



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

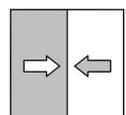
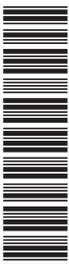


Operating Manual

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"



Masthead

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Subject to technical amendments.



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Table of contents

1 Safety notes	5
1.1 General	5
1.2 Personnel Qualification	5
1.3 Risks due to Non-Observance of Safety Instructions	5
1.4 Safety Instructions for the Operating Company and the Operator	5
1.5 Unauthorised Modification	6
1.6 Inadmissible Modes of Operation	6
1.7 Safe working practices for maintenance and installation work	6
1.8 Pictogram explanation	6
2 Product and functional description	7
2.1 Use as intended	7
2.2 Equipment versions	8
2.3 Function diagram	10
2.4 Design and mode of operation	11
2.5 Market access	11
3 Installation and assembly	12
3.1 General	12
3.2 Assembly	12
3.3 Use in zones where there is a risk of explosion	13
3.4 Process connection	14
3.5 Electrical connections	16
4 Commissioning	18
4.1 General	18
4.2 Safety information	18
4.3 Display and control elements	19
4.4 Lead seal	19
4.5 Zero point correction	19
4.6 Switch point setting	20
4.7 Function test	20
5 Maintenance	21
5.1 Safety information	21
5.2 Wartung (maintenance)	21
5.3 Transport	21
5.4 Service	22
5.5 Accessories	22
5.6 Disposal	23

6 Technical data	24
6.1 Input variables	24
6.2 Output parameters	24
6.3 Measured Value Display	24
6.4 Electrical connection	25
6.5 Application conditions.....	25
6.6 Construction design.....	26
6.7 Dimensional drawings	27
7 Order Codes	32
8 Attachments	34

1 Safety notes

1.1 General

This operating manual contains basic instructions for the installation, operation and maintenance of the device that must be followed without fail. It must be read by the installer, the operator and the responsible specialist personnel before installing and commissioning the device.

This operating manual is an integral part of the product and therefore needs to be kept close to the instrument in a place that is accessible at all times to the responsible personnel.

The following sections, in particular instructions about the assembly, commissioning and maintenance, contain important information, non-observance of which could pose a threat to humans, animals, the environment and property.

The instrument described in these operating instructions is designed and manufactured in line with the state of the art and good engineering practice.

1.2 Personnel Qualification

The instrument may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the pertinent standards.

For explosion-proof models the specialized personnel must have received special training or instruction or be authorized to work with explosion-proof instruments in explosion hazard areas.

1.3 Risks due to Non-Observance of Safety Instructions

Non-observance of these safety instructions, the intended use of the device or the limit values given in the technical specifications can be hazardous or cause harm to persons, the environment or the plant itself.

The supplier of the equipment will not be liable for damage claims if this should happen.

1.4 Safety Instructions for the Operating Company and the Operator

The safety instructions governing correct operation of the instrument must be observed. The operating company must make them available to the installation, maintenance, inspection and operating personnel.

Dangers arising from electrical components, energy discharged by the medium, escaping medium and incorrect installation of the device must be eliminated. See the information in the applicable national and international regulations.

Please observe the information about certification and approvals in the Technical Data section.

The instrument must be decommissioned and secured against inadvertent re-operation if a situation arises in which it must be assumed that safe operation is no longer possible. Reasons for this assumption could be:

- evident damage to the instrument
- failure of the electrical circuits
- longer storage outside the approved temperature range.
- considerable strain due to transport

Repairs may be carried out by the manufacturer only.

A professional single conformity inspection as per DIN EN 61010, section 1, must be carried out before the instrument can be re-commissioned. This inspection must be performed at the manufacturer's location. Correct transport and storage of the instrument are required.

1.5 Unauthorised Modification

Modifications of or other technical alterations to the instrument by the customer are not permitted. This also applies to replacement parts. Only the manufacturer is authorised to make any modifications or changes.

1.6 Inadmissible Modes of Operation

The operational safety of this instrument can only be guaranteed if it is used as intended. The instrument model must be suitable for the medium used in the system. The limit values given in the technical data may not be exceeded.

The manufacturer is not liable for damage resulting from improper or incorrect use.

1.7 Safe working practices for maintenance and installation work

The safety instructions given in this operating manual, any nationally applicable regulations on accident prevention and any of the operating company's internal work, operating and safety guidelines must be observed.

The operating company is responsible for ensuring that all required maintenance, inspection and installation work is carried out by qualified specialized personnel.

1.8 Pictogram explanation



DANGER

Type and source of danger

This indicates a **direct** dangerous situation that could lead to death or **serious injury** (highest danger level).

1. Avoid danger by observing the valid safety regulations.



WARNING

Type and source of danger

This indicates a **potentially** dangerous situation that could lead to death or **serious injury** (medium danger level).

1. Avoid danger by observing the valid safety regulations.



CAUTION

Type and source of danger

This indicates a **potentially** dangerous situation that could lead to slight or serious injury, damage or **environmental pollution** (low danger level).

1. Avoid danger by observing the valid safety regulations.



NOTICE

Note / advice

This indicates useful information of advice for efficient and smooth operation.

2 Product and functional description

2.1 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.



IEC 61508 SIL

2.2 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.

2.2.1 Pressure chamber in aluminium

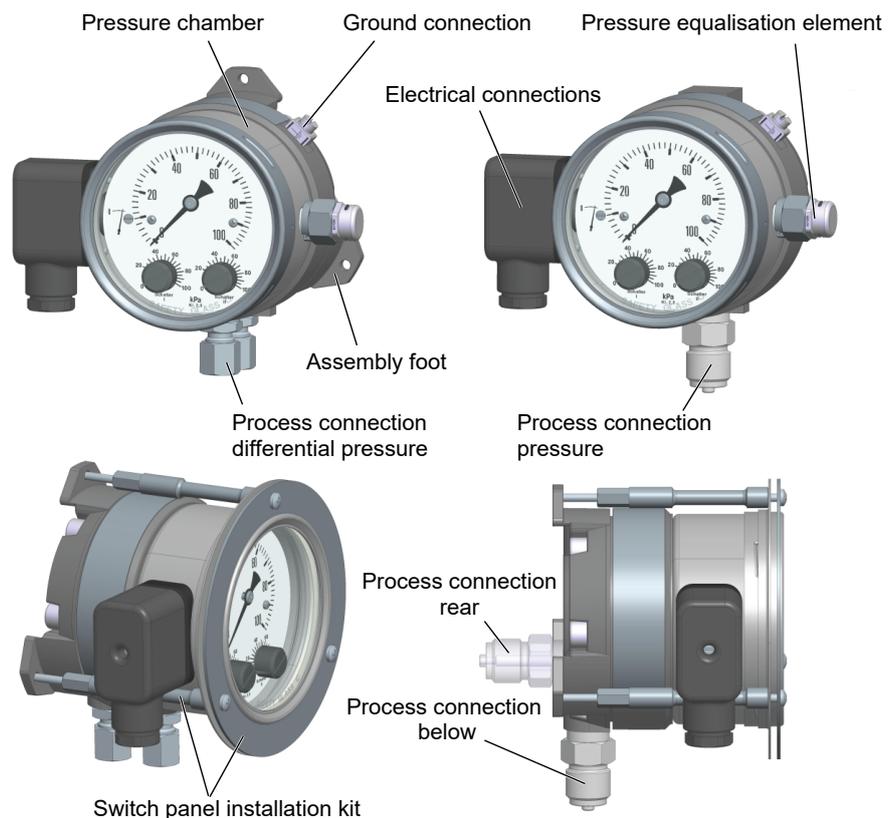


Fig. 1: DS21 Pressure chamber in aluminium [ATEX]

2.2.2 Pressure chamber in stainless steel

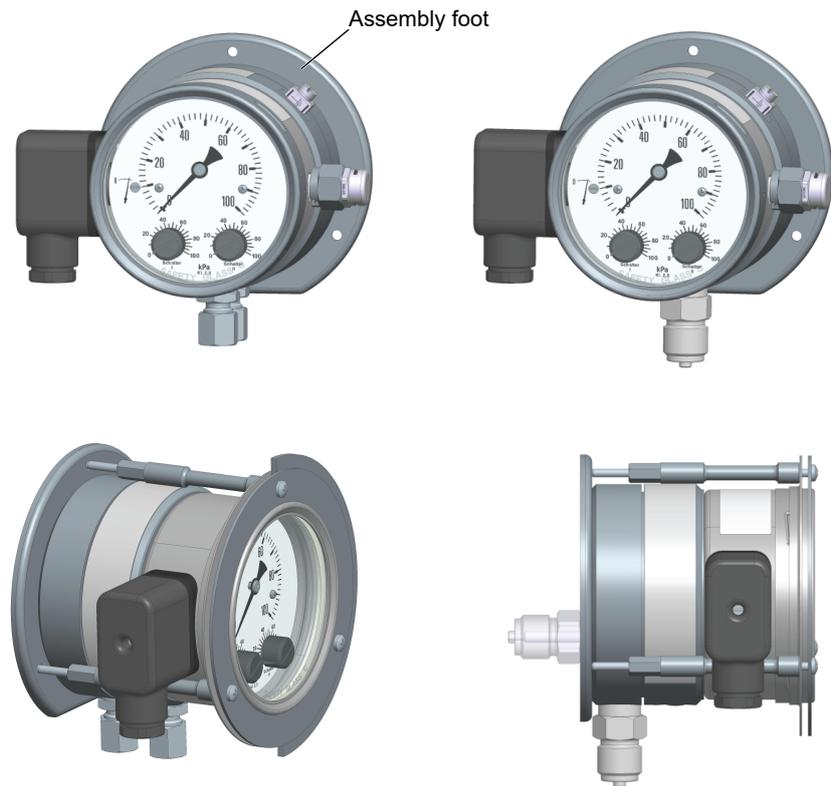
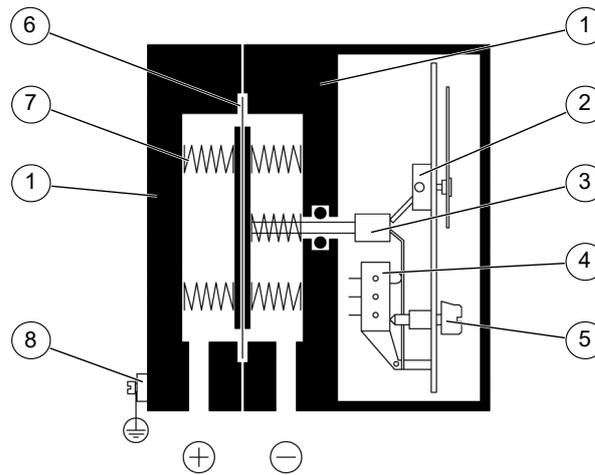


Fig. 2: DS21 Pressure chamber in stainless steel [ATEX]

2.2.3 Electro connection variants

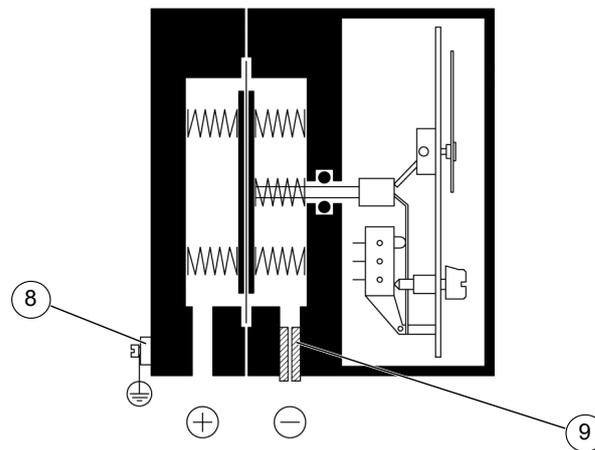
All unit models are supplied with a cable socket. Only the DNV-GL model is supplied with an additional 3 m long connection cable. The associated wiring diagrams are shown on the type plate and in the section 'Installation and assembly'.

2.3 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		

2.4 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.

2.5 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.

3 Installation and assembly

3.1 General

The instrument may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the pertinent standards.

If units are used in potentially explosive areas, the personnel must receive additional training or briefings or have a permit to work on explosion-protected units in potentially explosive systems.

3.2 Assembly

The standard unit is designed for wall mounting. This is accomplished using the rear attachment plate that acts as a mounting foot.

A control panel installation set can be ordered for each unit that allowed installation on the front of the unit.

The unit can be ordered for use as a pressure, measuring and switch unit; it is designed for direct mounting. This is accomplished using a connection adapter that is either mounted below the unit or on the rear wall. Wall mounting is not possible if there is a rear connection adapter.

The unit is set for vertical installation ex-works. Only this installation position is allowed. To ensure safety during installation and maintenance, we recommend installing a suitable shut-off valve on the system.



WARNING

Installation regulations

During installation and mounting, the application-specific installation guidelines in the respective approvals in the appendix must be satisfied.



WARNING

Falling objects

The operator must ensure that any falling objects cannot collide with the installed unit. Steps must be taken to prevent

- ▷ sparks being generated on impact.
- ▷ invalidation of the protection class of the casing.
 1. This can be avoided by attaching protective cover,
 2. a protective casing or
 3. a similar element.

3.3 Use in zones where there is a risk of explosion

3.3.1 Application areas

Zone 1 and 2 – Risk from vapours

- Order code:
DS21 # # # # # # # # # # H
- Identification:
 II 2G Ex ib c IIC T6 Gb
- Certificates and declarations:
CE declaration of conformity for equipment of category 2
EC Examination Certificate 94/9/EC
(TÜV 06 ATEX 2964)

Zone 21 and 22 – Risk from conductive dust

- Order code:
DS21 # # # # # # # # # # H
- Identification:
 II 2D tb c IIIC T70 °C Db
- Certificates and declarations:
CE declaration of conformity for equipment of category 2
EC Examination Certificate 94/9/EC
(TÜV 06 ATEX 2964)

3.3.2 Authorized temperatures

- Allowed ambient temperature: $-10\text{ °C} \leq T_{\text{amb}} \leq 60\text{ °C}$
- Allowed medium temperature in the differential measurement instrument: 60°C.

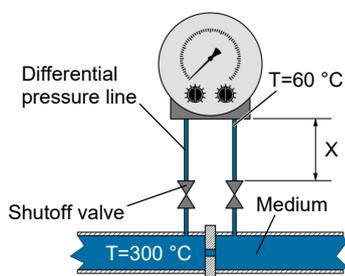


Fig. 5: DS21 Measurement setup

Depending on the system, the media may reach temperatures of $> 60\text{ °C}$. No media flows through the pressure differential lines between the pressure differential transducer and the differential pressure measuring and switch unit. When setting the length of the differential pressure lines, a temperature drop is created that can reduce the media temperature to the allowed 60 °C in the unit. The media temperature drops by approx. 50K for every 100mm of differential pressure line (pipe 6×1).

The allowed length of the differential pressure line (x) must be at least 500 mm in compliance with DIN 4754-2 Sec. 4.3.4.4.

This line reduces the media temperature of 300 °C to the ambient temperature before it reaches the unit. If the media temperature is higher, longer differential pressure lines are required.

The design of the differential pressure line is the responsibility of the system manufacturer.



WARNING

Temperature class

The operator and system manufacturer must observe the temperature class T1 ... T6 that depends on the media temperature and the maximum allowed surface temperature $T70\text{ °C}$ for the respective application.



⚠ WARNING

Pulsating differential pressures

In the case of gaseous media, compression heat that can be created via pulsating differential pressures can lead to an increase in the temperature of the casing. For safety reasons, the pulse frequency of 0.2 Hz may not be exceeded. At this frequency and a differential pressure change between 10 and 90% of the measuring range, the temperature rises by less than 3°C.

The maximum surface temperature 70 °C was determined under the following conditions without dust accumulation and safety factor.

- ▷ Ambient temperature: 60 °C
- ▷ Medium temperature in the instrument: 60°C
- ▷ Pulse frequency: <0.2 Hz

1. In these application cases, the pressure change speed must be throttled, e.g. by means of capillary throttles.



⚠ WARNING

Sunlight

In order to avoid additional heating, the instruments may not be exposed to direct sunlight during operation.



⚠ WARNING

Isolation

The differential pressure lines may not be insulated.

3.4 Process connection

- By authorized and qualified specialized personnel only.
- The pipes need to be depressurized when the instrument is being connected.
- Appropriate steps must be taken to protect the device from pressure surges.
- Check that the device is suitable for the medium being measured.
- Maximum pressures must be observed (cf. Tech. data)

The differential pressure connections are marked with (+) and (-) symbols on the device. The differential pressure connection lines must be mounted according to these symbols.

- (+) Higher pressure
- (-) Lower pressure

Units designed as pressure measuring and switch units (code D), only have one connection adapter on the (+) side. This is located on the rear or below the unit depending on the assembly type.

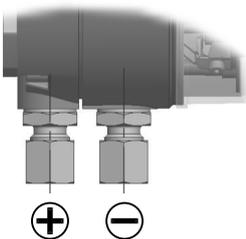


Fig. 6: Differential pressure connection

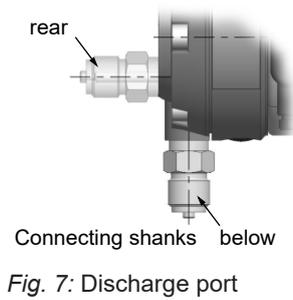


Fig. 7: Discharge port

The differential pressure lines must be installed at an inclination so that when fluids are measured no air pockets are created or when measuring gases, no water pockets are created. If the required inclination is not reached, water or air filters must be installed at suitable places.

The differential pressure lines must be kept as short as possible and installed without any tight bends to avoid delays.

In the case of fluid measuring media, the differential pressure lines must be vented because different fluid columns in the lines will distort the measurements.

If water is used as a measuring medium, the unit must be protected against frost.

3.4.1 Installation regulations for flow guards in heat transfer units in compliance with DIN 4754-2

In the case of differential pressure transducers in compliance with DIN 1952/VDI 2014, the measurement must be set up in compliance with DIN 4754-2 Sec. 4.3.4.

Shut-off valves in differential pressure lines may only be activated with tools. Threaded screw connections in these lines must be designed so that they remain tight without any sealing agent, or the connection must be welded or hard-soldered.

The clear diameter and length of differential pressure lines must be dimensioned so that when the line is cold (approx. 20 °C), the response time of the unit is no longer than 5 sec.

Differential pressure lines must be made of metal. Their clear width may not undercut 4 mm and the stretched length must be at least 500 mm. If arranged with block valves, the differential pressure line between the valve block and differential pressure transducer must be at least 500 mm.

Locking and unlocking conditions must be ensured during installation via the following electrical lines.

3.4.2 Installation regulations for flow limiters in steam boilers and hot water systems

Differential pressure transducers in compliance with DIN 1952/VDI 2041, Itabar or Annubar probes must be used as measuring elements. The measurement must be taken in compliance with DIN 19216 Sec. 6.

Shut-off valves in differential pressure lines may only be activated with tools. Threaded screw connections in these lines must be designed so that they remain tight without any sealing agent, or the connection must be welded or hard-soldered.

The differential pressure lines must be made of metal and have a clear width of at least 8 mm. The stretched length of the differential pressure lines must be at least 500 mm.

3.5 Electrical connections

- By authorized and qualified specialized personnel only.
- When connecting the unit, the national and international electro-technical regulations must be observed.
- Disconnect the system from the mains, before electrically connecting the device.
- Install the consumer-adapted fuses.
- Do not connect the connector if strained.



⚠ WARNING

Operation in areas at risk of explosion

If operated in explosive areas, the electrical data of the unit and the valid local regulations and guidelines for the installation and operation of electrical systems in explosive areas must be observed. (e.g. DIN EN 60079)

Intrinsically safe power circuits

For use in areas at risk of explosion, the device must be connected to certified, intrinsically safe power circuits. The value highest values are:

max. voltage	$U_i = 30V$
max. current	$I_i = 160\text{ mA}$
max. output	$P_i = 800\text{ mW}$

The effective inner inductivities and capacities are negligible. Recommended isolating devices are stated in the accessories section.

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		



can be mounted offset by 180°

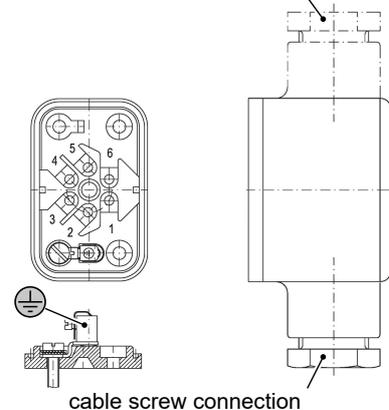


Fig. 8: Cable socket

The installed cables and wires must be tested with a reduced tensile force (25%) in compliance with Section A.3.1 of the standard EN 60079-0 and may only be used for permanent installation of operating equipment of Group II. The operator must ensure that the cables are connected with clamps accordingly.

Information from the manufacturer of the cable socket

Cable screw connection	M20 x 1.5
Cable diameter	7 ... 13 mm
max. conductor cross-section	1.5 mm ²
Tightening torque	3 Nm (clockwise tight)
Key width	21

When laying the electrical supply lines, ensure that no short circuit between the electrical conductors and the surroundings can occur.

DNV GL model

In models with one switch, a cable **(0.6/1KV 4Gx1.5)** with the following color code is connected:

Ter- minal	Wire ID
1	grey
2	brown
3	black
⊕	green/yellow

In models with two switches, a cable **(0.6/1KV 7Gx1.5)** with numbers for identifying the wires must be connected. The numbers of the cable correspond to the terminal numbers of the cable socket.

Outer ground terminal

The outer ground connection must always be connected to the protective potential equalisation or a similar local potential equalisation. The connection is suitable for connecting fine-wire conductors up to 4 mm² or single-wire conductors up to 6 mm².



Fig. 9: Ground connection

4 Commissioning

4.1 General

The instrument may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the pertinent standards.

If units are used in potentially explosive areas, the personnel must receive additional training or briefings or have a permit to work on explosion-protected units in potentially explosive systems.

A prerequisite for commissioning is correct installation of all electrical supply lines and the differential pressure lines. All connections are arranged so that there are no mechanical forces acting on the device.



CAUTION

Leak test

The differential pressure lines need to be checked for leaks before commissioning.

4.2 Safety information

The instrument must be decommissioned and secured against inadvertent re-operation if a situation arises in which it must be assumed that safe operation is no longer possible.

Reasons for this assumption could be:

- Evident damage to the instrument
- Failure of the electrical function.
- Storage in temperatures over 85°C for a long period.
- Considerable strain due to transport



WARNING

Re-commissioning

A professional single conformity inspection as per DIN EN 61010, section 1, must be carried out before the instrument can be re-commissioned. This inspection must be performed at the manufacturer's location. Correct transport and storage of the instrument are required.

Repairs may be carried out by the manufacturer only.

4.3 Display and control elements

The illustration shows an example because the measurement scale and therefore also the reference value scale depend on the respective measuring range. The position and form of the control elements are at least similar to the illustration.

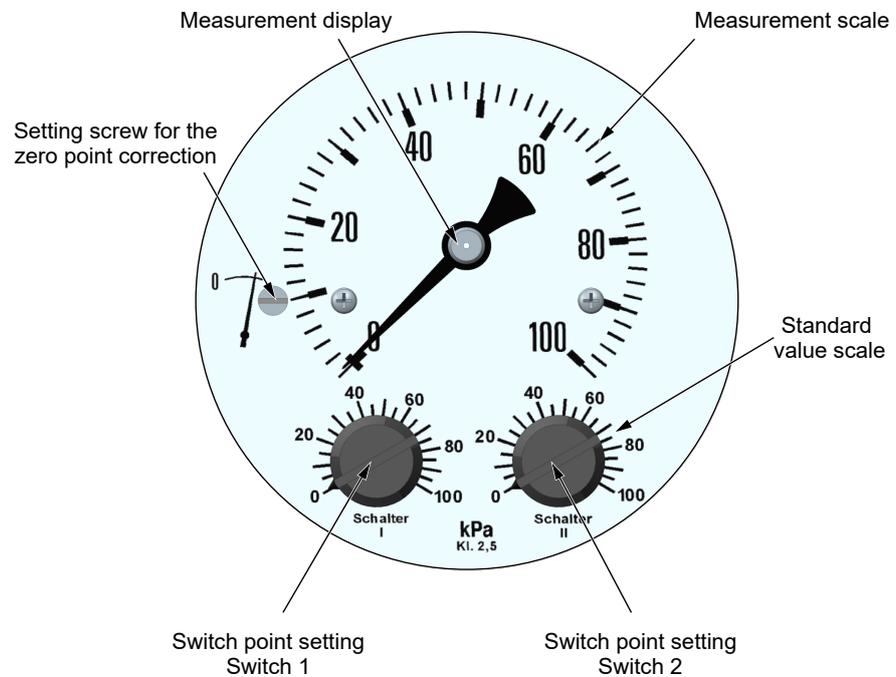


Fig. 10: Control elements [DS21]

4.4 Lead seal

It is possible to secure the unit against removal and adjustment of the switch points by means of a lead seal. This seal may not be removed. The device can be sealed on site or ex-works. In the latter case, the device is supplied with a pre-setting. After this, it is no longer possible to adjust the switch point setting or correct the zero-point.

4.5 Zero point correction

1. Load the pressure chamber with the existing static system pressure.
2. Open the unit by removing the bayonet ring and the front disk. Use a wrench to mount or remove the bayonet ring to prevent damage to the casing.
3. Set the measurement display with the setting screw for correcting the zero-point to the zero-point of the measurement scale.
4. Close the unit.

4.6 Switch point setting

1. Open the unit by removing the bayonet ring and the front disk. Use a wrench to mount or remove the bayonet ring to prevent damage to the casing.
2. Use a screwdriver to set the required switch points in compliance with the markings on the standard value scale.
3. Close the unit.



NOTICE

Setting accuracy

The achievable setting accuracy with the standard value scale is $\pm 5\%$.

A higher level of precision can only be achieved using suitable units such as test manometers, ohmmeters etc. Optionally, these devices can be pre-installed ex-works.

4.7 Function test

Open the unit by removing the bayonet ring and the front disk. Use a wrench to mount or remove the bayonet ring to prevent damage to the casing.

If the unit has two switch points, the stated test steps must be carried out for both switches.

After the test, the switch points need to be reset (see above).



NOTICE

Lead seal

It is possible to secure the bayonet ring against removal by means of a lead seal. This seal may not be removed. A function test can only be carried out in this case by setting the operating pressure (see below).

4.7.1 Checking the switch points in a depressurized state

No measurement is shown and the measurement display point to zero.

Turn the switch point setting button toward the zero-point until the micro-switch is activated.

4.7.2 Checking the switch points when the system is operational

A measurement is shown. If despite operational pressure, no measurement is shown, you can generate a differential pressure by blocking the differential pressure line on one side.

Turn the switch point setting button toward the measurement until the micro-switch is activated.

4.7.3 Checking the switch points by changing the operational pressure

If the unit is sealed or the switch point setting cannot be changed for any other reason, you can carry out a function test by changing the operational pressure. Set the differential pressure so that the micro-switch(es) are activated.

5 Maintenance

5.1 Safety information

The instrument must be decommissioned and secured against inadvertent re-operation if a situation arises in which it must be assumed that safe operation is no longer possible.

Reasons for this assumption could be:

- Evident damage to the instrument
- Failure of the electrical function.
- Storage in temperatures over 85°C for a long period.
- Considerable strain due to transport



WARNING

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A professional single conformity inspection as per DIN EN 61010, section 1, must be carried out before the instrument can be re-commissioned. This inspection must be performed at the manufacturer's location. Correct transport and storage of the instrument are required.

Repairs may be carried out by the manufacturer only.

5.2 Wartung (maintenance)

The unit is maintenance-free apart from regular cleaning of the surface of the casing.



WARNING

Dust deposits

The casing of the unit must be cleaned regularly with a damp cloth to prevent heat accumulation, as this can lead to the surface overstepping the maximum allowed temperature (T70 °C). The cleaning frequency depends on the amount of dust in the location.

To ensure reliable operation and a long service life, we recommend carrying out the following test on a regular basis:

- Check the reading.
- Checking the switch function in connection with the downstream components.
- Checking the differential pressure lines for leaks.
- Checking the electrical connections (terminal connection of the cable).

The precise test cycles and operating and ambient conditions need to be adjusted. If several components of the unit interact, all operating instructions of the other units also need to be observed.

5.3 Transport

The measuring device must be protected against impacts. It should be transported in the original packaging or a suitable transport container.

5.4 Service

All defective or faulty devices should be sent directly to our repair department. Please coordinate all shipments with our sales department.



WARNING

Process media residues

Process media residues in and on dismantled devices can be a hazard to people, animals and the environment. Take adequate preventive measures. If required, the devices must be cleaned thoroughly.

Return the device in the original packaging or a suitable transport container.

5.5 Accessories

Recommended isolating unit amplifier

All isolating amplifiers stated below are for mounting on TS35 rails.

- **FFA6-SR2-Ex1.W**
Art.No. 05003042
 - 230 V AC \pm 10 %
 - 1-channel
 - Control power circuit EEx ia IIC
 - Reversible direction of action
 - 1 relay output with 1 converter
 - LB-/LK monitoring
 - Can be used up to SIL 2 in compliance with IEC 61508
- **KFA-SR2-Ex2.W**
Art.No. 05003043
 - 230 V AC \pm 10 %
 - 2-channel
 - Control power circuit EEx ia IIC
 - Reversible direction of action
 - 2 relay outputs with 1 converter per channel
 - LB-/LK monitoring
 - Can be used up to SIL 2 in compliance with IEC 61508
- **TS500-Ex-ia-1R-5**
Art.No. 05003065
 - 24 V DC \pm 15 %
 - 1-channel
 - Control power circuit is intrinsically-safe
ATEX II (1) G [Ex ia] IIC/IIB
ATEX II (1) D [Ex iaD]
 - Reversible direction of action
 - 1 relay output with 1 converter
 - LB-/LK monitoring

- **TS500-Ex-ia-2R-5**
Art.No. 05003066
 - 24 V DC \pm 15 %
 - 1-channel
 - Control power circuit is intrinsically-safe
ATEX II (1) G [Ex ia] IIC/IIB
ATEX II (1) D [Ex iaD]
 - Reversible direction of action
 - 2 relay outputs with 1 converter per channel
 - LB-/LK monitoring
- **TS500-Ex-ia-1R-0**
Art.No. 05003083
 - 230 V AC \pm 10 %
 - 1-channel
 - Control power circuit is intrinsically-safe
ATEX II (1) G [Ex ia] IIC/IIB
ATEX II (1) D [Ex iaD]
 - Reversible direction of action
 - 1 relay output with 1 converter
 - LB-/LK monitoring
- **TS500-Ex-ia-2R-0**
Art.No. 05003084
 - 230 V AC \pm 10 %
 - 1-channel
 - Control power circuit is intrinsically-safe
ATEX II (1) G [Ex ia] IIC/IIB
ATEX II (1) D [Ex iaD]
 - Reversible direction of action
 - 2 relay outputs with 1 converter per channel
 - LB-/LK monitoring

5.6 Disposal

Please help to protect the environment by always disposing of the work pieces and packaging materials in compliance with the valid national waste and recycling guidelines or reuse them.

6 Technical data

Please also observe the order code here.

6.1 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

6.2 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

6.3 Measured Value Display

Anzeige

Indicator with measurement scale

Measurement accuracy

± 2.5% of the upper range value

6.4 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

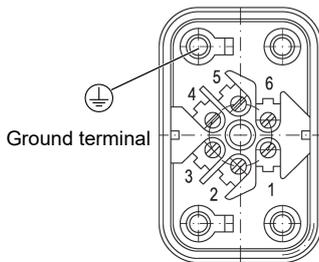


Fig. 11: Cable socket

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	

6.5 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).

6.6 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

6.6.1 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

6.6.2 Assembly

Wall mounting
Mounting the control panel
Direct mounting

6.7 Dimensional drawings

(All dimensions in mm unless otherwise stated)

6.7.1 Pressure chamber in aluminium

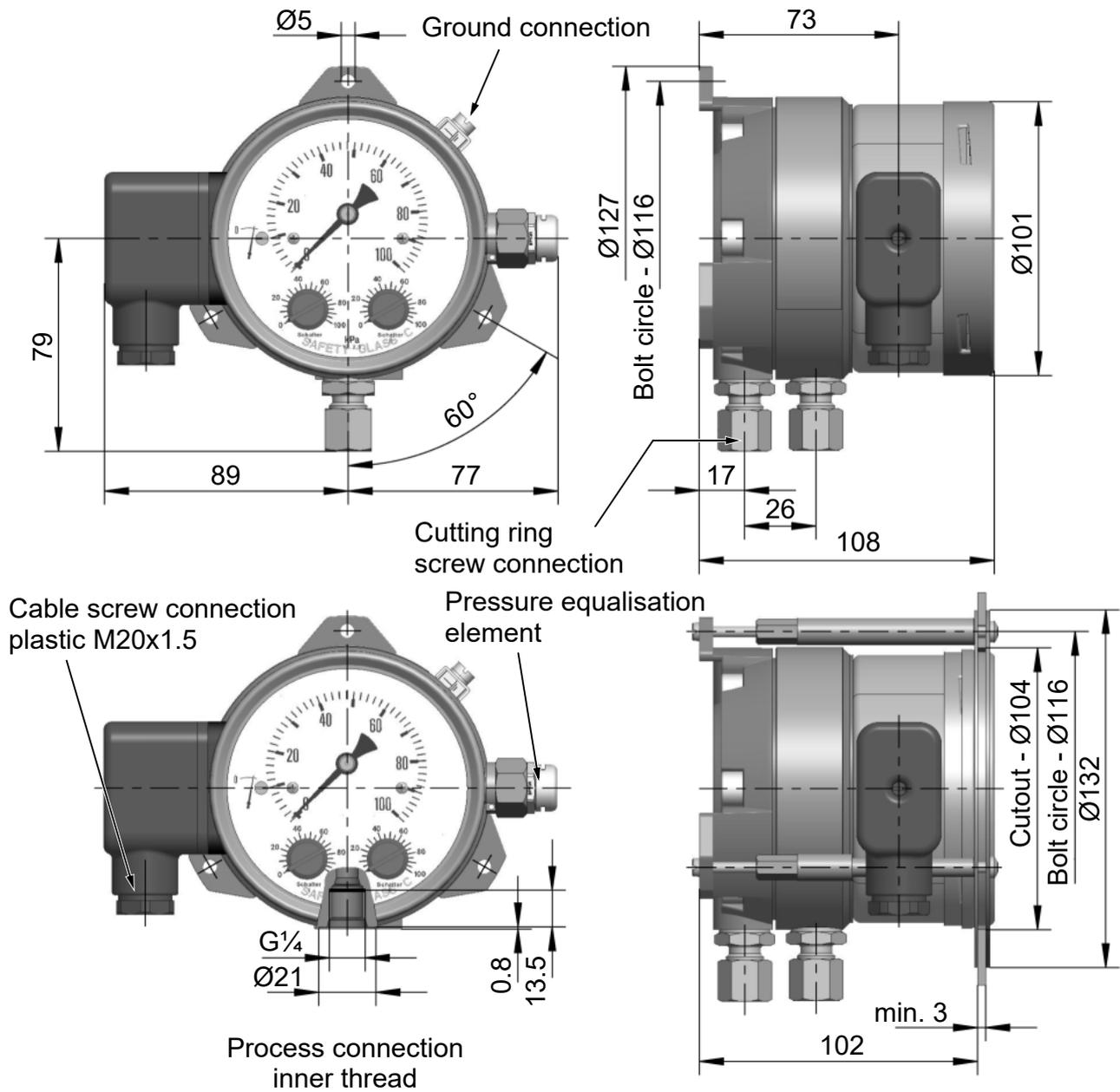


Fig. 12: Pressure chamber in aluminium (ATEX)

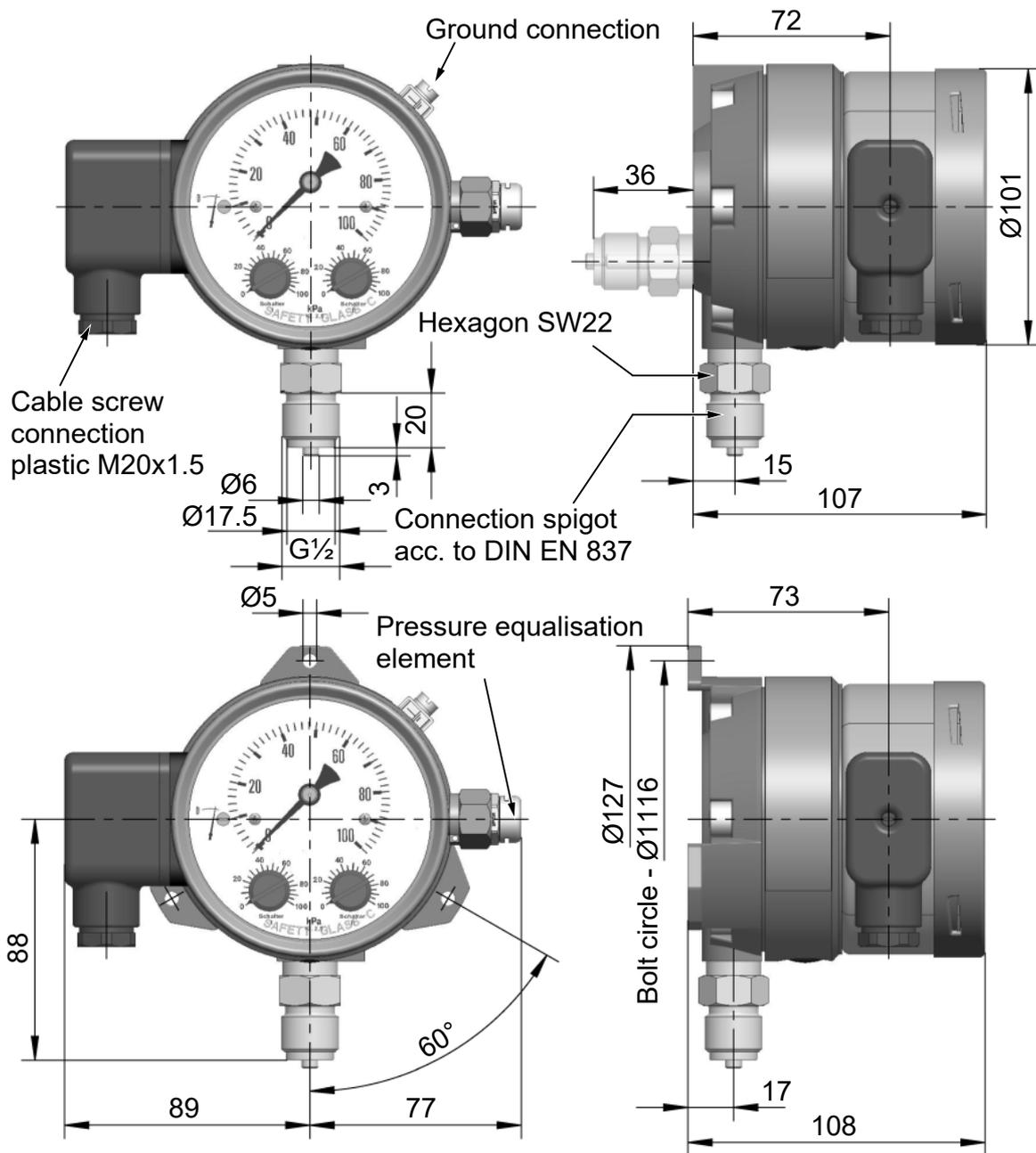
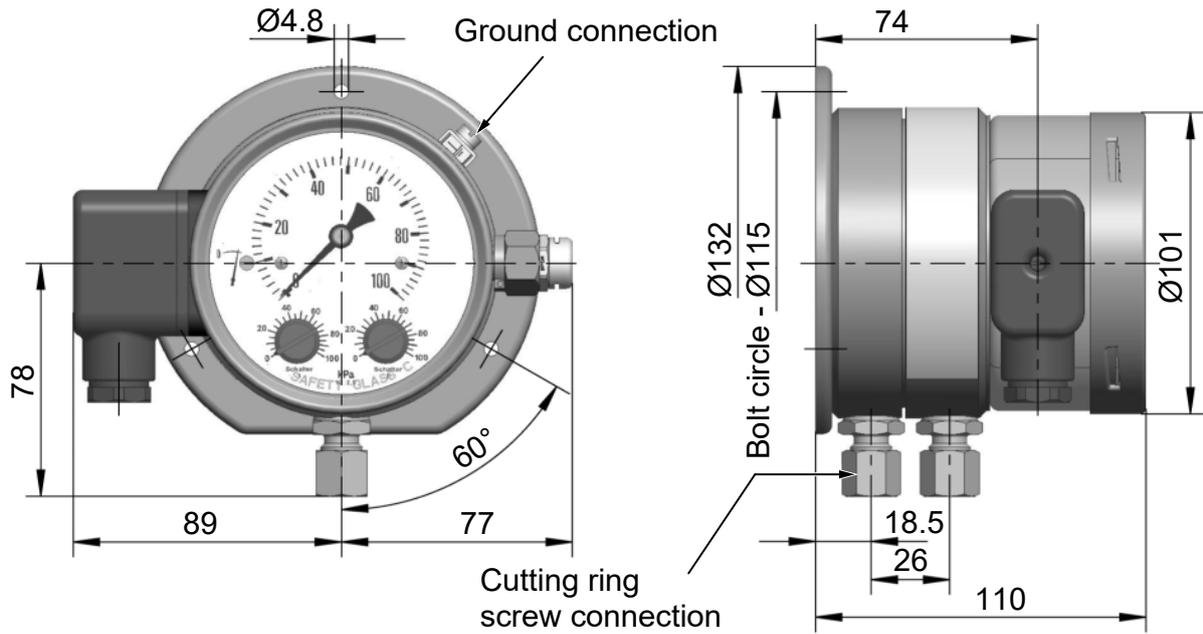


Fig. 13: Pressure chamber in aluminium (ATEX) direct assembly

6.7.2 Pressure chamber in stainless steel



Cable screw connection
plastic M20x1.5

Pressure equalisation
element

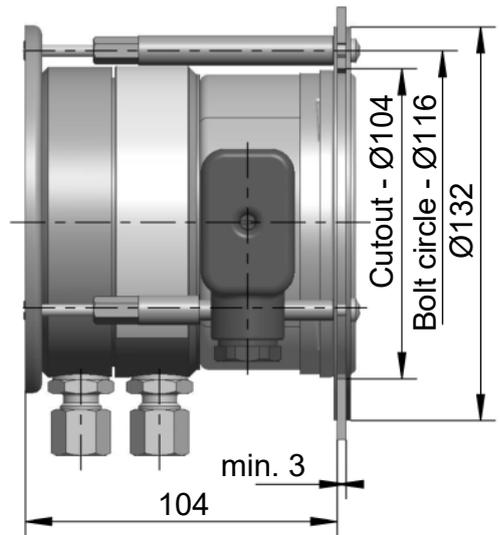
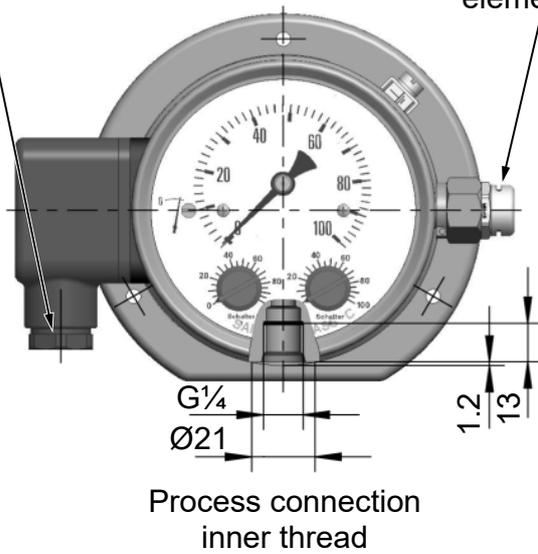


Fig. 14: Pressure chamber in VA (ATEX)

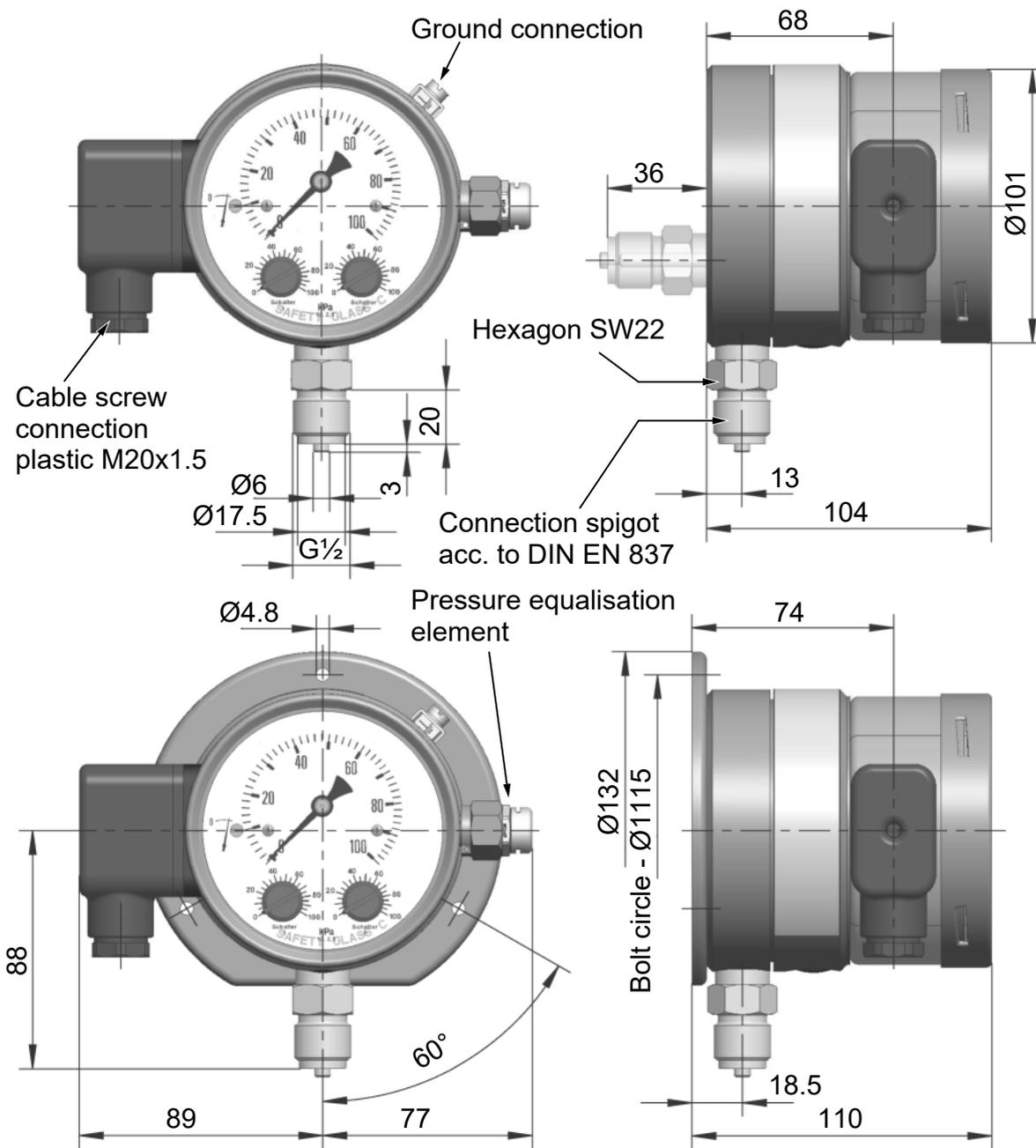


Fig. 15: Pressure chamber in VA (ATEX) direct assembly

6.7.3 Installation of front panel

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

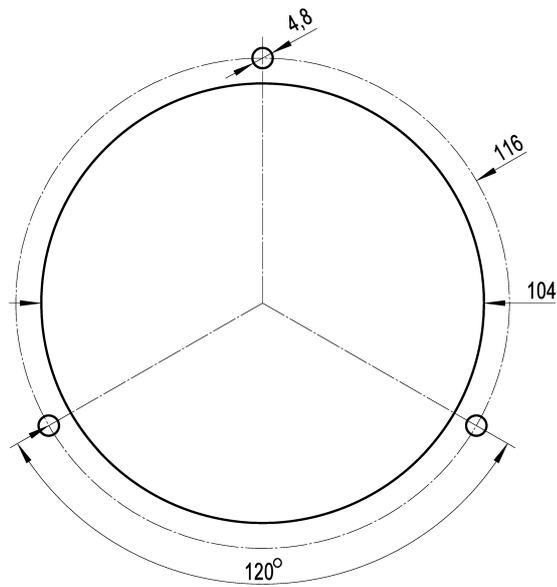
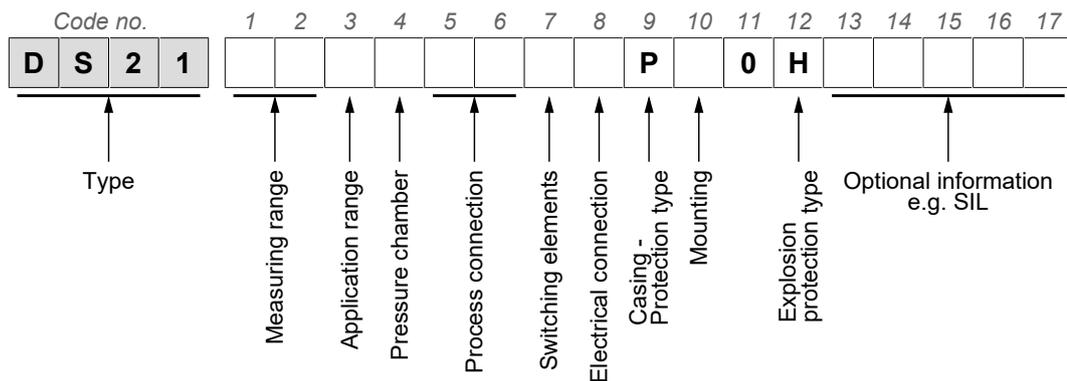


Fig. 16: Front panel cutout

7 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.

8 Attachments

8.1 EU Declaration of Conformity



(Translation) **CE**

EU Declaration of Conformity

For the product described as follows

Product designation **Differential pressure measuring and switching device**

Type designation **DS21 ... H**

it is hereby declared that it corresponds with the basic requirements specified in the following designated directives:

2014/35/EU	Low Voltage Directive
2014/34/EU	ATEX Directive
2014/68/EU	Pressure Equipment Directive
2011/65/EU	RoHS Directive
(EU) 2015/863	Delegated Directive amending Annex II to Directive 2011/65/EU

The products were tested in compliance with the following standards.

Low Voltage Directive (LVD)

DIN EN 61010-1:2020-03 *Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements*
 EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019

Explosive atmospheres (ATEX)

DIN EN IEC 60079-0:2019-09 *Explosive atmospheres - Part 0: Equipment - General requirements*
 EN IEC 60079-0:2018

Correction 1
 IEC 60079-0:2017/COR1:2020

DIN EN 60079-11:2012-06 *Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"*
 EN 60079-11:2012

DIN EN 60079-31:2014-12 *Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"*
 EN 60079-31:2014

DIN EN ISO 80079-36:2016-12 *Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements*
 EN ISO 80079-36:2016

DIN EN ISO 80079-37:2016-12 *Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"*
 EN ISO 80079-37:2016

The notified body

TÜV NORD CERT GmbH
NB 0044

has issued the following certificates according to Directive 94/9/EC:
EC type examination certificate

TÜV 06 ATEX 2964

Pressure Equipment Directive (PED)

DIN EN 837-1:1997-02 *Pressure gauges - Part 1: Bourdon tube pressure gauges; dimensions, metrology, requirements and testing*
 EN 837-1:1996

DIN EN 12516-2:2022-08 *Industrial valves - Shell design strength - Part 2: Calculation method for steel valve shells*
 EN 12516-2:2014+A1:2021

DIN EN 12516-4:2018-11 *Industrial valves - Shell design strength - Part 4: Calculation method for valve shells manufactured in metallic materials other than steel*
 EN 12516-4:2014+A1:2018

Pressure accessory category IV

The notified body for QA surveillance

TÜV NORD SYSTEMS GmbH & Co. KG
NB 0045

has issued the following certificates in accordance with Directive 2014/68/EU:
EU type-examination certificate (type) - module B

0045/202/1403/Z/01262/22/D/001(00)



RoHS Directive (RoHS3)

DIN EN IEC 63000:2019-05
EN IEC 63000:2018

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Further applied technical specifications (not published in the Official Journal of the European Union):

AD2000 rules and regulations 2023

Regulations for pressure equipment, pressure vessels, steam boilers, pipework and plant engineering. Based on the European Pressure Equipment Directive (PED)

DIN 4754-2:2015-03

Heat transfer installations working with organic heat transfer fluids - Part 2: Draught diverter Flow 100

Vd-TÜV Leaflet

DIN EN 12952-11:2007-09
EN 12952-11:2007

Water-tube boilers and auxiliary installations - Part 11: Requirements for limiting devices of the boiler and accessories

DIN EN 12953-9:2007-09
EN 12953-9:2007

Shell boilers - Part 9: Requirements for limiting devices of the boiler and accessories

DIN EN 61508:2011
EN 61508:2010

Functional safety of electrical/electronic/programmable electronic safety-related systems - Parts 1-7

The product has been subjected to the conformity assessment procedures 'Internal production control' (Module A)

- and, in accordance with the Pressure Equipment Directive, a 'Type examination' (Module B) and 'Conformity to type based on quality assurance of the production process' (Module D/D1)
- and, in accordance with the ATEX Directive, a 'Type examination' (Module B) and 'Conformity to type based on quality assurance of the production process' (Module D).

The manufacturer is responsible for issuing this declaration of conformity with regard to the fulfilment of the essential requirements and the preparation of the technical documentation.

Manufacturer

FISCHER Mess- und Regeltechnik GmbH

Bielefelder Str. 37a
32107 Bad Salzufflen, Germany
Tel. +49 (0)5222 974 0

The devices bear the following marking:



Zone 1 and 2 II 2G Ex ib c IIC T6 Gb
Zone 21 and 22 II 2D Ex tb c IIIC T70 °C Db

Bad Salzufflen
07 Jan 2025

T. Malischewski
Managing Director



8.2 ATEX Certificate

Translation

(1) **EC-Type Examination Certificate**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 94/9/EC**

(3) **Certificate Number** TÜV 06 ATEX 2964

(4) for the equipment: Differential pressure switch type DS21.....I

(5) of the manufacturer: **Fischer Mess- und Regeltechnik GmbH**

(6) Address: Bielefelder Straße 37 a
D-32107 Bad Salzuflen

Order number: 8000552858

Date of issue: 2006-08-28

- (7) This equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.
- (8) The TÜV NORD CERT GmbH, notified body No. 0044 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 06 YEX 552858.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
- EN 50 014:1997 +A1+A2 EN 50 020:2002 EN 13 463-1:2001**
EN 13 463-5:2003
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This EC-type examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the equipment or protective system must include the following:

 **II 2 G EEx ib c IIC T6**

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, accredited by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the certification body


Schwedt

Hanover office, Am TÜV 1, 30519 Hanover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590

This certificate may only be reproduced without any change, schedule included.
Excerpts or changes shall be allowed by the TÜV NORD CERT GmbH

P17-F-011 06-06

page 1/3

Fig. 19: TÜV 06 ATEX 2964 Page1



(13) **SCHEDULE**

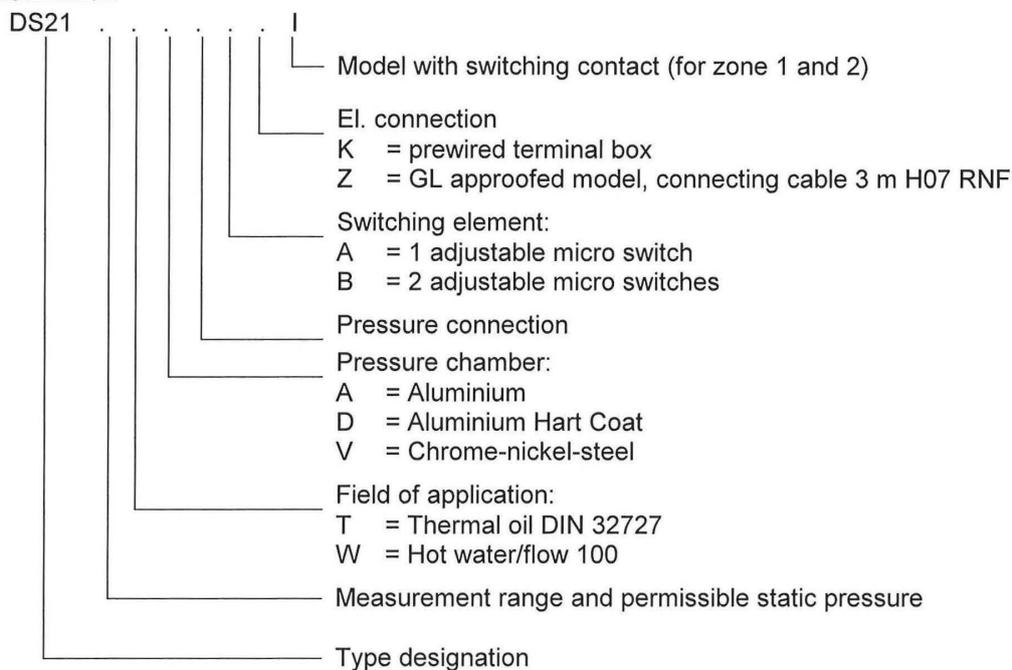
(14) **EC-Type Examination Certificate No. TÜV 06 ATEX 2964**

(15) Description of equipment

The Differential pressure switch type DS21.....I is to measure differential pressures to guarantee the flow in thermal oil plants.

The above mentioned equipment consists of a pressure chamber with a membrane and an upper housing with motion work and two micro switches connected to intrinsically safe circuits.

Type code



Technical Data

Permissible range of ambient temperature	-10 °C to +60 °C
Permissible range of medium temperature	0 °C to +60 °C
Max. permissible medium pressure	6 bar
Max. permissible pressure impulse frequency	0,2 Hz
Max. permissible pressure rate of change	5 bar/s



Schedule EC-Type Examination Certificate No. TÜV 06 ATEX 2964

Electrical Data

Contact circuit in the type of protection Intrinsic Safety EEx ib IIC
(Connections in the connection box;) only for connection to certified intrinsically safe circuits
connections 1, 2, 3; 4, 5, 6) Maximum values per circuit:
 $U_i = 30 \text{ V}$
 $I_i = 160 \text{ mA}$
 $P_i = 800 \text{ mW}$
The effective internal inductances and capacitances are negligibly small.

The intrinsically safe contact circuits are safe galvanically separated from each other and ground potential.

(16) Test documents are listed in the test report No. 06 YEX 552858.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones

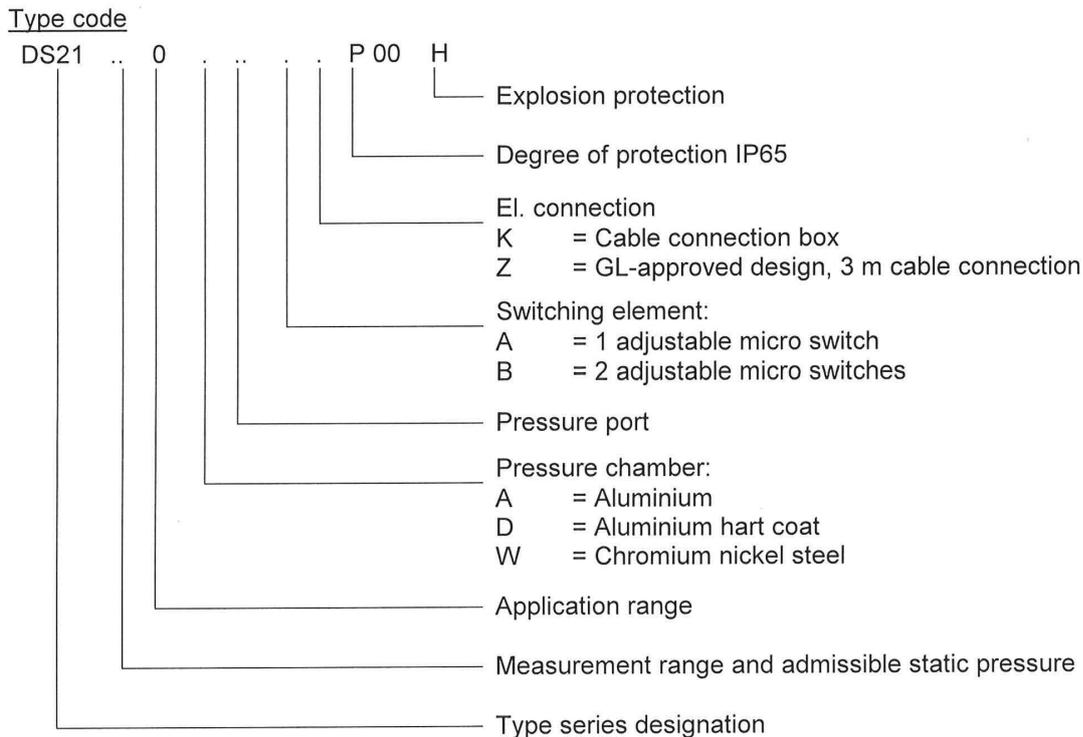


Translation
1. SUPPLEMENT

to Certificate No. TÜV 06 ATEX 2964
Equipment: Differential pressure measuring- and switching device
 type DS21.....I
Manufacturer: Fischer Mess- und Regeltechnik GmbH
Address: Bielefelder Straße 37 a
 32107 Bad Salzuflen
 Germany
Order number: 8000402409
Date of issue: 2012-05-02

Amendments:
 The changes concern the suitability for the use within areas exposed to dust explosion hazards, the type code and the construction. In the future the above-named device may be manufactured according to the test documents mentioned below.

The type designation changes as follows:





1. Supplement to Certificate No. TÜV 06 ATEX 2964

Electrical data

Contact circuit..... in the type of protection intrinsic safety Ex ib IIC
 (connections inside of the only for connection to certified intrinsically safe circuits
 Connection box; Maximum values per circuit:
 $U_i = 30 \text{ V}$
 $I_i = 160 \text{ mA}$
 $P_i = 800 \text{ mW}$
 The effective internal inductance and capacitance are negligibly small.

The intrinsically safe circuits are isolated galvanically safe from each other and to the earth potential, also in explosion hazardous areas with conductive dust.

All other details remain unchanged.

The marking changes as follows:

 II 2 G Ex ib c IIC T6
 II 2 D Ex tb c IIIC T70 °C IP 65

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2009 **EN 60079-11:2007** **EN 60079-31:2009**
EN 13463-1:2009 **EN 13463-5:2011**

(16) The test documents are listed in the test report No. 12 203 092915.

(17) Special conditions for safe use

no additional ones

(18) Essential Health and Safety Requirements

no additional ones

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body



Schwedt

Hanover office, Am TÜV 1, 30519 Hanover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590



Translation
2. SUPPLEMENT

to Certificate No.	TÜV 06 ATEX 2964
Equipment:	Differential pressure switch type DS21.....H
Manufacturer:	Fischer Mess- und Regeltechnik GmbH
Address:	Bielefelder Straße 37 a 32107 Bad Salzuflen Deutschland
Order number:	8000421886
Date of issue:	06.05.2014

Amendments:

Amendments according to the EC-Type Examination Certificate TÜV 06 ATEX 2964 incl.

1. Supplement:

The below mentioned standards are considered.

All other data apply unchanged.

The marking changes as follows:

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

The equipment incl. this supplement meets the requirements of these standards:

EN 60079-0:2012	EN 60079-11:2012	EN 60079-31:2009
EN 13463-1:2009	EN 13463-5:2011	

(16) The test documents are listed in the test report No. 14 203 122999.

(17) Special conditions for safe use

no additional ones

(18) Essential Health and Safety Requirements

no additional ones

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body

Meyer

Hannover office, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

8.3 SIL Certificate



ZERTIFIKAT CERTIFICATE

Hiermit wird bescheinigt, dass das unten beschriebene Produkt der Firma
This certifies that the product mentioned below from company

Fischer Mess- und Regeltechnik
Bielefelder Straße 37a
32107 Bad Salzuflen
Deutschland

die Anforderungen der folgenden Prüfunterlage(n) erfüllt.
fulfills the requirements of the following test regulations.

Geprüft nach: **EN 61508:2010 Teile/Parts 1-7**
Tested in accordance with:

Beschreibung des Produktes: **Differenzdruck Mess- und Schaltgerät / Differential Pressure Switch**
(Details s. Anlage 1) **Kontaktmanometer / Contact Pressure Gauge**
Description of product:
(Details see Annex 1)

Typenbezeichnung: **DS11, DS13 und DS21**
Type Designation: **MS11**

Dieses Zertifikat bescheinigt das Ergebnis der Prüfung an dem vorgestellten Prüfgegenstand. Eine allgemein gültige Aussage über die Qualität der Produkte aus der laufenden Fertigung kann hieraus nicht abgeleitet werden.
This certifies the result of the examination of the product sample submitted by the manufacturer. A general statement concerning the quality of the products from the series manufacture cannot be derived there from.

Registrier-Nr. / Registered No. 44 799 13759902
Prüfbericht Nr. / Test Report No. 3526 2583
Aktenzeichen / File reference 8003015248

Gültigkeit / Validity
von / from 2020-03-18
bis / until 2025-03-17


Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2020-03-18

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de technology@tuev-nord.de

Bitte beachten Sie auch die umseitigen Hinweise
Please also pay attention to the information stated overleaf

Fig. 25: SIL_4479913759902



ANLAGE ANNEX

Anlage 1, Seite 1 von 1
Annex 1, page 1 of 1

zum Zertifikat Registrier-Nr. / to Certificate Registration No. 44 799 13759902

Allgemeine Angaben
General Information

Siehe auch Seite 1 des Zertifikats
See also page 1 of the certificate

Produktbeschreibung:
Product description:

Differenzdruck Mess- und Schaltgerät / Differential Pressure Switch DS11, DS13, DS21
Kontaktmanometer / Contact Pressure Gauge MS11

Technische Daten:
Technical data:

Sicherheitsparameter / Safety Parameter
SFF = 70 %
PFH = $3,3 \cdot 10^{-11}$ 1/h
HFT = 0
Typ-A-Teilkomponente / Type

Die Geräte können mit einer geeigneten Testung in SIL2 Anwendungen eingesetzt werden.
The components can be used with an appropriate testing in SIL2 applications.


Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2020-03-18

TÜV NORD CERT GmbH

Langemarckstraße 20

45141 Essen

www.tuev-nord-cert.de

technology@tuev-nord.de

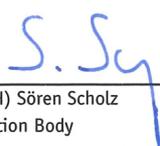
Fig. 26: SIL_4479913759902

8.4 DIN CERTCO certification DIN 4754-2



CERTIFICATE

Certificate holder	FISCHER Mess- und Regeltechnik GmbH Bielefelder Str. 37a 32107 Bad Salzuflen GERMANY
Product	Flow switches for heat transfer installations
Type, Model	DS21...
Testing basis	DIN 4754-2:2015-03 Zertifizierungsprogramm Strömungs- und Füllstandsicherungen (2016-01)
Mark of conformity	
Registration No.	10S001
Valid until	2025-10-31
Right of use	This certificate entitles the holder to use the mark of conformity shown above in conjunction with the specified registration number. See annex for further information.

2020-12-21 
 Dipl.-Wi.-Ing. (FH) Sören Scholz
 Head of Certification Body





ANNEX

Page 1 of 1

Certificate	10S001 dated 2020-12-21
Technical Data	Model: differential pressure gauge Operating pressure: 6 bar, 10 bar and 16 bar (according to design) Rated voltage: 250 V AC, 5 A or 30 V DC, 0,4 A Switching hysteresis: 2,5 % accumulated value of measuring range
Testing laboratory/ Inspection body	TÜV Rheinland Industrie Service GmbH Am Grauen Stein 51105 Köln GERMANY
Test report(s)	SSW 1710/15 dated 2015-10-07 968/FI 1018.00/18 dated 2018-09-24 968/FI 1018.01/19 dated 2019-09-27 968/FSP 2160.00/20 dated 2020-11-25

DIN CERTCO Gesellschaft für Konformitätsbewertung mbH · Alboinstraße 56 · D-12103 Berlin · www.dincertco.de

Fig. 28: DIN_CERTCO_10S001_DE_Page_2



8.5 EC type examination according to 2014/68/EU



ZERTIFIKAT CERTIFICATE

**EU-Baumusterprüfbescheinigung (Baumuster) - Modul B -
nach Richtlinie 2014/68/EU**
EU type-examination certificate (production type) - module B -
according to directive 2014/68/EU

Zertifikat-Nr.: 0045/202/1403/Z/01262/22/D/001(00)
Certificate No.:

Name und Anschrift des Herstellers: Fischer Mess- und Regeltechnik GmbH
Name and address of manufacturer: Bielefelder Straße 37a
32107 Bad Salzufen

Hiermit wird bescheinigt, dass das unten genannte Baumuster die Anforderungen der Richtlinie 2014/68/EU erfüllt.

We hereby certify that the type examination mentioned below fulfills the requirements of directive 2014/68/EU.

Prüfgrundlage: Test specification:	EN 837-1
Prüfbericht-Nr.: Test report No.:	0045/202/1403/P/01262/22/D/001(00)
Beschreibung des Baumusters Description of production type	Differenzdruck Mess- und Schaltgerät DS 21 pressure difference contactor and measurement device
Fertigungsstätte Place of manufacture:	Fischer Mess- und Regeltechnik GmbH Bielefelder Straße 37a 32107 Bad Salzufen
Gültig bis: Valid until:	08/2032

Anlagen:
Attachment
--



Notifizierte Stelle 0045 für Druckgeräte
Notified Body 0045 for pressure equipment



Digital unterschrieben
von Kocielnik Bodo
Datum: 2022.12.13
15:33:56 +01'00'

TÜV NORD Systems GmbH & Co. KG, Große Bahnstraße 31, 22525 Hamburg

Kontakt / Contact:
E-Mail imruhrgebietost@tuev-nord.de
Tel./Phone +49(0) 231-5186-0

Zur Verifizierung der Gültigkeit eines digital signierten Dokuments ist die Installation des TÜV NORD GROUP Stammzertifikats notwendig: <https://www.tuev-nord.de>, siehe Kunden-Login/Digitale Signatur
To verify the validity of a digitally signed document, an installation of the TÜV NORD GROUP root certificate is required: <https://www.tuev-nord.de/en/company>, see Customer Login/Digital Signature

B EU Baumuster Druckgerät und Baugruppe deu eng digital Rev. 3 / 06.20

Fig. 29: Type examination certificate module B

8.6 Part test current 100



Bescheinigung Certificate

über die Zuerkennung eines Bauteil-
kennzeichens für *for the grant of a type test approval
mark in respect of*

Strömungswächter/-begrenzer

Aufgrund eines Prüfberichts
zur Bauteilprüfung des *In virtue of a test report
concerning by*

TÜV Rheinland von 2020-11-25

wird dem Antragsteller, der Firma *the applicant, the company*

**Fischer Mess- und Regeltechnik GmbH
Bielefelder Straße 37a; 32107 Bad Salzufen**

zuerkannt das Bauteilkennzeichen-Nr. *is granted the type test approval mark No.*

TÜV . SW/SB . 20 - 020

für *for*

Differenzdruckgerät

Typ *type*

DS21...

Die Zuerkennung erfolgt in Anwendung von *The adjudication is made pursuant to*

VdTÜV-Merkblatt Strömung 100, Ausgabe 2017-03-15 in Verbindung mit VdTÜV-Merkblatt Allgemeines 002; grundlegende Sicherheitsanforderungen der Richtlinie 2014/68/EU (Druckgeräterichtlinie); DIN 4754-2:2015-03

Sie ist bis **2025-11-30** *It expires 2025-11-30*
befristet und kann widerrufen werden. *and is revocable.*

Die Bescheinigung von 2015-11-30
wird hierdurch ersetzt. *The certificate dated 2015-11-30
is replaced herewith.*

Hinweis: Der Hersteller oder Importeur ist verpflichtet, den zuständigen Sachverständigen zu beauftragen, Bauteile aus der laufenden Fertigung auf Übereinstimmung mit dem Baumuster einmal jährlich stichprobenweise zu überprüfen.

Note: The manufacturer or importer is obliged to the competent Authorized Inspector to conduct a random check on the accessories concerning identity to the type once a year. The accessories have to be taken from the current production.

Berlin, 2021-02-17
Blo/Hel

Verband der TÜV e.V.
Geschäftsbereich Anlagentechnik,
Arbeitswelt, Systemsicherheit
- Zertifizierungen und Registrierungen -

Blohm

Verband der TÜV e.V. · Friedrichstraße 136 · 10117 Berlin · Deutschland
Telefon +49 30 760095-400 · Telefax +49 30 760095-401 · Internet: www.vdtuev.de

Fig. 30: Part test current 100

8.7 Type test flow limiter DIN EN 12952-11

TÜV Rheinland Energy GmbH
Test Centre for Energy Appliances



Type test of a flow limiter DIN EN 12952-11:2007.09 / DIN EN 12953-9:2007.09

Manufacturer / Client:	Fischer Mess- und Regeltechnik GmbH Bielefelder Straße 37a 32107 Bad Salzufen
Product:	Flow limiter
Type designation:	DS21
Test object:	Differential pressure transducer with switching contact
Technical data:	
Measurement range	0...6 bar (different versions see chapter 2)
Nominal pressure	25 bar
Switching current	AC 250 V / 5 A oder DC 30 V / 0,4 A
Hysteresis	2,5% of upper full scale
Accuracy	2,5% of upper full scale
Ambient temperature	-10 ... 70°C
Media temperature	-10 ... 70°C
Class of protection (EN 60529)	IP55 / IP65 (depending on version)
Process connection	G 1/4 oder compression fitting
Cause of test:	Proof of compliance with the requirements of above listed test standards
Test result:	The test object meets the requirements of above listed test standards
Remarks:	The differential pressure transducer is certified according to the Pressure Equipment Directive 97/23/EC. Essential test results were adopted from test reports of TÜV Nord (see related test reports). To exclude the fault condition „contact welding“ the installation manual must give instructions for installation of a fuse with a rated trip current of 0.6-times of the nominal switching current.

Köln, 12th of May, 2016
432/rw
Expert

Dirk Wilczek

Test Centre for Energy Appliances

Head of the Test Centre

Dipl.-Ing. W. Rückwart

8.8 DNV-GL Certificate



This is to certify:

That the Pressure Indicator

with type designation(s)
DS11, DS21

Issued to
FISCHER Mess- und Regeltechnik GmbH
Bad Salzuflen, Nordrhein-Westfalen, Germany

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Location classes:

Temperature B
Humidity B
Vibration A*
EMC N/A
Enclosure B (IP54)

Issued at **Hamburg** on **2019-06-03**

This Certificate is valid until **2024-06-02**.
DNV GL local station: **Magdeburg**

Approval Engineer: **Holger Jansen**



Digitally Signed By: Rinkel, Marco
for **DNV GL**
Location: Hamburg, on behalf of

Joannis Papanuskas
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Form code: TA 251

Revision: 2016-12

www.dnvgl.com

Page 1 of 3

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Fig. 32: DNV-GL_TAA00002BW_(1)

Job Id: **262.1-030917-1**
 Certificate No: **TAA00002BW**

Product description

Pressure Indicator and Switching Device

Type: DS11, DS21

Pressure indicator: 270° scale, Indicator class: 2.5

Ranges	Max. Static Pressure DS11 [DS21]
0 - 400 mbar	6 [6] bar
0 - 0.6 bar	10 [10] bar
0 - 1 bar	16 [16] bar
0 - 1.6bar; 0 - 2.5bar; 0 - 4bar; 0 - 6bar	25 [16] bar
0 - 10 bar [only DS11]	25 bar

Max. medium temperature:	70° C
Gasket and membrane:	NBR or Viton
Wetted parts:	1.4310, 1.4305
Pressure gauge:	GKAlSi 10(MgCu), with hart coat or 1.4305
Output:	2 c/o - contacts separate adjustable
Rating:	3A, 250 V AC, 250 VA
Electrical connection:	fixed cable, length 3m, type MPRX 0,6/1 (Nexans) or equivalent

Type DS21: identical technical data, gaskets and membrane = viton

Application/Limitation

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV GL, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV GL Rules for Ships Pt.4 Ch.9 Control and Monitoring Systems.

A* Vibration test: 2 to 17 Hz amplitude = 1.6 mm,
 17 to 100 Hz acceleration = 2g

Type Approval documentation

Data sheets: DS11, Rev.B 2014-08
 DS21, Rev.B 2014-08
Drawings: DS11 Dwg.-no. 24855, Rev.d; 2019-02-13
 DS11 Dwg.-no. 02.011.00.24857.3, Rev.e; 2018-02-06
 DS21 Dwg.-no. 26023, Rev.g; 2019-02-15
 DS21 Dwg.-no. 02.021.00.26067.3, Rev.h; 2018-02-12
 DS11-DS21 Dwg.-no. 02.021.01.34017.3, Rev.a; 2011-02-08
Test reports: TÜV 57 011 7, 1982-06-04
 Type Approval Assessment Report 2019-05-21

Tests carried out

Applicable tests according to DNV GL Class Guideline CG0339, November 2016.

Marking of product

The products to be marked with:

- Model name
- Manufacturer name
- Serial number



Job Id: **262.1-030917-1**
Certificate No: **TAA00002BW**

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE



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