High Pressure Filter

Inline mounting

Type : 250/450-LE/LEN

Technical Data

Design	: Simplex Inline
Max. Pressure (PS)	: 250 bar [3625 psi] 450 bar [6525 psi].
Test Pressure (PT)	: 1.43 x PS (as per CE/PED) 1.3 x PS (as per ASME)
Temperature range	: -20°C to +100°C (Standard) -4°F to +212°F (Standard)
Connection	: Upto SAE 2-1/2" / SAE-32
Element design	: LE Series - EPE standard LEN Series - As per DIN-24550

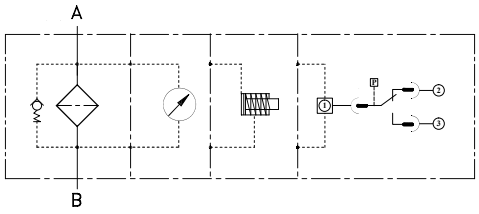
Material of Construction

Head	: GGG50.
Bowl	: Carbon Steel.
Seals	: Nitrile / Viton / EPDM.
Paint	: Bowl Externally painted in RAL-5010. Others on request.

Flow Capacity

0005 / 0040	50 lpm [13 gpm]
0008 / 0063	80 lpm [20 gpm]
0013 / 0100	130 lpm [35 gpm]
0015	150 lpm [40 gpm]
0018	180 lpm [45 gpm]
0020 / 0160	200 lpm [50 gpm]
0030 / 0250	300 lpm [65 gpm]
0045 / 0400	450 lpm [100 gpm]
0095 / 0630	950 lpm [250 gpm]
0145 / 1000	1450 lpm [380 gpm]

Hydraulic Symbol



Description

The 250/450-LE/LEN series Filters are used for direct installation in the pipeline and provide wear protection of downstream components & systems. Simplex in design for inline mounting the filter inlet & outlet are located the opposite sides. The flow path arrow (inlet to outlet) is marked on filter head.

The Filter head is provided with an element locating spigot. The Filter bowl is mounted below the filter head and is unscrewed for maintenance.

Accessories

Maintenance indicator - for monitoring the filter element contamination status. Available in various designs including

- Optical (pop-up version) with Electrical option.
- Optical (dual dial version) with Electrical option.
- Optical-Electrical with 2 switching points.

Magnet - to protect the filter from ferrous contamination.
Bypass valve - to protect the filter element during start-up and over pressurisation due to clogging.
Drain valve - for draining the filter during servicing.

Filter Element

The Filter Element is of star-pleated design with optimised pleat density for providing prolonged life.

The filter element is of Out-to-In design and the contaminant is retained outside the filter element and collected in the filter bowl.

The elements are available in various media options and selected based on the required oil cleanliness, initial pressure drop and dirt holding capabilities.

Media options for the filter element include
SS Wire Mesh - Cleanable, Nominal filtration.
Paper - Non-cleanable, Nominal filtration.
Non-woven - Non-cleanable, Nominal filtration.
Inorganic glass fibre - Non-cleanable, Absolute filtration acc. to ISO-16889.
Aquasorb - Water absorbing media, Non-cleanable.

For special applications / fluids the filter elements are supplied with SS hardware (end caps & inner tube) and / or different adhesives.

Technical specifications subject to change.

Ordering Code - Filter

1	2	3	4	5	6ab	7	8	9ab	10	11	12	13
450	**LE**	**0013**	**H10XP**	**A**	**0 P**	**0**	**9**	**A5.0**	**G05**	**P**	**0**	**0** /

1	**Max. working pressure**	250 bar [3625 psi] 450 bar [6525 psi]	**= 250** **= 450**
2	**Filter type**	Inline - EPE Standard Element Inline - Element acc. to DIN 24550	**= LE** **= LEN**
3	**Nominal Size**	Filter type LE Filter type LEN	**= 0005 0008 0013** **0015 0018** **0020 0030 0045** **0095 0145** **= 0040 0063 0100** **0160 0250 0400** **0630 1000**
4	**Filtering Media & Filtration Grade**	<u>Nominal Filtration Grade</u> SS Wire Mesh | Cleanable with additional epoxy layer upstream for 10/25/40µm	**= G10 G25 G40** **G60 G80 G100** Others on request
		Paper | Non-cleanable with epoxy mesh	**= P5 P10 P25**
		Non-Woven | Non-cleanable with epoxy mesh	**= VS10 VS25 VS40** **VS60**
		<u>Absolute Filtration Grade (ISO16889)</u> Glass Fibre | Non-cleanable with epoxy mesh	**= H1XL H3XL H6XL** **H10XL H16XL H20XL**
		Long Life Glass Fibre | Non-cleanable with plastic mesh & outer sleeve	**= H3XP H5XP** **H10XP H15XP H20XP**
		Long Life Glass Fibre | Non-cleanable with epoxy mesh	**= H3XE H5XE** **H10XE H15XE H20XE**
		Glass Fibre - Electrically Conductive Non-cleanable with epoxy mesh	**= H3XC H5XC** **H10XC H15XC H20XC**
		Glass Fibre - Water Absorbing Non-cleanable with epoxy mesh	**= AS1 AS3 AS6** **AS10 AS20**
		SS Fibre | Cleanable with SS mesh	**= M5 M10 M15**
5	**Differential Pressure of Element**	<u>Maximum allowed differential pressure</u> 30 bar [435 psid] 60 bar [870 psid] 160 bar [2321 psid] 330 bar [4785 psid]	**= A** (standard) **= D** **= C** **= B**
6a	**Element Adhesive**	Standard Adhesive T=100°C [212°F] Epoxy Adhesive (for fuels) High Temp. Adhesive T=160°C [320°F]	**= 0** (standard) **= 1** **= E**
6b	**Element Hardware (End Caps + Inner Tube)**	Carbon Steel + Carbon Steel Polyamide + Carbon Steel Stainless Steel + Stainless Steel Nickel Coated CS + Nickel Coated CS Carbon Steel + Stainless Steel	**= C** (standard) **= P** (standard) **= X** **= D** **= M**
7	**Magnet**	Without With ring magnet[(a)]	**= 0** (standard) **= X**

* Before ordering, check for availability.

[(a)] Magnets kept loose under the elements.

Ordering Code - Filter

1	2	3	4	5	6ab	7	8	9ab	10	11	12	13
450	**LE**	**0013**	**H10XP**	**A**	**0 P**	**0**	**9**	**A5.0**	**G05**	**P**	**0**	**0** /

8	**Bypass Valve**	Without With Bypass Valve - 1.5 bar [21.7 psid] With Bypass Valve - 2.5 bar [36.2 psid] With Bypass Valve - 5.0 bar [72.5 psid] With Bypass Valve - 7.0 bar [101.5 psid] Other pressures on request	**= 0** (standard) **= 3** **= 5** **= 7** **= 9** (preferred)
9a	**Maintenance Indicator - type**	Without Optical (Pop-up) Optical(Pop-up) + Electrical with DIN Plug Optical(Pop-up) + Electrical with Lamp Optical + Electrical with 2 Switching points - set to operate at 75% and 100% Optical (Dual dial) Optical(dial) + Electrical with DIN Plug Optical(dial) + Electrical with Lamp Special	**= 0** (standard) **= A..** **= B..** **= D..** **= T..** **= AD..** **= BD..** **= DD..** **= SP**
9b	**Maintenance Indicator - cracking pressure**	Without 0.8 bar [11.6 psid] 1.5 bar [21.7 psid] 2.5 bar [36.2 psid] 4.2 bar [60.9 psid] 5.0 bar [72.5 psid] Other pressures on request	**= -** (standard) **= ..0.8** **= ..1.5** **= ..2.5** **= ..4.2** **= ..5.0** (preferred)
10	**Inlet / Outlet - connections** (Refer C1 on pg.5)	BSP Thread (ISO-228) - 3/4" BSP(F) BSP Thread (ISO-228) - 1" BSP(F) BSP Thread (ISO-228) - 1-1/4" BSP(F) SAE Flanged - 6000# - SAE 1-1/2" SAE Flanged - 6000# - SAE 2" SAE Flanged - 6000# - SAE 2-1/2" SAE Straight Thread O'Ring Boss (J1926) Special connection With adaptor	**= G05** **= G06** **= G07** **= S086** **= S096** **= S106** **= S**** (refer pg.5) **= X0** (to be specified) = **RA0** (to be specified)
11	**Seal Material**	Nitrile Viton EPDM Neoprene	**= P** (standard) **= V** **= E** **= N**
12	**Housing Material**	Standard - as per catalogue Special	**= 0** (standard) **= SP**
13	**Other Options** (multiple options possible)	Without With 1/4" drain port - duly plugged With 1/4" CS drain valve in bowl With 1/4" SS drain valve in bowl	**= 0** (standard) **= 4** **= DV** **= DVX**

* Before ordering, check for availability

Ordering Code - Filter Element

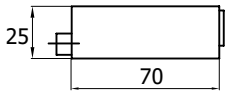
2. 0013 - H10XP - A - 0 P - 0 - P

3 4 5 6ab 11

Ordering Code - Seal Kit

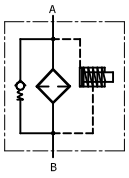
D - 450 - LE - 0013 - A - G05 - P - 0

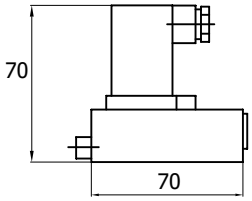
1 2 3 9a 10 11



A = Optical (Pop-up)

Ordering Code
F-xx-A0-00-00-P





B = Optical (Pop-up) + Electrical

Ordering Code
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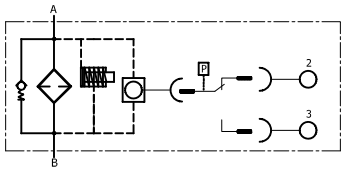

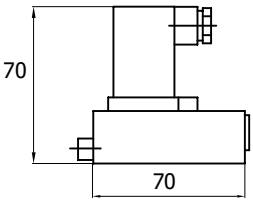

D = Optical (Pop-up) + Electrical with 2 LEDs

Ordering Code
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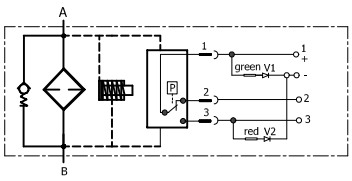

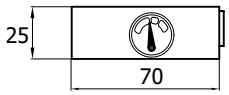

AD = Optical (Dual Dial)

Ordering Code
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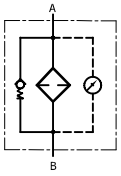

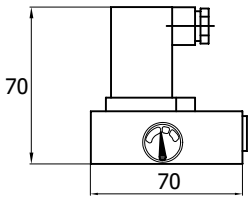

BD = Optical (Dual Dial) + Electrical

Ordering Code
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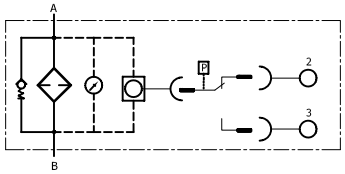

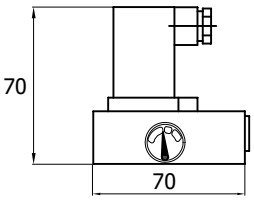

DD = Optical (Dual Dial) + Electrical with 2 LEDs

Ordering Code
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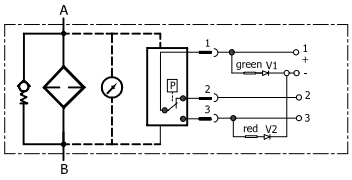
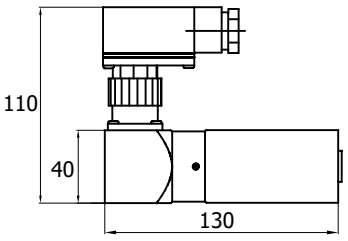


Maintenance Indicator functioning

These indicators work on the differential pressure and operate when a preset pressure differential is reached between the inlet & outlet ports.
In the pop-up version a red indicator pin pops out in the housing chamber thereby indicating the state whereas in the dual dial version two dial gauges - with green, yellow & red bands - placed on opposite side indicate the condition. If available, the electronic switching element is also triggered.
In the 2-switching points version (type T) the green LED glows in operating condition, yellow LED glows when 75% of the preset pressure differential is reached and red LED at 100%.



T = Optical/Electrical with 3 LEDs & 2 Switching points

Ordering Code
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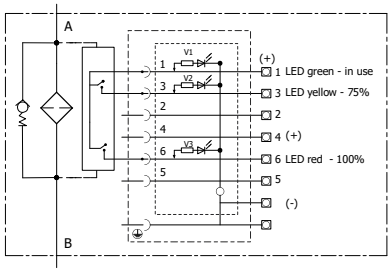


Tightening Torque Values : Nm [ft/lbs] ±10%

Type	Inlet/Outlet Ports		Bowl to Head Torque	Mounting Holes	
	Size	Torque		Size	Torque
LE 0005-0013	G 3/4"	180 [130]	40 [29]	M10 x 1.5	12 [9]
LE 0015-0018	G 1"	230 [170]	50 [37]	M12 x 1.75	15 [11]
LE 0020-0030	G 1-1/4"	250 [185]	60 [44]	M16 x 2.0	18 [13]
LE 0045 /LEN 0400	SAE1-1/2"	-	60 [44]	M16 x 2.0	18 [13]
LE 0095 /LEN 0630	SAE 2"	-	60 [44]	M20 x 2.5	20 [15]
LE 0145 /LEN 1000	SAE2-1/2"	-	60 [44]	M20 x 2.5	20 [15]
LEN 0040-0100	G 3/4"	180 [130]	40 [29]	M10 x 1.5	12 [9]
LEN 0160-0250	G 1"	250 [185]	60 [44]	M16 x 2.0	18 [13]

xx - preset differential pressure (bar)

Dimensions

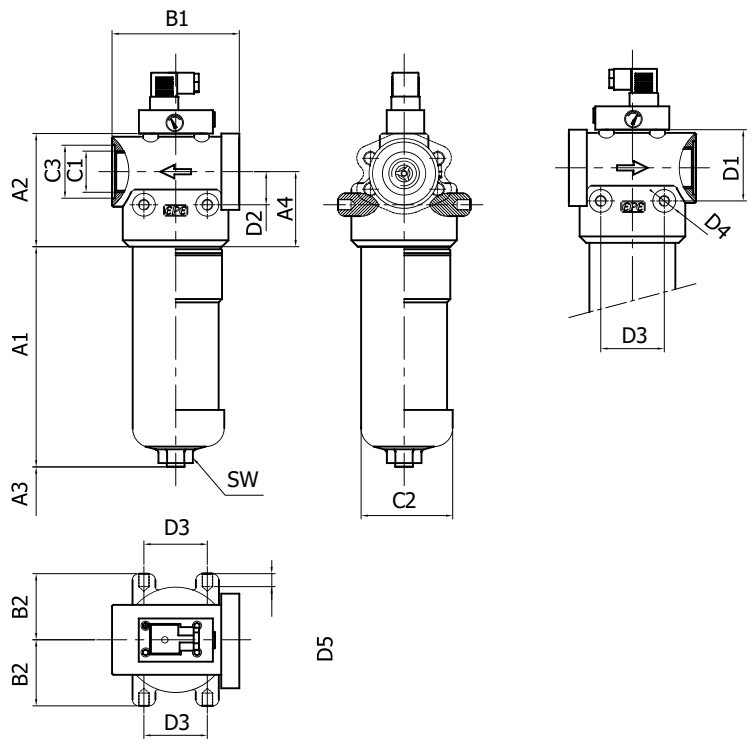


Fig.1

Type	Capacity ltr [gal]	Weight kg [lbs][1)]	A1	A2	A3[2)]	A4	B1	B2	SW
250/450 LE 0005 250/450 LEN 0040	0.2 [0.05]	4.0 [8.82]	98 [3.86]	89 [3.50]	110 [4.33]	59 [2.32]	100 [3.94]	50 [1.97]	24 [0.95]
250/450 LE 0008 250/450 LEN 0063	0.3 [0.08]	4.5 [9.92]	161 [6.34]						
250/450 LE 0013 250/450 LEN 0100	0.5 [0.13]	5.4 [11.9]	251 [9.88]						
250/450 LE 0015	0.9 [0.24]	10.3 [22.71]	187 [7.36]	125 [4.92]	130 [5.12]	82 [3.23]	140 [5.51]	70 [2.76]	32 [1.26]
250/450 LE 0018	1.1 [0.29]	12.6 [27.78]	236 [9.29]						
250/450 LE 0020 250/450 LEN 0160	1.3 [0.34]	16.8 [37.04]	171 [6.73]	142 [5.59]	150 [5.91]	87 [3.42]	160 [6.30]	78 [3.07]	32 [1.26]
250/450 LE 0030 250/450 LEN 0250	1.9 [0.50]	19.5 [43.00]	259 [10.20]						
250/450 LE 0045 250/450 LEN 0400	3.0 [0.79]	23.8 [52.47]	413 [16.26]						
450 LE 0095 450 LEN 0630	4.5 [1.19]	49.5 [109.10]	415 [16.34]	187 [7.36]	150 [5.91]	110 [4.33]	200 [7.87]	100 [3.94]	41 [1.61]
450 LE 0145 450 LEN 1000	6.2 [1.64]	64.6 [142.40]	636 [25.04]						

Type	C1 - Conn {Codification}		C2	C3	D1	D2	D3	D4	D5
	BSP|SAE	SAE J1926/1 Thread							
250/450 LE 0005 250/450 LEN 0040	G3/4" (Std) 20 dp {G05} G1" {G06}	1-1/16-12UN 2B {S12} 1-5/16-12UN 2B {S16} 1-5/8-12UN 2B {S20} 1-7/8-12UN 2B {S24}	Ø67 [Ø2.64]	Ø34x1.5dp [Ø1.34]	56 [2.20]	26 [1.02]	50 [1.97]	M10x1.5	13 [0.51]
250/450 LE 0008 250/450 LEN 0063									
250/450 LE 0013 250/450 LEN 0100									
250/450 LE 0015	G 1" 25 dp {G06}	1-5/16-12UN 2B {S16} 1-5/8-12UN 2B {S20} 1-7/8-12UN 2B {S24} 2-1/2-12UN 2B {S32}	Ø92 [Ø3.62]	Ø39.5x1.5dp [Ø1.53]	79 [3.11]	36 [1.42]	80 [3.15]	M12x1.75	20 [0.79]
250/450 LE 0018									
250/450 LE 0020 250/450 LEN 0160	G 1¼" 25 dp {G07}	1-5/16-12UN 2B {S16} 1-5/8-12UN 2B {S20} 1-7/8-12UN 2B {S24} 2-1/2-12UN 2B {S32}	Ø114 [Ø4.49]	Ø51x1dp [Ø2.01]	92 [3.62]	37 [1.46]	80 [3.15]	M16x2.0	20 [0.79]
250/450 LE 0030 250/450 LEN 0250									
250/450 LE 0045 250/450 LEN 0400	SAE 1-1/2" {S086}								
450 LE 0095 450 LEN 0630	SAE 2" {S096}	1-7/8-12UN 2B {S24}	Ø140 [Ø5.51]	-	119 [4.68]	42 [1.65]	100 [3.94]	M20x2.5	27 [1.06]
450 LE 0145 450 LEN 1000	SAE 2-1/2" {S106}		Ø160 [Ø6.30]						

[1)] = Weight including standard filter element and maintenance indicator

[2)] = Servicing height for filter element replacement

Dimensions in mm [inch]

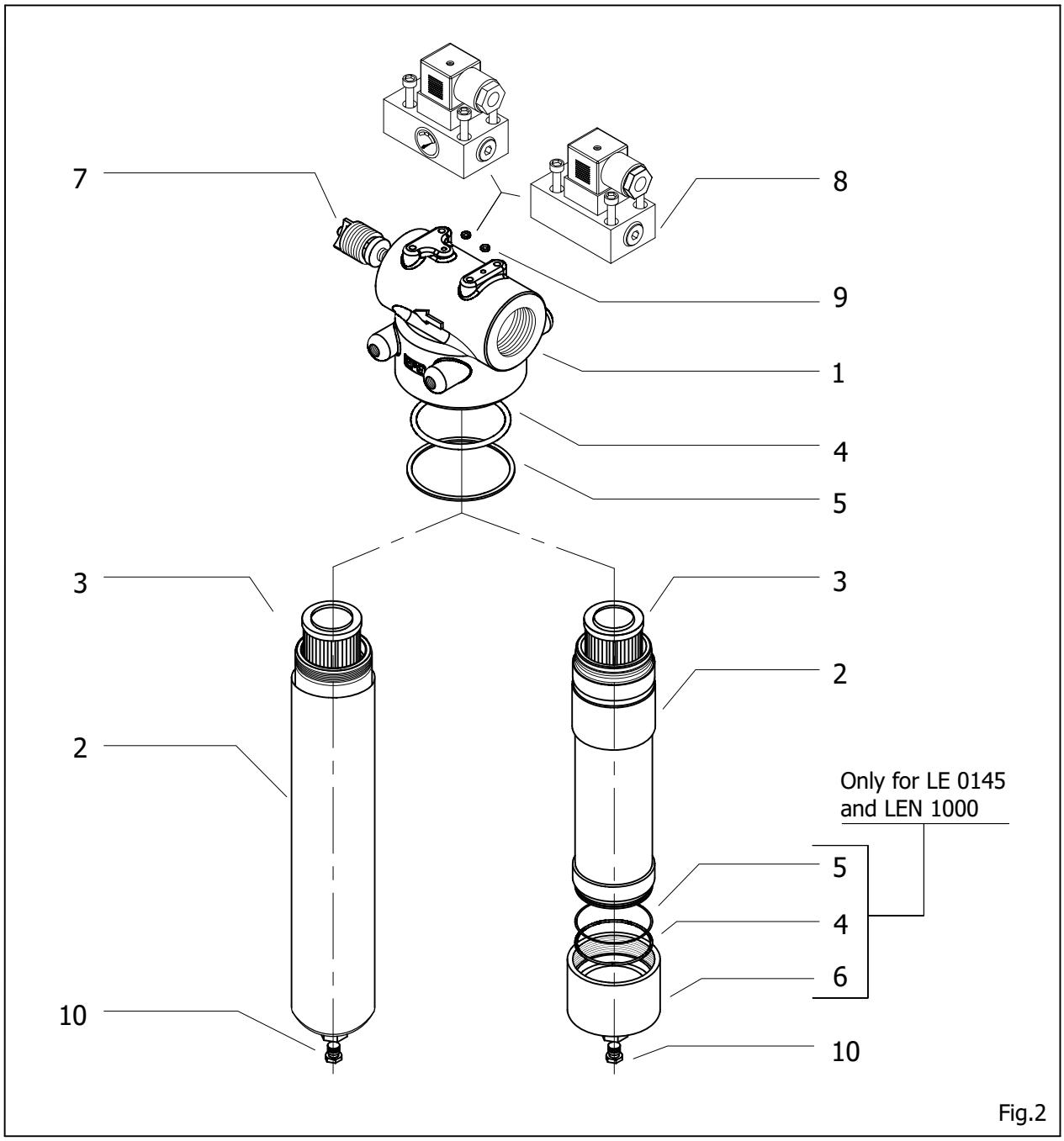


Fig.2

Spare Parts List

	Qty.	Size LE Size LEN		0005 0040	0008 0063	0013 0100	0015	0018	0020 0160	0030 0250	0045 0400	0095 0630	0145 1000
Item #	1	Description	Material										
1	1	Filter Head	GGG50	-									
2	1	Filter Bowl	Carbon steel	-									
3	1	Filter Element	Various	As per "Ordering Code - Filter Element"									
4	1(2)	Housing O-Ring	Buna N/Viton	Sold as kit - "Ordering Code - Filter Seal Kit"									
5	1(2)	Support Ring	Teflon	Sold as kit - "Ordering Code - Filter Seal Kit"									
6	1	Bottom Bowl	Carbon Steel	n/a									-
7	1	Bypass Valve	Al / synthetic	Part No.BYP01/xx			Part No.BYP02/xx		Part No.BYP03/xx				
8	1	Indicator	Carbon Steel	As per Section "Maintenance Indicator"									
9	2	Indicator O-Rings	Buna N/Viton	Sold as kit - "Ordering Code - Filter Seal Kit"									
10	1	Drain plug	Steel	Part No.DBP01									

xx - Cracking pressure (bar)

Installation

Before installation, conduct a visual check to ensure that the filter has not suffered any damage during shipping / handling. Verify that the requested type matches with what stamped on the nameplate.
Verify operating pressure with name plate information.
During assembly of the filter the tightening torques (refer page 4), the flow direction (direction arrows on the filter head) and the required service height (A3 in fig.1) of the filter element are to be taken into consideration.
Mount the filter assembly using the mounting holes on the filter head (C3) considering the flow direction. Failure to observe flow direction during assembly with cause damage to the filter element and components downstream.
Tighten the mounting bolts to specified torques (page 4).
We recommend using a suitable safety relief valve in the system to ensure the user and equipment are protected against possible damage caused by pressure surges.
Provide for the required servicing clearance below the filter for cleaning / replacing the filter element.
These filters must preferably be installed in vertical position with the filter bowl at the bottom to ensure proper venting and draining.
Proceed to the assembly ensuring the filter is not subjected to any abnormal forces and also fastened to avoid the transmission of vibrations. Tighten the inlet and outlet connections to the specified torques.
Make sure the optical part of the indicator is visible and the electricals connected appropriately.
If the maintenance indicator is ignored the bypass valve, if available, will open when the pressure differential increases thereby bypassing the filter element and contaminated fluid will pass to the clean side of the filter outlet thereby compromising the filtration effectiveness and risking the downstream components.

Connecting electrical indicator

Connect indicator using the three wired cable.

Verify electrical ratings on the indicator (6) name plate.

Connection settings:

1. Closer	1 (black) + 3 (blue)
2. Opener	1 (black) + 2 (brown)
3. Changer	1 (black) + 2 (brown) + 3 (blue)

Special Instructions

It is strictly forbidden to:
- weld or solder or carry out any mechanical operations on the filter.
- engrave or permanently stamp the surfaces of the filter and / or carry out other operations that could affect or change the mechanical properties of the filter.
- use the filter as a structural element: it should not be subjected to stresses or loads.
- change the data of the nameplate and / or filter without the permission of the manufacturer.
- use a different fluid than those designed for.

Starting Operation

Switch on the service pump.
Ensure the filter is completely filled with the working fluid and air in the housing vented.

Maintenance

The filter element is clogged and must be changed or cleaned when at operating temperature the red pointer on the pop-up indicator (8) is hard against the plastic cap / the pointer on the dual dial indicator (8) is at the end of the red marking and / or the switching process on the electrical indicator is triggered.

Filter element service

Switch off pump. Drain the filter housing through the drain plug (10) / drain valve. Unscrew filter bowl (2) and remove filter element (3), turning slightly off from its locator in the filter head (1). Check filter bowl inside and clean if necessary.
Filter element of type H..-XL, H..-XP, H..-XE, H..-XC, AS..., P... and VS ... is to be replaced.
Filter elements with G... & M... media are cleanable. The effectiveness of cleaning depends on the type of dirt and the level of the differential pressure at the time of changing the filter element. If the differential pressure after the filter element's cleaning process exceeds more than 50% of the pre-service value the G... & M... filter element also needs to be replaced.
Remove the safety packing from the new filter element before installing in the filter.
Replace filter element by slightly turning it back on its locator. Check Housing O-Ring (4) and Support Ring (5) on filter bowl (2), replace in case of damage or wear. Screw filter bowl and tighten to the specified torque (page 4) at hexagon bolt using a suitable tool.
Operate filter as described above.

Pressure Directives

Pressure Line Filters for hydraulic application are pressure holding equipment according to Article 2 Section 5 of the Pressure Equipment Directive 2014/68/EU. However, on the basis of the exception in Article 1, Section 2(f) of the PED the pressure line filters are exempt from the PED if they are not classified higher than category I (Guideline A-19) & do not receive any CE mark.

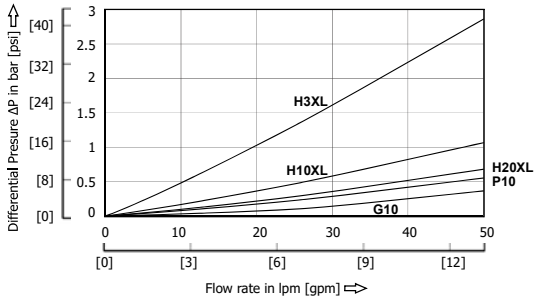
Disposal / Environmental Protection

Careless disposal of the filter, filter element and the residual fluid contained therein can cause environmental pollution.
Dispose the filter / filter element in accordance with provisions applicable in the country of use.
Fluid residues are to be disposed according to the respective safety data sheets valid for the specific hydraulic fluids.

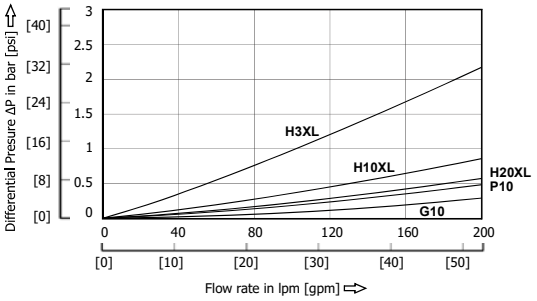
Performance Curves (Flow rate Vs Pressure Drop) - for complete filters

Oil Viscosity : 30 mm2/s [142 SUS]
Specific gravity < 0.9 kg/dm3
Recommended initial Pressure Drop (ΔP) for assembly = 1.5 bar [21.7 psid]

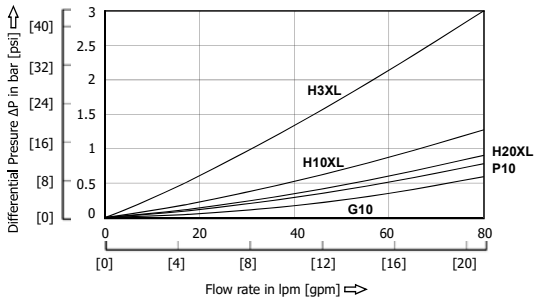
... LE-0005 / LEN-0040 - G05



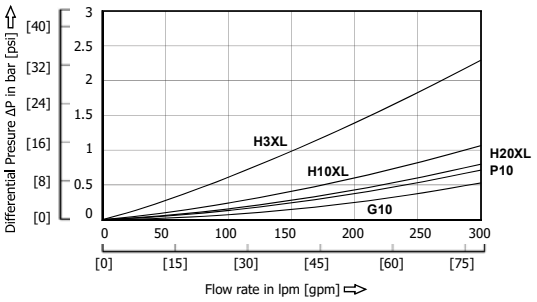
... LE-0020 / LEN-0160 - G07



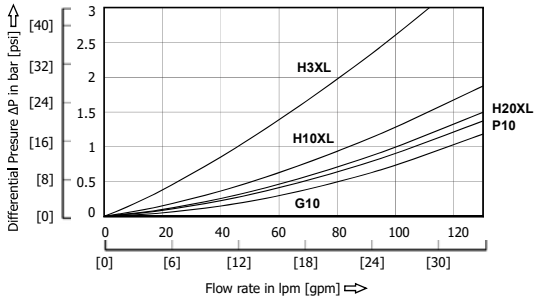
... LE-0008 / LEN-0063 - G05



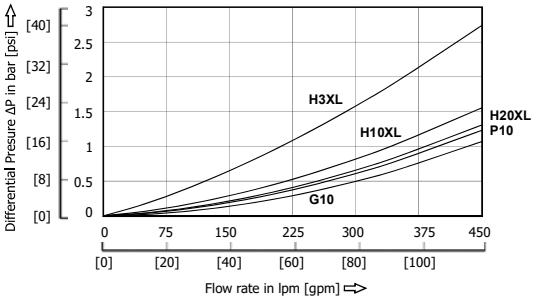
... LE-0030 / LEN-0250 - G07



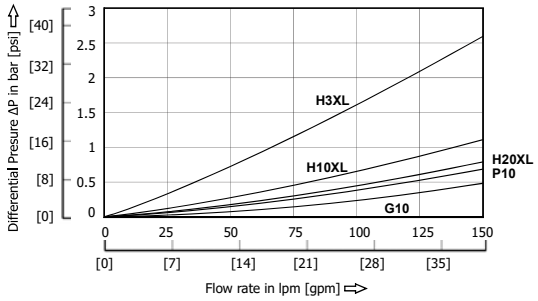
... LE-0013 / LEN-0100 - G05



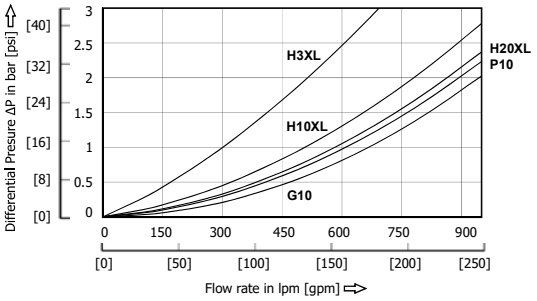
... LE-0045 / LEN-0400 - S086



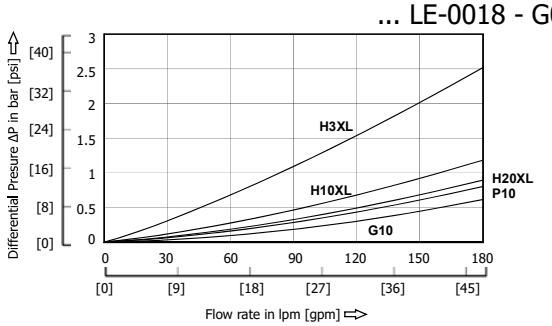
... LE-0015 - G06



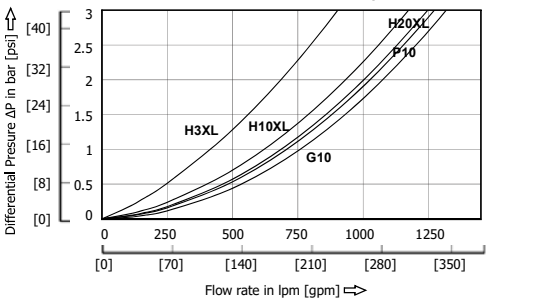
... LE-0095 / LEN-0630 - S096



... LE-0018 - G06



... LE-0145 / LEN-1000 - S106



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