



Maintenance indicator for filters

Type WE and WO



Pressure differential indicators WO for filters in pressure lines
Backpressure indicators WO for return line filters
Electronic switching elements WE

Nominal pressure 10, 160 and 450 bar [145, 2321 and 6527 psi]
Operating temperature WO -30 °C to +100 °C [-22 °F to 212 °F]
Operating temperature WE -30 °C to +85 °C [-22 °F to 185 °F]

Features

Maintenance indicators serve the monitoring of filters by indicating the exceedance of a pressure differential and/or a backpressure in the filter.

They distinguish themselves by the following:

- Modular structure
- Mechanical-optical indicators WO with one switching point and memory function
- Electronic switching elements WE with one or two switching points
- Possibility to suppress the signal during cold start

Ordering code

of the mechanical optical maintenance indicator

WO — — — — —					
Maintenance indicator					
Mechanical optical = WO					
Design					
Backpressure, connection M30x1.5 = S01					
Pressure differential, connection M20x1.5 = D01					
Switching pressure					
bar	S01	S01 (PA)	D01 (160 bar)	D01 (450 bar)	
0,8	X		X		= 0.8
1.5	X		X		= 1.5
2.2	X	X	X	X	= 2.2
5.0				X	= 5.0
8.0				X	= 8.0
Complementary details					
without = No complementary details					
-PA = Backpressure indicator mode of plastic (only with S01-2.2)					
Max. operating pressure					
S01 10 bar [145 psi]					
D01 160 bar [2321 psi]					
450 bar [6527 psi]					
Seal					
M = NBR seal					
V = FKM seal					

Material numbers of the mechanical optical maintenance indicators - Pressure differential

Type	Switching pressure in bar [psi]	Tolerance in bar [psi]	Material	Maximum operating pressure in bar [psi]
WO-D01-5,0-M-450	5,0 [72.5]	±0,5 [7.3]	Brass	up to 450 [6527]
WO-D01-5,0-V-450				
WO-D01-8,0-M-450	8,0 [116]	±0,8 [11.6]		
WO-D01-8,0-V-450				
WO-D01-2,2-M-450	2.2 [31.9]	±0.3 [4.4]	Aluminum	up to 160 [2321]
WO-D01-2,2-V-450				
WO-D01-2,2-M-160	2.2 [31.9]	±0.3 [4.4]		
WO-D01-2,2-V-160				
WO-D01-1,5-M-160	1.5 [21.8]	±0.2 [2.9]		
WO-D01-1,5-V-160				
WO-D01-0,8-M-160	0.8 [11.6]	±0.15 [2.2]		
WO-D01-0,8-V-160				

Material numbers of the mechanical optical maintenance indicators - Backpressure

Type	Switching pressure in bar [psi]	Tolerance in bar [psi]	Material	Maximum operating pressure in bar [psi]
WO-S01-2,2-M-10	2.2 [31.9]	±0.3 [4.4]	Aluminum	up to 10 [145]
WO-S01-2,2-V-10				
WO-S01-1,5-M-10	1.5 [21.8]	±0.2 [2.9]		
WO-S01-1,5-V-10				
WO-S01-0,8-M-10	0.8 [11.6]	±0.15 [2.2]	PA6.6	up to 10 [145]
WO-S01-0,8-V-10				
WO-S01-2,2-M-10-PA	2.2 [31.9]	±0.44 [6.4]		
WO-S01-2,2-V-10-PA		±0.3 [4.4]		

Ordering code

of the electronic switching element

		WE — —	
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

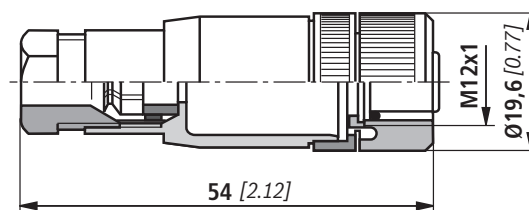
Material numbers of the mechanical optical maintenance indicators

Type	Signal	Switching points	Connector	LED
WE-1SP-M12x1	Changeover	1	M12x1	No
WE-2SP-M12x1	Normally open (at 75 %) / normally closed contact (at 100 %)	2		3 pieces
WE-2SPSU-M12x1				
WE-1SP-EN175301-803	Normally closed contact	1	EN 175301-803	No

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

For electronic switching element with round plug-in connection M12x1

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

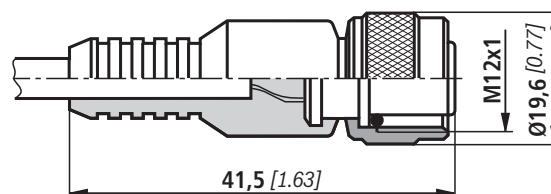


Mating connector suitable for K24-3m 4-pin, M12x1 with potted-in PVC cable, 3 m long.

Line cross-section: 4 x 0.34 mm²

Core marking:

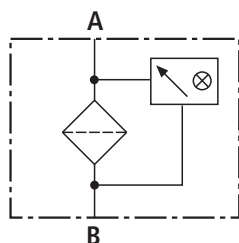
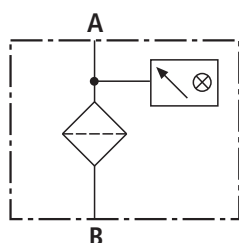
1	Brown
2	White
3	Blue
4	Black



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

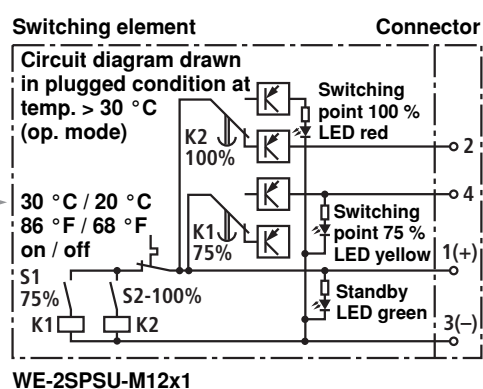
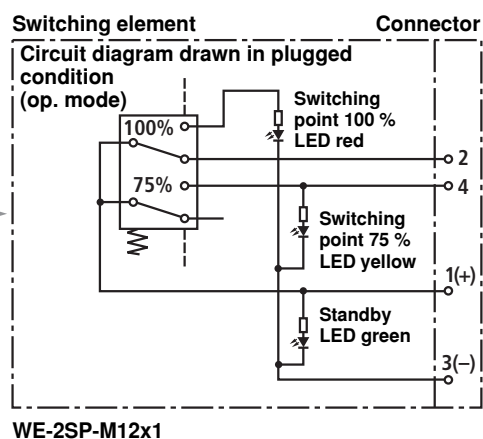
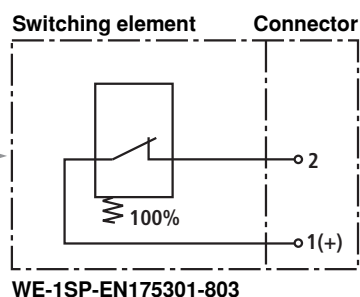
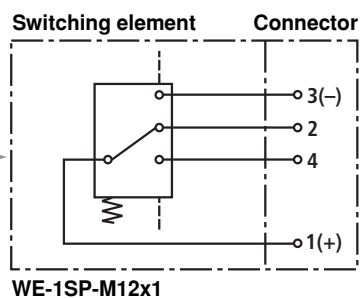
Symbols

Mechanical optical backpressure indicator
with a return line filter without bypass



Mechanical optical pressure differential indicator
with a line filter without bypass

**Electronic switching element
for maintenance indicator**



Function, section

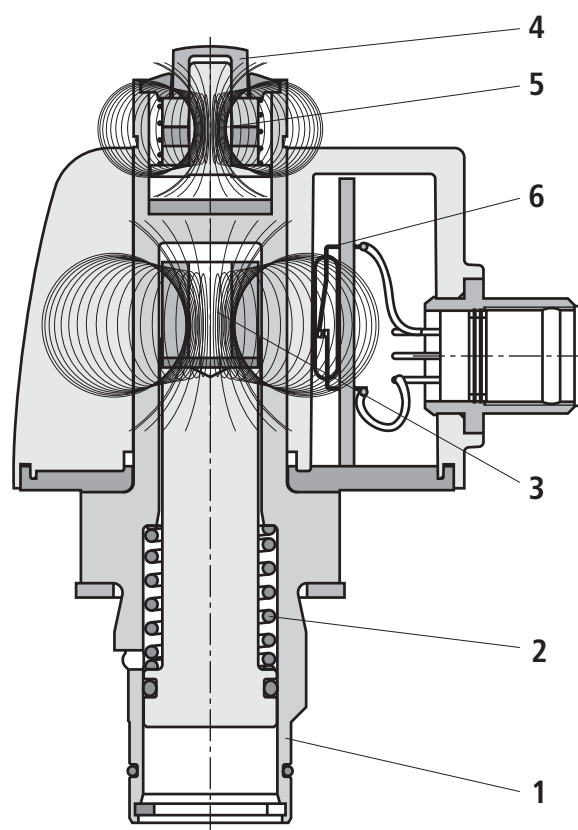
By default, the filters are supplied with a mechanical optical maintenance indicator (WO). The electronic switching element (WE) is available as accessory and compatible with the mechanical optical maintenance indicator. The electronic switching element is attached to the optical maintenance indicator and fixed by means of a locking ring. The electronic maintenance indicator is not dependent on the nominal filter pressure.

The increasing backpressure and/or pressure difference pushes a spool (1) against a spring (2) upwards. The solenoid (3) mounted on the spool is moved together with the spool. The optical pin (4) can take two valid positions. If the position of the spool (1) with solenoids (3) is below the nominal pressure of the maintenance indicator, the optical pin remains in retracted "rest position". If the nominal pressure is exceeded for the first time, the position of the optical pin (5) is changed suddenly into the second possible "on condition" by repulsion of the solenoid of pin (5) to the solenoid of the spool (3). The pin will remain visible in this extended position on a permanent basis, even after the machine has been switched off (or after pressure drop or cold start) (memory function). It has to be acknowledged.

The reed contact (6) integrated in the switching element is operated by the magnetic field change. In case of two switching points, two reed contacts are installed.

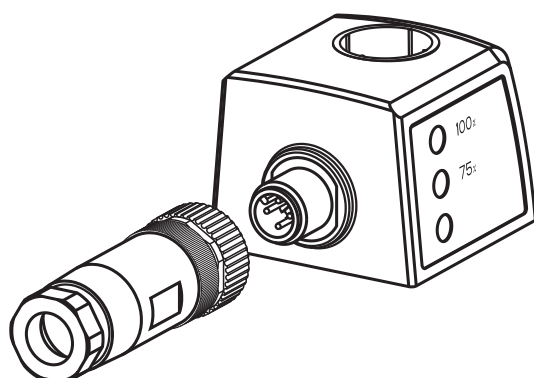
For the electronic switching element WE-2SPSU, the temperature for the temperature suppression is dissipated via the housing of the mechanical optical maintenance indicator.

The electronic switching element WE-2SPSU is not suitable for the mechanical optical maintenance indicator made of polyamide (WO-S01-2,2-...-PA).



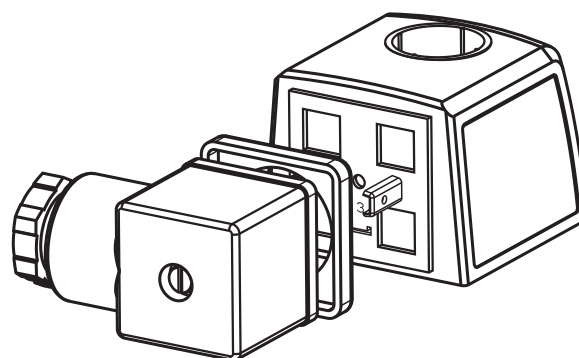
WE-2SP-M12x1

with mating connector (not included in the delivery)



WE-1SP-EN175301-803

with plug-in connection



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

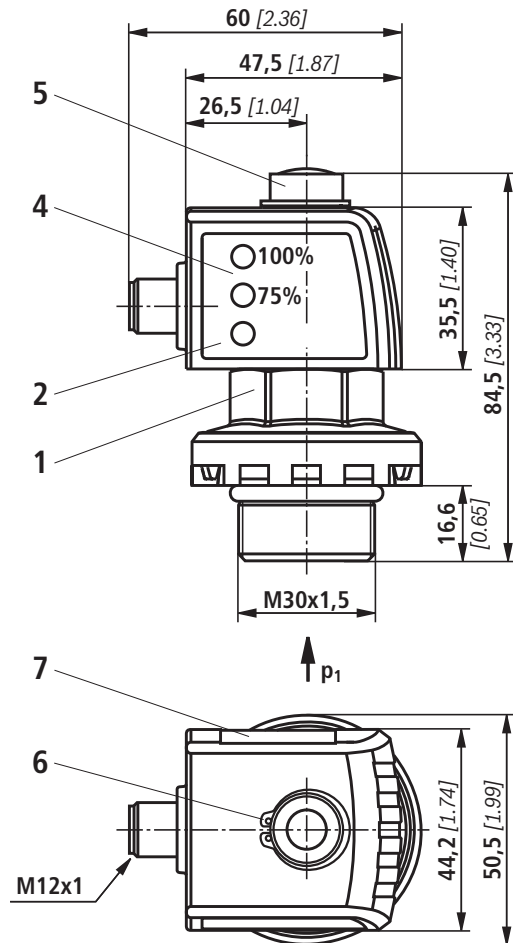
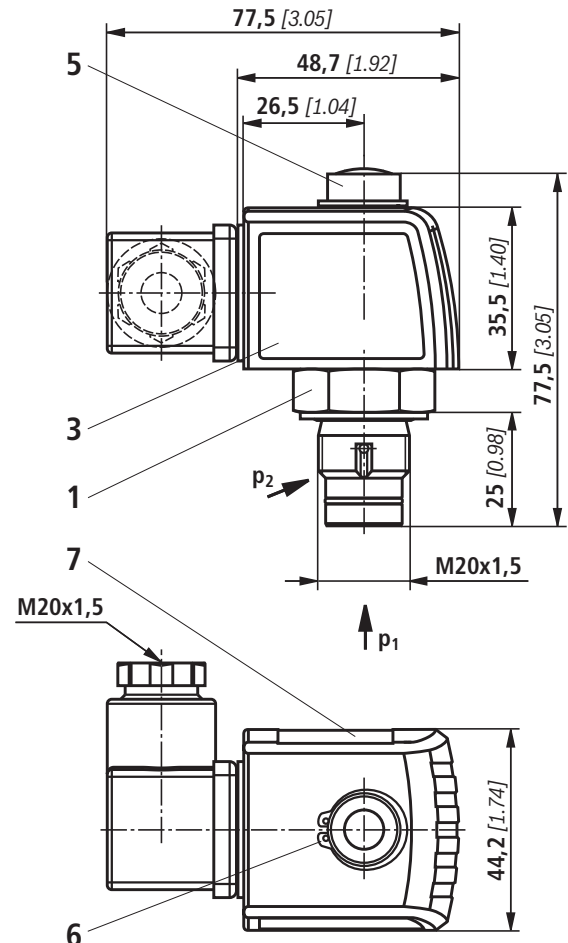
of the mechanical optical maintenance indicator

Material	Version	D01 (450 bar)	D01 (160 bar)	S01	S01 (PA)
	Material	Brass	Aluminum	Aluminum	PA6.6

Sealing material		NBR	FKM
Temperature range	°C [°F]	-30...+100 [-22...212]	-20...+120 [-4...248]

of the electronic switching element

Electrical connection		Round plug-in connection M12x1, 4-pin			Rectangular plug-in 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]		

Maintenance indicator (dimensions in mm [inch])
**Backpressure indicator
with assembled switching element**

**Backpressure indicator
with assembled switching element**


- 1 Mechanical optical maintenance indicator;
max. tightening torque $M_{A \max} = 50 \text{ Nm [36.88 lb-ft]}$
tightening torque for backpressure indicator in
PA6.6 $M_{A \max} = 35 \text{ Nm [25.82 lb-ft]}$
- 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.

Installation, operating and maintenance instructions

Connection of the electronic switching elements

By default, the filter is equipped with a mechanical optical maintenance indicator WO (4). The electronic switching element (2) is attached to the mechanical optical maintenance indicator (1) and fixed by means of a locking ring (6).

The following must generally be observed with filters:

- Make sure that the components are assembled in a stressless form.
- The filter housing must always be grounded.

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 electric signal has not gone out at operating temperature, the filter element must be exchanged or cleaned respectively.
- The filter element should be replaced or cleaned after max. 6 months.

Quality and standardization

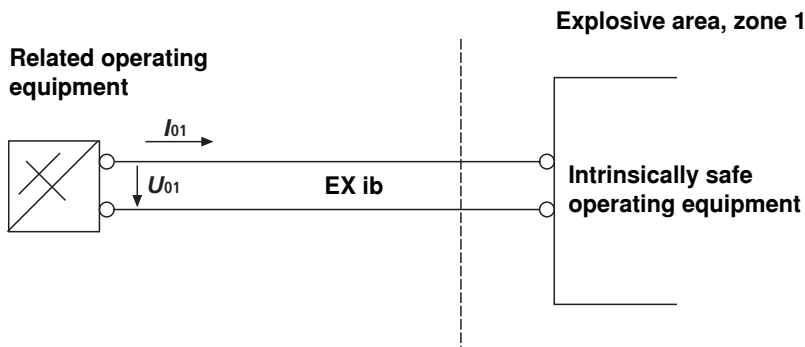
Use in explosive areas according to directive 94/9/EC (ATEX)

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.

When using filters in explosive areas, potential equalization must always be ensured.

Possible circuit according to DIN EN 60079-14



The declaration of incorporation according to DIN EN 13463 is available for this filter separately