

Duplex filter with filter element according to DIN 24550

RE 51446/09.11
Replaces: 07.11

1/18

Type 150LDN0040 to 0400; 50/150LD0130, 0150Size according to **DIN 24550**: 0040 to 0400

Additional sizes: 0130, 0150

Nominal pressure 160 bar [2321 psi]

Connection up to SAE 1 1/2" 6000 psi

Operating temperature –10 °C to 100 °C [14 °F to 212 °F];
Shortly –30 °C [–22 °F]

H7833_d

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Features

- Duplex filters are used in hydraulic systems for separating solid materials from the hydraulic fluids and lubricating oils. They are intended for installation into piping. They allow for the exchange of the filter element without operational interruption.
- They distinguish themselves by the following:
- Special highly efficient filter media
 - Absorption of very fine particles across a broad pressure differential range
 - High dirt holding capacity across a broad pressure differential range
 - High dirt holding capacity thanks to large specific filter area
 - Good chemical resistance of the filter elements
 - High collapse resistance of the filter elements (e.g. in case of cold start)
 - Filtration ratings of 3 µm to 100 µm
 - By default equipped with mechanical optical maintenance indicator with memory function
 - Continuous operating mode due to duplex filter design

of the filter

150LD		—	—	—	—	—
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Duplex filter 150 bar
[2176 psi] = 150LD

with filter element according
to DIN 24550 (only with size
0040-0100 + 0160-0400) = **N**

LDN... = 0040 0063 0100
0160 0250 0400

LD... = 0130 0150

Stainless steel wire mesh, cleanable
G10, G25, G40, G100 = G...

Micro glass, not cleanable
H3XL, H6XL, H10XL, H20XL = H...XL

Max. admissible pressure differential of the filter element

30 bar [435 psi], with bypass valve	= A00
330 bar [4785 psi], without bypass valve	= B00

Maintenance indicator, mech./optical	
Specify switching pressure 2.2 bar [32psi] –	
Bypass cracking pressure 3.5 bar [51 psi]	= V2,2
Maintenance indicator, mech./optical	
Specify switching pressure 5.0 bar [78.5 psi] –	
Bypass cracking pressure 7 bar [102 psi]	= V5.0

150LDN0160-H3XLA00-V2.2-M-R6

Further versions (filter materials, connections,...) are available at request.

M = Additional Minimes connections G1/4
at the top

E = Bleeding valve instead of bleed screw

NB = Without bypass valve
(only with filter element version "A00")

Port

	Frame size	0040-0100	0130-0150	0160-0400	
	Port				
R4 =	G1	•			Pipe thread according to ISO 228
R5 =	G1 1/4		•		
R6 =	G1 1/2			•	
U4 =	SAE 12	x			Pipe thread according to SAE J1926
S5 =	SAE 1 1/4"		x		SAE flange 3000 psi
S6 =	SAE 1 1/2"			x	

- = Standard connection
- x = Additional connection possibility

Seal

M = NBR seal
V = FKM seal

of the filter element

2.		—	—	0	—
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Design = 2.

LDN... = 0040 0063 0100 0160 0250 0400

LD... = 0130 0150

Stainless steel wire mesh, cleanable
G10, G25, G40, G100 = G...

Micro glass, not cleanable
H3XL, H6XL, H10XL, H20XL = H...XL

M = NBR seal

V = FKM seal

Bypass valve

0 = at filter element always 0

Pressure differential

Max. admissible pressure differential of the filter element

A00 = 30 bar [435 psi]

B00 = 330 bar [4785 psi]

Order example:

2.0100 H3XL-A00-0-M

Standard types

150LD(N) standard types, NBR seal, flow information for 30 mm²/s [143 SUS]

Duplex filter, filtration rating 3 µm

Type	Flow in l/min [US gpm] with $\Delta p = 1$ bar [14.5 psi] ¹⁾	Material no. Filter				Material no. Replacement element
150LDN0040-H3XLA00-V5,0-M-..	25 [6.60]	..R4	R928039315	..U4	R928041843	R928006645
150LDN0063-H3XLA00-V5,0-M-..	35 [9.25]	..R4	R928039318	..U4	R928041844	R928006699
150LDN0100-H3XLA00-V5,0-M-..	42 [11.10]	..R4	R928039319	..U4	R928041845	R928006753
150LD0130-H3XLA00-V5,0-M-..	62 [16.38]	..R5	R928039322	..S5	R928041841	R928022274
150LD0150-H3XLA00-V5,0-M-..	80 [21.13]	..R5	R928039324	..S5	R928041842	R928022283
150LDN0160-H3XLA00-V5,0-M-..	85 [22.45]	..R6	R928039326	..S6	R928039327	R928006807
150LDN0250-H3XLA00-V5,0-M-..	100 [26.42]	..R6	R928039354	..S6	R928039352	R928006861
150LDN0400-H3XLA00-V5,0-M-..	125 [33.02]	..R6	R928039357	..S6	R928039355	R928006915

150LD(N) standard types, NBR seal, flow information for 30 mm²/s [143 SUS]

Duplex filter, filtration rating 6 µm

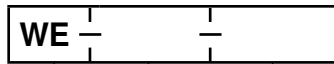
Type	Flow in l/min [US gpm] with $\Delta p = 1$ bar [14.5 psi] ¹⁾	Material no. Filter				Material no. Replacement element
150LDN0040-H6XLA00-V5,0-M-..	30 [7.93]	..R4	R928041846	..U4	R928041860	R928006646
150LDN0063-H6XLA00-V5,0-M-..	39 [10.30]	..R4	R928041847	..U4	R928041861	R928006700
150LDN0100-H6XLA00-V5,0-M-..	49 [12.94]	..R4	R928041848	..U4	R928041862	R928006754
150LD0130-H6XLA00-V5,0-M-..	79 [20.87]	..R5	R928041849	..S5	R928041850	R928022275
150LD0150-H6XLA00-V5,0-M-..	92 [24.30]	..R5	R928041851	..S5	R928041852	R928022284
150LDN0160-H6XLA00-V5,0-M-..	101 [26.68]	..R6	R928041853	..S6	R928041854	R928006808
150LDN0250-H6XLA00-V5,0-M-..	115 [30.38]	..R6	R928041855	..S6	R928041856	R928006862
150LDN0400-H6XLA00-V5,0-M-..	131 [34.61]	..R6	R928041857	..S6	R928041858	R928006916

150LD(N) standard types NBR seal, flow information for 30 mm²/s [143 SUS]

Duplex filter, filtration rating 10 µm

Type	Flow in l/min [US gpm] with $\Delta p = 1$ bar [14.5 psi] ¹⁾	Material no. Filter				Material no. Replacement element
150LDN0040-H10XLA00-V5,0-M-..	33 [8.72]	..R4	R928038264	..U4	R928041838	R928006647
150LDN0063-H10XLA00-V5,0-M-..	41 [10.83]	..R4	R928038267	..U4	R928041839	R928006701
150LDN0100-H10XLA00-V5,0-M-..	53 [14.00]	..R4	R928038268	..U4	R928041840	R928006755
150LD0130-H10XLA00-V5,0-M-..	90 [23.78]	..R5	R928038269	..S5	R928041836	R928022276
150LD0150-H10XLA00-V5,0-M-..	100 [26.42]	..R5	R928038270	..S5	R928041837	R928022285
150LDN0160-H10XLA00-V5,0-M-..	112 [29.59]	..R6	R928039325	..S6	R928038271	R928006809
150LDN0250-H10XLA00-V5,0-M-..	125 [33.02]	..R6	R928039353	..S6	R928038272	R928006863
150LDN0400-H10XLA00-V5,0-M-..	135 [35.66]	..R6	R928039356	..S6	R928038273	R928006917

¹⁾ Measured pressure differential across filter and measuring equipment according to ISO 3968. The measured pressure differential at the maintenance indicator is lower.

Ordering code: Electronic switching element for maintenance indicator**Maintenance indicator**

Electronic switching element

= WE

Type of signal

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**M12x1** = Round plug-in connection M12x1, 4-pin**EN 175301-803** = Rectangular plug-in connector,
2-pin design A according to EN-175301-803**Material numbers of the electronic switching elements**

Material no.	Type	Signal	Switching points	Connector	LED
R928028409	WE-1SP-M12x1	Changeover	1	M12x1	No
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	No

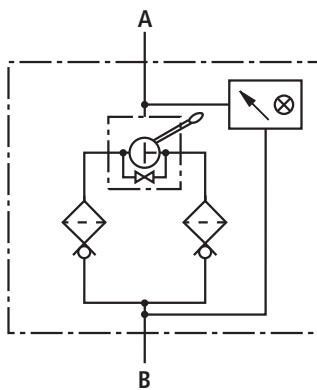
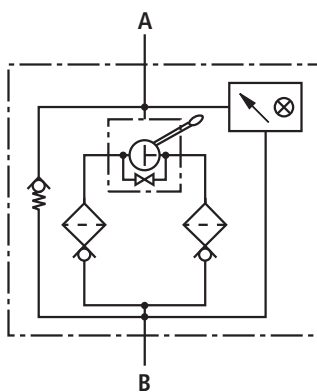
Order example: Duplex filter with mechanical optical maintenance indicator for $p_{nom.} = 150$ bar [2176 psi] with bypass valve, size 0160, with filter element 3 µm and electronic switching element M12x1 with 1 switching point for hydraulic fluid mineral oil HLP according to DIN 51524.

Filter: 150LDN0160-H3XLA00-V2,2-M-R6**Material no. R928039326****Maintenance indicator:** WE-1SP-M12x1**Material no. R928028409**

For round plug-in connections refer to data sheet 08006.

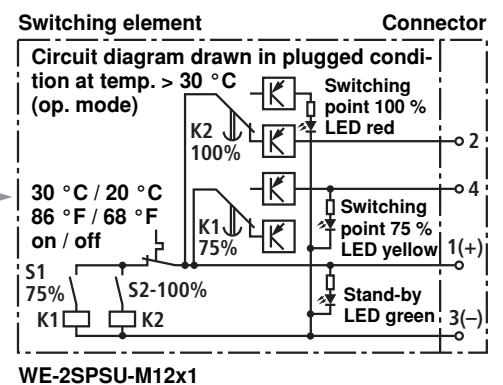
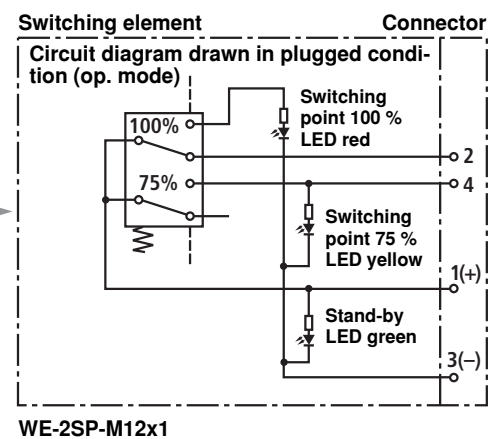
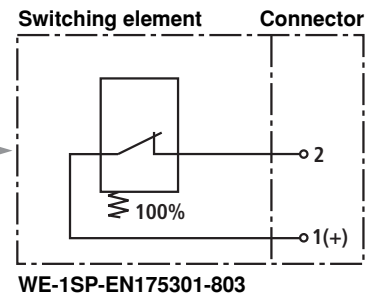
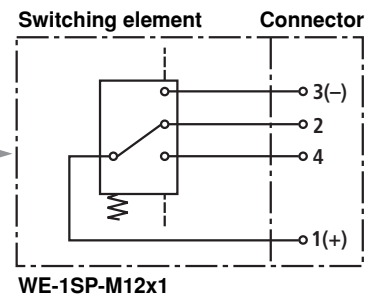
Symbols

**Duplex filter
with bypass and
mechanical indicator**



**Duplex filter
without bypass and
mechanical indicator**

**Electronic switching element
for maintenance indicator**



Function, section

The 150LD(N) duplex filters are suitable for direct installation into pressure lines. They are mostly installed upstream control units or controllers to be protected.

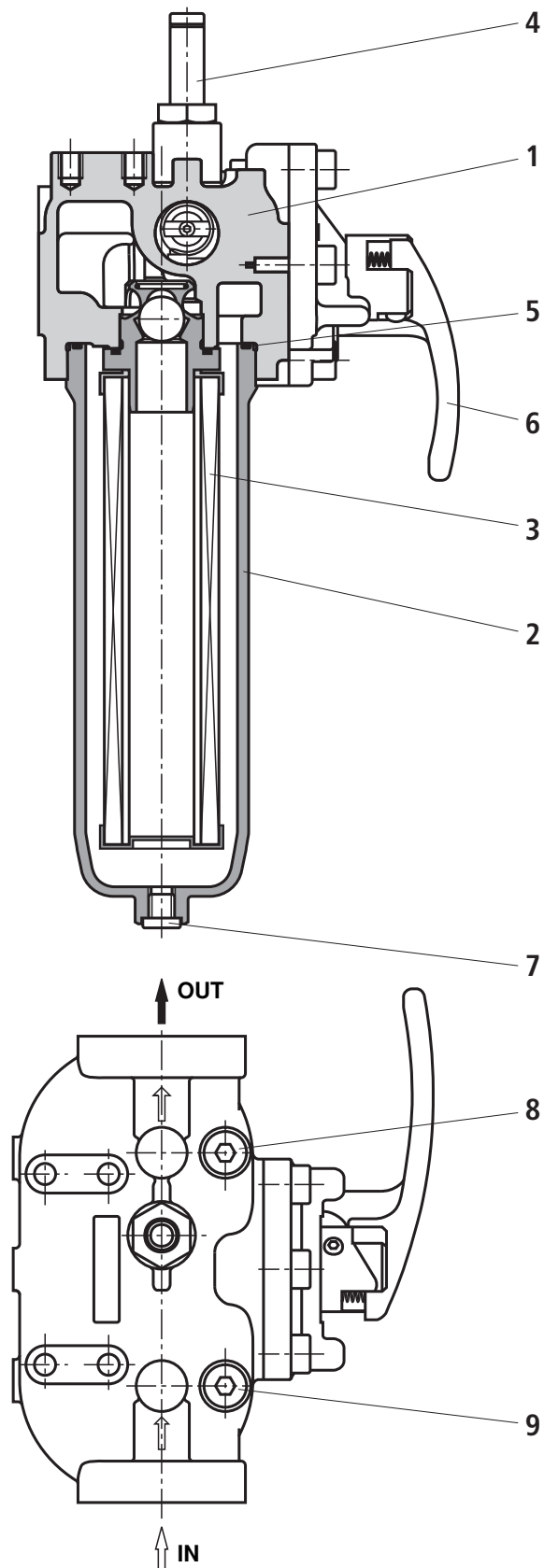
They basically consist of filter head (1) with switch-over fitting (6), a screwable filter bowl (2), filter element (3) as well as mechanical optical maintenance indicator (4).

Via port IN, the hydraulic fluid reaches the filter element (3) where it is cleaned. The dirt particles filtered out settle in the filter bowl (2) and in the filter element (3). Via port OUT, the filtered hydraulic fluid enters the hydraulic circuit.

The filter housing and all connection elements are designed so that pressure peaks – as they may e.g. occur in case of abrupt opening of large control valves due to the accelerated fluid weight – can be securely absorbed.

As of size 0160, the standard equipment comprises an oil drain plug (7).

Via the bleed screws and/or bleeding valves – complementary detail E – (8, 9), the filter side to be maintained can be bled.



Technical data (For applications outside these parameters, please consult us!)**general**

Installation position		Vertical			
Ambient temperature range		°C [°F] −30 to +100 [−22 to +212]			
Weight	Size	0040	0063	0100	0130
	kg [lbs]	7.4 [16.3]	8.5 [18.7]	10.3 [22.7]	13.9 [30.6]
Weight	Size	0150	0160	0250	0400
	kg [lbs]	17.3 [38.1]	21.6 [47.6]	23.4 [51.6]	26.2 [57.7]
Material	Filter head		GGG		
	Filter bowl		Steel		
	Optical maintenance indicator	V2.2	Aluminum		
		V5.0	Brass		
	Electronic switching element		Plastic PA6		

hydraulic

Maximum operating pressure	bar [psi]	160 [2288]
Hydraulic fluid temperature range	°C [°F]	-10 to +100 [+14 to +212] (shortly -30 [-22])
Fatigue strength according to ISO 10771	Load cycles	> 10 ⁶ with max. operating pressure
Cracking pressure of the bypass valve	bar [psi]	Not available
Type of pressure measurement of the maintenance indicator		Pressure differential
Response pressure of the maintenance indicator	bar [psi]	2.2 ± 0.25 [31.9 ± 3.6]; 5 ± 0.5 [72 ± 7]

of the electronic switching element

Electrical connection		Round plug-in connection M12x1, 4-pin			Standard connection EN 175301-803	
		Version	1SP-M12x1	2SP-M12x1	2SP-M12x1	1SP-EN175301-803
Contact load, direct voltage		A _{max.}	1			
Voltage range		V _{max.}	150 (AC/DC)	10-30 (DC)		250 (AC) / 200 (DC)
Max. switching power with resistive load		W	20			70
Switching type	75 % signal		–	Normally open contact		–
	100 % signal		Changeover	Normally closed contact		Normally closed contact
	2SPSU				Signal switching through at 30 °C [86 °F], Return switching at 20 °C [68 °F]	
Display via LEDs in the electronic switching element 2SP...				Stand-by (LED green); 75 % switching point (LED yellow) 100 % switching point (LED red)		
Protection class according to EN 60529			IP 67			IP 65
Ambient temperature range		°C [°F]	–25 to +85 [–13 to +185]			
For direct voltage above 24 V, spark extinguishing is to be provided for protecting the switching contacts.						
Weight	Electronic switching element: – with round plug-in connection M12x1	kg [lbs]	0.1 [0.22]			

Technical data (For applications outside these parameters, please consult us!)**Filter element**

Glass fiber paper H..XL			Single-use element on the basis of inorganic fiber	
			Filtration ratio according to ISO 16889 up to $\Delta p = 5 \text{ bar}$ [72.5 psi]	Achievable oil cleanliness according to ISO 4406 [SAE-AS 4059]
H20XL			$\beta_{20}(c) \geq 200$	19/16/12 – 22/17/14
H10XL			$\beta_{10}(c) \geq 200$	17/14/10 – 21/16/13
H6XL			$\beta_6(c) \geq 200$	15/12/10 – 19/14/11
H3XL			$\beta_5(c) \geq 200$	13/10/8 – 17/13/10
Admissible pressure differential	A	bar [psi]	30 [435]	
	B	bar [psi]	330 [4785]	

Seal material for hydraulic fluids

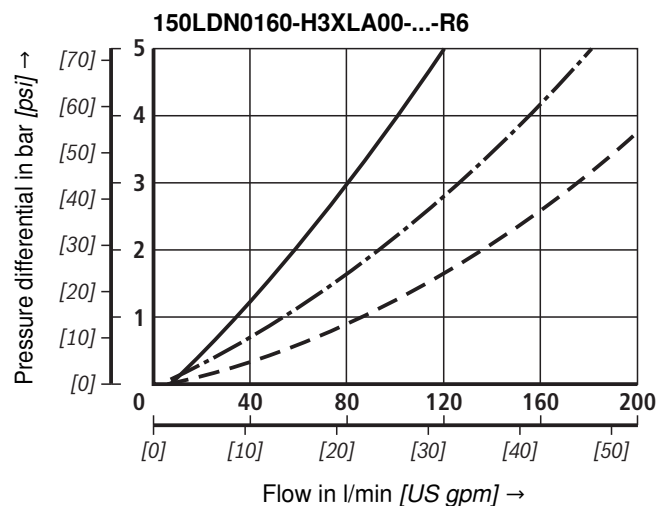
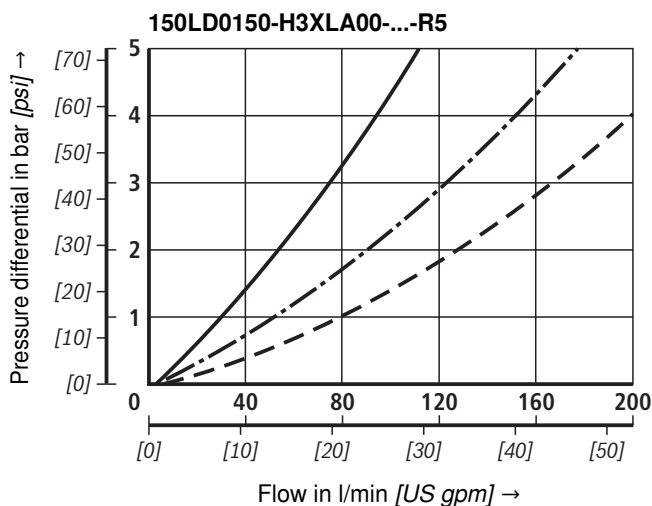
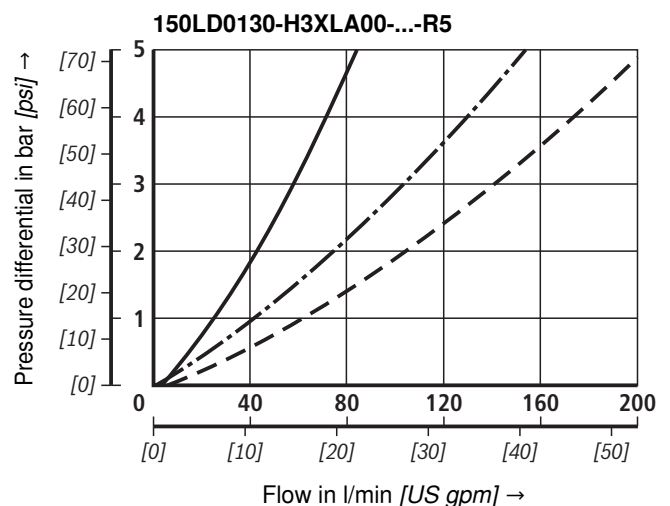
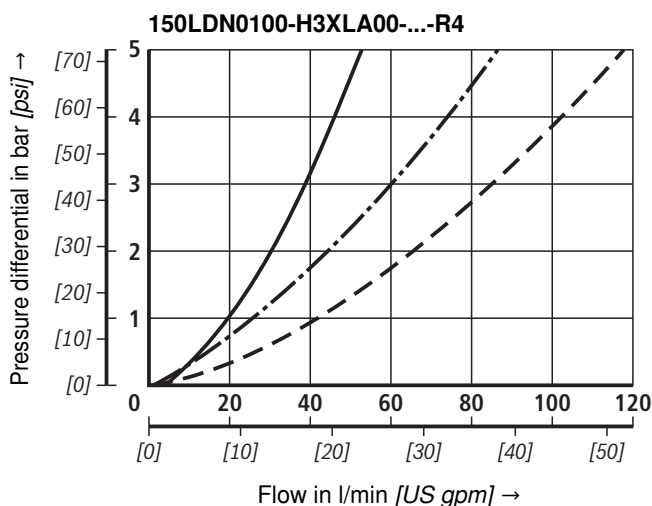
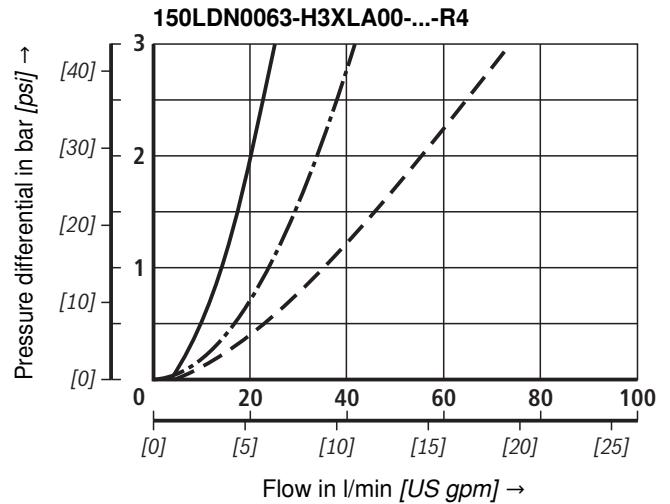
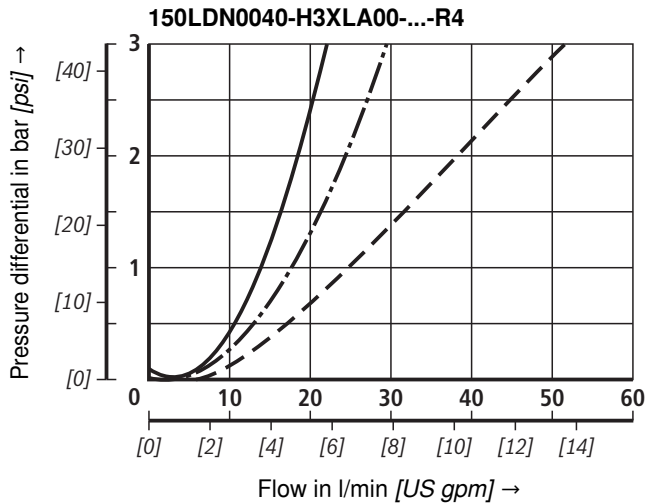
Mineral oil			Ordering code
Mineral oil	HLP	according to DIN 51524	M
Flame-resistant hydraulic fluids			Ordering code
Emulsions	HFA-E	according to DIN 24320	M
Synthetic water solutions	HFA-S	according to DIN 24320	M
Water solutions	HFC	according to VDMA 24317	M
Phosphoric acid esters	HFD-R	according to VDMA 24317	V
Organic esters	HFD-U	according to VDMA 24317	V
Fast biodegradable hydraulic fluids			Ordering code
Triglycerides (rape seed oil)	HETG	according to VDMA 24568	M
Synthetic esters	HEES	according to VDMA 24568	V
Polyglycols	HEPG	according to VDMA 24568	V

Characteristic curves (measured with HLP46, according to ISO 3968)**H3XL**Specific weight: < 0.9 kg/dm³ Δp -Q characteristic curves for complete filtersrecommended initial Δp for design = 0.8 bar [11.6 psi]

A proper filter design is enabled by our computer program "BRFilterSelect".

Oil viscosity:

— 140 mm²/s [649 SUS]
 - - - 68 mm²/s [315 SUS]
 - - - 30 mm²/s [143 SUS]



Characteristic curves (measured with HLP46, according to ISO 3968)

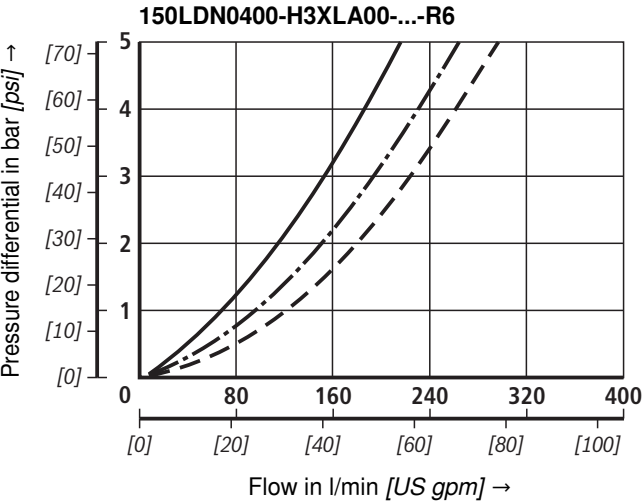
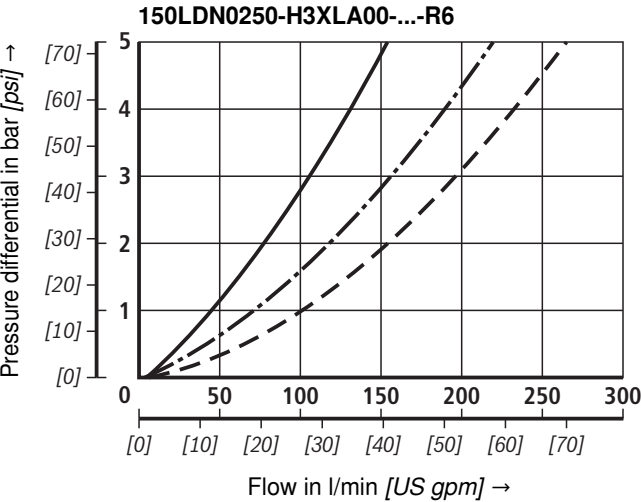
H3XL; H10XL

Specific weight: < 0.9 kg/dm³
Δp-Q characteristic curves for complete filters
recommended initial Δp for design = 0.8 bar [11.6 psi]

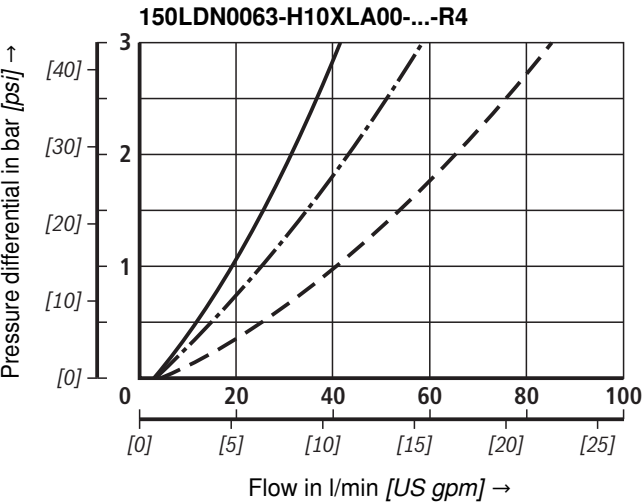
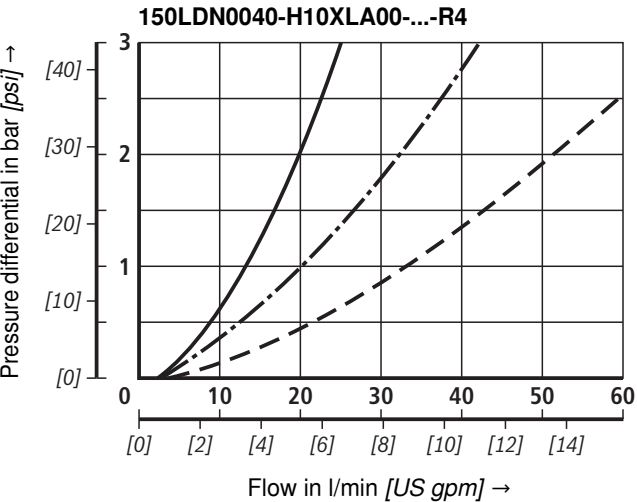
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Oil viscosity: ——— 140 mm²/s [649 SUS]
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 - - - 30 mm²/s [143 SUS]

H3XL



H10XL

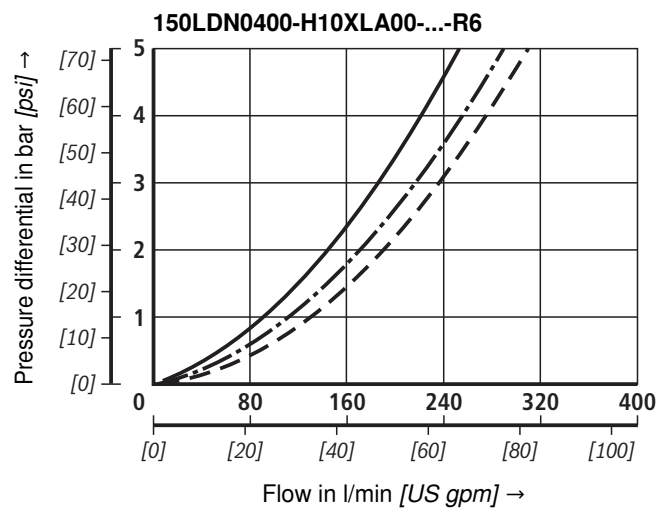
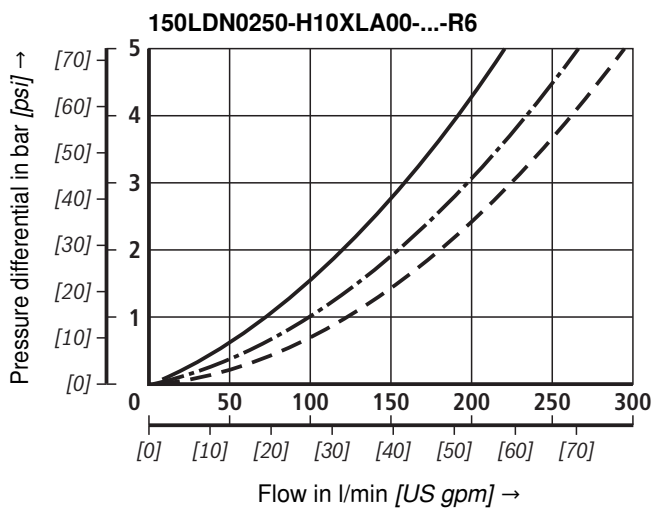
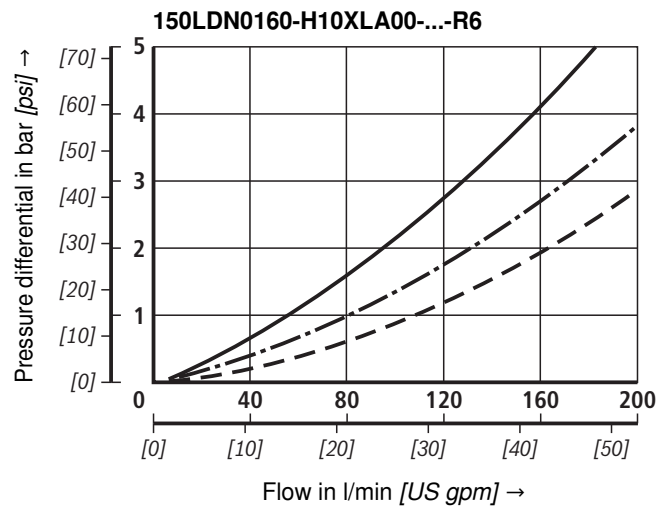
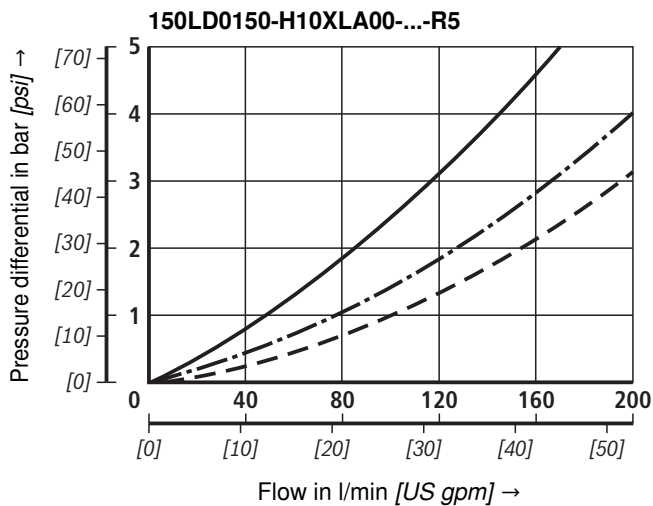
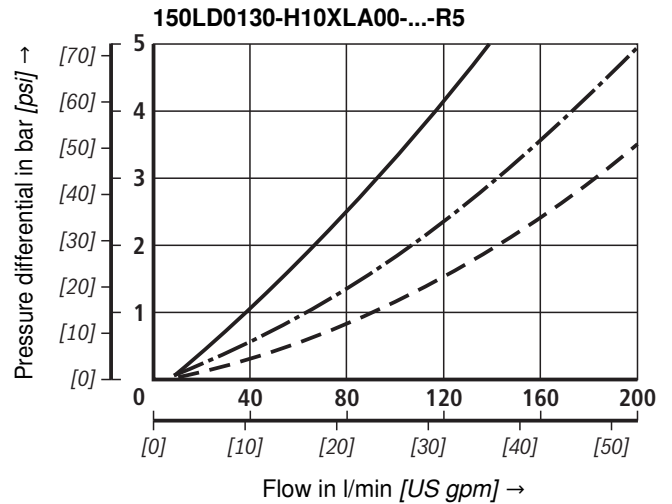
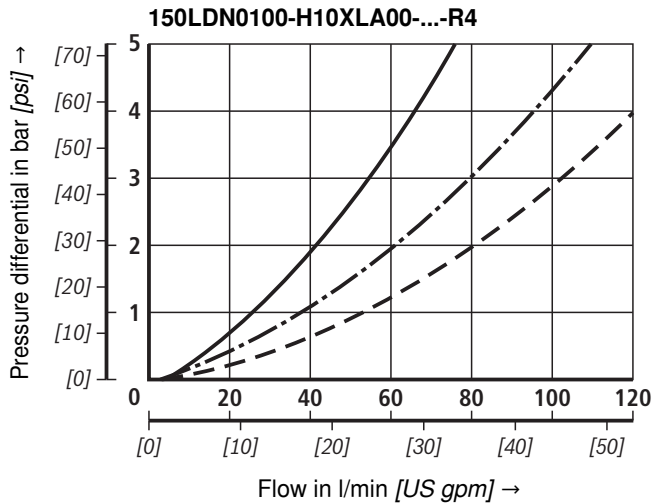


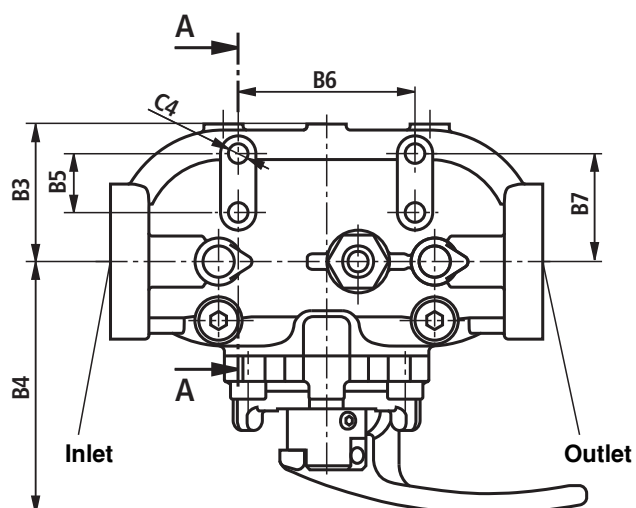
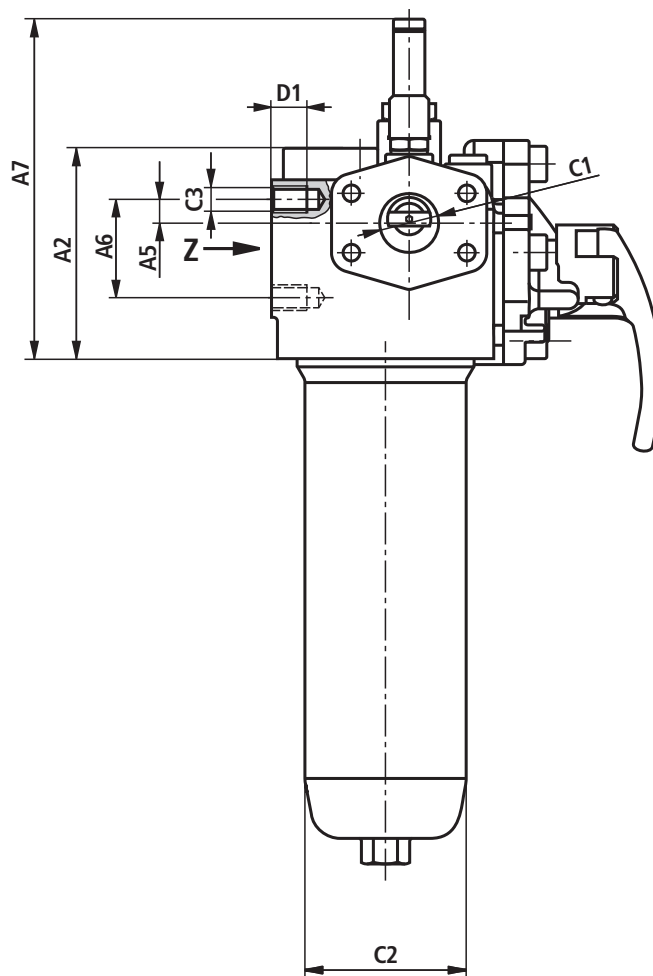
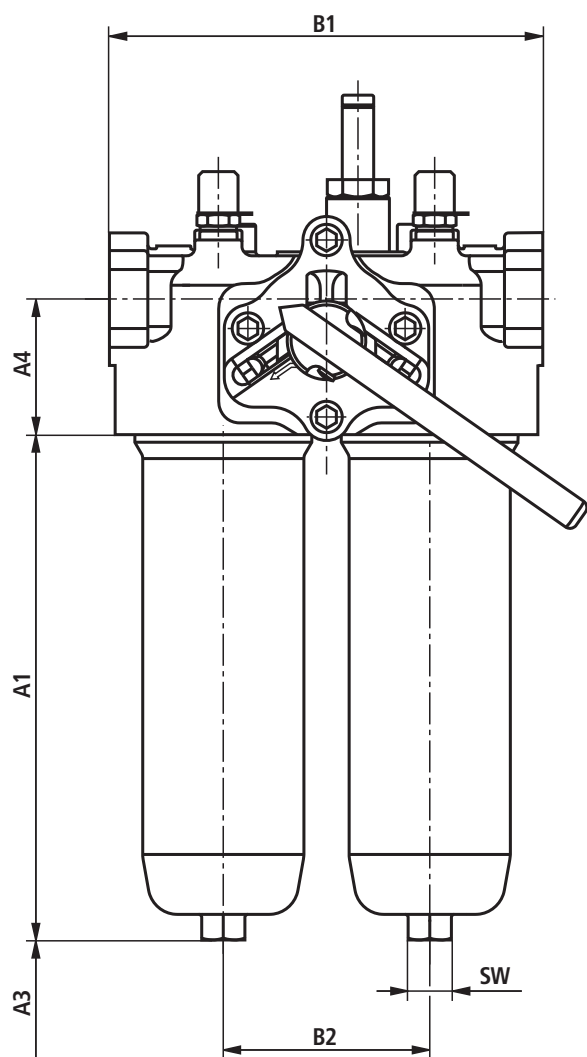
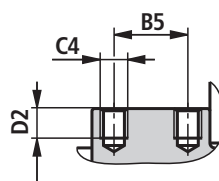
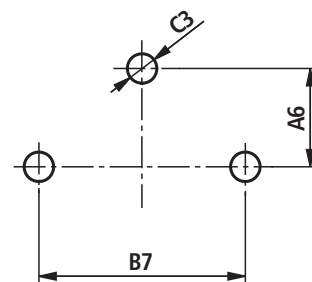
Characteristic curves (measured with HLP46, according to ISO 3968)**H10XL**Specific weight: < 0.9 kg/dm³ Δp -Q characteristic curves for complete filtersrecommended initial Δp for design = 0.8 bar [11.6 psi]

A proper filter design is enabled by our computer program "BRFilterSelect".

Oil viscosity:

— 140 mm²/s [649 SUS]
 - - - 68 mm²/s [315 SUS]
 - - - 30 mm²/s [143 SUS]



Unit dimensions size 0040 to size 0400 (dimensions in mm [inch])

Section A-A

View Z


Unit dimensions size 0040 to size 0400 (dimensions in mm [inch])**Filter housing for filter elements according to DIN 24550 and according to Rexroth standard**

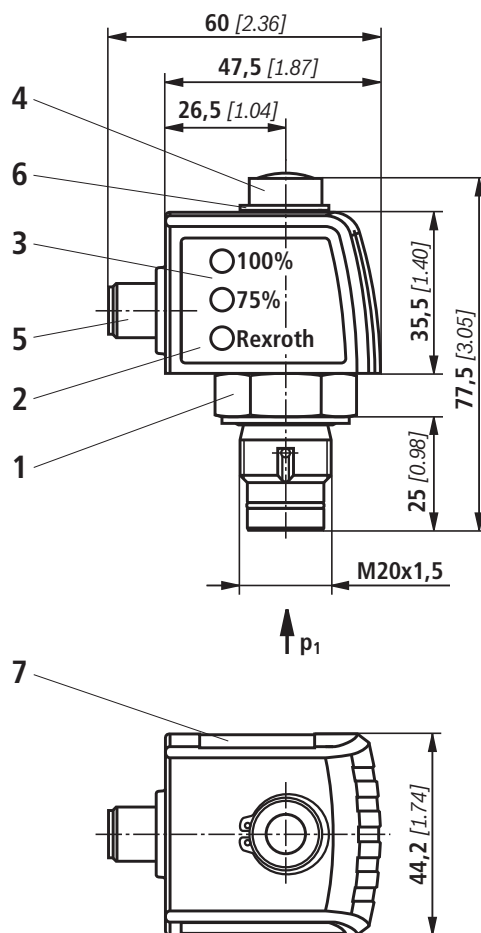
Type	A1	A2	A3 ¹⁾	A4	A5	A6	A7	B1	B2	B3	B4	B5
150 LDN 0040	115 [4.53]	108 [4.25]	80 [3.15]	70 [2.76]	9 [0.35]	50 [1.97]	170 [6.71]	170 [6.69]	80 [3.15]	57 [2.24]	127 [5.00]	30 [1.18]
150 LDN 0063	179 [7.05]											
150 LDN 0100	269 [10.59]											
150 LD 0130	213 [8.39]	107 [4.21]	140 [5.51]	69 [2.72]	14 [0.55]	50 [1.97]	173 [6.82]	220 [8.66]	105 [4.13]	70 [2.76]	128 [5.04]	30 [1.18]
150 LD 0150	263 [10.35]											
150 LDN 0160	184 [7.24]	122 [4.80]	140 [5.51]	80 [3.15]	25 [0.98]	55 [2.17]	184 [7.25]	270 [10.63]	134 [5.28]	103 [4.06]	152 [5.98]	30 [1.18]
150 LDN 0250	274 [10.79]											
150 LDN 0400	425 [16.73]											

Type	B6	B7	C1 connection			Ø C2	C3	C4	D1	D2	SW
			R Standard	U (SAE J1926)	S (SAE flange 3000 psi)						
150 LDN 0040	90 [3.54]	30 [1.18]	G1	SAE 12 1 1/16-12UN-2B	-	55 [2.17]	M10	M8	15 [0.59]	15 [0.59]	19 [0.75]
150 LDN 0063											
150 LDN 0100											
150 LD 0130	90 [3.54]	55 [2.17]	G1 1/4	-	SAE 1 1/4"	77 [3.03]	M12	M8	18 [0.71]	12 [0.47]	24 [0.94]
150 LD 0150											
150 LDN 0160	130 [5.12]	65 [2.56]	G1 1/2	-	SAE 1 1/2"	98 [3.86]	M16	M10	22 [0.87]	15 [0.59]	27 [1.06]
150 LDN 0250											
150 LDN 0400											

¹⁾ Servicing height for filter element replacement

Maintenance indicator (dimensions in mm [inch])

Electronic switching element M12x1



- 1 Mechanical optical maintenance indicator;
max. tightening torque $M_{A \max} = 50 \text{ Nm}$ [36.88 lb-ft]
- 2 Switching element with locking ring for electrical maintenance indicator (rotatable by 360°);
plug-in connection M12x1
- 3 Housing with three LEDs: 24 V =
Green: Stand-by
Yellow: Switching point 75 %
Red: Switching point 100 %
- 4 Optical indicator bistable
- 5 Round connector M12x1, 4-pin
- 6 Locking ring DIN 471-16x1,
Material no. R900003923
- 7 Name plate

Notes:

Presentation contains mechanical optical maintenance indicator (1) and electronic switching element (2).

Switching elements with increased switching power at request.

Spare parts

Electronic switching element

Electronic switching element	W	O	D01			
Maintenance indicator	= W					
Mechanical optical indicator	= O					
Design pressure differential M20x1.5		= D01				
Switching pressure						
2.2 bar [31.9 psi]			= 2,2			
5.0 bar [72.5 psi]			= 5,0			
				M =		
				V =		

Max. nominal pressure

Switching pressure 2.2 bar [31.9 psi]
160 bar [2321 psi]

Switching pressure 5.0 bar [72.5 psi]
450 bar [6527 psi]

Seal

NBR seal

FKM seal

Mechanical optical maintenance indicator	Material no.
WO-D01-2,2-M-160	R901025312
WO-D01-5,0-M-450	R901025313

Seal kit

		D	150LD			
Seal kit	= D					Seal
Series	= 150LD				M =	NBR seal
Size					V =	FKM seal
Size 0040-0100						
Size 0130-0150						
Size 0160-0400						

Seal kit	Material no.
D50/150LDN0040-0100-M	R928039376
D50/150LD0130-0150-M	R928039377
D50/150LDN0160-0400-M	R928039378

Installation, commissioning and maintenance

Installation of the filter

Verify operating overpressure with name plate information.

Screw the filter head (item 1) to the fastening device considering flow direction (direction arrows) and servicing height of the filter element (item 3).

Remove the plugs from filter inlet and outlet, screw filter in pipeline without tension stress.

Bring the switching lever (item 6) into central position in order to fill both filter sides. Switch on system pump. Bleed filter by opening the screws / valves (item 8 or 9); close them again when operating liquid escapes. Switch the filter into the operating position. While doing so, the conical handle (item 6) must rest against the stop.

Switch-over lever is on the filter side that is out of order.

Connection of the electronic maintenance indicator

Basically, the filter is equipped with mechanical optical maintenance indicator (4). The electronic maintenance indicator is connected via the switching element with 1 or 2 switching points, which is attached to the mechanical optical maintenance indicator and held by means of the locking ring.

When must the filter element be exchanged or cleaned respectively?

After initial start-up of the system, the filter element is to be exchanged.

Upon start-up in cold condition, the red pushbutton of the optical maintenance indicator (4) may jump out and an electrical signal is output via the switching element. Only push the red pushbutton in again after the operating temperature has been reached. If it jumps out again immediately or if the electric signal has not gone out at operating temperature, the filter element must be exchanged or cleaned respectively.

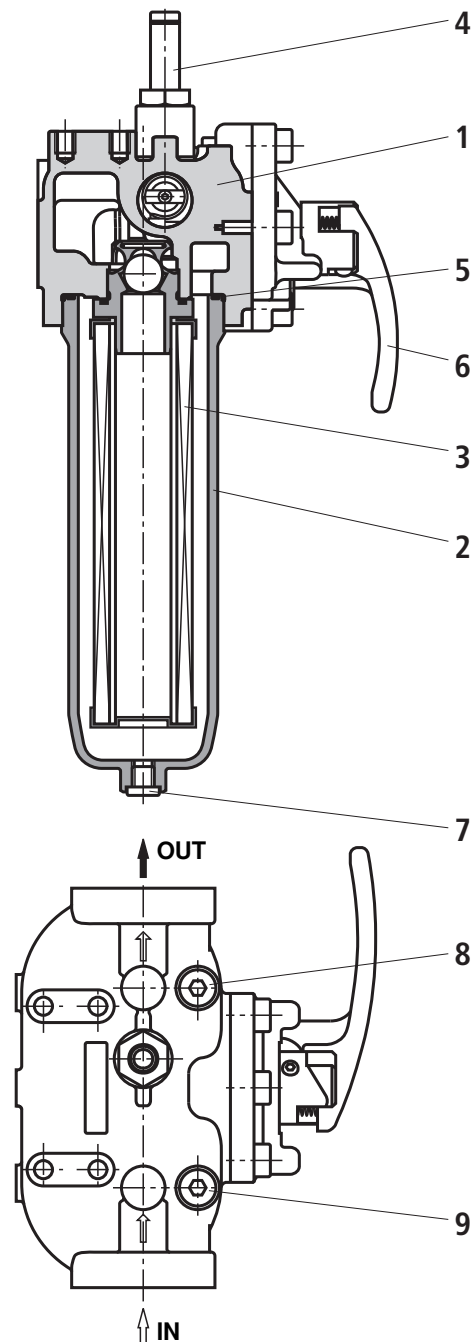
The filter element should be replaced or cleaned after max. 6 months.

Element exchange

- Pull the switch-over lever and switch over to the second filter.
- Open the bleed screw or bleeding valve (item 8 or 9) at the decommissioned filter side and reduce the pressure.
- Unscrew the filter bowl (item 2) and remove the filter element (item 3) from the centering spigot on the filter head (item 1) by turning it slightly.
- Check the filter head for cleanliness and clean if necessary.
- Replace filter element, clean filter element with material G....
- The efficiency of the cleaning process depends on the type of dirt and the amount of the pressure differential before the filter element exchange. If the pressure differential after the filter element exchange exceeds 50 % of the value before the filter element exchange, the G... element also needs to be replaced.

- Install cleaned or replaced filter element by slightly turning it back on its spigot.
- Check seal ring (item 5) in the filter bowl and replace when damaged or worn.
- Attach filter bowl and tighten at the hexagon using a suitable tool.
- Pull switch-over lever for pressure compensation. Bleed filter by opening the bleed screw (item 8 or 9); close it again when operating liquid escapes.
- Lower switch-over lever in basic position.

Technical modifications reserved!



Quality and standardization

The duplex filters for hydraulic applications according to 51446 are pressure holding equipment according to article 1, section 2.1.4 of the Pressure Equipment Directive 97/23/EC (PED). However, on the basis of the exception in article 1, section 3.6 of the PED, hydraulic filters are exempt from the PED if they are not classified higher than category I (guideline 1/19). They do not receive a CE mark.

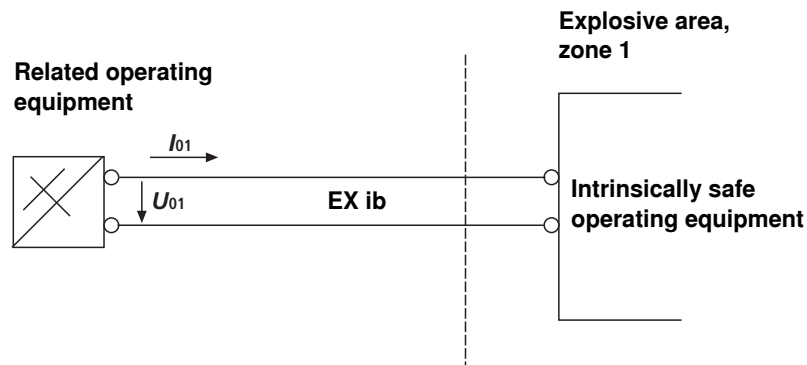
Use in explosive areas according to directive 94/9/EC (ATEX)

The duplex filters according to 51446 are no equipment or components in the sense of directive 94/9/EC and are not provided with a CE mark.

When using the duplex filters according to 51446 in explosive areas, potential equalization has to be ensured.

According to DIN EN 60079-11, the electronic maintenance indicators WE-1SP-M12x1 are simple, electronic operating equipment not having an own voltage source. This simple, electronic operating equipment may - according to DIN EN 60079-14 - in intrinsically safe electrical circuits (EEx ib) be used in systems for device group II, category 2G (zone 1) and category 3G (zone 2) without marking and certification. The operating equipment is assigned to explosion group II B and temperature class T5.

Possible circuit according to DIN EN 60079-14



The manufacturer's declaration according to DIN EN 13463 is available for this filter separately, with Material no. R928028899

Notes
