

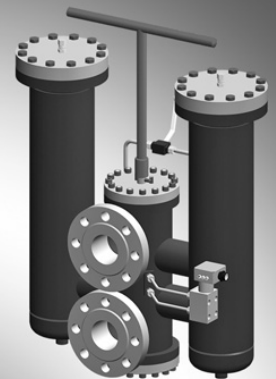
# Duplex filter

**RE 51409/09.10**  
Replaces: 02.09

1/16

**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 BRFS: 0045, 0055, 0120, 0200, 0270  
 Nominal pressures 100 bar  
 Connections up to DN 100  
 Operating temperature  $-10\text{ }^{\circ}\text{C}$  to  $+100\text{ }^{\circ}\text{C}$



100\_fid\_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

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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

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Pleated design with optimized pleat density and various filter media.

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

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.

## Accessories

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### Clogging indicator

Basically, the filter is equipped with mechanical optical clogging indicator. The electronic clogging 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 clogging 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

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An optimum filter selection is made possible by our "BRFilterSelect" software, see download area <http://www.eppensteiner.de>.

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

## Quality and standardization

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The development, manufacture, and assembly of BRFS industrial filters and BRFS filter elements is carried out within the framework of a certified quality management system in accordance with ISO 9001:2000.

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

	100			-		-	0		V5,0	D0		0	
--	-----	--	--	---	--	---	---	--	------	----	--	---	--

**Pressure**  
100 bar = 100

**Design**  
Duplex filter with filter element according to DIN 24550 = **FLDN**  
Duplex filter with filter element according to BRFS 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 H3XL, H10XL, H20XL = **H...XL**

**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<sup>1)</sup>**

**Solenoid**  
without = **0**

**Complementary details**  
**A** = Pressure compensation line  
**Z<sup>2)</sup>** = Certificate

**Material**  
**0** = Standard

**Seal**  
**M** = NBR seal  
**V** = FKM seal

**Connection**  
**D0** = DIN flange

**Clogging indicator**  
**V5,0** = clogging indicator, optical state switching pressure 5.0 bar

**Bypass valve**  
Opening pressure:  
without  
3.5 bar

**0 =**  
**7 =**

**Ordering example:**  
**100 FLD 0045 H10XL-A00-07V5,0-D0M0A**

### of the filter element

	1.			-		-	0		-
--	----	--	--	---	--	---	---	--	---

**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: H3XL, H10XL, H20XL = **H...XL**

**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:  
With filter element always 0

**Element model**  
**0...** = Standard adhesive T = 100 °C  
**...0** = Standard material  
**...D<sup>1)</sup>** = chemically nickel-plated

**0 =**

**Ordering example:**  
**1.0045 H10XL-A00-0-M**

<sup>1)</sup> Only in connection with FKM seals

<sup>2)</sup> 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 $v = 30 \text{ mm}^2/\text{s}$ and $\Delta p = 0.8 \text{ bar}$	Material number
100 FLDN 0160 H10XL-A00-09V5,0-D0M0A	290	R928000621
100 FLDN 0250 H10XL-A00-09V5,0-D0M0A	380	R928000622
100 FLD 0045 H10XL-A00-09V5,0-D0M0A	460	R928000626
100 FLD 0055 H10XL-A00-09V5,0-D0M0A	510	R928000627
100 FLDN 0400 H10XL-A00-09V5,0-D0M0A	690	R928000623
100 FLDN 0630 H10XL-A00-09V5,0-D0M0A	830	R928000624
100 FLD 0120 H10XL-A00-09V5,0-D0M0A	950	R928000628
100 FLDN 1000 H10XL-A00-09V5,0-D0M0A	850	R928000625
100 FLD 0201 H10XL-A00-09V5,0-D0M0A	1500	R928000705
100 FLD 0271 H10XL-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 H3XL-A00-09V5,0-D0M0A	130	R928000613
100 FLDN 0250 H3XL-A00-09V5,0-D0M0A	198	R928000614
100 FLD 0045 H3XL-A00-09V5,0-D0M0A	285	R928000618
100 FLD 0055 H3XL-A00-09V5,0-D0M0A	352	R928000619
100 FLDN 0400 H3XL-A00-09V5,0-D0M0A	355	R928000615
100 FLDN 0630 H3XL-A00-09V5,0-D0M0A	515	R928000616
100 FLD 0120 H3XL-A00-09V5,0-D0M0A	735	R928000620
100 FLDN 1000 H3XL-A00-09V5,0-D0M0A	550	R928000617
100 FLD 0201 H3XL-A00-09V5,0-D0M0A	1040	R928000703
100 FLD 0271 H3XL-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 H10XL-C00-00V5,0-D0M0A	290	R928000668
100 FLDN 0250 H10XL-C00-00V5,0-D0M0A	380	R928000669
100 FLD 0045 H10XL-C00-00V5,0-D0M0A	460	R928000672
100 FLD 0055 H10XL-C00-00V5,0-D0M0A	510	R928000673
100 FLDN 0400 H10XL-C00-00V5,0-D0M0A	690	R928000670
100 FLDN 0630 H10XL-C00-00V5,0-D0M0A	830	R928000671
100 FLD 0120 H10XL-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 H3XL-C00-00V5,0-D0M0A	130	R928000661
100 FLDN 0250 H3XL-C00-00V5,0-D0M0A	198	R928000662
100 FLD 0045 H3XL-C00-00V5,0-D0M0A	285	R928000665
100 FLD 0055 H3XL-C00-00V5,0-D0M0A	352	R928000666
100 FLDN 0400 H3XL-C00-00V5,0-D0M0A	355	R928000663
100 FLDN 0630 H3XL-C00-00V5,0-D0M0A	515	R928000664
100 FLD 0120 H3XL-C00-00V5,0-D0M0A	735	R928000667

**Ordering details:** electronic switching element for clogging indicator

	<b>ABZ F V - -1X/-DIN</b>	
Rexroth power unit accessories		-DIN = Identification for DIN and SAE models
Filter		
Clogging indicator		<b>Unit series</b>
electronic switching element with 1 switching point (changeover) round plug-in connection M12x1	<b>= E1SP-M12X1</b>	unit series 10 to 19 (10 to 19; unchanged installation and connection dimensions)
electronic switching element with 2 switching points (normally open/normally closed), 75%, 100%, round plug-in connection M12x1, 3 LED	<b>= E2SP-M12X1</b>	
electronic switching element with 2 switching points (normally open/normally closed), 75%, 100%, signal suppression until 30 °C round plug-in connection M12x1, 3 LED	<b>= E2SPSU-M12X1</b>	

Electronic switching element	Material no.
ABZ FV-E1SP-M12X1-1X/-DIN	R901025339
ABZ FV-E2SP-M12X1-1X/-DIN	R901025340
ABZ FV-E2SPSU-M12X1-1X/-DIN	R901025341

**Ordering example:** Pressure filter with mechanical optical clogging indicator for  $p_{nom.} = 100 \text{ bar}$  [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 H10XL-A00-07V5,0-D0M0A **Material number: R928000626**

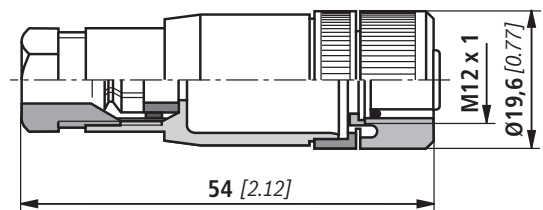
**Clogging indicator:** ABZ FV-E1SP-M12X1-1X/-DIN **Material number: R901025339**

**Plug-in connectors according to IEC 60947-5-2 (dimensions in mm [inch])**

for electronic switching element with round plug-in connection M12 x 1

**Plug-in connector for K24 4-pin, M12 x 1 with screwed connection, cable fitting Pg9.**

**Material no. R900031155**

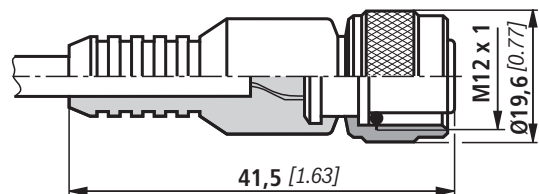


**Plug-in connector for K24-3m 4-pin, M12 x 1 with molded in PVC cable, 3 m long.**

**Line cross-section:** 4 x 0.34 mm<sup>2</sup>

- Core marking:**
- 1 brown
  - 2 white
  - 3 blue
  - 4 black

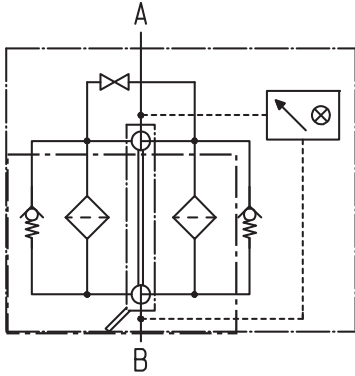
**Material no. R900064381**



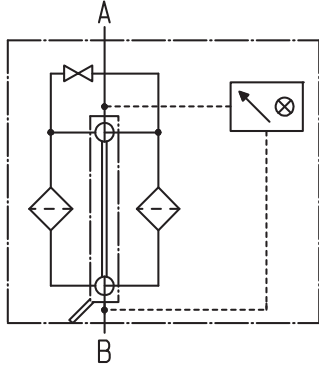
For additional round plug-in connections, see data sheet 08006.

## Symbols

**Pressure filter with bypass and mechanical display**

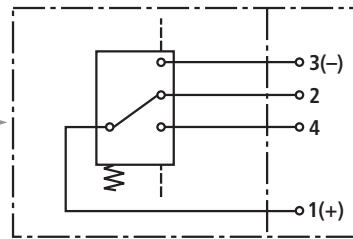


**Pressure filter without bypass and mechanical display**



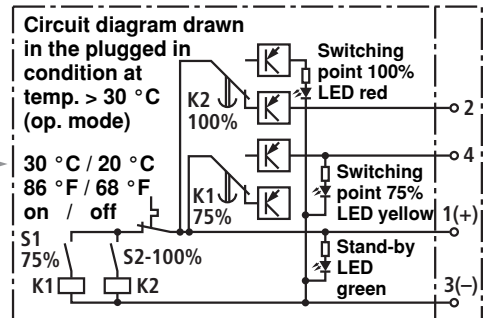
**Electronic switching element for clogging indicator**

**Switching element Plug**



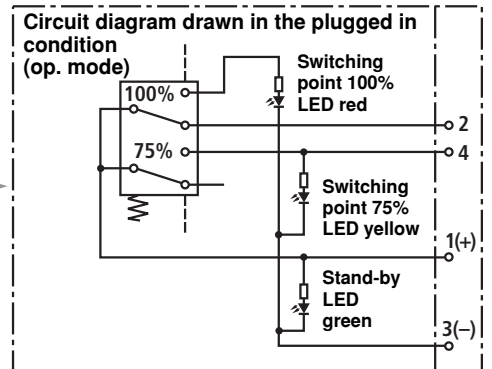
**ABZFV-E1SP-M12X1-1X/-DIN**

**Switching element Plug**



**ABZFV-E2SPSU-M12X1-1X/-DIN**

**Switching element Plug**



**ABZFV-E2SP-M12X1-1X/-DIN**

**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]

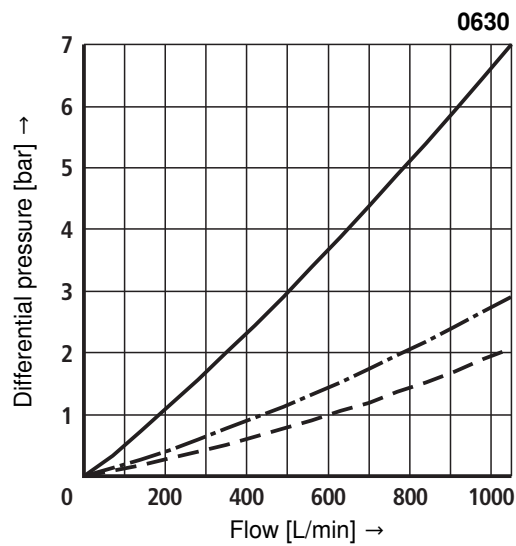
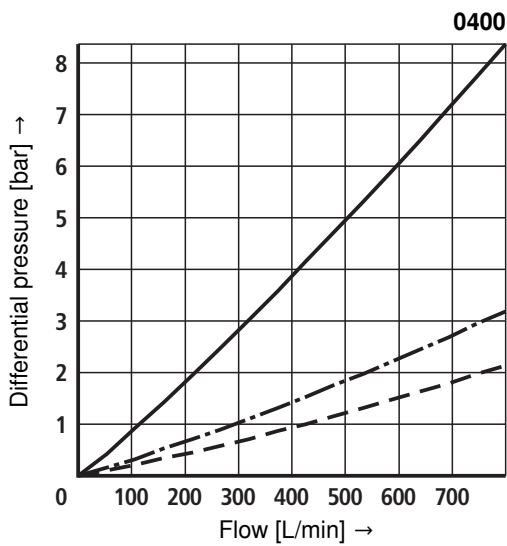
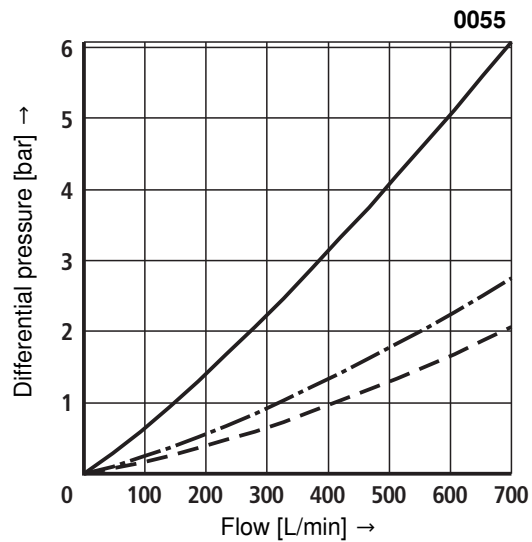
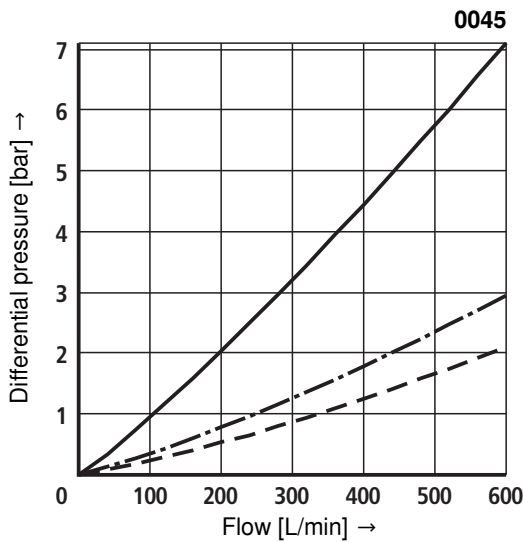
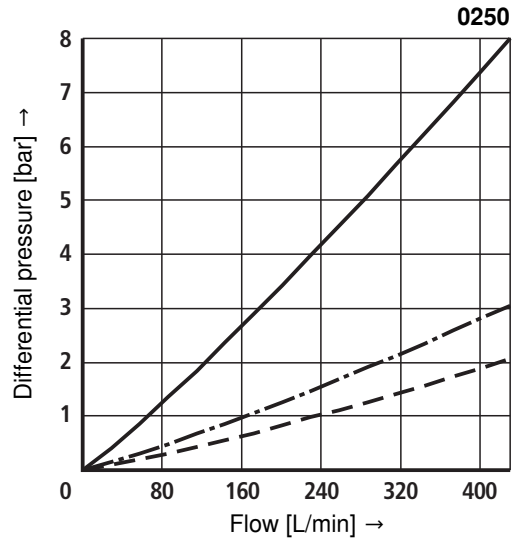
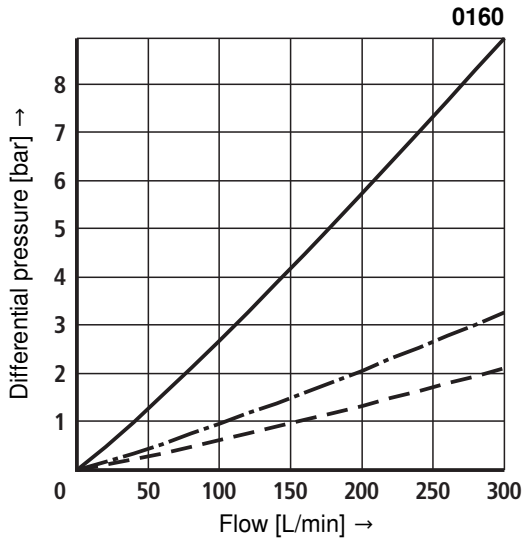
## Characteristic curves

H3XL...

Specific weight:  $< 0.9 \text{ kg/dm}^3$   
 $\Delta p$ -Q characteristic curves for complete filters recommended  
 initial  $\Delta p$  for design = 0.8 bar

An optimum filter selection is made possible by our computer program "BRFilterSelect".

Oil viscosity:  
 — 120  $\text{mm}^2/\text{s}$   
 - · - 46  $\text{mm}^2/\text{s}$   
 - - - 30  $\text{mm}^2/\text{s}$





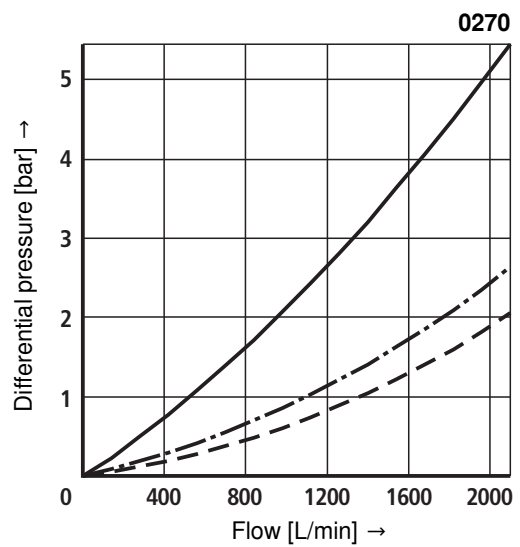
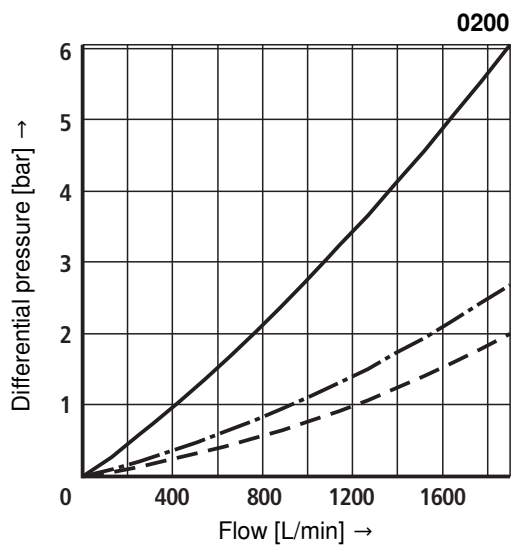
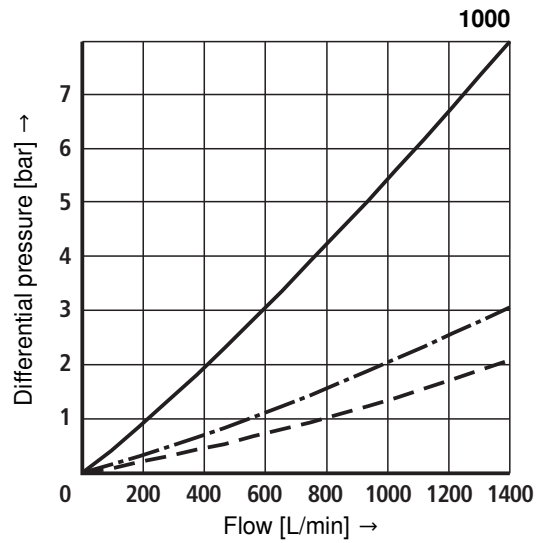
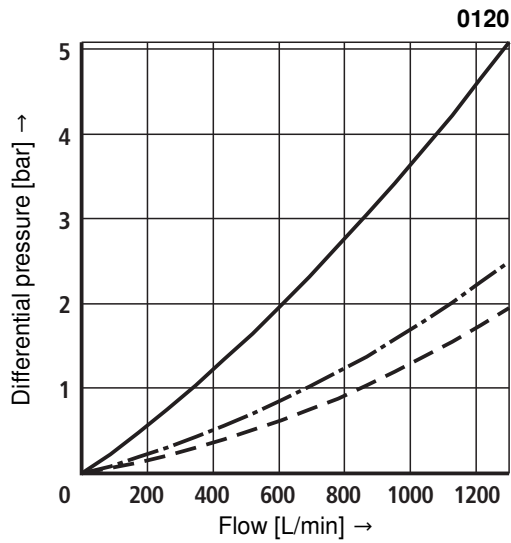
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H3XL...

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Oil viscosity:  
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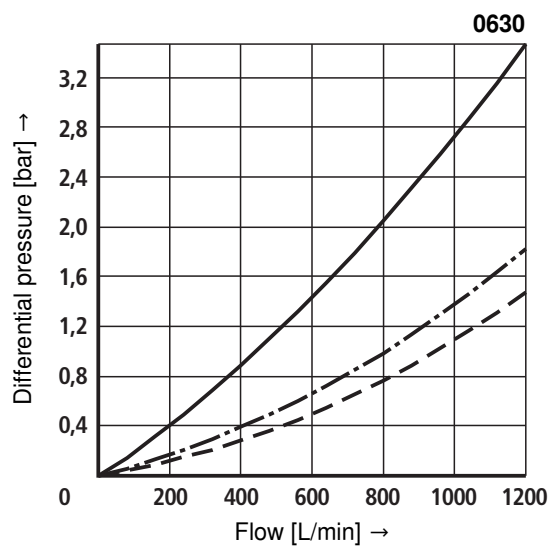
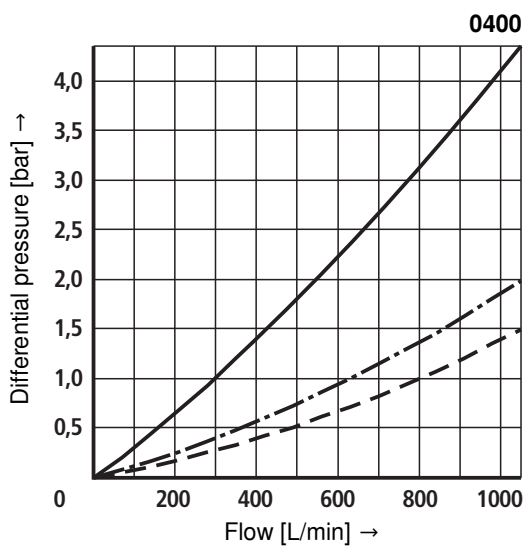
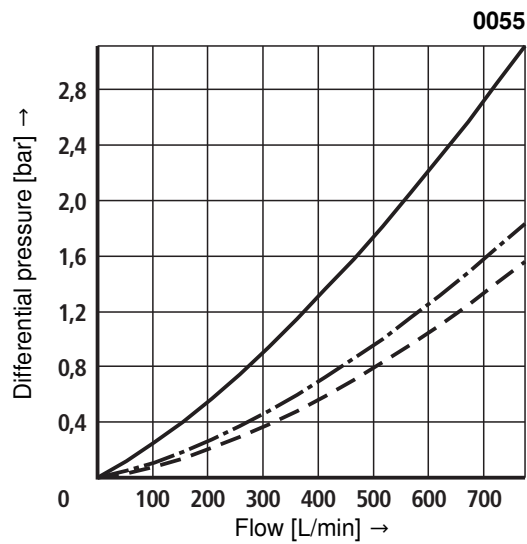
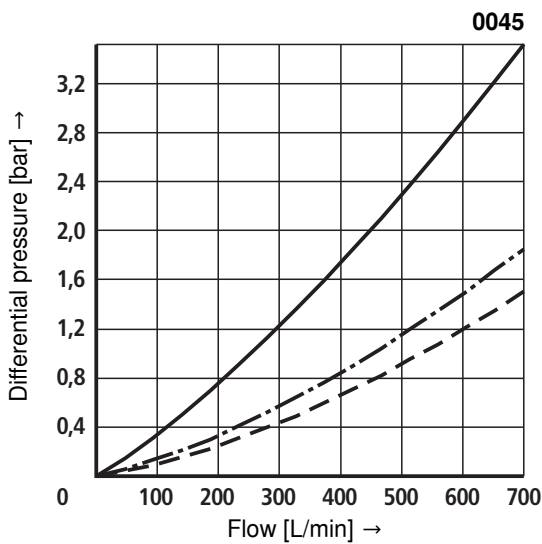
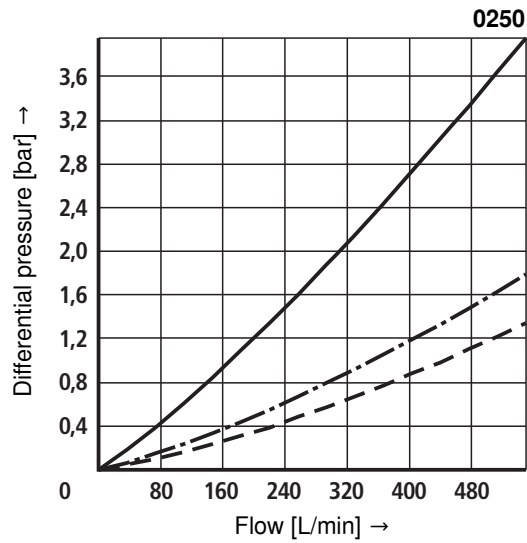
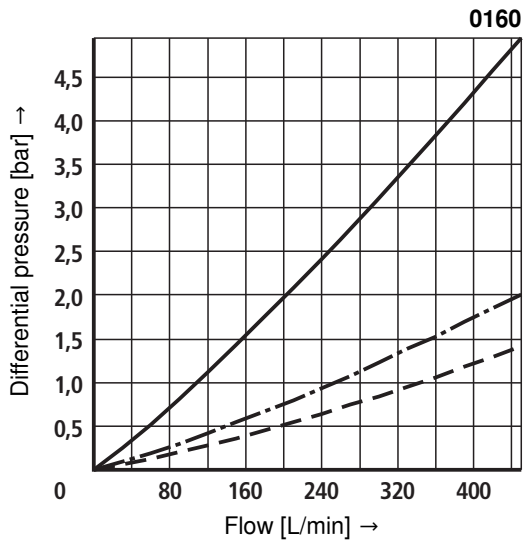
## Characteristic curves

H10XL...

Specific weight:  $< 0.9 \text{ kg/dm}^3$   
 $\Delta p$ -Q characteristic curves for complete filters recommended  
 initial  $\Delta p$  for design = 0.8 bar

An optimum filter selection is made possible by our computer program "BRFilterSelect".

Oil viscosity:  
 ——— 120  $\text{mm}^2/\text{s}$   
 - - - 46  $\text{mm}^2/\text{s}$   
 - - - 30  $\text{mm}^2/\text{s}$



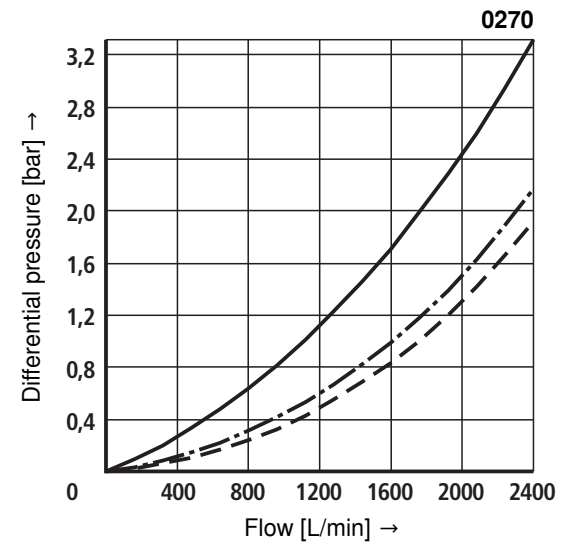
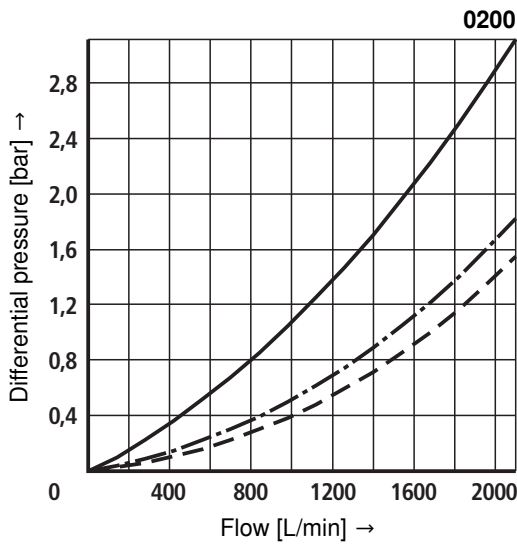
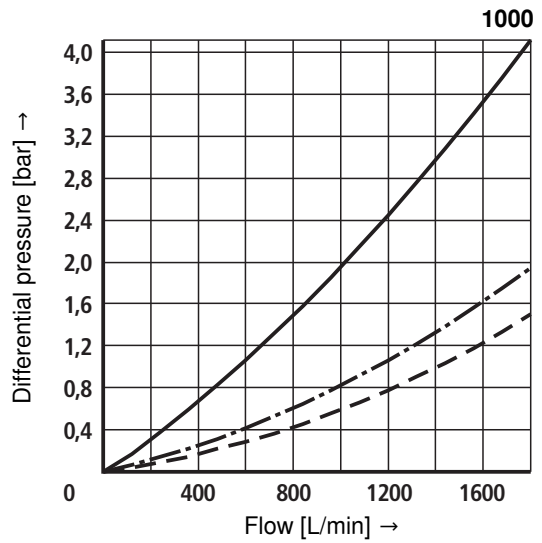
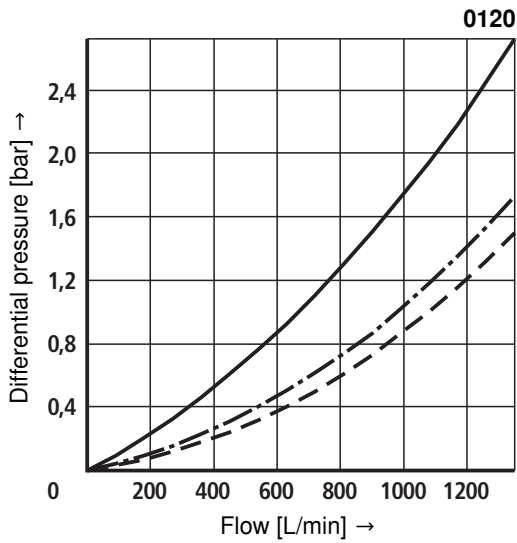
## Characteristic curves

H10XL...

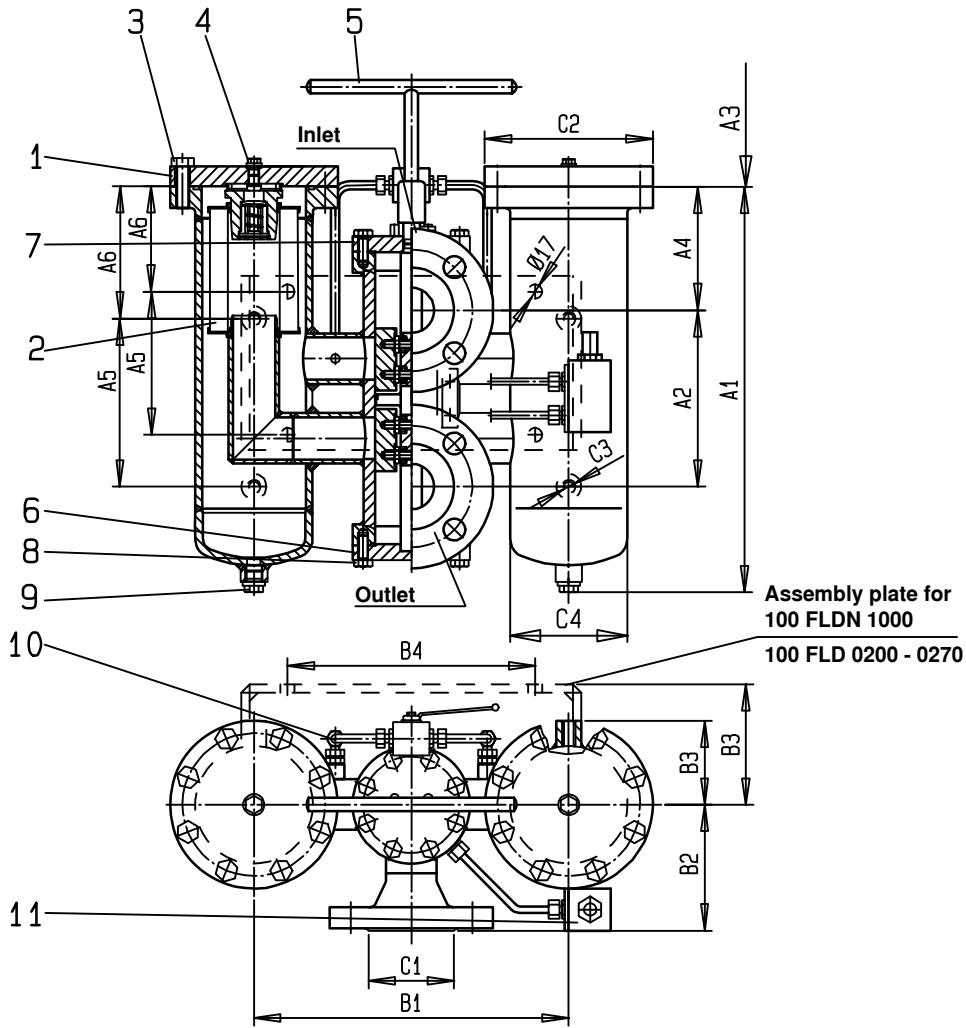
Specific weight:  $< 0.9 \text{ kg/dm}^3$   
 $\Delta p$ -Q characteristic curves for complete filters recommended  
 initial  $\Delta p$  for design = 0.8 bar

An optimum filter selection is made possible by our computer program "BRFilterSelect".

Oil viscosity:  
 ——— 120 mm<sup>2</sup>/s  
 - · - · 46 mm<sup>2</sup>/s  
 - - - 30 mm<sup>2</sup>/s



**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 <sup>1)</sup>	A1	A2	A3 <sup>2)</sup>	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	420	256	-	230	485	180	115	-	DN 80	Ø 240	M20	Ø 168.3
0630	2 x 13	187	777			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 BRFS standard**

Type 100 FLD...	Content in L	Weight in kg <sup>1)</sup>	A1	A2	A3 <sup>2)</sup>	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													
0270	2 x 33	384	1480	270	1010	1055	250	-	480	225	-	188	DN 100	Ø 260	-	Ø 193.7

<sup>1)</sup> Weight including standard filter element and clogging indicator.

<sup>2)</sup> 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 compensa- tion line	Steel	Please indicate ordering information Filter										
11	1	Clogging indicator	various	See ordering information Clogging indicator										
	1	Sealing kit	various	Please indicate ordering information Filter										

All part numbers BRFS specific.

## Spare parts (insert for DIN and SAE filters)

### Mechanical optical clogging indicator

**ABZ | F | V - HV5 - 1X / - DIN**

Rexroth power unit accessories

Filter

Clogging indicator

Mechanical optical clogging indicator for high-pressure filters

Switching point 5 bar [72 psi]

**= HV5**

**DIN =**

Identification for DIN and SAE models

**M =**

**V =**

### Sealing material

see table below

see table below

### Unit series

unit series 10 to 19

(10 to 19; unchanged installation and connection dimensions)

**1X =**

Mechanical optical clogging indicator	Material no.
ABZ FV-HV5-1X/M-DIN	R901025313

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	
		Element model	
<b>Mineral oils</b>			
Mineral oil	HLP according to DIN 51524	M	...0
<b>Fire-resistant hydraulic fluids</b>			
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
<b>Hydraulic fluids that are fast biodegradable</b>			
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

## Installation, commissioning and maintenance

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### 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 clogging indicator and the pressure compensation while the filter is under pressure!

Functional and safety warranty only applicable when using genuine Rexroth 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 clogging 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 H...-XL, 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

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