100	
306760	04.852 127.100G.HR.E.P	852 127 DRG VST 100	
306761	04.852 264.10VG.16.B.O	852 264 SMX 10	
306762	04.852 264.25VG.16.B.O	852 264 SMX 25	
306764	04.852 264.25G.16.B.O	852 264 DRG 25	
306765	04.852 264.60G.16.B.O	852 264 DRG 60	
306766	04.852 264.100G.16.B.O	852 264 DRG 100	
306776	04.852 444.6VG.16.B.P	852 444 SMX 6	
306777	04.852 444.10VG.16.B.P	852 444 SMX 10	
303531	04.852 444.25VG.16.B.P	852 444 SMX 25	
306778	04.852 444.25G.16.B.P	852 444 DRG 25	
302044	04.852 444.40G.16.B.P	852 444 DRG 40	

01.02.2009		Preisliste Filterelemente Pricelist Filter-Elements		E48
Artikelnr.	Artikelbezeichnung			Netto-Preis
Ident.no.	Designation			Unit-Price
4.3 Filterelemente/Filter Elements 04.PI...RN				
317483	01.NR 63.3VG.10.B.P.-	PI 21006 RN SMX 3		
317484	01.NR 63.6VG.10.B.P.-	PI 22006 RN SMX 6		
314218	01.NR 63.10VG.10.B.P.-	PI 23006 RN SMX 10		
312792	01.NR 63.25VG.10.B.P.-	PI 25006 RN SMX 25		
	1) 01.NR 63 MEHRPREIS VITON DICHTUNG			
	2) 01.NR 63 MEHRPREIS AUSF. KPL. EDELSTAHL			
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06			10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08			25%
317487	01.NR 100.3VG.10.B.P.-	PI 21010 RN SMX 3		
316886	01.NR 100.6VG.10.B.P.-	PI 22010 RN SMX 6		
313167	01.NR 100.10VG.10.B.P.-	PI 23010 RN SMX 10		
312504	01.NR 100.25VG.10.B.P.-	PI 25010 RN SMX 25		
	1) 01.NR 100 MEHRPREIS VITON DICHTUNG			
	2) 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL			
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06			10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08			25%
314485	01.NR 160.3VG.10.B.P.-	PI 21016 RN SMX 3		
314486	01.NR 160.6VG.10.B.P.-	PI 22016 RN SMX 6		
314220	01.NR 160.10VG.10.B.P.-	PI 23016 RN SMX 10		
314449	01.NR 160.25VG.10.B.P.-	PI 25016 RN SMX 25		
	1) 01.NR 160 MEHRPREIS VITON DICHTUNG			
	2) 01.NR 160 MEHRPREIS AUSF. KPL. EDELSTAHL			
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06			10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08			25%
314491	01.NR 250.3VG.10.B.P.-	PI 21025 RN SMX 3		
314492	01.NR 250.6VG.10.B.P.-	PI 22025 RN SMX 6		
314191	01.NR 250.10VG.10.B.P.-	PI 23025 RN SMX 10		
314454	01.NR 250.25VG.10.B.P.-	PI 25025 RN SMX 25		
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG			
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL			
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06			10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08			25%
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel		
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E49
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
317489	01.NR 400.3VG.10.B.P.-	PI 21040 RN SMX 3	
314817	01.NR 400.6VG.10.B.P.-	PI 22040 RN SMX 6	
314870	01.NR 400.10VG.10.B.P.-	PI 23040 RN SMX 10	
317492	01.NR 400.25VG.10.B.P.-	PI 25040 RN SMX 25	
	1) 01.NR 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
304533	01.NR 630.3VG.10.B.P.-	PI 21063 RN SMX 3	
304534	01.NR 630.6VG.10.B.P.-	PI 22063 RN SMX 6	
304535	01.NR 630.10VG.10.B.P.-	PI 23063 RN SMX 10	
305036	01.NR 630.25VG.10.B.P.-	PI 25063 RN SMX 25	
	1) 01.NR 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
306604	01.NR 1000.3VG.10.B.P.-	PI 21100 RN SMX 3	
305449	01.NR 1000.6VG.10.B.P.-	PI 22100 RN SMX 6	
306605	01.NR 1000.10VG.10.B.P.-	PI 23100 RN SMX 10	
306606	01.NR 1000.25VG.10.B.P.-	PI 25100 RN SMX 25	
	1) 01.NR 1000 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
4.4 Filterelemente/Filter Elements 04.PI...DN			
312621	01.NL 40.3VG.30.E.P.-	PI 21004 DN SMX 3	
313873	01.NL 40.3VG.HR.E.P.-	PI 71004 DN SMX VST 3	
312623	01.NL 40.6VG.30.E.P.-	PI 22004 DN SMX 6	
312884	01.NL 40.6VG.HR.E.P.-	PI 72004 DN SMX VST 6	
311433	01.NL 40.10VG.30.E.P.-	PI 23004 DN SMX 10	
312299	01.NL 40.10VG.HR.E.P.-	PI 73004 DN SMX VST 10	
312542	01.NL 40.25VG.30.E.P.-	PI 25004 DN SMX 25	
314169	01.NL 40.25VG.HR.E.P.-	PI 75004 DN SMX VST 25	
	1) 01.NL 40 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 40 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
1) Surplus price: viton sealing		2) Surplus price: execution complete stainless steel	
3) Surplus price: element execution IS 06		4) Surplus price: element execution IS 08	

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E50
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
312636	01.NL 63.3VG.30.E.P.-	PI 21006 DN SMX 3	
316536	01.NL 63.3VG.HR.E.P.-	PI 71006 DN SMX VST 3	
312637	01.NL 63.6VG.30.E.P.-	PI 22006 DN SMX 6	
317323	01.NL 63.6VG.HR.E.P.-	PI 72006 DN SMX VST 6	
311365	01.NL 63.10VG.30.E.P.-	PI 23006 DN SMX 10	
311487	01.NL 63.10VG.HR.E.P.-	PI 73006 DN SMX VST 10	
311571	01.NL 63.25VG.30.E.P.-	PI 25006 DN SMX 25	
315123	01.NL 63.25VG.HR.E.P.-	PI 75006 DN SMX VST 25	
	1) 01.NL 63 MEHRPREIS VITON DICHUNG		
	2) 01.NL 63 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
312649	01.NL 100.3VG.30.E.P.-	PI 21010 DN SMX 3	
312797	01.NL 100.3VG.HR.E.P.-	PI 71010 DN SMX VST 3	
312651	01.NL 100.6VG.30.E.P.-	PI 22010 DN SMX 6	
313670	01.NL 100.6VG.HR.E.P.-	PI 72010 DN SMX VST 6	
311574	01.NL 100.10VG.30.E.P.-	PI 23010 DN SMX 10	
312301	01.NL 100.10VG.HR.E.P.-	PI 73010 DN SMX VST 10	
312653	01.NL 100.25VG.30.E.P.-	PI 25010 DN SMX 25	
301752	01.NL 100.25VG.HR.E.P.-	PI 75010 DN SMX VST 25	
	1) 01.NL 100 MEHRPREIS VITON DICHUNG		
	2) 01.NL 100 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300784	01.NL 250.3VG.30.E.P.-	PI 21025 DN SMX 3	
300790	01.NL 250.6VG.30.E.P.-	PI 22025 DN SMX 6	
300367	01.NL 250.10VG.30.E.P.-	PI 23025 DN SMX 10	
301900	01.NL 250.25VG.30.E.P.-	PI 25025 DN SMX 25	
	1) 01.NL 250 MEHRPREIS VITON DICHUNG		
	2) 01.NL 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
	1) Surplus price: viton sealing		
	2) Surplus price: element execution IS 06		
		2) Surplus price: execution complete stainless steel	
		4) Surplus price: element execution IS 08	

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E51
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
307250	01.NL 400.3VG.30.E.P.-	PI 21040 DN SMX 3	
311449	01.NL 400.3VG.HR.E.P.-	PI 71040 DN SMX VST 3	
307251	01.NL 400.6VG.30.E.P.-	PI 22040 DN SMX 6	
311448	01.NL 400.6VG.HR.E.P.-	PI 72040 DN SMX VST 6	
307252	01.NL 400.10VG.30.E.P.-	PI 23040 DN SMX 10	
312800	01.NL 400.10VG.HR.E.P.-	PI 73040 DN SMX VST 10	
307255	01.NL 400.25VG.30.E.P.-	PI 25040 DN SMX 25	
314880	01.NL 400.25VG.HR.E.P.-	PI 75040 DN SMX VST 25	
	1) 01.NL 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300371	01.NL 630.3VG.30.E.P.-	PI 21063 DN SMX 3	
300795	01.NL 630.6VG.30.E.P.-	PI 22063 DN SMX 6	
300791	01.NL 630.10VG.30.E.P.-	PI 23063 DN SMX 10	
300792	01.NL 630.25VG.30.E.P.-	PI 25063 DN SMX 25	
	1) 01.NL 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
	1) Surplus price: viton sealing	2) Surplus price: execution complete stainless steel	
	3) Surplus price: element execution IS 06	4) Surplus price: element execution IS 08	

01.02.2009		Preisliste Filterelemente Pricelist Filter-Elements		E52
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price		
5. Abmessungen/Sizes PALL				
5.1 Filterelemente/Filter Elements 05...				
306531	05.8300.3VG.10.B.P.8	HC8300 F*P 8 H		
305209	05.8300.3VG.10.B.P.16	HC8300 F*P 16 H		
301916	05.8300.3VG.10.B.P.39	HC8300 F*P 39 H		
304655	05.8300.6VG.10.B.P.8	HC8300 F*N 8 H		
301081	05.8300.6VG.10.B.P.16	HC8300 F*N 16 H		
301059	05.8300.6VG.10.B.P.39	HC8300 F*N 39 H		
306532	05.8300.12.200.10.B.P.8	HC8300 F*S 8 H		
301080	05.8300.12.200.10.B.P.16	HC8300 F*S 16 H		
301056	05.8300.12.200.10.B.P.39	HC8300 F*S 39 H		
301826	05.8300.25VG.10.B.P.8	HC8300 F*T 8 H		
301057	05.8300.25VG.10.B.P.16	HC8300 F*T 16 H		
301058	05.8300.25VG.10.B.P.39	HC8300 F*T 39 H		
1) 05.8300 MEHRPREIS VITON DICHTUNG				
333429	05.8304.1VG.10.B.P.16	HC8304 FKZ 16 H		
333430	05.8304.1VG.10.B.V.16	HC8304 FKZ 16 Z		
333427	05.8304.1VG.10.B.P.39	HC8304 FKZ 39 H		
333431	05.8304.1VG.10.B.V.39	HC8304 FKZ 39 Z		
333420	05.8304.3VG.10.B.P.16	HC8304 FKP 16 H		
333421	05.8304.3VG.10.B.V.16	HC8304 FKP 16 Z		
333422	05.8304.3VG.10.B.P.39	HC8304 FKP 39 H		
333423	05.8304.3VG.10.B.V.39	HC8304 FKP 39 Z		
333419	05.8304.6VG.10.B.P.16	HC8304 FKN 16 H		
333417	05.8304.6VG.10.B.V.16	HC8304 FKN 16 Z		
333418	05.8304.6VG.10.B.P.39	HC8304 FKN 39 H		
333407	05.8304.6VG.10.B.V.39	HC8304 FKN 39 Z		
333424	05.8304.25VG.10.B.P.16	HC8304 FKT 16 H		
333425	05.8304.25VG.10.B.V.16	HC8304 FKT 16 Z		
333426	05.8304.25VG.10.B.P.39	HC8304 FKT 39 H		
333428	05.8304.25VG.10.B.V.39	HC8304 FKT 39 Z		
333432	05.8304.12.200.10.B.P.16	HC8304 FKS 16 H		
333434	05.8304.12.200.10.B.V.16	HC8304 FKS 16 Z		
333433	05.8304.12.200.10.B.P.39	HC8304 FKS 39 H		
333435	05.8304.12.200.10.B.V.39	HC8304 FKS 39 Z		
333453	05.8314.1VG.10.B.P.16	HC8314 FKZ 16 H		
333454	05.8314.1VG.10.B.V.16	HC8314 FKZ 16 Z		
333455	05.8314.1VG.10.B.P.39	HC8314 FKZ 39 H		
333456	05.8314.1VG.10.B.V.39	HC8314 FKZ 39 Z		
333442	05.8314.3VG.10.B.P.16	HC8314 FKP 16 H		
333444	05.8314.3VG.10.B.V.16	HC8314 FKP 16 Z		
333443	05.8314.3VG.10.B.P.39	HC8314 FKP 39 H		
333445	05.8314.3VG.10.B.V.39	HC8314 FKP 39 Z		
333438	05.8314.6VG.10.B.P.16	HC8314 FKN 16 H		
333439	05.8314.6VG.10.B.V.16	HC8314 FKN 16 Z		
333441	05.8314.6VG.10.B.P.39	HC8314 FKN 39 H		
333440	05.8314.6VG.10.B.V.39	HC8314 FKN 39 Z		
* Hier kann beliebig D, K oder U eingesetzt werden / Here you can fit in D, K or U				
1) Surplus price: viton sealing				

5. Abmessungen/Sizes PALL

5.1 Filterelemente/Filter Elements 05...

306531	05.8300.3VG.10.B.P.8	HC8300 F*P 8 H
305209	05.8300.3VG.10.B.P.16	HC8300 F*P 16 H
301916	05.8300.3VG.10.B.P.39	HC8300 F*P 39 H
304655	05.8300.6VG.10.B.P.8	HC8300 F*N 8 H
301081	05.8300.6VG.10.B.P.16	HC8300 F*N 16 H
301059	05.8300.6VG.10.B.P.39	HC8300 F*N 39 H
306532	05.8300.12.200.10.B.P.8	HC8300 F*S 8 H
301080	05.8300.12.200.10.B.P.16	HC8300 F*S 16 H
301056	05.8300.12.200.10.B.P.39	HC8300 F*S 39 H
301826	05.8300.25VG.10.B.P.8	HC8300 F*T 8 H
301057	05.8300.25VG.10.B.P.16	HC8300 F*T 16 H
301058	05.8300.25VG.10.B.P.39	HC8300 F*T 39 H

1) 05.8300 MEHRPREIS VITON DICHTUNG

333429	05.8304.1VG.10.B.P.16	HC8304 FKZ 16 H
333430	05.8304.1VG.10.B.V.16	HC8304 FKZ 16 Z
333427	05.8304.1VG.10.B.P.39	HC8304 FKZ 39 H
333431	05.8304.1VG.10.B.V.39	HC8304 FKZ 39 Z
333420	05.8304.3VG.10.B.P.16	HC8304 FKP 16 H
333421	05.8304.3VG.10.B.V.16	HC8304 FKP 16 Z
333422	05.8304.3VG.10.B.P.39	HC8304 FKP 39 H
333423	05.8304.3VG.10.B.V.39	HC8304 FKP 39 Z
333419	05.8304.6VG.10.B.P.16	HC8304 FKN 16 H
333417	05.8304.6VG.10.B.V.16	HC8304 FKN 16 Z
333418	05.8304.6VG.10.B.P.39	HC8304 FKN 39 H
333407	05.8304.6VG.10.B.V.39	HC8304 FKN 39 Z
333424	05.8304.25VG.10.B.P.16	HC8304 FKT 16 H
333425	05.8304.25VG.10.B.V.16	HC8304 FKT 16 Z
333426	05.8304.25VG.10.B.P.39	HC8304 FKT 39 H
333428	05.8304.25VG.10.B.V.39	HC8304 FKT 39 Z
333432	05.8304.12.200.10.B.P.16	HC8304 FKS 16 H
333434	05.8304.12.200.10.B.V.16	HC8304 FKS 16 Z
333433	05.8304.12.200.10.B.P.39	HC8304 FKS 39 H
333435	05.8304.12.200.10.B.V.39	HC8304 FKS 39 Z

333453	05.8314.1VG.10.B.P.16	HC8314 FKZ 16 H
333454	05.8314.1VG.10.B.V.16	HC8314 FKZ 16 Z
333455	05.8314.1VG.10.B.P.39	HC8314 FKZ 39 H
333456	05.8314.1VG.10.B.V.39	HC8314 FKZ 39 Z
333442	05.8314.3VG.10.B.P.16	HC8314 FKP 16 H
333444	05.8314.3VG.10.B.V.16	HC8314 FKP 16 Z
333443	05.8314.3VG.10.B.P.39	HC8314 FKP 39 H
333445	05.8314.3VG.10.B.V.39	HC8314 FKP 39 Z
333438	05.8314.6VG.10.B.P.16	HC8314 FKN 16 H
333439	05.8314.6VG.10.B.V.16	HC8314 FKN 16 Z
333441	05.8314.6VG.10.B.P.39	HC8314 FKN 39 H
333440	05.8314.6VG.10.B.V.39	HC8314 FKN 39 Z

* Hier kann beliebig D, K oder U eingesetzt werden / Here you can fit in D, K or U

1) Surplus price: viton sealing

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E53
Artikelnr.	Artikelbezeichnung	Netto-Preis	
Ident.no.	Designation	Unit-Price	
333449	05.8314.25VG.10.B.P.16	HC8314 FKT 16 H	
333450	05.8314.25VG.10.B.V.16	HC8314 FKT 16 Z	
333451	05.8314.25VG.10.B.P.39	HC8314 FKT 39 H	
333452	05.8314.25VG.10.B.V.39	HC8314 FKT 39 Z	
333457	05.8314.12.200.10.B.P.16	HC8314 FKS 16 H	
333458	05.8314.12.200.10.B.V.16	HC8314 FKS 16 Z	
333459	05.8314.12.200.10.B.P.39	HC8314 FKS 39 H	
333436	05.8314.12.200.10.B.V.39	HC8314 FKS 39 Z	
306533	05.8400.3VG.10.B.P.8	HC8400 F*P 8 H	
306537	05.8400.3VG.10.B.P.16	HC8400 F*P 16 H	
306540	05.8400.3VG.10.B.P.26	HC8400 F*P 26 H	
306543	05.8400.3VG.10.B.P.39	HC8400 F*P 39 H	
306534	05.8400.6VG.10.B.P.8	HC8400 F*N 8 H	
306538	05.8400.6VG.10.B.P.16	HC8400 F*N 16 H	
301084	05.8400.6VG.10.B.P.26	HC8400 F*N 26 H	
306544	05.8400.6VG.10.B.P.39	HC8400 F*N 39 H	
306535	05.8400.12.200.10.B.P.8	HC8400 F*S 8 H	
306539	05.8400.12.200.10.B.P.16	HC8400 F*S 16 H	
306541	05.8400.12.200.10.B.P.26	HC8400 F*S 26 H	
306545	05.8400.12.200.10.B.P.39	HC8400 F*S 39 H	
306536	05.8400.25VG.10.B.P.8	HC8400 F*T 8 H	
301082	05.8400.25VG.10.B.P.16	HC8400 F*T 16 H	
306542	05.8400.25VG.10.B.P.26	HC8400 F*T 26 H	
306546	05.8400.25VG.10.B.P.39	HC8400 F*T 39 H	
1) 05.8400 MEHRPREIS VITON DICHTUNG			
306547	05.8500.3VG.10.B.P.8	HC8500 F*P 8 H	
306550	05.8500.3VG.10.B.P.13	HC8500 F*P 13 H	
301085	05.8500.3VG.10.B.P.26	HC8500 F*P 26 H	
306548	05.8500.6VG.10.B.P.8	HC8500 F*N 8 H	
301060	05.8500.6VG.10.B.P.13	HC8500 F*N 13 H	
301090	05.8500.6VG.10.B.P.26	HC8500 F*N 26 H	
306549	05.8500.12.200.10.B.P.8	HC8500 F*S 8 H	
305443	05.8500.12.200.10.B.P.13	HC8500 F*S 13 H	
301086	05.8500.12.200.10.B.P.26	HC8500 F*S 26 H	
301087	05.8500.25VG.10.B.P.8	HC8500 F*T 8 H	
301088	05.8500.25VG.10.B.P.13	HC8500 F*T 13 H	
301089	05.8500.25VG.10.B.P.26	HC8500 F*T 26 H	
1) 05.8500 MEHRPREIS VITON DICHTUNG			
* Hier kann beliebig D, K oder U eingesetzt werden / Here you can fit in D, K or U			
** Preise auf Anfrage / prices on request			

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E54
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
306551	05.8700.3VG.10.B.P.4	HC8700 F*P 4 H	
301091	05.8700.3VG.10.B.P.8	HC8700 F*P 8 H	
306552	05.8700.6VG.10.B.P.4	HC8700 F*N 4 H	
301094	05.8700.6VG.10.B.P.8	HC8700 F*N 8 H	
312747	05.8700.12.200.10.B.P.4	HC8700 F*S 4 H	
312746	05.8700.12.200.10.B.P.8	HC8700 F*S 8 H	
306553	05.8700.25VG.10.B.P.4	HC8700 F*T 4 H	
301093	05.8700.25VG.10.B.P.8	HC8700 F*T 8 H	
	1) 05.8700 MEHRPREIS VITON DICHTUNG		
306554	05.8900.3VG.10.E.P.8	HC8900 F*P 8 H	
306561	05.8900.3VG.10.E.P.13	HC8900 F*P 13 H	
301095	05.8900.3VG.10.E.P.16	HC8900 F*P 16 H	
318751	05.8900.3VG.10.E.P.26	HC8900 F*P 26 H	
	05.8900.3VG.10.E.P.39	HC8900 F*P 39 H	
306555	05.8900.6VG.10.E.P.8	HC8900 F*N 8 H	
306562	05.8900.6VG.10.E.P.13	HC8900 F*N 13 H	
301096	05.8900.6VG.10.E.P.16	HC8900 F*N 16 H	
318753	05.8900.6VG.10.E.P.26	HC8900 F*N 26 H	
321936	05.8900.6VG.10.E.P.39	HC8900 F*N 39 H	
306559	05.8900.12.200.10.E.P.8	HC8900 F*S 8 H	
312748	05.8900.12.200.10.E.P.13	HC8900 F*S 13 H	
306565	05.8900.12.200.10.E.P.16	HC8900 F*S 16 H	
318750	05.8900.12.200.10.E.P.26	HC8900 F*S 26 H	
318766	05.8900.12.200.10.E.P.39	HC8900 F*S 39 H	
306560	05.8900.25VG.10.E.P. 8	HC8900 F*T 8 H	
306564	05.8900.25VG.10.E.P.13	HC8900 F*T 13 H	
306566	05.8900.25VG.10.E.P.16	HC8900 F*T 16 H	
318752	05.8900.25VG.10.E.P.26	HC8900 F*T 26 H	
317615	05.8900.25VG.10.E.P.39	HC8900 F*T 39 H	
	1) 05.8900 MEHRPREIS VITON DICHTUNG		
301061	05.9020.3VG.10.E.P.4	HC9020 F*P 4 H	
301097	05.9020.3VG.10.E.P.8	HC9020 F*P 8 H	
301102	05.9020.6VG.10.E.P.4	HC9020 F*N 4 H	
306567	05.9020.6VG.10.E.P.8	HC9020 F*N 8 H	
301098	05.9020.12.200.10.E.P.4	HC9020 F*S 4 H	
301099	05.9020.12.200.10.E.P.8	HC9020 F*S 8 H	
301100	05.9020.25VG.10.E.P.4	HC9020 F*T 4 H	
301101	05.9020.25VG.10.E.P.8	HC9020 F*T 8 H	
	1) 05.9020 MEHRPREIS VITON DICHTUNG		
301104	05.9021.3VG.210.E.P.4	HC9021 F*P 4 H	
301105	05.9021.3VG.210.E.P.8	HC9021 F*P 8 H	
301107	05.9021.6VG.210.E.P.4	HC9021 F*N 4 H	
301108	05.9021.6VG.210.E.P.8	HC9021 F*N 8 H	
301106	05.9021.12.200.210.E.P.4	HC9021 F*S 4 H	
312762	05.9021.12.200.210.E.P.8	HC9021 F*S 8 H	
303167	05.9021.25VG.210.E.P.4	HC9021 F*T 4 H	
306568	05.9021.25VG.210.E.P.8	HC9021 F*T 8 H	
	1) 05.9021 MEHRPREIS VITON DICHTUNG		
	* Hier kann beliebig D, K oder U eingesetzt werden / Here you can fit in D, K or U ** Preise auf Anfrage / prices on request 1) Surplus price: viton sealing		

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E55
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
329620	05.9400.3VG.10.B.P.13	HC9400 F*P 13 H	
309654	05.9400.3VG.10.B.P.26	HC9400 F*P 26 H	
304784	05.9400.3VG.10.B.P.39	HC9400 F*P 39 H	
329724	05.9400.6VG.10.B.P.13	HC9400 F*N 13H	
	05.9400.6VG.10.B.P.26	HC9400 F*N 26H	
323931	05.9400.6VG.10.B.P.39	HC9400 F*N 39 H	
328513	05.9400.12.200.10.B.P.13	HC9400 F*S 13 H	
312764	05.9400.12.200.10.B.P.26	HC9400 F*S 26 H	
326835	05.9400.12.200.10.B.P.39	HC9400 F*S 39 H	
331865	05.9400.25VG.10.B.P.13	HC9400 F*T 13 H	
327025	05.9400.25VG.10.B.P.26	HC9400 F*T 26 H	
	05.9400.25VG.10.B.P.39	HC9400 F*T 39 H	
1) 05.9400 MEHRPREIS VITON DICHTUNG			
301110	05.9600.3VG.10.E.P.4	HC9600 (9620) F*P 4 H	
301062	05.9600.3VG.10.E.P.8	HC9600 (9620) F*P 8 H	
301063	05.9600.3VG.10.E.P.13	HC9600 (9620) F*P 13 H	
301064	05.9600.3VG.10.E.P.16	HC9600 (9620) F*P 16 H	
301115	05.9600.6VG.10.E.P.4	HC9600 (9620) F*N 4 H	
301070	05.9600.6VG.10.E.P.8	HC9600 (9620) F*N 8 H	
301071	05.9600.6VG.10.E.P.13	HC9600 (9620) F*N 13 H	
301072	05.9600.6VG.10.E.P.16	HC9600 (9620) F*N 16 H	
312752	05.9600.12.200.10.E.P.4	HC9600 (9620) F*S 4 H	
301065	05.9600.12.200.10.E.P.8	HC9600 (9620) F*S 8 H	
312751	05.9600.12.200.10.E.P.13	HC9600 (9620) F*S 13 H	
312753	05.9600.12.200.10.E.P.16	HC9600 (9620) F*S 16 H	
301067	05.9600.25VG.10.E.P.4	HC9600 (9620) F*T 4 H	
301068	05.9600.25VG.10.E.P.8	HC9600 (9620) F*T 8 H	
301069	05.9600.25VG.10.E.P.13	HC9600 (9620) F*T 13 H	
301114	05.9600.25VG.10.E.P.16	HC9600 (9620) F*T 16 H	
1) 05.9600 (9620) MEHRPREIS VITON DICHTUNG			
301073	05.9601.3VG.210.E.P.4	HC9601 F*P 4 H	
301117	05.9601.3VG.210.E.P.8	HC9601 F*P 8 H	
301118	05.9601.3VG.210.E.P.13	HC9601 F*P 13 H	
301074	05.9601.3VG.210.E.P.16	HC9601 F*P 16 H	
301129	05.9601.6VG.210.E.P.4	HC9601 F*N 4 H	
301130	05.9601.6VG.210.E.P.8	HC9601 F*N 8 H	
301131	05.9601.6VG.210.E.P.13	HC9601 F*N 13 H	
301132	05.9601.6VG.210.E.P.16	HC9601 F*N 16 H	
312769	05.9601.12.200.210.E.P.4	HC9601 F*S 4 H	
312766	05.9601.12.200.210.E.P.8	HC9601 F*S 8 H	
312768	05.9601.12.200.210.E.P.13	HC9601 F*S 13 H	
312767	05.9601.12.200.210.E.P.16	HC9601 F*S 16 H	
301125	05.9601.25VG.210.E.P.4	HC9601 F*T 4 H	
303350	05.9601.25VG.210.E.P.8	HC9601 F*T 8 H	
301127	05.9601.25VG.210.E.P.13	HC9601 F*T 13 H	
301128	05.9601.25VG.210.E.P.16	HC9601 F*T 16 H	
1) 05.9601 MEHRPREIS VITON DICHTUNG			

01.02.2009	Preisliste Filterelemente Pricelist Filter-Elements		E56
Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price	
303348	05.9800.3VG.10.E.P.4	HC9800 F*P 4 H	
306570	05.9800.3VG.10.E.P.8	HC9800 F*P 8 H	
301137	05.9800.6VG.10.E.P.4	HC9800 F*N 4 H	
305375	05.9800.6VG.10.E.P.8	HC9800 F*N 8 H	
312775	05.9800.12.200.10.E.P.4	HC9800 F*S 4 H	
312776	05.9800.12.200.10.E.P.8	HC9800 F*S 8 H	
301076	05.9800.25VG.10.E.P.4	HC9800 F*T 4 H	
301077	05.9800.25VG.10.E.P.8	HC9800 F*T 8 H	
1) 05.9800 MEHRPREIS VITON DICHTUNG			
301138	05.9801.3VG.210.E.P.4	HC9801 F*P 4 H	
301139	05.9801.3VG.210.E.P.8	HC9801 F*P 8 H	
306571	05.9801.3VG.210.E.P.13	HC9801 F*P 13 H	
301145	05.9801.6VG.210.E.P.4	HC9801 F*N 4 H	
301146	05.9801.6VG.210.E.P.8	HC9801 F*N 8 H	
306572	05.9801.6VG.210.E.P.13	HC9801 F*N 13 H	
301079	05.9801.12.200.210.E.P.4	HC9801 F*S 4 H	
312782	05.9801.12.200.210.E.P.8	HC9801 F*S 8 H	
312784	05.9801.12.200.210.E.P.13	HC9801 F*S 13 H	
301143	05.9801.25VG.210.E.P.4	HC9801 F*T 4 H	
301144	05.9801.25VG.210.E.P.8	HC9801 F*T 8 H	
306573	05.9801.25VG.210.E.P.13	HC9801 F*T 13 H	
1) 05.9801 MEHRPREIS VITON DICHTUNG			
306578	05.9901.3VG.210.B.P.13	HC9901 F*P 13 H	
301981	05.9901.3VG.210.B.P.26	HC9901 F*P 26 H	
306579	05.9901.6VG.210.B.P.13	HC9901 F*N 13 H	
306582	05.9901.6VG.210.B.P.26	HC9901 F*N 26 H	
306580	05.9901.12.200.210.B.P.13	HC9901 F*S 13 H	
306583	05.9901.12.200.210.B.P.26	HC9901 F*S 26 H	
306581	05.9901.25VG.210.B.P.13	HC9901 F*T 13 H	
306584	05.9901.25VG.210.B.P.26	HC9901 F*T 26 H	
1) 05.9901 MEHRPREIS VITON DICHTUNG			

Preisliste Filterelemente

Pricelist Filter-Elements

E57

Artikelnr.	Artikelbezeichnung	Netto-Preis
Ident.no.	Designation	Unit-Price

5.2 Filterelemente/Filter Elements 05...

317487	01.NR 100.3VG.10.B.P.-	HC0251 F*P 10 H
316886	01.NR 100.6VG.10.B.P.-	HC0251 F*N 10 H
313167	01.NR 100.10VG.10.B.P.-	HC0251 F*S 10 H
1)	01.NR 100 MEHRPREIS VITON DICHTUNG	
2)	01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

314491	01.NR 250.3VG.10.B.P.-	HC0252 F*P 10 H
314492	01.NR 250.6VG.10.B.P.-	HC0252 F*N 10 H
314191	01.NR 250.10VG.10.B.P.-	HC0252 F*S 10 H
1)	01.NR 250 MEHRPREIS VITON DICHTUNG	
2)	01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

304533	01.NR 630.3VG.10.B.P.-	HC0171 F*P 16 H
304534	01.NR 630.6VG.10.B.P.-	HC0171 F*N 16 H
304535	01.NR 630.10VG.10.B.P.-	HC0171 F*S 16 H
1)	01.NR 630 MEHRPREIS VITON DICHTUNG	
2)	01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

306604	01.NR 1000.3VG.10.B.P.-	HC0600 F*P 16 H
305449	01.NR 1000.6VG.10.B.P.-	HC0600 F*N 16 H
306605	01.NR 1000.10VG.10.B.P.-	HC0600 F*S 16 H
1)	01.NR 1000 MEHRPREIS VITON DICHTUNG	
2)	01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

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