

Pressure switch type DG 51 E

Product documentation



Operating pressure p_{\max} : 600 bar



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1 Overview of pressure switch type DG 51 E

Pressure switches are hydraulic accessories. They close or open electrical contacts when under pressure. They are used to issue an electrical switching command or signal for further work steps when a predefined pressure value is reached. Two independent switching points can be programmed. Pushbuttons or IO-Link can be used to carry out the setting.

Features and benefits:

- Two switch outputs as normally closed contact or normally open contact, PNP or NPN programmable
- System pressure is constantly measured and shown on the display
- Optical switching point monitoring by LED
- IO-Link communication

Intended applications:

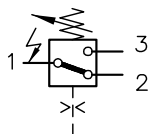
- General hydraulic systems
- Machine tools



Pressure switch type DG 51E

2 Available versions, main data

Circuit symbol:



Order coding example:

DG 51 E	- A	250	
			Pressure range Table 2 Pressure range
			Hydraulic connection Table 1 Hydraulic connection

Basic type

Table 1 Hydraulic connection

Coding	Description
- A	External thread G 1/4 A (BSPP)
- I	Internal thread G 1/4 (BSPP)

Table 2 Pressure range

Coding	Pressure setting (bar)
100	0 to 100
250	0 to 250
400	0 to 400
600	0 to 600

3 Parameters

3.1 General

Designation	Pressure switch
Design	Ceramic-Capacitive (100 bar) Metallic thin-film cell (250 bar, 400 bar, 600 bar)
Model	Screw-in part
Material	V2A, Plastic (250 bar, 400 bar, 600 bar) V4A, Plastic (100 bar)
Ports	M12, 4-pole
Tightening torques	25 to 35 Nm Chapter 4, "Dimensions"
Material with contact to the medium	V2A (1.4542)
Installation position	As desired
Protection class	IP 67, mounted
Temperatures	Medium temperature: -25 to +80°C Ambient temperature: -25 to +80°C Storage temperature: -40 to +100°C

Pressure

		DG 51 E- to 100	DG 51 E- to 250	DG 51 E- to 400	DG 51 E- to 600
Measuring range	bar	0 to 100	0 to 250	0 to 400	0 to 600
	PSI	0 to 1450	0 to 3625	0 to 5800	0 to 8700
Maximum pressure	bar	300	500	800	800
	PSI	4350	7250	11580	11580
Bursting pressure	bar	650	1200	1700	2500
	PSI	9400	17400	24650	36250
Switching point SP1 and SP2	bar	1 to 100	2 to 250	4 to 400	4 to 600
	PSI	10 to 1450	40 to 3650	40 to 5800	40 to 8700
Reset point rP1 and rP2	bar	0.5 to 99.5	1 to 249	2 to 398	2 to 598
	PSI	5 to 1445	20 to 3600	20 to 5780	20 to 8680
Pressure difference Δp	bar	0.5	1	2	2
	PSI	5	20	20	20

3.2 Electrical data

Version	PNP/NPN switching, programmable
Operating voltage U_B	18 to 30 DC, protected against polarity reversal
Idle current I_L	< 35 mA
Insulation resistance R_{I50}	> 100 M Ω

Outputs

Switching current I_A	< 200 mA, overload-proof
Voltage drop ΔU_A	< 2.5 V
Switching frequency f_s	\leq 170 Hz
Switching cycles N	> 100 million

Accuracy

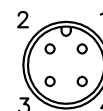
Switching point accuracy	< ± 0.5
Hysteresis	< ± 0.25
Repeat accuracy	< ± 0.1

Reaction time

Startup	0.3 s
Response time of output T_s	< 3 ms
Delay time d_S & d_r	0 to 50 s, programmable

Electrical connection

Signal	Pin	Wire colour
U_B	1	Brown
OUT2	2	White
GND	3	Blue
OUT1/IO-Link	4	Black



3.3 IO-Link communication

Type	COM2, 38.4 kBaud
Revision	1.1
SDCI standard	IEC 61131-9
Device ID	100 bar: 915 d / 000 393 h 250 bar: 916 d / 000 394 h 400 bar: 917 d / 000 395 h 600 bar: 918 d / 000 396 h
Profiles	Smart Sensor, Process Data Variable, Device Identification, Device Diagnosis
SIO mode	Yes
Master port class	A
Analogue process data	1
Binary process data	2
Cycle time	> 2.3 ms

A superordinate IO-Link Master is required to use the IO-Link interface. Process and diagnostic data can be accessed directly using the IO-Link.

It is also possible to adjust the settings during ongoing operation.

The device-specific IODDS file will be provided on request.

3.4 Acceptance tests and environmental tests

EMC

Immunity to interference	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-3

Environment test

Shock resistance	DIN EN 60068-2-27	50 g, 11 ms
Vibration resistance	DIN EN 60068-2-6	20 g, 10 to 2000 Hz
MTTF	201.44a	

For the scope of validity cULus:

The device shall be supplied from an isolating transformer having a secondary Listed fuse rated either

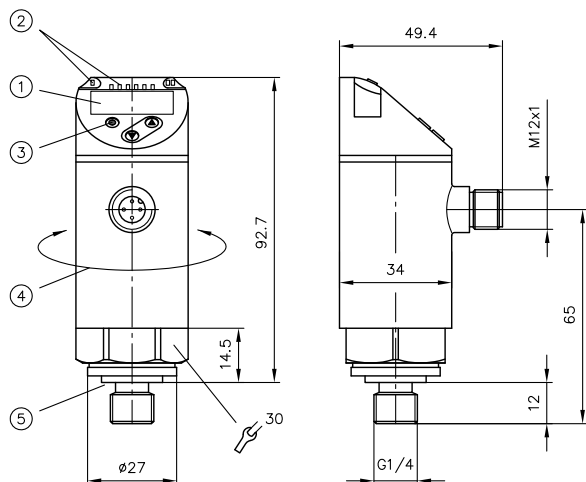
- a) max 5 amps for voltages 0~20 Vrms (0~28.3 Vp) or
- b) 100/Vp for voltages of 20~30 Vrms (28.3~42.4 Vp).

The device shall be connected only by using any Listed (CYJV/7) or R/C (CYJV2/8) cord in respect of Condition of Acceptability, having suitable ratings.

4 Dimensions

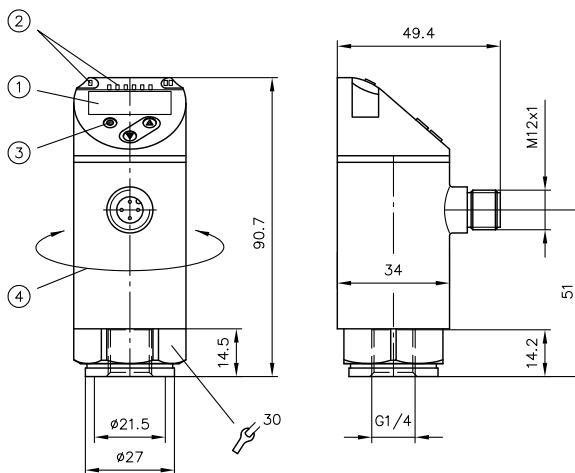
All dimensions in mm, subject to change.

DG 51 E- A -...



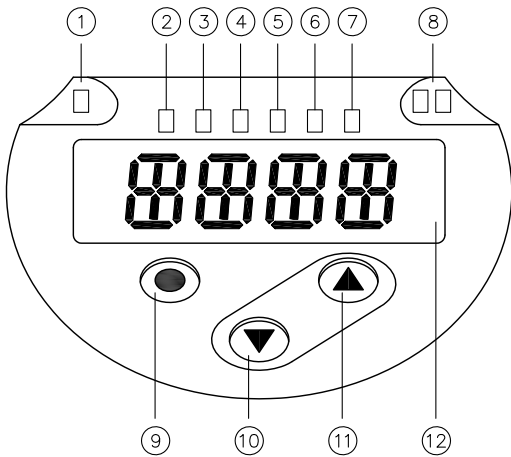
- 1 Four-digit 10-segment display, alphanumeric
- 2 Display unit/switching state
- 3 Programming buttons
- 4 Housing can be turned, max. 345°
- 5 FKM sealing ring

DG 51 E- I -...



- 1 Four-digit 10-segment display, alphanumeric
- 2 Display unit/switching state
- 3 Programming buttons
- 4 Housing can be turned, max. 345°

5.1 Control element and display element



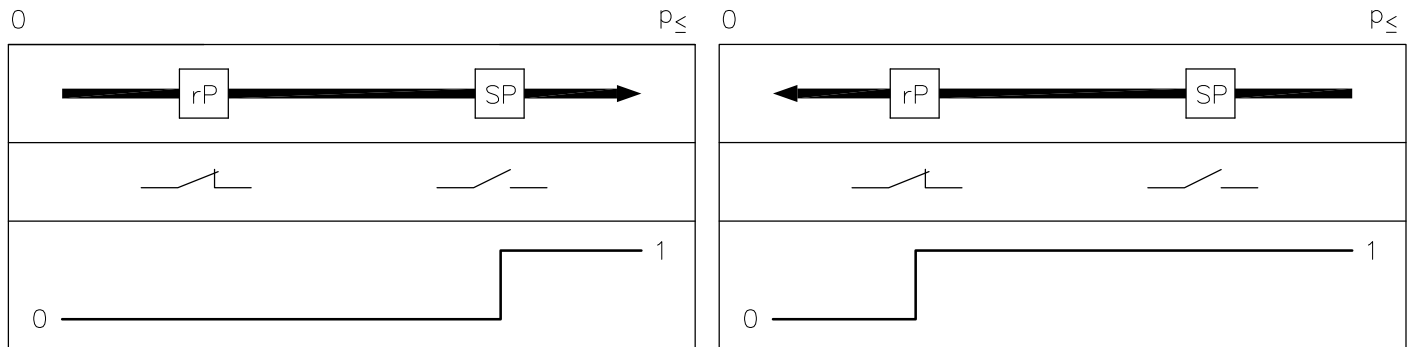
Layout plan

Number	Element	Function/meaning
1	Yellow LED	OUT 1 is activated
2	Green LED	Display in bar
3	Green LED	Display in PSI
4	Green LED	Display in MPa
5 - 7	Green LED	Not assigned
8	Yellow LED	OUT 2 is activated
9	Enter button	Selection of the parameters and confirmation of the values
10	Arrow button down	Setting the parameter values Gradually by individual pressure, continually by continuous pressure
11	Arrow button up	Setting the parameter values Gradually by individual pressure, continually by continuous pressure
12	Alphanumeric display	Displays the current system pressure Displays parameters and parameter values

5.2 Switching function

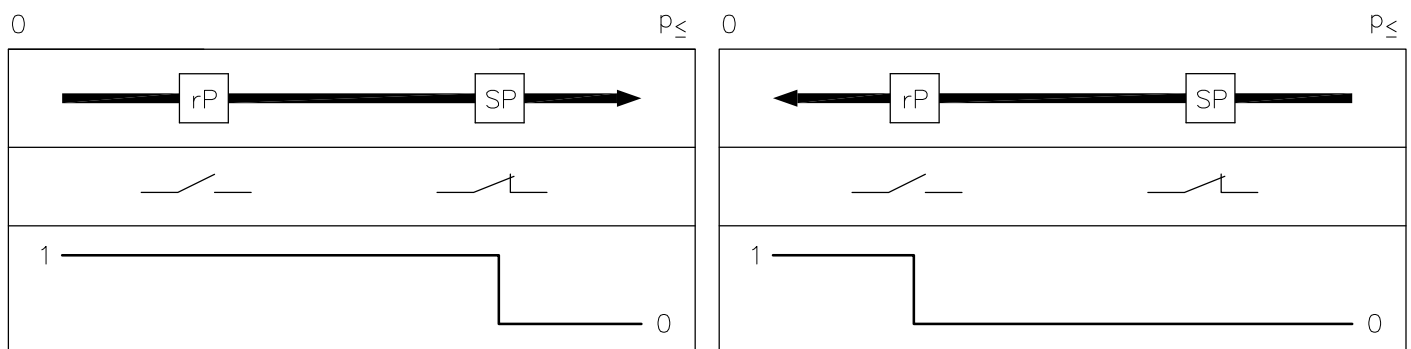
Hysteresis N/O contact

System pressure increases above the switching point SP. The contact closes. A signal is present at the output.
System pressure falls below the reset point rP. The contact opens. No signal is present at the output.



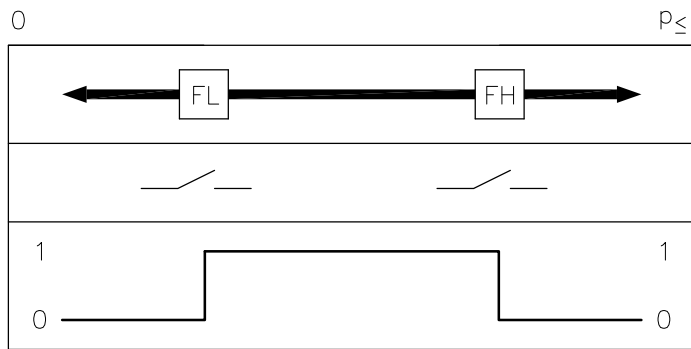
Hysteresis N/C contact

System pressure increases above the switching point SP. The contact opens. No signal is present at the output.
System pressure falls below the reset point rP. The contact closes. A signal is present at the output.



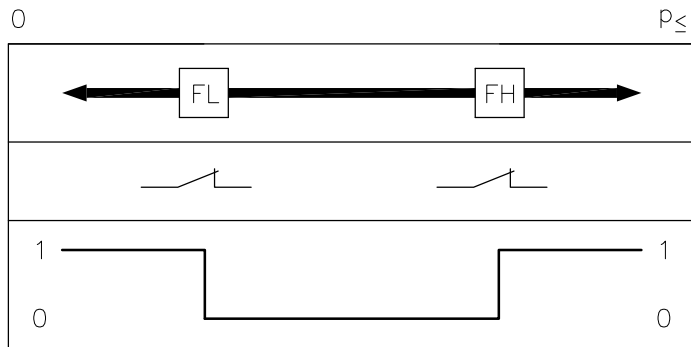
Window function N/O contact

The system pressure is between FL and FH. Both contacts are closed. A signal is present at the output.
The system pressure falls below FL or increases above FH. One contact opens. No signal is present at the output.



Window function N/C contact

The system pressure is between FL and FH. Both contacts are open. No signal is present at the output.
The system pressure falls below FL or increases above FH. One contact closes. A signal is present at the output.



5.3 Programming with buttons

The pressure switch type DG 51 E is programmed using three programming buttons [Enter], [Up] and [Down].

Pressing the arrow button up [U] or down [D] increases or decreases the values. Continuously pressing [U] and [D] increases or decreases the values continuously.

General programming

1. Pressing the [Enter] button opens the programming menu
 - ▶ Display shows `SP I`
2. Press [U] or [D] until the parameter to be edited appears in the display
3. Press [Enter] to edit the parameter displayed
 - ▶ Display shows the parameter value
4. Pressing [U] or [D] for at least 1 s activates editing
5. Press [U] or [D] until the desired value is shown
6. [Enter] saves the value
 - ▶ Display shows the parameter name



Note

- Display shows `CLOC`: IO-Link communication is active. Parameter changes are not possible
- Display shows `SLOC`: DG 51 E is continuously locked by software and this can only be cancelled by software. Parameter changes are not possible

Locking and unlocking

The DG 51 E can be electronically locked in order to prevent unintended parameter changes. For this purpose, the DG 51 E must be in the default setting.

Locking:

Press [U] and [D] simultaneously for at least 10 s

- ▶ Display shows `L O C`

Unlocking:

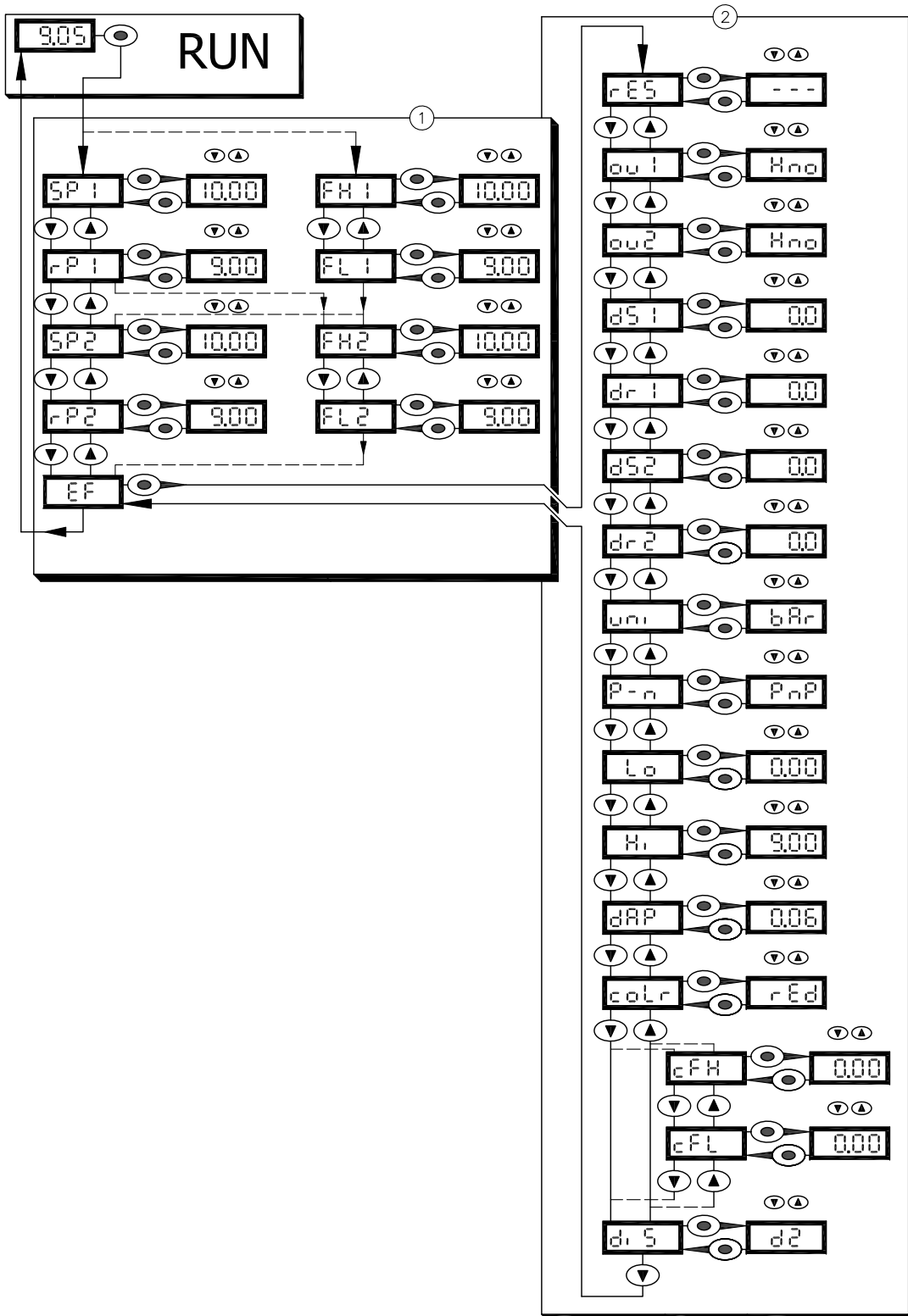
Press [U] and [D] simultaneously for at least 10 s

- ▶ Display shows `U L O C`

Timeout

If no entry is made for at least 30 s, the program automatically resets to the initial state with unaltered settings.

5.4 Menu structure



5.5 Parameter

Menu level 1

Coding	Description
SP 1 SP 2	<p>Switching point1/2 Upper limit value at which the output OUT 1/OUT 2 changes its state.</p> <p>Precondition: Parameters $\text{ou} 1$ or $\text{ou} 2$ in the submenu EF must be set to Hno or Hnc.</p> <p>Default: SP 1 = 25% of P_{\max} SP 2 = 75% of P_{\max}</p>
rP 1 rP 2	<p>Reset point 1/2 Limit value at which the output OUT 1/OUT 2 changes its state.</p> <p>Precondition: Parameters $\text{ou} 1$ or $\text{ou} 2$ in the submenu EF must be set to Hno or Hnc.</p> <p>Default: rP 1 = 23% of P_{\max} rP 2 = 73% of P_{\max}</p>
FH 1 FH 2	<p>Upper window switching point Upper limit value at which the output OUT 1/OUT 2 changes its state.</p> <p>Precondition: Parameters $\text{ou} 1$ or $\text{ou} 2$ in the submenu EF must be set to Fno or Fnc.</p>
FL 1 FL 2	<p>Lower window switching point Lower limit value at which the output OUT 1/OUT 2 changes its state. FL must always be smaller than FH.</p> <p>Precondition: Parameters $\text{ou} 1$ or $\text{ou} 2$ in the submenu EF must be set to Fno or Fnc.</p>
EF	<p>Advanced functions Opens menu level 2</p>

Menu level 2

Coding	Description
rES	Reset to factory settings
ou 1	Configuration of output 1 HNO = Hysteresis function of N/O contact (normally open) HNC = Hysteresis function of N/C contact (normally closed) FNO = Window function of N/O contact (normally open) FNC = Window function of N/C contact (normally closed) Default: HNO
ou2	Configuration of output 2 HNO = Hysteresis function of N/O contact (normally open) HNC = Hysteresis function of N/C contact (normally closed) FNO = Window function of N/O contact (normally open) FNC = Window function of N/C contact (normally closed) Default: HNO
ds 1 ds2	Switch-on delay of output 1 and output 2 Value range 0 to 50 s 0 = Deactivation of the delay Default: 0.0
dr 1 dr2	Switch-off delay of output 1 and output 2 Value range 0 to 50 s 0 = Deactivation of the delay Default: 0.0
un 1	Unit for system pressure BAR = bar MBAR = millibar MPA = megapascal kPA = kilopascal PSI = psi inHG = Default: BAR
P-n	Switching logic of output 1 and output 2 PnP = Positive switching nPn = Negative switching Default: PnP

Menu level 2

Coding	Description
L o	<p>Minimum value Lowest system pressure since the last reset</p> <p>Reset:</p> <ol style="list-style-type: none"> 1 Press [U] or [D] until display --- shows 2 Press [Enter] briefly
H i	<p>Maximum value Highest system pressure since the last reset</p> <p>Reset:</p> <ol style="list-style-type: none"> 1 Press [U] or [D] until display --- shows 2 Press [Enter] briefly
dAP	<p>Damping of the outputs Value range: 0.000 to 4.000 s Pressure peaks can be filtered out</p> <p>Default: 60</p>
coLr	<p>Pressure-controlled display colours</p> <p>rEd = Display colour red, measured value independent</p> <p>GrEn = Display colour green, measured value independent</p> <p>r1ou = Display colour red if OUT1 switches.</p> <p>Gr1ou = Display colour green if OUT1 switches.</p> <p>r2ou = Display colour red if OUT2 switches.</p> <p>Gr2ou = Display colour green if OUT2 switches.</p> <p>r-12 = Display colour red if measured value is between SP1 and SP2</p> <p>Gr-12 = Display colour green if measured value is between SP1 and SP2</p> <p>r-cF = Display colour red if the measured value is between cFL and cFH</p> <p>Gr-cF = Display colour green if the measured value is between cFL and cFH</p> <p>Parameters cFL and cFH can only be selected if r-cF or Gr-cF has been activated.</p> <p>Default: rEd</p>
cFL	Lower pressure value for colour change
cFH	Upper pressure value for colour change

Menu level 2

Coding	Description
d 15	<p>Display of the update rate and position</p> <p>d 1 = Measured value update every 50 ms</p> <p>d 2 = Measured value update every 200 ms</p> <p>d 3 = Measured value update every 600 ms</p> <p>r d 1 : Display such as d 1, d 2, d 3; rotated by 180°</p> <p>r d 2</p> <p>r d 3</p> <p>OFF = The measured value display is switched off in Run mode.</p> <p>The LEDs also remain active when the display is switched off. Error messages are also shown when the display is switched off.</p> <p>Default: d 2</p>

5.6 Error management

Display	LED OUT1	LED OUT2	Designation	Independent troubleshooting
None			Supply voltage too low	Check the supply voltage and increase it if necessary. Check connection cable
SC	Flashing	Flashing	Short-circuit/overcurrent of output 1 and output 2	Check output 1 and output 2 and correct error
SC 1	Flashing		Short-circuit/overcurrent of output 1	Check output 1 and correct error
SC 2	Flashing		Short-circuit/overcurrent of output 2	Check output 2 and correct error
C.Loc			Manual programming blocked. IO-Link communication is active	Wait until the IO-Link parametrisation has finished
S.Loc			Manual programming locked	Unlocking via IO-Link or parametrisation tool
OL			Process value too high	Check system pressure and reduce it if necessary. Use DG 5 E with a higher pressure range
UL			Process value too low	Check system pressure and increase it if necessary. Use DG 5 E with a lower pressure range

6 Other information

6.1 Accessories, spare parts and separate components

Protective cover

Order coding:	Protective cover
Order number:	6217 8047-00
Description:	Transparent plastic protective cover. Sealable. Prevents unwanted shifting.

M12 connector

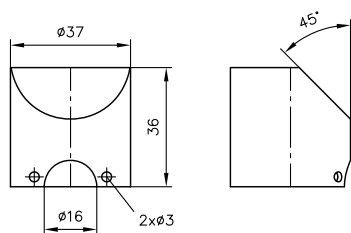
Order coding:	MSD-T7
Order number:	6217 8048-00
Description:	M12 line connector. 4-pole. Cable feed rotatable by 90°. Cable must be provided by the customer

Mounting adapter

Order coding:	ERMETO EGE 8-SR-ED
Order number:	6030 7411-00
Description:	Straight screw-in connector with sealing cone G 1/4 - G 1/4

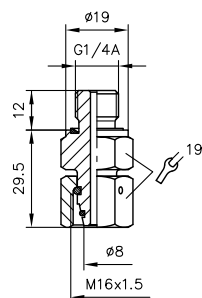
Protective cover

Transparent (PU material)



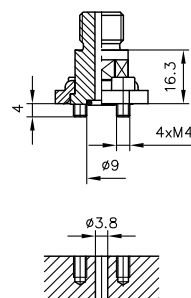
ERMETO-EGE 8-RS-ED

Straight screw-in connector with sealing cone



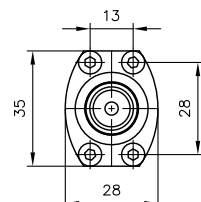
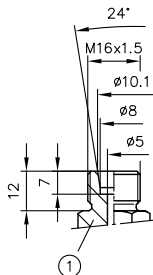
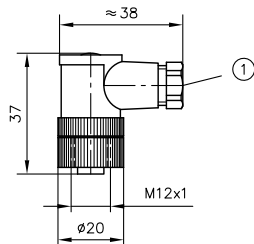
Y1E

Flange adapter



MSD-T7 M12

Line connector



1 Cable feed rotatable by 90°

1 Connection part for ERMETO-EGE 8-SR-ED

Further information

Additional versions

- Electronic pressure switch type DG 6: D 5440 F
- Electronic pressure transducer type DT 2: D 5440 T/1
- Electronic pressure transducer type DT 11: D 5440 T/2
- Pressure switch type DG: D 5440
- Fitting type X 84: D 7077