



Duplex filter with filter element according to DIN 24550

- ▶ Size according to **DIN 24550**: 0040 to 0400
- ▶ Additional sizes: 0130, 0150
- ▶ Nominal pressure 160 bar [2321 psi]
- ▶ Connection up to 1 1/2"
- ▶ Operating temperature -10 °C to +100 °C [14 °F to 212 °F]

**Type 150LDN0040 to 0400;
150LD0130, 0150**

Features

Duplex filters are used in hydraulic systems for separating solid materials from the fluids and lubricating oils. They are intended for installation into piping and allow for the exchange of the filter element without operational interruption.

They distinguish themselves by the following:

- ▶ Filters for inline installation
- ▶ Special highly efficient filter materials
- ▶ Filtration of very fine particles and high dirt holding capacity across a broad pressure differential range
- ▶ High collapse rating of the filter elements
- ▶ By default equipped with mechanical optical maintenance indicator with memory function
- ▶ Various, optional electronic switching elements, modular design
- ▶ Optional bypass valve integrated in the filter housing
- ▶ Pressure equalization function integrated in the switch-over
- ▶ Optional measuring port

Ordering code

Filter

01	02	03	04	05	06	07	08	09	09	09	09
150LD			-			-	-		-		-

Series

01	Duplex filter 160 bar [2320 psi]	150LD
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Filter element

02	With filter element according to DIN 24550	N
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Size

03	LDN... (Filter element according to DIN 24550)	0040 0063 0100 0160 0250 0400
	LD... (Filter elements according to standard)	0130 0150

Filter rating in μm

04	Nominal Stainless steel wire mesh, cleanable	G10 G25 G40 G60 G100
	Nominal Filter paper, not cleanable	P10 P25
	Absolute (ISO 16889 ; $\beta_x(c) \geq 200$) Non-woven glass fiber media, not cleanable	H3XL H6XL H10XL H20XL

Pressure differential

05	Max. admissible pressure differential of the filter element 30 bar [435 psi], with bypass valve	A00
	Max. admissible pressure differential of the filter element 330 bar [4785 psi], without bypass valve	B00

Maintenance indicator

06	Maintenance indicator, mech./optical, switching pressure 1.5 bar [12.8 psi] – bypass cracking pressure 2.5 bar [36.6 psi]	V1,5
	Maintenance indicator, mech./optical, switching pressure 2.2 bar [32 psi] – bypass cracking pressure 3.5 bar [51 psi]	V2,2
	Maintenance indicator, mech./optical, switching pressure 5.0 bar [72.5 psi] – bypass cracking pressure 7 bar [102 psi]	V5,0

Seal

07	NBR seal	M
	FKM seal	V

Connection

08	Frame size	0040 ... 0100	0130 ... 0150	0160 ... 0400		
	Connection					
	G 1	●			Pipe thread according to ISO 228	R4
	G 1 1/4		●			R5
	G 1 1/2			●		R6
	SAE 12	X			Pipe thread according to SAE J1926	U4
	SAE 1 1/4"		X		SAE flange 3000 psi	S5
	SAE 1 1/2"			X		S6
	● Standard connection X Alternative connection					

Ordering code

Filter

01	02	03	04	05	06	07	08	09	09	09	09
150LD			-			-	-	-	-	-	-

Supplementary information (Multiple specifications possible)

09	Bleed valve instead of bleed screw	E
	Additional threaded couplings, G1/4 top clean and dirt side	M
	Without bypass valve (only possible in connection with filter element version "A00") ¹⁾	NB
	Manufacturer's inspection certificate M according to DIN 55350 T18	Z1

¹⁾ **Attention:** If this option is selected and the maintenance indicator is not observed, the filter element may collapse in case of pressure differentials of more than 30 bar [435 psi].

Order example:

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

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

Preferred types

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

Duplex filter, filter rating 3 µm

Type	Flow in l/min [US gpm] with $\Delta p = 1$ bar [14.5 psi] ¹⁾	filters			
150LDN0040-H3XLA00-V5,0-M-..	25 [6.60]	..R4		..U4	
150LDN0063-H3XLA00-V5,0-M-..	35 [9.25]	..R4		..U4	
150LDN0100-H3XLA00-V5,0-M-..	42 [11.10]	..R4		..U4	
150LD0130-H3XLA00-V5,0-M-..	62 [16.38]	..R5		..S5	
150LD0150-H3XLA00-V5,0-M-..	80 [21.13]	..R5		..S5	
150LDN0160-H3XLA00-V5,0-M-..	85 [22.45]	..R6		..S6	
150LDN0250-H3XLA00-V5,0-M-..	100 [26.42]	..R6		..S6	
150LDN0400-H3XLA00-V5,0-M-..	125 [33.02]	..R6		..S6	

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

Duplex filter, filter rating 6 µm

Type	Flow in l/min [US gpm] with $\Delta p = 1$ bar [14.5 psi] ¹⁾	filters			
150LDN0040-H6XLA00-V5,0-M-..	32 [8.45]	..R4		..U4	
150LDN0063-H6XLA00-V5,0-M-..	39 [10.30]	..R4		..U4	
150LDN0100-H6XLA00-V5,0-M-..	50 [13.20]	..R4		..U4	
150LD0130-H6XLA00-V5,0-M-..	86 [22.71]	..R5		..S5	
150LD0150-H6XLA00-V5,0-M-..	92 [24.30]	..R5		..S5	
150LDN0160-H6XLA00-V5,0-M-..	102 [26.94]	..R6		..S6	
150LDN0250-H6XLA00-V5,0-M-..	110 [29.05]	..R6		..S6	
150LDN0400-H6XLA00-V5,0-M-..	122 [32.22]	..R6		..S6	

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

Duplex filter, filter rating 10 µm

Type	Flow in l/min [US gpm] with $\Delta p = 1$ bar [14.5 psi] ¹⁾	filters			
150LDN0040-H10XLA00-V5,0-M-..	33 [8.72]	..R4		..U4	
150LDN0063-H10XLA00-V5,0-M-..	41 [10.83]	..R4		..U4	
150LDN0100-H10XLA00-V5,0-M-..	53 [14.00]	..R4		..U4	
150LD0130-H10XLA00-V5,0-M-..	93 [24.56]	..R5		..S5	
150LD0150-H10XLA00-V5,0-M-..	105 [27.73]	..R5		..S5	
150LDN0160-H10XLA00-V5,0-M-..	112 [29.59]	..R6		..S6	
150LDN0250-H10XLA00-V5,0-M-..	125 [33.02]	..R6		..S6	
150LDN0400-H10XLA00-V5,0-M-..	135 [35.66]	..R6		..S6	

Ordering code

Accessories

(dimensions in mm [inch])

Electronic switching element for maintenance indicators

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 plug-in connector, 2-pole, design A according to EN-175301-803	EN175301-803

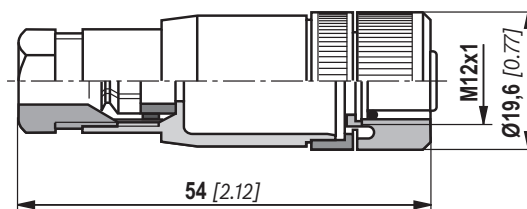
Material numbers of the electronic switching elements

Type	Signal	Switching points	Connector	LED
WE-1SP-M12x1	Changeover	1	M12x1	No
WE-2SP-M12x1	Normally open (at 75 %) / normally closed contact (at 100 %)	2		3 pieces
WE-2SPSU-M12x1				
WE-1SP-EN175301-803	Normally closed contact	1	EN 175301-803	No

Mating connectors according to IEC 60947-5-2

For electronic switching element with round plug-in connection M12x1

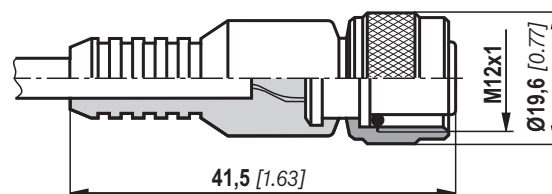
Mating connector suitable for K24 4-pole, M12x1
with screw connection, cable gland Pg9.



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



For more round plug-in connections and technical data refer to data sheet.

Order example:

Duplex filter with mechanical optical maintenance indicator for $p_{nom.} = 160 \text{ bar}$ [2320 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.

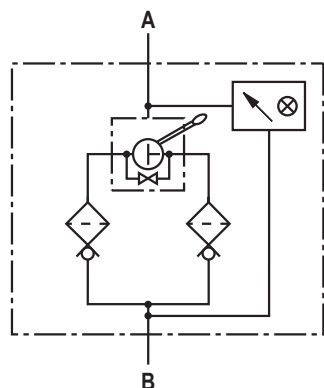
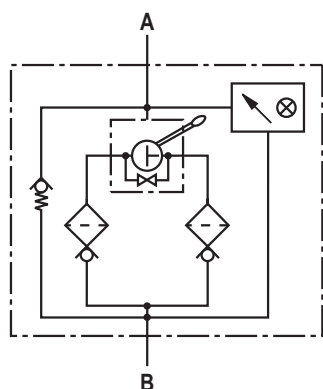
Filter with mech. optical maintenance indicator: 150LDN0160-H3XLA00-V2,2-M-R6

Electr. switching element: WE-1SP-M12x1

Mating connector: Mating connector suitable for K24 4-pole, M12x1
with screw connection, cable gland Pg9.

Symbols

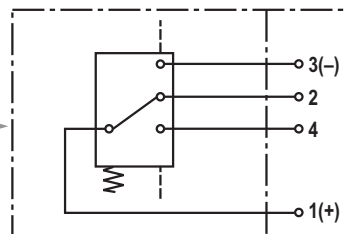
Duplex filter with bypass and mechanical indicator



Duplex filter without bypass and with mechanical indicator

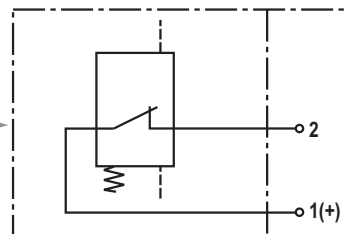
**Electronic switching element
for maintenance indicator**

Switching element Connector



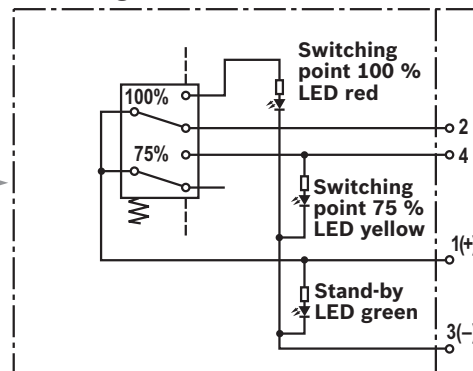
WE-1SP-M12x1

Switching element Connector



WE-1SP-EN175301-803

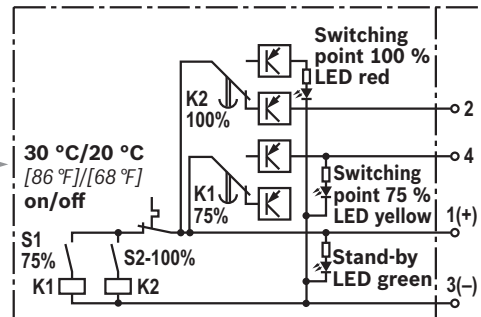
Switching element Connector



WE-2SP-M12x1

Circuit diagram drawn in plugged condition (operating state)

Switching element Connector



WE-2SPSU-M12x1

Circuit diagram drawn in plugged condition at temperature > 30 °C [86°F] (operating state)

Function, section

The 150LD(N) duplex filter is suitable for direct installation into pressure lines. It is installed upstream of components to be protected. Any use in the suction area is not admissible. It basically consists of a filter head (1) with switch-over fitting (6) and integrated pressure equalization function, two screwable filter bowls (2), two filter elements (3) as well as a mechanical optical maintenance indicator (4). In case of filters with low-collapse filter elements (= code letter pressure differential A), there is also an integrated bypass valve (11).

Via the inlet, the fluid reaches the filter element (3) where it is cleaned. The dirt particles filtered out collect in the filter element (3). Via the outlet, the filtered 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 quantity - can be securely absorbed. For sizes 0160 and larger, the filter bowl is equipped with a drain plug (7).

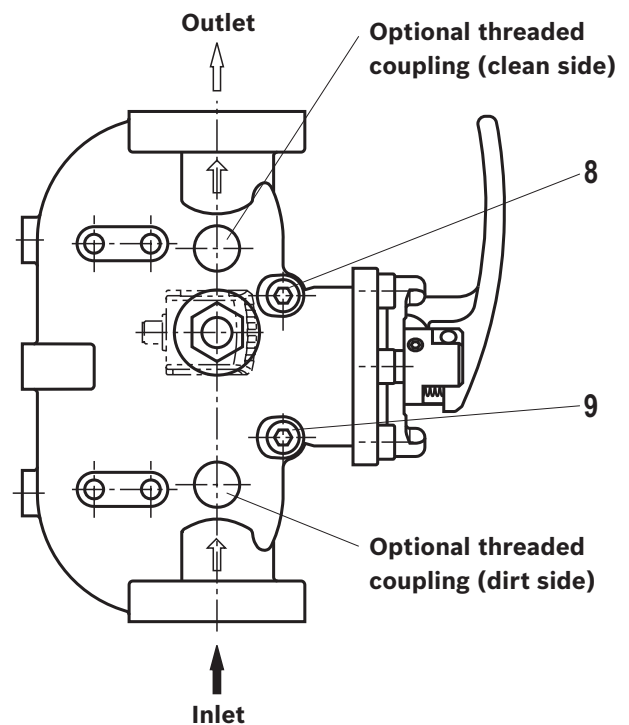
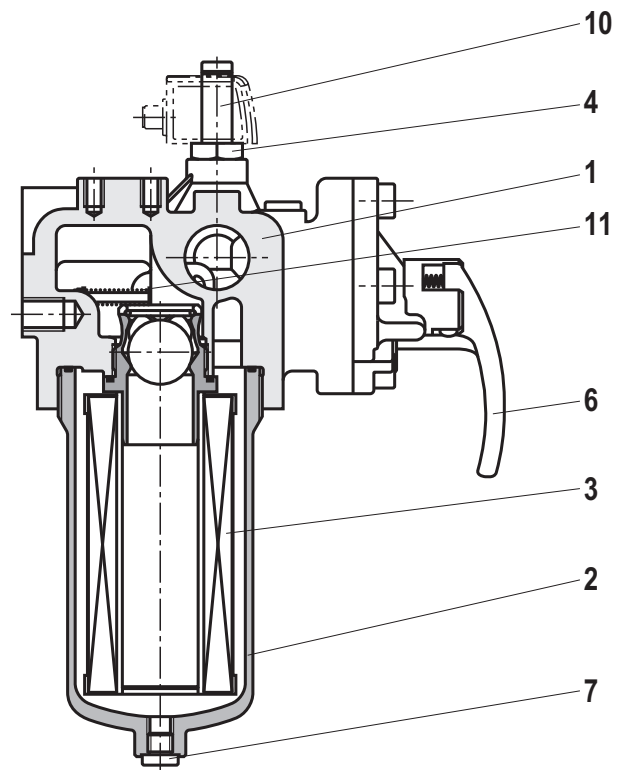
Via the bleed screws and/or the optional bleed valves - amending information E - (8, 9), the filter side to be maintained can be bled.

Measuring ports in the form of threaded couplings on clean and dirt side are available in the type key under the amending information "M".

Only then will the filter head be drilled accordingly.

By default, the filter is equipped with mechanical optical maintenance indicator (4). The electronic switching element (10) which has to be ordered separately is attached to the mechanical optical maintenance indicator (4) and held by means of a locking ring.

The electronic switching elements with 1 or 2 switching points are connected via a mating connector according to IEC-60947-5-2 or via a cable connection according to EN17301-803.



Type 150LDN0160

WARNING!

If the maintenance indicator is ignored when an element change is required, there is the possibility the filter will go into bypass and contaminated oil will pass to the clean side of the filter outlet. Therefore the filtration effectiveness is no longer guaranteed.

Technical data

(For applications outside these parameters, please consult us!)

general						
Weight		Size	0040	0063	0100	0130
		kg [lbs]	7.4 [16.3]	8.5 [18.7]	10.3 [22.7]	13.9 [30.6]
		Size	0150	0160	0250	0400
		kg [lbs]	17.3 [38.1]	21.6 [47.6]	23.4 [51.6]	26.2 [57.7]
Volume		Size	0040	0063	0100	0130
		l	2 x 0.35	2 x 0.45	2 x 0.7	2 x 0.82
		[US gal]	2 x [0.09]	2 x [0.12]	2 x [0.18]	2 x [0.22]
		Size	0150	0160	0250	0400
		l	2 x 0.98	2 x 1.25	2 x 1.95	2 x 2.9
		[US gal]	2 x [0.26]	2 x [0.33]	2 x [0.51]	2 x [0.77]
Installation position			Vertical			
Ambient temperature range			°C [°F] –10 ... +100 [14... +212] (shortly up to –30 [–22])			
Material	– Filter head		Ductile Iron			
	– Filter bowl		Steel			
	– Bypass valve		Aluminum / steel / POM			
	– Seals		NBR or FKM			
	– Optical maintenance indicator	V1,5; 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 ... +100 [+14... +212]			
Minimum conductivity of the medium		pS/m	300			
Fatigue strength according to ISO 10771		Load cycles	> 10 ⁶ with operating pressure			
Type of pressure measurement of the maintenance indicator			Pressure differential			
Assignment: Response pressure of the maintenance indicator/Cracking pressure of the bypass valve			Response pressure of the maintenance indicator		Cracking pressure of the bypass valve	
			bar [psi]			
			1.5 ± 0.2 [21.8 ± 2.9]		2.5 ± 0.25 [36.3 ± 3.6]	
			2.2 ± 0.3 [31.9 ± 4.4]		3.5 ± 0.35 [50.8 ± 5.1]	
			5.0 ± 0.5 [72.5 ± 7.3]		7.0 ± 0.5 [101.5 ± 7.3]	
Filtration direction			From the outside to the inside			

Technical data

(For applications outside these parameters, please consult us!)

electric (electronic switching element)						
Electrical connection		Round plug-in connection M12x1, 4-pole			Standard connection EN 175301-803	
		Version	WE-1SP-M12x1	WE-2SP-M12x1	WE-2SPSU-M12x1	WE-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 interconnection 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 ... +85 [–13 ... +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]		

Filter element				
Non-woven glass fiber media 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]
Particle separation	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	$\beta_{3(c)} \geq 200$		13/10/8 ... 17/13/10
Admissible pressure differential	A	bar [psi]	30 [435]	
	B	bar [psi]	330 [4785]	

Compatibility with hydraulic fluids

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oil		HLP	NBR	DIN 51524
Bio-degradable	– insoluble in water	HETG	NBR	VDMA 24568
		HEES	FKM	
	– soluble in water	HEPG	FKM	VDMA 24568
Flame-resistant	– water-free	HFDU, HFDR	FKM	VDMA 24317
		HFAS	NBR	DIN 24320
	– containing water	HFAE	NBR	
		HFC	NBR	VDMA 24317



Important information on hydraulic fluids!

- For more information and data on the use of other hydraulic fluids, please refer to data sheet or contact us.
- **Flame-resistant - containing water:** Due to possible chemical reactions with materials or surface coatings of machine and system components, the service life with these hydraulic fluids may be less than expected. Filter materials made of filter paper

P... (cellulose) may not be used, filter elements with filter materials made of glass fiber (HydroClean H...XL or wire mesh G) have to be used instead.

- **Bio-degradable:** If filter materials made of filter paper are used, the filter life may be shorter than expected due to material incompatibility and swelling.

Characteristic curves

(measured with mineral oil HLP46 according to DIN 51524 at $T = 40\text{ }^{\circ}\text{C}$ [$104\text{ }^{\circ}\text{F}$])

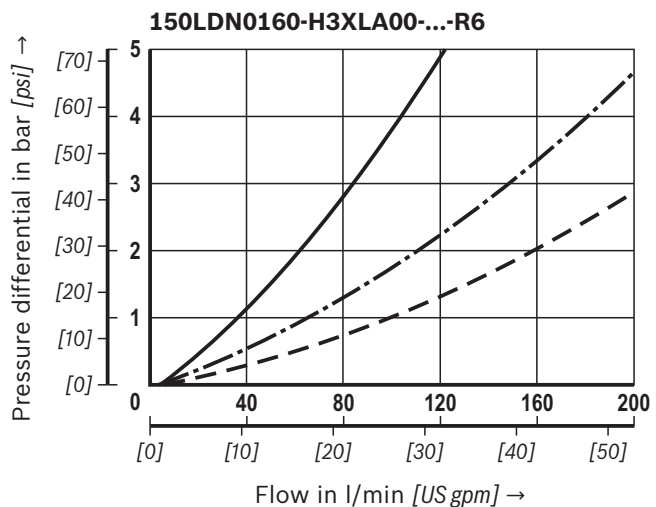
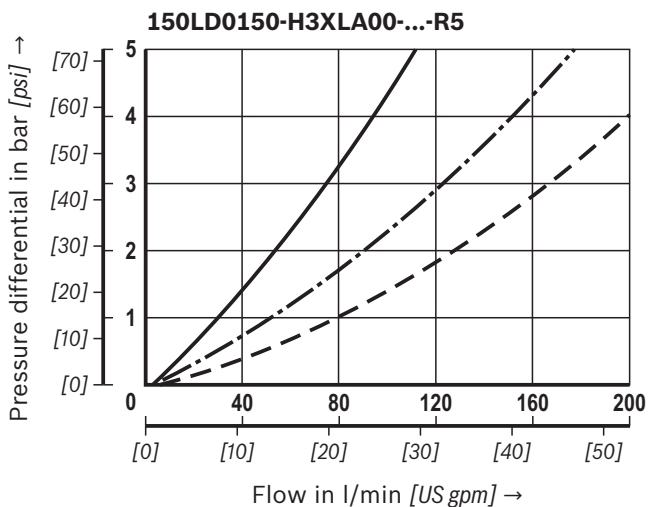
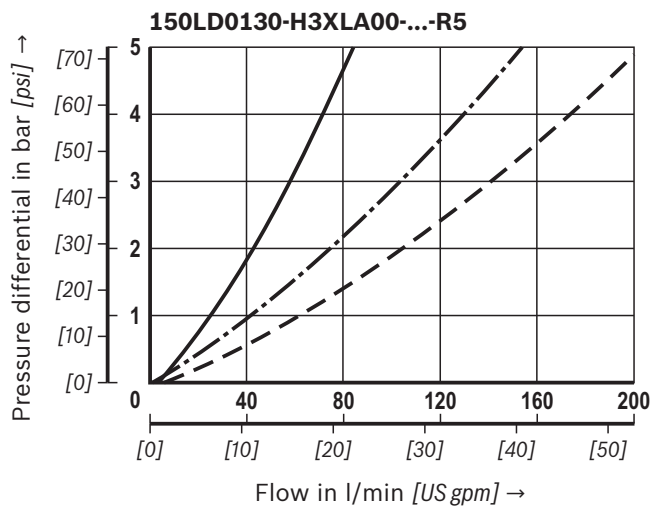
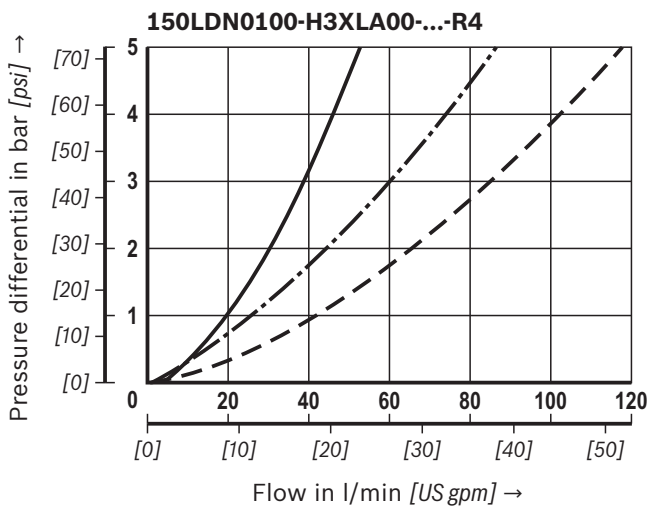
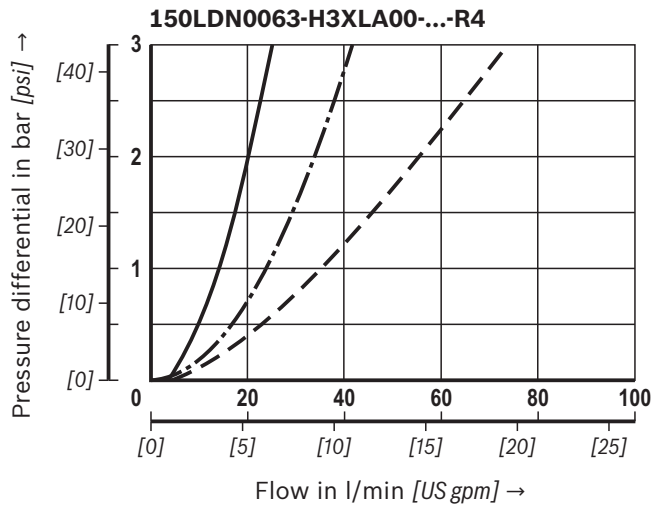
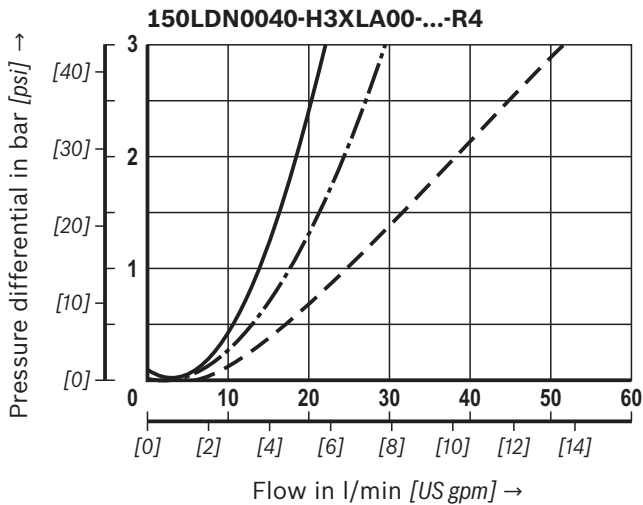
H3XL

Spec. weight: $< 0.9\text{ kg/dm}^3$

Δp -Q characteristic curves for complete filters

recommended initial Δp for design = 0.8 bar [11.6 psi]

Oil viscosity: $\begin{array}{l} \text{—} \quad 140\text{ mm}^2/\text{s} \quad [649\text{ SUS}] \\ \text{— · —} \quad 68\text{ mm}^2/\text{s} \quad [315\text{ SUS}] \\ \text{---} \quad 30\text{ mm}^2/\text{s} \quad [143\text{ SUS}] \end{array}$



Characteristic curves

(measured with mineral oil HLP46 according to DIN 51524 at $T = 40\text{ }^{\circ}\text{C}$ [$104\text{ }^{\circ}\text{F}$])

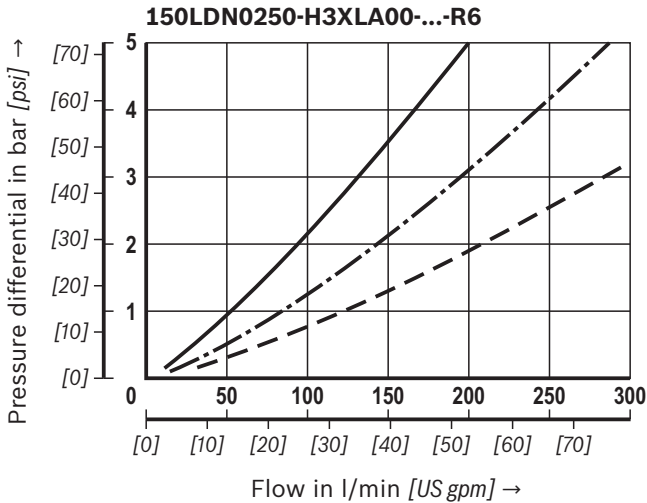
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Δp -Q characteristic curves for complete filters

recommended initial Δp for design = 0.8 bar [11.6 psi]

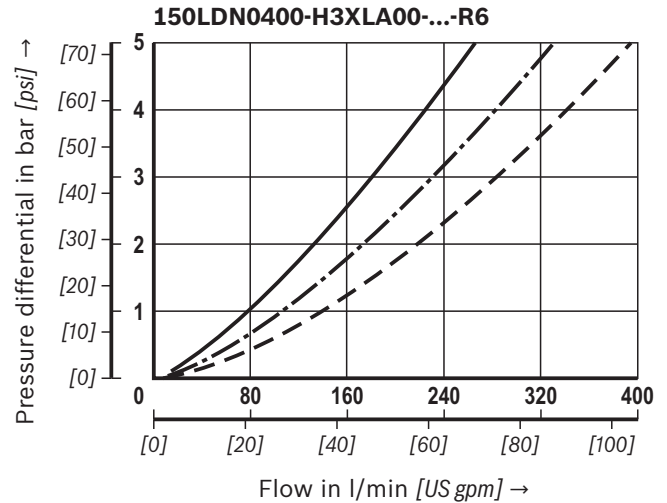
H3XL; H10XL

H3XL

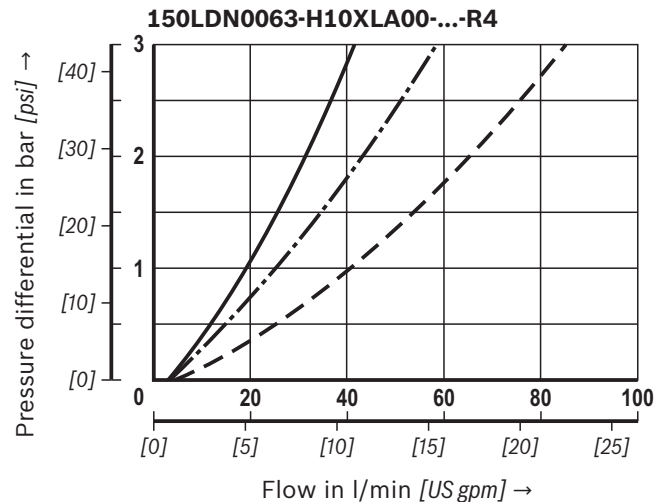
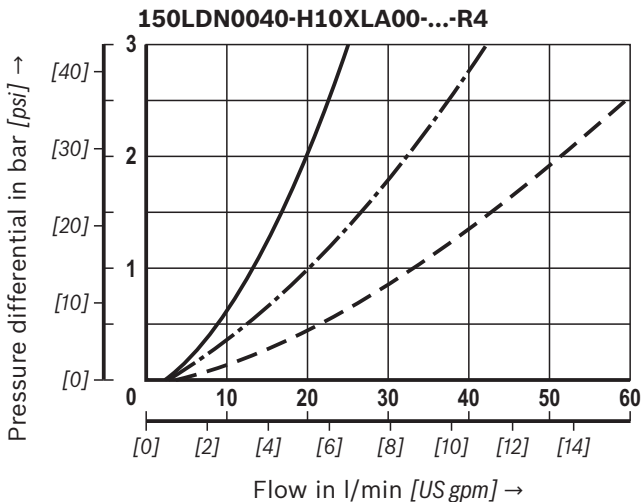


Oil viscosity:

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



H10XL



Characteristic curves

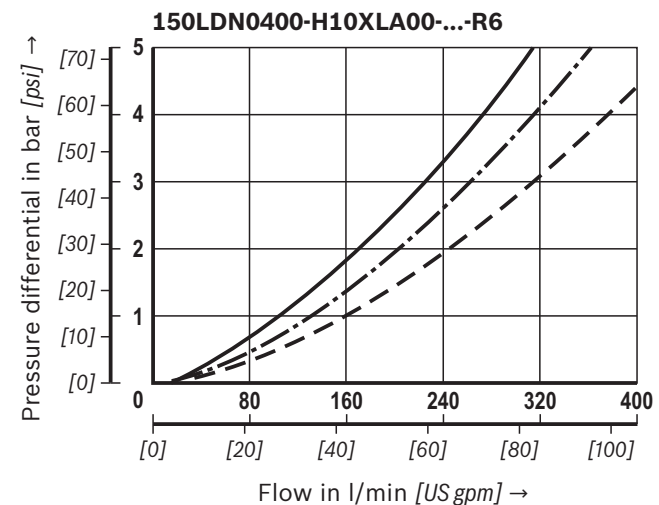
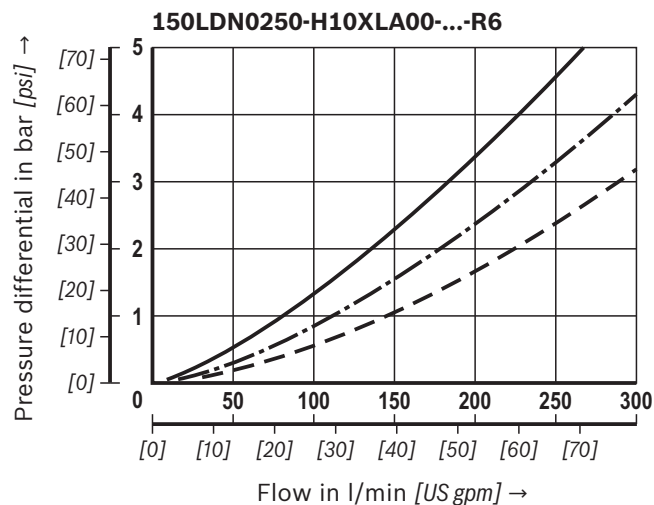
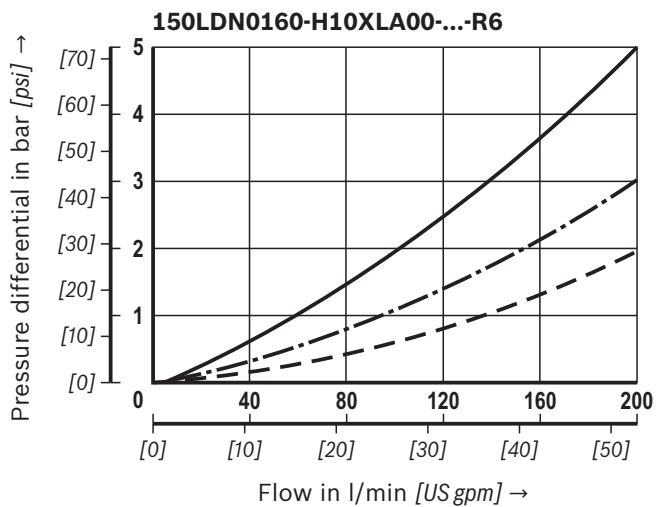
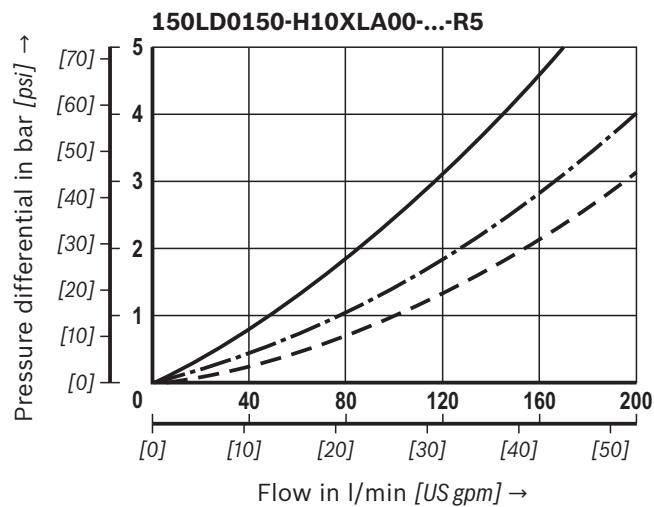
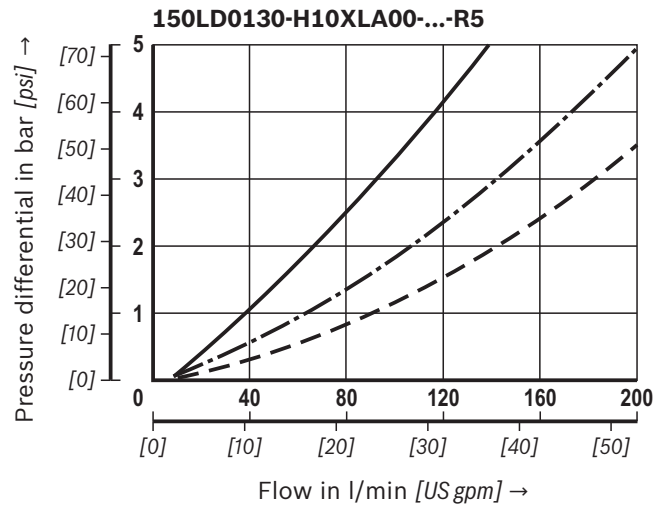
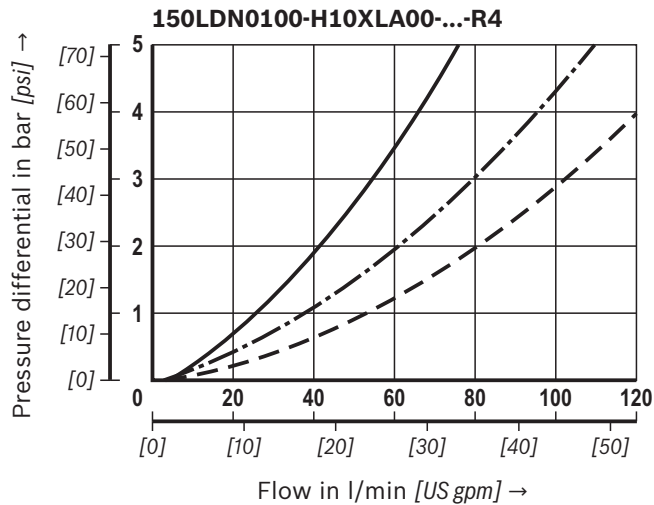
(measured with mineral oil HLP46 according to DIN 51524 at $T = 40\text{ }^{\circ}\text{C}$ [$104\text{ }^{\circ}\text{F}$])

Spec. weight: $< 0.9\text{ kg/dm}^3$

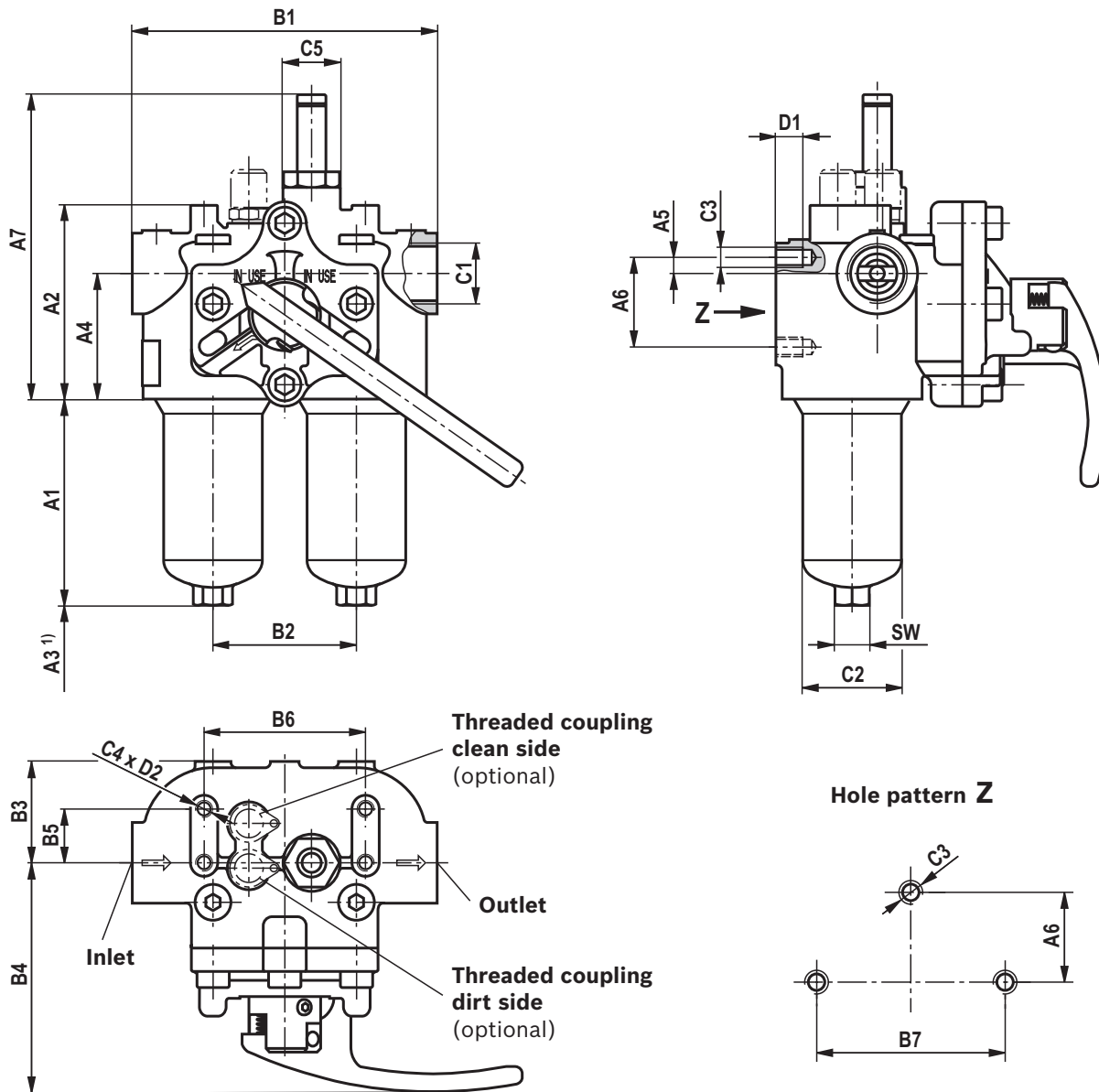
Δp -Q characteristic curves for complete filters

recommended initial Δp for design = 0.8 bar [11.6 psi]

Oil viscosity:
 — 140 mm²/s [649 SUS]
 - · - 68 mm²/s [315 SUS]
 - - - 30 mm²/s [143 SUS]



Dimensions: Size 0040 ... size 0100
 (dimensions in mm [inch])

150LDN0040-0100


¹⁾ Servicing height for filter element exchange

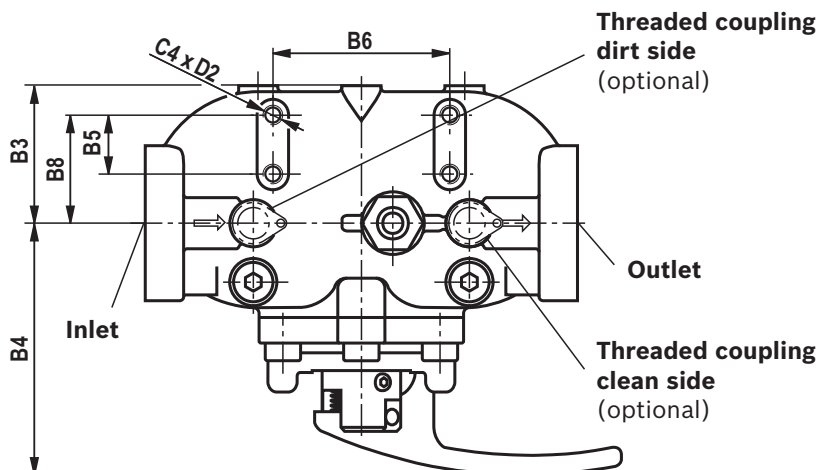
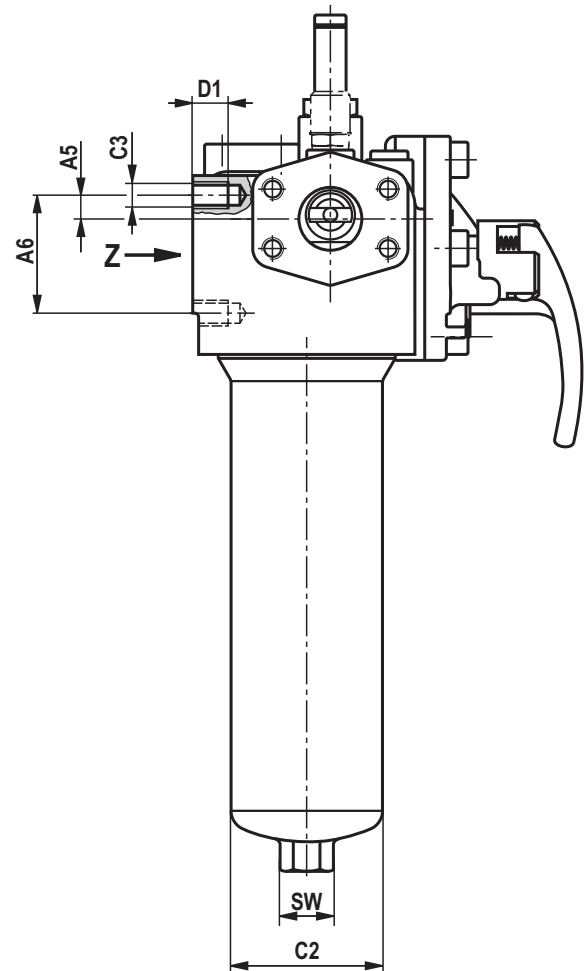
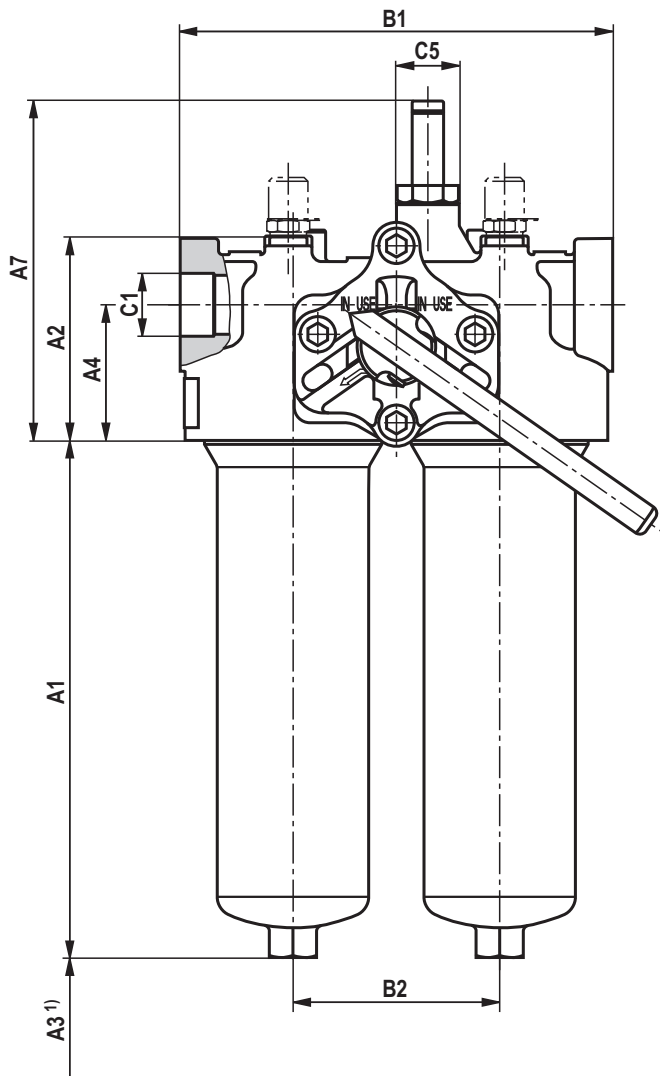
Filter housing for filter elements in accordance with DIN 24550

Type	A1	A2	A3 ¹⁾	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6
150LDN0040	115 [4.53]	108 [4.25]	80 [3.15]	70 [2.76]	9 [0.35]	50 [1.97]	170 [6.69]	170 [6.69]	80 [3.15]	56.5 [2.22]	127 [5.00]	30 [1.18]	90 [3.54]
150LDN0063	179 [7.05]												
150LDN0100	269 [10.59]												

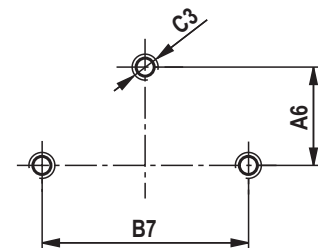
Type	B7	C1 connection			ØC2	C3	C4	ØC5	D1	D2	SW
		R standard	U (SAEJ1926)	S (SAE flange 3000 psi)							
150LDN0040	80 [3.15]	G 1	SAE 12 1 1/16-12UN-2B	-	57 [2.24]	M10x1.5	M8x1.25	32 [1.26]	15 [0.59]	15 [0.59]	19 [0.75]
150LDN0063											
150LDN0100											

Dimensions: Size 0130 ... size 0400
 (dimensions in mm [inch])

150LD(N)0130-0400



Hole pattern Z



¹⁾ Servicing height for filter element exchange

Dimensions: Size 0130 ... size 0400

(dimensions in mm [inch])

Filter housing for filter elements according to DIN 24550 and according to standard

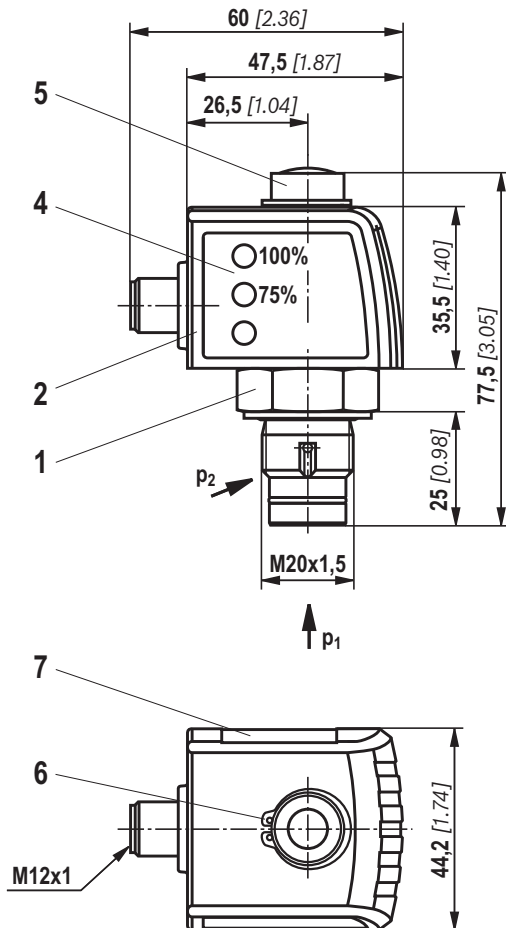
Type	A1	A2	A3 ¹⁾	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6
150LD0130	213 [8.39]	99 [3.90]	140 [5.51]	69 [2.72]	12 [0.47]	50 [1.97]	173 [6.81]	220 [8.66]	105 [4.13]	70 [2.76]	128 [5.04]	30 [1.18]	90 [3.54]
150LD0150	263 [10.35]												
150LDN0160	184 [7.24]	115 [4.53]		80 [3.15]	25 [0.98]	55 [2.17]	184 [7.24]	270 [10.63]	134 [5.28]	103 [4.06]	152 [5.98]		130 [5.12]
150LDN0250	274 [10.79]												
150LDN0400	425 [16.73]												

Type	B7	B8	C1 connection			ØC2	C3	C4	ØC5	D1	D2	SW
			R standard	U (SAEJ1926)	S (SAE flange 3000 psi)							
150LD0130	105	65 [2.56]	G 1 1/4	SAE12 15/16-12UN-2B	SAE 1 1/4"	77 [3.03]	M12	M8	32 [1.26]	18	12	24
150LD0150	[4.13]									[0.71]	[0.47]	[0.94]
150LDN0160	134 [5.28]		G 1 1/2	SAE20 15/8-12UN-2B	SAE 1 1/2"	98 [3.86]	M16	M10		22	15	27
150LDN0250										[0.87]	[0.59]	[1.06]
150LDN0400												

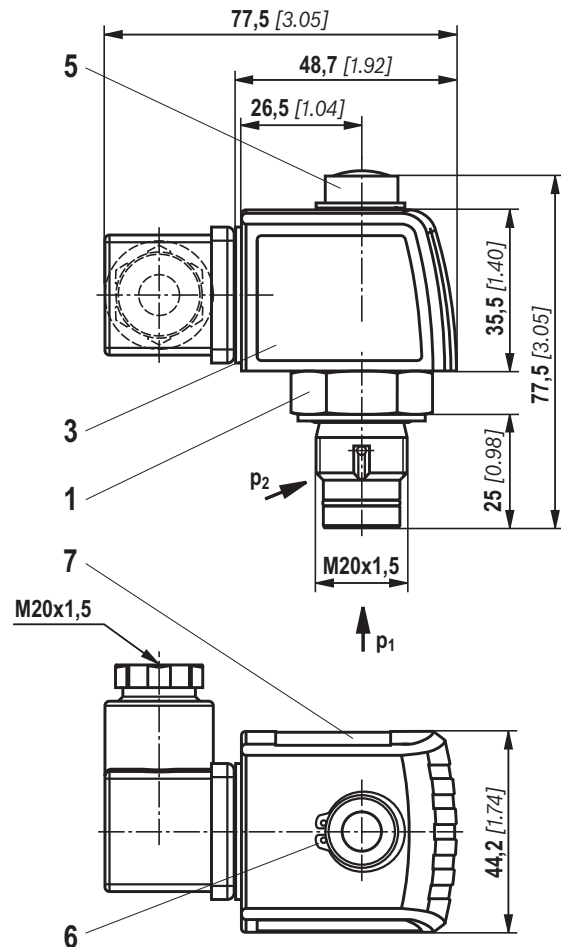
Maintenance indicator

(dimensions in mm [inch])

**Pressure differential indicator
with mounted switching element M12x1**



**Pressure differential indicator
with assembled switching element EN-175301-803**



- 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°);
round plug-in connection M12x1, 4-pole
- 3 Switching element with locking ring for
electrical maintenance indicator (rotatable by 360°);
rectangular plug-in connection EN175301-803
- 4 Housing with three LEDs: 24 V =
Green: Stand-by
Yellow: Switching point 75 %
Red: Switching point 100 %
- 5 Visual indicator with memory function
- 6 Locking ring DIN 471-16x1,
- 7 Name plate

Notices:

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

Ordering code Spare parts

Filter element

01	02	03	04	05	06
2.			-	-	0

Filter element

01	Design	2.
----	--------	----

Size

02	LDN... (Filter element according to DIN 24550)	0040 0063 0100 0160 0250 0400
	LD... (Filter elements according to standard)	0130 0150

Filter rating in μm

03	Nominal Stainless steel wire mesh, cleanable	G10 G25 G40 G60 G100
	Nominal Filter paper, not cleanable	P10 P25
	Absolute (ISO 16889 ; $\beta_x(c) \geq 200$) Non-woven glass fiber media, not cleanable	H3XL H6XL H10XL H20XL

Pressure differential

04	Max. admissible pressure differential of the filter element 30 bar [435 psi]	A00
	Max. admissible pressure differential of the filter element 330 bar [4785 psi]	B00

Bypass valve

05	Without bypass valve	0
----	----------------------	---

Seal

06	NBR seal	M
	FKM seal	V

Order example:

2.0100 H3XL-A00-0-M

For detailed information on filter elements please refer to data sheet.

Preferred program replacement filter element

Replacement filter element 3 micron	Replacement filter element 6 micron	Replacement filter element 10 micron
2.0040 H3XL-A00-0-M	2.0040 H6XL-A00-0-M	2.0040 H10XL-A00-0-M
2.0063 H3XL-A00-0-M	2.0063 H6XL-A00-0-M	2.0063 H10XL-A00-0-M
2.0100 H3XL-A00-0-M	2.0100 H6XL-A00-0-M	2.0100 H10XL-A00-0-M
2.0130 H3XL-A00-0-M	2.0130 H6XL-A00-0-M	2.0130 H10XL-A00-0-M
2.0150 H3XL-A00-0-M	2.0150 H6XL-A00-0-M	2.0150 H10XL-A00-0-M
2.0160 H3XL-A00-0-M	2.0160 H6XL-A00-0-M	2.0160 H10XL-A00-0-M
2.0250 H3XL-A00-0-M	2.0250 H6XL-A00-0-M	2.0250 H10XL-A00-0-M
2.0400 H3XL-A00-0-M	2.0400 H6XL-A00-0-M	2.0400 H10XL-A00-0-M

Ordering code

Spare parts

Mechanical optical maintenance indicator

01	02	03	04	05	06
W	O	-	D01	-	-

01	Maintenance indicator	W
02	Mechanical visual indicator	O
03	Design pressure differential M20x1.5	D01

Switching pressure

04	1.5 bar [21.8 psi]	1,5
	2.2 bar [31.9 psi]	2,2
	5.0 bar [72.5 psi]	5,0

Seal

05	NBR seal	M
	FKM seal	V

Max. nominal pressure

06	Switching pressure 1.5 bar [21.8 psi], 160 bar [2321 psi]	160
	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

Mechanical optical maintenance indicator

Description
WO-D01-1,5-M-160
WO-D01-2,2-M-160
WO-D01-5,0-M-450
WO-D01-1,5-V-160
WO-D01-2,2-V-160
WO-D01-5,0-V-450

Ordering code

Spare parts

Seal kit

01	02	03	04
D	150LD		-

01	Seal kit	D
02	Series	150LD

Size

03	0040-0100	N0040-0100
	0130-0150	0130-0150
	0160-0400	N0160-0400

Seal

04	NBR seal	M
	FKM seal	V

Seal kit

Description
D150LDN0040-0100-M
D150LD0130-0150-M
D150LDN0160-0400-M
D150LDN0040-0100-V
D150LD0130-0150-V
D150LDN0160-0400-V

Assembly, commissioning, maintenance

Assembly

The max. operating pressure of the system must not exceed the max. admissible operating pressure of the filter (see name plate).

During assembly of the filter (see also chapter "Tightening torque"), the flow direction (direction arrows) and the required servicing height of the filter element (see chapter "Dimensions") are to be considered.

Proper function is only guaranteed in the installation with the filter bowl vertically downwards. The maintenance indicator must be arranged so it is easily viewed in operation.

Remove the plastic plugs in the filter inlet and outlet.

Ensure that the system is assembled without tension stress.

The optional electronic maintenance indicator is connected via the electronic 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.

Commissioning

Bring the switching lever into central position in order to fill both filter sides.

Start the system.

Bleed filter by opening the bleed screws or bleed valves, close when operating liquid begins to escape.

Switch the filter into the operating position; to do so, switch the switching lever to one of the two end positions.

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

Maintenance

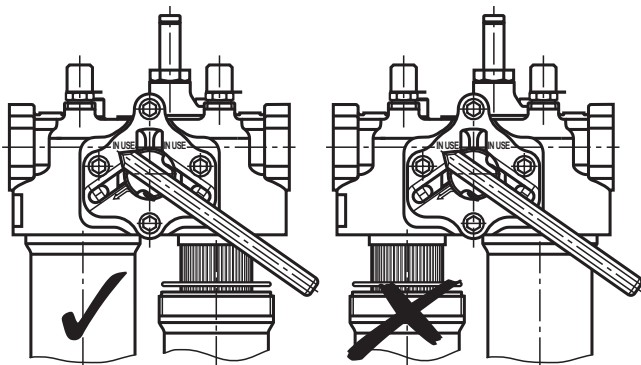
- ▶ If at operating temperature, the red indicator pin reaches out of the mechanical optical maintenance indicator and/or if the switching process in the electronic switching element is triggered, the filter element is contaminated and needs to be replaced or cleaned respectively.
- ▶ The material number of the corresponding replacement filter element is indicated on the name plate of the complete filter. It must correspond to the material number on the filter element.
- ▶ The switch-over lever is on the filter side that is out of order. Observe the switching symbol on the switching lever and/or the switch-over.
- ▶ For pressure equalization and unlocking, pull the switch-over lever and switch to the opposite end position.
- ▶ Open the bleed screw or bleed valve at the decommissioned filter side in order to reduce the pressure.
- ▶ Via the drain screw (from size 0160 and larger), the oil on the dirt side can be drained.
- ▶ Unscrew the filter bowl – see figure assembly aid.
- ▶ Remove the filter element from the spigot by rotating it slightly.
- ▶ Clean the filter components, if necessary.
- ▶ Check the seals at the filter bowl for damage and replace them, if necessary.
For suitable seal kits refer to chapter "Spare parts".
- ▶ Filter elements made of wire mesh can be cleaned.
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 150 % of the value of a brand-new filter element, the filter element made of wire mesh (G...) also needs to be replaced. For detailed cleaning instructions refer to data sheet.
- ▶ Install the new or cleaned filter element on the spigot again by slightly rotating it.
- ▶ The filter is to be assembled in reverse order.
- ▶ The torque specifications ("Tightening torques" chapter) are to be observed.
- ▶ To fill the maintained filter side, pull the switch-over lever.
- ▶ The filter is bled via the bleed screw or the bleed valve which is still open.
- ▶ After fluid escapes, close the bleed screw or the bleed valve again.
- ▶ Make sure that the switch-over lever is engaged.

Assembly, commissioning, maintenance

Assembly aid

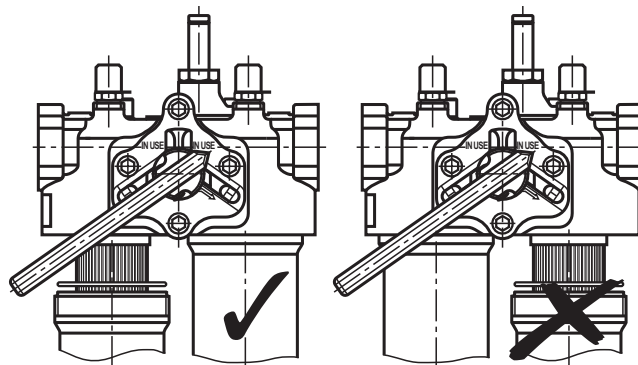
Correct

Wrong



Correct

Wrong



WARNINGS!

- ▶ Assemble and disassemble only with depressurized system! For the filter element exchange refer to "Maintenance".
- ▶ Tank is pressurized!
- ▶ Maintenance only by trained specialists.
- ▶ Remove the filter bowl only if it is not under pressure!
- ▶ Do not exchange the maintenance indicator while the filter is under pressure!
- ▶ Do not operate the switching lever during the filter element exchange.
- ▶ When disassembling the filter, ensure that the downstream side is depressurized via the system.
- ▶ Warranty is only applicable when using genuine spare parts!
- ▶ Warranty becomes void if the delivered item is changed by the ordering party or third parties or improperly mounted, installed, maintained, repaired, used or exposed to environmental condition that do not comply with the installation conditions.

Tightening torques

(dimensions in mm [inch])

Fastening top

Series 150 ...	LDN0040	LDN0063	LDN0100	LD0130	LD0150	LDN0160	LDN0250	LDN0400
Screw/tightening torque with $\mu_{\text{total}} = 0.14$	M8/10.5 Nm $\pm 10\%$ [8 lb-ft +/- 10%]					M10/21 Nm $\pm 10\%$ [16 lb-ft +/- 10%]		
Quantity	4							
Recommended property class of screw	8.8							
Minimum screw-in depth	10 mm + 4 mm			10 mm + 1 mm		10 mm + 4 mm		

Fastening back

Series 150 ...	LDN0040	LDN0063	LDN0100	LD0130	LD0150	LDN0160	LDN0250	LDN0400
Screw/tightening torque with $\mu_{\text{total}} = 0.14$	M10/21 Nm $\pm 10\%$ [16 lb-ft +/- 10%]			M12/37 Nm $\pm 10\%$ [27 lb-ft +/- 10%]		M16/90 Nm $\pm 10\%$ [66 lb-ft +/- 10%]		
Quantity	3							
Recommended property class of screw	8.8							
Minimum screw-in depth	10 mm + 4 mm			14 mm + 2 mm		19 mm + 2 mm		

Filter bowl and maintenance indicator

Series 150 ...	LDN0040	LDN0063	LDN0100	LD0130	LD0150	LDN0160	LDN0250	LDN0400
Tightening torque filter bowl	50 Nm + 10 Nm [37 lb-ft +/- 10%]							
Tightening torque maintenance indicator	50 Nm [37 lb-ft max]							
Tightening torque cubic connector screw switching element EN-175301-803	M3/0.5 Nm [0.4 lb-ft +/- 10%]							

Directives and standardization

Classification according to the Pressure Equipment Directive

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, based on 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 not equipment or components in the sense of directive 94/9/EC and are not provided with a CE mark. It has been proven with the ignition risk analysis that these inline filters do not have own ignition sources acc. to DIN EN 13463-1:2009.

According to DIN EN 60079-11:2012, the electronic maintenance indicators WE-1SP-M12x1 and WE-1SP-EN175301-803 are simple, electronic operating equipment not having an own voltage source. This simple, electronic operating equipment may - according to DIN EN 60079-14:2008 - in intrinsically

safe electric circuits (Ex ib) be used in systems without marking and certification.

The duplex filters and the electronic maintenance indicators described here can be used for the following explosive areas:

	Zone suitability	
Gas	1	2
Dust	21	22

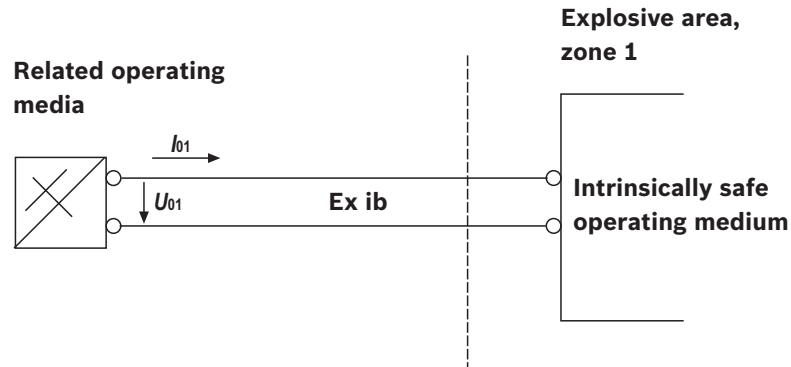
Complete filter with mech./opt. maintenance indicator				
Use /assignment			Gas 2G	Dust 2D
Assignment			Ex II 2G c IIB TX	Ex II 2D c IIB TX
Conductivity of the medium	pS/m	Min	300	
Dust accumulation		Max	–	0.5 mm

Electronic switching element in the intrinsically safe electric circuit					
Use /assignment			Gas 2G		Dust 2D
Assignment			Ex II 2G Ex ib IIB T4 Gb		Ex II 2D Ex ib IIIC T100 °C Db
Adm. intrinsically safe electric circuits			Ex ib IIC, Ex ic IIC		Ex ib IIIC
Technical data			Values only for intrinsically safe electric circuit		
Switching voltage		Ui	Max	150 V AC/DC	
Switching current		Ii	Max	1.0 A	
Switching power		Pi	Max	1.3 W T4 T _{max} 40 °C	750 mW T _{max} 40 °C
			Max	1.0 W T4 T _{max} 80 °C	550 mW T _{max} 100 °C
Surface temperature ¹⁾			Max	–	100 °C
Inner capacity		Ci	Neglectable		
Inner inductivity		Li	Neglectable		
Dust accumulation		Max	–		0.5 mm

¹⁾ The temperature depends on the temperature of the medium in the filter and must not exceed the value specified here.

Directives and standardization

Possible circuit according to DIN EN 60079-14



WARNING!

- ▶ Explosion hazard due to high temperature!
The temperature depends on the temperature of the medium in the hydraulic circuit and must not exceed the value specified here. Measures are to be taken so that in the explosive area, the max. admissible ignition temperature is not exceeded.
- ▶ When using the duplex filters according to in explosive areas, sufficient potential equalization has to be ensured. The filter is preferably to be grounded via the mounting screws. It has to be noted in this connection that paintings and oxidic protective layers are not electrically conductive.
- ▶ Maintenance only by specialists, instruction by the machine end-user acc. to DIRECTIVE 1999/92/EC appendix II, section 1.1.
- ▶ During filter element exchanges, the packaging material is to be removed from the replacement element outside the explosive area.
- ▶ Functional and safety warranty only applicable when using genuine spare parts.