developing solutions

ELECTROPROJECT
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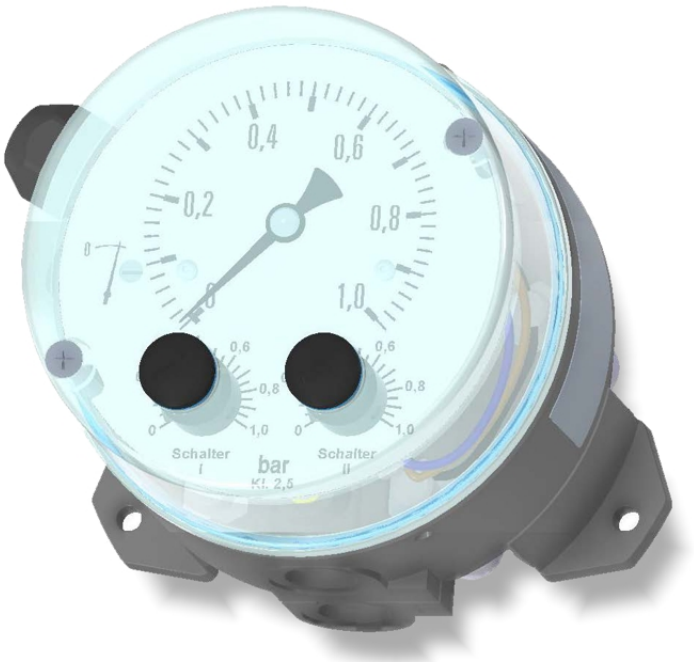
IEC 61508
SIL

TYPE APPROVED PRODUCT
DNV
DNV.COM/AF

CE
RoHS III
COMPLIANT

UK
CA

EAC



Data sheet

DS11

Differential pressure measuring and switching device

09005784 • DB_EN_DS11 • Rev. ST4-D • 12/25

1 Product and functional description

1.1 Delivery scope

- Differential pressure measuring and switching device DS11
- Operating Manual

1.2 Performance characteristics

Typical applications

- Differential pressure measurements between the supply and return in heating systems.
- Monitoring of filters and pumps

Important features

- High repetition accuracy of the switch points
- Long life span
- High overload protection
- Lost of application options

1.3 Intended use

The DS11 is a combined display and switching device for differential pressure, over and under-pressure for gaseous and fluid media. This series is ideally suited for various measuring tasks in rough environments.

Typical applications are measuring differential pressure between the supply and return in heating systems and monitoring filters and pumps.

Please contact the manufacturer before using this unit with dirty or aggressive media because the unit needs to be adapted in terms of the parts that come into contact with the media.

The device can be used as a functional safety components (SIL) as agreed with the manufacturer (see order code).

The device is to be exclusively used for the applications agreed between the manufacturer and the user.

1.4 Function diagram

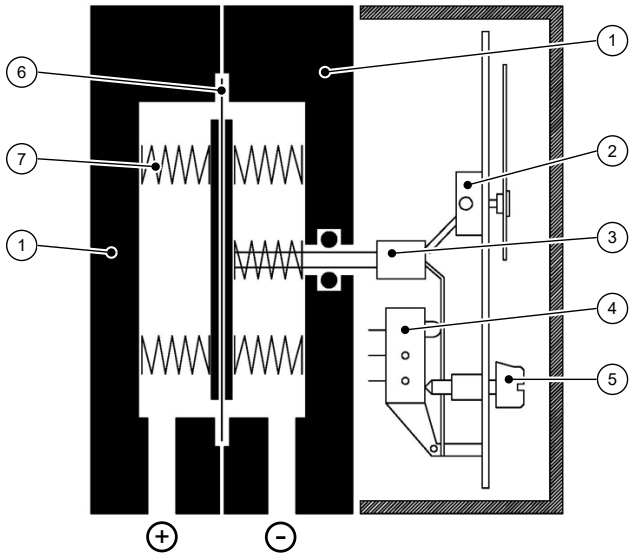


Fig. 1: Function diagram

1	Pressure chamber	**2**	Motion train
3	Tappet	**4**	Micro-switch
5	Switch point setting	**6**	Measuring diaphragm
7	Measuring springs		

1.5 Design and mode of operation

A sturdy non-sensitive diaphragm measuring unit that is suitable for measuring differential pressure, and over and under-pressure is used as a measuring system. The unit uses the same measuring principle for all three measuring applications.

In the rest position, the spring forces on both sides of the membrane are balanced out. Due to the pressure or under-pressure to be measured, a single-sided force is created on the membrane which shifts the membrane system against the measurement range springs up to compensation of the spring forces. In case of overload, the membrane supports against the metallic support surfaces.

A centrally positioned tappet transfers the movement of the membrane system on the motion train and operating elements of the micro-switches.

2 Technical data

2.1 General Information

Reference conditions (acc. to IEC 61298-1)		
Temperature	+15 … +25 °C	
Relative humidity	45 … 75 %	
Air pressure	86 … 106 kPa	860 … 1060 mbar
Installation position	vertical	

2.2 Input variables

Measuring ranges	Measuring accuracy	Allowed static operating pressure	Overpressure	Underpressure
0 … 250 mbar	± 6.25 mbar	16 bar	25 bar	- 1 bar
0 … 400 mbar	± 10 mbar	16 bar		
0 … 0.6 bar	± 0.015 bar	16 bar		
0 … 1 bar	± 0.025 bar	16 bar		
0 … 1.6 bar	± 0.04 bar	25 bar		
0 … 2.5 bar	± 0.0625 bar	25 bar		
0 … 4 bar	± 0.1 bar	25 bar		
0 … 6 bar	± 0.15 bar	25 bar		
0 … 10 bar	± 0.25 bar	25 bar		
0 … 16 bar	± 0.4 bar	25 bar		
0 … 25 bar	± 0.625 bar	25 bar		
-0.6 … 0 bar	± 0.015 bar	16 bar		
-1 … 0 bar	± 0.025 bar	16 bar		
-1 … +0.6 bar	± 0.04 bar	25 bar		
-1 … +1.5 bar	± 0.0625 bar	25 bar		
-1 … +3 bar	± 0.1 bar	25 bar		
-1 … +5 bar	± 0.15 bar	25 bar		
0 … 30 psi	± 0.75 psi	25 bar		

Rated pressure of the measuring system	25 bar
Test pressure	1.5 times the rated pressure
Zero-point setting	Arranged in the front panel of the scale
Measuring accuracy	± 2.5% of the measuring span

2.3 Output parameters

Switch contacts	1 to 2 micro-switches
Switching function (per contact)	Changeover contact
Switch point setting	Can be set to reference scales from outside
Smallest settable value	5% of the measuring span
Switch hysteresis	approx. 2.5% of the measuring span

Per contact	**AC**	**DC**
Switching voltage	250 V	30 V
Switching current	5 A	0.4 A
Switching output	250 VA	10 W

2.4 Operating conditions

Increase ambient temperature	-10 … +70 °C
Media temperature	-10 … +70 °C
Storage temperature	-15 … +75 °C
Enclosure protection class	IP55 or IP65 acc. to EN 60529 depending on model
NSR	DIN EN 61010-1:2020-03 *EN 61010-1:2010 + A1:2019 + A1:2019/ AC:2019*
RoHS	DIN EN IEC 63000:2019-05 *EN IEC 63000:2018*
SIL2	DIN EN 61508:2011 parts 1-7 *EN 61508:2010*
DNV-GL	Type testing according to the regulations of the DNV GL Class Guideline CG0339, November 2016

2.5 Construction design

Process connection	Inner thread G¼
	Inner thread ¼-18 NPT
Brass, CrNi steel	Connection shank G½ B DIN EN 837
	Connection shank G¼ B DIN EN 837
	Connecting shanks ¼-18 NPT
Brass, CrNi steel, galvanised steel	Cutting ring connection in brass for 6 mm pipe
	Cutting ring connection in brass for 8 mm pipe
	Cutting ring connection in brass for 10 mm pipe
Electrical connection	Permanently wired numbered cables
	7-pin plug connection
	Cable socket
Installation position	vertical
Dimensions	See dimensional drawings
Weight	Pressure chamber in aluminium 1.2 kg
	Pressure chamber in stainless steel 3.5 kg

2.5.1 Materials

Parts in contact with the medium	
Pressure chamber	Aluminium GkAlSi10(mg); painted black
	Aluminium GkALSi10(mg); HART-COAT© surface protection
	Chromium nickel steel 1.4305
Measuring diaphragm	NBR
	VITON®
	Inconel 718
Seals	NBR
	VITON®
Other inner parts	Rustproof steel 1.4310, 1.4305
Process connection Connection shanks	Brass
	Chromium nickel steel
Process connection Cutting ring screw connection	Brass
	Galvanised steel
	Chromium nickel steel

Parts with no contact with the medium		
Cover hood	IP55	Makrolon
Bayonet ring housing	IP65	Stainless steel 1.4301
Dial face and needle		Aluminium
Setting buttons		AlCuMgPb 3.1645

2.5.2 Dimensional drawings

All dimensions in mm unless otherwise stated

The following are the dimensional diagrams for the different models of the pressure chambers in aluminium. The dimensional diagrams for the pressure chambers in stainless steel are similar. For this reason, there is no illustration.

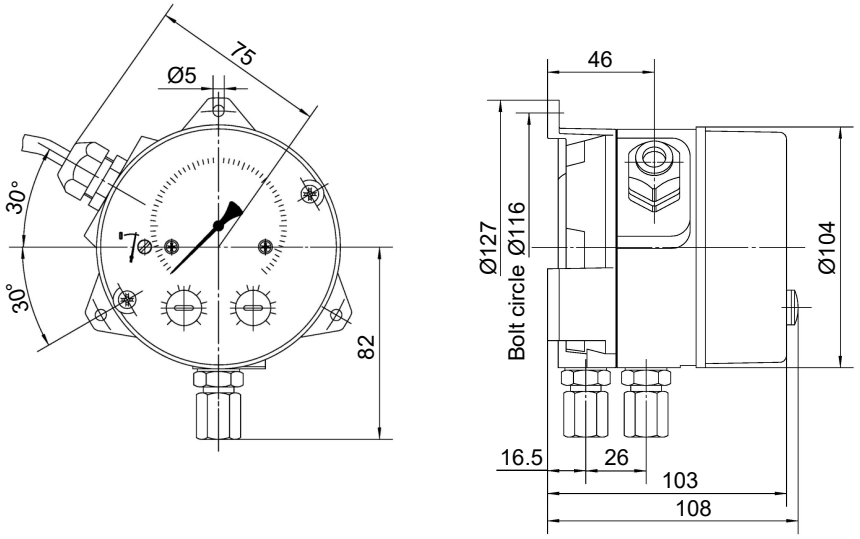


Fig. 2: Standard model (Wall mounting)

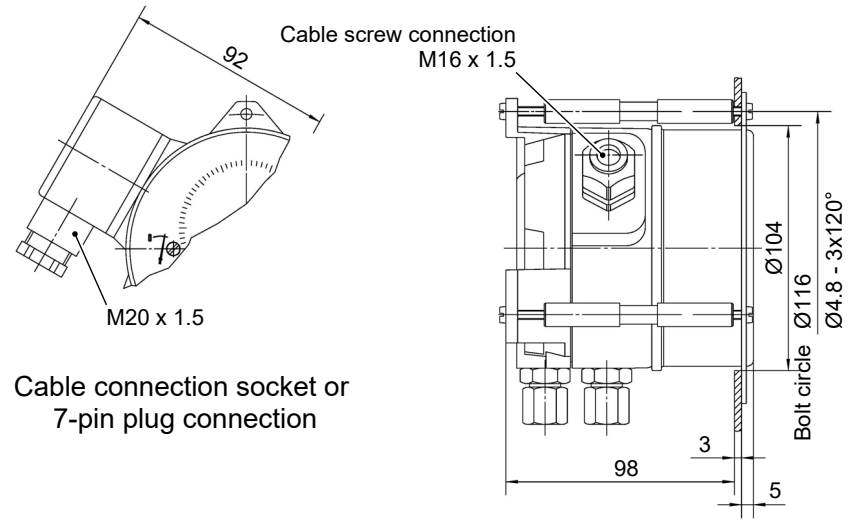


Fig. 3: Electrical connection and switch panel installation

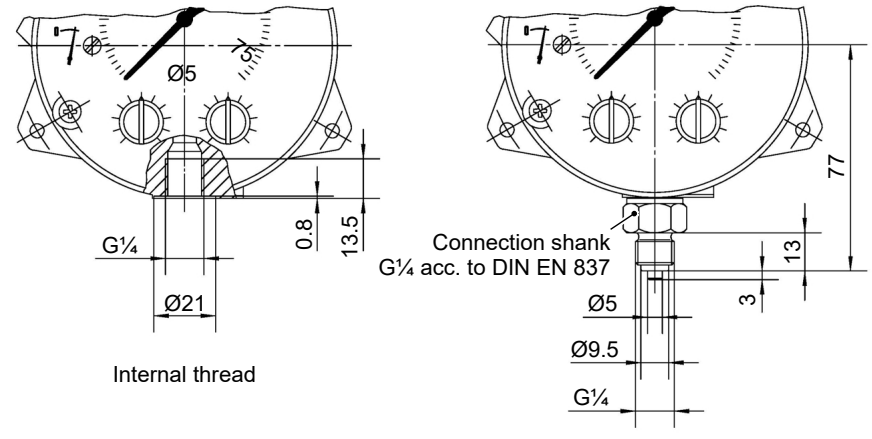
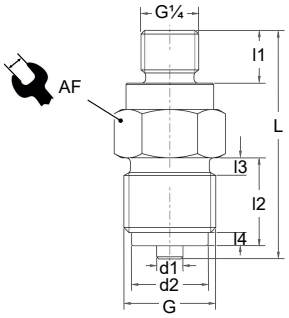
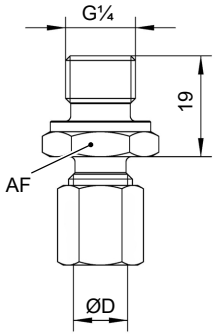


Fig. 4: Process connection

Process connection variants

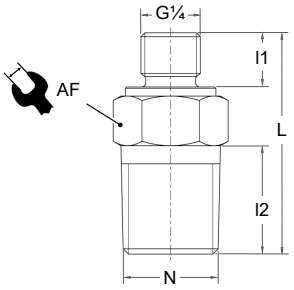


DIN EN 837



Cutting ring

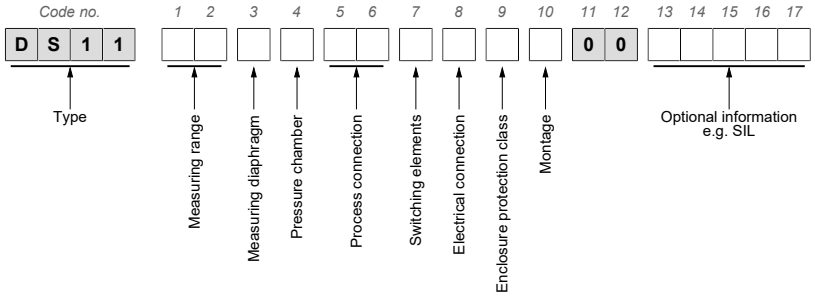
Connecting shanks	d1	d2	l1	l2	l3	l4	A/F
G¼B	5	9.5	13	13	3,3	2	19
G½B	6	17.5	20	12,5	4,5	3	22
Cutting ring screw connection				ØD			A/F
Pipe diameter				6, 8, 10			19



NPT outside

Connecting shanks	N	L	l1	l2	A/F
NPT outside	¼-18 NPT	42	12	18	19

3 Order Codes



		Measuring diaphragm	
[1.2]	**Measuring range**	**NBR / VITON**	**Inconel 718**
82	0 … 250 mbar	x	
83	0 … 400 mbar	x	
01	0 … 0.6 bar	x	
02	0 … 1 bar	x	
03	0 … 1.6 bar	x	
04	0 … 2.5 bar	x	
05	0 … 4 bar	x	
06	0 … 6 bar	x	
07	0 … 10 bar	x	
08	0 … 16 bar	x	
09	0 … 25 bar		x
30	-0.6 … 0 bar	x	
31	-1 … 0 bar	x	
32	-1 … +0.6 bar	x	
33	-1 … +1.5 bar	x	
34	-1 … +3 bar	x	
35	-1 … +5 bar	x	
H5	0 … 30 psi	x	

[3]	**Measuring diaphragm**	**Sealant**	**Comment**
N	NBR	NBR	
V	VITON®	VITON®	
E	Inconel 718	NBR	Only measuring ranges 0 … 25 bar
E	Inconel 718	VITON®	Only measuring ranges 0 … 25 bar

[4]	**Pressure chamber**	**Comment**
A	Aluminium	Only measuring range ≤ 0 ... 16 bar
E	Aluminium HART COAT®	
W	Stainless steel 1.4305	

[5.6]	Process connection	Material
01	Inner thread G¼	
04	Inner thread ¼-18 NPT	
06	Connection shanks with external thread G¼ B	Brass
11	Connection shanks with external thread G¼ B	CrNi steel
14	Connecting port G½ with outer thread ¼-18 NPT	CrNi steel
20	Cutting ring connection in brass for 6 mm pipe	Galvanised steel
21	Cutting ring connection in brass for 8 mm pipe	Galvanised steel
22	Cutting ring connection in brass for 10 mm pipe	Galvanised steel
24	Cutting ring connection in brass for 6 mm pipe	CrNi steel 1.4571
25	Cutting ring connection in brass for 8 mm pipe	CrNi steel 1.4571
26	Cutting ring connection in brass for 10 mm pipe	CrNi steel 1.4571
28	Cutting ring connection in brass for 6 mm pipe	Brass
29	Cutting ring connection in brass for 8 mm pipe	Brass
30	Cutting ring connection in brass for 10 mm pipe	Brass

[7]	Switching Elements
A	1 adjustable micro-switch
B	2 adjustable microswitches

[8]	Electrical connection
1	1 metre numbered cable; permanently wired
2	2.5 metre numbered cable; permanently wired
5	5 metre numbered cable; permanently wired
K	Cable connection socket
W	7-pin plug connection
S	DNV-GL approved version with 3 m connection cable

[9]	Casing protection class	Comment
0	IP55 as per DIN EN 60529	
P	IP65 as per DIN EN 60529	Only with electrical connection K, W, Z

[10]	Assembly
T	Switch panel installation set
W	Wall mounting

[13-17]	Optional information
#####	Code for special models e.g. SIL The code is generated as agreed with our sales team.

Accessories

Please go to our website fischermesstechnik.de for data sheets for the measuring device accessories.

DZ11	Installation set for retrofitting from wall mounting to switch panel installation. Please state the precise device type of the DS11 because there are different switch panel installation sets depending on the model.
DZ23/24	The shut-off valve DZ23 in a three spindle model and DZ24 in a four spindle model can be particularly beneficial when mounting the differential pressure measuring and switch device DS11. The following can be used for example: • is a system is to be depressurized or taken out of operation • for repairs or tests to disconnect differential pressure devices within the affected systems from the mains supply The shutoff devices can therefore also be used for function tests on site. In contrast to DZ23, the DZ24 also has a venting valve to vent the connected pipe system. The shut-off and venting valves are designed for the rated pressure level PN40. The housing can be selected in aluminium, brass or chrome-nickel-steel 1.4301. There are various pressure connections available for process-side screw connections or connection threads.
MZ	Measuring device accessory (throttles, siphons, etc.)

3.1 Information about the document

This document contains all technical data about the device. Great care was taken when compiling the texts and illustrations. nevertheless, errors cannot be ruled out.

Subject to technical amendments.

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