



IEC 61508
SIL



DIN 4754



DNVGL.COM/AF



Ex II 2G Ex ib c IIC T6 Gb
Ex II 2D Ex tb c IIIC T70 °C Db



RoHS III
COMPLIANT

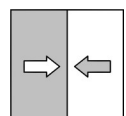
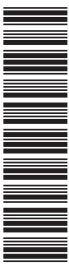


Datasheet

DS21 ... H

Differential pressure measuring and switching device
for explosive areas

Flow guard in heat transfer oil systems in compliance with DIN 4754-2
and hot water systems according to VdTÜV Information sheet "Flow 100"



1 Product and functional description

1.1 Use as intended

The unit is exclusively designed for the purpose defined by the manufacturer in the data sheet or operating instructions.

The unit is suitable for operation in potentially explosive areas

- Zone 1 and 2 – Risk from vapours
- Zone 21 and 22 – Risk from dust

For every application, the respective installation instructions and the conditions laid out in the section 'Use in explosive areas' must be observed.

Differential pressure measuring and switching device

The DS21 is a measuring and switch unit for measuring differential pressure under difficult measuring conditions such as: pressure surges, vibrations, frequent switching and high demands on the switching output. 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.

NOTICE! With regard to the Pressure Equipment Directive, the device is designed for a static load of up to 25 bar and a media temperature of up to 85 °C.

Flow assurance

The units in this series are used as flow guards in heat transfer oil systems in compliance with DIN 4754-2 and hot water systems in compliance with VdTÜV information sheet 'Flow 100'. The flow guards comprise a differential pressure transducer, e.g. a measuring orifice, the differential pressure measuring and switch unit and shut-off fittings. The respective installation instructions must be observed for this application case. All units of the series DS21 satisfy these requirements.



NOTICE

The type tests in compliance with DIN 4754-2 and VdTÜV information sheet "Flow 100" only apply in conjunction with a differential pressure transducer, not for a differential pressure measuring and switching device alone.

The successful type test of the series DS21 was confirmed by means of the following test symbols:

- for flow guards in compliance with DIN 4754-2 :
DIN CERTCO registration number 10S001
- according to VdTÜV Information sheet "Flow 100" :
Part code TÜV . SW/SB . 15 – 020

Use in safety-related systems (SIL)

The unit can be used in safety-related systems.

For use in safety-related systems according to 'Functional Safety' (SIL), the correct function of the safety function must be proven. The necessary key figures, safety instructions, assembly and maintenance instructions can be found in the Safety Manual (SHB).

The safety manual is available for download at www.fischermesstechnik.de.



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1.2 Equipment versions

The DS21 can be supplied with the following different pressure chambers:

- Aluminium
- Stainless steel 1.4305

The aluminium pressure chambers can also be supplied with a HART COAT® coating. The following shows the various unit versions.

All casings have protection class IP 65.

The DS21 can also be used as a pressure measuring and switch unit. The measurement is a relative pressure measurement. The following illustrations of the various device models are found in the left side of the differential pressure devices and on the right side of the pressure measurement devices.



NOTICE

Switch panel installation

Please note that the switch points of devices with bayonet rings need to be set before mounting the control panel. When installed, the unit can no longer be opened.

Please see the order code for the process connection options.

1.2.1 Pressure chamber in aluminium

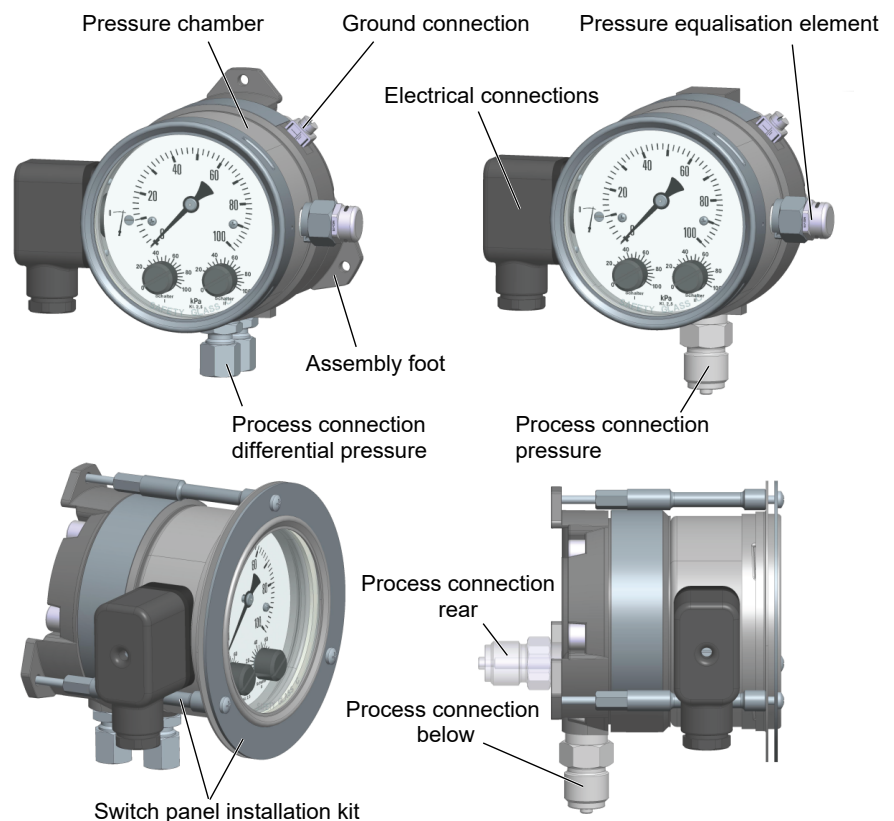


Fig. 1: DS21 Pressure chamber in aluminium [ATEX]

1.2.2 Pressure chamber in stainless steel

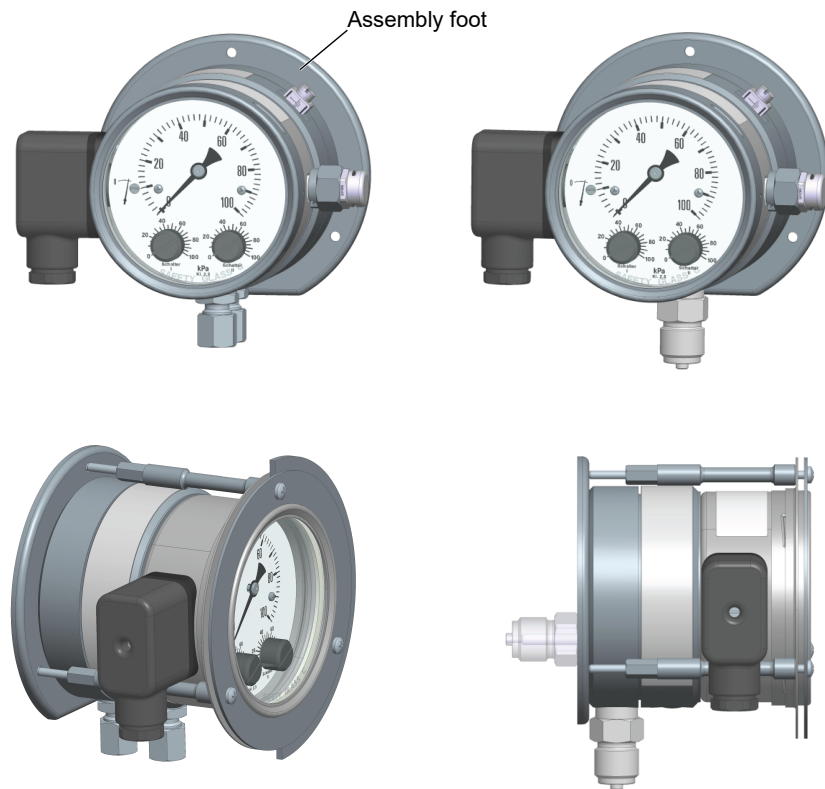
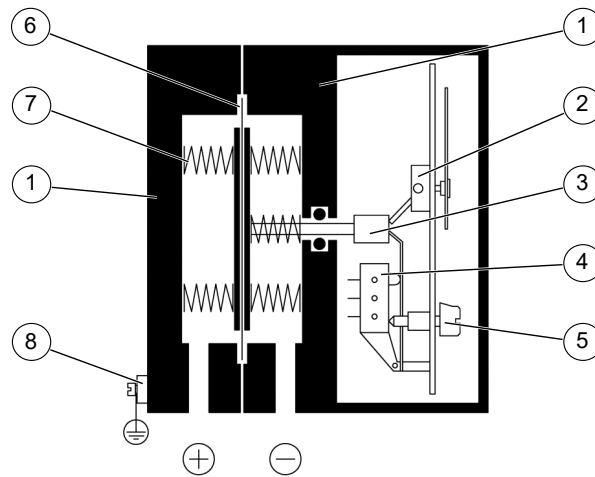


Fig. 2: DS21 Pressure chamber in stainless steel [ATEX]

1.2.3 Electro connection variants

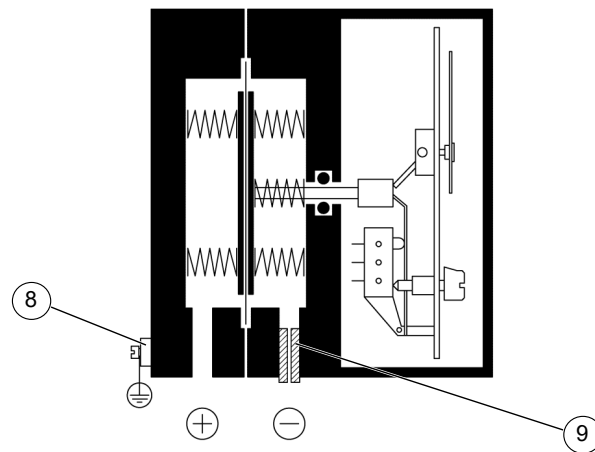
All unit models are supplied with a cable socket. Only the DNV-GL model is supplied with an additional 3 m long connection cable. The associated wiring diagrams are shown on the type plate and in the section 'Installation and assembly'.

1.3 Function diagram



Model as differential pressure measuring and switching device

Fig. 3: DS21 Function diagram differential pressure [ATEX]



Model as pressure measuring and switching device

Fig. 4: DS21 Function diagram pressure [ATEX]

1	Pressure chamber	2	Motion train
3	Tappet	4	Micro-switch
5	Switch point setting	6	Measuring diaphragm
7	Measuring springs	8	Ground connection
9	Closing plug		

1.4 Design and mode of operation

The basis for this measurement and switch unit is a sturdy non-sensitive diaphragm measuring unit that is suitable for measuring differential pressure, and over and under-pressure. The unit uses the same measuring principle for all three measuring applications.

In the idle position, the spring forces are equalised on both sides of the measuring diaphragm. The pressure that is to be measured or the differential pressure creates a one-sided force on the measuring diaphragm that moves the diaphragm system against the measuring range springs until the spring forces are equalised. In the case of overload, the measuring diaphragm is supported by metallic contact surfaces.

A central tappet transfers the movement of the diaphragm system onto the display mechanism and, at the same time, onto the actuation elements of the micro-switches. The switch points are set via the setting screws and referenc value scale.

1.5 Market access

The approval or type examination by a notified body is valid throughout the EU. The acceptance of the certificates issued for export to third countries must be checked in each individual case.

UK market (UKCA)

With the 'BREXIT', EU testing institutes lose their validity as notified bodies in the UK. The certificates issued in the EU will subsequently no longer be recognised.

Eurasian Economic Union (EAC)

Certificates issued by European testing institutes in the EU are generally not recognised in the Eurasian Union. For example, the use of the device in potentially explosive atmospheres requires a type examination by a Russian testing institute.

2 Technical data

Please also observe the order code here.

2.1 Input variables

Measuring variable

Differential, over and under-pressure for gaseous and fluid media.

Measurement range

Measurement range	Allowed static operating pressure
0 ... 250 mbar	6 bar
0 ... 400 mbar	6 bar
0 ... 0.6 bar	10 bar
0 ... 1 bar	16 bar
0...1.6 bar	16 bar
0...2.5 bar	16 bar
0 ... 4 bar	16 bar
0 ... 6 bar	16 bar

Rated pressure of the measuring system

25 bar

Max. pressure load

Over-pressure-proof on one side up to rated pressure of the measuring system, (+) and (-) sides, under-pressure-proof

2.2 Output parameters

Switching outputs

1 or 2 micro-switches with 1-pin changeover contact.



WARNING

Only for connection to certified intrinsically safe circuits in the ignition protection class Ex ib IIC.

Highest values per electricity circuit:

$$U_i = 30 \text{ V}$$

$$I_i = 160 \text{ mA}$$

$$P_i = 800 \text{ mW}$$

The effective inner inactivities and capacities are negligible.

The intrinsically safe contact circuits are safely galvanically separated from each other and from the ground potential even in potentially explosive areas with conductible dust.

Switch point setting

After opening the casing using the setting screw and reference value scale. Smallest settable value approx. 5% of the end value of the measuring range.

Reproducibility

The reproducibility of the switch-point setting corresponds to the measuring precision.

Switch hysteresis

approx. 2.5% of the upper range value

2.3 Measured Value Display

Anzeige

Indicator with measurement scale

Measurement accuracy

± 2.5% of the upper range value

2.4 Electrical connection

- Cable socket
screw terminal up to 1.5 mm² with wire protection
Contact material Ms gold-flashed
Cable screw connection M20 x 1.5
- Cable screw connection
Cable outside diameter: 7 – 13 mm
Tightening torque of the pressure screw: 3 Nm
SW pressure screw: SW21

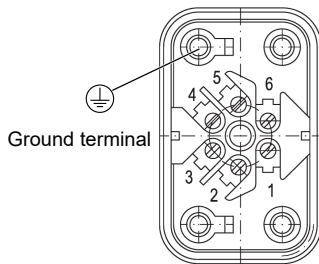


Fig. 5: Cable socket

No	Contact	Switch
1	Make contact	NO
2	Break contact	NC
3	Joint	COM
4	Joint	COM
5	Make contact	NO
6	Break contact	NC
	Ground connection	

2.5 Application conditions

Ambient conditions

Allowed ambient temperatures	-10 °C ... +60 °C
Allowed temperature of the medium	-10 °C ... +85 °C ^{*)}
Maximum surface temperature	+70 °C
Enclosure protection class	IP 65 acc. to DIN EN 60529
ATEX	Zone 1 and 2 Risk from gases
	Zone 21 and 22 Risk from conductive dust

^{*)} The temperature in the unit must not exceed +60 °C.

EC Declaration of conformity

Low-Voltage Directive	2014/35/EU
Pressurised Vessel Directive	2014/68/EU
RoHS Directive	2011/65/EU (EU) 2015/863
ATEX Guideline	2014/34/EU

Certificates

EC Examination Certificate (ATEX)	TÜV 06 ATEX 2964
Type testing (Module B)	0045/202/1403/Z/01262/22/D/001(00)
Quality assurance system (Module D)	0045/202/1404/Z/00289/21/D/001(01)
DIN CERTCO	10S001
VdTÜV	TÜV.SW/SB.20-020
DNV GL	TAA00002BW
SIL 2 ^{**)}	44 799 13759902

^{**)} Only for devices with the order code for SIL (optional information).

2.6 Construction design

Process connection	Inner thread G $\frac{1}{4}$ Cutting ring screw connection in steel for 6, 8, 10, 12 mm pipe Cutting ring screw connection in stainless steel 1.4571 for 6, 8, 10, 12 mm pipe
Measuring system	Pressure spring measuring diaphragm system
Weight	Pressure chamber in aluminium: approx. 1.2 kg Pressure chamber in CrNi steel: approx. 3.5 kg

2.6.1 Materials

Pressure chamber	Aluminium Gk-AISI10Mg, painted black Aluminium Gk-AISI10MG with HART-COAT [®] Surface protection CrNi steel 1.4305
Measuring diaphragm	Fabric-reinforced VITON [®]
Gaskets	VITON [®]
Inner parts in contact with the medium	CrNi-steel 1.4310, 1.4305
Bayonet ring	CrNi-Steel 1.4305
Front pane	Safety laminated glass

2.6.2 Assembly

Wall mounting
Mounting the control panel
Direct mounting

2.7 Dimensional drawings

(All dimensions in mm unless otherwise stated)

2.7.1 Pressure chamber in aluminium

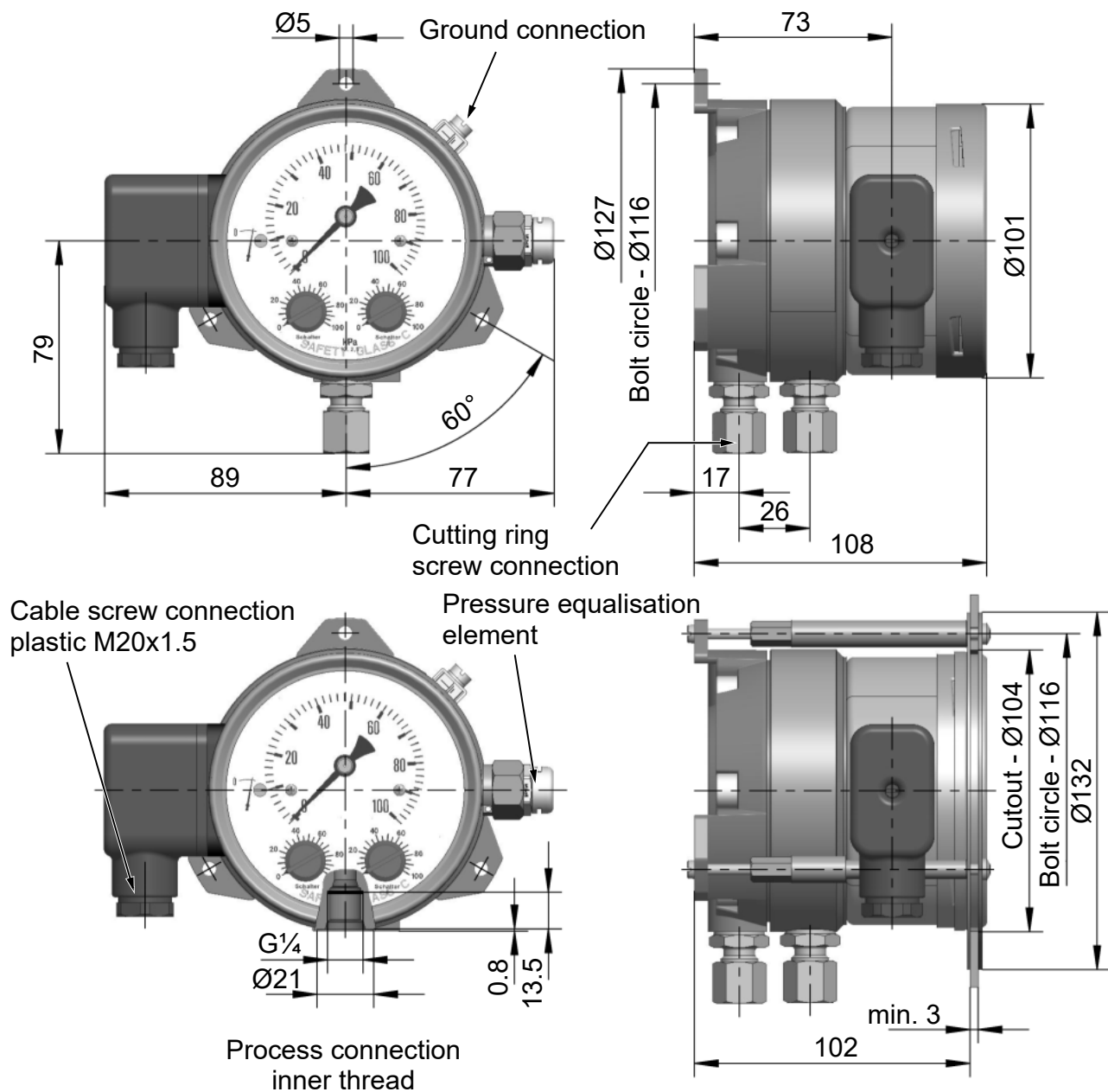


Fig. 6: Pressure chamber in aluminium (ATEX)

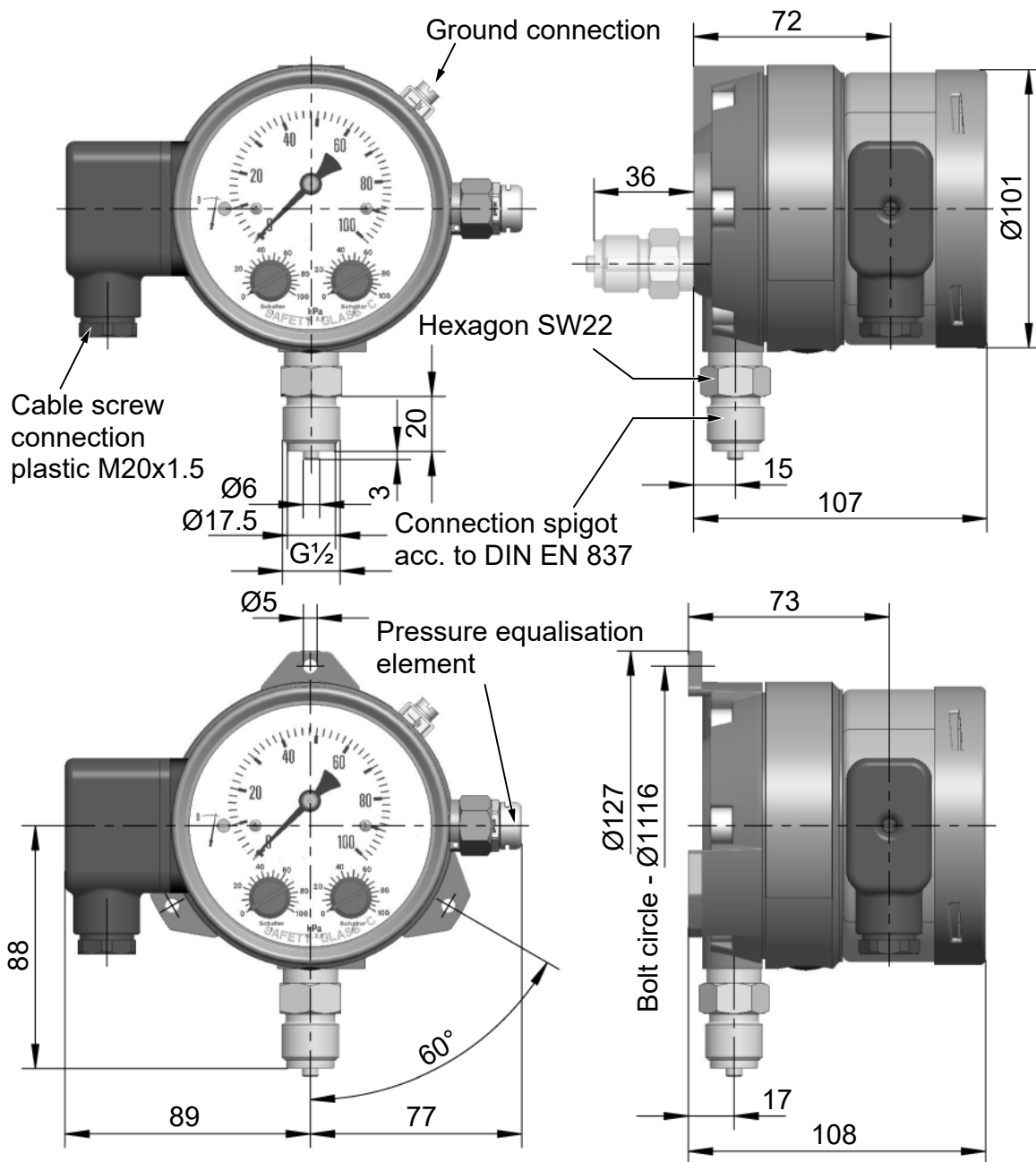


Fig. 7: Pressure chamber in aluminium (ATEX) direct assembly

2.7.2 Pressure chamber in stainless steel

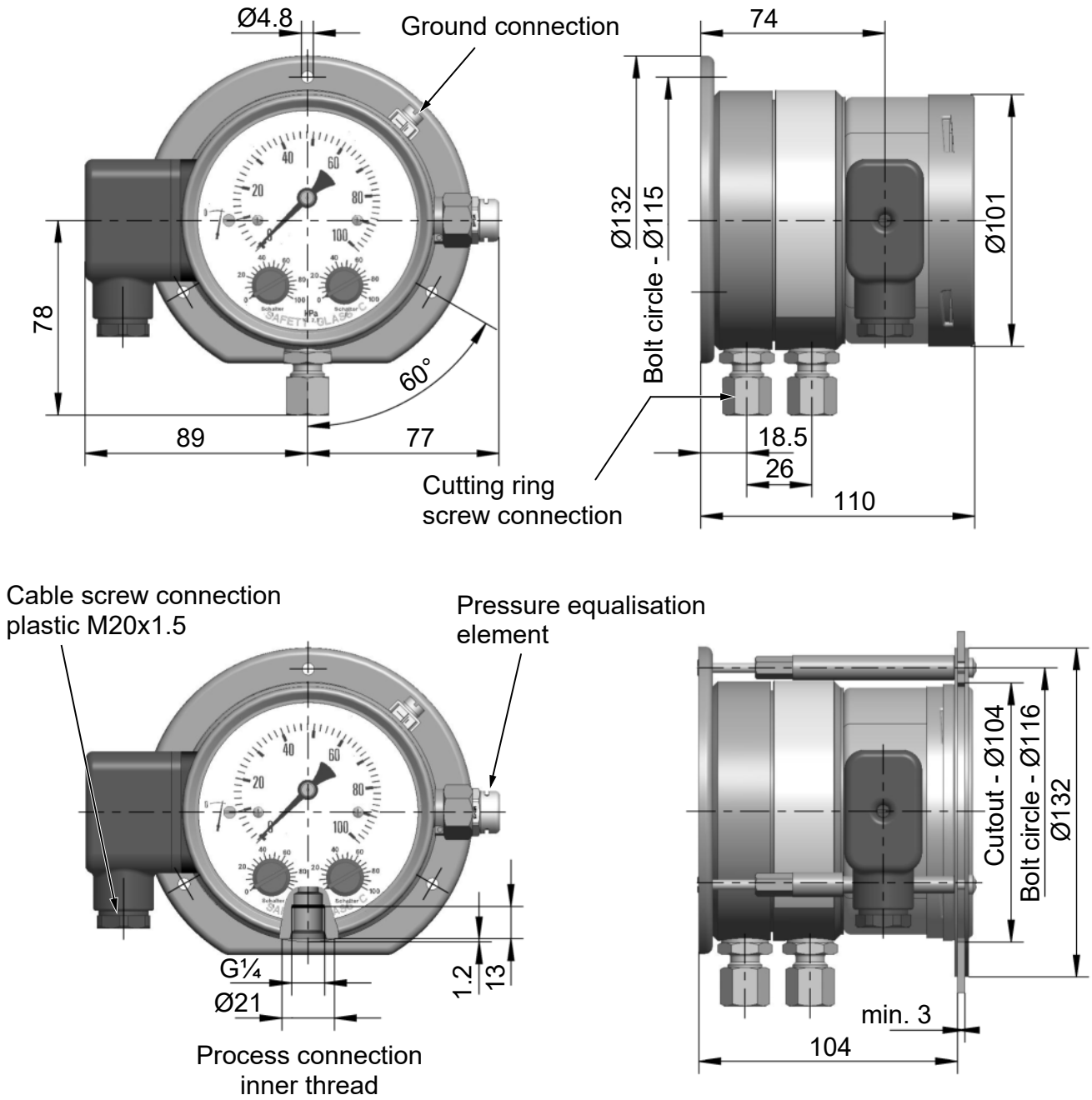


Fig. 8: Pressure chamber in VA (ATEX)

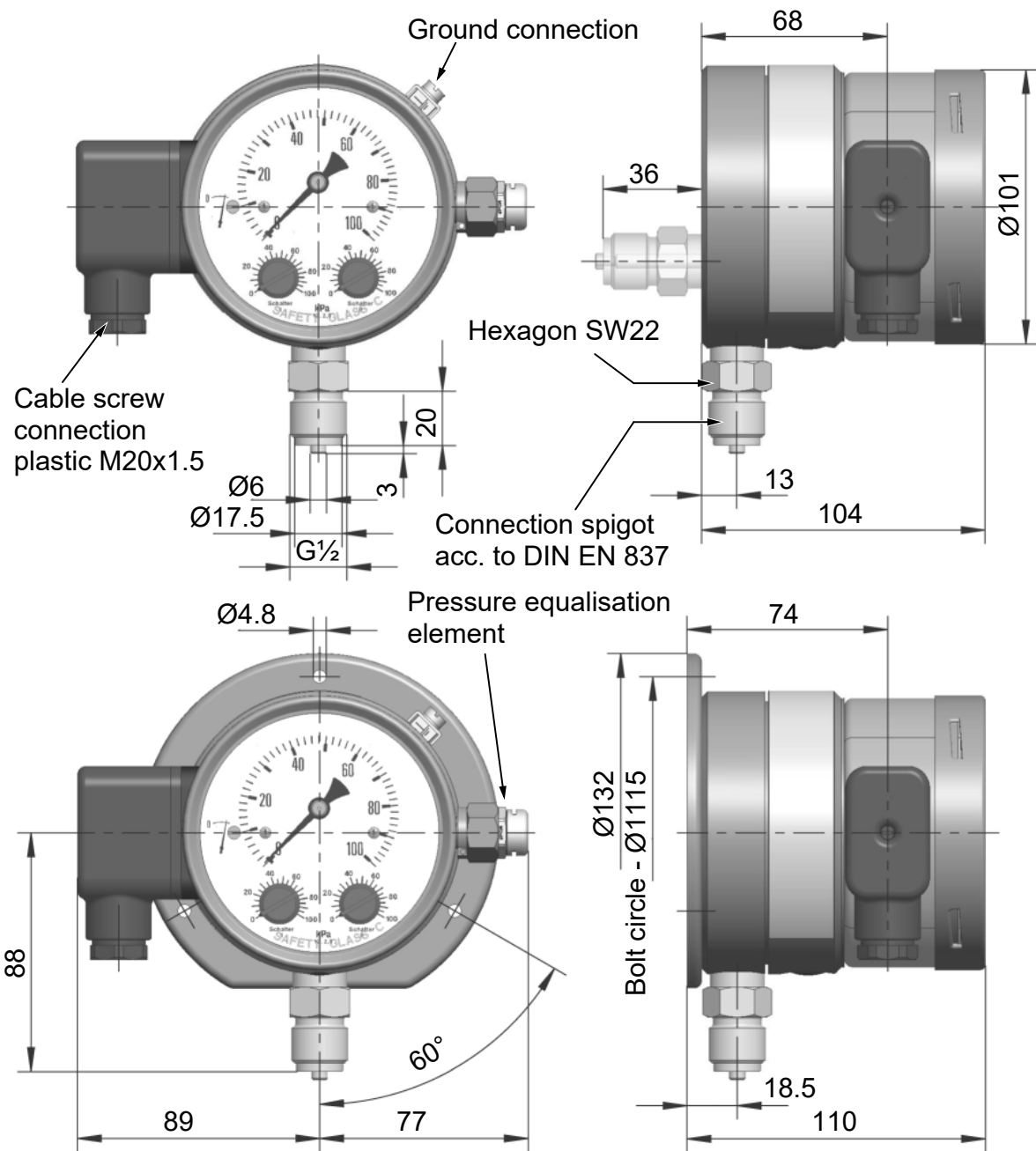


Fig. 9: Pressure chamber in VA (ATEX) direct assembly

2.7.3 Installation of front panel

The cutout required to mount the front control panel is the same for all models.

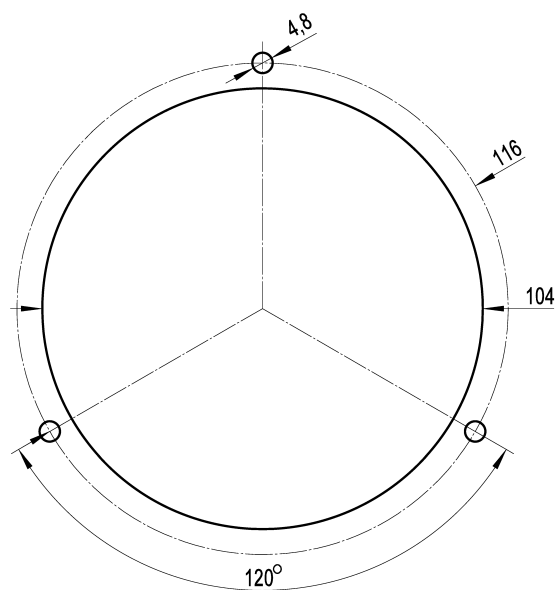
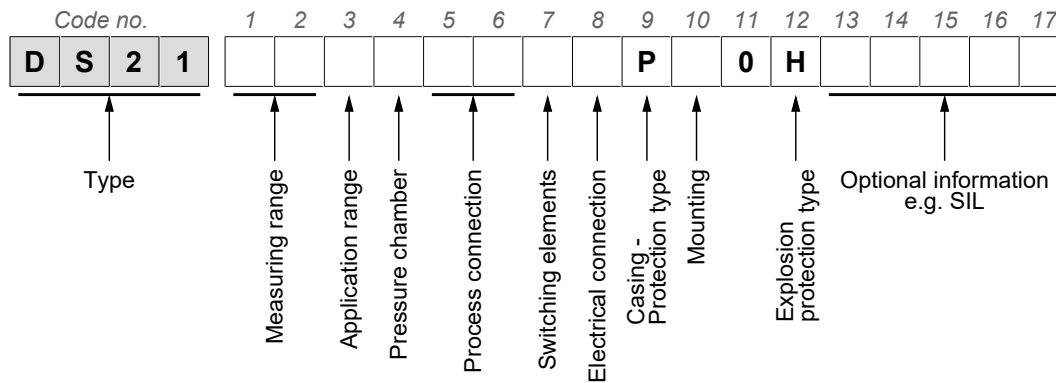


Fig. 10: Front panel cutout

3 Order Codes



Measuring range

[1.2]	← Code no.	Allowed static pressure
82	0 ... 250 mbar	6 bar
83	0 ... 400 mbar	6 bar
01	0 ... 0.6 bar	10 bar
02	0 ... 1 bar	16 bar
03	0 ... 1.6 bar	16 bar
04	0 ... 2.5 bar	16 bar
05	0 ... 4 bar	16 bar
06	0 ... 6 bar	16 bar

Application scope

[3]	← Code no.
0	Thermal oil DIN 4754-2 / Hot water Flow 100
D	Use as a pressure measuring and switching unit

Pressure chamber

[4]	← Code no.
A	Aluminium
D	Aluminium with HART COAT® coating
W	Stainless steel 1.4305

Process connection

[5.6]	← Code no.
01	Inner thread G 1/4
Cutting ring screw connections made of steel	
20	for 6 mm tube
21	for 8 mm tube
22	for 10 mm tube
23	for 12 mm tube
Cutting ring screw connections made of stainless steel 1.4571	
24	for 6 mm tube
25	for 8 mm tube
26	for 10 mm tube
27	for 12 mm tube
Connecting shanks	
82	G½ B in brass connection below
92	G½ B in brass connection rear
87	G½ B in stainless steel 1.4404 connection below
97	G½ B in stainless steel 1.4404 connection rear

Switch output	[7] ← Code no.
	A 1 micro-switch (can be configured)
	B 2 micro-switch (can be configured)
Electrical connection	[8] ← Code no.
	K Cable connection socket
	W DNV-GL version with 3 m connection cable
Casing protection class	[9] ← Code no.
	P IP65
Assembly	[10] ← Code no.
	T Front panel mounting
	W Wall mounting
Optional information	[13-17] ← Code no.
	##### Code for special models e.g. SIL The code is generated as agreed with our sales team.

Notes

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