



Inline filter with filter element according to DIN 24550

Size according to **DIN 24550**: 0040 to 1000
Additional sizes: 0130, 0150
Nominal pressure 350 bar [5079 psi]
Port up to G 2; SAE 2"; SAE 24
Operating temperature -10 °C to 100 °C [14 °F to 212 °F]

**Type 350LEN0040 to 1000;
350LE0130, 0150**

Features

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

They distinguish themselves by the following:

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

Ordering code

of the filter

350	LE	N	—	—	00—V5,0—	—
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Pressure

350 bar
[5079 psi] = 350

Inline filter

Simple = LE

Filter element

According to DIN 24550 = N

Size

LEN... = 0040 0063 0100 0160
0250 0400 0630 1000

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 7 bar [102 psi] = A

330 bar [4786 psi], without bypass valve = B

Element version

Standard adhesive T = 100 °C [212 °F] = 0...

Standard material tin-plated = ...0

Maintenance indicator

Maintenance indicator, optical = V5,0
specify switching pressure 5.0 bar [72.5 psi]

Port

	Frame size	0040	0063-0100	0130-0150	0160-0400	0630-1000	
	Port						
R2 =	G1/2	•	x				Pipe-thread according to ISO 228
R3 =	G3/4	x	x				
R4 =	G1	x	•	x			
R5 =	G1 1/4			•	x		
R6 =	G1 1/2			x	•		
R8 =	G2					•	SAE flange 6000 psi
S6 =	SAE 1 1/2"				x		
S8 =	SAE 2"					x	
U3 =	SAE 10	x					Pipe-thread according to SAE J1926
U4 =	SAE 12		x				
U5 =	SAE 20			x			
U6 =	SAE 24				x		

• = Standard port

x = Additional connection possibility

Seal

M = NBR seal

V = FKM seal

Order example:

350LEN0100-H10XLA00-V5,0-M-R4

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

of the filter element

2.	—	—	—	0	—
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Filter element

Design = 2.

Size

LEN... = 0040 0063 0100 0160 0250 0400 0630 1000

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

Seal

M = NBR seal

V = FKM seal

Bypass valve

0 = at filter element always 0

Pressure differential

Max. admissible pressure differential of the filter element

A00 = 30 bar [435 psi]

B00 = 330 bar [4786 psi]

Order example:

2.0100 H10XL-A00-0-M

Standard types

350LE(N) standard types, NBR seal, flow information for $v = 30 \text{ mm}^2/\text{s}$ [150 SUS]

Inline filter with bypass, filtration rating 3 μm

Type	Flow in l/min [US gpm] with $\Delta p = 1 \text{ bar}$ [14.5 psi] ¹⁾	Filter			
350LEN0040-H3XLA00-V5,0-M-..	26 [6.87]	..R2		..U3	
350LEN0063-H3XLA00-V5,0-M-..	36 [9.51]	..R4		..U4	
350LEN0100-H3XLA00-V5,0-M-..	46 [12.15]	..R4		..U4	
350LE0130-H3XLA00-V5,0-M-..	74 [19.55]	..R5		..U5	
350LE0150-H3XLA00-V5,0-M-..	83 [21.93]	..R5		..U5	
350LEN0160-H3XLA00-V5,0-M-..	125 [33.02]	..R6		..U6	
350LEN0250-H3XLA00-V5,0-M-..	200 [52.83]	..R6		..U6	
350LEN0400-H3XLA00-V5,0-M-..	253 [66.84]	..R6		..U6	
350LEN0630-H3XLA00-V5,0-M-..	340 [89.82]	..R8		..S8	
350LEN1000-H3XLA00-V5,0-M-..	470 [124.16]	..R8		..S8	

Inline filter with bypass, filtration rating 6 μm

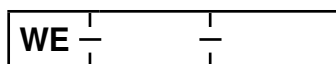
Type	Flow in l/min [US gpm] with $\Delta p = 1 \text{ bar}$ [14.5 psi] ¹⁾	Filter			
350LEN0040-H6XLA00-V5,0-M-..	33 [8.72]	..R2		..U3	
350LEN0063-H6XLA00-V5,0-M-..	55 [14.53]	..R4		..U4	
350LEN0100-H6XLA00-V5,0-M-..	69 [18.23]	..R4		..U4	
350LE0130-H6XLA00-V5,0-M-..	114 [30.12]	..R5		..U5	
350LE0150-H6XLA00-V5,0-M-..	130 [34.34]	..R5		..U5	
350LEN0160-H6XLA00-V5,0-M-..	168 [44.38]	..R6		..U6	
350LEN0250-H6XLA00-V5,0-M-..	232 [61.29]	..R6		..U6	
350LEN0400-H6XLA00-V5,0-M-..	281 [74.23]	..R6		..U6	
350LEN0630-H6XLA00-V5,0-M-..	405 [106.99]	..R8		..S8	
350LEN1000-H6XLA00-V5,0-M-..	492 [129.97]	..R8		..S8	

Inline filter with bypass, filtration rating 10 μm

Type	Flow in l/min [US gpm] with $\Delta p = 1 \text{ bar}$ [14.5 psi] ¹⁾	Filter			
350LEN0040-H10XLA00-V5,0-M-..	37 [9.77]	..R2		..U3	
350LEN0063-H10XLA00-V5,0-M-..	70 [18.49]	..R4		..U4	
350LEN0100-H10XLA00-V5,0-M-..	78 [20.61]	..R4		..U4	
350LE0130-H10XLA00-V5,0-M-..	138 [36.46]	..R5		..U5	
350LE0150-H10XLA00-V5,0-M-..	162 [42.80]	..R5		..U5	
350LEN0160-H10XLA00-V5,0-M-..	198 [52.31]	..R6		..U6	
350LEN0250-H10XLA00-V5,0-M-..	252 [66.57]	..R6		..U6	
350LEN0400-H10XLA00-V5,0-M-..	301 [79.52]	..R6		..U6	
350LEN0630-H10XLA00-V5,0-M-..	450 [118.88]	..R8		..S8	
350LEN1000-H10XLA00-V5,0-M-..	521 [137.63]	..R8		..S8	

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

Ordering code: Electronic switching element for maintenance indicator



Maintenance indicator

Electronic switching element

= WE

Type of signal

1 switching point

= 1SP

2 switching points, 3 LED

= 2SP

2 switching points, 3 LED and signal suppression at 30 °C [86 °F]

= 2SPSU

Connector

M12x1 = Round plug-in connection M12x1, 4-pin

EN 175301-803 = Rectangular plug-in connection, 2-pin design A according to EN-175301-803

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

More information on maintenance indicators is available in the data sheet

Order example: Inline filter with mechanical optical maintenance indicator for $p_{nom.} = 350 \text{ bar}$ [5079 psi] with bypass valve, size 0100, with filter element 10 μm and electronic switching element M12x1 with 1 switching point for hydraulic fluid mineral oil HLP according to DIN 51524.

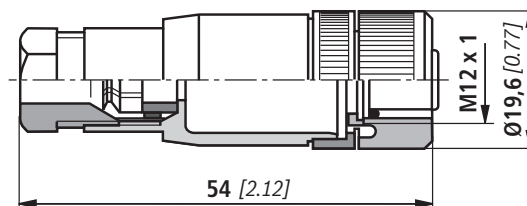
Filter: 350LEN0100-H10XLA00-V5,0-M-R4

Maintenance indicator: WE-1SP-M12x1

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

for electronic switching element with round plug-in connection M12 x 1

Mating connector for K24 4-pin, M12 x 1 with screw connection, cable gland Pg9.

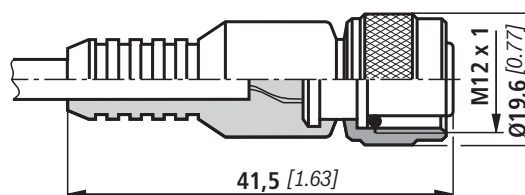


Mating connector for K24-3m 4-pin, M12 x 1 with potted-in PVC cable, 3 m long.

Line cross-section: 4 x 0.34 mm²

Core marking:

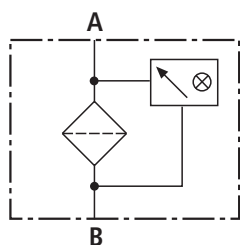
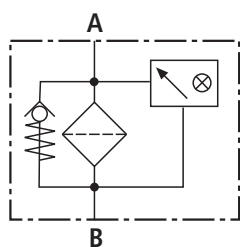
1	Brown
2	White
3	Blue
4	Black



For more round plug-in connections, see data sheet.

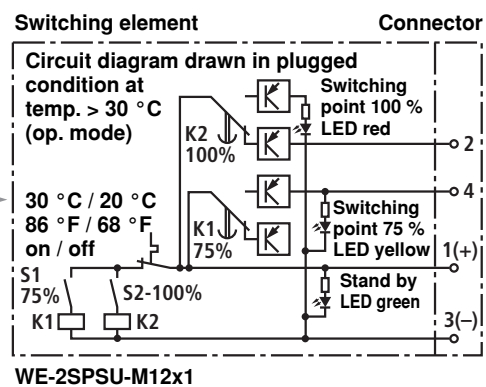
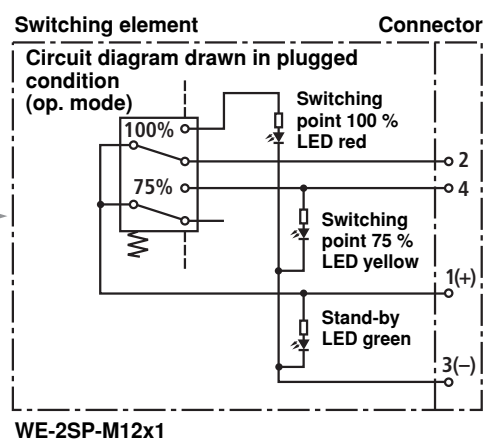
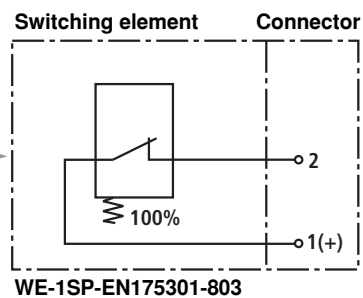
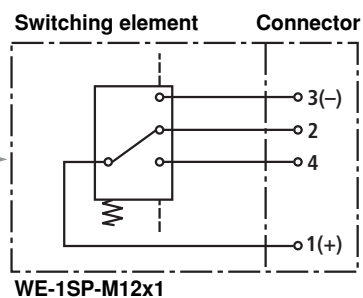
Symbols

Inline filter
with bypass and
mechanical indicator



Inline filter
without bypass and
mechanical indicator

Electronic switching element
for maintenance indicator



Function, section

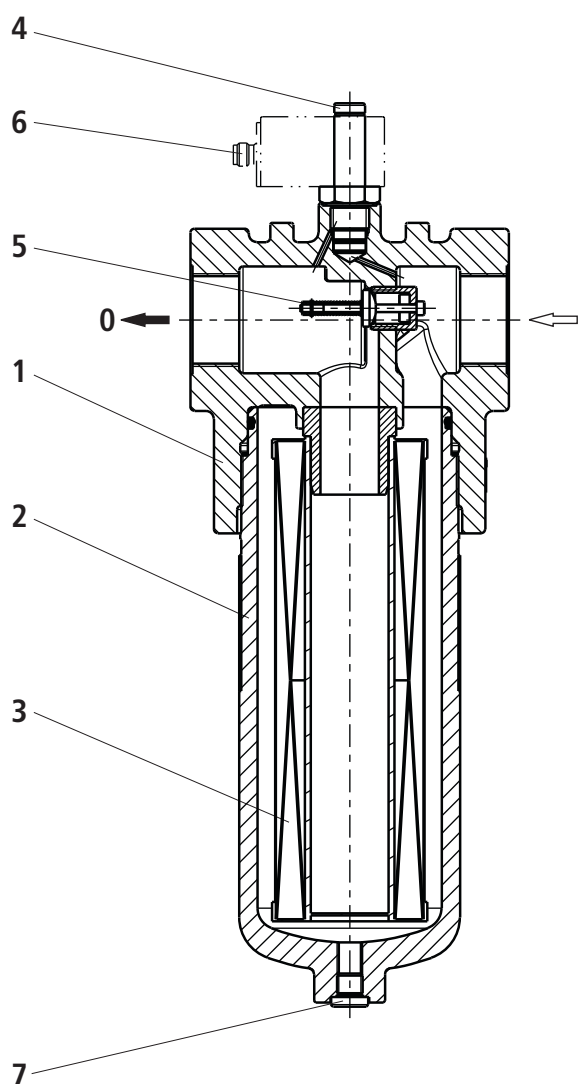
The 350LE(N) Inline filters are suitable for direct installation into pressure lines. They are mostly installed upstream open-loop or closed-loop control units to be protected.

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).

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 O, 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 the 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). With size 1000, the filter bowl has a two-part design.

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 (6), 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]	4.4 [9.73]	5.0 [11.1]	5.9 [13]	10.5 [23.21]
Weight	Size	0160	0250	0400	0630
	kg [lbs]	17.2 [30.02]	19.5 [43.11]	23.0 [50.84]	45.0 [99.47]
Material	Filter head	GGG			
	Filter bowl	Steel			
	Optical maintenance indicator	Brass			
	Electronic switching element	Plastic PA6			

hydraulic

Maximum operating pressure	bar [psi]	350 [5079]
Plage de température du fluide hydraulique	°C [°F]	-10 to +100 [+14 to +212] (shortly -30 [-22])
Fatigue strength according to ISO 10771	Load cycles	> 10 ⁶ with max. operating pressure
Cracking pressure of the bypass valve	bar [psi]	7 ± 0.5 [100 ± 7]
Type of pressure measurement of the maintenance indicator	Pressure differential	
Response pressure of the maintenance indicator	bar [psi]	5 ± 0.5 [72 ± 7]

electrical (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		Change-over	Normally closed contact		Normally closed contact
	2SPSU				Signal switching through at 30 °C [86 °F], Return switching at 20 °C [68 °F]	
Display via LEDs in the electronic switching element 2SP...				Stand-by (LED green); 75 % switching point (LED yellow) 100 % switching point (LED red)		
Protection class according to EN 60529			IP 67			IP 65
Ambient temperature range		°C [°F]	–25 to +85 [–13 to +185]			
For direct voltage above 24 V, spark extinguishing is to be provided for protecting the switching contacts.						
Weight	Electronic switching element: – with round plug-in connection M12x1		kg [lbs]	0.1 [0.22]		

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

Filter element

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

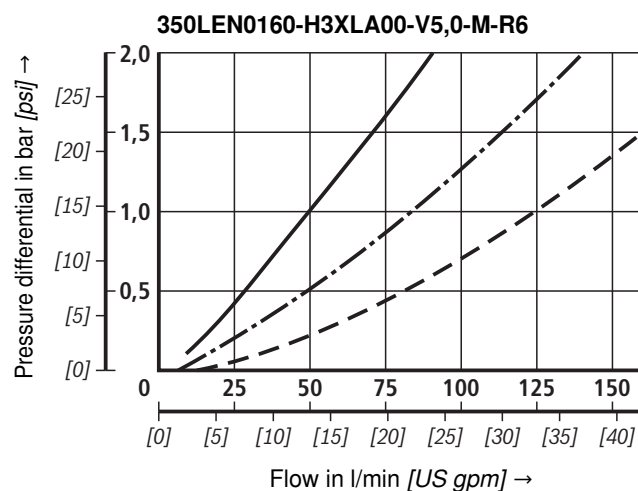
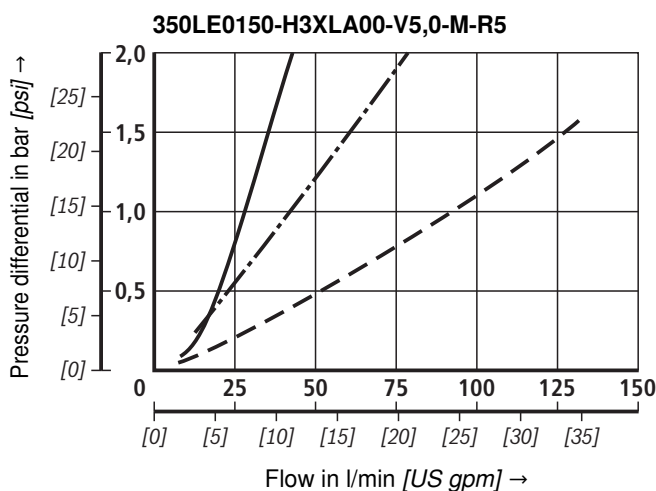
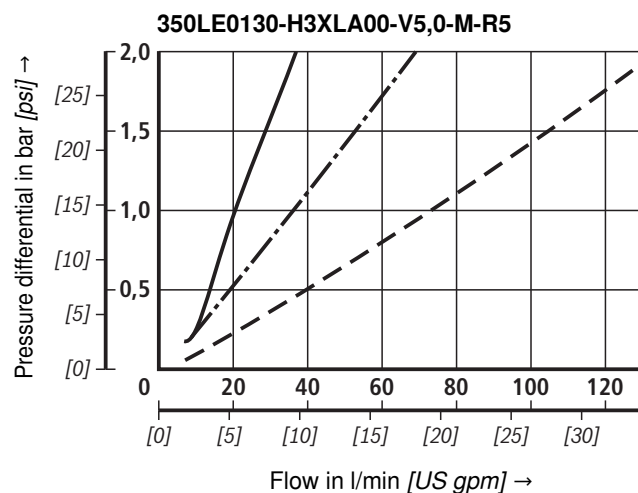
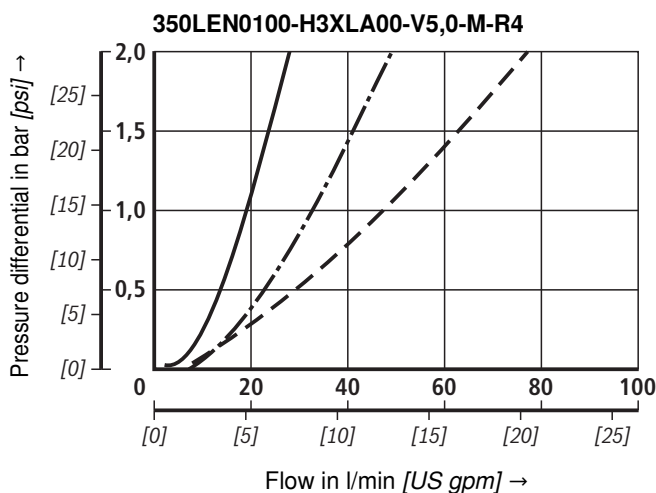
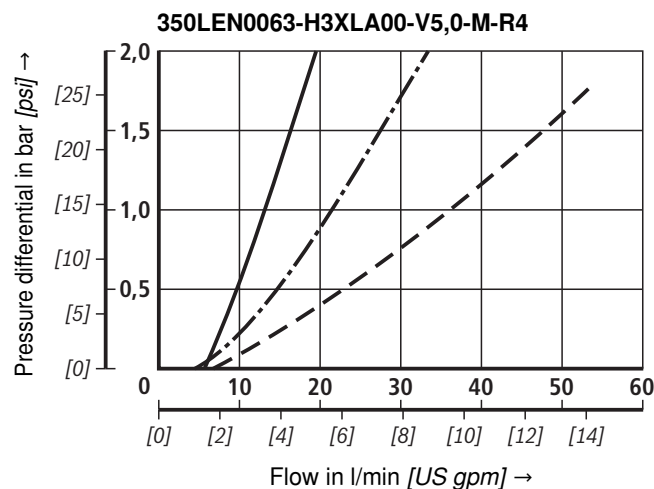
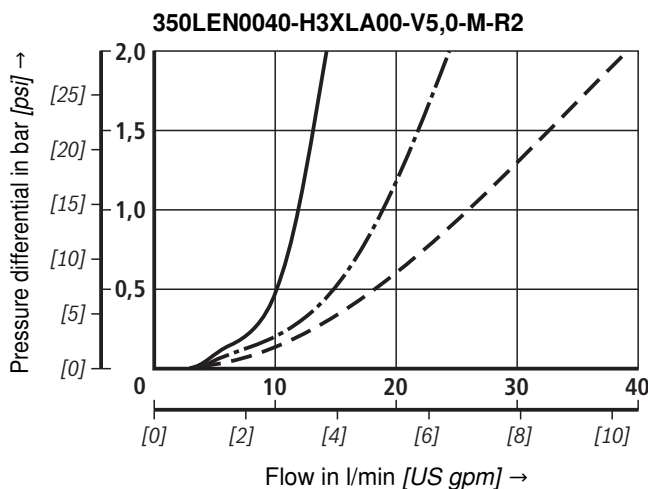
Seal material for hydraulic fluids

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

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

H3XL

 Specific weight: < 0.9 kg/dm³
 Δp -Q characteristic curves for complete filters recommended
 initial Δp for design = 1 bar [14.5 psi]

 Oil viscosity:
 — 140 mm²/s [649 SUS]
 - · - 68 mm²/s [315 SUS]
 - - - 30 mm²/s [139 SUS]


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

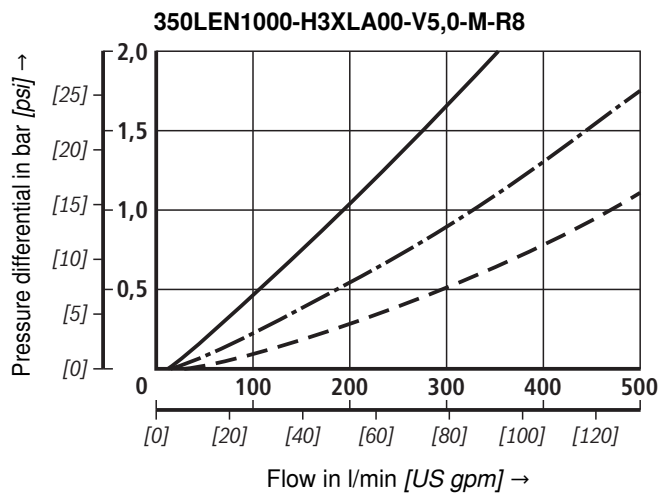
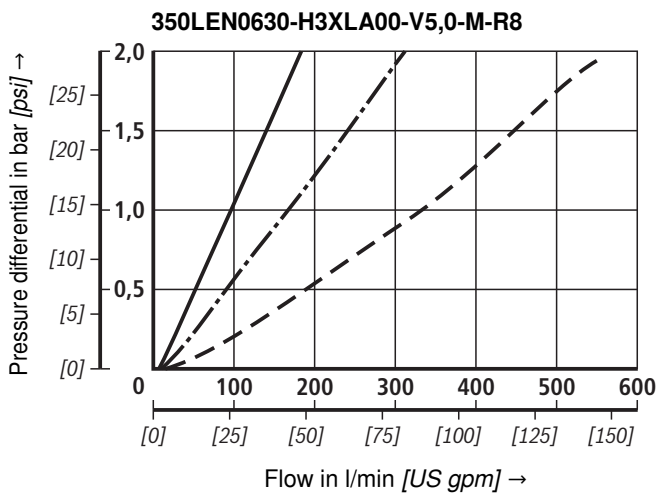
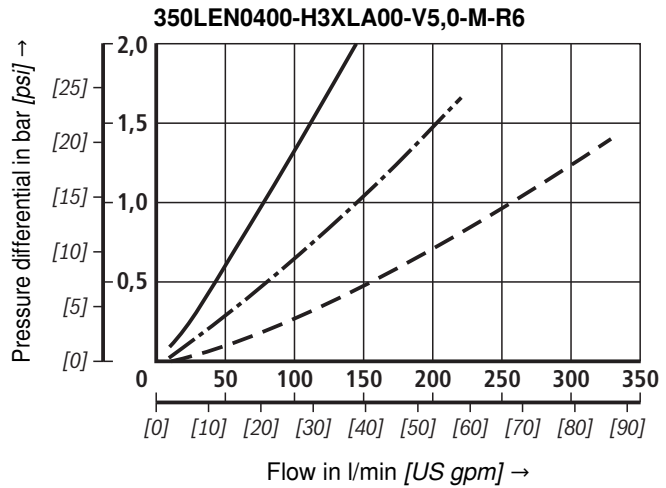
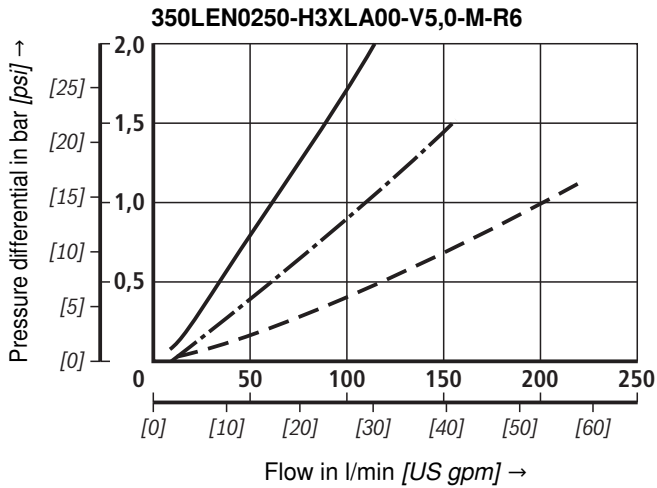
H3XL

 Specific weight: $< 0.9 \text{ kg/dm}^3$
 Δp -Q characteristic curves for complete filters recommended

 initial Δp for design = 1 bar [14.5 psi]

 Oil viscosity:

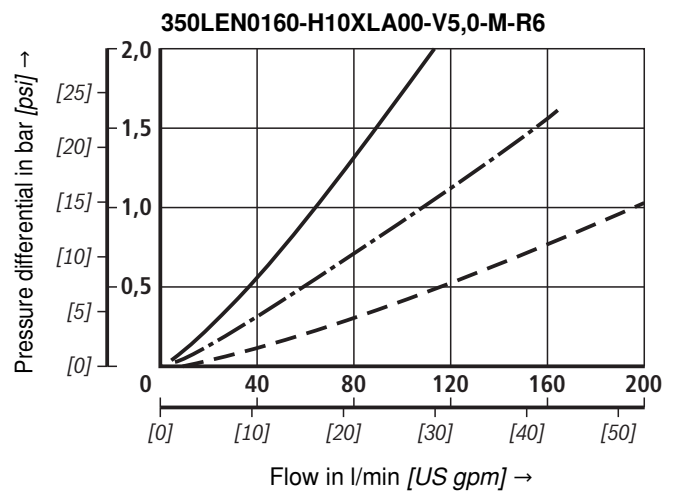
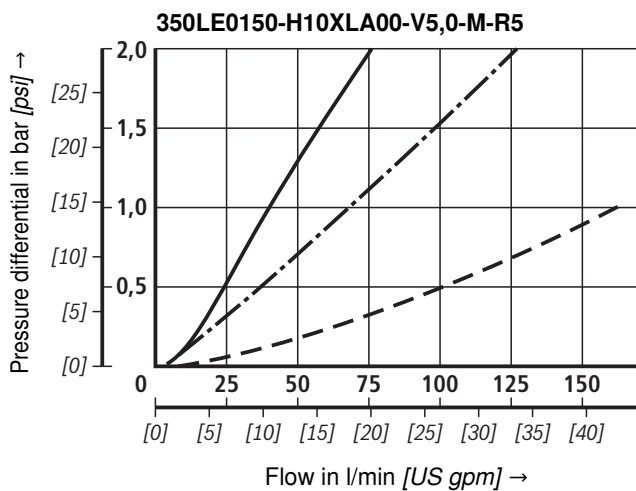
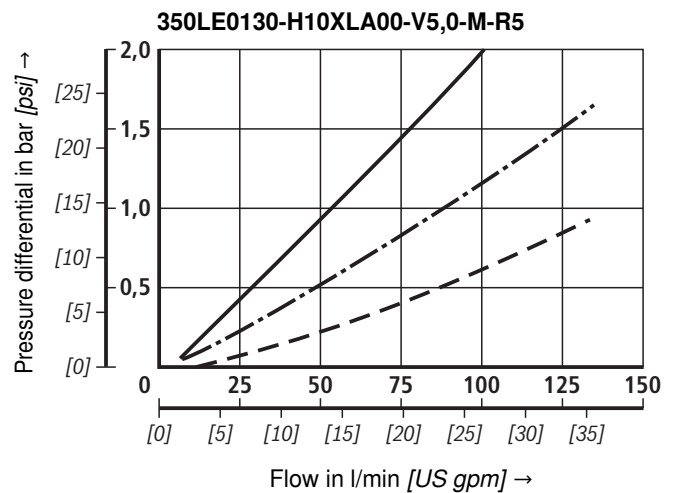
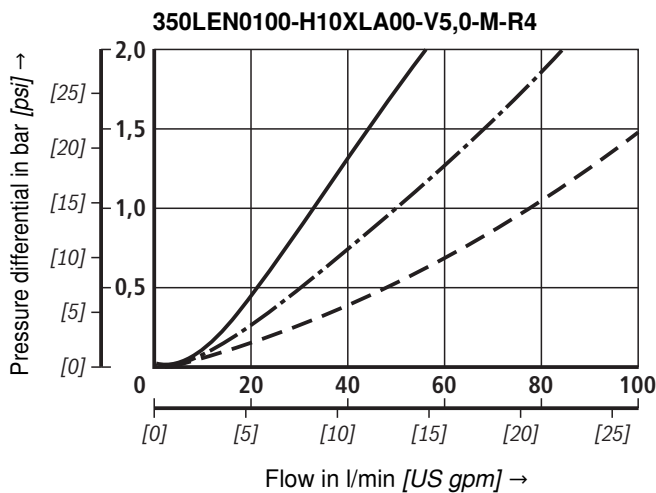
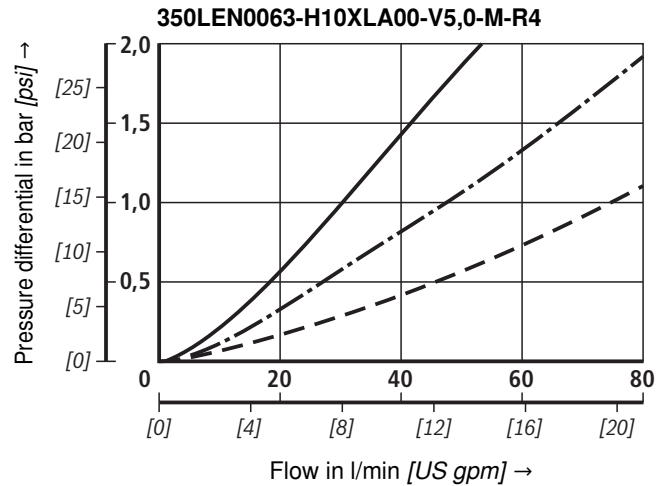
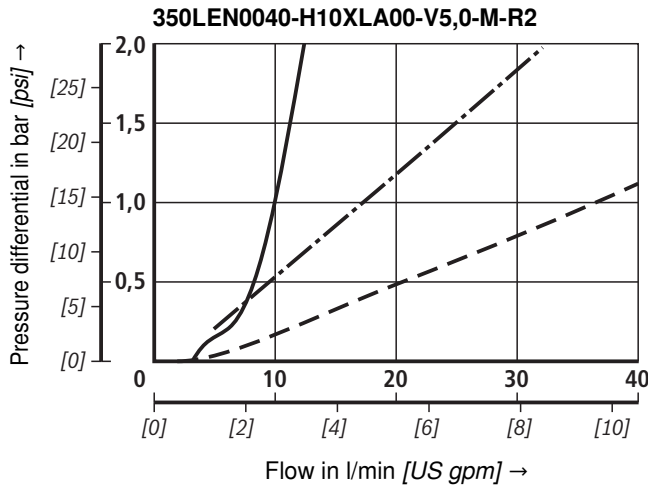
- 140 mm²/s [649 SUS]
- · - 68 mm²/s [315 SUS]
- - - 30 mm²/s [139 SUS]



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

H10XL

 Specific weight: < 0.9 kg/dm³
 Δp -Q characteristic curves for complete filters recommended
 initial Δp for design = 1 bar [14.5 psi]

 Oil viscosity:
 — 140 mm²/s [649 SUS]
 - · - 68 mm²/s [315 SUS]
 - - - 30 mm²/s [139 SUS]


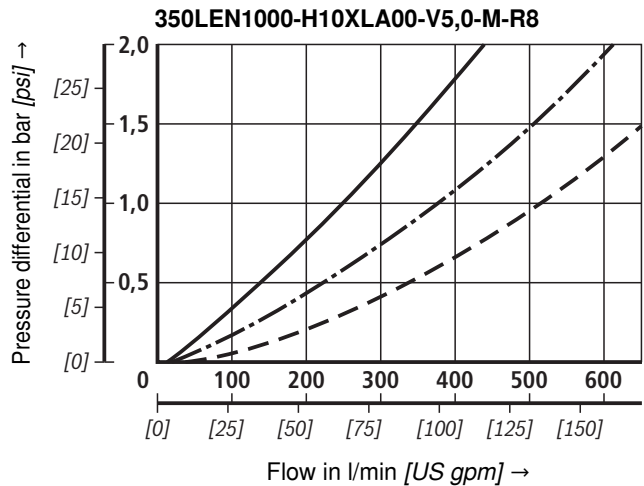
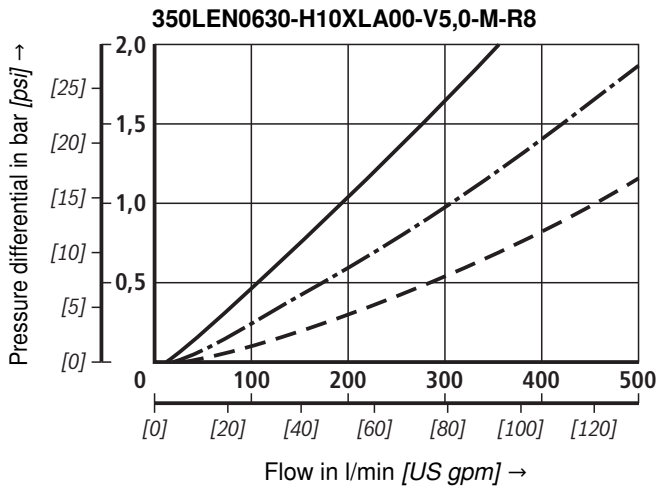
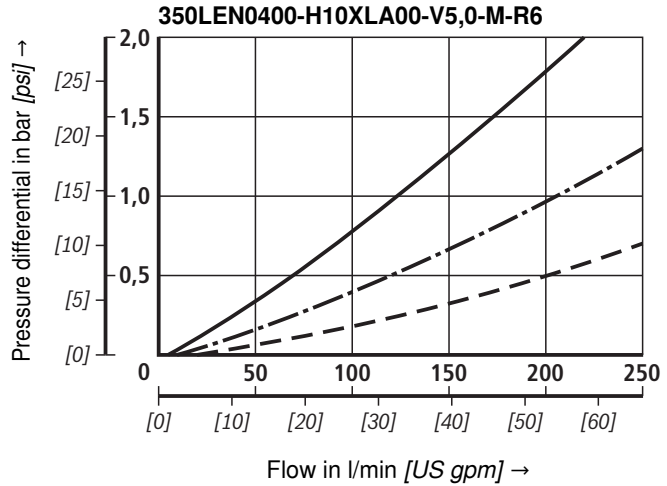
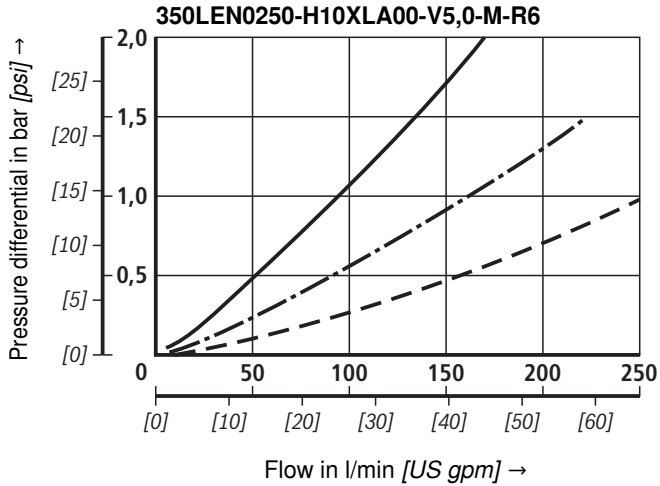
Characteristic curves (measured with HLP46, according to ISO 3968)

H10XL

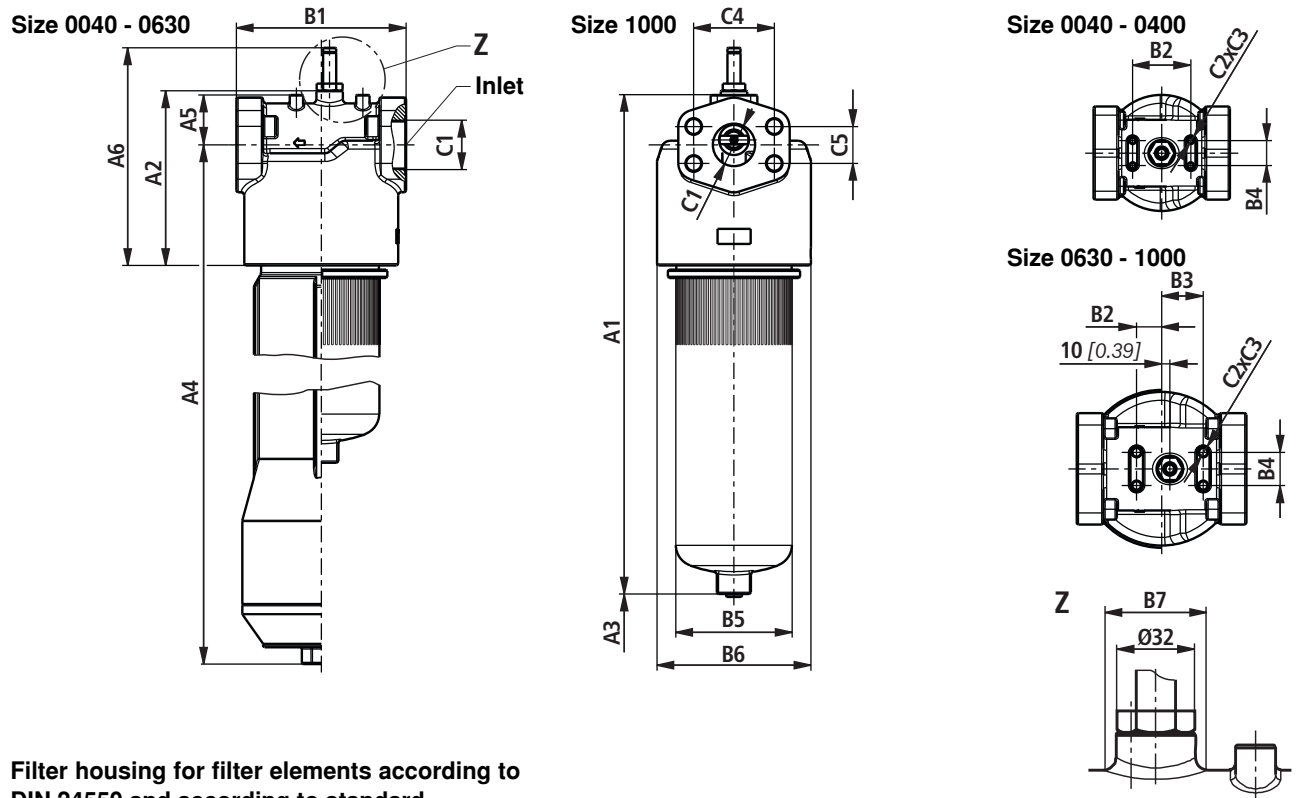
 Specific weight: < 0.9 kg/dm³
 Δp -Q characteristic curves for complete filters recommended

 initial Δp for design = 1 bar [14.5 psi]

Oil viscosity:

 — 140 mm²/s [649 SUS]
 - - 68 mm²/s [315 SUS]
 - - - 30 mm²/s [139 SUS]


Unit dimensions size 0040 to size 1000 (dimensions in mm [inch])



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

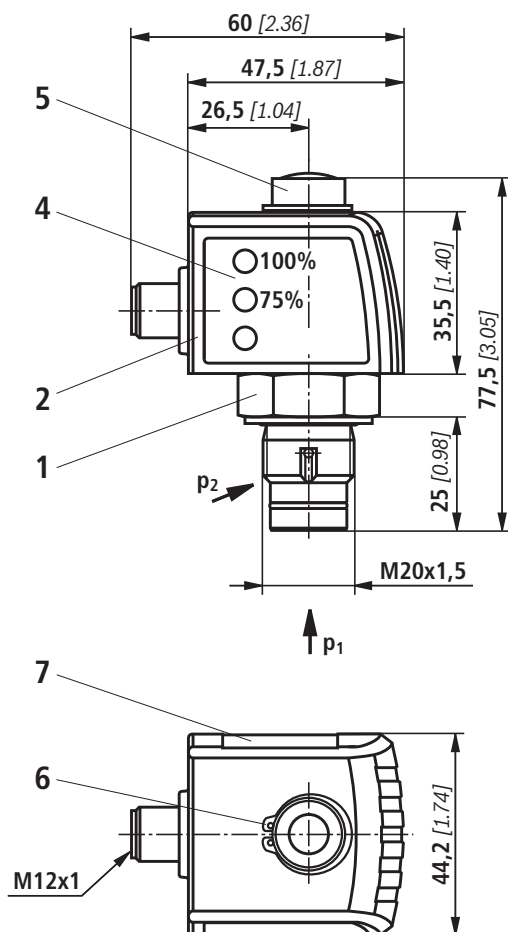
Type 350LE(N)	Content in l [US gal]	A1	A2	A3 ¹⁾	A4	A5	A6	B1 ²⁾	B2			
0040	0.25 [0.07]	203 [7.99]	115 [4.53]	80 [3.15]	158 [6.22]	25 [0.98]	167 [6.57]	92 [3.62]	65 [2.56]			
0063	0.35 [0.09]	266 [10.47]			221 [8.70]							
0100	0.52 [0.14]	356 [14.02]			311 [12.24]							
0130	0.9 [0.24]	328 [12.91]	150 [5.91]	140 [5.51]	273 [10.75]	40 [1.57]	202 [7.95]	132 [5.20]	80 [3.15]			
0150	1.1 [0.29]	364 [14.33]			324 [12.76]							
0160	1.3 [0.34]	322 [12.68]	170 [6.69]		262 [10.31]	50 [1.97]	222 [8.74]	164 [6.46]	70 [2.76]			
0250	1.9 [0.50]	412 [16.22]			352 [13.86]							
0400	3.0 [0.79]	562 [22.13]		502 [19.76]								
0630	4.5 [1.19]	605 [23.82]	210 [8.27]	160 [6.30]	540 [21.26]	60 [2.36]	262 [10.31]	204 [8.03]	30 [1.18]			
1000	6.5 [1.72]	843 [33.19]		650 [25.59]	778 [30.63]							
Type 350LE(N)	B3	B4	B5 Ø	B6 Ø	B7 Ø	Standard (ISO 228)	C1 U... (SAE J1926)	SAE flanges	C2	C3	C4	C5
0040	-	30	64	85	47	G 1/2	SAE 10 7/8-14 UNF-2B	-	M6	8 [0.32]	-	-
0063		[1.18]	[2.52]	[3.35]	[1.85]	G 1	SAE 12					
0100							1 1/16-12 UN-2B					
0130	-	30	92	118	47	G 1 1/4	SAE 20	-	M8	12 [0.47]	79.38 [3.13]	36.5 [1.44]
0150		[1.18]	[3.62]	[4.65]	[1.85]		1 5/8-12 UN-2B					
0160												
0250	-	30	114	140	32	G 1 1/2	SAE 24	SAE 1 1/2" 6000 psi	M8	12 [0.47]	96.82 [3.81]	44.45 [1.75]
0400		[1.18]	[4.49]	[5.51]	[1.26]		1 7/8-12 UN-2B					
0630	50 [1.97]	40 [1.57]	140 [5.51]	185	32	G 2	-	SAE 2" 6000 psi	M12	12 [0.47]	96.82 [3.81]	44.45 [1.75]
1000				[7.28]	[1.26]							
			190 [7.48]									

¹⁾ Servicing height for filter element replacement

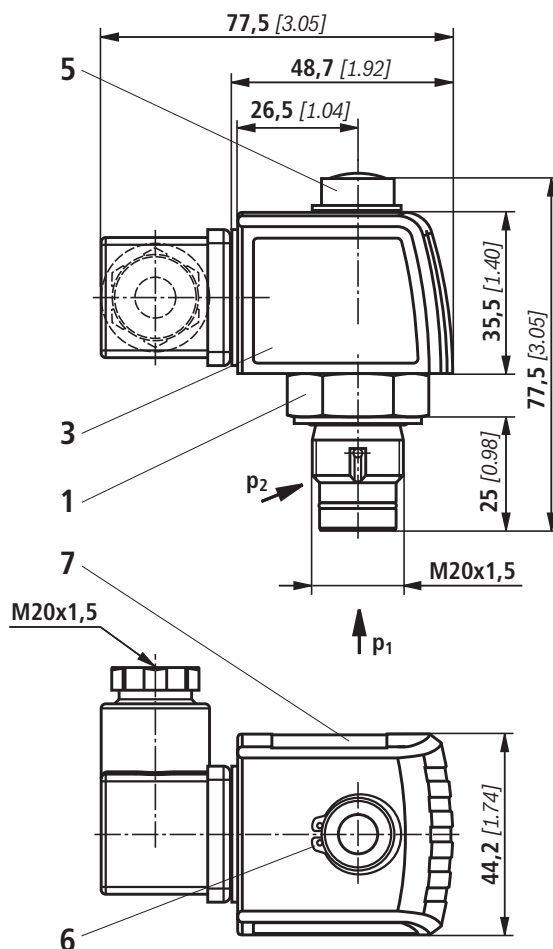
²⁾ For SAE flanges dimension B1 is reduced by 4 mm [0.16 inch]

Maintenance indicator (dimensions in mm [inch])

Pressure differential indicator with assembled 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-pin
- 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 Optical indicator bistable
- 6 Locking ring DIN 471-16x1,
- 7 Name plate

Notes:

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

Switching elements with increased switching power at request.

Mechanical optical maintenance indicator

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

D350LEN0040-0100-M
D350LE0130-0150-M
D350LEN0160-0400-M
D350LEN0630-M
D350LEN1000-M

Installation, commissioning and maintenance

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 in a stressless form. 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?

- After initial start-up of the system, the filter element is to be exchanged.
- Upon start-up in cold condition, the red pushbutton of the optical maintenance indicator (4) may jump out and an electrical signal is output via the switching element. Only push the red pushbutton in again after the operating temperature has been reached. If it jumps out again immediately or if the 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 are pressure holding equipment according to article 1, section 2.1.4 of the pressure equipment directive 97/23/EC (PED). However, on the basis of the exception in article 1, section 3.6 of the PED, hydraulic filters are exempt from the PED if they are not classified higher than category I (guide-line 1/19). They do not receive a CE mark.

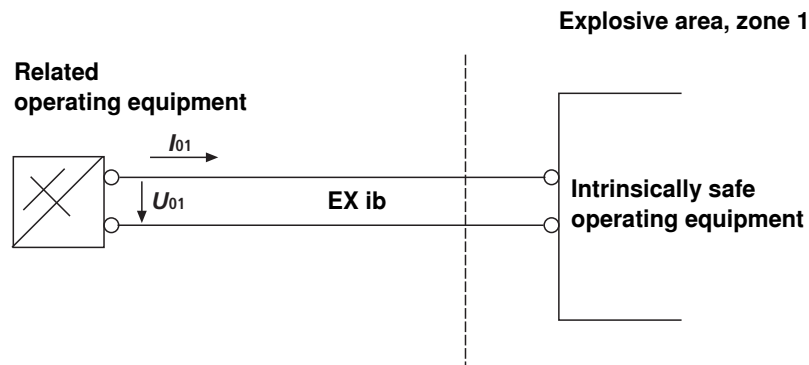
Use in explosive areas according to directive 94/9/EC (ATEX)

The inline filters according to 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 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