HARLEX

Inline filters with filter element according to DIN 24550

Type 110LEN0040 to 0400; 110LE0130, 0150

- Sizes according to **DIN 24550**: 0040 to 0400
- additional sizes: 0130, 0150
- Nominal pressure 110 bar *[1595 psi]*
- Connection up to 1 1/2”
- Operating temperature –10 °C to +100 °C *[14 °F to 212 °F]*

Features

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

They distinguish themselves by the following:

- Filters for inline installation
- High filtration performance due to the tangential cyclone-effect flow path
- Special highly efficient filter materials
- Filtration of very fine particles and high dirt holding capacity across a broad pressure differential range
- High collapse resistance of the filter elements
- By default equipped with mechanical optical maintenance indicator with memory function
- Available as an option with different electronic switching elements, modular design
- Optional bypass valve integrated in the filter housing
- Optional measuring port

Ordering code
Filters

01	02	03		04	05		06		07		08		09		09		09
110LE			–			–		–		–		–		–		–	

Series

01	Inline filter 110 bar *[1595 psi]*	**110LE**

Filter element

02	**with** filter element according to **DIN 24550**	**N**

Size

03	LEN... (with filter element according to **DIN 24550**)	**0040** **0063** **0100** **0160** **0250** **0400**
	LE... (Filter element according t**o 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 *[4786 psi]*, without bypass valve	**B00**

Maintenance indicator

06	Maintenance indicator, mech./optical, switching pressure 1.5 bar *[21.8 psi]* – bypass cracking pressure 2.5 bar *[36 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

Ordering code
Filters

01	02	03		04	05		06		07		08		09		09		09
110LE			–			–		–		–		–		–		–	

08	**Frame size** / **Connection**	**0040**	**0063-0100**	**0130-0150**	**0160-0400**		
	G 3/4	●	X			Pipe thread according to ISO 228	**R3**
	G 1	X	●	X			**R4**
	G 1 1/4			●			**R5**
	G 1 1/2				●		**R6**
	SAE 12	X	X			Pipe thread according to SAE J1926	**U4**
	SAE 16			X			**U9**
	SAE 24				X		**U6**
	● Standard connection X Alternative connection						

Supplementary information

09		
	additional threaded couplings, G 1/4, lateral at clean and dirt side (from size 0130)	**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:
110LEN0100-H3XLA00-V5,0-M-R4

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

Preferred types

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

Inline filter 110 LE(N), filter rating 3 µm

Type	Volume flow in l/min *[gpm]* at Δ*p* = 1 bar *[14.5 psi]*	Filters		
110LEN0040-H3XLA00-V5,0-M-..	24 *[6.34]*	..R3	..U4	
110LEN0063-H3XLA00-V5,0-M-..	32 *[8.45]*	..R4	..U4	
110LEN0100-H3XLA00-V5,0-M-..	46 *[12.15]*	..R4	..U4	
110LE0130-H3XLA00-V5,0-M-..	90 *[23.78]*	..R5	..U9	
110LE0150-H3XLA00-V5,0-M-..	92 *[24.31]*	..R5	..U9	
110LEN0160-H3XLA00-V5,0-M-..	115 *[30.38]*	..R6	..U6	
110LEN0250-H3XLA00-V5,0-M-..	152 *[40.16]*	..R6	..U6	
110LEN0400-H3XLA00-V5,0-M-..	250 *[66.04]*	..R6	..U6	

Inline filter 110 LE(N), filter rating 6 µm

Type	Volume flow in l/min *[gpm]* at Δ*p* = 1 bar *[14.5 psi]*	Filters			
110LEN0040-H6XLA00-V5,0-M-..	31 *[8.19]*	..R3		..U4	
110LEN0063-H6XLA00-V5,0-M-..	47 *[12.42]*	..R4		..U4	
110LEN0100-H6XLA00-V5,0-M-..	57 *[15.06]*	..R4		..U4	
110LE0130-H6XLA00-V5,0-M-..	94 *[24.83]*	..R5		..U9	
110LE0150-H6XLA00-V5,0-M-..	103 *[27.21]*	..R5		..U9	
110LEN0160-H6XLA00-V5,0-M-..	184 *[48.61]*	..R6		..U6	
110LEN0250-H6XLA00-V5,0-M-..	236 *[62.34]*	..R6		..U6	
110LEN0400-H6XLA00-V5,0-M-..	283 *[74.76]*	..R6		..U6	

Inline filter 110 LE(N), filter rating 10 µm

Type	Volume flow in l/min *[gpm]* at Δ*p* = 1 bar *[14.5 psi]*	Filters			
110LEN0040-H10XLA00-V5,0-M-..	33 *[8.72]*	..R3		..U4	
110LEN0063-H10XLA00-V5,0-M-..	50 *[14.53]*	..R4		..U4	
110LEN0100-H10XLA00-V5,0-M-..	61 *[16.12]*	..R4		..U4	
110LE0130-H10XLA00-V5,0-M-..	100 *[26.42]*	..R5		..U9	
110LE0150-H10XLA00-V5,0-M-..	127 *[33.55]*	..R5		..U9	
110LEN0160-H10XLA00-V5,0-M-..	192 *[50.73]*	..R6		..U6	
110LEN0250-H10XLA00-V5,0-M-..	243 *[64.20]*	..R6		..U6	
110LEN0400-H10XLA00-V5,0-M-..	300 *[79.25]*	..R6		..U6	

Ordering code
Accessories
(dimensions in mm *[inch]*)

Electronic switching element for maintenance indicators

01		02		03
WE	–		–	

Maintenance indicator

01	electronic switching element	**WE**

Type of signal

02	1 switching point	**1SP**
	2 switching points, 3 LED	**2SP**
	2 switching points, 3 LED and signal suppression up to 30 °C *[86 °F]*	**2SPSU**

Connector

03	Round plug-in connection M12x1, 4-pole	**M12 x 1**
	Rectangular plug-in connection, 2-pole, design A according to EN-175301-803	**EN175301-803**

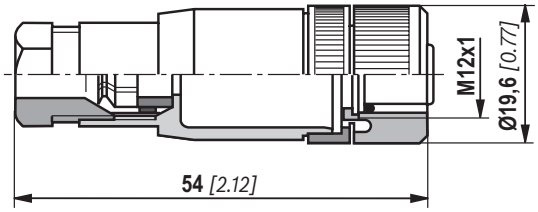
Material numbers of the electronic switching elements

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

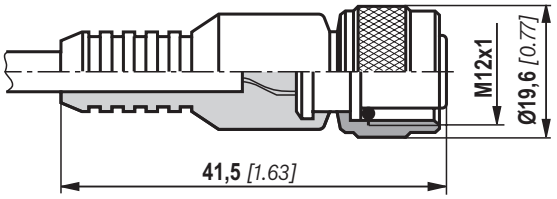
Mating connectors according to IEC 60947-5-2

for electronic switching element with round plug-in connection M12x1

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



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



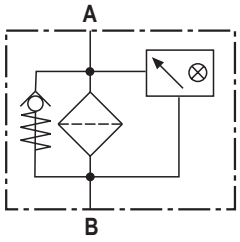
For more round plug-in connections and technical data refer to data sheet.

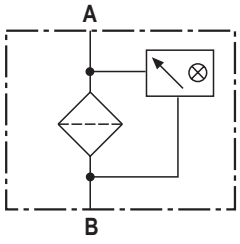
Order example:
Inline filter with mechanical optical maintenance indicator for $p_{nom.}$ = 110 bar *[1595 psi]* with bypass valve, size 0160, with filter element 10 µm and electronic switching element M12x1 with 1 switching point for hydraulic fluid mineral oil HLP according to DIN 51524.

Filter with mech. optical maintenance indicator:	**110LEN0160-H10XLA00-V5,0-M-R6**
Switching element:	**WE-1SP-M12x1**
Mating connector:	**Mating connector suitable for K24 4-pole, M12x1 with screw connection, cable gland Pg9.**

Symbols

Inline filter with bypass and mechanical indicator

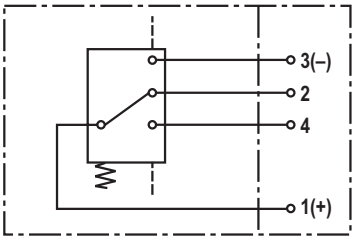




Inline filter without bypass and with mechanical indicator

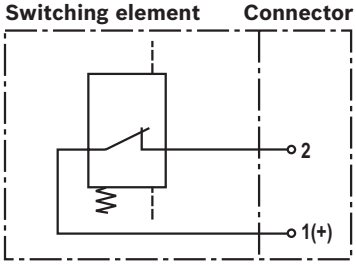
electronic switching element for maintenance indicator

Switching element **Connector**



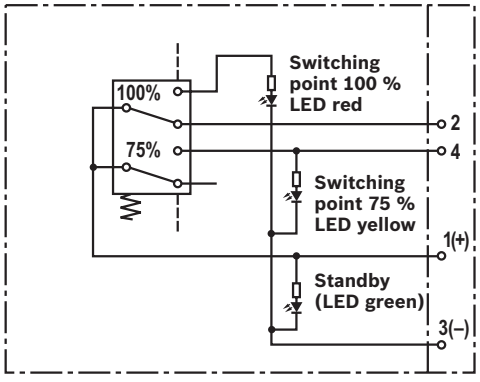
WE-1SP-M12x1

Switching element **Connector**



WE-1SP-EN175301-803

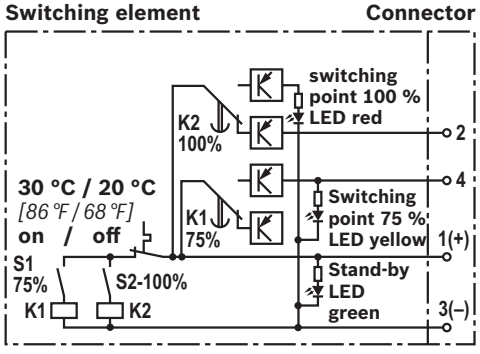
Switching element **Connector**



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)**

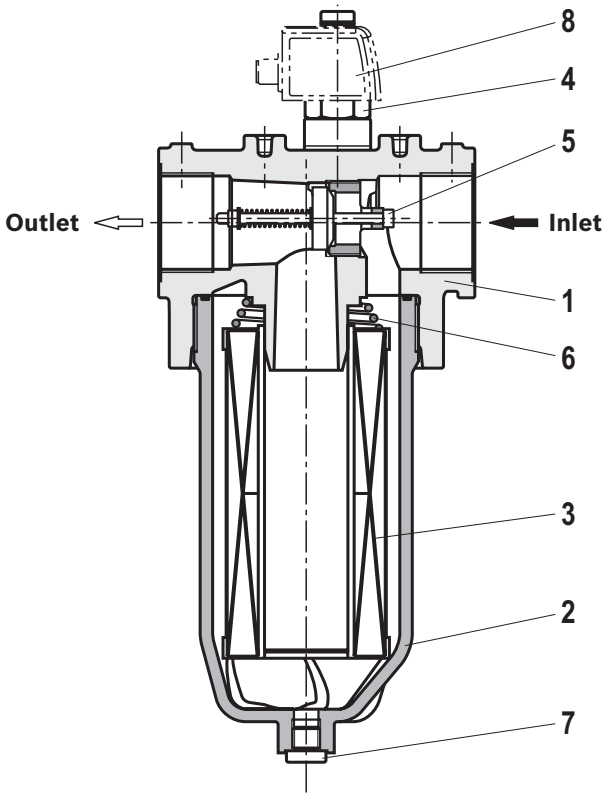
Function, section

The 110LE(N) inline filter is suitable for direct installation into pressure lines. It is installed upstream components to be protected.
It basically consists 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 an assembled bypass valve (5) as standard.
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 the inlet, the 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 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. As of size 0160, the standard equipment comprises a drain screw (7).

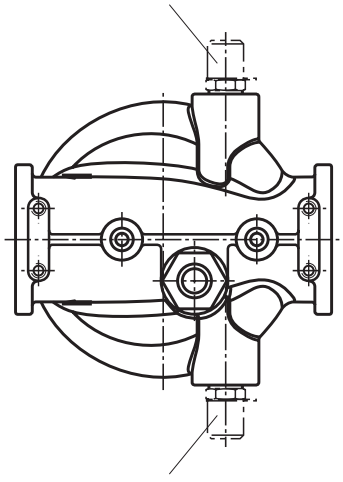
By default, the filter is equipped with mechanical optical maintenance indicator (4). The electronic switching element (8) which has to be ordered separately is attached to the mechanical optical maintenance indicator (4) and held by means of a locking ring.
The electronic switching elements with 1 or 2 switching points are connected via a mating connector according to IEC-60947-5-2 or via a cable connection according to EN17301-803.

As of size 0130, it is possible to order the filters with threaded couplings for separate pressure differential measurement. Only then will the filter head be drilled accordingly.

High filtration performance due to the tangential cyclone-effect flow path in the filter housing in connection with a slowdown zone at the bottom of the filter bowl.



Dirt side from size 0130 optional threaded couplings



Clean side from size 0130 optional threaded couplings

Type 110LEN0160

☞ **WARNING!**
If the maintenance indicator is not observed while the element is exchanged, the bypass valve will open if the pressure differential increases. This means that part of the volume flow enters unfiltered into the clean side of the filter. Effective filtration is therefore no longer guaranteed.

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

General						
Installation position			vertical			
Ambient temperature range		°C *[°F]*	–10 ... +100 *[14 ... +212]* (shortly up to –30 *[–22]*)			
Weight		NS	**0040**	**0063**	**0100**	**0130**
		kg *[lbs]*	1.1 *[2.4]*	1.3 *[2.9]*	1.5 *[3.3]*	2.5 *[5.5]*
		NS	**0150**	**0160**	**0250**	**0400**
		kg *[lbs]*	2.6 *[5.7]*	3.5 *[7.7]*	4.0 *[8.8]*	4.9 *[10.8]*
Volume		NS	**0040**	**0063**	**0100**	**0130**
		l *[US gal]*	0.3 *[0.08]*	0,4 *[0.11]*	0.6 *[0.16]*	0.9 *[0.24]*
		NS	**0150**	**0160**	**0250**	**0400**
		l *[US gal]*	1.1 *[0.29]*	1.3 *[0.34]*	1.9 *[0.50]*	2.9 *[0.77]*
Material	– Filter head		Aluminum			
	– Filter bowl		Aluminum			
	– Bypass valve		Aluminum / steel / POM			
	– Seals		NBR or FKM			
	– Visual maintenance indicator	V1.5; V2.2	Aluminum			
		V5.0	Brass			
	–Electronic switching element		Plastic PA6			

Hydraulic				
Maximum operating pressure	bar *[psi]*	110 *[1595]*		
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]*	
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 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				
Non-woven glass fiber media H..XL			Single-use element on the basis of inorganic fiber	
			Filtration ratio according to ISO 16889 up 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	$\beta_{3}(c) \geq 200$	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
Biodegradable	– 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
	– containing water	HFAS	NBR	DIN 24320
		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.
- **Biodegradable:** 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

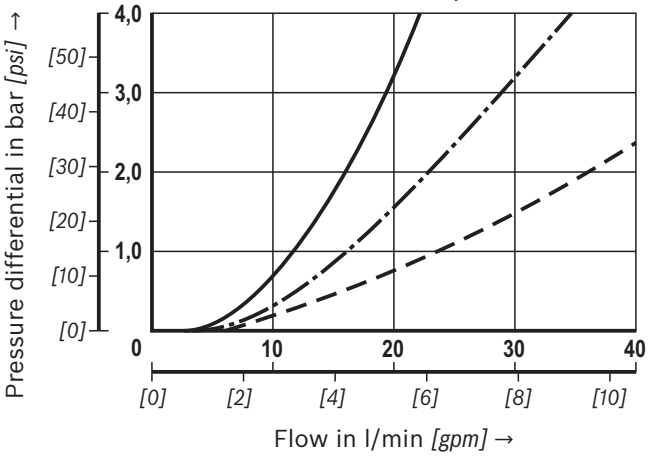
H3XL

(measured with mineral oil HLP46 according to DIN 51524 at T = 40 °C *[104 °F]*)

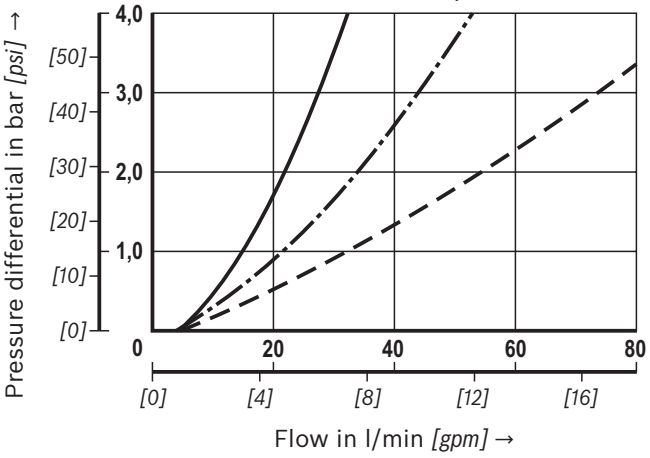
Spec. weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial-Δ*p* for design = 1 bar *[14.5 psi]*

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

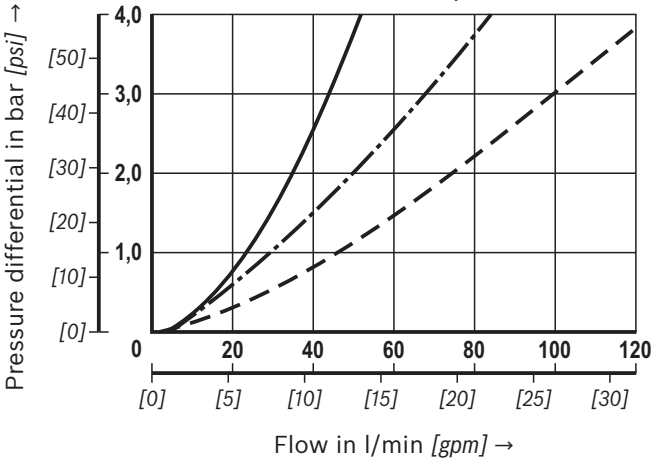
110LEN0040-H3XLA00-V5,0-M-R3



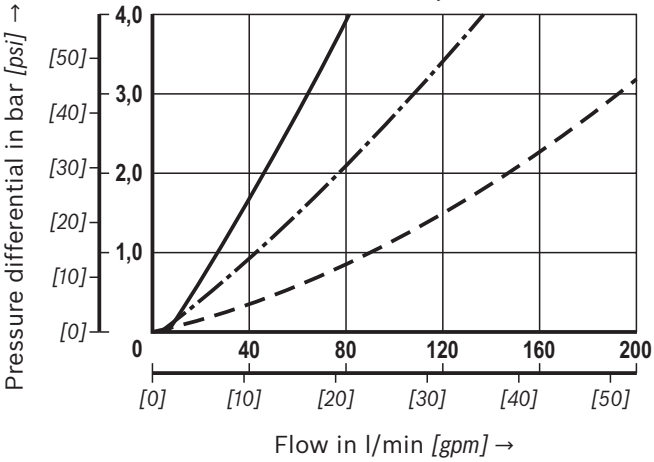
110LEN0063-H3XLA00-V5,0-M-R4



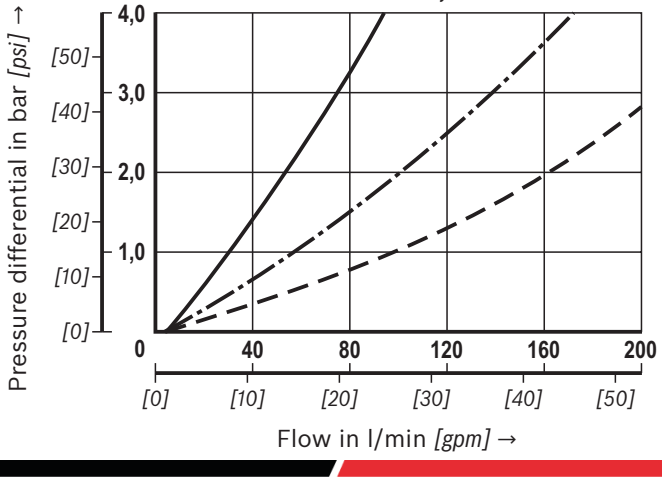
110LEN0100-H3XLA00-V5,0-M-R4



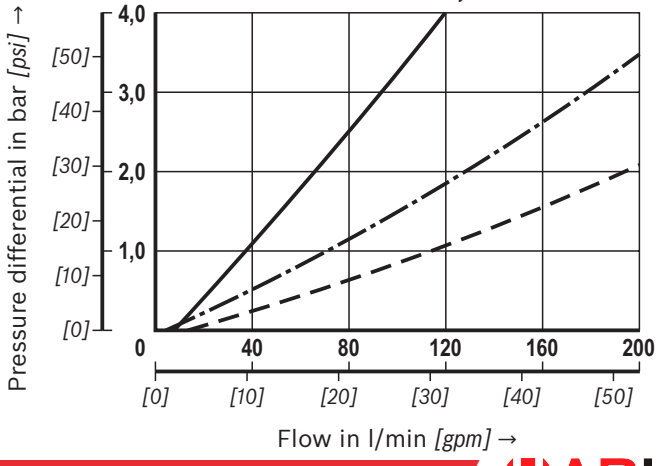
110LE0130-H3XLA00-V5,0-M-R5



110LE0150-H3XLA00-V5,0-M-R5



110LEN0160-H3XLA00-V5,0-M-R6



Characteristic curves

H3XL, H10XL

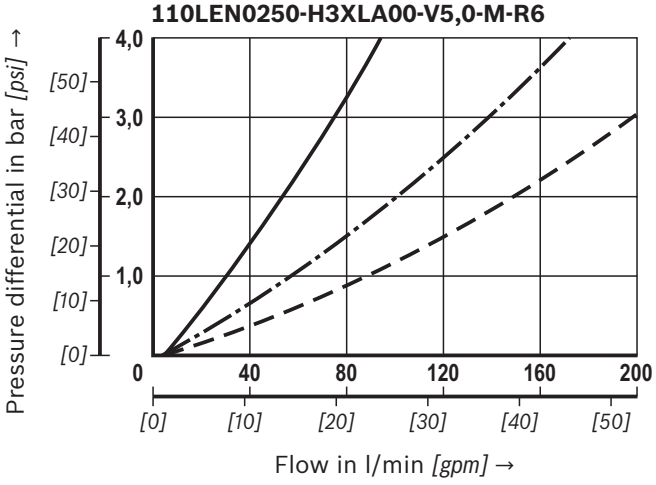
(measured with mineral oil HLP46 according to DIN 51524 at T = 40 °C *[104 °F]*)

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]*

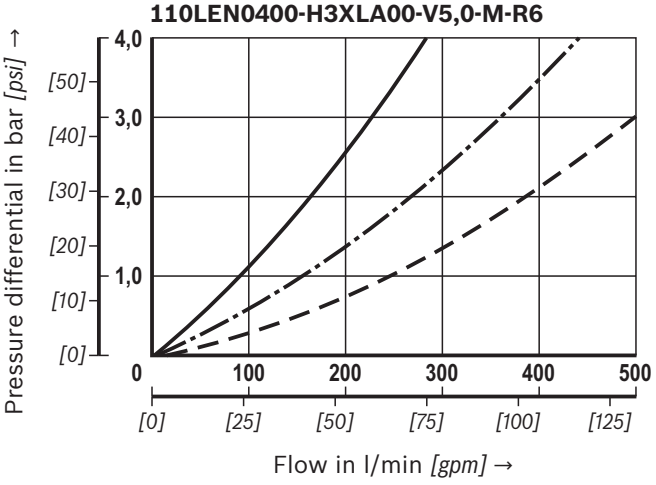
Oil viscosity:
- **140 mm²/s** *[649 SUS]*
- **68 mm²/s** *[315 SUS]*
- **30 mm²/s** *[143 SUS]*

H3XL

110LEN0250-H3XLA00-V5,0-M-R6

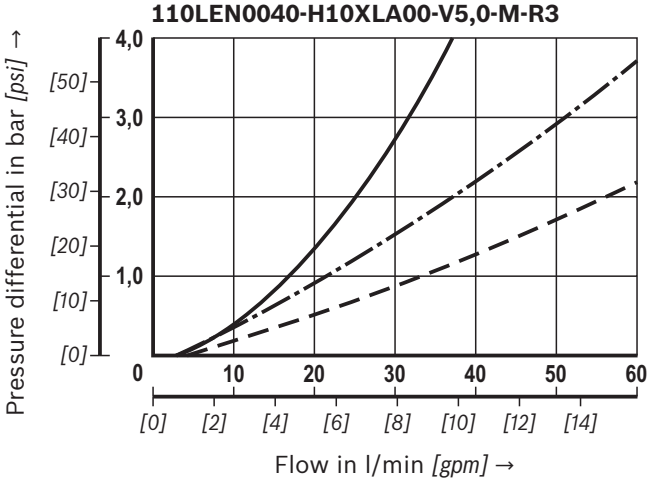


110LEN0400-H3XLA00-V5,0-M-R6

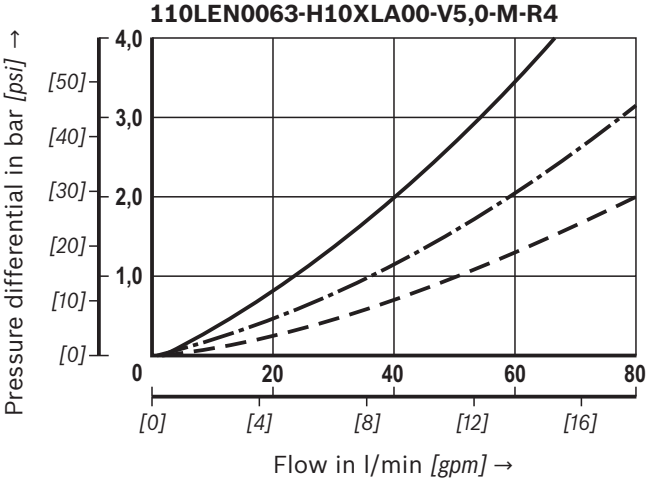


H10XL

110LEN0040-H10XLA00-V5,0-M-R3



110LEN0063-H10XLA00-V5,0-M-R4



Characteristic curves

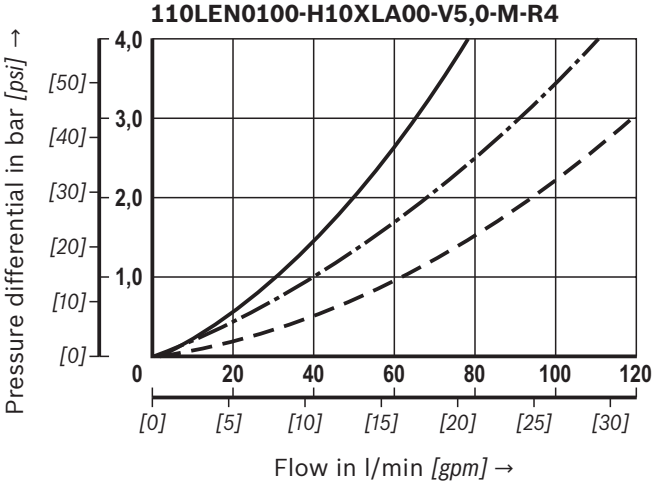
H10XL

(measured with mineral oil HLP46 according to DIN 51524 at T = 40 °C *[104 °F]*)

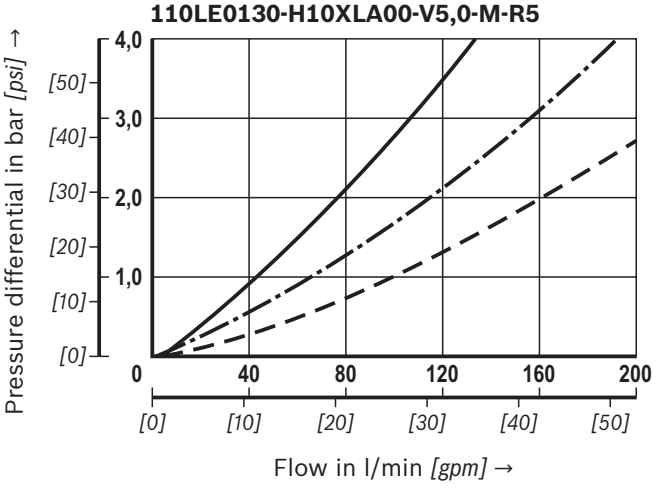
Spec. weight: < 0.9 kg/dm³
Δ*p*-Q characteristic curves for complete filter
recommended initial-Δ*p* for design = 1 bar *[14.5 psi]*

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

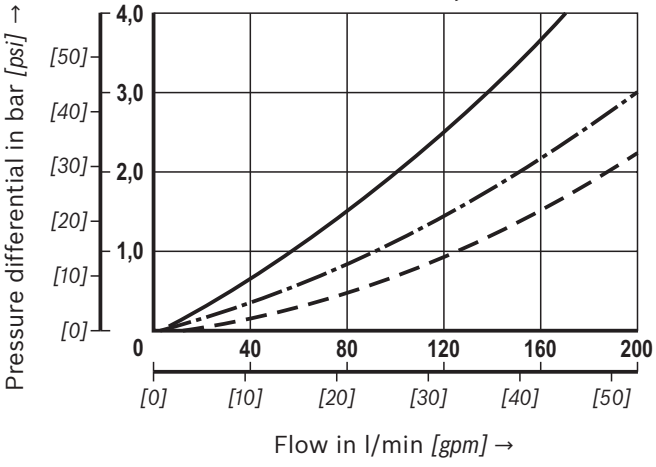
110LEN0100-H10XLA00-V5,0-M-R4



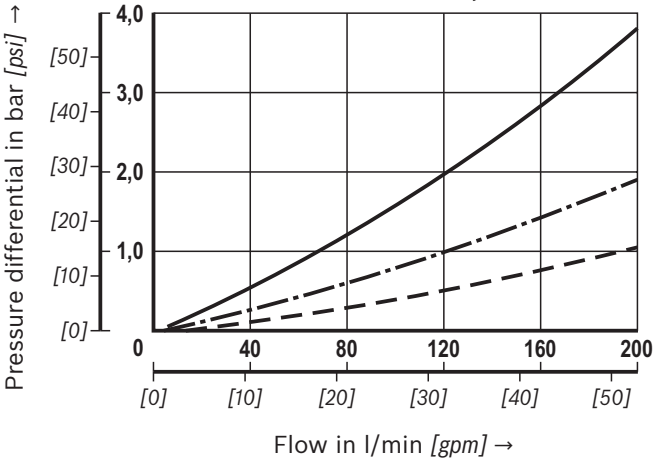
110LE0130-H10XLA00-V5,0-M-R5



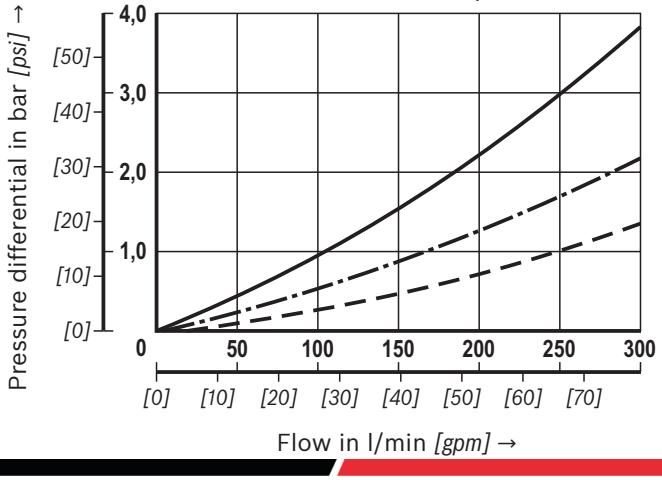
110LE0150-H10XLA00-V5,0-M-R5



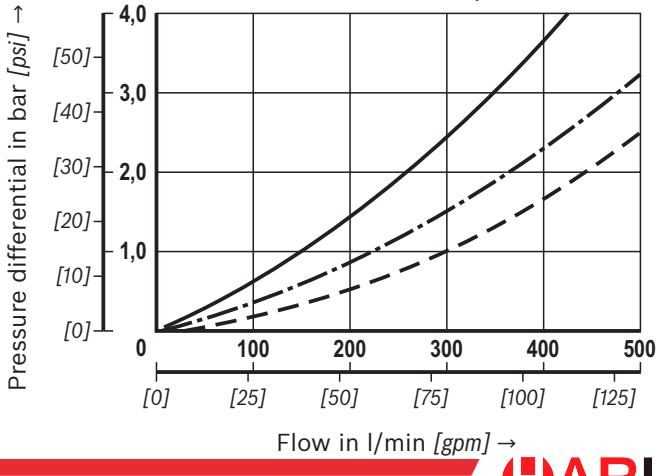
110LEN0160-H10XLA00-V5,0-M-R6



110LEN0250-H10XLA00-V5,0-M-R6

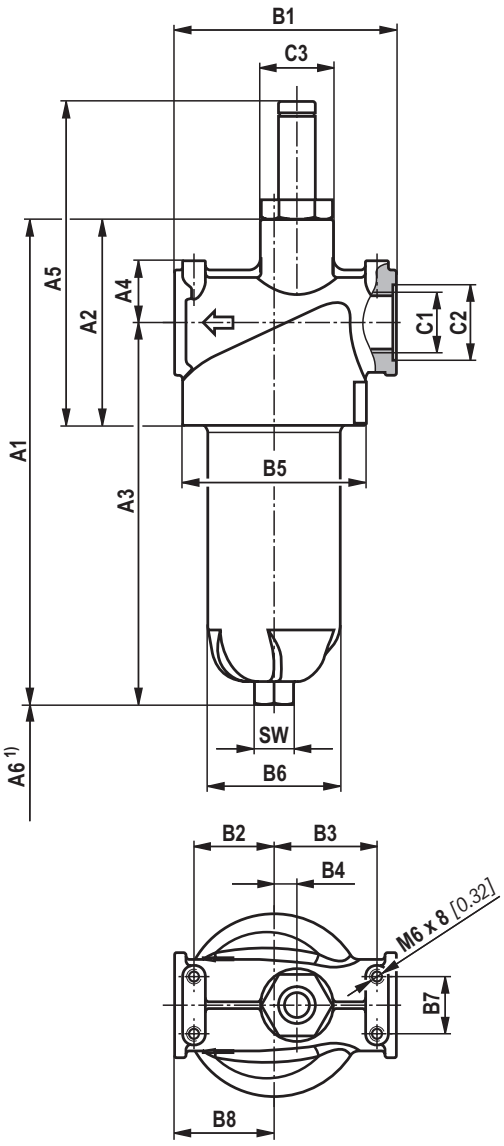


110LEN0400-H10XLA00-V5,0-M-R6



Dimensions: NG0040 - NG0100
(dimensions in mm *[inch]*)

110 LEN 0040-0100



Filter housing for filter elements in accordance with DIN 24550

Type	Contents in l *[US gal]*	Weight in kg *[lbs]*	A1	A2	A3	A4	A5	A6	B1	B2
110LEN0040	0.3 *[0.08]*	1.1 *[2.4]*	212 *[8.35]*	90 *[3.54]*	167 *[6.57]*	27 *[1.06]*	142 *[5.59]*	80 *[3.15]*	97 *[3.82]*	35 *[1.38]*
110LEN0063	0.4 *[0.11]*	1.3 *[2.9]*	272 *[10.71]*		227 *[8.94]*					
110LEN0100	0.6 *[0.16]*	1.5 *[3.3]*	362 *[14.25]*		317 *[12.48]*					

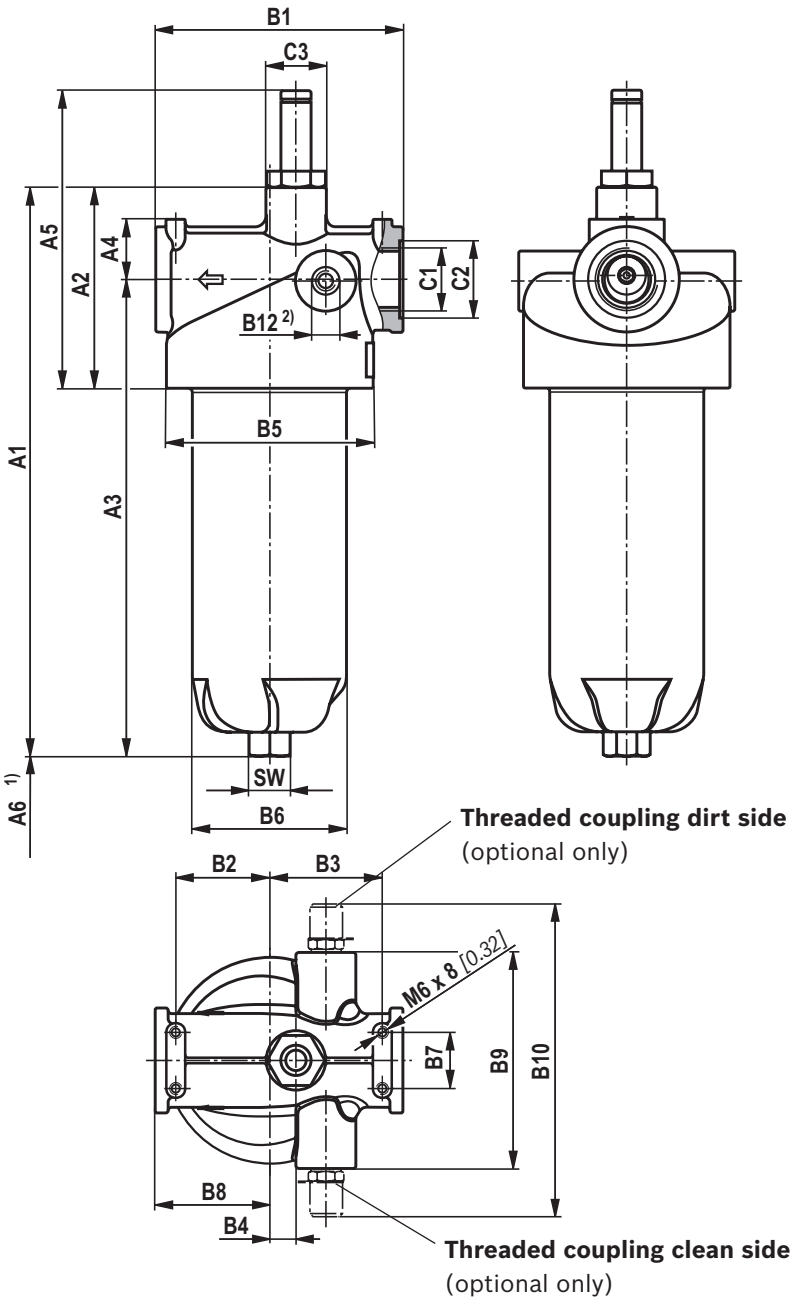
Type	B3	B4	ØB5	ØB6	B7	B8	C1 connection			ØC2	ØC3	SW
							Standard	ØC2	U... (SAE J1926)			
110LEN0040	45 *[1.77]*	10 *[0.39]*	80 *[3.15]*	58 *[2.28]*	25 *[0.98]*	43,5 *[1.71]*	G 3/4 G 1	33 *[1.30]* 41 *[1.61]*	SAE 12 1 1/16-12 UN-2B	41 *[1.61]*	32 *[1.26]*	17 *[0.67]*
110LEN0063												
110LEN0100												

1) Servicing height for filter element exchange

Dimensions: NG0130 - NG0150

(dimensions in mm *[inch]*)

110 LE 0130-0150



Filter housing for filter elements according to standard

Type	Contents in l *[US gal]*	Weight in kg *[lbs]*	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	ØB5
110LE0130	0.9 *[0.24]*	2.5 *[5.5]*	303 *[11.93]*	107 *[4.21]*	254 *[10.00]*	32 *[1.26]*	159 *[6.26]*	140 *[5.51]*	132 *[5.20]*	50 *[1.97]*	60 *[2.36]*	14 *[0.55]*	110 *[4.33]*
110LE0150	1.1 *[0.29]*	2.6 *[5.7]*	354 *[13.94]*		305 *[12.01]*								

Type	ØB6	B7	B8	B9	B10	B12	C1 connection			ØC2	ØC3	SW
							Standard	ØC2	U... (SAE J1926)			
110LE0130	82 *[3.23]*	30 *[1.18]*	61 *[2.40]*	115 *[4.53]*	175 *[6.89]*	G 1/4	G 1	41 *[1.61]*	SAE 16	49 *[1.93]*	32 *[1.26]*	22 *[0.87]*
110LE0150							G 1 1/4	51 *[2.00]*	1 5/16-12 UN-2B			

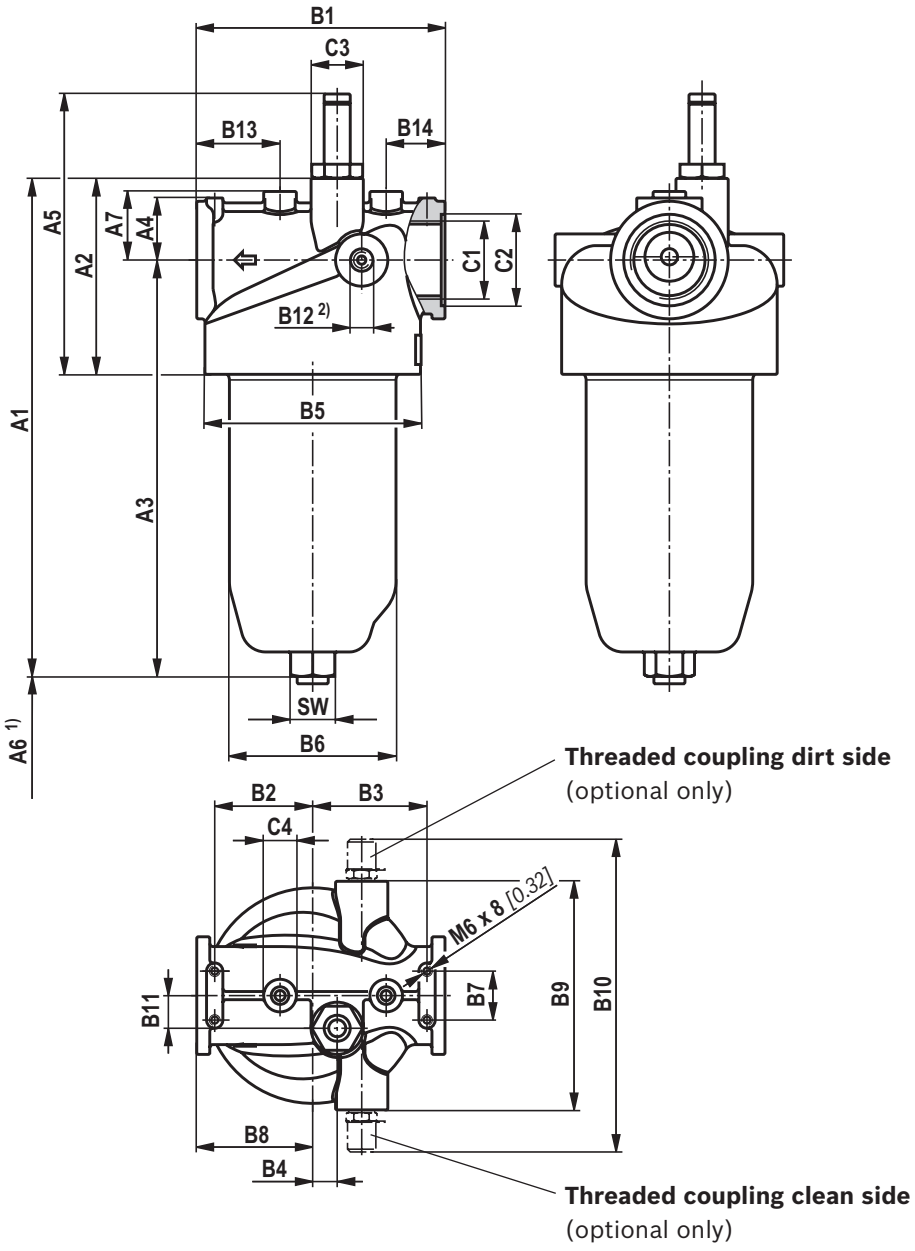
1) Servicing height for filter element exchange

2) Thread only drilled with Minimess connection option

Dimensions: NG0160 - NG0400

(dimensions in mm *[inch]*)

110 LEN 0160-0400



Filter housing for filter elements in accordance with DIN 24550

Type	Contents in l *[US gal]*	Weight in kg *[lbs]*	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	ØB5
110LEN0160	1.3 *[0.34]*	3.5 *[7.7]*	305 *[12.01]*	120 *[4.72]*	255 *[10.04]*	38 *[1.50]*	172 *[6.77]*	140 *[5.51]*	42 *[1.65]*	152 *[5.98]*	60 *[2.36]*	70 *[2.76]*	15 *[0.59]*	132 *[5.20]*
110LEN0250	1.9 *[0.50]*	4.0 *[8.8]*	395 *[15.55]*		345 *[13.58]*									
110LEN0400	2.9 *[0.77]*	4.9 *[10.8]*	545 *[21.46]*		495 *[19.49]*									

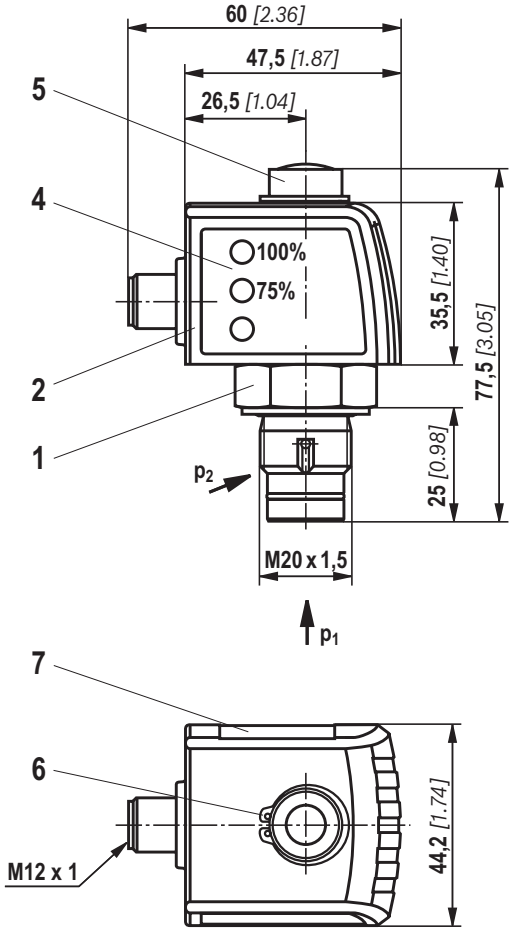
Type	ØB6	B7	B8	B9	B10	B11	B12	B13	B14	C1 connection			ØC2	ØC3	SW
										Standard	ØC2	U... (SAE J1926)			
110LEN0160	102 *[4.02]*	30 *[1.18]*	71 *[2.80]*	140 *[5.51]*	200 *[7.87]*	20 *[0.79]*	G 1/4	51 *[2.01]*	36 *[1.42]*	G 1 1/2	56 *[2.20]*	SAE 24 1 7/8-12 UN-2B	65 *[2.56]*	32 *[1.26]*	27 *[1.06]*
110LEN0250															
110LEN0400															

1) Servicing height for filter element exchange

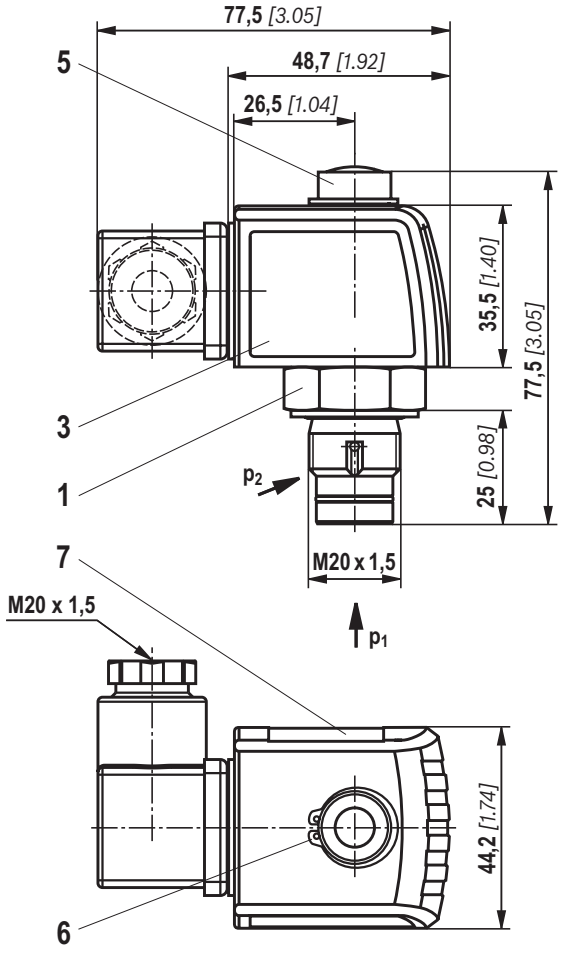
2) Thread only drilled with Minimess connection option

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-pole

3 Switching element with locking ring for electric maintenance indicator (rotatable by 360°); rectangular plug-in connection EN175301-803

4 Housing with three LEDs: 24V =
green: Stand-by
yellow: Switching point 75 %
red: Switching point 100 %

5 Visual indicator bistable

6 Locking ring DIN 471-16x1,

7 Name plate

☞ **Notices:**
Representation contains mechanical optical maintenance indicator (1) and electronic switching element (2) (3). Switching elements with increased switching power upon request.

Ordering code
Spare parts

Filter element

01	02	03		04		05		06
2.			**–**		**–**	**0**	**–**	

Filter element

01	Design	**2.**

Nominal size

02	LEN... (Filter element according to **DIN 24550)**	**0040** **0063** **0100** **0160** **0250** **0400**
	LE... (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 *[4786 psi]*	**B00**

Bypass valve

05	Always 0 with filter element	**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 optical indicator**	**O**

Design

03	Pressure differential, design 01	**D01**

Switching pressure

04	1.5 bar *[22 psi]*	**1,5**
	2.2 bar *[32 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-D01-1.5-V-160
WO-D01-2.2-M-160
WO-D01-2.2-V-160
WO-D01-5.0-M-450
WO-D01-5.0-V-450

Ordering code
Spare parts

Seal kit

01	02	03		04
D	**50/110LE**		**–**	

01	**Seal kit**	**D**

02	**Series 50LE and 110LE**	**50/110LE**

Nominal 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
D50/110LEN0040-0100-M
D50/110LE0130-0150-M
D50/110LEN0160-0400-M
D50/110LEN0040-0100-V
D50/110LE0130-0150-V
D50/110LEN0160-0400-V

Assembly, commissioning, maintenance

Installation

The max. operating pressure of the system must not exceed the max. admissible operating pressure of the filter (see type 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.

Easy filter element exchange is guaranteed in the installation position filter bowl vertically downwards. The maintenance indicator must be arranged in a well visible way.

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

Commission the system.

☞ **Notice:**

There is no bleeding provided at the filter.

However, some sizes have optional measuring ports which may also be used for bleeding.

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 and cleaned respectively. More details see data sheet.
- The material number of the corresponding replacement filter element is indicated on the name plate of the complete filter. It must comply with the material number on the filter element.
- Decommission the system.
- The operating pressure is to be built up on the system side.

☞ **Notice:**

There is no bleeding provided at the filter.

However, some sizes have optional measuring ports which may also be used for bleeding.

- Via the drain screw (from size 0160 fitted by default), the oil on the dirt side can be drained.
- Screw off the filter bowl.
- 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 renew 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 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.
- Commission the system.

☞ **WARNINGS!**

- Assembly and disassembly only with depressurized system!
- Tank is under pressure!
- Maintenance only be specialists.
- Remove the filter bowl only if it is not under pressure!
- Do not exchange the maintenance indicator while the filter is under pressure!
- Functional and safety warranty 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]*)

Mounting

Series 110 ...	LEN0040	LEN0063	LEN0100	LE0130	LE0150	LEN0160	LEN0250	LEN0400
Screw/ tightening torque with μ_{total} = 0.14	M6/4.5 Nm ± 10 %							
Quantity	4							
Recommended property class of screw	8.8							
Screw-in depth	6 mm + 1 mm							

Filter bowl and maintenance indicator

Series 110 ...	LEN0040	LEN0063	LEN0100	LE0130	LE0150	LEN0160	LEN0250	LEN0400
Tightening torque filter bowl	50 Nm + 10 Nm							
Tightening torque maintenance indicator	50 Nm							
Tightening torque cubic connector screw switching element EN-175301-803	M3/0.5 Nm							

Directives and standardization

Classification according to the Pressure Equipment Directive

The inline filters for hydraulic applications according 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 51448 are no 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 inline filters and the electronic maintenance indicators described here can be used for the following explosive areas

	zone suitability	
Gas	1	2
Dust	21	22

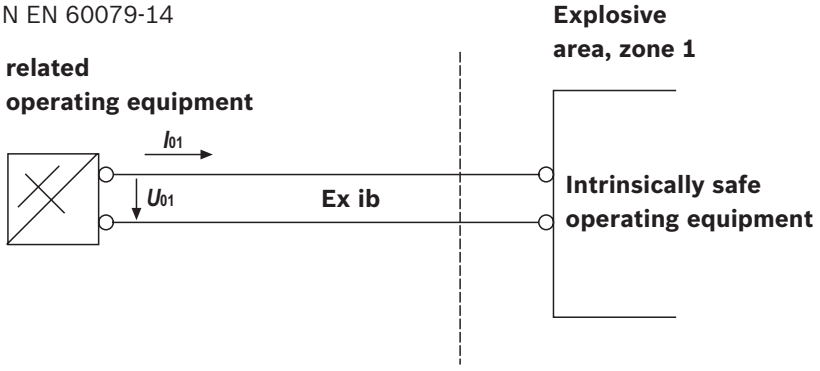
Directives and standardization

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
perm. 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		negligible	
inner inductivity	Li		negligible	
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.

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 inline filters according to in explosive areas, appropriate equipotential bonding has to be ensured. The filter is preferably to be earthed 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