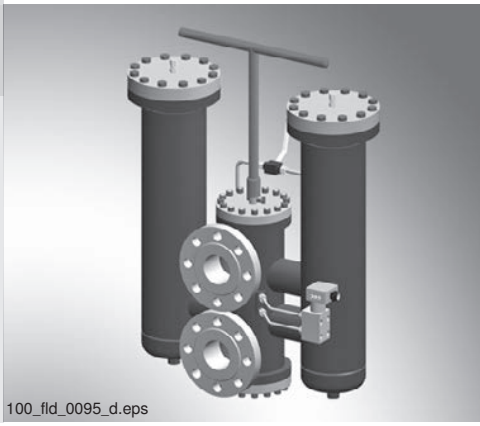
Duplex filter

RE 51409 1/14
Edition: 2023-06
Replaced: 2021-04

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


100_fld_0095_d.eps

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 °C

Table of contents

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.

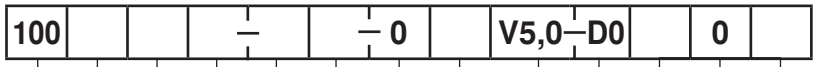
Quality and standardization

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.

Ordering details

of the filter



Pressure
100 bar **= 100**

Design
Duplex filter with filter element according to DIN 24550 **= FLDN**
Duplex filter with filter element according to Hengst standard **= FLD**

Nom. size
FLDN… **= 0160 0250 0400 0630 1000**
FLD… **= 0045 0055 0120 0200 0270**

Filtration rating in µm
nominal
Stainless steel wire mesh, cleanable:
G10, G25 **= G…**
Paper, non-cleanable
P10 **= P…**
absolute (ISO 16889)
Micro glass, non-cleanable
PWR3, PWR10, PWR20 **= PWR..**

Pressure differential
Max. admissible pressure differential of the filter element
30 bar **= A**
60 bar not for 100 FLD 0200 and 100 FLD 0270 **= C**

Element model
Standard adhesive T = 100 °C **= 0…**
Standard material **= …0**
chemically nickel-plated **= …D** [1]

Solenoid
without **= 0**

Complementary details
A = Pressure compensation line
Z [2] **=** Certificate

Material
0 = Standard

Seal
M = NBR seal
V = FKM seal

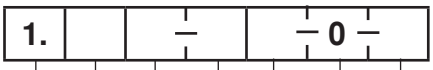
Connection
D0 = DIN flange

Maintenance indicator
V5,0 = maintenance indicator, optical state switching pressure 5.0 bar

Bypass valve
Opening pressure:
0 = without
7 = 3.5 bar

Ordering example:
100 FLD 0045 PWR10-A00-07V5,0-D0M0A

of the filter element



Filter element
Design **= 1.**

Nom. size
FLDN… **= 0160 0250 0400 0630 1000**
FLD… **= 0045 0055 0120 0200 0270**

Filtration rating in µm
nominal
Stainless steel wire mesh, cleanable: G10, G25 **= G…**
Paper, non-cleanable: P10 **= P…**
absolute (ISO 16889)
Micro glass, non-cleanable: PWR3, PWR10, PWR20 **= PWR..**

Pressure differential
Max. admissible pressure differential of the filter element
30 bar **= A**
60 bar not for 100 FLD 0200 and 100 FLD 0270 **= C**

Seal
M = NBR seal
V = FKM seal

Bypass valve
Opening pressure:
0 = With filter element always 0

Element model
0… = Standard adhesive T = 100 °C
…0 = Standard material
…D [1] **=** chemically nickel-plated

Ordering example:
1.0045 PWR10-A00-0-M

[1] Only in connection with FKM seals

[2] Z = manufacturer's inspection certificate M according to DIN 55350 T18

Preferred types

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

Type	Flow in L/min at ν = 30 mm²/s and Δp = 0.8 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 ν = 30 mm²/s and Δp = 0.8 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 ν = 30 mm²/s and Δp = 0.8 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 ν = 30 mm²/s and Δp = 0.8 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**

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

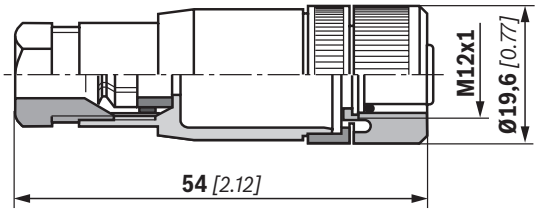
Material no.	Type	Signal	Switching points	Connector	LED
R928028409	WE-1SP-M12x1	Changeover	1	M12x1	Without
R928028410	WE-2SP-M12x1	Normally open (at 75%) / normally closed contact (at 100%)	2		3 pieces
R928028411	WE-2SPSU-M12x1				
R928036318	WE-1SP-EN175301-803	Normally closed contact	1	EN 175301-803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

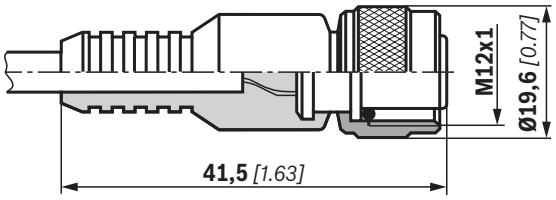


Mating connector suitable for K24-3m 4-pole, M12x1
with potted-in PVC cable, 3 m long.

Line cross-section: 4 x 0.34 mm²

Core 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

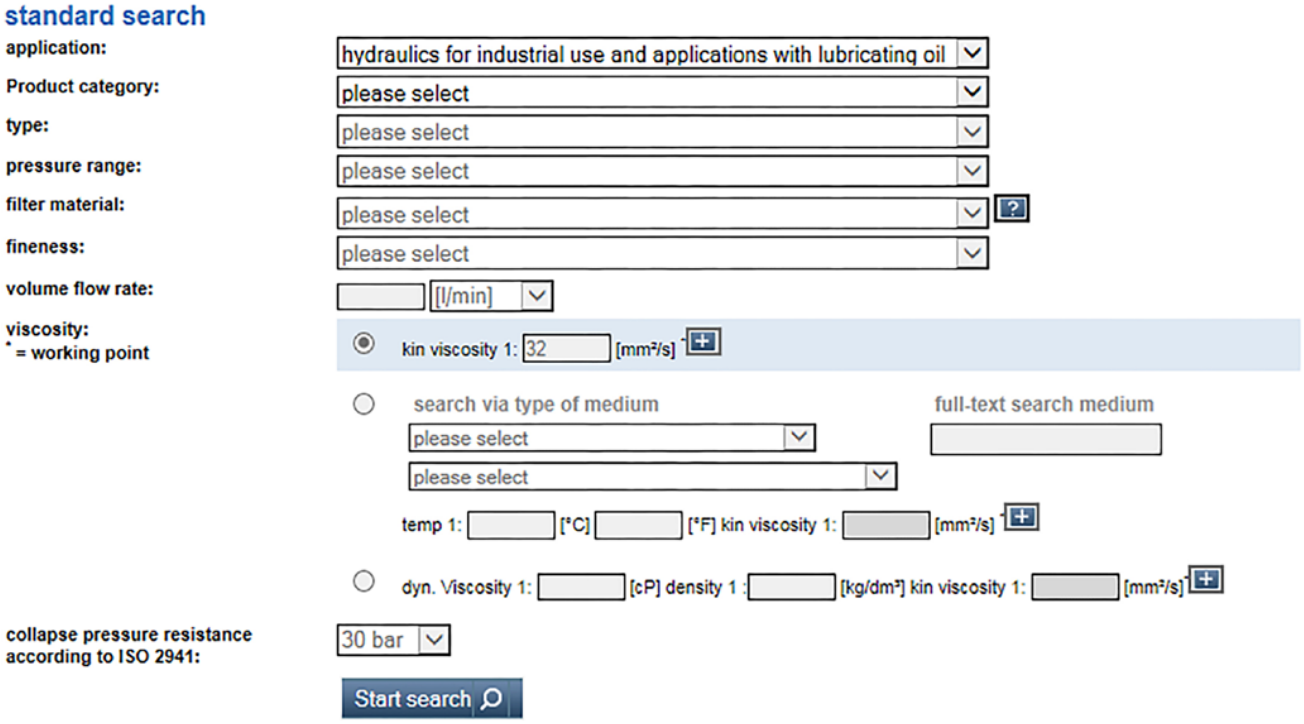
Easy selection of the filter size is made possible by the FilterSelect online tool. The filter can be designed using the operating pressure, flow and fluid system parameters. The required filter rating is based on the application,
the sensitivity to contamination of the components and the environmental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

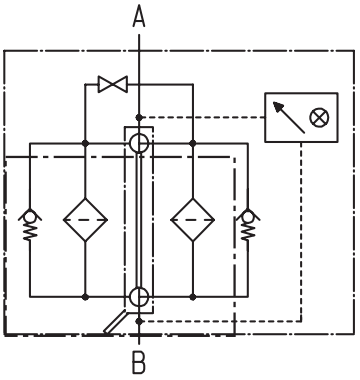
Link FilterSelect:
http://www.filterselect.de/

Other languages can be selected using the page navigation.

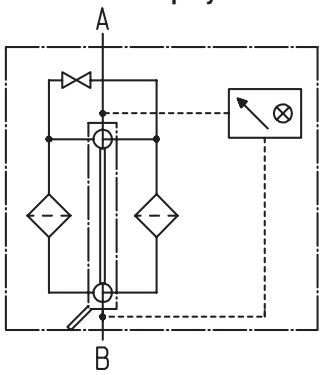


Symbols

Pressure filter with bypass and mechanical display



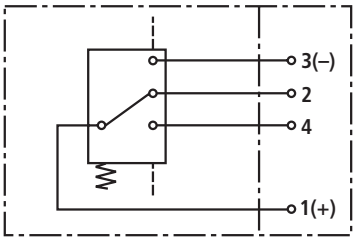
Pressure filter without bypass and mechanical display



Electronic switching element

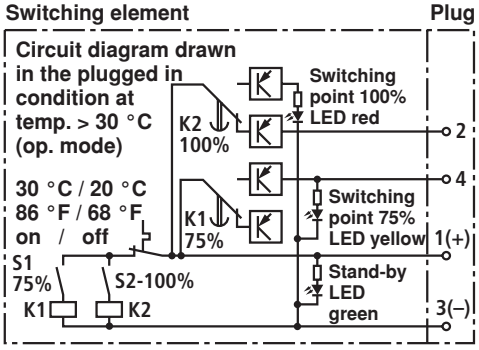
for maintenance indicator

Switching element **Plug**



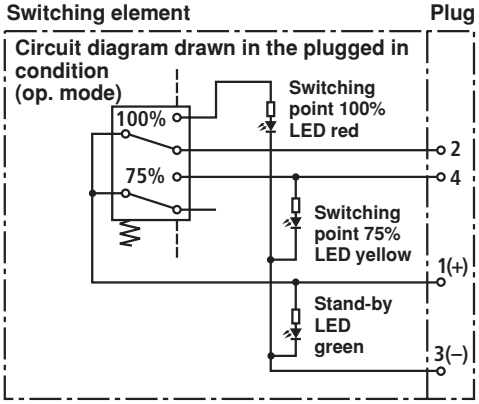
WE-1SP-M12x1

Switching element **Plug**



WE-2SPSU-M12x1

Switching element **Plug**



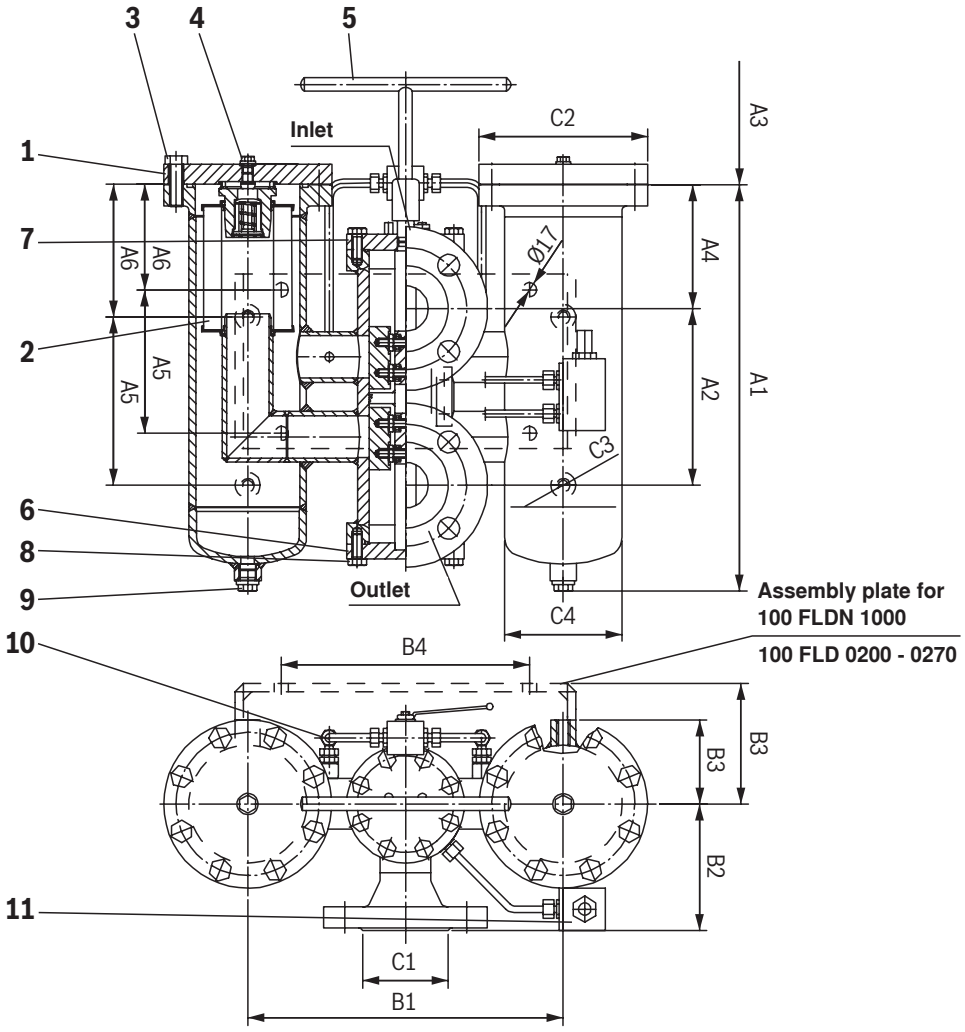
WE-2SP-M12x1

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	Max. 150
	E2SP	V DC	10 to 30
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	–	DN 50	Ø 200	M16	Ø 139.7
0250	2 x 6	130	580		270	238										
0400	2 x 10	181.5	627	235		256		230	485	180	115		DN 80	Ø 240	M20	Ø 168.3
0630	2 x 13	187	777		420	406										
1000	2 x 19	226	888	270		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	–	DN 50	Ø 200	M16	Ø 139.7
0055	2 x 10	139	898		590	556										
0120	2 x 20	199	1134	235	780	763		230	485	180	115		DN 80	Ø 240	M20	Ø 168.3
0200	2 x 28	322	1246	270	780	821		–	480	225	–		DN 100	Ø 260	–	Ø 193.7
0270	2 x 33	384	1480		1010	1055	250					188				

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

Spare parts list

		Size FLDN		0160	0250			0400	0630		1000		
		FLD				0045	0055			0120		0200	0270
Part	**Piece**	**Description**	**Material**	**Ordering information**									
1	2	Filter cover	various	Please indicate ordering information Filter									
2	2	Filter element	various	See ordering information Filter Element									
3	16	Hexagonal head screw	8.8	602				–					
	24			–				605					
4	2	Bleed screw	5.8	4158									
5	1	Plug key	Steel	Please indicate ordering information Filter									
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	Please indicate ordering information Filter									
11	1	Maintenance indicator	various	See ordering information Maintenance indicator									
	1	Sealing kit	various	Please indicate ordering information Filter									

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**

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 depressurized!

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!

Notes

Hengst Filtration GmbH
Hardtwaldstr. 43
68775 Ketsch, Germany
Phone +49 (0) 62 02 / 6 03-0
hydraulicfilter@hengst.de
www.hengst.com