Inline filter with filter element according to DIN 24550

RE 51447/10.11 1/16
Replaces: RE 51400

Type 50LEN0040 to 0400; 50LE0130, 0150

Size **according to DIN 24550**: 0040 to 0400
Additional sizes: 0130, 0150
Nominal pressure 50 bar *[725 psi]*
Port up to G 1 1/2; SAE 24
Operating temperature –10 °C to 100 °C *[14 °F to 212 °F]*

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Features

Inline filters are used in hydraulic systems for separating solid materials from the hydraulic fluids and lubricating oils. They are intended for attachment in pipelines.

They distinguish themselves by the following:

- Adsorption of very fine particles across a broad pressure differential range
- Good chemical resistance of the filter elements
- High collapse resistance of the filter elements (e.g. in case of cold start)
- Filter ratings of 3 µm to 100 µm
- By default equipped with mechanical optical maintenance indicator with memory function
- Flow-optimized design due to 3D computer-supported design.

Ordering code

of the filter

50	LE		–	A00	–	–	–	

Pressure
up to 50 bar *[725 psi]* **= 50**

Inline filter
Single **= LE**

Filter element
not according to DIN 24550 **= no code**
according to DIN 24550 **= N**

Size
LEN… **= 0040 0063 0100 0160 0250 0400**
LE… **= 0130 0150**

Filter rating in µm
nominal
Stainless steel wire mesh, cleanable
G10, G25, G40, G100 **= G…**
absolute (ISO 16889)
Micro glass, not cleanable
H3XL, H6XL, H10XL, H20XL **= H…XL**

Pressure differential
max. admissible pressure differential of the filter element
30 bar *[435 psi]*, with bypass valve **= A00**

Maintenance indicator
Maintenance indicator, mechanical optical
Switching pressure 5.0 bar *[72.5 psi]* **= V5,0**
Switching pressure 2.2 bar *[31.9 psi]* **= V2,2**
Switching pressure 1.5 bar *[21.8 psi]* **= V1,5**

Supplementary information
No code = without supplementary information
– NB = without bypass valve

Port

	Port	Frame size 0040-0100	0130-0150	0160-0400	
R3 =	G 3/4	•			Pipe thread according to ISO 228
R4 =	G 1		•		
R6 =	G 1 1/2			•	
U4 =	SAE 12	x			Pipe thread according to SAE J1926
U9 =	SAE 16		x		
U6 =	SAE 24			x	

• = Standard port
x = Additional connection possibility

Seal
M = NBR seal
V = FKM seal

Order example:
50LEN0100-H3XLA00-V5,0-M-R4

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

of the filter element

2.		–	A00	–	0	–	

Filter element
Design **= 2.**

Size
LEN… **= 0040 0063 0100 0160 0250 0400**
LE… **= 0130 0150**

Filter rating in µm
nominal
Stainless steel wire mesh, cleanable
G10, G25, G40, G100 **= G…**
absolute (ISO 16889)
Micro glass, not cleanable
H3XL, H6XL, H10XL, H20XL **= H…XL**

Pressure differential
max. admissible pressure differential of the filter element
A00 = 30 bar *[435 psi]*

Bypass valve
0 = with filter element always 0

Seal
M = NBR seal
V = FKM seal

Order example:
2.0100 H3XL-A00-0-M

More information on Rexroth filter elements is available in the data sheet 51420

Preferred types

NBR seal, with bypass, flow specifications for 30 mm²/s *[143 SUS]*

Inline filter 50 LE(N), filter rating **3 µm**

Type	Flow in l/min *[gpm]* with Δp = 1 bar *[14.5 psi]*	Material no. Filter				Material no. Replacement element
50LEN0040-H3XLA00-V2,2-M-..	23 *[6.08]*	..R3	**R928048449**	..U4	**R928048452**	**R928006645**
50LEN0063-H3XLA00-V2,2-M-..	30 *[7.93]*	..R3	**R928050995**	..U4	**R928048453**	**R928006699**
50LEN0100-H3XLA00-V2,2-M-..	44 *[11.62]*	..R3	**R928051075**	..U4	**R928048454**	**R928006753**
50LE0130-H3XLA00-V2,2-M-..	74 *[19.55]*	..R4	**R928050770**	..U9	**R928048455**	**R928022274**
50LE0150-H3XLA00-V2,2-M-..	89 *[23.51]*	..R4	**R928050850**	..U9	**R928048456**	**R928022283**
50LEN0160-H3XLA00-V2,2-M-..	132 *[34.87]*	..R6	**R928051152**	..U6	**R928048457**	**R928006807**
50LEN0250-H3XLA00-V2,2-M-..	190 *[50.19]*	..R6	**R928051232**	..U6	**R928048458**	**R928006861**
50LEN0400-H3XLA00-V2,2-M-..	250 *[66.04]*	..R6	**R928051312**	..U6	**R928048459**	**R928006915**

Inline filter 50 LE(N), filter rating **10 µm**

Type	Flow in l/min *[gpm]* with Δp = 1 bar *[14.5 psi]*	Material no. Filter				Material no. Replacement element
50LEN0040-H10XLA00-V2,2-M-..	36 *[9.51]*	..R3	**R928047959**	..U4	**R928048460**	**R928006647**
50LEN0063-H10XLA00-V2,2-M-..	69 *[18.23]*	..R3	**R928050967**	..U4	**R928048461**	**R928006701**
50LEN0100-H10XLA00-V2,2-M-..	75 *[19.81]*	..R3	**R928051047**	..U4	**R928048462**	**R928006755**
50LE0130-H10XLA00-V2,2-M-..	127 *[33.55]*	..R4	**R928050743**	..U9	**R928048463**	**R928022276**
50LE0150-H10XLA00-V2,2-M-..	150 *[39.63]*	..R4	**R928050822**	..U9	**R928048464**	**R928022285**
50LEN0160-H10XLA00-V2,2-M-..	210 *[55.48]*	..R6	**R928051125**	..U6	**R928048465**	**R928006809**
50LEN0250-H10XLA00-V2,2-M-..	260 *[68.68]*	..R6	**R928051204**	..U6	**R928048466**	**R928006863**
50LEN0400-H10XLA00-V2,2-M-..	300 *[79.25]*	..R6	**R928051284**	..U6	**R928048467**	**R928006917**

Ordering code: Electronic switching element for maintenance indicator

WE – – –

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
EN175301-803 = Rectangular plug-in connection, 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

More information on maintenance indicators is available in the data sheet 51450

Order example: Inline filter with mechanical optical maintenance indicator for $p_{Nominal}$ = 50 bar *[725 psi]* with bypass valve, size 0160, with filter element 10 µm and electronic switching element M12x1 with 1 switching point for hydraulic fluid mineral oil HLP according to DIN 51524.

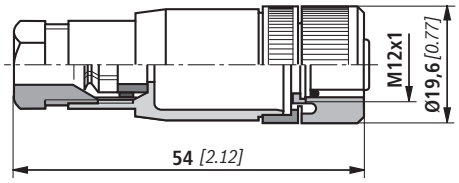
Filter with mech.-opt. maintenance indicator:	**50LEN0160-H10XLA00-V5,0-M-R6**	**Material no. R928051126**
Electr. switching element:	**WE-1SP-M12x1**	**Material no. R928028409**

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

For electronic switching element with round plug-in connection M12x1

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

Material no. R900031155

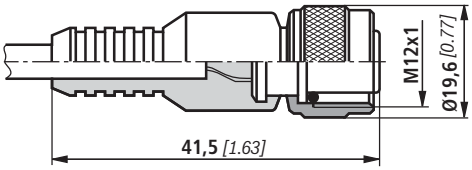


Mating connector suitable for K24-3m 4-pin, M12x1 with potted-in PVC cable, 3 m long.

Line cross-section: 4 x 0.34 mm²

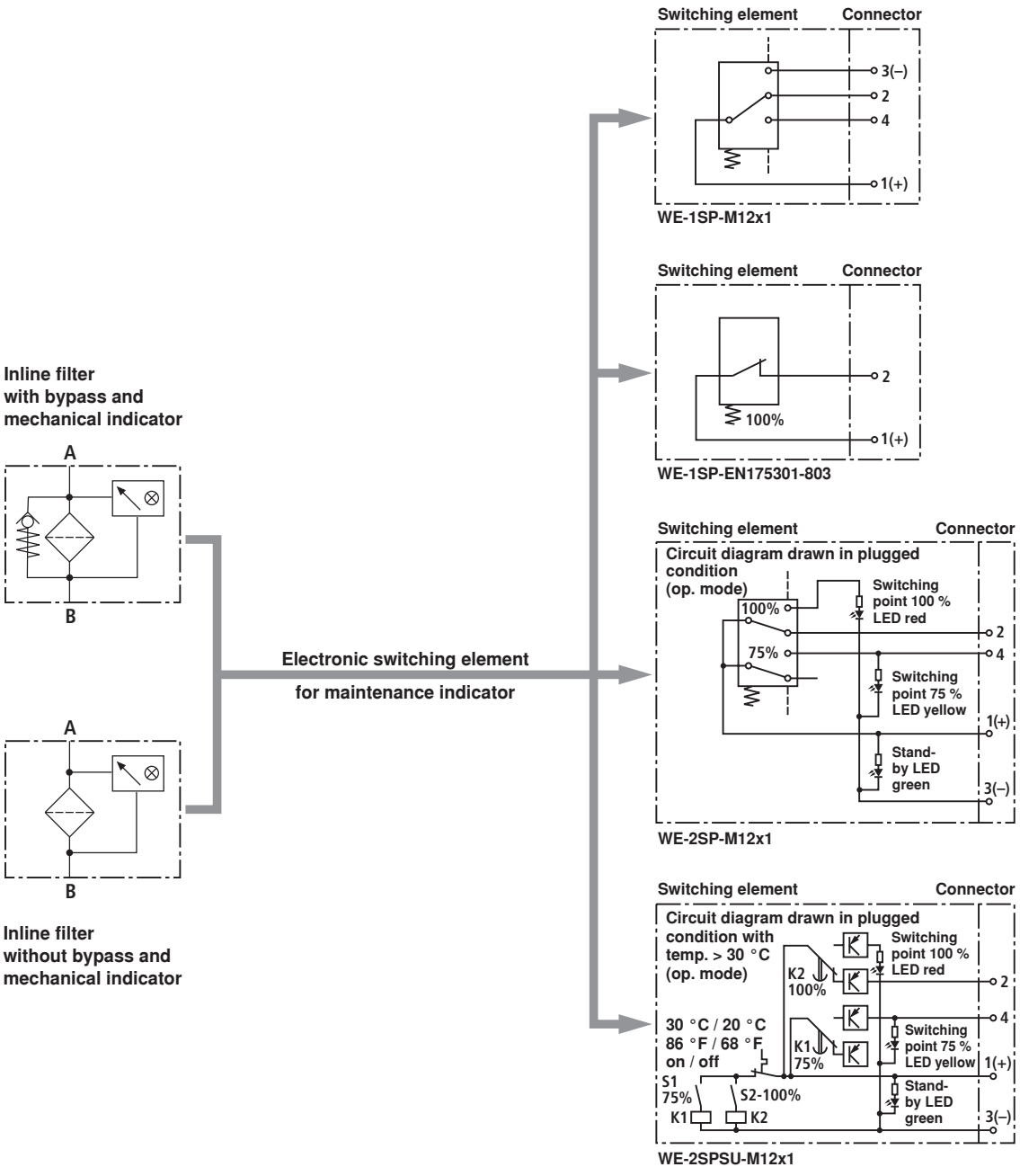
Core marking:
1 Brown
2 White
3 Blue
4 Black

Material no. R900064381



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

Symbols



Function, section

The 50LE(N) inline filters are suitable for direct installation into pressure lines. They are mostly installed upstream open-loop or closed-loop control units to be protected.

They basically consist of filter head (1), a screwable filter bowl (2), filter element (3) as well as mechanical optical maintenance indicator (4). In case of filters with low-pressure-differential-stable filter elements (= code letter pressure differential A), there is also an assembled bypass valve (5).

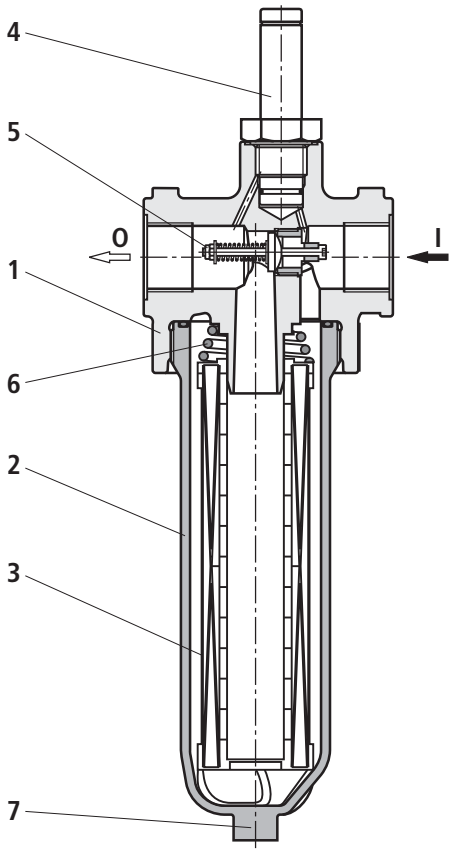
The installed spring (6) prevents possible vibrations of the filter element (3). During disassembly, the contact pressure of the spring (6) holds the filter element in the filter bowl (2).

Via port I, 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 0, 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).

Basically, the filter is equipped with mechanical optical maintenance indicator (4). The electronic maintenance indicator is connected via the electronic switching element with 1 or 2 switching points (see p. 4), 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.



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]*	1.05 *[2.3]*	1.1 *[2.4]*	1.2 *[2.6]*	1.91 *[4.2]*
		Size	**0150**	**0160**	**0250**	**0400**
		kg *[lbs]*	2.06 *[4.5]*	3.1 *[6.8]*	3.3 *[7.3]*	3.8 *[8.4]*
Volume		Size	**0040**	**0063**	**0100**	**0130**
		l *[US gal]*	0.27 *[0.07]*	0.39 *[0.1]*	0.58 *[0.15]*	0.89 *[0.23]*
		Size	**0150**	**0160**	**0250**	**0400**
		l *[US gal]*	1.1 *[0.29]*	1.31 *[0.35]*	1.89 *[0.50]*	2.84 *[0.75]*
Material	Filter head		Aluminum			
	Filter bowl		Aluminum			
	Optical maintenance indicator	V1.5; V2.2	Aluminum			
		V5.0	Brass			
	Electronic switching element		Plastic PA6			

hydraulic

Maximum operating pressure	bar *[psi]*	50 *[725]*	
Hydraulic fluid temperature range	°C *[°F]*	–10 to +100 *[+14 to +212]*	
Minimum conductivity of the medium	pS/m	300	
Fatigue strength according to ISO 10771	Load cycles	> 10^6 with max. 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]*

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

electric (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 inter-connection at 30 °C *[86 °F]*, return switch-ing 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]*			

Filter element

Glass fiber paper H..XL			Single-use element on the basis of inorganic fiber	
			Filtration ratio according to ISO 16889 to Δp = 5 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

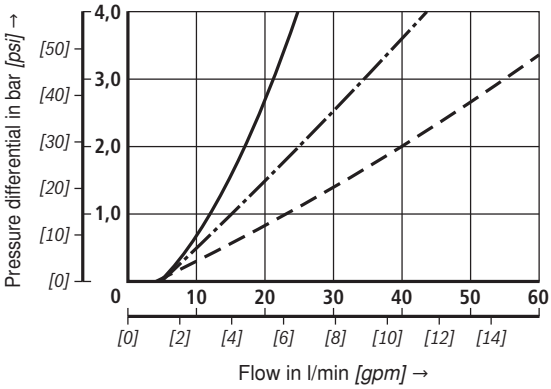
Characteristic curves H3XL

Spec. weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 1 bar *[14.5 psi]*

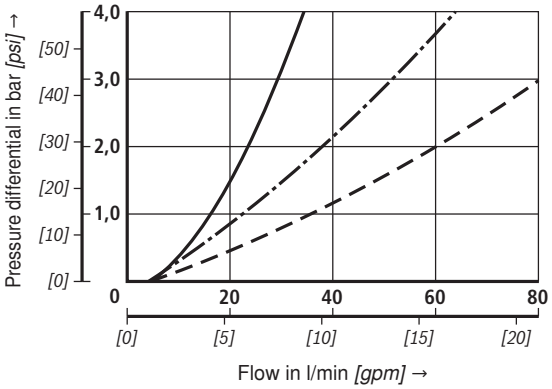
A proper filter design is enabled by our computer program "BRFilterSelect".

Oil viscosity: 140 mm²/s *[649 SUS]*, 68 mm²/s *[315 SUS]*, 30 mm²/s *[143 SUS]*

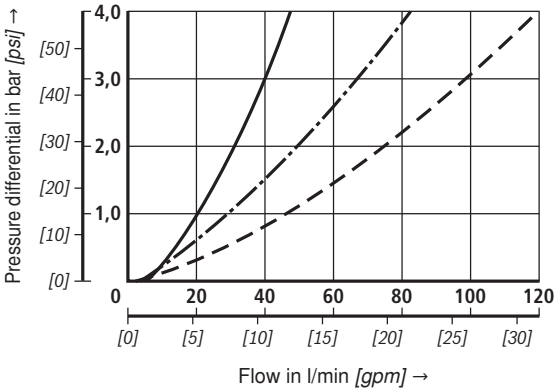
50LEN0040-H3XLA00-V5,0-M-R3



50LEN0063-H3XLA00-V5,0-M-R3



50LEN0100-H3XLA00-V5,0-M-R3



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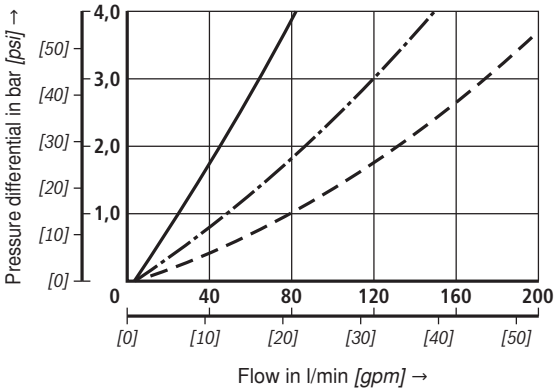
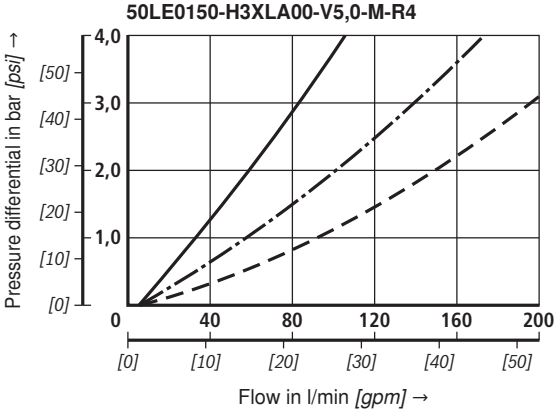
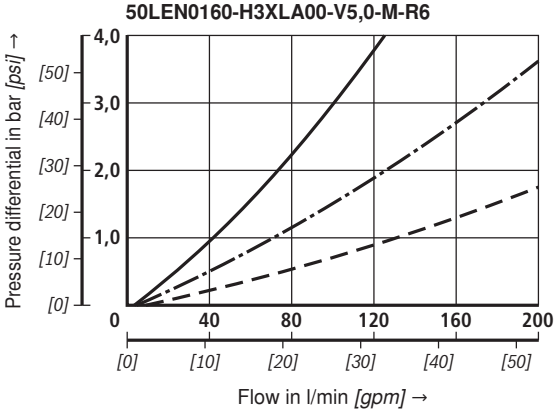


50LE0150-H3XLA00-V5,0-M-R4



50LEN0160-H3XLA00-V5,0-M-R6



Characteristic curves — H3XL, H10XL

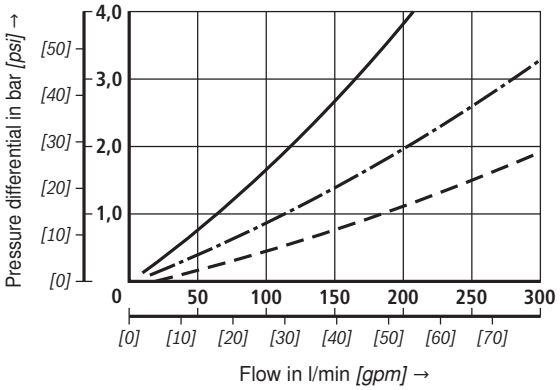
Spec. weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 1 bar *[14.5 psi]*

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

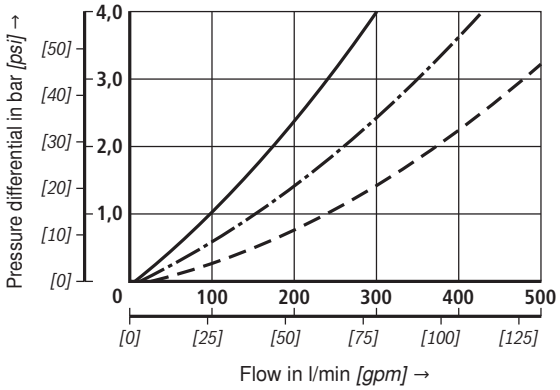
Oil viscosity: —— 140 mm²/s *[649 SUS]*
—·— 68 mm²/s *[315 SUS]*
– – – 30 mm²/s *[143 SUS]*

H3XL

50LEN0250-H3XLA00-V5,0-M-R6

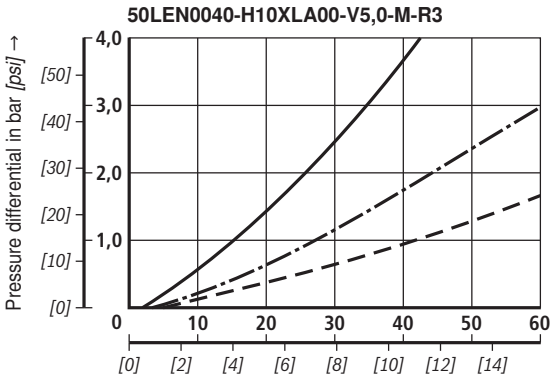


50LEN0400-H3XLA00-V5,0-M-R6

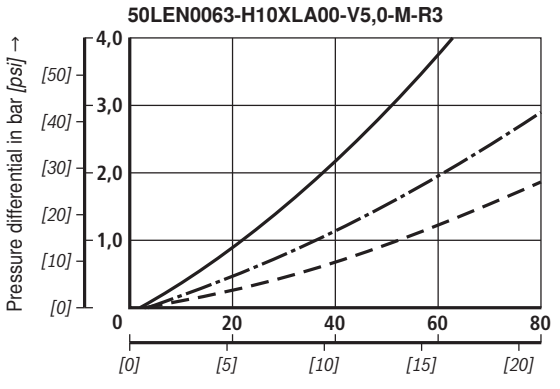


H10XL

50LEN0040-H10XLA00-V5,0-M-R3



50LEN0063-H10XLA00-V5,0-M-R3



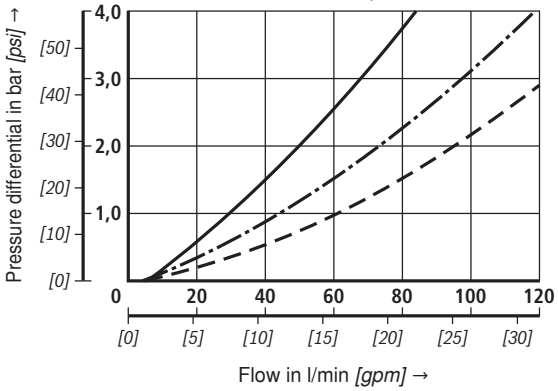
Characteristic curves H10XL

Spec. weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial Δ*p* for design = 1 bar *[14.5 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]*

50LEN0100-H10XLA00-V5,0-M-R3



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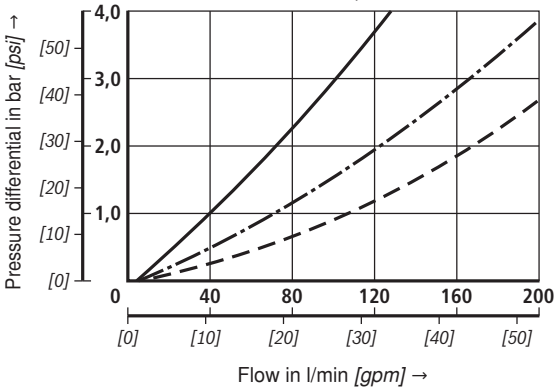
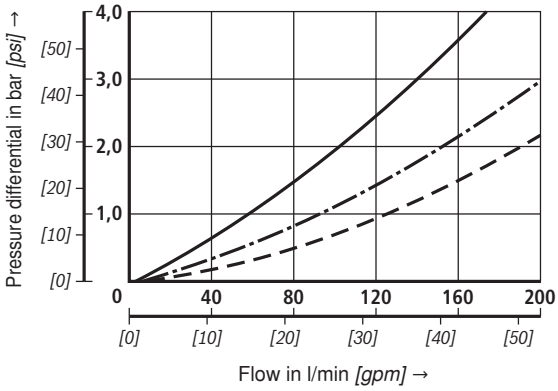
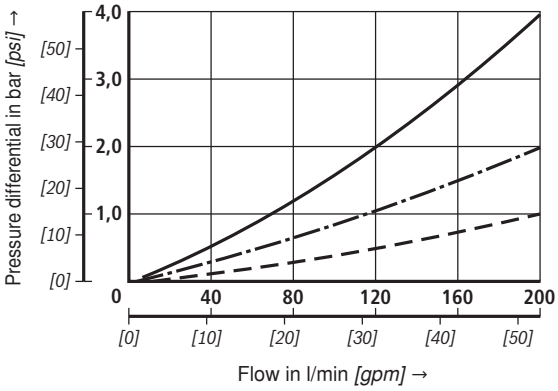


50LE0150-H10XLA00-V5,0-M-R4



50LEN0160-H10XLA00-V5,0-M-R6



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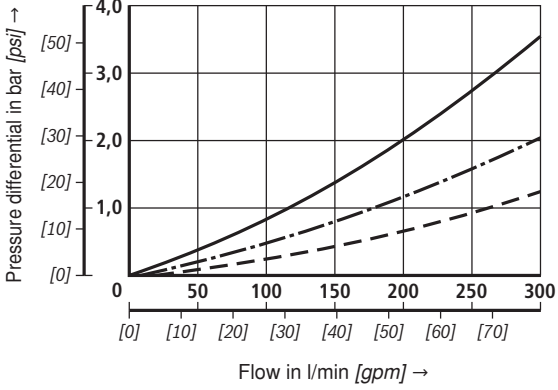
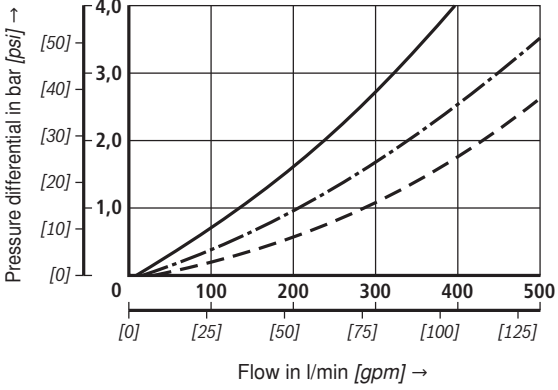
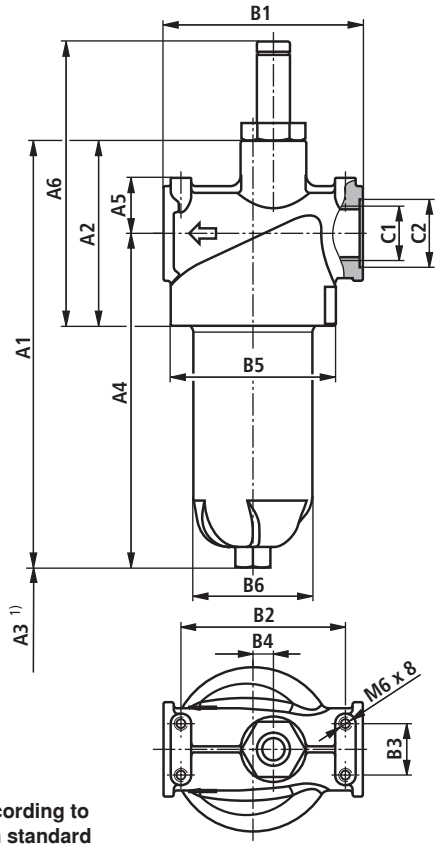


50LEN0400-H10XLA00-V5,0-M-R6



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

50 LEN 0040-0400



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

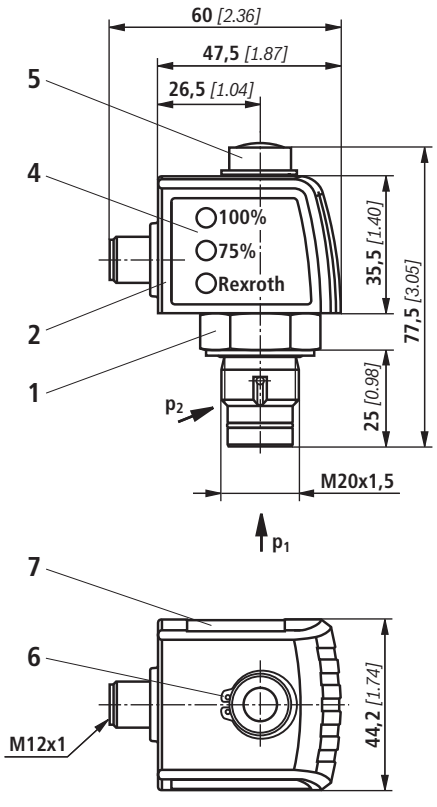
Type 50 LE(N)	A1	A2	A3	A4	A5	A6	B1	B2	B3
0040	209 *[8.23]*	87 *[3.43]*	80 *[3.15]*	164 *[6.46]*	24 *[0.94]*	139 *[5.47]*	92 *[3.62]*	65 *[2.56]*	20 *[0.79]*
0063	269 *[10.59]*			224 *[8.82]*					
0100	359 *[14.13]*			314 *[12.36]*					
0130	299 *[11.77]*	98 *[3.86]*	140 *[5.51]*	251 *[9.88]*	30 *[1.18]*	150 *[5.91]*	122 *[4.80]*	90 *[3.54]*	20 *[0.79]*
0150	350 *[13.78]*			302 *[11.89]*					
0160	310 *[12.20]*	122 *[4.80]*	140 *[5.51]*	255 *[10.04]*	35 *[1.38]*	174 *[6.85]*	142 *[5.59]*	110 *[4.33]*	30 *[1.18]*
0250	400 *[15.75]*			345 *[13.58]*					
0400	550 *[21.65]*			495 *[19.49]*					

Type 50 LE(N)	B4	Ø B5	ØB6	C1 connection		ØC2	
				Standard	U...(SAE J1926)	Standard	U...(SAE J1926)
0040	10 *[0.39]*	75 *[2.95]*	58 *[2.28]*	G 3/4	SAE 12 1 1/16-12 UN-2B	33 *[1.30]*	41 *[1.61]*
0063							
0100							
0130	14 *[0.55]*	105 *[4.13]*	82 *[3.23]*	G 1	SAE 16 1 5/16-12 UN-2B	41 *[1.61]*	49 *[1.93]*
0150							
0160	20 *[0.79]*	125 *[4.92]*	102 *[4.02]*	G 1 1/2	SAE 24 1 7/8-12 UN-2B	56 *[2.20]*	65 *[2.56]*
0250							
0400							

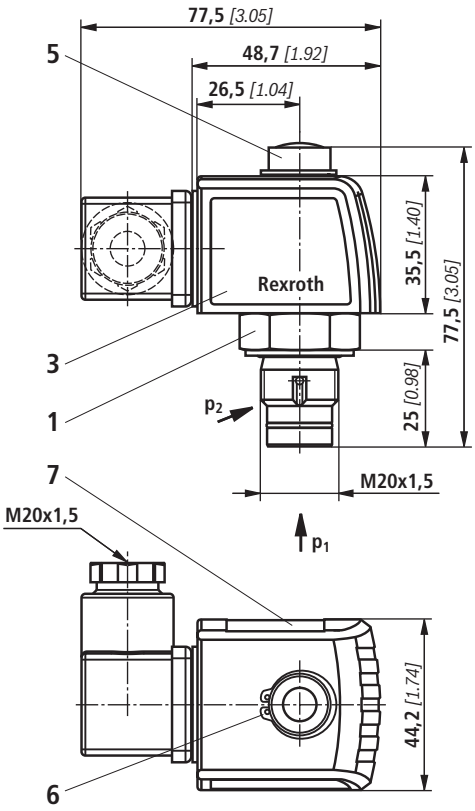
1) Servicing height for filter element replacement

Maintenance indicator (dimensions in mm *[inch]*)

Pressure differential indicator with mounted switching element M12x1



Pressure differential indicator with mounted switching element EN-175301-803



1 Mechanical optical maintenance indicator; max. tightening torque $M_{A\,max}$ = 50 Nm *[36.88 lb-ft]*

2 Switching element with locking ring for electric maintenance indicator (rotatable by 360°); round plug-in connection M12x1, 4-pin

3 Switching element with locking ring for electric 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 Optical indicator bistable

6 Locking ring DIN 471-16x1,
Material no. R900003923

7 Name plate

Notice:

Presentation contains mechanical optical maintenance indicator (1) and electronic switching element (2) (3).

Switching elements with increased switching power at request.

Spare parts

Mechanical optical maintenance indicator

W | O – D01 – – – 160

Maintenance indicator = W
Mechanical optical indicator = O

Design
Pressure differential, design 01 = D01

Switching pressure
5.0 bar = 5,0
2.2 bar = 2,2
1.5 bar = 1,5

Seal
M = NBR seal
V = FKM seal

Max. operating pressure
D01-1.5; D01-2.2
160 = 160 bar *[2321 psi]*
D01-5.0
450 = 450 bar *[6527 psi]*

Mechanical optical maintenance indicator	Material no.
WO-D01-5,0-M-450	**R901025312**
WO-D01-2.2-M-160	**R901025312**
WO-D01-1.5-M-160	**R928038781**

Seal kit

D | 50/110LE | –

Seal kit = D
Series 50LE and 110LE = 50/110LE

Size
Size 0040-0100 = N0040-0100
Size 0130-0150 = 0130-0150
Size 0160-0400 = N0160-0400

Seal
M = NBR seal
V = FKM seal

Seal kit	Material no.
D50/110LEN0040-0100-M	**R928046935**
D50/110LE0130-0150-M	**R928046936**
D50/110LEN0160-0400-M	**R928046937**

Installation, operating and maintenance notes

Installation of the filter

Verify operating overpressure with name plate information. Remove the blanking plugs in the filter inlet and outlet. Screw the filter head (1) to the fastening device, considering flow direction (direction arrows) and servicing height of the element. Make sure that the components are assembled without tension stress. The housing must be grounded.

The filter must preferably be installed with the filter bowl (2) downward. The maintenance indicator must be arranged in a well visible way.

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 (6) 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?

- The filter element is to be exchanged after initial start-up of the system.
- 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 electrical signal has not gone out at operating temperature, the filter element must be exchanged or cleaned respectively after the end of the shift.
- The filter element should be replaced or cleaned after max. 6 months at the latest.

Element exchange

- Switch off the system and discharge the filter on the pressure side.
- Screw off the filter bowl (2) by anticlockwise rotation. Clean the filter housing in a suitable medium.
- Remove the filter element (3) from the spigot in the filter head by turning it slightly
- Check the seal ring in the filter bowl for position and damage. If necessary, these parts are to be renewed.
- Replace filter elements H...XL, clean filter elements 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 differential pressure after the filter element exchange exceeds 150 % of the value of a brand-new filter element, the G… element also needs to be replaced.
- Check whether the type designation or material number on the replacement element corresponds to the type designation/material number on the name plate of the filter.
- Install replaced or cleaned filter element on the spigot again by slightly turning it.
- Now screw in the filter bowl to stop (torque 50 Nm $^{+10\ Nm}$).

Quality and standardization

The inline filters for hydraulic applications according to 51447 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 PEG, 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.

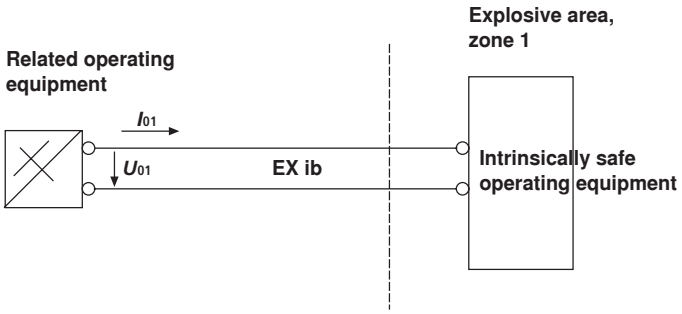
Use in explosive areas according to directive 94/9/EC (ATEX)

The inline filters according to 51447 are no equipment or components in the sense of directive 94/9/EC and are not provided with a CE mark.

When using the inline filters according to 51447 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.