

Inline filter with filter element according to Hengst standard

Type 16 FE 2500 ... 7500

RE 51403

Edition: 2021-04

Replaces: -



- ▶ Sizes according to **according to Hengst standard:**
2500 ... 7500
- ▶ Nominal pressure of 16 bar [232 MPa]
- ▶ Connection up to DN 300
- ▶ Operating temperature of $-10\text{ °C} \dots +100\text{ °C}$ [$14\text{ °F} \dots 212\text{ °F}$]

Features

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

They distinguish themselves by the following:

- ▶ Filter for inline installation, return flow or bypass with several filter elements in one filter housing
- ▶ Special highly efficient filter materials
- ▶ Filtration of very fine particles and high dirt holding capacity across a broad pressure differential range
- ▶ High collapse rating of the filter elements
- ▶ Optionally equipped with mechanical/optical maintenance indicator with memory function
- ▶ Optional equipment with various electronic switching elements, modular design
- ▶ Optional bypass valves integrated in the filter elements

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Ordering code

Filter

01	02	03	04	05	06	07	08	09	10	11	11	11
16 FE			- A00	- 0			- D0		0		-	-

Series

01	Inline filter, 16 bar [232 psi]	16 FE
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Size

02	FE... (Filter element according to Hengst standard)	2500 3000 4000 6000 7000 7500
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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
		Filter paper, not cleanable	P10 P25

Pressure differential

04	Max. admissible pressure differential of the filter element of 30 bar [435 psi]	A00
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Solenoid

05	Without a solenoid	0
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Bypass valve

06	Filter element without bypass valve	0
	Filter element with bypass valve, cracking pressure of 3 bar [44 psi]	6

Maintenance indicator

07	Maintenance indicator, mech./optical, switching pressure of 0.8 bar [11.6 psi]	V0,8
	Maintenance indicator, mech./optical, switching pressure of 1.5 bar [21.8 psi]	V1,5
	Maintenance indicator, mech./optical, switching pressure of 2.2 bar [32 psi]	V2.2

Port

08	Frame size	2500	3000 ... 4000	6000	7000	7500	D0
	Port						
	DN 125	•					
	DN 150		•				
	DN 200			•			
	DN 250				•		
	DN 300					•	
<input checked="" type="checkbox"/> Standard port							

Seal

09	NBR seal	M
	FKM seal	V

Material

10	Standard	0
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Ordering code Filter

01	02	03	04	05	06	07	08	09	10	11	11	11					
16	FE		-	A00	-	0			-	D0		0		-		-	

Supplementary information

11	Without supplementary information	0
	Bleed valve	E
	Cover removal device (as of NG4000)	LD
	Manufacturer's inspection certificate M according to DIN 55350 T18 Z1	Z1

Order example:

16 FE 2500 PWR10-A00-06V2,2-D0M00

Material number: R928001249

Further models on request.

Preferred types

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

Inline filter 16 FE, filter rating of 3 µm

Type	Flow in l/min [gpm] at Δp = 0.5 bar [7.25 psi] ¹⁾	Material no. Filter	Material no. Replacement filter element
16 FE 2500 PWR3-A00-06V2,2-D0M00	1390 [367.20]	R928001243	3x R928007113
16 FE 3000 PWR3-A00-06V2,2-D0M00	1480 [390.97]	R928001244	3x R928007113
16 FE 4000 PWR3-A00-06V2,2-D0M00	2100 [554.76]	R928001245	4x R928007131
16 FE 6000 PWR3-A00-06V2,2-D0M00	3250 [858.56]	R928001246	6x R928007131
16 FE 7000 PWR3-A00-06V2,2-D0M00	5050 [1334.07]	R928001247	10x R928007131
16 FE 7500 PWR3-A00-06V2,2-D0M00	5550 [1452.95]	R928001248	10x R928007131

Inline filter 16 FE, filter rating of 10 µm

Type	Flow in l/min [gpm] at Δp = 0.5 bar [7.25 psi] ¹⁾	Material no. Filter	Material no. Replacement filter element
16 FE 2500 PWR10-A00-06V2,2-D0M00	2400 [634.01]	R928001249	3x R928007115
16 FE 3000 PWR10-A00-06V2,2-D0M00	2950 [779.31]	R928001250	3x R928007115
16 FE 4000 PWR10-A00-06V2,2-D0M00	3540 [935.17]	R928001251	4x R928007133
16 FE 6000 PWR10-A00-06V2,2-D0M00	5750 [1518.99]	R928001252	6x R928007133
16 FE 7000 PWR10-A00-06V2,2-D0M00	8100 [2139.79]	R928001253	10x R928007133
16 FE 7500 PWR10-A00-06V2,2-D0M00	11800 [3117.23]	R928001254	10x R928007133

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

Ordering codes**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 plug-in connection, 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	without
R928028410	WE-2SP-M12x1	Normally open contact (at 75%) / normally closed contact (at 100%)	2		3 pieces
R928028411	WE-2SPSU-M12x1				
R928036318	WE-1SP-EN175301-803	Normally closed contact	1	EN 175301-803	without

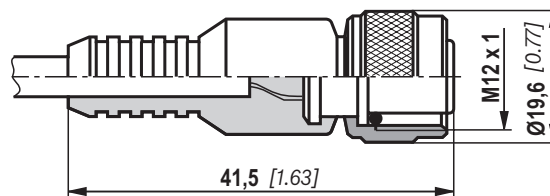
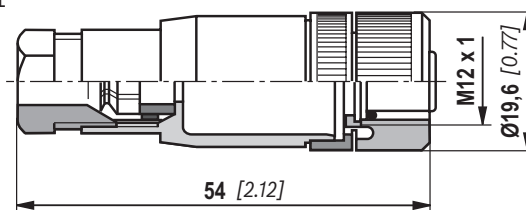
Mating connectors (max. permissible voltage of 50 V)

for electronic switching element with round plug-in connection M12x1

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

Material no. R900031155

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

Line cross-section: 4 x 0.34 mm²Core marking: **1** brown **2** white
 3 blue **4** black**Material no. R900064381**

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

Order example:Inline filter with mechanical/optical maintenance indicator for $p_{nom} = 16 \text{ bar}$ [232 psi] with bypass valve, size 3000, with 10 µm filter element and electronic switching element M12x1 with one switching point.**Filter with mech./opt. maintenance indicator:** 16 FE 3000 PWR10-A00-06V2,2-D0M00 **Material no. R928001250****Electr. switching element:** WE-1SP-M12x1 **Material no. R928028409****Mating connector:** Mating connector suitable for K24 4-pole, M12x1 with screw connector, Cable gland Pg9. **Material no. R900031155**

Filter design

Easy selection of the filter size is made possible by the FilterSelect online tool. The filter can be designed using the operating pressure, flow and fluid system parameters. The required filter rating is based on the application, the sensitivity to contamination of the components and the environmental conditions.

The program leads you through the menu on a step-by-step basis.

A documentation of the filter selection can finally be created in the form of a PDF file. This file contains the entered parameters, the designed filter with material number including spare parts, and the pressure loss curves.

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]

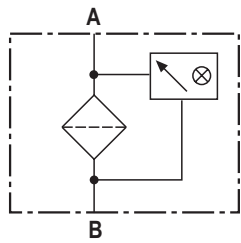
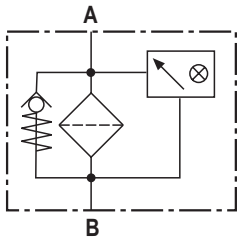
dyn. Viscosity 1: [] [cP] density 1: [] [kg/dm³] kin viscosity 1: [] [mm²/s]

collapse pressure resistance according to ISO 2941: 30 bar

Start search

Symbols

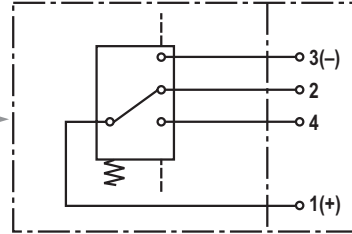
Inline filter
with bypass and
mechanical indicator



Inline filter
without bypass and with
mechanical indicator

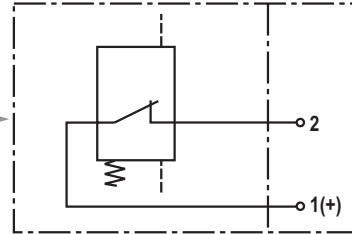
**Electronic switching element
for maintenance indicator**

Switching element Connector



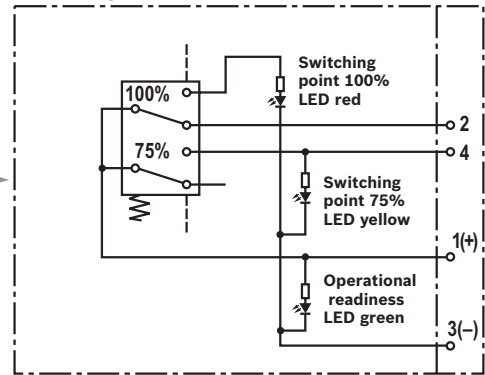
WE-1SP-M12x1

Switching element Connector



WE-1SP-EN175301-803

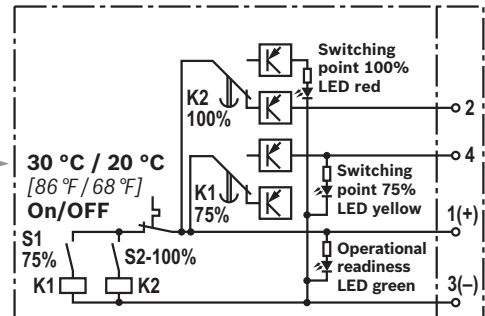
Switching element Connector



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 condition)

Function, section

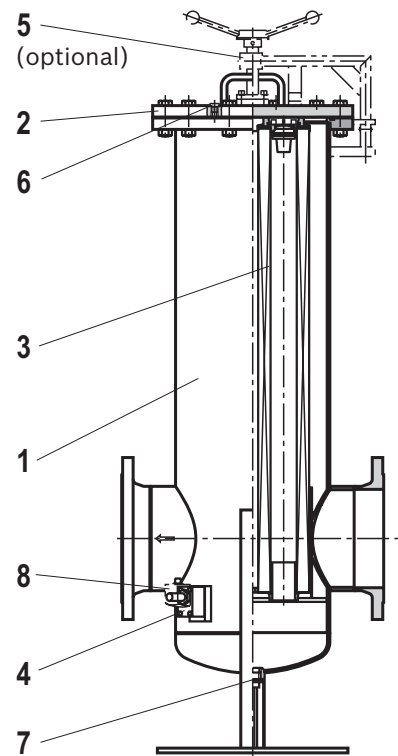
The 16 FE inline filter is suitable for inline installation.

Essentially, it consists of filter housing (1), a filter cover (2), several filter elements (3) and mechanical/optical maintenance indicator (4) and an optional cover removal tool (5). The fluid reaches the filter element (3), where it is cleaned, via the inlet. The dirt particles filtered out collect in the filter elements (3). The filter elements are filled indirectly.

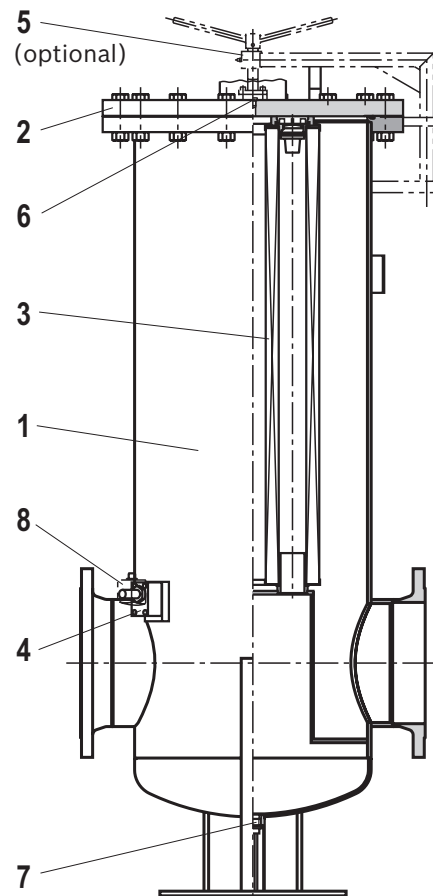
The filtered fluid enters the hydraulic circuit via the outlet. The filter housing and all connection elements are designed so that pressure peaks – as they may occur, for example, in the event of abrupt opening of large control valves due to the accelerated fluid quantity – can be securely absorbed. A bleed screw (6) and drain screw (7) is included in standard equipment for all sizes.

Instead of a bleed screw, an optional bleed valve – option code E – (6) is possible.

An electronic switching element can be added to the mechanical/optical maintenance indicator in order to integrate the maintenance indicator. The electronic switching element (8) must be attached to the mechanical/optical maintenance indicator (4) and held by means of a locking ring. The electronic switching elements are connected by means of a mating connector or cable connection. The electronic switching element must be ordered separately.



16 FE 2500 ... 6500



16 FE 7000 ... 7500

WARNING!

- If the maintenance indicator is not observed while the element is exchanged, the optional bypass valves will open as 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 values, please consult us!)

General				
Installation position		Vertical		
Ambient temperature range		°C [°F]	-10 ... +65 [14... +149] (short-time to -30 [-22])	
Storage conditions	▶ NBR seal	°C [°F]	-40 ... +65 [-40... +149]; max. relative air humidity of 65%	
	▶ FKM seal	°C [°F]	-20 ... +65 [-4... +149]; max. relative air humidity of 65%	
Mass filter	Size	2500	3000	4000
	kg [lbs]	104 [229]	108 [238]	140 [308]
	Size	6000	7000	7500
	kg [lbs]	168 [370]	333 [734]	355 [782]
Cover weight	Size	2500	3000	4000
	kg [lbs]	21 [46]	21 [46]	26 [57]
	Size	6000	7000	7500
	kg [lbs]	29.5 [65]	91 [200]	91 [200]
Volume	Size	2500	3000	4000
	l [US gal]	51 [13]	53 [14]	94 [24]
	Size	6000	7000	7500
	l [US gal]	149 [39]	335 [88]	344 [90]
Material	▶ Filter housing\filter cover		Steel	
	▶ Connection flange		Steel according to DIN 2633	
	▶ Bypass valve		Steel/plastic	
	▶ Seals		NBR or FKM	
	▶ Visual maintenance indicator		Aluminum	
	▶ Electronic switching element		Plastic PA6	

Hydraulic					
Maximum operating pressure		Bar [psi]	16 [7.25]		
Hydraulic fluid temperature range		°C [°F]	-10 ... +100 [+14... +212]		
Minimum conductivity of the medium		pS/m	300		
Fatigue strength according to ISO 10771		Load cycles	> 10 ⁶ at 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]	0.8 ± 0.15 [11.6 ± 2.2]		3.0 ± 0.3 [43.51 ± 4.4]
			1.5 ± 0.2 [21.8 ± 2.9]		
			2.2 ± 0.3 [31.9 ± 4.4]		
Filtration direction		From the outside to the inside			

Technical data

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

Electrical (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 at resistive load	W	20		70
Switching type	▶ 75% signal	–	Normally open contact	
	▶ 100% signal	Changeover	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 ... +85 [-13 ... +185]		
For direct voltage above 24 V, spark extinguishing is to be provided for protecting the switching contacts.				
Weight		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 of up to $\Delta p = 5$ bar [72.5 psi]	Achievable oil cleanliness according to ISO 4406 [SAE-AS 4059]
	PWR20	$\beta_{20}(c) \geq 200$	19/16/12 – 22/17/14
	PWR10	$\beta_{10}(c) \geq 200$	17/14/10 – 21/16/13
	PWR6	$\beta_6(c) \geq 200$	15/12/10 – 19/14/11
	PWR3	$\beta_5(c) \geq 200$	13/10/8 – 17/13/10
Admissible pressure differential	▶ A00	Bar [psi]	30 [435]

For detailed information on Hengst filter elements, please refer to data sheet 51420.

Compatibility with permitted hydraulic fluids

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oil	HLP	NBR	DIN 51524
Bio-degradable	▶ Insoluble in water	HETG	VDMA 24568
		HEES	
	▶ Soluble in water	HEPG	VDMA 24568
Flame resistant	▶ Water free	HFDU, HFDR	VDMA 24317
	▶ Containing water	HFAS	DIN 24320
		HFAE	
		HFC	

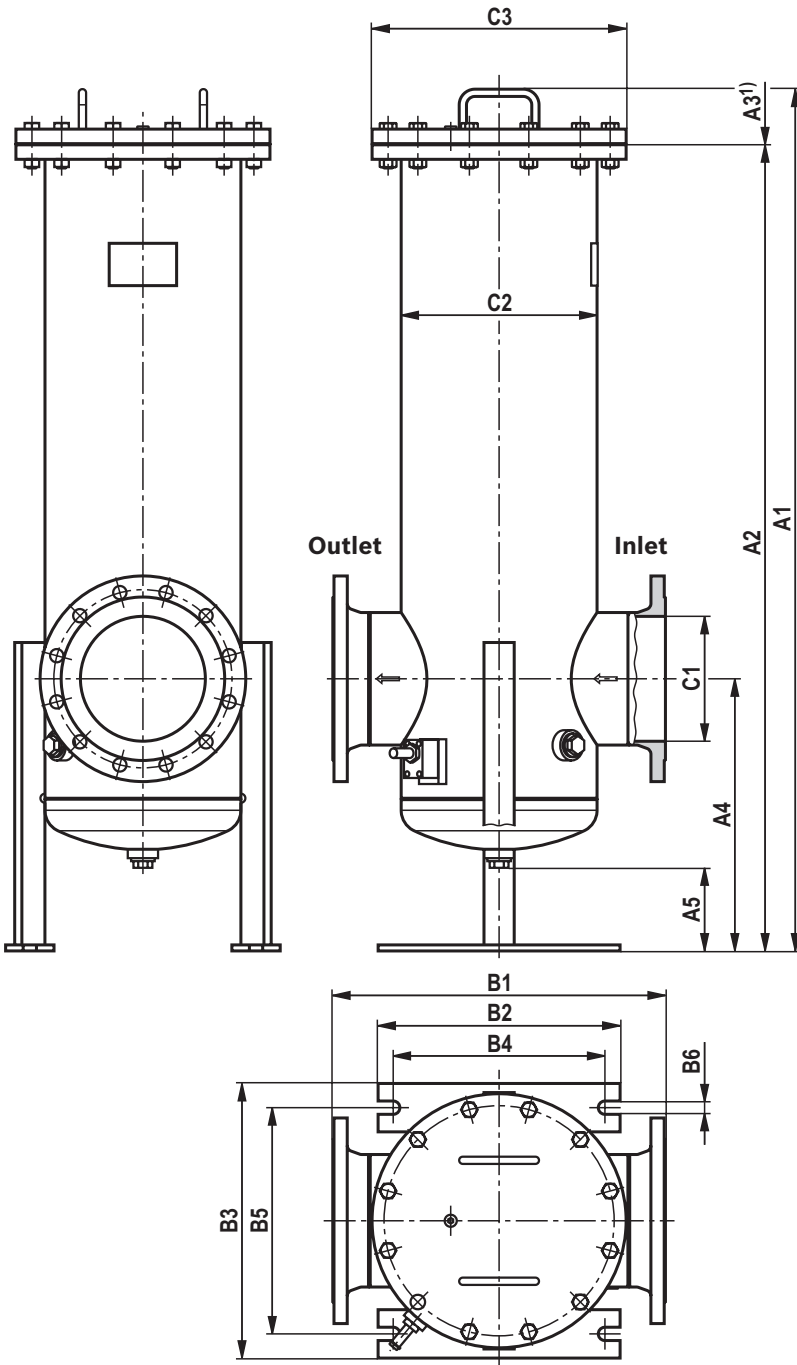
Important information on hydraulic fluids:

- ▶ For more 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 less than expected.

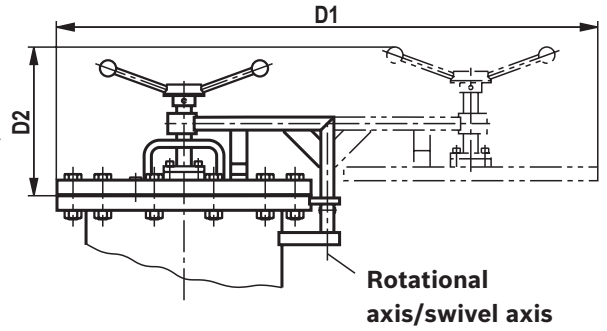
Filter materials made of filter paper (cellulose) must not be used, filter elements with glass fiber filter material or wire mesh must be used instead.

- ▶ **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: NG2500 ... NG6500
(dimensions in mm [inch])



Variant with cover removal tool



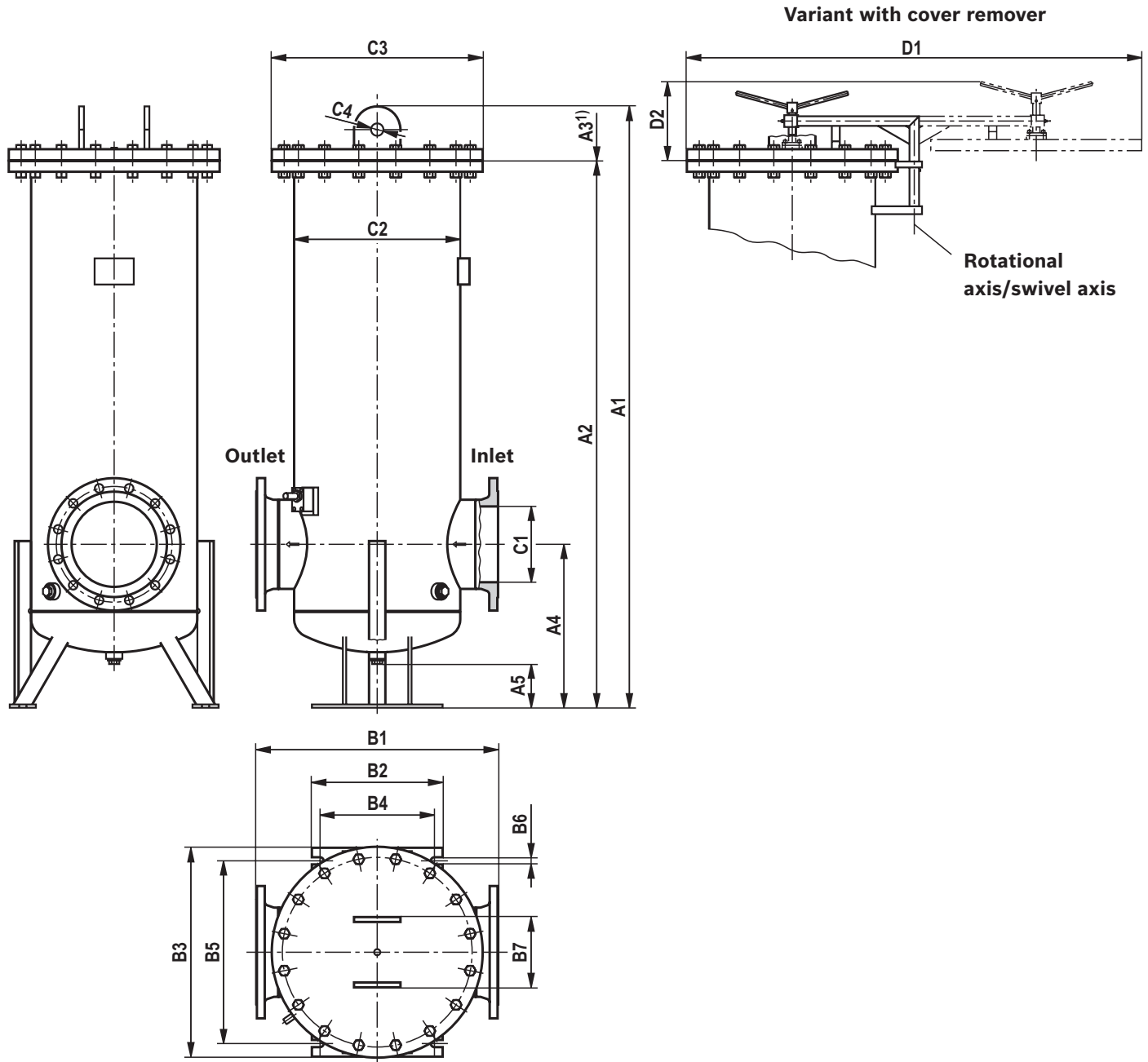
16 FE...	D1	D2
2500	Approx. 330 [12.99]	Approx. 800 [31.50]
3000		Approx. 900 [35.43]
4000		Approx. 900 [35.43]
4500		Approx. 900 [35.43]
6000		Approx. 1100 [43.31]
6500		

16 FE...	C1		ØC2	ØC3
	Ø	DN		
2500	131.7 [5.19]	DN125	273 [10.75]	375 [14.76]
3000	159.3 [6.27]	DN150		
4000	206.5 [8.13]	DN200	323.9 [12.75]	420 [16.54]
4500			355.6 [14.00]	445 [17.52]
6000	260.4 [10.25]	DN250	355.6 [14.00]	445 [17.52]
6500				

1) Servicing height for filter element exchange

16 FE...	A1	A2	A3 ¹⁾	A4	A5	B1	B2	B3	B4	B5	B6	
2500	1385 [54.53]	1295 [50.98]	860 [33.86]	500 [19.69]	257 [10.12]	500 [19.69]	400 [15.75]	403 [15.87]	350 [13.78]	323 [12.72]	22 [0.87]	
3000				450 [17.72]	198 [7.80]	550 [21.65]		454 [17.87]		374 [14.72]		
4000	1465 [57.68]	1375 [54.13]	990 [38.98]	500 [19.69]	155 [6.10]	600 [23.62]	486 [19.13]	350 [13.78]	350 [13.78]	374 [14.72]	406 [15.98]	
4500	1425 [56.10]	1335 [52.56]			212 [8.35]					486 [19.13]		406 [15.98]
6000	1730 [68.11]	1640 [64.57]			210 [8.27]					486 [19.13]		406 [15.98]
6500	1760 [69.29]	1670 [65.75]										

Dimensions: NG7000 ... NG7500
(dimensions in mm [inch])



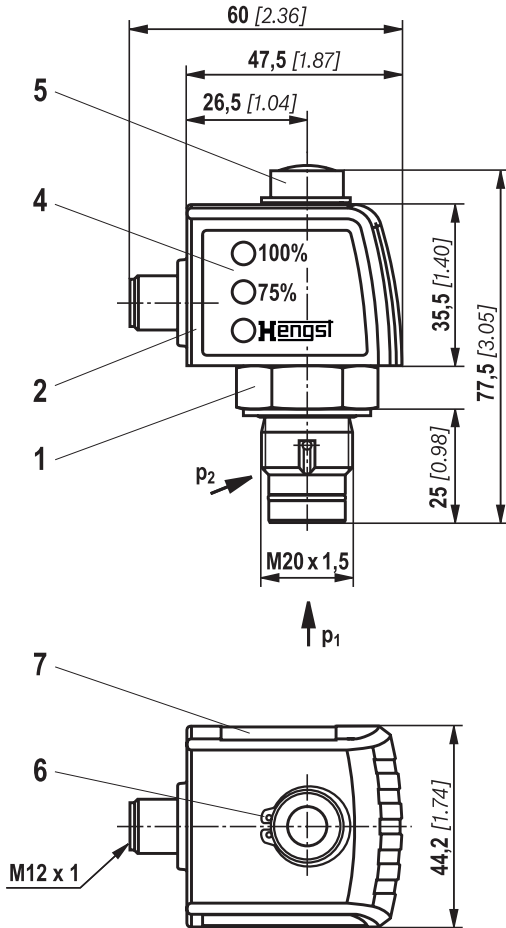
¹⁾ Servicing height for filter element exchange

16 FE...	A1	A2	A3 ¹⁾	A4	A5	B1	B2	B3	B4	B5	B6	B7
7000	1840 [72.44]	1675 [65.94]	990 [38.98]	500 [19.69]	134 [5.28]	740 [29.13]	400 [15.75]	639 [25.16]	350 [13.78]	559 [22.01]	22 [0.87]	215 [8.46]
7500	1870 [73.62]	1705 [67.13]			114 [4.49]	750 [29.53]						

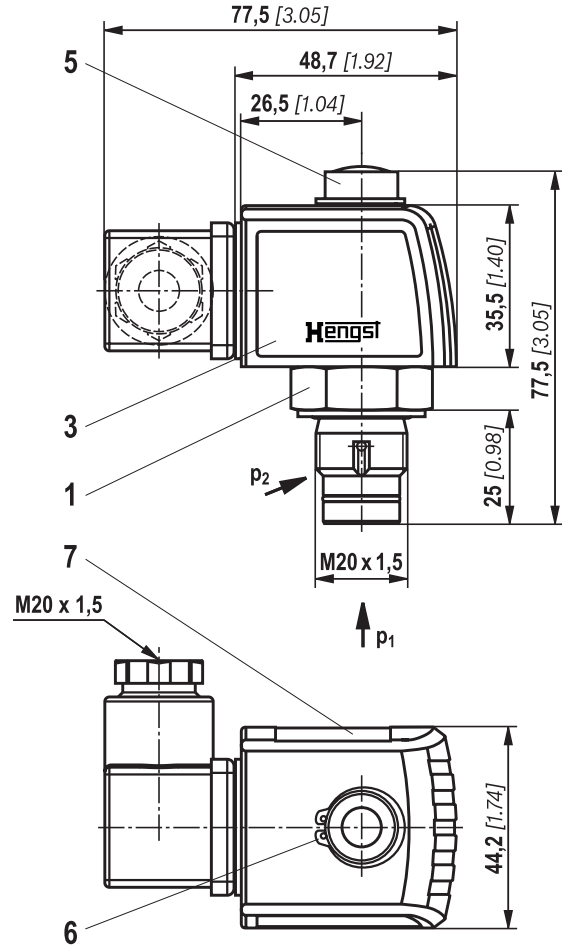
16 FE...	C1		ØC2	ØC3	ØC4	D1	D2
	Ø	DN					
7000	260.4 [10.25]	DN250	508 [20.00]	645 [25.39]	38 [1.50]	Approx. 350 [13.78]	Approx. 1400 [55.12]
7500	309.7 [12.19]	DN300					

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 Visual indicator with memory function
- 6 Locking ring DIN 471-16x1,
material no. R900003923
- 7 Name plate

Notices:

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

Ordering code
Spare parts

Filter element

01	02	03	04	05	06
2nd			- A00 -		

Filter element

01	Design	2nd
----	--------	-----

Size

02	FE... (Filter elements according to Hengst standard)	Filter size	Number of filter elements per filter	
		2500, 3000	3	0058
		4000	4	0059
		6000	6	0059
		7000, 7500	10	0059

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
		Filter paper, not cleanable	P10 P25

Pressure differential

04	Max. admissible pressure differential of the filter element of 30 bar [435 psi]	A00
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Bypass valve

05	Filter element without bypass valve	0
	Filter element with bypass valve of 3.0 bar [43.51 psi]	6

Seal

06	NBR seal	M
	FKM seal	V

Order example:

2.0058 PWR10-A00-6-M

Material number: R928007115

For detailed information on Hengst filter elements, please refer to data sheet 51420.

Preferred types

Filter elements

Type	Material no. Filter element, Filter rating in µm		
	PWR3	PWR6	PWR10
2.0058 PWR..-A00-6-M	R928007113	R928007114	R928007115
2.0059 PWR..-A00-6-M	R928007131	R928007132	R928007133

Ordering code

Spare parts

Mechanical/optical maintenance indicator

01	02	03	04	05	06
W	O	-	D01	-	-
					160

01	Maintenance indicator	W
----	-----------------------	----------

02	Mechanical/optical indicator	O
----	------------------------------	----------

Version

03	Pressure differential, modular design	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

Seal

05	NBR seal	M
	FKM seal	V

Max. nominal pressure

06	Switching pressure of 0.8 bar [11.6 psi], 160 bar [2321 psi]	160
	Switching pressure of 1.5 bar [21.8 psi], 160 bar [2321 psi]	160
	Switching pressure of 2.2 bar [31.9 psi], 160 bar [2321 psi]	160

Material no.	Description
R928038779	WO-D01-0.8-M-160
R928038778	WO-D01-0.8-V-160
R928038781	WO-D01-1.5-M-160
R928038780	WO-D01-1.5-V-160
R901025312	WO-D01-2.2-M-160
R901066233	WO-D01-2.2-V-160

Ordering code
Spare parts

Seal kit

01	02	03	04
D	16FE		-

01	Seal kit	D
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02	Series 16FE	16FE
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Size

03	2500-3000	2500-3000
	4000	4000
	6000	6000
	7000-7500	7000-7500

Seal

04	NBR seal	M
	FKM seal	V

Material no.	Description
R928044517	D16FE2500-3000-M
R928038587	D16FE2500-3000-V
R928054095	D16FE4000-M
R928054096	D16FE4000-V
R928054097	D16FE6000-M
R928054098	D16FE6000-V
R928054099	D16FE7000-7500-M
R928054100	D16FE7000-7500-V

Assembly, commissioning, maintenance

Assembly

- ▶ The max. operating pressure of the system must not exceed the max. admissible 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 elements (see chapter “Dimensions”) are to be considered.
- ▶ The maintenance indicator must be arranged so it is easily visible in operation.
- ▶ For stability reasons, the cover must not be pivoted before the assembly on filters with a cover remover.
- ▶ Remove the plastic plugs from the filter inlet and outlet.
- ▶ The filter must be installed vertically.
- ▶ Fasten the filter feet to the floor or frame. Ensure that the system is assembled without tension stress.
- ▶ The optional electronic maintenance indicator is connected via the electronic switching element with one or two switching points, which is attached to the mechanical/optical maintenance indicator and held by means of the locking ring.

Commissioning

- ▶ Commission the system and bleed the filter until fluid begins to escape from the bleeding point.

Maintenance

- ▶ If, at operating temperature, the red indicator pin reaches out of the mechanical/optical maintenance indicator and/or the switching process is triggered in the electronic switching element, the filter element is contaminated and needs to be replaced or cleaned. For more details, see data sheet 51450.

- ▶ The material number of the corresponding replacement filter elements is indicated on the name plate of the complete filter. It must correspond to the material number on the filter elements.
- ▶ Decommission the system.
- ▶ Open the bleed screw or bleed valve and relieve the pressure
- ▶ After undoing and removing the cover screws, the filter cover is removed by hand and placed on a clean surface.
Alternatively, the cover can be removed from the filter by turning the hand wheel of the optional cover remover counter-clockwise before being swiveled to the side.
- ▶ The fluid on the dirt side can be drained via the lateral drain screw. If necessary, additional fluid can be drained via the lower drain screw (clean side).
- ▶ Remove the filter elements from the spigot by rotating them slightly.
- ▶ Clean the filter components, if necessary.
- ▶ Check the cover seal, mounting screws and nuts for damage and replace them, if necessary.
For suitable seal kits, refer to chapter “Spare parts”.
- ▶ Filter elements made of wire mesh can be cleaned. For detailed cleaning instructions, refer to data sheet 51420.
- ▶ Install the new or cleaned filter elements on the respective spigots again by slightly rotating them.
- ▶ The filter is to be assembled in reverse order.
- ▶ The torque specifications (Tightening torques chapter) are to be observed.
- ▶ Commission the system and bleed the filter until fluid begins to escape from the bleeding point.

WARNING!

- | | |
|--|--|
| <ul style="list-style-type: none"> ▶ Assemble and disassemble only with depressurized system! ▶ Filter is under pressure! ▶ Open the cover screws only if it is depressurized! ▶ Do not exchange the maintenance indicator while the filter is under pressure! | <ul style="list-style-type: none"> ▶ If the flow direction is not considered during assembly, the filter element will be destroyed. Particles will enter the system and damage the downstream components. |
|--|--|

Notices:

- ▶ All maintenance of the filter should be performed by trained specialists.
- ▶ Proper function and safety are only guaranteed if original Hengst filter elements and spare parts are used.
- ▶ Warranty becomes void if the delivered item is modified by the ordering party or third parties or improperly mounted, installed, serviced, repaired, used or exposed to environmental condition that do not comply with the installation conditions.

Tightening torques

(dimensions in mm [inch])

Cover mounting

Series 16 FE...	2500 ... 3000	4000	6000	7000 ... 7500
Screw	M16		M20	
Tightening torque at $\mu_{\text{tot}} = 0.14$	Nm [lbf-ft]		215 ± 20 [159 ± 15]	
Quantity	8	12	16	16
Recommended property class of screw	8.8			

Bleed screw

Series 16 FE...	2500 ... 3000	4000	6000	7000 ... 7500
Screw	G1/4			
Tightening torque at $\mu_{\text{tot}} = 0.14$	Nm [lbf-ft]			
Quantity	30 ± 3 [22 ± 2]			
Recommended property class of screw	1			
	1.4571			

Drain screw

Series 16 FE...	2500 ... 3000	4000	6000	7000 ... 7500
Screw	G1			
Tightening torque at $\mu_{\text{tot}} = 0.14$	Nm [lbf-ft]			
Quantity	225 [166] ± 10 %			
Recommended property class of screw	2			
	5.8			

Maintenance indicator

Series 16 FE...	2500 ... 3000	4000	6000	7000 ... 7500
Tightening torque of mechanical/optical maintenance indicator	Nm [lbf-ft]			
Tightening torque of cubic connector screw switching element EN-175301-803	Max. 50 [37]			
	M3 / 0.5 [0.4]			

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.

Directives and standardization

Classification according to the Pressure Equipment

Directive

The inline filters for hydraulic applications according to 51403 are pressure-holding equipment according to article 1, section 2.1.4 of the Pressure Equipment Directive 97/23/EC (PED). However, based on 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 (guideline 1/19). The fluids from the chapter “Compatibility with approved hydraulic fluids” were considered for the classification. They do not receive a CE mark.

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

The inline filters according to 51403 are not devices or components in the sense of directive 94/9/EC and are not provided with a CE mark. It has been proven by the ignition risk analysis that these inline filters do not have own ignition sources according to DIN EN 13463-1:2009.

are simple electronic operating equipment that do not have their own voltage source. This simple electronic operating equipment may be used – according to DIN EN 60079-14:2012 – in intrinsically safe electric circuits (Ex ib) without marking and certification in systems. The inline filters and the electronic maintenance indicators described here can be used in the following explosive areas:

According to DIN EN 60079-11:2012, electronic maintenance indicators with a switching point:

WE-1SP-M12x1 **R928028409**
 WE-1SP-EN175301-803 **R928036318**

	Zone suitability	
Gas	1	2
Dust	21	22

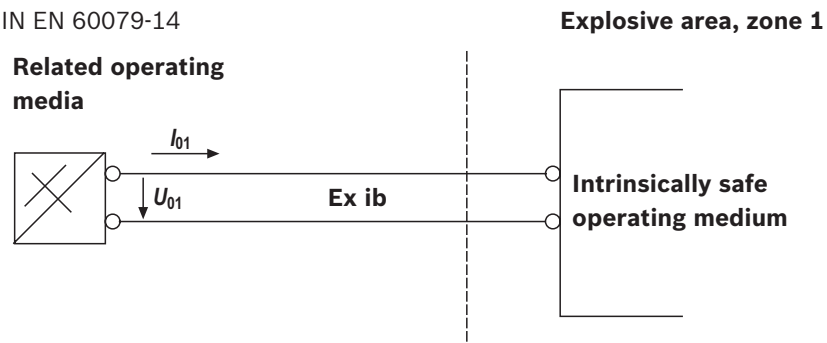
Complete filter with mech./opt. maintenance indicator				
Use/assignment			Gas 2G	Dust 2D
Assignment			Ex II 2G c IIC TX	Ex II 2D c IIC TX
Conductivity of the medium	pS/m	min	300	
Dust accumulation		max	–	0.5 mm

Electronic switching element in intrinsically safe electric circuit				
Use/assignment			Gas 2G	Dust 2D
Assignment			Ex II 2G Ex ib IIC 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	li	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			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.

Directives and standardization

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 the max. admissible ignition temperature is not exceeded in the explosive area.
- ▶ When using the inline filters according to 51403 in explosive areas, sufficient potential equalization has to be ensured. The filter is preferably to be grounded via the mounting screws.
It has to be noted in this connection that coatings and oxide protective layers are not electrically conductive.
- ▶ During filter element exchanges, the packaging material is to be removed from the replacement element outside the explosive area

👉 Notices:

- ▶ Maintenance only by specialists, instruction by the machine end-user according to DIRECTIVE 1999/92/EC appendix II, section 1.1
- ▶ Functional and safety warranty is only applicable when using original Hengst spare parts

Notes

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