

Duplex filter

RE 51409

1/14

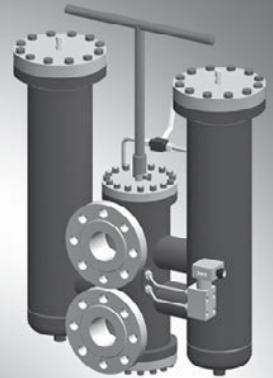
Edition: 2023-06

Replaced: 2021-04

Types 100 FLDN 0160 to 1000; 100 FLD 0045, 0055, 0120, 0200, 0270

Nominal sizes **according to DIN 24550**: 0160 to 1000
 Nominal sizes according to Hengst standard: 0045, 0055, 0120, 0200, 0270

Nominal pressures 100 bar
 Connections up to DN 100
 Operating temperature -10°C to $+100^{\circ}\text{C}$



100_fld_0095_d.eps

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Application

- Filtration of pressure fluids and lubricants.
- Filtration of fluids and gases.
- Direct installation into pipelines.
- Direct wear protection of downstream components and systems.
- Continuous operating mode due to duplex filter design.

Features

- Filters for inline installation, for continuous operation
- FLDN series with filter elements in accordance with DIN 24550
- Versatile applications
- Compact modular design
- Low pressure drop
- Special highly efficient filter media

Design

Two filter housings in steel welded design, connected by means of switch housing. Vertically aligned connections for inlet and outlet at the front of the switch housing. Materials as per spare parts list.

Further design variants available on request.

Filter element

Pleated design with optimized pleat density and various filter media.

The filter element is the most important component of the "FILTER" system in view of the prolonged life and the wear protection of the systems.

The most important criteria for selection are the required degree of cleanliness of the operating medium, the initial pressure differential and the contamination retention capacity.

For further detailed information please refer to our brochure "Filter Elements".

Accessories

Maintenance indicator

Basically, the filter is equipped with mechanical optical maintenance indicator. The electronic maintenance indicator is connected via the electronic switching element with 1 or 2 switching points, which has to be ordered separately. The electronic switching element is attached to the mechanical optical maintenance indicator and held by means of a locking ring.

Bypass valve

To protect the filter element during startup and over pressurization due to clogging.

Characteristic curves

An optimum filter selection is made possible by our "FilterSelect" software, see <http://www.filterselect.de/>.

Additional characteristic curves for the filters in this catalogue can be found in the FilterSelect filter calculation program.

Quality and standardization

The development, manufacture, and assembly of Hengst industrial filters and Hengst filter elements is carried out within the framework of a certified quality management system in accordance with ISO 9001:2015.

The pressure filters for hydraulic applications according to 51409 are pressure holding equipment according to article 1, section 2.1.4 of the pressure equipment directive 97/23/EC (DGRL). However, on the basis of the exception in article 1, section 3.6 of the DGRL, hydraulic filters are exempt from the DGRL if they are not classified higher than category I (guideline 1/19). They do not receive a CE mark.

Preferred types

Duplex filter with bypass, filtration rating 10 µm and nominal pressure 100 bar

Type	Flow in L/min at $v = 30 \text{ mm}^2/\text{s}$ and $\Delta p = 0.8 \text{ bar}$	Material number
100 FLDN 0160 PWR10-A00-09V5,0-D0M0A	290	R928000621
100 FLDN 0250 PWR10-A00-09V5,0-D0M0A	380	R928000622
100 FLD 0045 PWR10-A00-09V5,0-D0M0A	460	R928000626
100 FLD 0055 PWR10-A00-09V5,0-D0M0A	510	R928000627
100 FLDN 0400 PWR10-A00-09V5,0-D0M0A	690	R928000623
100 FLDN 0630 PWR10-A00-09V5,0-D0M0A	830	R928000624
100 FLD 0120 PWR10-A00-09V5,0-D0M0A	950	R928000628
100 FLDN 1000 PWR10-A00-09V5,0-D0M0A	850	R928000625
100 FLD 0201 PWR10-A00-09V5,0-D0M0A	1500	R928000705
100 FLD 0271 PWR10-A00-09V5,0-D0M0A	1570	R928000706

Duplex filter with bypass, filtration rating 3 µm and nominal pressure 100 bar

Type	Flow in L/min at $v = 30 \text{ mm}^2/\text{s}$ and $\Delta p = 0.8 \text{ bar}$	Material number
100 FLDN 0160 PWR3-A00-09V5,0-D0M0A	130	R928000613
100 FLDN 0250 PWR3-A00-09V5,0-D0M0A	198	R928000614
100 FLD 0045 PWR3-A00-09V5,0-D0M0A	285	R928000618
100 FLD 0055 PWR3-A00-09V5,0-D0M0A	352	R928000619
100 FLDN 0400 PWR3-A00-09V5,0-D0M0A	355	R928000615
100 FLDN 0630 PWR3-A00-09V5,0-D0M0A	515	R928000616
100 FLD 0120 PWR3-A00-09V5,0-D0M0A	735	R928000620
100 FLDN 1000 PWR3-A00-09V5,0-D0M0A	550	R928000617
100 FLD 0201 PWR3-A00-09V5,0-D0M0A	1040	R928000703
100 FLD 0271 PWR3-A00-09V5,0-D0M0A	1190	R928000704

Duplex filter without bypass, filtration rating 10 µm and nominal pressure 100 bar

Type	Flow in L/min at $v = 30 \text{ mm}^2/\text{s}$ and $\Delta p = 0.8 \text{ bar}$	Material number
100 FLDN 0160 PWR10-C00-00V5,0-D0M0A	290	R928000668
100 FLDN 0250 PWR10-C00-00V5,0-D0M0A	380	R928000669
100 FLD 0045 PWR10-C00-00V5,0-D0M0A	460	R928000672
100 FLD 0055 PWR10-C00-00V5,0-D0M0A	510	R928000673
100 FLDN 0400 PWR10-C00-00V5,0-D0M0A	690	R928000670
100 FLDN 0630 PWR10-C00-00V5,0-D0M0A	830	R928000671
100 FLD 0120 PWR10-C00-00V5,0-D0M0A	950	R928000674

Duplex filter without bypass, filtration rating 3 µm and nominal pressure 100 bar

Type	Flow in L/min at $v = 30 \text{ mm}^2/\text{s}$ and $\Delta p = 0.8 \text{ bar}$	Material number
100 FLDN 0160 PWR3-C00-00V5,0-D0M0A	130	R928000661
100 FLDN 0250 PWR3-C00-00V5,0-D0M0A	198	R928000662
100 FLD 0045 PWR3-C00-00V5,0-D0M0A	285	R928000665
100 FLD 0055 PWR3-C00-00V5,0-D0M0A	352	R928000666
100 FLDN 0400 PWR3-C00-00V5,0-D0M0A	355	R928000663
100 FLDN 0630 PWR3-C00-00V5,0-D0M0A	515	R928000664
100 FLD 0120 PWR3-C00-00V5,0-D0M0A	735	R928000667

Ordering details: electronic switching element for maintenance indicator

01	02	03
WE	-	

Maintenance indicator

01	Electronic switching element	WE
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Type of signal

02	1 switching point	1SP
	2 switching points, 3 LED	2SP
	2 switching points, 3 LED and signal suppression up to 30 °C [86 °F]	2SPSU

Connector

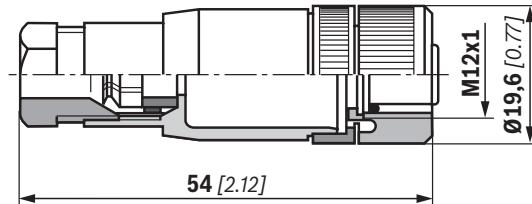
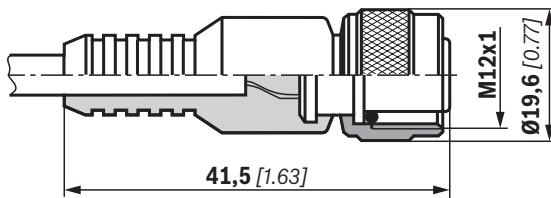
03	Round plug-in connection M12x1, 4-pole	M12x1
	Rectangular connector, 2-pole, design A according to EN-175301-803	EN175301-803

Material numbers of the electronic switching elements

Material no.	Type	Signal	Switching points	Connector	LED
R928028409	WE-1SP-M12x1	Changeover	1	M12x1	Without
R928028410	WE-2SP-M12x1	Normally open (at 75%) / normally closed contact (at 100%)	2		3 pieces
R928028411	WE-2SPSU-M12x1				
R928036318	WE-1SP-EN175301-803	Normally closed contact	1	EN 175301-803	Without

Mating connector (max. permissible voltage: 50 V)

for electronic switching element with round plug-in connection M12x1

Mating connector suitable for K24 4-pole, M12x1
with screw connection, cable gland Pg9.**Material no. R900031155**Mating connector suitable for K24-3m 4-pole, M12x1
with potted-in PVC cable, 3 m long.Line cross-section: 4 x 0.34 mm²Core marking: 1 brown 2 white
3 blue 4 black**Material no. R900064381****Order example:**Pressure filter with mechanical optical maintenance indicator for $p_{nom.} = 100$ bar [1450 psi] with bypass valve, nominal size 0045, with filter element 10 µm and electronic switching element M12x1 with 1 switching point for pressure liquid mineral oil HLP according to DIN 51524.**Filter:** 100 FLD 0045 PWR10-A00-07V5,0-D0M0A**Material number:** R928000626**Maintenance indicator:** WE-1SP-M12x1**Material number:** R928028409

Filter design

Easy selection of the filter size is made possible by the FilterSelect online tool. The filter can be designed using the operating pressure, flow and fluid system parameters. The required filter rating is based on the application, the sensitivity to contamination of the components and the environmental conditions.

The program leads you through the menu on a step-by-step basis.

A documentation of the filter selection can finally be created in the form of a PDF file. This file contains the entered parameters, the designed filter with material number including spare parts, and the pressure loss curves.

Link FilterSelect:

<http://www.filterselect.de/>

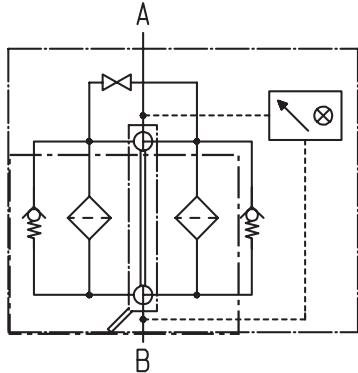
Other languages can be selected using the page navigation.

standard search

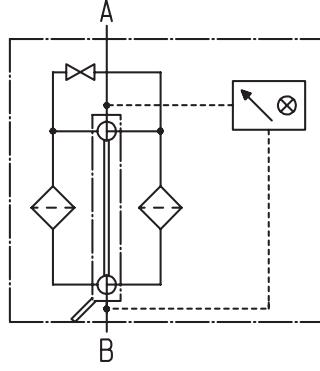
application:	hydraulics for industrial use and applications with lubricating oil
Product category:	please select
type:	please select
pressure range:	please select
filter material:	please select
fineness:	please select
volume flow rate:	<input type="text"/> [l/min]
viscosity: * = working point	<input checked="" type="radio"/> kin viscosity 1: <input type="text"/> [mm ² /s] <input type="button" value="+"/> <input type="radio"/> search via type of medium full-text search medium <input type="text"/> [please select] <input type="text"/> <input type="text"/> [please select] <input type="text"/> temp 1: <input type="text"/> [°C] <input type="text"/> [°F] kin viscosity 1: <input type="text"/> [mm ² /s] <input type="button" value="+"/> <input type="radio"/> dyn. Viscosity 1: <input type="text"/> [cP] density 1: <input type="text"/> [kg/dm ³] kin viscosity 1: <input type="text"/> [mm ² /s] <input type="button" value="+"/>
collapse pressure resistance according to ISO 2941:	<input type="text"/> 30 bar
<input style="background-color: #005a99; color: white; padding: 5px; border: none; border-radius: 5px; width: 150px; height: 30px; margin-top: 10px;" type="button" value="Start search"/>	

Symbols

Pressure filter
with bypass and
mechanical display

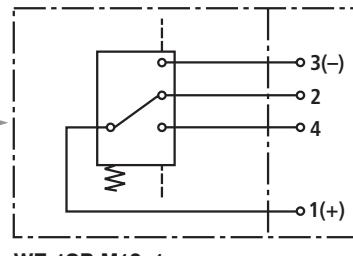


Pressure filter
without bypass and
mechanical display



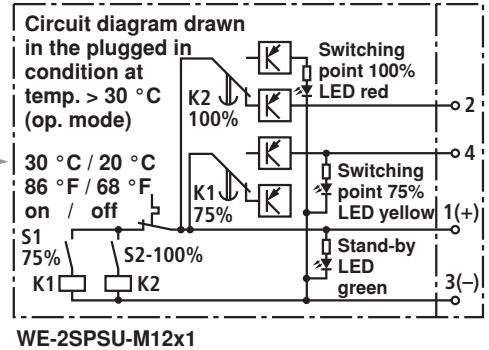
Electronic
switching element
for maintenance
indicator

Switching element
Plug



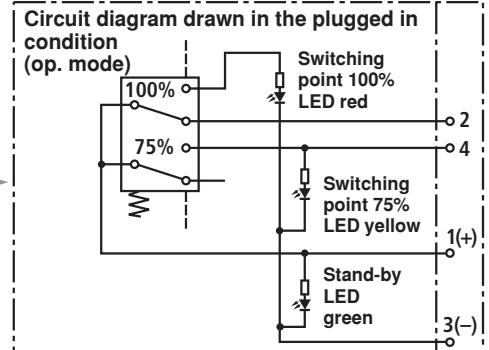
WE-1SP-M12x1

Switching element
Plug



WE-2SPSU-M12x1

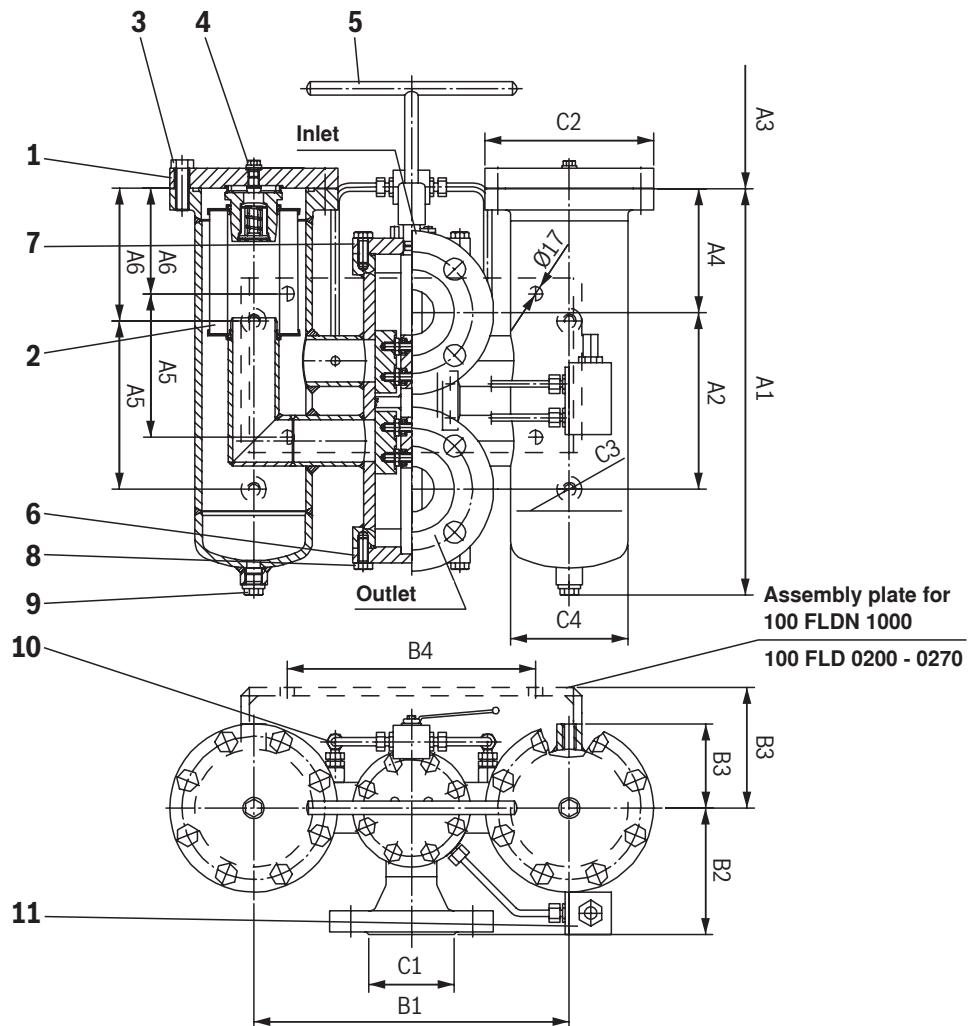
Switching element
Plug



WE-2SP-M12x1

Technical data (for applications outside these parameters, please consult us!)**Electronic (electric switching element)**

Electrical connection	Round plug-in connection M12 x 1, 4-pin	
Contact load, direct voltage	A	Max. 1
Voltage range	E1SP-M12x1	V DC/AC
	E2SP	V DC
Max. switching capacity with ohmic loads	20 VA; 20 W; (70 VA)	
Switching type	E1SP-M12x1	Changeover
	E2SP-M12x1	Normally open at 75% of the response pressure, Normally closed at 100% of the response pressure
	E2SPSU-M12x1	Normally open at 75% of the response pressure, Normally closed at 100% of the response pressure Signal switching through at 30 °C [86 °F], Return switching at 20 °C [68 °F]
Display via LEDs in the electronic switching element E2SP...	Stand-by (LED green); 75% switching point (LED yellow) 100% switching point (LED red)	
Type of protection according to EN 60529	IP 65	
For direct voltage above 24 V a spark suppression is to be provided to protect the switching contacts.		
Weight electronic switching element: – with round plug-in connection M12 x 1	kg [lbs]	0.1 [0.22]

Unit dimensions, spare parts (dimensions in mm)**Filter housing for filter elements in accordance with DIN 24550**

Type 100 FLDN...	Content in L	Weight in kg ¹⁾	A1	A2	A3 ²⁾	A4	A5	A6	B1	B2	B3	B4	C1 Connection DIN 2637	C2	C3	C4	
0160	2 x 5	127.5	490		210	180	148		210	375	150	100					
0250	2 x 6	130	580			238							DN 50	Ø 200	M16	Ø 139.7	
0400	2 x 10	181.5	627		270	256							DN 80	Ø 240	M20	Ø 168.3	
0630	2 x 13	187	777		235	406			230	485	180	115					
1000	2 x 19	226	888	270		420	463	250	—	480	225	—	188	DN 100	Ø 260	—	Ø 193.7

Filter housing for filter elements according to Hengst standard

Type 100 FLD...	Con- tent in L	Weight in kg ¹⁾	A1	A2	A3 ²⁾	A4	A5	A6	B1	B2	B3	B4	C1 Connection DIN 2637	C2	C3	C4
0045	2 x 8	134.5	730		210	420	388		210	375	150	100				
0055	2 x 10	139	898			590	556						DN 50	Ø 200	M16	Ø 139.7
0120	2 x 20	199	1134	235		780	763						DN 80	Ø 240	M20	Ø 168.3
0200	2 x 28	322	1246		270	780	821						DN 100	Ø 260	—	Ø 193.7
0270	2 x 33	384	1480			1010	1055	250	—	480	225	—				

¹⁾ Weight including standard filter element and maintenance indicator.²⁾ Withdrawal dimension for filter element replacement.

Spare parts list

Part	Piece	Description	Material	Ordering information							
				0160	0250	0045	0055	0400	0630	0120	1000
Size	FLDN	FLD									
1	2	Filter cover	various								
2	2	Filter element	various								
3	16	Hexagonal head screw	8.8		602					–	
	24				–					605	
4	2	Bleed screw	5.8					4158			
5	1	Plug key	Steel								
6	1	Switch housing bottom	Steel	4019				4055			4075
7	1	Switch housing cover	Steel	4018				4056			4058
8	32	Socket head cap screw	8.8		–			654			–
	24				–			–			662
	16	Hexagonal head screw		594				–			
9	2	Plug	5.8		789						790
10	1	Pressure compensation line	Steel								
11	1	Maintenance indicator	various								
	1	Sealing kit	various								

All part numbers Hengst specific.

Ordering code

Spare parts

Mechanical/optical maintenance indicator

01	02	03	04	05	06
W	O	-	D01	-	

01	Maintenance indicator	W
02	mechanical/optical indicator	O

Version

03	Design pressure differential M20x1.5	D01
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Switching pressure

04	2.2 bar [32 psi]	2,2
	5.0 bar [72.5 psi]	5,0
	8.0 bar [116 psi]	8,0

Seal

05	NBR seal	M
	FKM seal	V

Max. operating pressure

06	Switching pressure 2.2 bar [31.9 psi], 160 bar [2321 psi]	160
	Switching pressure 5.0 bar [72.5 psi], 450 bar [6527 psi]	450
	Switching pressure 8.0 bar [116 psi], 450 bar [6527 psi]	450

Mechanical/optical maintenance indicator

Material no.	Mechanical/optical maintenance indicator
R901025312	WO-D01-2,2-M-160
R901025313	WO-D01-5,0-M-450
R901066233	WO-D01-2,2-V-160
R901066235	WO-D01-5,0-V-450
R928038785	WO-D01-8,0-M-450
R928038784	WO-D01-8,0-V-450

The ordering details for filter elements can be found in the order details on page 3.

Sealing kits must be ordered by stating the complete part key.

Sealing material and surface coating for pressure fluids

		Ordering detail
Mineral oils		Element model
Mineral oil	HLP according to DIN 51524	M ...0
Fire-resistant hydraulic fluids		
Emulsions	HFA-E according to DIN 24320	M ...0
Synthetic water solutions	HFA-S according to DIN 24320	M ...D
Water solutions	HFC according to VDMA 24317	M ...D
Phosphate esters	HFD-R according to VDMA 24317	V ...D
Organic esters	HFD-U according to VDMA 24317	V ...D
Hydraulic fluids that are fast biodegradable		
Triglycerides (rape seed oil)	HETG according to VDMA 24568	M ...D
Synthetic esters	HEES according to VDMA 24568	V ...D
Polyglycoles	HEPG according to VDMA 24568	V ...D

Directives and standardization

Product validation

Hengst filters, the filter elements built into them and filter accessories are tested and quality-monitored according to different ISO test standards:

Pressure pulse test	ISO 10771:2015-08
Filtration performance test (multipass test)	ISO 16889:2008-06
Δp (pressure loss) characteristic curves	ISO 3968:2001-12
Compatibility with hydraulic fluid	ISO 2943:1998-11
Collapse pressure test	ISO 2941:2009-04

The development, manufacture and assembly of Hengst industrial filters and Hengst filter elements is carried out within the framework of a certified quality management system in accordance with ISO 9001:2015.

Installation, commissioning and maintenance

Installation

Verify operating pressure with name plate information. Install the filter into the pipe work; when doing so, consider the flow direction (direction arrows) and the withdrawal height of the filter elements.

Warning!

Vessel is under pressure!

Assemble and disassemble the filter only when system is de-pressurized!

Keep the pressure compensation closed if the filter is open!

Do not operate the change over valve when the filter is opened!

Do not replace the maintenance indicator and the pressure compensation while the filter is under pressure!

Functional and safety warranty only applicable when using genuine Hengst spare parts!

Service filter only by trained personnel!

Commissioning

Move the switch lever into the central position in order to fill both filter sides. Switch on system pump. Bleed filter by opening the bleed screw, close when operating fluid vents. Switch filter into its operating position. In this connection, the switch lever must be in the stop position.

Maintenance

If at operating temperature, the red indicator pin shows out of the maintenance indicator so far that it contacts the plastic cap and/or if the switching process in the electric display is triggered, the filter element is clogged and needs to be replaced or cleaned respectively.

Filter element replacement

Open the pressure compensation line, switch the switch lever over into the opposite direction to the stop to the clean filter side. Close the pressure compensation line again. Open the bleed screw and reduce the pressure. Close the bleed screw again. Screw off the filter head. Open the plug and drain the filter; then close the plug again. Remove the filter element from the lower centering spigot in the filter housing by turning it lightly. Check the filter housing for cleanliness and clean if necessary.

Replace filter elements PWR..., P. The filter element with mater G... is cleanable. The efficiency of the cleaning process depends on the type of contamination and the value of the pressure differential before the filter element was exchanged. If the pressure differential after replacing the filter element is less than 50% of the value of a new filter element, the cleaning is not reasonable any more. Install the cleaned or new filter element into the filter housing. Check the seal ring and replace it in case of damage. Without any tools, install filter head by rotating it clockwise by hand up to the last thread. Rotate back 1/4 rotation. Bleed filter by opening the bleed screw, close again when operating fluid vents.

Technical modifications reserved!