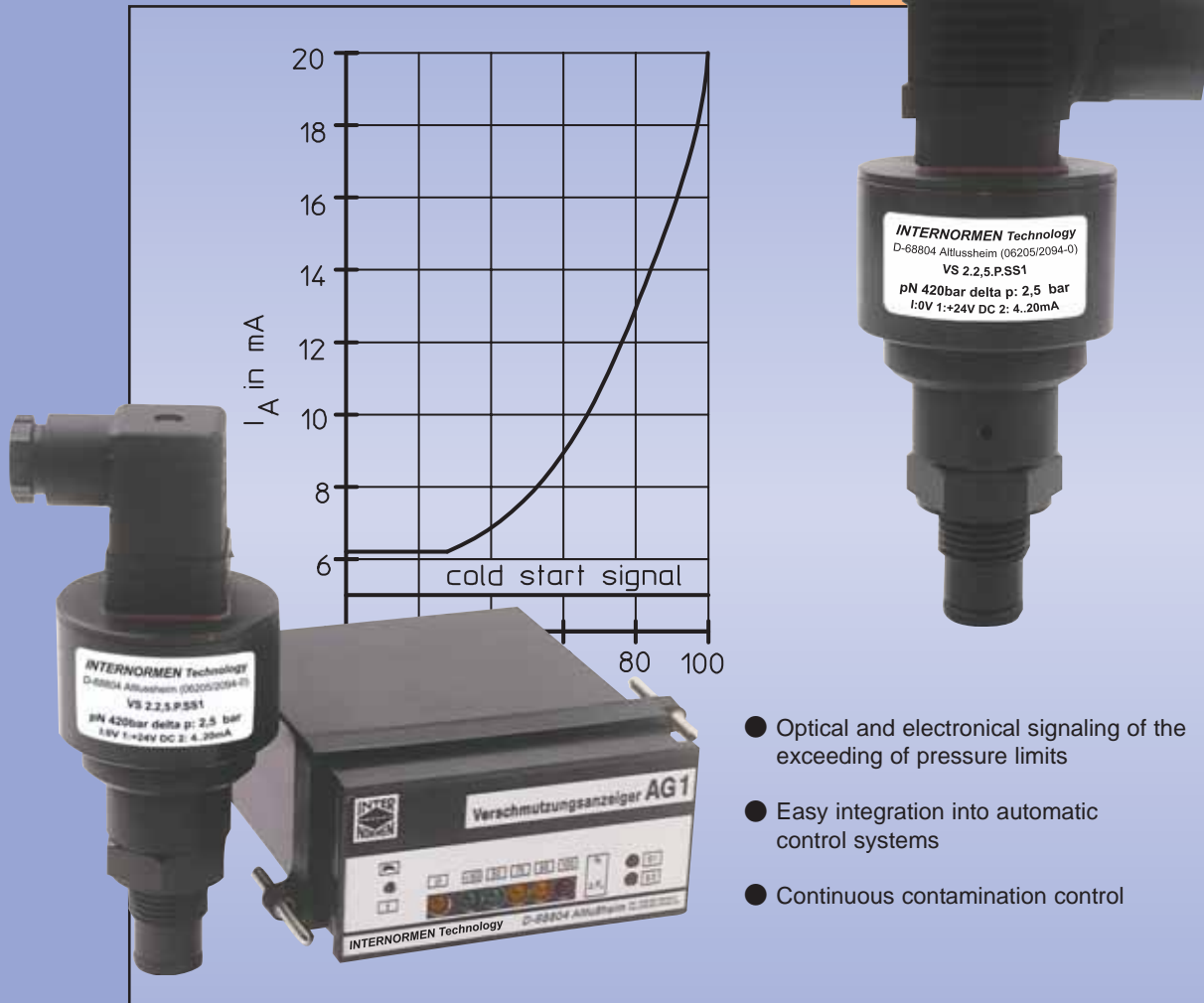


# INTERNORMEN

## Intelligent Filter Control by Electronics



- Optical and electronical signaling of the exceeding of pressure limits
- Easy integration into automatic control systems
- Continuous contamination control

Electronical Clogging Sensors and Indicating Systems for Hydraulic and Lubricating Oil Filters

**internormen**   
 **electronics**



# Electronical Clogging Sensor VS 1

- Continuous pressure difference measuring
- Optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- Early identification of increased contamination inside the system
- Cold start indication up to approx. 77°F
- Suppression of pressure peaks
- Dust-proof and splash-proof aluminium or stainless steel housing
- Interference-free signal transmission over longer distances
- Interchangeable with clogging indicators type AE and type AO

Type code (ordering example):

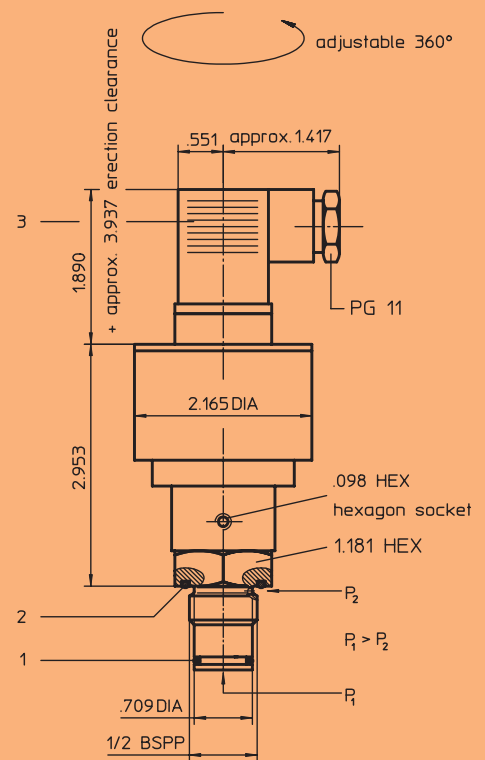
VS1.	1,5.	P.	-.	GS	-.	E
1	2	3	4	5	6	7

- 1] VS 1 = electronical clogging sensor with analog 4...20mA output signal
- 2] 1,5 = pressure difference 22 PSI range  
2,5 = pressure difference 36 PSI range  
5,0 = pressure difference 73 PSI range  
6,0 = pressure difference 87 PSI range }  $\Delta p$ -nominal
- 3] Sealing material:  
P = Nitrile (NBR)  
V = Viton (FPM)
- 4] VA = stainless steel  
- = standard version
- 5] GS = line adapter DIN 43650-A, three channel plug
- 6] - = standard
- 7] E = 0 volt free of grounding  
G = 0 volt grounded

## Technical Data:

max. operating pressure: 6000 PSI  
screw thread: G 1/2  
distribution voltage: 24V DC  $\pm$  20%;  
residual ripple: < 10%  
temperature range: +14°F...+212°F (fluids)  
+14°F...+176°F (electronics)  
connection: according to DIN 43650-A  
three-channel plug  
line adapter: GDM 3011  
output signal: 4...20mA; max. load: 400 Ohm  
error of measurement:  $\pm$  5% of the final value ( $\Delta p$ -nominal)  
system of protection: IP 65 according to DIN 40050

## Clogging Sensors VS 1 ... VS 2 ... GS



## Indicating System AG 1 (control panel set)

- Evaluation set for current signals emitted by VS 1
- Pressure difference indication by LED-band
- 2 x relay switching contacts (75% und 100% of the  $\Delta p$ -nominal range)
- Indication of switching position by LED
- Cold start indication by LED
- Adjustable pressure peak suppression

### Technical Data:

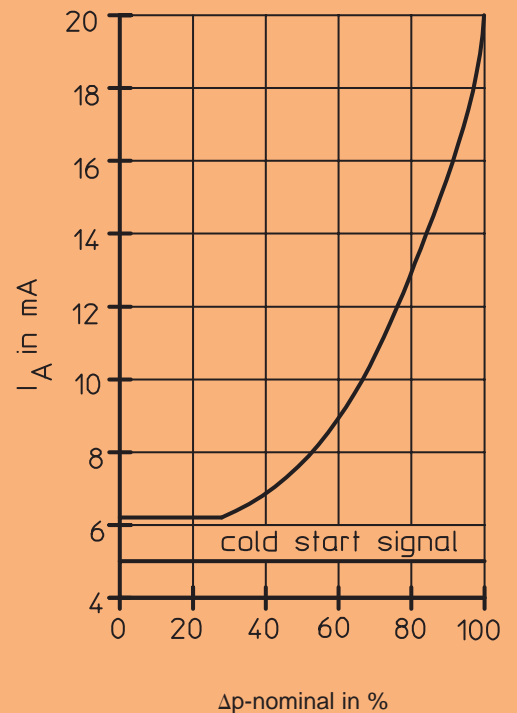
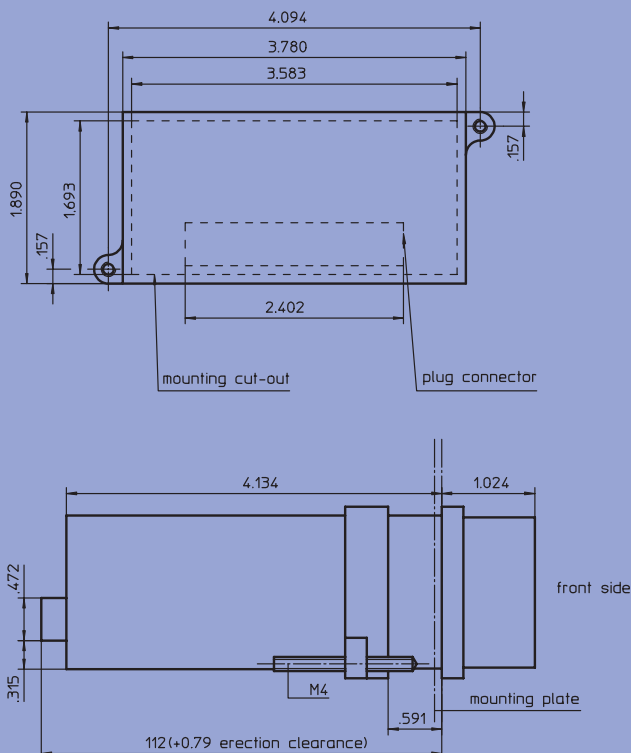
distribution voltage:	24V DC $\pm$ 20%; residual ripple: < 10%
contacts:	2 x contact maker; $U_{max}$ : 240V AC $I_{max}$ : 0,5A $P_{max}$ : 10 Watt
temperature range:	32°F...158°F
system of protection:	IP 53 (only front side with transparent protection cap)
housing dimensions:	according to DIN 43700 (see illustration)

Type code (ordering example):

AG 1  
1

1 AG 1 = electronic display unit with clear protective cover mounts remote in control cabinets to be used with electronic clogging sensor VS 1

## Indicating system AG 1



REQUEST DATA SHEETS NO.1617 FOR VS 1/AG 1 AND NO.1618 FOR VS 2/SS 1 FOR FURTHER DETAILS.

MODERN LABORATORIES WITH UP-TO-DATE TEST EQUIPMENT GUARANTEE BEST QUALITY.

## Electronical Clogging Sensor VS 2

- Discrete control of the filter contamination by means of two PNP-switching contacts (75% and 100% of the  $\Delta p$ -nominal range)
- Indication of switching position by LED immediately at the sensor in connection with the signal plug SS 1
- Cold start suppression up to approx. 77°F
- Suppression of pressure peaks
- Interchangeable with clogging indicators type AE and type AO

Type code (ordering example):

VS2	.	1,5	.	P	.	-	.	GS
1	2	3	4	5				

- 1] VS 2 = electronic clogging sensor with  
2 x PNP-switching contacts  
(75% and 100% of the  $\Delta p$ -nominal range)
- 5] GS = connector plug (type of plug: GDM 3011)  
SS 1 = signal plug to indicate the actual switching  
position at the VS 2 by 3 LED  
(plug type: GDME 311)

2; 3; 4 see VS 1

### Technical Data:

max. operating pressure: 6000 PSI  
screw thread: G 1/2  
distribution voltage: 24V DC $\pm$  20%;  
residual ripple: < 10%  
temperature range: +14°F...+212°F (fluids)  
+14°F...+176°F (electronics)  
connection: according to DIN 43650-A  
three channel plug  
PNP-switching contacts: contact-maker;  
 $I_{max} = 200\text{mA}$  with 24 V  
system of protection: IP 65 according to DIN 40050

### Spare Parts VS 1, VS 2

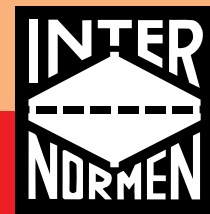
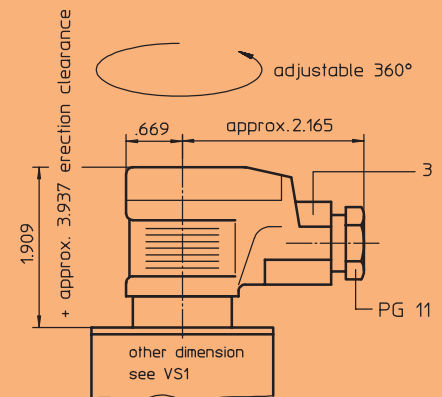
item	qty.	designation	dimension	article-no.	
1	1	O-ring	14x2	304342 (NBR)	304722(FPM)
2	1	O-ring	22x2	304708 (NBR)	304721(FPM)
3	1	GS	DIN 43650-A	312492	
4	1	SS1	DIN 43650-A	310403	

Request data sheets no. 1617 for VS 1/AG 1 and  
no. 1618 for VS 2/SS 1 for further details.

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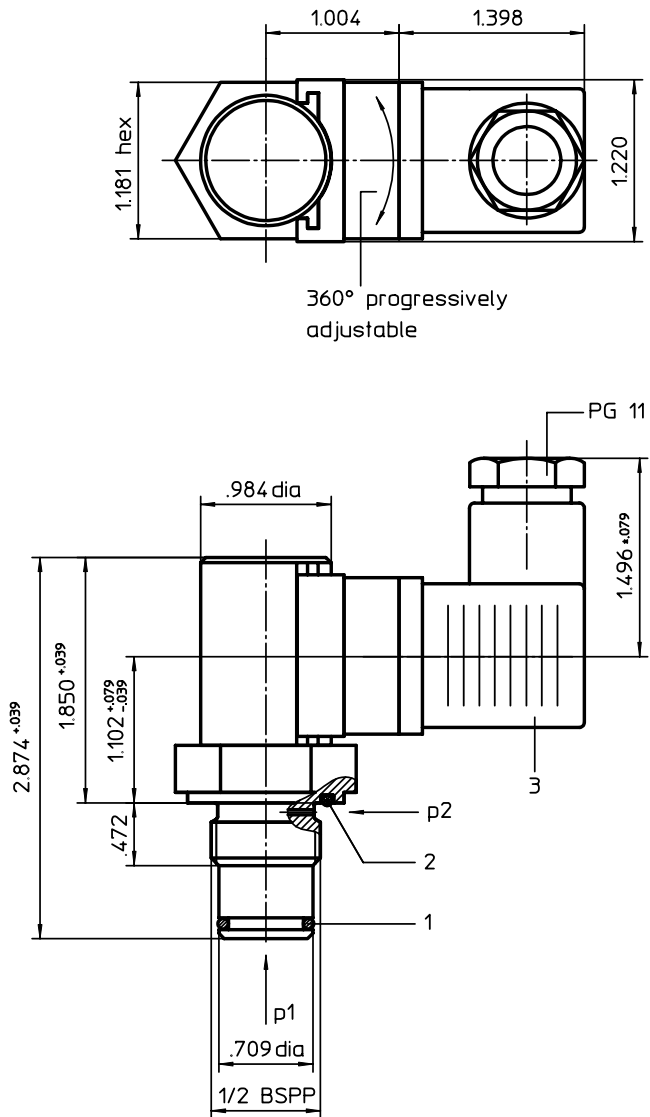
### Signal Plug SS 1



# CLOGGING INDICATOR

Series AE (electrical / visual-electrical, thread execution)

Sheet No.  
**1615 J**



## 1. Clogging indicator AE

### 1.1. Type index: (ordering example)

**AE. 30. 1,5. P. - . - . -**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 **series:**  
AE = clogging indicator, electrical / visual-electrical
- 2 **version:**  
30-80 = see table below
- 3 **indicator-pressure difference:  $\Delta p$ -nominal**  
1,5 = 22 PSI  
2,5 = 36 PSI  
5,0 = 73 PSI
- 4 **sealing material:**  
P = Nitrile (NBR)  
V = Viton (FPM)
- 5 **material:**  
- = standard  
VA = stainless steel
- 6 **execution:**  
- = standard
- 7 **damper:**  
- = standard with hydraulic damper  
1 = without hydraulic damper

## 2. Technical data:

- temperature ranges
- operating temperature: + 14°F to +176°F (for a short time +212°F)
- resistant to compression: -22°F to +212°F
- survival temperature: -40°F to +212°F
- max. operating pressure: 6000 PSI
- max. pressure difference: 2320 PSI

Clogging indicator AE with redundant switches, see data sheet-no. 40968-4

version	luminous indication	contact	voltage	max. rupturing capacity (resistive load)	max. switching current (resistive load)	connection protection
30	-	contact maker and contact breaker	..... 175V DC	3 VA	0,25 A	line adapter according to DIN 43650-designA/ISO4400
40	-		..... 125V AC	3 Watt	0,25 A	
50	1x LED <sup>1)</sup>		..... 175V DC	20 VA	1,0 A	
62	1x LED		..... 230V AC	10 Watt	0,5 A	
70	2x LED		120V AC/DC	3 Watt/VA	0,025 A with 120V AC/DC	
80	2x LED		110...230V AC/DC	20 Watt/VA	0,180 A with 110V AC/DC 0,090 A with 230V AC/DC	
			24V DC	3 VA	0,080 A with 24V DC	IP 65 according to DIN EN 60529
			24V DC	20 VA	0,750 A with 24V DC	

<sup>1)</sup> LED = light emitting diode

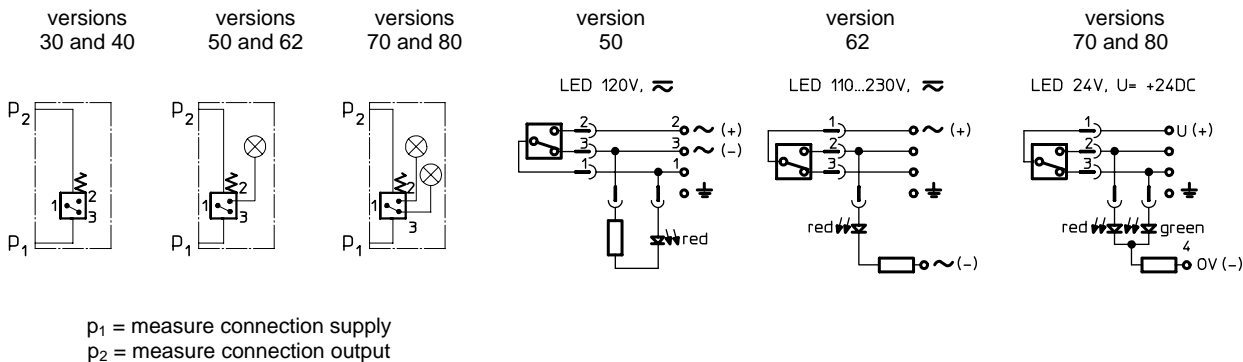
### 3. Spare parts:

item	qty.	designation	dimension	article-no.	type
1	1	O-ring	14 x 2	304342 (NBR)	versions 30 - 80
				304722 (FPM)	
2	1	O-ring	22 x 2	304708 (NBR)	
				304721 (FPM)	
3	1	line adapter	DIN 43650-designA/ISO4400	312492	versions 30 and 40
	1	line adapter with LED 24V		315012	versions 70 and 80
	1	line adapter with LED 120V		315010	version 50
	1	line adapter with LED 110...230V		332235	version 62

### 4. Symbols:

hydraulic-electrical symbol

connection configuration for LED



### 5. Description:

The AE 30 and AE 40 pollution indicators are electrical differential pressure indicators. The AE 50 to AE 80 pollution indicators are combined optical and electrical differential pressure indicators. These differential pressure indicators can be fitted to all pressure filters  $p \leq 6000$  PSI for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure  $p_1$  and the exit pressure  $p_2$  of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, in the pollution indicators

- AE 30 and AE 40, two electrical signals (contact maker/contact breaker) are triggered
- AE 50 and AE 62, two electrical signals (contact maker/contact breaker) are triggered and one optical signal is formed
- AE 70 and AE 80, two electrical signals (contact maker/contact breaker) are triggered and two optical signals are formed.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical and optical indication is effected as a digital signal at the given switching pressure. Versions 50 to 80 of the pollution indicator are fitted with additional LED displays. The optical LED signal becomes visible according to the selected version in the translucent cover plate of the line box on the pollution indicator.

In the pollution indicators

- AE 50 and AE 62, the red LED signal that the filter element needs to be changed
- AE 70 and AE 80, the green LED signal the normal operating state ( filter element not yet polluted to an unacceptable level), while the red LED signal that the filter element needs to be changed.

### 6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging indicator into the bare hole (starting torque 92.18 lb.-ft.)

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2
- O-ring 14 x 2

as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

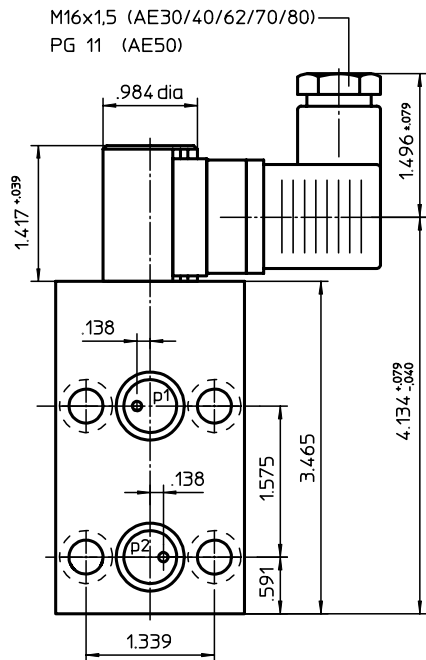
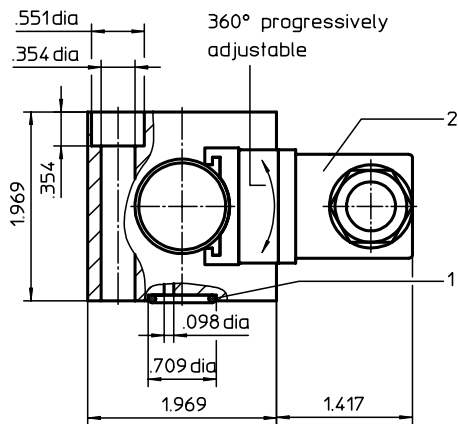
### 7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the transparent cap of the optical indicator.

# CLOGGING INDICATOR

Series AE (electrical / visual-electrical, block execution)

Sheet No.  
**1609 H**



## 1. Clogging indicator AE

### 1.1. Type index: (ordering example)

**AE. 30. 1,5. P. -. B. -**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**  
AE = clogging indicator, electrical / visual-electrical
- 2 version:**  
30-80 = see table below
- 3 indicator-pressure difference: Δp-nominal**  
1,5 = 22 PSI  
2,5 = 36 PSI  
5,0 = 73 PSI
- 4 sealing material:**  
P = Nitrile (NBR)  
V = Viton (FPM)
- 5 material: (block)**  
- = standard  
VA = stainless steel
- 6 execution:**  
B = block execution
- 7 damper:**  
- = standard with hydraulic damper  
1 = without hydraulic damper

## 2. Technical data:

temperature ranges  
- operating temperature: + 14°F to +176° F  
(for a short time +212°F)  
- resistant to compression: -22°F to +212°F  
- survival temperature: -40°F to +212°F  
max. operating pressure: 6000 PSI  
max. pressure difference: 2320 PSI

version	luminous indication	contact	voltage	max. rupturing capacity (resistive load)	max. switching current (resistive load)	connection protection
30	-	contact maker and contact breaker	..... 175V DC ..... 125V AC	3 VA 3 Watt	0,25 A 0,25 A	line adapter according to DIN 43650-designA/ISO4400
40	-		..... 175V DC ..... 230V AC	20 VA 10 Watt	1,0 A 0,5 A	
50	1x LED <sup>1)</sup>		120V AC/DC	3 Watt/VA	0,025 A with 120V AC/DC	
62	1x LED		110...230V AC/DC	20 Watt/VA	0,180 A with 110V AC/DC 0,090 A with 230V AC/DC	
70	2x LED		24V DC	3 VA	0,080 A with 24V DC	IP 65 according to DIN EN 60529
80	2x LED		24V DC	20 VA	0,750 A with 24V DC	

<sup>1)</sup> LED = light emitting diode

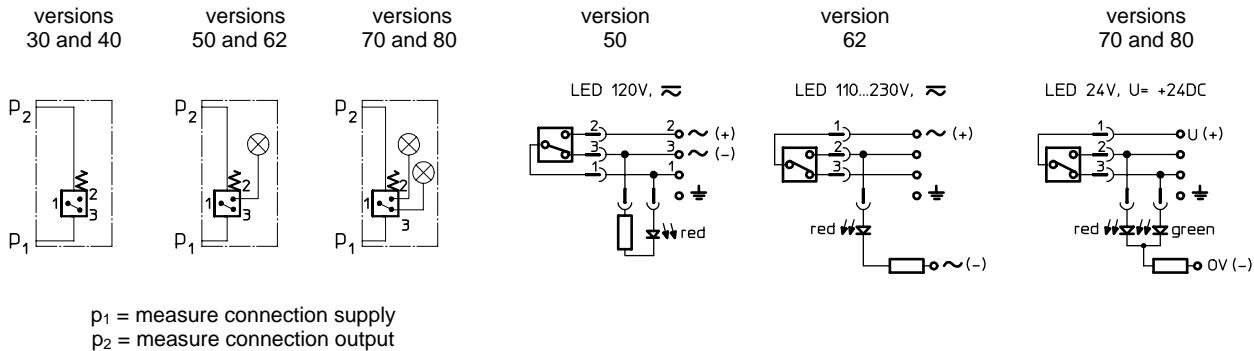
### 3. Spare parts:

item	qty.	designation	dimension	article-no.	type
1	2	O-ring	14 x 2	304342 (NBR)	versions 30 - 80
				304722 (FPM)	
2	1	line adapter	DIN 43650-designA/ISO4400	312492	versions 30 and 40
	1	line adapter with LED 24V		315012	versions 70 and 80
	1	line adapter with LED 120V		315010	version 50
	1	line adapter with LED 110...230V		332235	version 62

### 4. Symbols:

hydraulic-electrical symbol

connection configuration for LED



### 5. Description:

The AE 30 and AE 40 pollution indicators are electrical differential pressure indicators. The AE 50 to AE 80 pollution indicators are combined optical and electrical differential pressure indicators. These differential pressure indicators can be fitted to all pressure filters  $p \leq 6000$  PSI for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p<sub>1</sub> and the exit pressure p<sub>2</sub> of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, in the pollution indicators

- AE 30 and AE 40, two electrical signals (contact maker/contact breaker) are triggered
- AE 50 and AE 62, two electrical signals (contact maker/contact breaker) are triggered and one optical signal is formed
- AE 70 and AE 80, two electrical signals (contact maker/contact breaker) are triggered and two optical signals are formed.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path, a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical and optical indication is effected as a digital signal at the given switching pressure. Versions 50 to 80 of the pollution indicator are fitted with additional LED displays. The optical LED signal becomes visible according to the selected version in the translucent cover plate of the line box on the pollution indicator.

In the pollution indicators

- AE 50 and AE 62, the red LED signals that the filter element needs to be changed
- AE 70 and AE 80, the green LED signals the normal operating state ( filter element not yet polluted to an unacceptable level), while the red LED signals that the filter element needs to be changed.

### 6. Operating instructions:

Normally filters are supplied with mounted clogging indicators.

It is necessary to make sure the availability and the right positioning of sealing parts O-ring 14 x 2 as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

### 7. Maintenance:

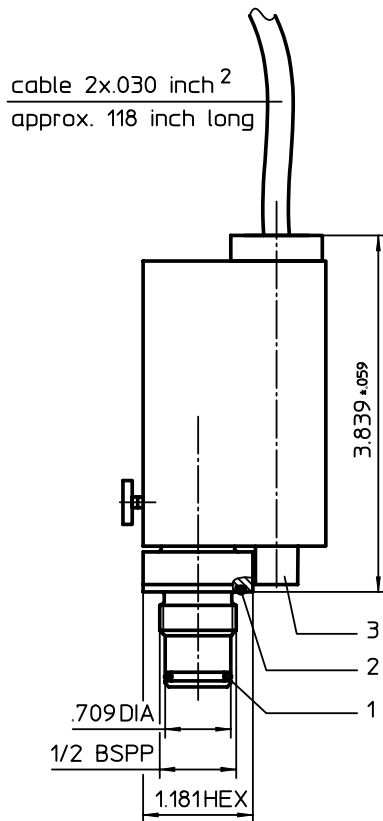
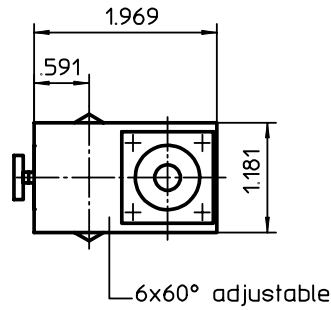
The device is maintenance-free, however, note that no cleaning fluids and solvents get on the transparent cap of the optical indicator.



# CLOGGING INDICATOR

Series AE (electrical) explosion-proof

Sheet No.  
**1625 B**



## 1. Type index: (ordering example)

**AE. 10. 1,5. P. VA. Ex**

1	2	3	4	5	6
---	---	---	---	---	---

- 1 | **series:**  
AE = clogging indicator electrical
- 2 | **contact:**  
10 = contact maker
- 3 | **indicator-pressure difference: Δp nominal**  
1,5 = 22 PSI; 2,5 = 36 PSI; 5,0 = 73 PSI
- 4 | **sealing material:**  
P = Nitrile (NBR)  
V = Viton (FPM)
- 5 | **material:**  
VA = stainless steel
- 6 | **execution:**  
Ex = explosion-proof

## 2. Technical data:

temperature range: +14°F to +176°F  
(for a short time +212°F)

max. operating pressure: 6000 PSI

max. pressure difference: 2320 PSI

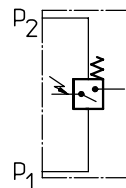
## 3. Electrical limit facts:

execution: V DC/V AC 200/250 V,  
max. 30 Watt

switch contact: contact maker

protection: EEx m II T6

## 4. Symbol:



contact maker

## 5. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
3	1	switch explosion-proof		315461

## 5. Description:

The AE 10 pollution indicator is an electrical differential pressure indicator.

The differential pressure indicator can be fitted to all pressure filters  $p \leq 6000$  PSI for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure  $p_1$  and the exit pressure  $p_2$  of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, an electrical signal on the AE 10 pollution indicator will be released.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical indication is effected as a digital signal at the given switching pressure.

At the AE 10 pollution indicator the closed condition signalizes that the change of the filter element is necessary.

## 6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging indicator into the bare hole (starting torque 92.18 lb.-ft.).

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2 and
- O-ring 14 x 2

as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

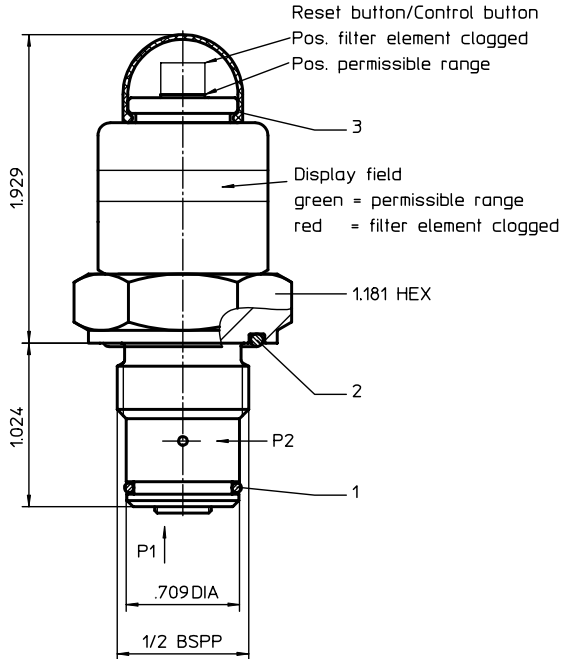
## 7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the housing and the cable of the switch.

# CLOGGING INDICATOR

## Series AOR, AOC (thread execution)

Sheet No.  
**1606 B**



## 1. Clogging indicator AOR, AOC

### 1.1. Type index: (ordering example)

**AOR. 1,5. P. -**

1	2	3	4
---	---	---	---

#### 1 series:

AOR = clogging indicator, visual with reset function  
AOC = clogging indicator, visual with control function

#### 2 indicator-pressure difference: $\Delta p$ -nominal

1,5 = 22 PSI  
2,5 = 36 PSI  
5,0 = 73 PSI

#### 3 sealing material:

P = Nitrile (NBR)  
V = Viton (FPM)

#### 4 material:

- = standard  
VA = stainless steel

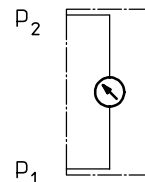
## 2. Technical data:

temperature ranges  
- operating temperature: + 14°F to +176° F  
(for a short time +212°F)  
- resistant to compression: -22°F to +212°F  
- survival temperature: -40°F to +212°F  
max. operating pressure: 6000 PSI  
max. pressure difference: 2320 PSI  
reset condition: < 60%  $\Delta p$ -nominal  
control condition: < 80%  $\Delta p$ -nominal  
max. display error:  $\pm$  10%

## 3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	15 x 1,5	315357 (NBR) 315427 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
3	1	cap		315325 (PUR)

## 4. Symbol:



p<sub>1</sub> = measure connection supply  
p<sub>2</sub> = measure connection output

## 5. Description:

The clogging indicators with designation AOR and AOC are visual pressure difference indicators with a reset function or control function.

These pressure difference indicators can be built on to all pressure filters where  $p \leq 6000$  PSI, and for which a corresponding allocation is provided on the respective dimension sheet. As the filter element becomes increasingly clogged, the difference between the inflow pressure  $p_1$  and the outflow pressure  $p_2$  of the filter will become larger. The display function is triggered at the switching pressure difference: this depends on the pressure difference just mentioned, and is independent of the operating pressure.

A measuring piston which is subject to the inflow and outflow pressure moves against a measuring spring in a manner which depends on the pressure difference. The tractive force between two magnets in the measuring piston and in the display cylinder changes according to the distance moved. At the switching point, the tractive force between the magnets and the force of the spring on the display cylinder are equally large, and are opposed.

In the range  $\pm 10\%$  of the set switching pressure, the spring on the display cylinder causes the display cylinder to move suddenly into the „filter element clogged“ display position. This means that the colour in the display field changes from green to red.

In the case of the clogging indicator AOR the display position „filter element clogged“ is fixed, and continues to be maintained even if the pressure difference returns to permissible values, dependent on the viscosity or the rate of flow. The fixed „element clogged“ display position can be canceled by operating the reset button, provided that the reset condition is satisfied.

In the case of the clogging indicator AOC the display position „filter element clogged“ is only fixed in the pressure difference range  $\geq 30 \pm 10\%$  of the switching pressure difference. In the range  $< 30 \pm 10\%$  of the switching pressure difference occurs a self-instructed shift down to the display position „permissible range“. In the range  $> 30\%, < 80\%$  of the switching pressure difference, the display position „filter element clogged“ can be restored for control functions with the control button.

The reset- or control button is located in a position where it is protected from dirt, underneath the elastic cap, item 3, and should be operated with slight manual pressure  $< 10N$ .

Note on functional behaviour:

The „filter element clogged“ display will also be triggered if the pressure difference exceeds the switching pressure difference for only a brief period ( $> 100ms$ ).

The „filter element clogged“ display is triggered in the event of oscillatory or impulse excitations  $> 1g$  at values  $< 90\%$  of the switching pressure difference.

## 6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator

- screw in the clogging indicator into the bare hole (starting torque 92 lb.-ft.)

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2 and

- O-ring 15 x 1,5

as well as a dirt-free mounting.

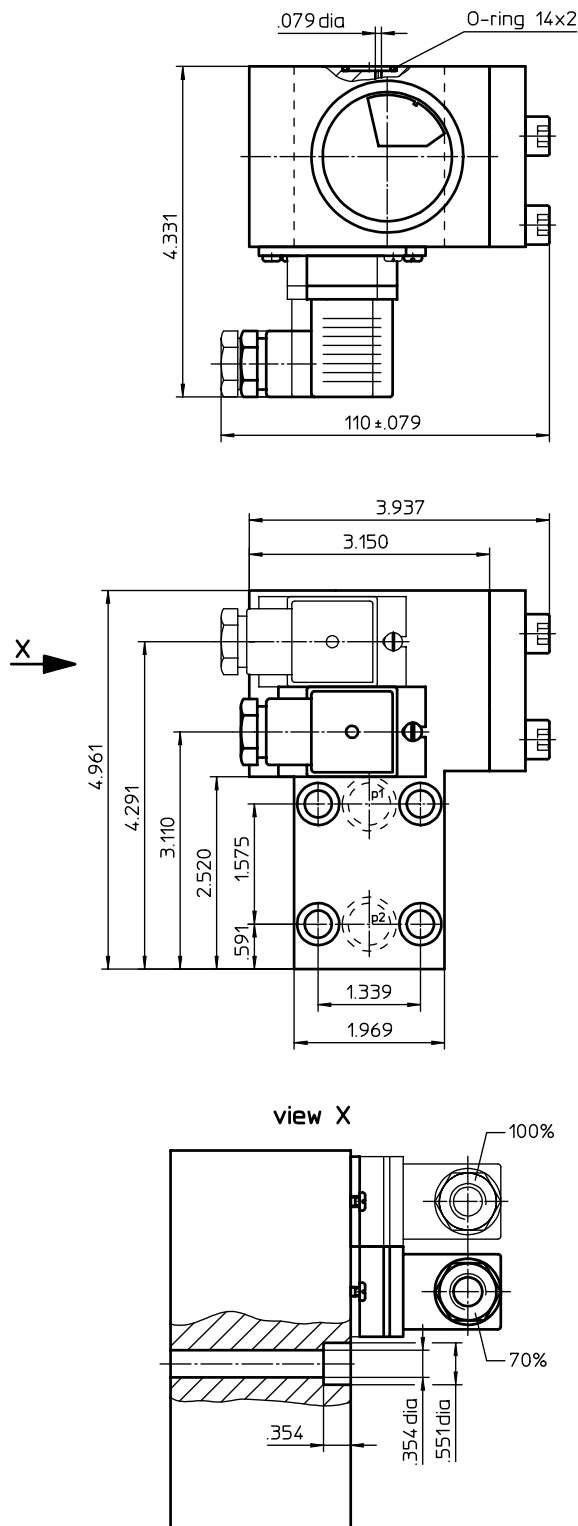
## 7. Maintenance:

This device is maintenance-free; however, care should be taken to ensure that no cleaning agent or solvents reach the transparent hood and the elastic cap over the reset button or control button.

# CLOGGING INDICATOR

Series OP (visual), OE (visual-electrical) block execution

Sheet No.  
**1628 E**



## 1. Clogging indicator OP-OE

### 1.1. Type index: (ordering example)

**OE1. 1,2. B. -. P. -. 1**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

#### 1 series:

- OE1 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% switching pressure difference
- OE2 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% and 100% switching pressure difference
- OE3 = clogging indicator, visual-electrical with 2 contacts maker and contacts breaker with 70% switching pressure difference
- OP = clogging indicator, visual (according to series OE without switching contacts)

#### 2 indicator-pressure difference: $\Delta p$ -nominal

0,3 = 4 PSI; 0,8 = 12 PSI; 1,2 = 17 PSI; 2,5 = 36 PSI; 4,5 = 65 PSI

#### 3 connection:

B = block execution with flange connection

#### 4 connection size:

- = standard

#### 5 sealing material:

P = Nitrile (NBR)  
V = Viton (FPM)

#### 6 material:

- = standard  
VA = stainless steel

#### 7 execution:

1 = execution 1 (electrical limit facts see item 3)  
2 = execution 2 (electrical limit facts see item 3)

## 2. Technical data:

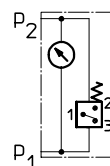
permissible operating pressure: 914 PSI  
permissible operating temperature: +176°F  
permissible pressure difference:  $p_1 - p_2 \leq 232$  PSI  
indicator-pressure difference: 4; 12; 17; 36; 65 PSI

## 3. Electrical limit facts:

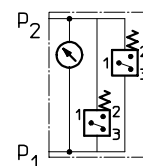
execution 1: 175V DC, 0,25A, 3 VA  
125V AC, 0,25A, 3 Watt  
execution 2: 175V DC, 1A, 20 VA  
230V AC, 0,5A, 10 Watt  
switch-over contact: contact maker and contact breaker  
protection: IP 65

## 4. Symbols:

execution OE1



execution OE2, OE3



1+2 contact maker  
1+3 contact breaker

Changes of measures and design are subject to alteration!

EDV 11/05

## 5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure  $\leq 914$  PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

A pressure difference dependent measuring piston, charged with supply pressure and output pressure, moves towards a measuring spring.

Concerning the OE1 a permanent magnet which is integrated in the measuring piston switches - depending on the gauge length - a Reed-contact (magnetic-switch) and releases electrical control signals upon reaching a pressure difference of 70%.

The OE2 is equipped with two magnetic switches which release electrical control signals in a sequence of 70% and 100% of the switching pressure.

The OE3 is equipped with two magnetic switches triggering electrical control signals at 70% of the switching pressure (redundance of the switches).

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

## 6. Operating instruction:

**Note:** Consider data and connecting conditions mentioned in items 2 to 4.

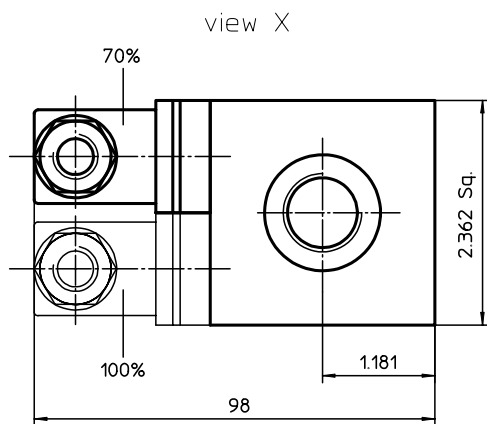
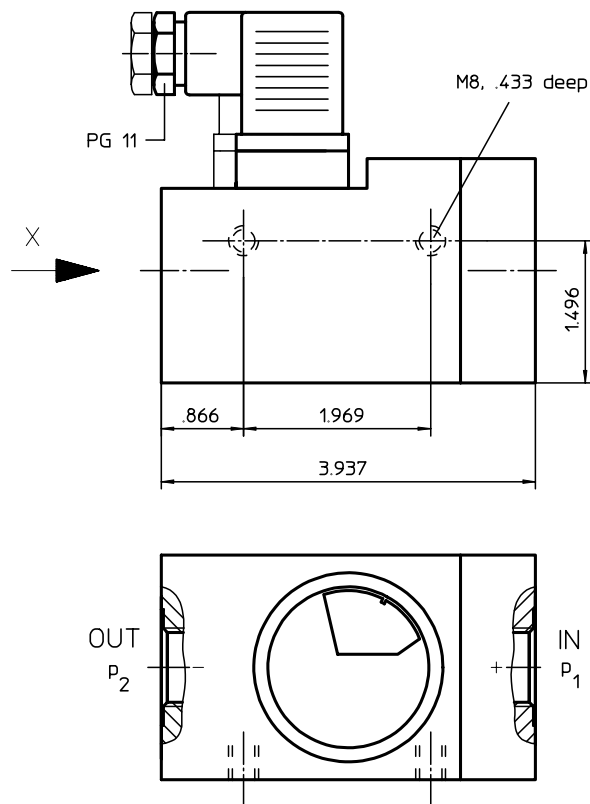
## 7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

# CLOGGING INDICATOR

## Series OP (visual), OE (visual-electrical)

Sheet No.  
**1614 D1**



### 1. Clogging indicator OP-OE

#### 1.1. Type index: (ordering example)

**OE1. 1,2. G. 1. P. -. 1**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

#### 1 series:

- OE1 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% switching pressure difference
- OE2 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% and 100% switching pressure difference
- OP = clogging indicator, visual (according to series OE without switching contacts)

#### 2 indicator-pressure difference: $\Delta p$ -nominal

0,8 = 12 PSI; 1,2 = 17 PSI; 2,5 = 36 PSI; 4,5 = 65 PSI

#### 3 connection:

G = thread connection

#### 4 connection size:

- 1 = 1/4 BSPP
- 3 = 1/2 BSPP

#### 5 sealing material:

P = Nitrile (NBR)      V = Viton (FPM)

#### 6 material:

- = standard
- VA = stainless steel

#### 7 execution:

- 1 = execution 1 (electrical limit facts see item 3)
- 2 = execution 2 (electrical limit facts see item 3)

### 2. Technical data:

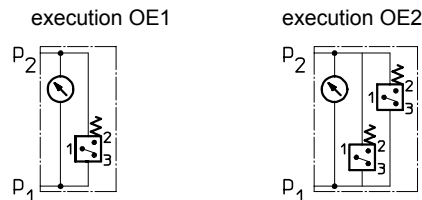
- permissible operating pressure: 914 PSI
- permissible operating temperature: +176°F
- temperature:
- permissible pressure difference:  $p_1 - p_2 \leq 232$  PSI
- indicator-pressure difference: 12; 17; 36; 65 PSI

The electrical signal takes place at 70% of the switching pressure difference using the design with two contacts the second signal takes place at 100% of the switching pressure difference.

### 3. Electrical limit facts:

- execution 1: 175V DC, 0,25A, 3 VA  
125V AC, 0,25A, 3 Watt
- execution 2: 175V DC, 1A, 20 VA  
230V AC, 0,5A, 10 Watt
- switch-over contact: contact maker and contact breaker
- protection: IP 65

### 4. Symbols:



1+2 contact maker  
1+3 contact breaker

Changes of measures and design are subject to alteration!

EDV 05/03

## 5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure  $\leq 914$  PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

A pressure difference dependent measuring piston, charged with supply pressure and output pressure, moves towards a measuring spring.

Concerning the OE1 a permanent magnet which is integrated in the measuring piston switches - depending on the gauge length - a Reed-contact (magnetic-switch) and releases electrical control signals upon reaching a pressure difference of 70%.

The OE2 is equipped with two magnetic switches which release electrical control signals in a sequence of 70% and 100% of the switching pressure.

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

## 6. Operating instruction:

- Connection

Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).

**Note:** Consider data and connecting conditions mentioned in items 2 to 4.

## 7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

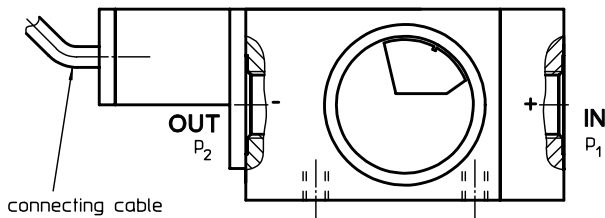
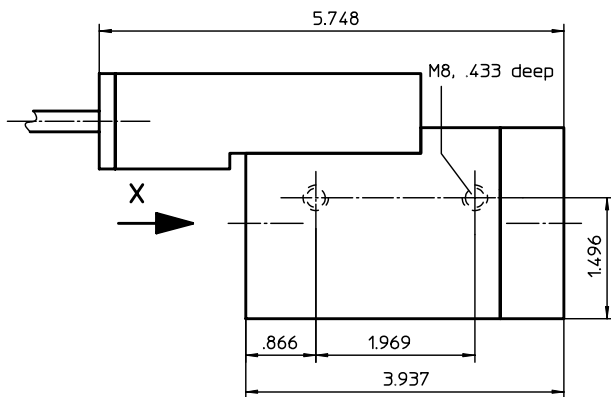
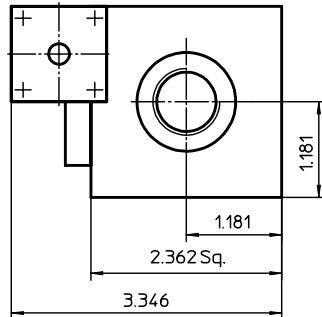


# CLOGGING INDICATOR

Series OE (electrical) explosion-proof

Sheet No.  
**1624 E**

view X



## 1. Type index: (ordering example)

**OE. 1.2. G. 1. P. VA. Ex**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

### 1 series:

OE = clogging indicator, visual-electrical with 1 contact maker with 70% switching pressure difference

### 2 indicator-pressure difference: $\Delta p$ -nominal

0,3 = 4 PSI  
0,8 = 12 PSI  
1,2 = 17 PSI  
2,5 = 36 PSI  
4,5 = 65 PSI

### 3 connection:

G = thread connection

### 4 connection size:

1 = 1/4 BSPP  
3 = 1/2 BSPP

### 5 sealing material:

P = Nitile (NBR)  
V = Viton (FPM)

### 6 material:

VA = stainless steel

### 7 execution:

EX = explosion-proof

## 2. Technical data:

permissible operating pressure: 914 PSI  
permissible fluid temperature: -40°F to +176°F  
permissible ambient temperature: -40°F to +140°F  
permissible pressure difference:  $p_1 - p_2 \leq 232$  PSI  
indicator-pressure difference  $\Delta p$ : 4; 12; 17; 36; 65 PSI

The electrical signal takes place at 70% of the switching pressure difference.

## 3. Electrical data switching contact:

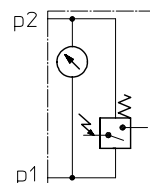
contact design: reed contact - normally open  
max. switching voltage: 200V DC  
250V AC peak - peak  
max. switching current: 1 A  
max. breaking capacity: 30 Watt  
type of protection:

II 2 GD EEx

m II T6  
KEMA 00ATEX 1112  
IP 65

certificated  
operating temperature range: -40°F to +140°C  
connecting cable: H05RN 2x .03 inch  
length connecting cable: max. 196 inch

## 4. Symbol:



1+2 normally open

EDV 06/09

Changes of measures and design are subject to alteration!

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## 5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure  $\leq 914$  PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

## 6. Operating instruction:

- Connection

Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).

**Note:** Consider data and connecting conditions mentioned in items 2 to 4.

## 7. Maintenance:

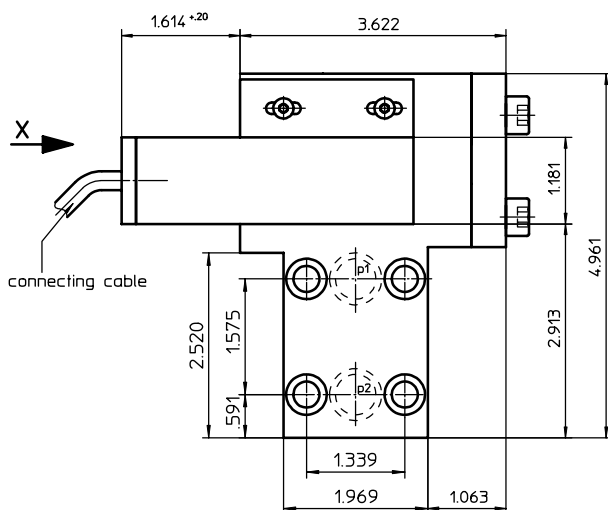
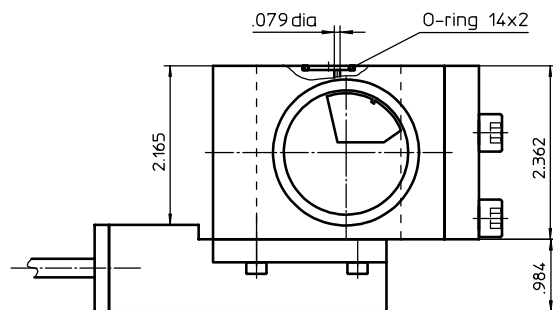
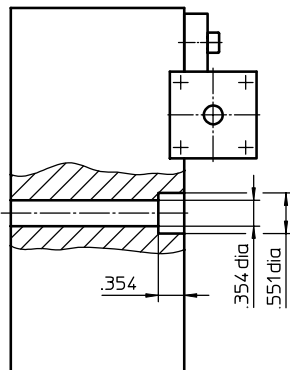
The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

# CLOGGING INDICATOR

Series OE (visual-electrical, block execution) explosion-proof

Sheet No.  
**1629 C**

view X



## 1. Type index: (ordering example)

**OE. 1,2. B. -. P. VA. Ex**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

### 1 series:

OE = clogging indicator, visual-electrical with 1 contact maker with 70% switching pressure difference

### 2 indicator-pressure difference: $\Delta p$ -nominal

0,8 = 12 PSI  
1,2 = 17 PSI  
2,5 = 36 PSI  
4,5 = 65 PSI

### 3 connection:

B = block execution with flange connection

### 4 connection size:

- = standard

### 5 sealing material:

P = Nitile (NBR)  
V = Viton (FPM)

### 6 material:

VA = stainless steel

### 7 execution:

EX = explosion-proof

## 2. Technical data:

permissible operating pressure: 914 PSI  
permissible fluid temperature: -40°F to +176°F  
permissible ambient temperature: -40°F to +140°F  
permissible pressure difference:  $p_1 - p_2 \leq 232$  PSI  
indicator-pressure difference  $\Delta p$ : 12; 17; 36; 65 PSI

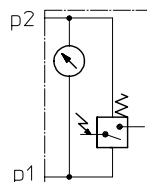
The electrical signal takes place at 70% of the switching pressure difference.

## 3. Electrical data switching contact:

contact design: reed contact - normally open  
max. switching voltage: 200V DC  
250V AC peak - peak  
max. switching current: 1 A  
max. breaking capacity: 30 Watt  
type of protection:  $\text{Ex}$  II 2 GD EEx  
m II T6  
KEMA 00ATEX 1112  
IP 65

certificated  
operating temperature range: -40°F to +140°C  
connecting cable: H05RN 2x .03 inch  
length connecting cable: max. 196 inch

## 4. Symbol:



1+2 normally open

## 5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure  $\leq 914$  PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

## 6. Operating instruction:

- Connection

Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).

**Note:** Consider data and connecting conditions mentioned in items 2 to 4.

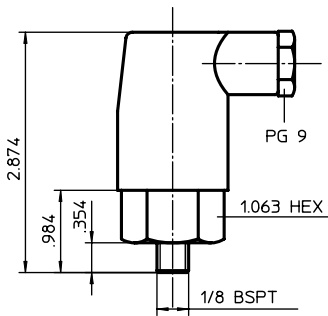
## 7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

# CLOGGING INDICATOR

## Series E (electrical), O (visual)

Sheet No.  
**1616 H**



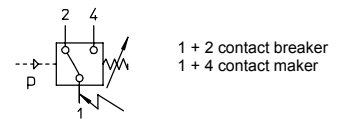
### 1. Type index: (ordering example)

- E2.0,3 = pressure switch, change over contacts, switching pressure 4.35 PSI
- E2.1,5 = pressure switch, change over contacts, switching pressure 22 PSI
- E2.2,5 = pressure switch, change over contacts, switching pressure 36 PSI

### 2. Technical data:

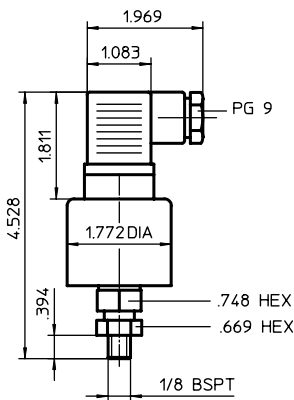
max. pressure to 1450 PSI  
 temperature range: -4°F to +176°F  
 max. contact load: max. 250 V ≅ /2A  
 protection: IP 55

### 3. Symbol:



1 + 2 contact breaker  
 1 + 4 contact maker

The functions contact making, contact breaking or contact making and breaking refer to the increasing pressure.



### 1. Type index: (ordering example)

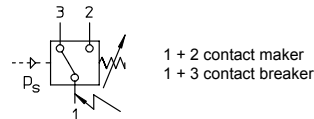
- E4.-0,25 = pressure switch, change over contacts, switching pressure -3.62 PSI

### 2. Technical data:

max. pressure to 1160 PSI  
 temperature range: -4°F to +176°F  
 max. contact load: max. 250 V ≅ /5A  
 protection: IP 65

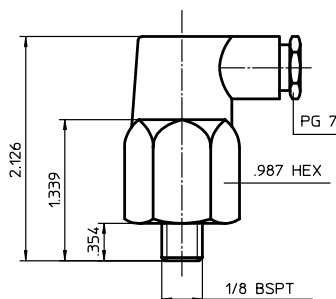
For the electrical connection please use only enclosed utensil socket. Other utensil sockets have a longer fixing screw which can destroy the inside micro switch. The screw of an available utensil socket should have a max. thread reach of 1.10 inch. Do not forget the shaped packing by sticking up the utensil and tighten the fixing screw moderately.

### 3. Symbol:



1 + 2 contact maker  
 1 + 3 contact breaker

The functions contact making, contact breaking or contact making and breaking refer to the increasing pressure (0 PSI → -.01 PSI).



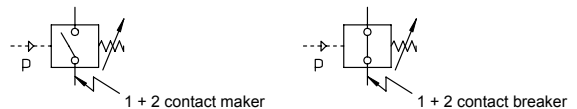
### 1. Type index: (ordering example)

- E1.1,5 = pressure switch, normally open contacts, switching pressure 22 PSI
- E1.2,5 = pressure switch, normally open contacts, switching pressure 36 PSI
- E5.1,5 = pressure switch, normally closed contacts, switching pressure 22 PSI
- E5.2,5 = pressure switch, normally closed contacts, switching pressure 36 PSI
- E5.5,0 = pressure switch, normally closed contacts, switching pressure 72 PSI

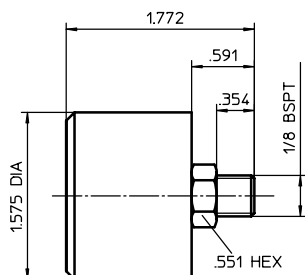
### 2. Technical data:

max. pressure to 4350 PSI  
 temperature range: -4°F to +212°F  
 max. contact load: max. 250 V ≅ /2A  
 protection: IP 55

### 3. Symbol:



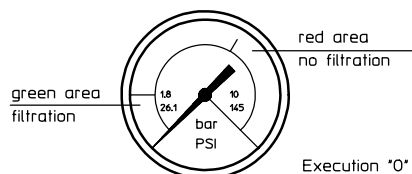
The function contact making or contact breaking refer to the increasing pressure.



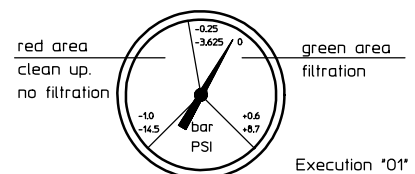
### 1. Type index: (ordering example)

- O = clogging indicator visual, 0 to 145 PSI
- O1 = clogging indicator visual, +8.7 PSI to -14.5 PSI

### 2. Symbol:



Execution "O"



Execution "O1"

EDV 08/07

Changes of measures and design are subject to alteration!

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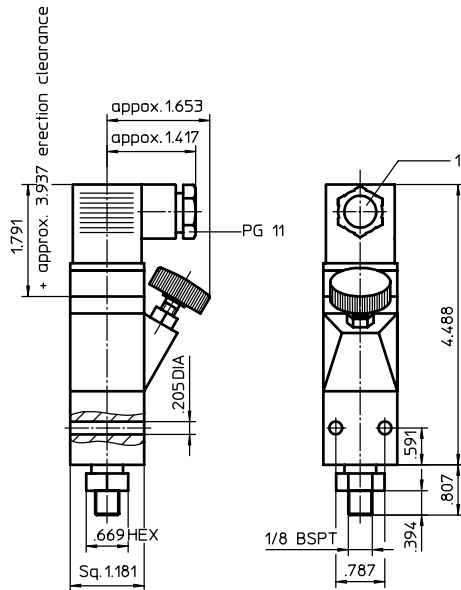


# CLOGGING INDICATOR

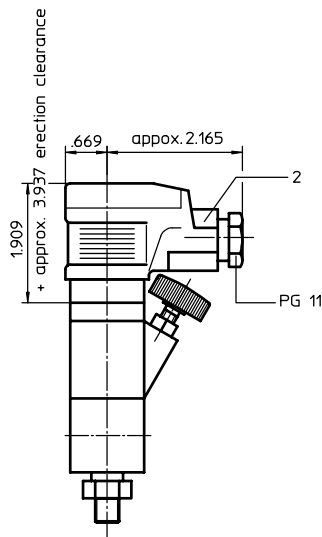
## Series E6

Sheet No.  
**1600 A**

### Clogging indicator E6 ... GS



### Clogging indicator E6 ... SS3



### 1. Type index: (ordering example)

#### E 6. 1,5. GS

1	2	3
---	---	---

#### 1 series:

E6 = pressure switch, contact maker and contact breaker

#### 2 switching pressure:

1,5 = 22 PSI

2,5 = 36 PSI

#### 3 connection:

GS = line adapter DIN 43650-A, three-channel plug

SS3 = line adapter DIN 43650-A, three-channel plug with LED indication of switching position

### 2. Technical data:

max. pressure:

to 1450 PSI

temperature range:

- 4°F to + 176°F

type of protection:

IP 55

connection of cable:

PG 11

max. contact load with GS-line adapter:

$U_{max} = 250$  V AC

$I_{max} = 2$  A

$P_{max} = 500$  VA

distribution voltage with SS3-line adapter:

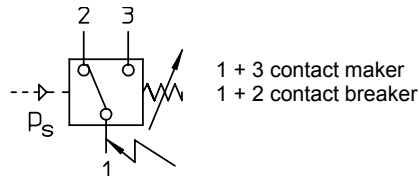
$U_{max} = 24$  V DC

max. contact load with SS3-line adapter:

$I_{max} = 2$  A

$P_{max} = 48$  VA

### 3. Symbol:



### 4. Spare parts:

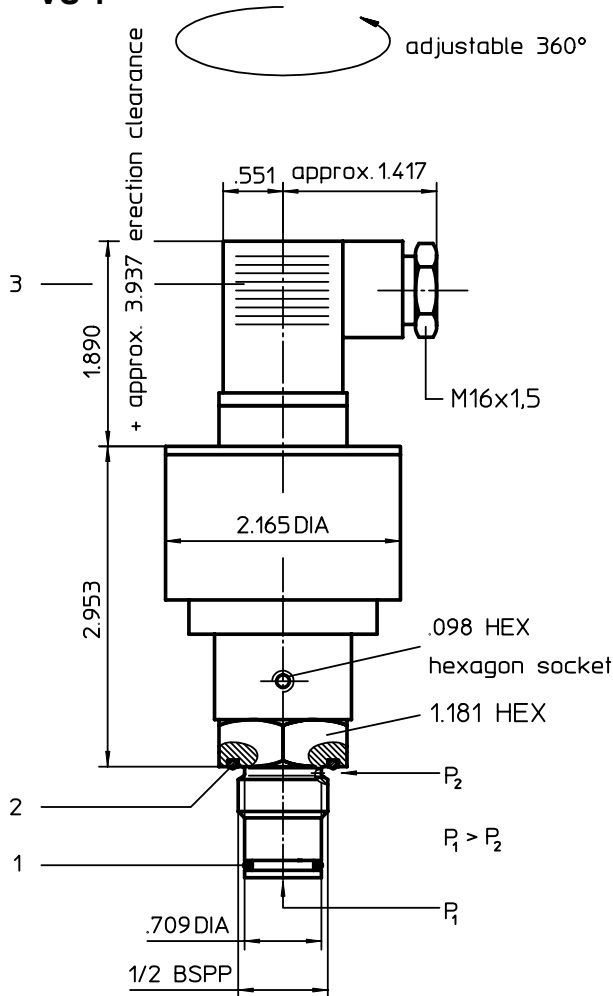
item	qty.	designation	dimension	article-no.
1	1	GS	DIN 43650-A	312492
2	1	SS3	DIN 43650-A	312478

# ELECTRONICAL CLOGGING SENSOR

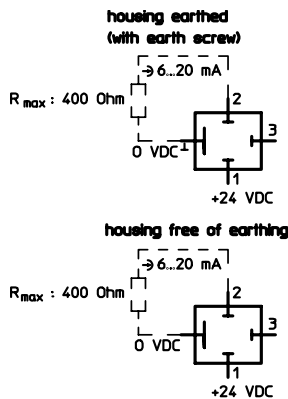
## Series VS 1 and Indicating System AG 1 (thread execution)

Sheet No.  
**1617 F**

### Clogging Sensor VS 1



### Connection Configuration



### 4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
2	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
3	1	GS	DIN 43650-designA/ISO4400	312492	

### 1. Type index:

<b>VS 1, 1,5, P, -, GS, -, E</b>
1   2   3   4   5   6   7

#### 1 series:

VS 1 = electronical clogging sensor with analog  
6... 20mA output signal

#### 2 indicator-pressure difference: Δp-nominal

1,5 = 22 PSI    5,0 = 73 PSI  
2,5 = 36 PSI    6,0 = 87 PSI

#### 3 sealing material:

P = Nitrile (NBR)  
V = Viton (FPM)

#### 4 material: (screw-in-housing)

- = standard  
VA = stainless steel

#### 5 connection:

GS = line adapter acc. to DIN 43650-designA/ISO4400,  
three-channel plug

#### 6 execution:

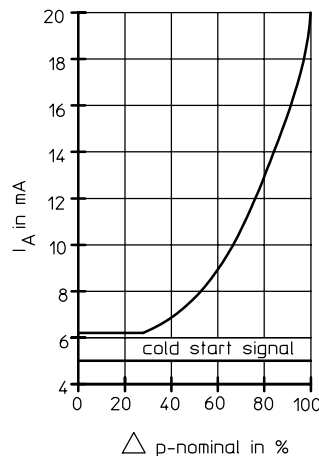
- = standard

#### 7 grounding:

E = 0 volt free of grounding  
G = 0 volt grounded

### 2. Technical data:

max. operating pressure: 6000 PSI  
max. pressure difference: 2320 PSI  
distribution voltage: 24 V DC ± 20%  
residual ripple: < 10%  
temperature range: +14°F to +212°F (fluids)  
+14°F to +176°F (electronics)  
output signal: 6...20mA  
cold start: 5mA  
max. load: 400 Ohm  
error of measurement: ± 5% v. Δp-nominal



### 3. Functions:

- Continuous pressure difference measuring
- Cold start indication up to approx. + 77°F
- Suppression of pressure peaks
- Dust-proof and splash-proof aluminium or stainless steel housing
- Interference-free signal transmission over longer distances
- Optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- Interchangeable with clogging indicator type AE (INT)

Changes of measures and design are subject to alteration!

EDV 02/10

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# Indicating System AG 1

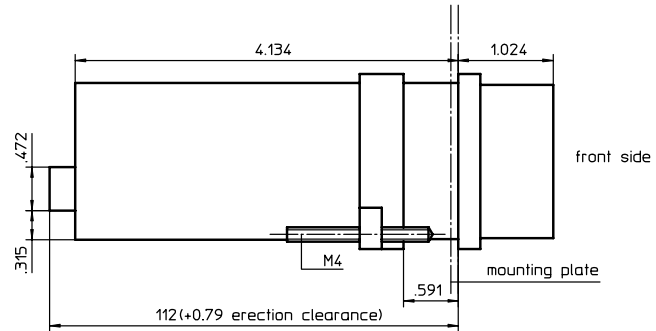
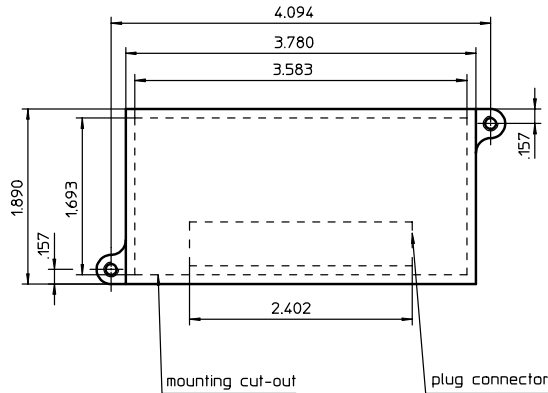
## 1. Type index: (ordering example)

**AG1.**

1

1 series:

AG 1 = electronic display unit with clear protective cover,  
mounts remote in control cabinets  
to be used with electronic clogging sensor VS1



## 2. Technical data:

distribution voltage: 24 V DC  $\pm$  20%  
residual ripple: < 10%

contacts: 2 x contact maker;  $U_{max}$  : 240 V AC  
(K1/K2)  $I_{max}$  : 0,5 A  
 $P_{max}$  : 10 Watt

temperature range: 32°F to 158°F

system of protection: IP 53 with transparent protection cap  
according to DIN 43700

housing dimensions: (see illustration)

## 3. Functions:

- Evaluation set for current signals emitted by VS1
- Pressure difference indication by LED - band
- 2 x relay switching contacts  
(75% and 100% of the  $\Delta p$  -nominal range)
- Indication of switching position by LED
- Cold start indication by LED
- Adjustable pressure peak suppression up to 60 seconds

## 4. Connection configuration:

24V <sub>-</sub>		K1		K2						→	24V <sub>-</sub>	
⊥	+	1	2	1	2					4...20 mA	+	⊥
1	2	3	4	5	6	7	8	9	10	11	12	

1, 2 = distribution voltage  
10, 11, 12 = VS1 - connection

## LED-Indicating scheme

$I_A$ -VS1 in mA	[V]	[< 50]	[50]	[75]	[90]	[100]	[S1]	[S2]	filter element - contamination level
	(ye)	(gr)	(gr)	(ye)	(ye)	(rd)	(rd)	(rd)	
4...6	x	x							- cold start indication (fluid temperature < 77°F) no information about the contamination level
6...8		x							- filter element unused pressure difference: < 50% $\Delta p$ -nominal initial contamination
8...12		x	x						- pressure difference: $\geq$ 50% $\Delta p$ -nominal moderate contamination
12...16		x	x	x			x		- pressure difference: $\geq$ 75% $\Delta p$ -nominal warning contact 1 switched
16...20		x	x	x	x		x		- heavy contamination pressure difference: $\geq$ 90% $\Delta p$ -nominal
20		x	x	x	x		x	x	- filter element used up pressure difference: $\geq$ 100% $\Delta p$ -nominal warning contact 2 switched

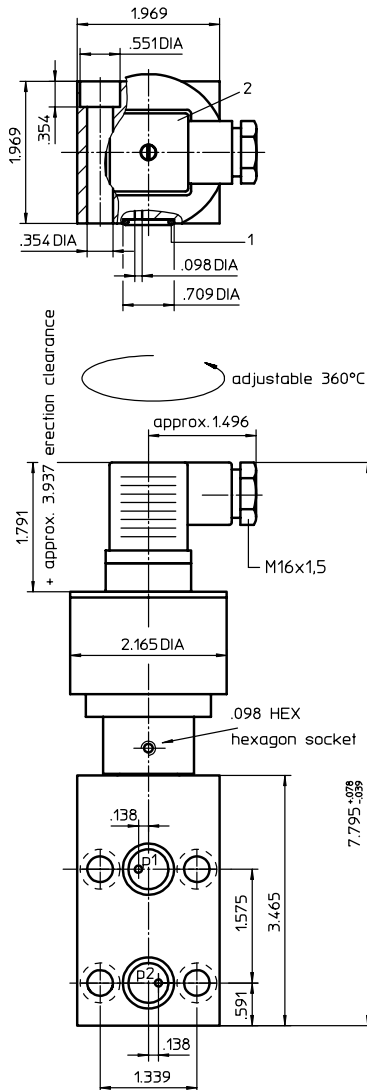


# ELECTRONICAL CLOGGING SENSOR

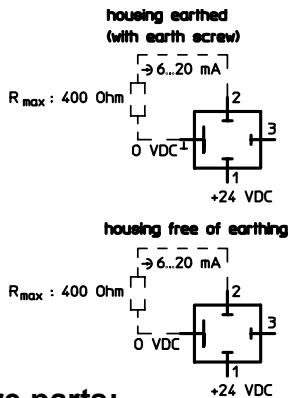
## Series VS 1 and Indicating System AG 1 (block execution)

Sheet No.  
**1607 D**

### Clogging Sensor VS 1



### Connection Configuration



### 4. Spare parts:

item	qty.	designation	dimension	article-no.
1	2	O-ring	14 x 2	304342 (NBR)   304722 (FPM)
2	1	GS	DIN 43650-designA/ ISO4400	312492

EDV 02/10

### 1. Type index:

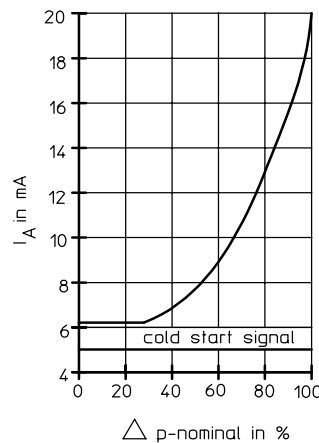
**VS 1. 1,5. P. -. GS. B. E**

1	2	3	4	5	6	7
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- 1 **series:**  
VS 1 = electronical clogging sensor with analog 6... 20mA output signal
- 2 **indicator-pressure difference:** ( $\Delta p$ -nominal)  
1,5 = 22 PSI    5,0 = 73 psi  
2,5 = 36 PSI    6,0 = 87 PSI
- 3 **sealing material:**  
P = Nitrile (NBR)  
V = Viton (FPM)
- 4 **material:** (block)  
- = standard  
VA = stainless steel
- 5 **connection:**  
GS = line adapter acc. to DIN 43650-designA/ISO4400, three-channel plug
- 6 **execution:**  
B = block execution
- 7 **grounding:**  
E = 0 volt free of grounding  
G = 0 volt grounded

### 2. Technical data:

max. operating pressure:	6000 PSI
max. pressure difference:	2320 PSI
distribution voltage:	24 V DC $\pm$ 20%
temperature range:	residual ripple: < 10%
	+14°F to +212°F (fluids)
	+14°F to +176°F (electronics)
output signal:	6...20mA
cold start:	5mA
max. load:	400 Ohm
error of measurement:	$\pm$ 5% v. $\Delta p$ -nominal



### 3. Functions:

- Continuous pressure difference measuring
- Cold start indication up to approx. + 77°F
- Suppression of pressure peaks
- Dust-proof and splash-proof aluminium or stainless steel housing
- Interference-free signal transmission over longer distances
- Optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- Interchangeable with clogging indicator type AE (INT)

Changes of measures and design are subject to alteration!

# Indicating System AG 1

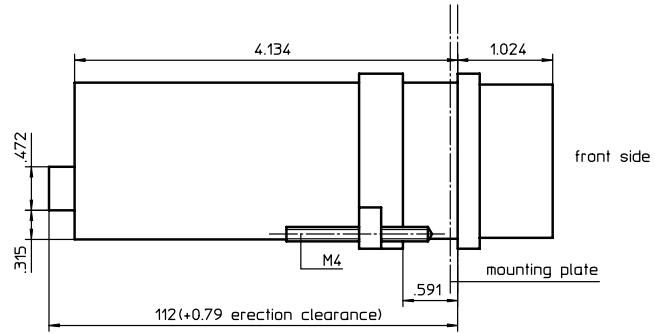
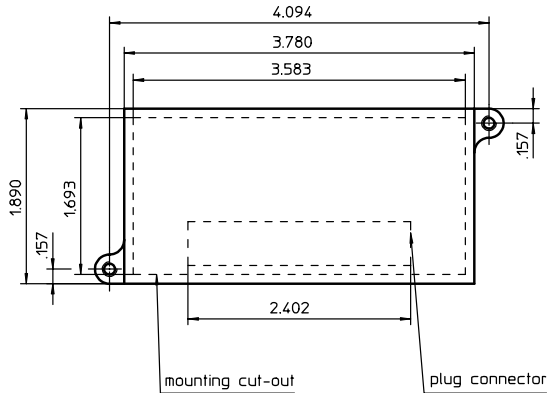
## 1. Type index: (ordering example)

**AG1.**

1

1 series:

AG 1 = electronic display unit with clear protective cover,  
mounts remote in control cabinets  
to be used with electronic clogging sensor VS1



## 2. Technical data:

distribution voltage: 24 V DC  $\pm$  20%  
residual ripple: < 10%

contacts: 2 x contact maker;  $U_{max}$  : 240 V AC  
(K1/K2)  $I_{max}$  : 0,5 A  
 $P_{max}$  : 10 Watt

temperature range: 32°F to 158°F

system of protection: IP 53 with transparent protection cap  
according to DIN 43700

housing dimensions: (see illustration)

## 3. Functions:

- Evaluation set for current signals emitted by VS1
- Pressure difference indication by LED - band
- 2 x relay switching contacts  
(75% and 100% of the  $\Delta p$  -nominal range)
- Indication of switching position by LED
- Cold start indication by LED
- Adjustable pressure peak suppression up to 60 seconds

## 4. Connection configuration:

24V <sub>-</sub>		K1		K2				4...20 mA		24V <sub>-</sub>	
⊥	+	1	2	1	2			→	+	⊥	
1	2	3	4	5	6	7	8	9	10	11	12

1, 2 = distribution voltage  
10, 11, 12 = VS1 - connection

## LED-Indicating scheme

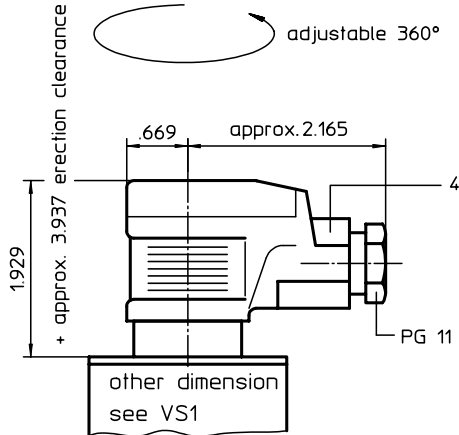
$I_A$ -VS1 in mA	[V]	[< 50]	[50]	[75]	[90]	[100]	[S1]	[S2]	filter element - contamination level
	(ve)	(gr)	(gr)	(ve)	(ve)	(rd)	(rd)	(rd)	
4...6	x	x							- cold start indication (fluid temperature < 77°F) no information about the contamination level
6...8		x							- filter element unused
8...12		x	x						- pressure difference: < 50% $\Delta p$ -nominal initial contamination
12...16		x	x	x			x		- pressure difference: $\geq$ 50% $\Delta p$ -nominal moderate contamination
16...20		x	x	x	x		x		- pressure difference: $\geq$ 75% $\Delta p$ -nominal warning contact 1 switched
20		x	x	x	x		x	x	- heavy contamination pressure difference: $\geq$ 90% $\Delta p$ -nominal filter element used up pressure difference: $\geq$ 100% $\Delta p$ -nominal warning contact 2 switched

# ELECTRONICAL CLOGGING SENSOR

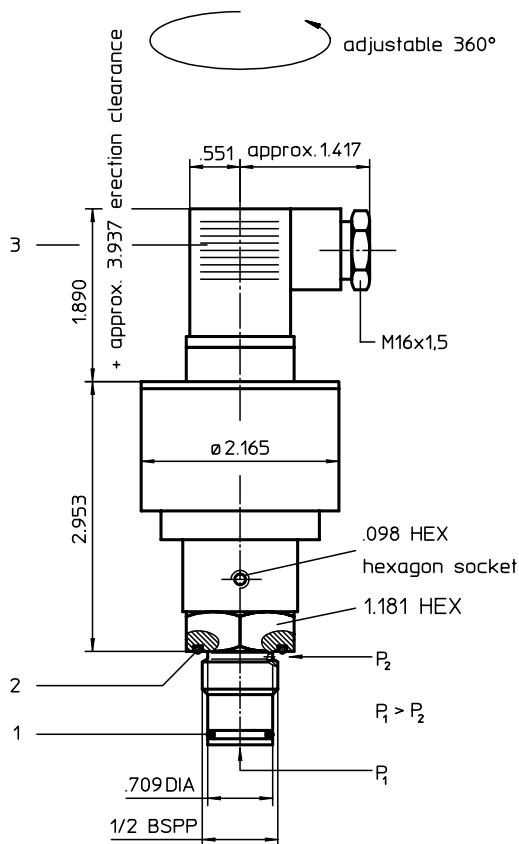
Series VS 2 (thread execution)

Sheet No.  
**1618 E**

## Clogging sensor VS 2 ... SS1



## Clogging sensor VS 2 ... GS



### 1. Type index: (ordering example)

**VS 2. 1,5. P. -. GS. -. E**

1	2	3	4	5	6	7
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#### 1 series:

VS2 = electronic clogging sensor with  
2x PNP-switching contacts (75% and 100% of the  $\Delta p$ -nominal range)

#### 2 indicator-pressure difference: ( $\Delta p$ -nominal)

1,5 = 22 PSI  
2,5 = 36 PSI  
5,0 = 73 PSI  
6,0 = 87 PSI

#### 3 sealing material:

P = Nitrile (NBR)  
V = Viton (FPM)

#### 4 material: (screw-in-housing)

- = standard  
VA = stainless steel

#### 5 connection:

GS = line adapter acc. to DIN 43650-designA/ISO4400,  
three-channel plug  
SS1 = line adapter acc. to DIN 43650-designA/ISO4400,  
three-channel plug with LED switch-position indicator for VS

#### 6 execution:

- = standard

#### 7 grounding:

E = 0 volt free of grounding  
G = 0 volt grounded

### 2. Technical data:

max. operating pressure: 6000 PSI  
max. pressure difference: 2320 PSI  
distribution voltage: 24 V DC  $\pm$  20%  
residual ripple: < 10%  
temperature range: + 14 °F to + 212°F (fluid)  
+ 14 °F to + 176°F (electronics)  
PNP-switching contacts: contact maker;  $I_{max}$  = 200 mA with 24V  
protection: IP65 acc. to DIN EN 60529

### 3. Functions:

- Discrete control of the filter contamination by means of two PNP-switching contacts (75% and 100% of the  $\Delta p$ -nominal range)
- Indication of switching position by LED immediately at the sensor in connection with the signal plug SS1
- Cold start suppression up to approx. + 77°F
- Suppression of pressure peaks
- Interchangeable with clogging indicator type AE (INT)

### 4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	14x2	304342 (NBR)	304722 (FPM)
2	1	O-ring	22x2	304708 (NBR)	304721 (FPM)
3	1	GS	DIN 43650-designA/ISO4400	312492	
4	1	SS1	DIN 43650-designA/ISO4400	310403	

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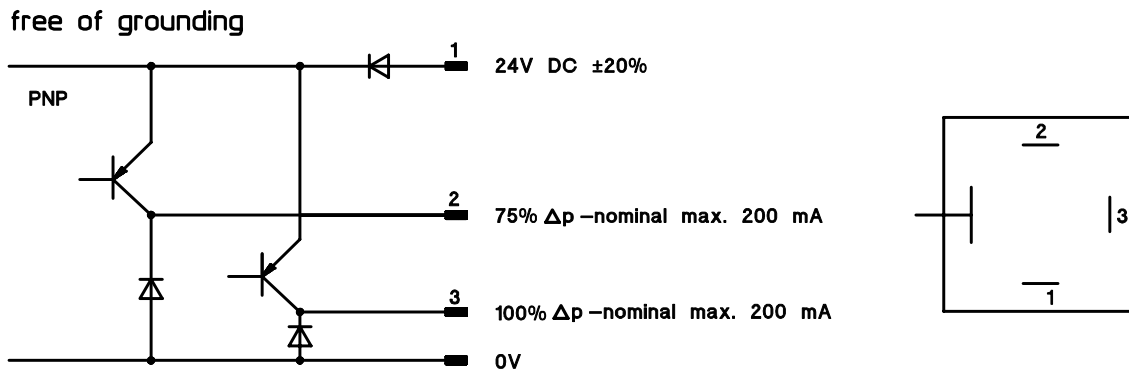
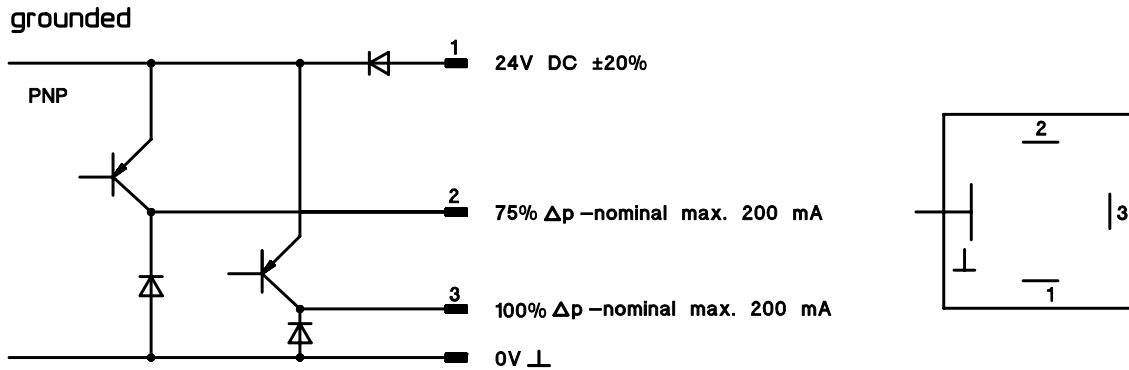
phone 740 - 452 - 7775  
fax 740 - 454 - 0075

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url www.internormen.com



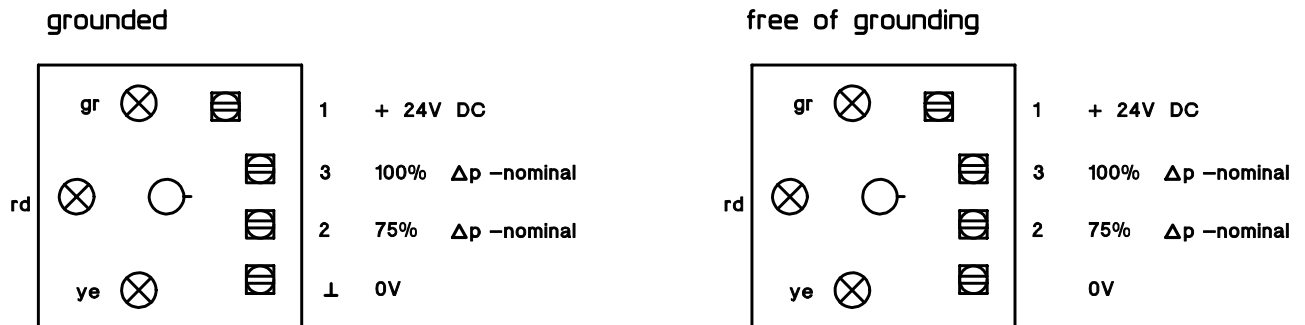
## 5. Connection configuration:

### Connection configuration VS 2



### Connection configuration SS 1

The signal plug SS1 is used to indicate the actual switching position at the VS2.



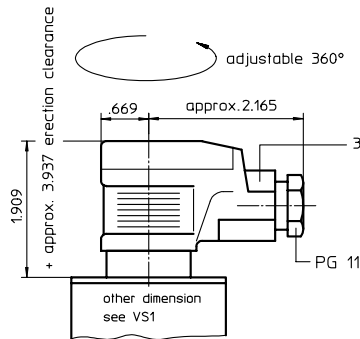
LED - green - on: operating pressure in on-position  
 LED - yellow - on: switching contact 75%  $\Delta p$ -nominal switched  
 LED - red - on: switching contact 100%  $\Delta p$ -nominal switched

# ELECTRONICAL CLOGGING SENSOR

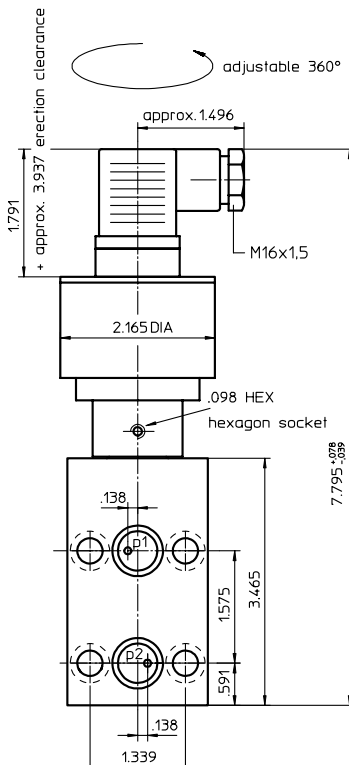
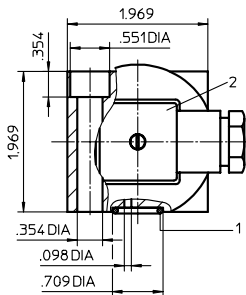
## Series VS 2 (block execution)

Sheet No.  
**1608 C**

### Clogging sensor VS 2 ... SS1



### Clogging sensor VS 2 ... GS



### 1. Type index: (ordering example)

**VS 2. 1,5. P. -. GS. B. E**

1	2	3	4	5	6	7
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#### 1 series:

VS2 = electrical clogging sensor with  
2x PNP-switching contacts (75% and 100% of the  $\Delta p$ -nominal range)

#### 2 indicator-pressure difference: ( $\Delta p$ -nominal)

1,5 = 22 PSI  
2,5 = 36 PSI  
5,0 = 73 PSI  
6,0 = 87 PSI

#### 3 sealing material:

P = Nitrile (NBR)  
V = Viton (FPM)

#### 4 material: (block)

- = standard  
VA = stainless steel

#### 5 connection:

GS = line adapter acc. to DIN 43650-designA/ISO4400,  
three-channel plug

SS1 = line adapter acc. to DIN 43650-designA/ISO4400,  
three-channel plug with LED switch-position indicator for VS 2

#### 6 execution:

B = block execution

#### 7 grounding:

E = 0 volt free of grounding  
G = 0 volt grounded

### 2. Technical data:

max. operating pressure: 6000 PSI  
max. pressure difference: 2320 PSI  
distribution voltage: 24 V DC  $\pm$  20%  
residual ripple: < 10%  
temperature range: + 14 °F to + 212°F (fluid)  
+ 14 °F to + 176°F (electronics)  
PNP-switching contacts: contact maker;  $I_{max}$  = 200 mA with 24V  
protection: IP65 acc. to DIN EN 60529

### 3. Functions:

- Discrete control of the filter contamination by means of two PNP-switching contacts (75% and 100% of the  $\Delta p$ -nominal range)
- Indication of switching position by LED immediately at the sensor in connection with the signal plug SS1
- Cold start suppression up to approx. + 77°F
- Suppression of pressure peaks
- Interchangeable with clogging indicator type AE (INT)

### 4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	O-ring	14x2	304342 (NBR)	304722 (FPM)
2	1	GS	DIN 43650-designA/ISO4400	312492	
3	1	SS1	DIN 43650-designA/ISO4400	310403	

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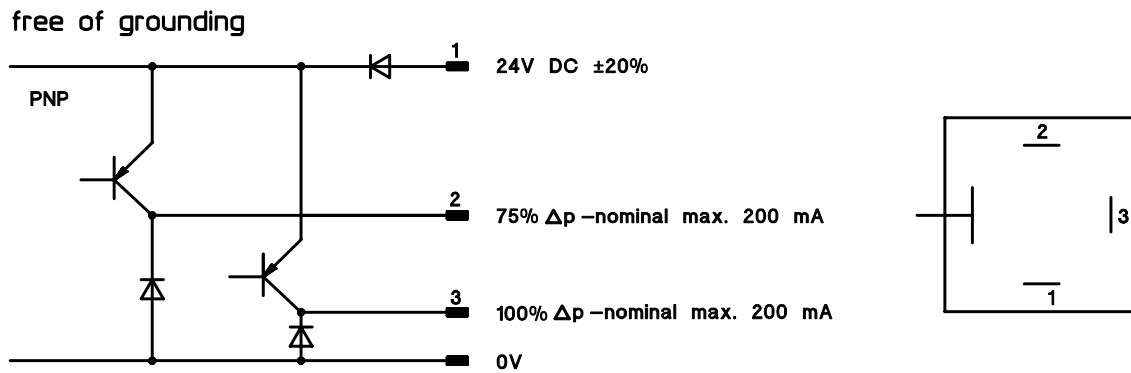
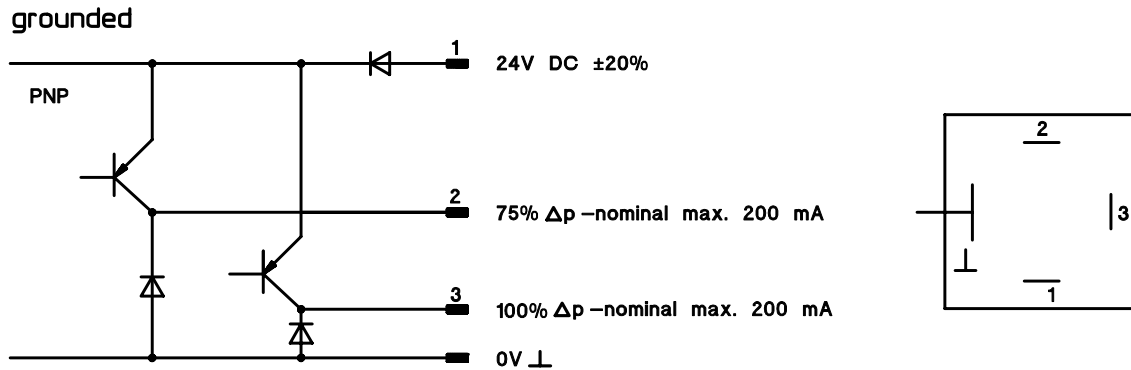
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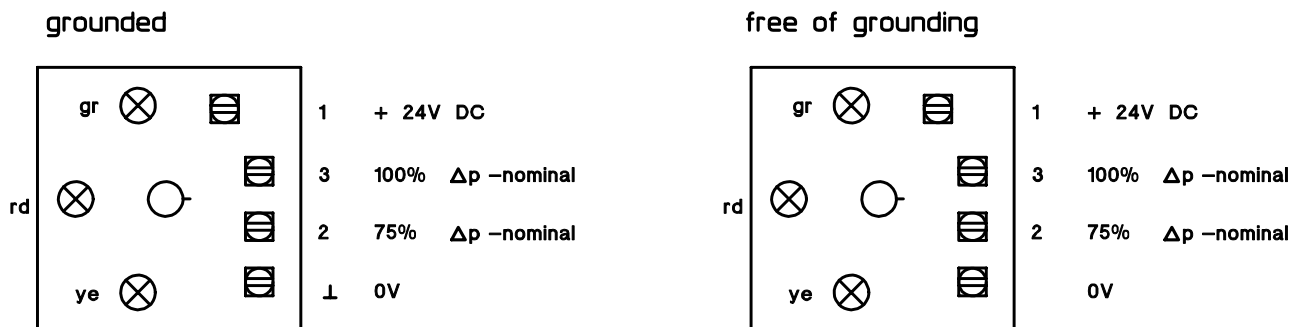
## 5. Connection configuration:

### Connection configuration VS 2



### Connection configuration SS 1

The signal plug SS1 is used to indicate the actual switching position at the VS2.



LED - green - on: operating pressure in on-position  
 LED - yellow - on: switching contact 75%  $\Delta p$ -nominal switched  
 LED - red - on: switching contact 100%  $\Delta p$ -nominal switched