

Inline filter with filter element according to DIN 24550

Type 110LEN0040-0400-2X/

RD 51448-2X
Edition: 2023-06
Replace: 2022-09



- ▶ Size according to **DIN 24550**: 0040 to 0400
- ▶ Nominal pressure 110 bar [1595 psi]
- ▶ Connection up to 1 1/2"
- ▶ Operating temperature -20 °C to +100 °C [4 °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
- ▶ Filtration support by means of cyclone-shaped flow path
- ▶ Highly efficient filter materials
- ▶ High collapse resistance of the filter elements
- ▶ Equipped with mechanical/optical maintenance indicator with memory function by default
- ▶ Optional equipment with various electrical switching elements, modular design
- ▶ Optional bypass valve integrated in the filter housing

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Ordering code

Filter

01	02	03	04	05	06	07	08	09	10	10	10
110LE	N	-	2X	-	-	-	-	-	-	-	-

Frame size

01	Inline filter 110 bar [1595 psi]	110LE
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Filter element

02	with filter element according to DIN 24550	N
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Size

03	LEN... (filter element according to DIN 24550)	0040 0063 0100 0160 0250 0400
04	Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions)	2X

Filter rating in µm

05	Absolut (ISO 16889) Non-woven glass fiber media, not cleanable	PWR3 PWR6 PWR10 PWR20
	Nominal Stainless steel wire mesh, cleanable	G10 G25 G40 G60 G100

Differential pressure

06	max. permissible pressure differential of the filter element 30 bar [435 psi], with bypass valve	A00
	max. permissible pressure differential of the filter element 330 bar [4786 psi], without bypass valve	B00

Maintenance indicator

07	Maintenance indicator, mech./visual, switching pressure 0.8 bar [11.6 psi] - bypass cracking pressure 2.5 bar [36 psi]	V0,8
	Maintenance indicator, mech./visual, switching pressure 1.5 bar [21.8 psi] - bypass cracking pressure 2.5 bar [36 psi]	V1,5
	Maintenance indicator, mech./visual, switching pressure 2.2 bar [32 psi] - bypass cracking pressure 3.5 bar [51 psi]	V2,2
	Maintenance indicator, mech./visual, switching pressure 5.0 bar [72.5 psi] - bypass cracking pressure 7 bar [102 psi]	V5,0

Seal

08	NBR seal	M
	FKM seal	V

Connection

09	Frame size	0040	0063-0100	0160-0400		
	Connection					
	G 3/4	●	X		Pipe thread according to ISO 228	R3
	G 1	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					U9
	SAE 24			X		U6
		<input checked="" type="checkbox"/> Standard port <input type="checkbox"/> Alternative connection possibility				

Ordering code Filter

01	02	03	04	05	06	07	08	09	10	10	10								
110LE	N		-	2X		-		-		-		-		-		-		-	

Supplementary information (multiple specifications possible)

10	additional threaded couplings, G 1/4, lateral at clean and dirt side (from NG0130)	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 switching signal of the maintenance indicator is not observed during operation, the filter element may collapse in case of pressure differentials of more than 30 bar [435 psi]

Order example:

110LEN0400-2X/PWR10A00-V5,0-M-R6

Preferred types

110LEN0040-0400, Flow specifications for 30 mm²/s [143 SUS]

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

Typ	Flow		Filter material no.				Replacement filter element material no.
	in l/min [gpm] at Δp = 0.8 bar [11.6 psi] ¹⁾	in l/min [gpm] at Δp = 0.5 bar [7.3psi] ¹⁾					
110LEN0040-2X/PWR3A00-V5,0-M-..	18 [4.76]	12 [3.17]	..R3	R928046899	..U4	R928046914	R928006645
110LEN0063-2X/PWR3A00-V5,0-M-..	27 [7.13]	18 [4.76]	..R4	R928046901	..U4	R928046915	R928006699
110LEN0100-2X/PWR3A00-V5,0-M-..	38 [10.04]	27 [7.13]	..R4	R928046903	..U4	R928046916	R928006753
110LEN0160-2X/PWR3A00-V5,0-M-..	100 [26.4]	68 [18.0]	..R6	R928058079	..U6	R928058091	R928006807
110LEN0250-2X/PWR3A00-V5,0-M-..	140 [37.0]	95 [25.1]	..R6	R928058083	..U6	R928058094	R928006861
110LEN0400-2X/PWR3A00-V5,0-M-..	200 [52.8]	143 [37.8]	..R6	R928058087	..U6	R928058097	R928006915

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

Typ	Flow		Filter material no.				Replacement filter element material no.
	in l/min [gpm] at Δp = 0.8 bar [11.6 psi] ¹⁾	in l/min [gpm] at Δp = 0.5 bar [7.3psi] ¹⁾					
110LEN0040-2X/PWR6A00-V5,0-M-..	20 [5.28]	14 [3.70]	..R3	R928050256	..U4	R928050257	R928006646
110LEN0063-2X/PWR6A00-V5,0-M-..	30 [7.93]	21 [5.55]	..R4	R928050336	..U4	R928050337	R928006700
110LEN0100-2X/PWR6A00-V5,0-M-..	42 [11.10]	30 [7.93]	..R4	R928050416	..U4	R928050417	R928006754
110LEN0160-2X/PWR6A00-V5,0-M-..	115 [30.4]	80 [21.10]	..R6	R928058080	..U6	R928058092	R928006808
110LEN0250-2X/PWR6A00-V5,0-M-..	160 [42.3]	110 [29.1]	..R6	R928058084	..U6	R928058095	R928006862
110LEN0400-2X/PWR6A00-V5,0-M-..	200 [52.8]	160 [42.3]	..R6	R928058088	..U6	R928058098	R928006916

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

Typ	Flow		Filter material no.				Replacement filter element material no.
	in l/min [gpm] at Δp = 0.8 bar [11.6 psi] ¹⁾	in l/min [gpm] at Δp = 0.5 bar [7.3psi] ¹⁾					
110LEN0040-2X/PWR10A00-V5,0-M-..	26 [6.87]	17 [4.50]	..R3	R928046922	..U4	R928046923	R928006647
110LEN0063-2X/PWR10A00-V5,0-M-..	35 [9.25]	25 [6.60]	..R4	R928041640	..U4	R928046924	R928006701
110LEN0100-2X/PWR10A00-V5,0-M-..	47 [12.4]	35 [9.25]	..R4	R928041641	..U4	R928046925	R928006755
110LEN0160-2X/PWR10A00-V5,0-M-..	138 [36.5]	95 [25.1]	..R6	R928058077	..U6	R928058089	R928006809
110LEN0250-2X/PWR10A00-V5,0-M-..	183 [48.3]	124 [32.8]	..R6	R928058081	..U6	R928058093	R928006863
110LEN0400-2X/PWR10A00-V5,0-M-..	240 [63.4]	175 [46.2]	..R6	R928058085	..U6	R928058096	R928006917

¹⁾ An appropriate differential pressure via the filter and measuring device according to ISO 3968. The differential pressure measured on the maintenance indicator is lower.

Filter design

Filter size selection is made easy by using our online FilterSelect tool. The filter can be selected using basic parameters like, flow rates, system pressure, viscosities, etc.. The filter fineness is dependant on the required cleanliness level, application, type of contamination and environmental conditions.

The online tool is very user friendly with step-by-step guidelines.

A PDF file can be created of the selected filter, which contains all the stipulated parameters, including relevant part numbers of the selected filter and its spare parts.

Link FilterSelect:

<http://www.filterselect.de>

Other languages can be selected using the page navigation.

standard search

application: hydraulics for industrial use and applications with lubricating oil

Product category: please select

type: please select

pressure range: please select

filter material: please select

fineness: please select

volume flow rate: [l/min]

viscosity:
 * = working point

kin viscosity 1: 32 [mm²/s]

search via type of medium full-text search medium
 please select
 please select

temp 1: [°C] [°F] kin viscosity 1: [mm²/s]

dyn. Viscosity 1: [cP] density 1: [kg/dm³] kin viscosity 1: [mm²/s]

collapse pressure resistance according to ISO 2941: 30 bar

Ordering code**Accessories** (dimensions in mm [*inch*])**Electronic switching element for maintenance indicators**

01	02	03
WE	-	-

Maintenance indicator

01	electronic switching element	WE
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Type of signal

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

Connector

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

Material numbers of the electronic switching elements

Material no.	Type	Signal	Switching points	Connector	LED	
R928028409	WE-1SP-M12x1	Changeover	1	M12x1	none	
R928028410	WE-2SP-M12x1	Normally open (at 75%) / normally closed contact (at 100%)	2		EN 175301-803	3 pieces
R928028411	WE-2SPSU-M12x1					
R928036318	WE-1SP-EN175301-803	Normally closed contact	1			none

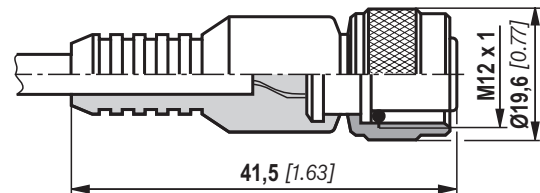
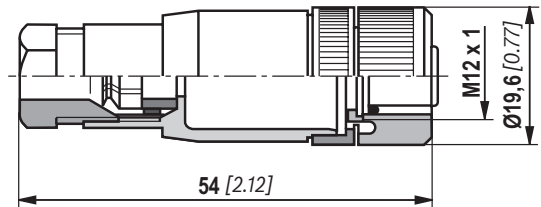
Connection sockets (max. permissible voltage: 50 V)

for electronic switching element with round plug-in connection M12x1

Connection socket suitable for K24 4-pole, M12x1 with screw connection, cable gland Pg9.

Material no. R900031155

Connection socket suitable for K24-3m 4-pole, M12x1 with integrated PVC cable, 3 m long.

Wire cross-section: 4 x 0.34 mm²Wire identification: 1 brown 2 white
 3 blue 4 black**Material no. R900064381**

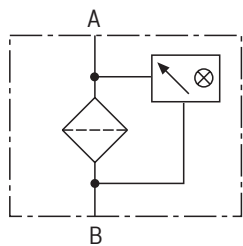
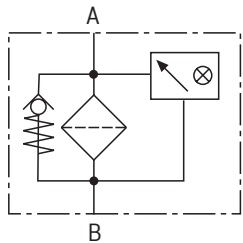
For further round plug-in connections and technical data, refer to data sheet 08006.

Order example:Inline filter with mechanical/optical maintenance indicator for $p_{nom.} = 110 \text{ bar}$ [1595 psi] with bypass valve, size 0250, with filter element 10 µm and electronic switching element M12x1 with 1 switching point.

Filter:	110LEN0250-2X/PWR10A00-V5,0-M-R6	Material no. R928058081
Maintenance indicator:	WE-1SP-M12x1	Material no. R928028409
Connection socket:	Connection socket suitable for K24 4 pole, M12x1	Material no. R900031155

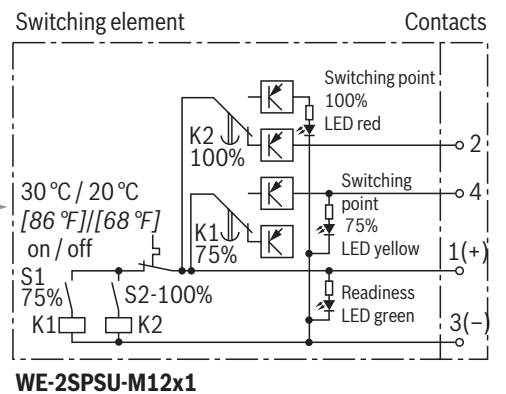
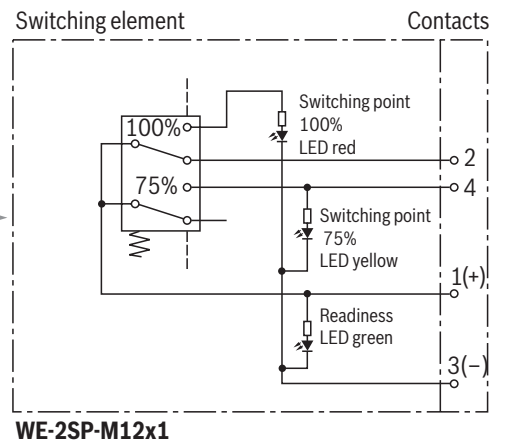
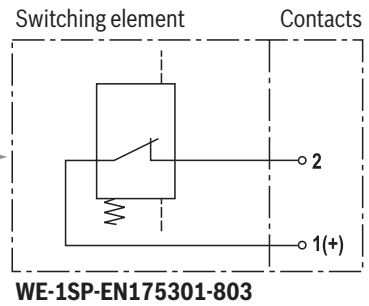
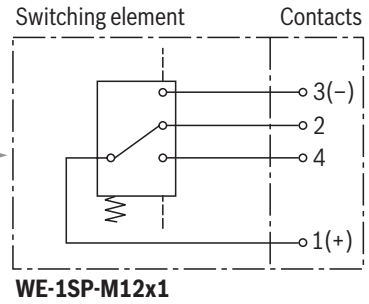
Symbols

Inline filter
with bypass and
mechanical indicator



Inline filter
without bypass with
mechanical indicator

Electronic switching element
for clogging indicator



Function, section

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

The 110LE(N) inline filter is suitable for direct installation into pressure lines. It is installed upstream of components to be protected.

The inline filter consists of filter head (1), a removable filter bowl (2), filter element (3) as well as a mechanical/visual maintenance indicator (4). In case of filters with low-pressure-differential-stable filter elements (= code letter pressure differential A), a by-pass valve (5) is fitted as a standard.

The fluid reaches the filter element (3) through the inlet port where it is cleaned. The filtered particulate settle either in the filter bowl (2) or in the filter element (3). The fluid then exits the filter through the outlet port and enters the hydraulic circuit. The filter housing and all connection elements are designed so that pressure peaks - which may occur in the case of the 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 (6).

The built-in spring (9) prevents any possible vibration of the filter element (3). The compression of the spring (9) keeps the filter element in the filter bed (2) when dismantling.

As a standard, the filter is equipped with a mechanical/optical maintenance indicator (4). The electronic switching element (6) which has to be ordered separately is attached over the mechanical/optical maintenance indicator (4) and is secured in place by a circlip ring.

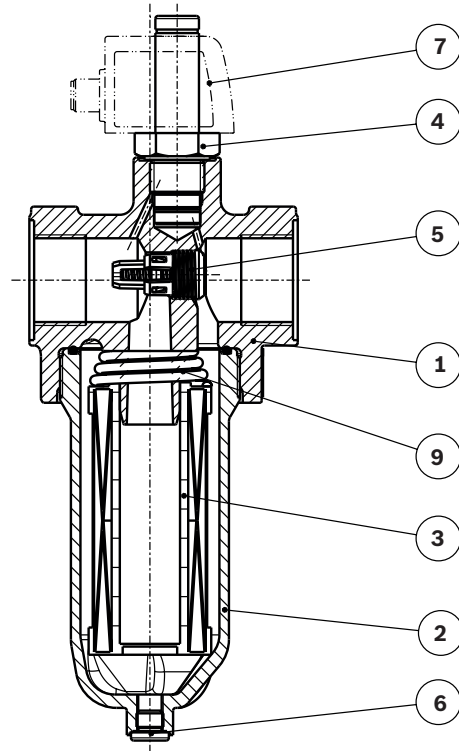
The electronic switching elements with 1 or 2 switching points are connected via a connection socket according to IEC 60947-5-2 or via a cable connection according to EN 17301-803.

From size 0160, it is possible to order the filters with mini-mess couplings (8) for individual pressure measurement and/or fluid sampling. These optional ports are only present if the filter is ordered with these measurement/sampling ports.

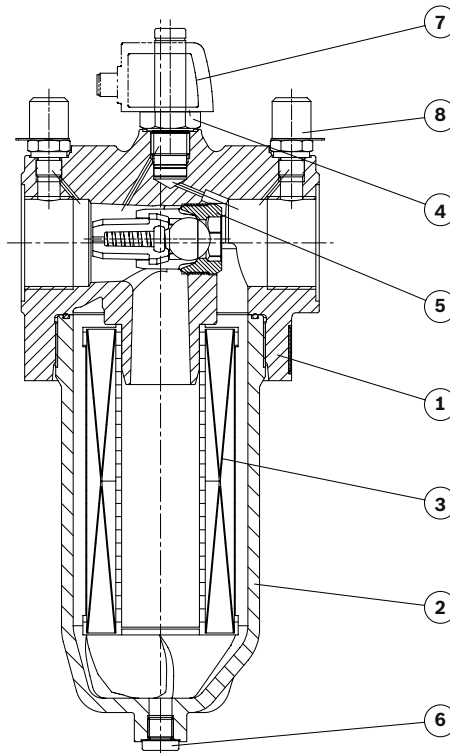
High filtration performance due to the tangential cyclone-effect flow path in the filter housing in connection with a slowdown zone at the bottom of the filter bowl.

WARNING!
 If the maintenance indicator warning is not adhered to, and the filter element is not changed on indication, the by-pass valve will open with the increase in differential pressure and part of the flow will be diverted passed the filter element, to the clean side without being filtered. Thus, effective filtration is no longer guaranteed.

110LEN0040-0100



110LEN0160-0400



Connections for threaded couplings optionally drilled and closed with optional threaded couplings

Technical data

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

general					
Installation position		Vertical			
Ambient temperature range		°C [°F] -20 ... +65 [+4 ... +149] (short periods down to -30 [-22])			
Storage conditions	- Seal NBR	°C [°F] -40 ... +65 [-40 ... +149]; max. relative air humidity 65 %			
	- Seal FKM	°C [°F] -0 ... +65 [+32 ... +149]; max. relative air humidity 65 %			
Weight	NG	0040	0063	0100	
	kg [lbs]	1.1 [2.4]	1.3 [2.9]	1.5 [3.3]	
	NG	0160	0250	0400	
	kg [lbs]	3.5 [7.7]	4.2 [9.3]	4.9 [11]	
Volume	NG	0040	0063	0100	
	l [US gal]	0.3 [0.08]	0.4 [0.11]	0.6 [0.16]	
	NG	0160	0250	0400	
	l [US gal]	1.4 [0.37]	1.9 [0.50]	2.9 [0.77]	
Material	- Filter head	Aluminum			
	- Filter bowl	Aluminum			
	- Bypass valve	PA6 / steel / POM			
	- Seals	NBR / FKM			
	- Optical maintenance indicator	V0,8; 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]	-20 to +100 [+4 to +212]	
Fatigue strength according to ISO 10771 ¹⁾		Load cycles	> 10 ⁶ at rated operating pressure	
Type of pressure measurement of the maintenance indicator		Differential pressure		
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]	0.8 ± 0.15 [11.6 ± 2.2]	2.5 ± 0.25 [36.3 ± 3.6]
			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]		

¹⁾ The service life of the components is e.g. influenced by:

- ▶ The individual load frequency of the application
- ▶ The actually occurring pressure increase rate

The technical specifications apply complying with the specified performance limits. Extended operational resistance/load change upon request.

Technical data

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

electric (electronic switching element)					
Electrical connection		Round plug-in connection M12x1, 4-pole			Standard connection EN 175301-803
	Version	WE-1SP- M12x1	WE-2SP- M12x1	WE-2SPSU- M12x1	WE-1SP- EN175301-803
Contact load, direct voltage	$A_{max.}$	1			
Voltage range	$V_{max.}$	150 (AC/DC)	10 ... 30 (DC)		250 (AC)/200 (DC)
max. switching power with resistive load	W	20			70
Switching type	- 75% signal	-	Normally open contact		-
	- 100% signal	Changeover	Normally closed contact		Normally closed contact
	- 2SPSU			Signal interconnection at 30 °C [86 °F], return switching at 20 °C [68 °F]	
Display via LEDs in the electronic switching element 2SP...			Stand-by (LED green); 75% switching point (LED yellow) 100% switching point (LED red)		
Protection class according to EN 60529		IP 67			IP 65
Ambient temperature range		°C [°F] -25 ... +85 [-13 ... +185]			
For direct voltage above 24 V, spark extinguishing is to be provided in order to protect the switching contacts.					
Weight	electronic switching element	kg [lbs]	0.1 [0.22]		

Filter element				
Glass fiber material PWR...		Single-use element on the basis of inorganic fiber		
		Filtration ratio according to ISO 16889 up to $\Delta p = 5$ bar [72.5 psi]		Achievable oil cleanliness according to ISO 4406 [SAE-AS 4059]
Particle separation	PWR20	$\beta_{20(c)} \geq 200$	$\beta_{21(c)} \geq 1000$	19/16/12 ... 22/17/14
	PWR10	$\beta_{10(c)} \geq 200$	$\beta_{11(c)} \geq 1000$	17/14/10 ... 21/16/13
	PWR6	$\beta_{6(c)} \geq 200$	$\beta_{8(c)} \geq 1000$	15/12/10 ... 19/14/11
	PWR3	$\beta_{5(c)} \geq 200$	$\beta_{6(c)} \geq 1000$	13/10/8 ... 17/13/10
Permissible pressure differential	- A00	bar [psi]	30 [435]	

Compatibility with permitted hydraulic fluids

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

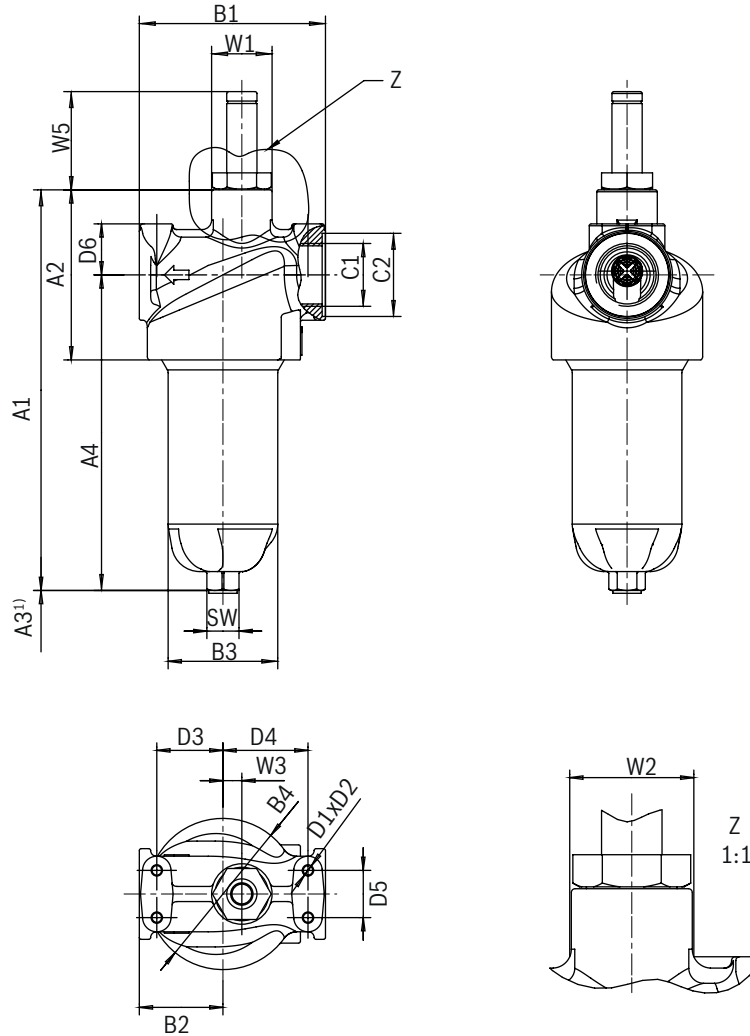
Important information on hydraulic fluids!

- ▶ For further information and data on the use of other hydraulic fluids, please refer to data sheet 90220 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 lower than expected. Filter materials made of filter paper P (cellulose) must not be used, filter elements with glass fiber material (Pure Power PWR... or wire mesh G) must be used instead.

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

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



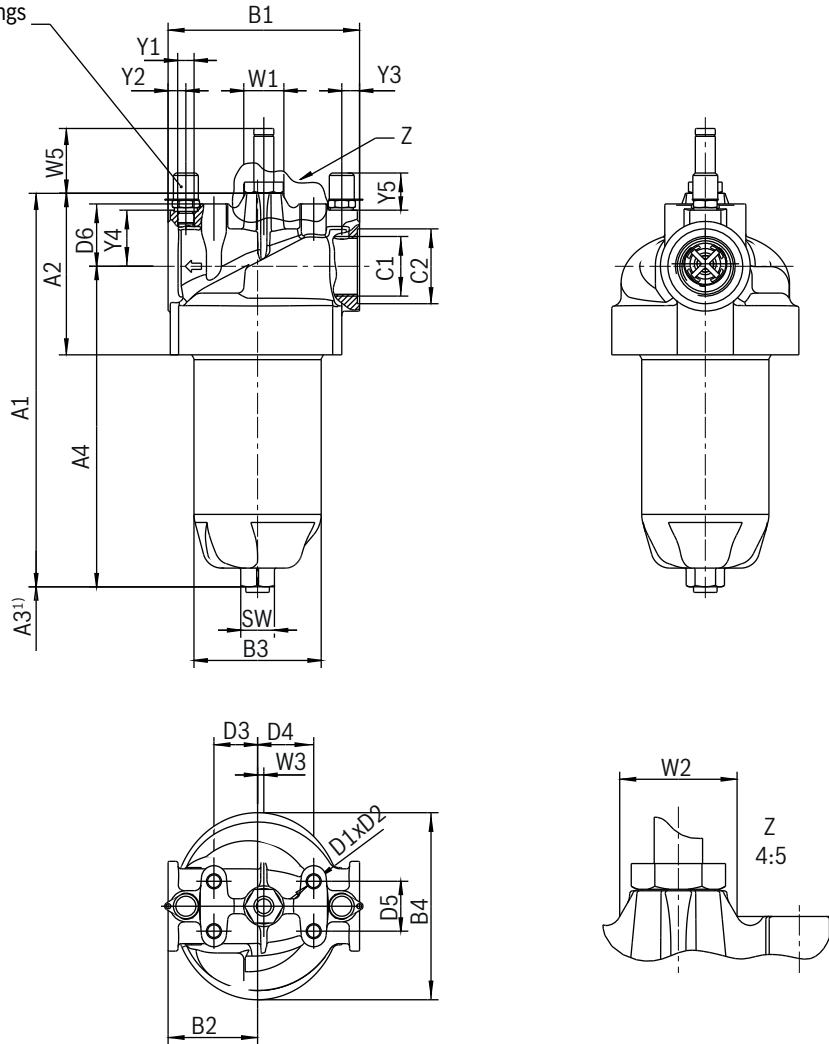
Type	Lengths / Heights				Widths / depths				Ports	
	A1	A2	A3 ¹⁾	A4	B1	B2	B3	B4	C1 connection	C2
110LEN0040	212 [8.35]	90 [3.54]	80 [3.15]	167 [6.57]	98.5 [3.88]	44.25 [1.74]	Ø58 [2.28]	80 [3.15]	G3/4 G1 1 1/16-12 UN-2B	Ø37 [1.46] Ø44 [1.73] Ø41 [1.61]
110LEN0063	272 [10.71]			227 [8.94]						
110LEN0100	362 [14.25]			317 [12.48]						

Type	Fastening						Maintenance indicator				
	D1	D2	D3	D4	D5	D6	W1	W2	W3	W5	SW
110LEN0040	M6	8 [0.31]	35 [1.38]	45 [1.77]	25 [0.98]	27 [1.06]	Ø32 [1.26]	Ø33 [1.33]	10 [0.39]	52 [2.05]	17 [0.67]
110LEN0063											
110LEN0100											

¹⁾ Servicing height

Dimensions: NG0160 - NG0400
(dimensions in mm [inch])

Connections for threaded couplings optionally drilled and closed with optional threaded couplings



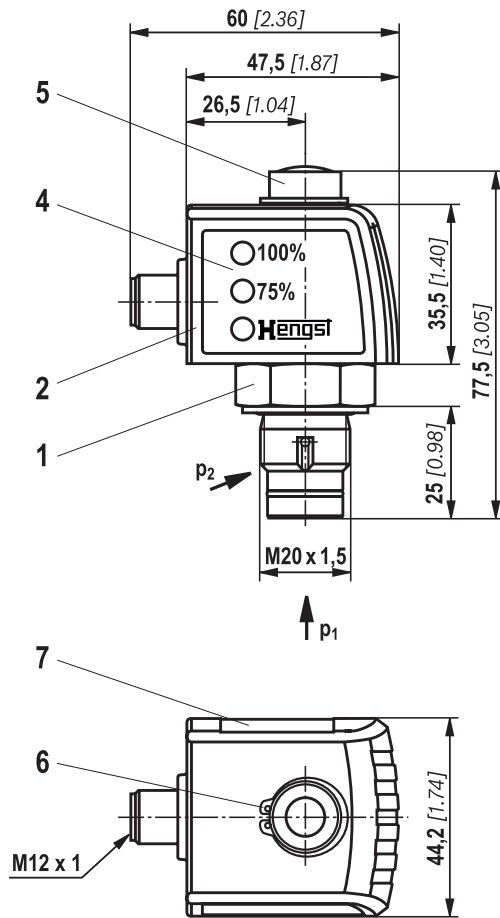
Type	Lengths / Heights				Widths / depths				Ports			
	A1	A2	A3 ¹⁾	A4	B1	B2	B3	B4	C1 connection	C2		
110LEN0160	315.5 [12.4]	129.5 [5.1]	140 [5.51]	257 [10.1]	153.5 [6.04]	71.75 [2.82]	Ø102 [4.02]	150 [5.91]	G1 1/2	Ø60 [2.36]		
110LEN0250	405.5 [16]			347 [13.7]							1 7/8-12 UN-2B	Ø65 [2.56]
110LEN0400	555.5 [21.9]			497 [19.6]								

Type	Fastening						Maintenance indicator					Minimes				
	D1	D2	D3	D4	D5	D6	W1	W2	W3	W5	SW	Y1	Y2	Y3	Y4	Y5
110LEN0160	M12	14 [0.55]	35 [1.38]	45 [1.77]	40 [1.57]	50 [1.97]	Ø32 [1.26]	Ø39 [1.54]	5 [0.2]	52 [2.05]	27 [1.06]	G1/4	14.25 [0.56]	14.25 [0.56]	45 [1.77]	30 [1.18]
110LEN0250																
110LEN0400																

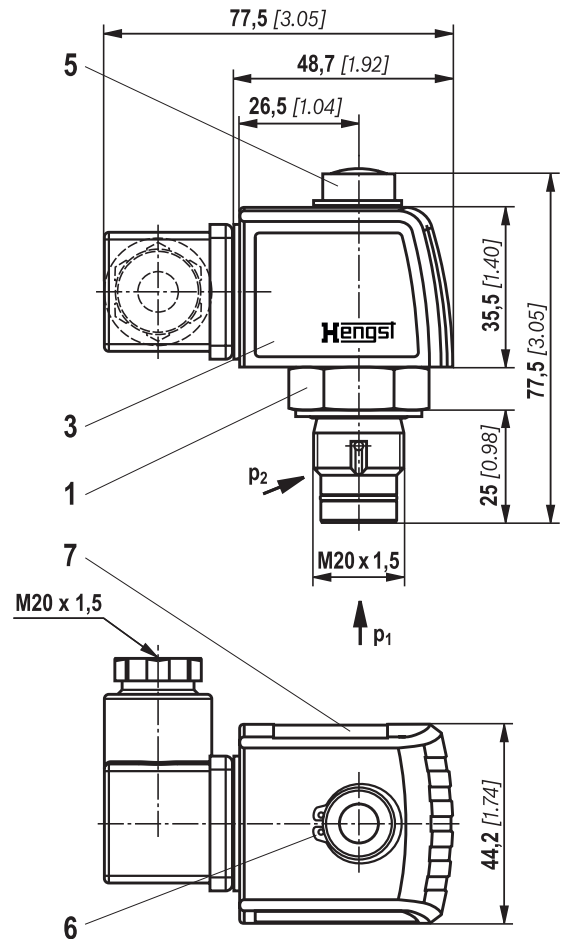
¹⁾ Servicing height

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 $M_{A\max} = 50 \text{ Nm}$ [36.88 lb-ft]
- 2 Switching element with locking ring for electrical maintenance indicator (rotatable by 360°); round plug-in connection M12x1, 4-pole
- 3 Switching element with locking ring for electrical maintenance indicator (rotatable by 360°); rectangular plug-in connection EN175301-803
- 4 Housing with three LEDs: 24 V =
green: stand-by
yellow: switching point 75%
red: switching point 100%
- 5 Optical indicator with memory function
- 6 Locking ring DIN 471-16x1,
material no. R900003923
- 7 Name plate

Notes:

The drawing shows the mechanical/optical maintenance indicator (1) and the electronic switching element (2) (3).

Ordering code

Spare parts

Filter element

01	02	03	04	05	06	07				
2.			-		-	0	-		-	

Filter element

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

Size

02	LEN... (Filter element according to DIN 24550)	0040 0063 0100 0160 0250 0400
	LE... (Filter element according to Hengst Standard)	0130 0150

Filter rating in µm

03	Absolute (ISO 16889; $\beta_{x(c)} \geq 200$)	Glass fiber material, not cleanable	PWR3 PWR6 PWR10 PWR20
	Nominal	Stainless steel wire mesh, cleanable	G10 G25 G40 G60 G100

Differential pressure

04	Max. permissible diff erential pressure of the filter element 30 bar [435 psi], filter with bypass valve	A
	Max. permissible diff erential pressure of the filter element 330 bar [4786 psi], filter without bypass valve	B

Element design

05	Standard adhesive in connection with material steel, tin-plated	00
----	---	----

Bypass valve

06	Without bypass valve	0
----	-----------------------------	---

Seal

07	NBR seal	M
	FKM seal	V

Order example:

2.0100 H10XL-A00-0-M

Material no. R928006755

For further information on Hengst filter elements, please refer to data sheet 51520.

Preferred program replacement element

Replacement element 3 micron		Replacement element 6 micron		Replacement element 10 micron	
R928006645	2.0040 PWR3-A00-0-M	R928006646	2.0040 PWR6-A00-0-M	R928006647	2.0040 PWR10-A00-0-M
R928006699	2.0063 PWR3-A00-0-M	R928006700	2.0063 PWR6-A00-0-M	R928006701	2.0063 PWR10-A00-0-M
R928006753	2.0100 PWR3-A00-0-M	R928006754	2.0100 PWR6-A00-0-M	R928006755	2.0100 PWR10-A00-0-M
R928006807	2.0160 PWR3-A00-0-M	R928006808	2.0160 PWR6-A00-0-M	R928006809	2.0160 PWR10-A00-0-M
R928006861	2.0250 PWR3-A00-0-M	R928006862	2.0250 PWR6-A00-0-M	R928006863	2.0250 PWR10-A00-0-M
R928006915	2.0400 PWR3-A00-0-M	R928006916	2.0400 PWR6-A00-0-M	R928006917	2.0400 PWR10-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
----	------------------------------	----------

Version

03	Design pressure differential M20x1.5	D01
----	--------------------------------------	------------

Switching pressure

04	0.8 bar [11.6 psi]	0,8
	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. operating pressure

06	Switching pressure 0.8 bar [11.8 psi], 160 bar [2321 psi]	160
	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

Mechanical/optical maintenance indicator	Material no.
WO-D01-0,8-M-160	R928038779
WO-D01-1,5-M-160	R928038781
WO-D01-2,2-M-160	R901025312
WO-D01-5,0-M-450	R901025313
WO-D01-0,8-V-160	R928038778
WO-D01-1,5-V-160	R928038780
WO-D01-2,2-V-160	R901066233
WO-D01-5,0-V-450	R901066235

Ordering code

Spare parts

Seal kit

01	02	03	04
D	110LEN		-

01	Seal kit	D
02	Series 50LE and 110LE	110LEN

Size

03	0040-0100	0040-0100-2X/
	0160-0400	0160-0400-2X/

Seal

04	NBR seal	M
	FKM seal	V

Seal kit

Material no.	Description
R928046935	D110LEN0040-0100-2X/-M
R928046937	D110LEN0160-0400-2X/-M
R928051951	D110LEN0040-0100-2X/-V
R928051953	D110LEN0160-0400-2X/-V

Ordering code

Accessories

Threaded coupling incl. hose for bleeding	Material no.
DN2-400/MCS20-MOS-G1/4/630ST3N00Z-P (NBR)	R901360230
DN2-400/MCS20-MOS-G1/4/630ST3F00Z-P (FKM)	R901360231

Assembly, commissioning, maintenance

Assembly

- ▶ The maximum operating pressure of the system must not exceed the maximum permissible operating pressure of the filter (see name plate).
- ▶ During assembly of the filter (see also chapter „Tightening torque“), the flow direction (direction arrows) and the required servicing height of the filter element (see chapter „Dimensions“) are to be considered.
- ▶ Easy filter element exchange is guaranteed in the installation position filter bowl vertically downwards. The maintenance indicator should be arranged in a visible manner.
- ▶ 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 in place 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.

Caution, risk of burning!

During any work at the filter, e.g. filter element exchange and cleaning, any hot operating fluids must be observed. The safety instructions of the machine end-user must be observed.

Maintenance

- ▶ If at operating temperature, the red indicator pin extends out of the mechanical/visual 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 51450.
- ▶ 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.

Caution, risk of burning!

During any work at the filter, e.g. filter element exchange and cleaning, any hot operating fluids must be observed. The safety instructions of the machine end-user must be observed.

- ▶ Via the drain screw (from NG0160 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, if necessary. For detailed cleaning instructions, refer to data sheet 51420.
- ▶ 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“ section) are to be observed.
- ▶ Commission the system.

Assembly, commissioning, maintenance

Warning!

- ▶ Assembly and disassembly work may only take place when the system is depressurized!
- ▶ Filter is under pressure!
- ▶ Remove the filter bowl only if it is depressurized!
- ▶ Do not exchange the maintenance indicator while the filter is under pressure!
- ▶ If the flow direction is not considered during the assembly, the filter element will be destroyed. Particles will get into the system and damage downstream components.

Notices:

- ▶ Work on the filter may only be carried out by trained specialists.
- ▶ Functional and safety warranty only applicable when using genuine Hengst 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

(Dimension in mm [inch])

Fastening

Series 110 ...	LEN0040	LEN0063	LEN0100	LEN0160	LEN0250	LEN0400
Screw/tightening torque with $\mu_{\text{total}} = 0,14$	M6/4.5 Nm [3.3 lb-ft] $\pm 10\%$			M12/35 Nm [26 lb-ft] $\pm 10\%$		
Quantity	4					
Recommended property class of screw	8.8					
Minimum screw-in depth	7.8 mm [0.31 inch]			14 mm [0.55 inch]		

Filter bowl and maintenance indicator

Series 110 ...	LEN0040	LEN0063	LEN0100	LEN0160	LEN0250	LEN0400
Tightening torque filter bowl by means of a 6 sided ring wrench	30 Nm +10 Nm [1528 lbf-ft + 7.4 lb-ft]					
Tightening torque maintenance indicator	50 Nm [37 lb-ft]					
Tightening torque cubic connector screw Switching element EN-175301-803	M3/0.5 Nm [0.37 lb-ft]					

Directives and standardization

Product validation

Hengst filters, the filter elements built into them and filter accessories are tested and quality-monitored according to different ISO test standards:

Pressure pulse test	ISO 10771:2015-08
Filtration performance test (multipass test)	ISO 16889:2008-06
Δp (pressure loss) characteristic curves	ISO 3968:2001-12
Compatibility with hydraulic fluid	ISO 2943:1998-11
Collapse pressure test	ISO 2941:2009-04

The development, manufacture and assembly of Hengst industrial filters and Hengst filter elements is carried out within the framework of a certified quality management system in accordance with ISO 9001:2015.

Classification according to the Pressure Equipment

Directive

The inline filters for hydraulic applications according to 51482 are pressure holding equipment according to article 2, section 5 of the Pressure Equipment Directive 2014/68/EU (PED). However, due to the safety requirements fulfilled in article 4, section 3, hydraulic filters are exempt from the PED if they are not classified higher than category I.

Use in potentially explosive areas according to directive 2014/34/EU

These inline filters are not equipment or components in terms of Directive 2014/34/EU and are not provided with the 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 ISO 80079-36.

The electronic maintenance indicators with one switching point:

WE-1SP-M12x1 **R928028409**

WE-1SP-EN175301-803 **R928036318**

are, according to DIN EN 60079-11:2012, simple, electronic operating equipment without own voltage source.

For classification, fluids from the chapter „Compatibility with permitted hydraulic fluids“ have been taken into consideration.

The intended use is only permissible with fluids of group 2 and within the specified limitations of use (see chapter „Technical data“).

Therefore, these filters are not provided with the CE mark.

According to DIN EN 60079-14:2014, in intrinsically safe electric circuits (Ex ib), this simple, electronic operating equipment may be used in systems without marking and certification.

The inline filters and electronic maintenance indicators described here can be used for the following potentially explosive areas.

	Zone suitability	
Gas	1	2
Dust	21	22

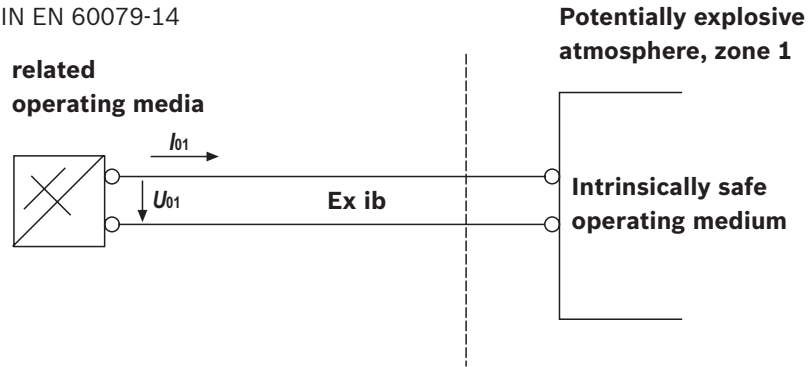
Directives and standardization

Complete filter with mechanical / optical maintenance indicator			
Use /assignment		Gas 2G	Dust 2D
Assignment		Ex h IIC T4...T1 Gb	Ex h IIC T100°C...T450°C Db
Conductivity of the medium	pS/m	min	300
Dust accumulation		max	-
			0,5 mm

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

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

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 to ensure that the maximum permissible ignition temperature is not exceeded in the potentially explosive atmosphere.

- ▶ When using the duplex filters according to 51482 in potentially explosive areas, sufficient equipotential bonding must be ensured. The filter should ideally be earthed via the mounting screws. In this respect, please note that paintwork and oxidic protective layers are not electrically conductive.
- ▶ When exchanging the filter element, the packaging material is to be removed from the replacement element outside the potentially explosive atmosphere.

⚠ Notices:

- ▶ Maintenance by specialist staff only. Instruction by the machine end-user according to DIRECTIVE 1999/92/EC appendix II, section 1.1

- ▶ Functional and safety warranty is only valid when using genuine Hengst spare parts.

Use

Intended use

The filters consist of a filter housing, filter element and maintenance indicator, which serve as components in the sense of the EC Machinery Directive 2006/42/EC in hydraulic machinery for the separation of dirt particles.

The filters are used under the following boundary conditions and limits:

- ▶ Only in systems with fluids of group 2, according to Pressure Equipment Directive 2014/68/EU.
- ▶ Only according to the application and environmental conditions in the section „Technical data“.
- ▶ Only in compliance with the specified performance limits in the section „Technical data“; extended operational durability/load cycles upon request.
- ▶ Only with hydraulic fluids and the intended seals according to the section „Compatibility with hydraulic fluids“
- ▶ Use in potentially explosive areas according to the section „Directives and standardization“.
- ▶ The notes regarding the operating modes according to the section „Assembly, commissioning, maintenance“ must be observed.
- ▶ Compliance with application and environmental conditions according to the technical data.
- ▶ Compliance with the specified performance limits.
- ▶ Use in the original condition, without damage.
- ▶ Maintenance work, such as the replacement of seals, filter elements and optical indicators with original Hengst spare parts, is permissible. Repair work by the customer, particularly on pressurized components, is impermissible.
- ▶ The filters are intended for professional use only and are not for private use.

Improper use

Any use deviating from the intended use is improper and not therefore permissible.

Improper use of the filters includes:

- ▶ Incorrect storage
- ▶ Incorrect transport
- ▶ Lack of cleanliness during storage and assembly
- ▶ Incorrect installation
- ▶ Use of inappropriate/non-permissible hydraulic fluids
- ▶ Exceeding the specified maximum pressures and load cycles
- ▶ Operation outside the approved temperature range
- ▶ Installation and operation in an impermissible device group or category
- ▶ Operation outside the specified limits for the operating voltage, see the section „Technical data“

Hengst Filtration GmbH does not assume any liability for damage caused by improper use. The user assumes responsibility for all risks surrounding improper use.

Environment and recycling

- ▶ The used filter element must be disposed of according to the country-specific statutory environmental protection regulations.
- ▶ At the end of the service life of the filter, the filter components can be recycled according to the country-specific statutory environmental protection regulations.

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