

Operating Manual

Pressure transmitters / screw-in transmitters for IS-areas

DX14-DMK 351, DX14-DMK 351 P, DX14-LMK 351, DX14B-DMK 387

DX19-DMK 331, DX19-DMK 331 P, DX19-DMP 311, DX19-DMP 321, DX19-DMP 331, DX19-DMP 331 i, DX19-DMP 331 P, DX19-DMP 331 Pi, DX19-DMP 333, DX19-DMP 333 i, DX19-DMP 334, DX19-DMP 335, DX19-DMP 336, DX19-DMP 339, DX19-DMP 343, DX19-LMK 331, DX19-LMP 331, DX19-LMP 331i, DX19-17.600G, DX19-17.605G, DX19-26.600G



READ THOROUGHLY BEFORE USING THE DEVICE **KEEP FOR FUTURE REFERENCE**

ID: BA_DMU-ES_EX_E | Version: 04.2023.0

1. General and safety-related information on this operating manual

This operating manual enables safe and proper handling of the product, and forms part of the device. It should be kept in close proximity to the place of use, accessible for staff members at any time

All persons entrusted with the mounting, installation, putting into service, operation, maintenance, removal from service, and disposal of the device must have read and understood the operating manual and in particular the safety-related information.

The following documents are an important part of the operating manual:

- data sheet - type-examination certificate For specific data on the individual device, please refer to the respective data sheet.

Download these by accessing www.bdsensors.de or request them: info@bdsensors.de | phone.: +49 (0) 92 35 / 98 11 0 The IS versions of our products are variants of the standard products.

Example: Standard: DMK 351 → IS version: DX14-DMK 351

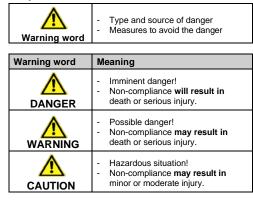
In addition, the applicable accident prevention regulations, safety requirements, and country-specific installation standards as well as the accepted engineering standards must be observed.

For the installation, maintenance and cleaning of the device, the relevant regulations and provisions on explosion protection (VDE 0160, VDE 0165 and/or EN 60079-14) as well as the accident prevention regulations must absolutely be observed. The device was designed by applying the following standards: DX14: EN IEC 60079-0:2018; EN 60079-11:2012 DX14B: EN 60079-0:2018; EN 60079-11:2012;

IECEx IBE 18.0019X: IEC 60079-0: 2017 Edition 7; IEC 60079-11: 2011 Edition 6

DX19: EN IEC 60079-0:2018; EN 60079-11:2012; IECEx IBE 12.0027X: IEC 60079-0: 2011 Edition 6; IEC 60079-11: 2011 Edition 6

1.1 Symbols used



NOTE - draws attention to a possibly hazardous situation that may result in property damage in case of non-compliance.

Precondition of an action

1.2 Staff qualification

Qualified persons are persons that are familiar with the mounting, installation, putting into service, operation, maintenance, removal from service, and disposal of the product and have the appropriate qualification for their activity. This includes persons that meet at least one of the following three requirements

APPLIED MEASUREMENTS LTD.

Transducer Specialists...

A device has an explosion-protection approval if this was specified in the purchase order and confirmed in our order

The user must check whether the device is suited for the

a 🖾 sign.

BD|SENSORS GmbH - All rights reserved.

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the consequences thereof!

http://www.bdsensors.de

1.4 Incorrect use

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WARNING

and liability claims.

1.6 Safe handling

unpacked condition!

DX14- ...:

DX14B-DMK 387:

DX19-...:

with dust must be prevented!

used or operated improperly.

acknowledgement. In addition, the manufacturing label includes

selected use. In case of doubt, please contact our sales department: info@bdsensors.de | phone: +49 (0) 92 35 98 11 0

BDISENSORS assumes no liability for any wrong selection and

The technical data listed in the current data sheet are engaging

intended use.

climbing aid.

Failure to observe the instructions or technical regulations,

improper use and use not as intended, and alteration of or damage to the device will result in the forfeiture of warranty

NOTE - Do not use any force when installing the device to

NOTE - Treat the device with care both in the packed and

NOTE - Excessive dust accumulation and complete coverage

NOTE - The device is state-of-the-art and is operationally

 $U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C_i = 14 \text{ nF}$, $L_i \approx 0 \text{ \muH}$;

 $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i = 14 \text{ nF}, L_i \approx 0 \mu \text{H},$

 $U_i = 28 \text{ V}; \text{ I}_i = 93 \text{ mA}; \text{ P}_i = 660 \text{ mW}; \text{ C}_i \approx 0 \text{ nF}; \text{ Li} \approx 0 \text{ } \mu\text{H};$

application in zone 1 and higher for type DX19- *** i:

pressure transmitter or screw-in transmitter

1.9 UL approval (for devices with UL marking)

The UL approval was effected by applying the US standards,

which also conform to the applicable Canadian standards on

Observe the following points so that the device meets the

- maximum operating voltage: according to data sheet

The device can be identified by means of the manufacturing

BD SENSORS pressure measurement. BD-Sensors-Str. 1 95199 Thierstein, Gerr

DX19-DMK 331P 505-4003-E-5-100-Z00-1-5-1-000

label with order code. The most important data can be gathered

Ordering code

Shield: 🛓

The device must be operated via a supply with energy

limitation (acc. to UL 61010) or an NEC Class 2 energy

for mechanical pressure ports DIN 3852:

for SIL2 version: safety data sheet

 C_{gnd} = 27 nF;; plus cable inductivities 1 µH/m and cable capacities 160 pF/m (for cable by factory)

 $C_{gnd} = 27 \text{ nF}$; plus cable inductivities 1 μ H/m and

cable capacities 160 pF/m (for cable by factory)

application in zone 0 (p_{atm} 0.8 bar up to 1.1 bar): -20 ... 60 °C application in zone 1 and higher: -25 ... 70 °C

application in zone 0 (p_{atm} 0.8 bar up to 1.1 bar): -20 ... 60 $^\circ C$ application in zone 1 and higher:: -25 ... 65 $^\circ C$

application in zone 0 (p_{atm} 0.8 bar up to 1.1 bar): -20 ... 60 $^{\circ}\text{C}$

Check that all parts listed in the scope of delivery are included

free of damage, and have been delivered according to your

 C_{gnd} = 27 nF; plus cable inductivities 1.5 $\mu\text{H/m}$ and

cable capacities 220 pF/m (for cable by factory)

reliable. Residual hazards may originate from the device if it is

1.5 Limitation of liability and warranty

prevent damage of the device and the plant!

NOTE - Do not throw or drop the device!

1.7 Safety-related maximum values

devices with temperature class T6:

application in zone 1 and higher:

O-ring (pre-mounted)

requirements of the UL approval:

2. Product identification

Type designation

Input: 0...400 bar gauge Output: 4...20 mA/2-wire Supply: === 10...28 VDC

tor Pinout: Vs+: 1; Vs -: 2

- only indoor usage

supply.

therefrom

this operating manual

1.8 Scope of delivery

purchase order:

safety.

modified in any way.

Danger through incorrect use

- Only use the device in permissible

media and in accordance with its

The device must not be altered or

Do not use the device as a ladder or

- BDISENSORS is not liable for damage

caused by improper or incorrect use

and must absolutely be complied with. If the data sheet is not available, please order or download it from our homepage:

appmeas.co.uk | info@appmeas.co.uk | +44 (0) 118 981 7339 This operating manual applies to devices with explosion protection approval and is intended for the use in IS-areas.

3. Mounting

3.1 Mounting and safety instructions

Danger of death from explosion, airborne parts, leaking fluid, electric shock /!\ Always mount the device in a depressurized and de-energized DANGER condition! Do not install the device while there is a risk of explosion. Danger of death from explosion Explosion hazard due to high-charging /!\ DANGER

processes in connection with freehanging submersible transmitters with cable FEP Fixed installation of the FEP cable!

NOTE - The technical data listed in the EU-type examination certificate are binding. Download this by accessing www.bdsensors.de or request it by e-mail or phone info@bdsensors.de | phone: +49 (0) 92 35 98 11 0

NOTE - Make sure that the entire interconnection of intrinsically safe components remains intrinsically safe. The owner-operator is responsible for the intrinsic safety of the overall system (entire circuitry).

NOTE - If there is increased risk of damage to the device by lightning strike or overvoltage, increased lightning protection must additionally be provided!

NOTE - Treat any unprotected diaphragm with utmost care; this can be damaged very easily.

 $\ensuremath{\textbf{NOTE}}$ - Provide a cooling line when using the device in steam piping and clarify the material compatibility.

NOTE - The measuring point must be designed in such a way that cavitation and pressure surges are avoided.

NOTE - When installing the device, avoid high mechanical stresses on the pressure port! This will result in a shift of the characteristic curve or to damage, in particular in case of very small pressure ranges and devices with a pressure port made of plastic

NOTE - In hydraulic systems, position the device in such a way that the pressure port points upward (ventilation).

NOTE - If the device is installed with the pressure port pointing upwards, ensure that no liquid drains off on the device. This could result in humidity and dirt blocking the gauge reference in the housing and could lead to malfunctions. If necessary, dust and dirt must be removed from the edge of the screwed joint of the electrical connection.

NOTE - Do not remove the packaging or protective caps of the device until shortly before the mounting procedure, in order to exclude any damage to the diaphragm and the threads! Protective caps must be kept! Dispose of the packaging properly

-25 ... 60°C

-40/-20 ... 70 °C

-40/-20 ... 65 °C

Serial number

SN: 10866330

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NOTE - The permissible tightening torque depends on the conditions on site (material and geometry of the mounting point). The specified tightening torques for the pressure transmitter must not be exceeded

NOTES - for mounting outdoors or in a moist

- environment:
- Please note that your application does not show a dew point, which causes condensation and can damage the pressure transmitter. There are specially protected pressure transmitters for these operating conditions. Please contact us in such case.
- Connect the device electrically straightaway after mounting or prevent moisture penetration, e.g. by a suitable protective cap. (The ingress protection specified in the data sheet applies to the connected device.)
- Select the mounting position such that splashed and condensed water can drain off. Stationary liquid on sealing surfaces must be excluded!
- If the device has a cable outlet, the outgoing cable must be routed downwards. If the cable needs to be routed upwards, this must be done in an initially downward curve.
- Mount the device such that it is protected from direct solar radiation. In the most unfavourable case, direct solar radiation leads to the exceeding of the permissible operating temperature. This must be excluded if the device is used in any explosion-hazardous area!
- For devices with gauge reference in the housing (small hole next to the electrical connection), install the device in such a way, that the gauge reference is protected from dirt and moisture. Should the device be exposed to fluid admission. the functionality will be blocked by the gauge reference. An exact measurement in this condition is not possible Furthermore, this can lead to damages on the device.

3.2 Conditions for devices with 3-A symbol

The device or its connecting piece must be installed in such a way that the surfaces are self-draining (permissible installation position 273° ... 87°).

Make sure that the welding socket is mounted flush inside the

The user is responsible for:

- the correct size of the seal and the choice of an elastomeric sealing material that complies with the 3-A standard
- an easy to clean installation position of the pressure transmitter with little dead space, as well as definition / verification / validation of a suitable cleaning process
- defining adequate service intervals

3.3 Conditions for devices, with EHEDG certificate

Install the device according to the requirements given in EHEDG Guidelines 8, 10 and 37. That is to mount the device in a selfdraining orientation. The device should be installed flush to the process area. If mounting in a T-piece, the ratio between the depth of the upstand (L) and the diameter (D) of the upstand shall be L/D<1. If welded adapters are used, the food contact surface must be smooth, and the welding has to be done according to EHEDG Guideline 9 and 35. Suitable pipe couplings and process connections must be applied according to the EHEDG Position Paper. (List the available ones.)

- Screw the device into the corresponding thread by hand. Devices equipped with a knurled ring:
- 2 only tighten by hand
- 3 Devices with a spanner flat must be tightened using a suitable open-end wrench. Permissible tightening torques for pressure transmitter: wrench flat made of steel:
 - G1/4": approx. 5 Nm G3/4": approx. 15 Nm G1/2": approx. 10 Nm G1": approx. 20 Nm G1 1/2": approx. 25 Nm
 - wrench flat made of plastic: max. 3 Nm

3.6 Mounting steps for connections according to EN 837

- A suitable seal for the medium and the pressure to be measured is available. (e.g. a copper seal)
- The sealing face of the mating component has a flawless surface. (Rz 6.3)
- Screw the device into the corresponding thread by hand. Then tighten it using an open-end wrench. Permissible tightening torques for pressure transmitter G1/4": approx. 20 Nm; G1/2": approx. 50 Nm

NOTE - permitted pressure ranges according to EN 837

G1/4" EN 837	p ≤ 600 bar	Counterpart has to be of steel according to		
G1/2" EN 837	p≤ 1000 bar	DIN 17440 with strength $R_{p0.2} \ge 190 \text{ N/mm}^2$		
G1/4" EN 837	p > 600 bar, p ≤ 1000 bar	Counterpart has to be of steel according to		
G1/2" EN 837	p> 1000 bar, p≤ 1600 bar	DIN 17440 with strength $R_{p0.2} \ge 260 \text{ N/mm}^2$		

NOTE - Please refer to data sheet or contact sales department at BD|SENSORS regarding max. permitted pressure of device.

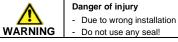
3.7 Mounting steps for NPT connections

- Suitable fluid-compatible sealing material, e.g. PTFE tape, is available.
- Screw the device into the corresponding thread by hand 1 Then tighten it using an open-end wrench. Permissible 2
- tightening torques for pressure transmitter 1/4" NPT: approx. 30 Nm; 1/2" NPT: approx. 70 Nm

3.8 Mounting steps for G1" cone connection

- Screw the device into the mating thread by hand (seal produced metallically)
- 2 Then tighten it using an open-end wrench. Permissible tightening torques for pressure transmitter: p_N < 10 bar: 30 Nm p_N ≥ 10 bar: 60 Nm

3.9 Mounting steps for internal threads M20x1.5 and 9/16" UNF (for high-pressure devices)



NOTE - The high-pressure tube will seal metal-to-metal in the chamfer of the pressure port. (sealing cone 60°)

- Screw the high-pressure fitting into the internal thread of the pressure transmitter. Then tighten it using an open-end wrench. The required tightening torque depends on the manufacturer's 2
- specifications for the high-pressure pipe you are using. (permissible tightening torque for pressure transmitter:

3.10 Mounting steps for dairy pipe connections

- The O-ring is undamaged and seated in the designated groove.
- Chapter "3.2 and/or 3.3" have been noticed. EHEDG conformity is only ensured in combination with an approved seal for codes M73, M75, M76. This is e.g.: ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH
- Centre the dairy pipe connection in the counterpart.
- Screw the cup nut onto the mounting part.
- 2 3 Then tighten it using a hook wrench.

3.11 Mounting steps for Clamp and Varivent®

- connections A suitable seal for the measured fluid and the pressure to be measured is available.
- Chapter "3.2 and/or 3.3" have been noticed. EHEDG conformity is only ensured in combination with an approved seal. This is e.g.: for Clamp connections - codes C61, C62, C63: T-ring seal from Combifit International B.V. for Varivent® connections - codes P40, P41: EPDM-O-ring which is FDA-listed
- Note, that P40 can only be used for tank flanges.
- Place the seal onto the corresponding mounting part. Centre the clamp connection or $\mathsf{Varivent}^{^{(\!\!\!R\!)}}$ connection
- 2 above the counterpart with seal. 3
- Then fit the device with a suitable fastening element (e. g. semi-ring or retractable ring clamp) according to the supplier's instructions

Put the seal between connecting flange and counter flange

Install the device with 4 resp. 8 screws (depending on

3.12 Mounting steps for flange connections A suitable seal for the measured fluid and the pressure to be measured is available. (e.g. a fiber seal)

- ogy a automation technology and are familiar therewith as project staff.
- They are operating staff of the measuring and automation systems and have been instructed in the handling of the systems. They are familiar with the operation of the devices and technologies described in this documentation
- They are commissioning specialists or are employed in the service department and have completed training that qualifies them for the repair of the system. In addition they are authorized to put into operation, to ground, and to mark circuits and devices according to the safety engineering standards.

All work with this product must be carried out by qualified persons!

1.3 Intended use

The device is intended for converting the physical parameter of pressure into an electric signal. It has to be used only for this purpose, considering the following information.

The above listed pressure transmitters have, according to the type, been developed for applications in overpressure and vacuum as well as for absolute pressure measurement.

The screw-in transmitters are intended for level and process measurement.

Devices with 3-A and / or EHEDG certified process connection have been developed especially for applications in food and pharmaceutical industry. The process connection is hygienic and can be sterilized.

Permissible measuring and cleaning media are gases or liquids, which are compatible with the media wetted parts of the device (according to data sheet) and your system. This must be ensured for the application.

	QUYX/ 2020
EU-type examination certificate no., explosion marking	Safety technical maximum values

Fig. 1: Example of manufacturing label

NOTE - The manufacturing label must not be removed!

The marking for devices with explosion-protection approval has to include following information:

DX14-...:

EU-type examination certific metallic pressure port:	ate IBExU05ATEX1070 X II 1G Ex ia IIC o. IIB T6 o. T4 Ga II 1D Ex ia IIIC T110°C Da
non-metallic pressure port:	II 1/2G Ex ia IIC T4 Ga/Gb II 1/2D Ex ia IIIC T110°C Da/Db
DX14B-DMK 387:	

EU-type examination certificate IBExU15ATEX1066 X				
metal housing:	II 1G Ex ia IIC T4 Ga			
PVDF or PP housing:	II 2G Ex ia IIC T4 Gb			
all types:	II 1D Ex ia IIIC T135 °C Da			

DX19-...:

EU-type examination certificate IBExU10ATEX1068 X			
non-metallic pressure port:	II 2G Ex ia IIC T4 Gb		
	II 2D Ex ia IIIC T85°C Db		
metallic pressure port:	II 1G Ex ia IIC T4 Ga		
	II 1D Ex ia IIIC T135°C Da		

3.4 Conditions for oxygen applications



Danger of death from explosion when used improperly

Make sure that your device was ordered for oxygen applications and delivered accordingly. (see manufacturing label - ordering code ends with the numbers "007")

Unpack the device directly prior to the installation. Skin contact during unpacking and installation must be avoided to prevent fatty residues remaining on the device. Wear safety gloves! The entire system must meet the requirements of BAM (DIN 19247)!

For oxygen applications > 25 bar, devices without seals are recommended.

Transmitters with o-rings of FKM (Vi 567): permissible maximum values: 25 bar / 150° C (BAM approval)

3.5 Mounting steps for connections according to DIN 3852

 $\ensuremath{\textbf{NOTE}}$ - Do not use any additional sealing material such as yarn, hemp or Teflon tape!

- √ The O-ring is undamaged and seated in the designated groove.
- The sealing face of the mating component has a flawless surface. (Rz 3.2)

4.1 Connection and safety instructions

4. Electrical connection

flange version) on the counter flange.

2



- Do not install the device while there is a risk of explosion.
- Operate the device only within the specification! (data sheet)
- The limit values listed in the EU-type examination certificate are observed. (Capacity and inductance of the connection cable are not included in the values.)
- The supply corresponds to protection class III (protective insulation).

NOTE - If the device is equipped with plug ISO 4400 or field housing, it must be ensured that the external diameter of the used cable is within the permissible clamping range: cable socket ISO 4400: Ø 4 ... 6 mm field housing code 850: Ø 2 ... 8 mm field housing code 880: Ø 5 ... 14 mm Moreover you have to ensure that it lies in the cable gland firmly and cleftlessly!

NOTE - When devices with ISO 4400 or Buccaneer connector are used, the cable socket must be properly mounted so that the ingress protection specified in the data sheet is ensured! Ensure that the delivered seal is placed between plug and cable socket. After connecting the cable. fasten the cable socket on the device by using the screw.

 $\ensuremath{\textbf{NOTE}}$ - On devices with $\ensuremath{\textbf{field housing}}$, the terminal clamps are situated under the metal cap. To install the device electrically, the cap must be screwed off. The connection must be made such that the isolation distances according to standard are observed and that loosening of the connecting lines is impossible. Before the cap is screwed on again, the O-ring and the sealing surface on the housing have to be checked for damages and if necessary to be changed! Afterwards screw the metal cap on by hand and make sure that the field housing is firmly locked again.

NOTE - for devices with cable outlet

When routing the cable, following bending radiuses have to be complied with:

cable without ventilation tube:

static installation: 8-fold cable diameter dynamic application: 12-fold cable diameter dynamic appro-cable with ventilation tube: -totic installation: 10-fold cable diameter

dynamic application: 20-fold cable diameter In case of devices with cable outlet and integrated

- ventilation tube, the PTFE filter located at the cable end on the air tube must neither be damaged nor removed! Route the end of the cable into an area or suitable connection box which is as dry as possible and free from aggressive gases in order to prevent any damage.
- For a clear identification, the intrinsically safe cables are marked with light blue shrink tubing (over the cable insulation). If the cable has to be modified (e. g. shortened) and the marking at the cable end has been lost in the process, it must be restored (for example, by marking it again with light blue shrink tubing or an appropriate identification sign).

NOTE - Use a shielded and twisted multicore cable for the electrical connection.

4.2 Conditions for the IS-area

Danger generated by electrostatic charging



formation from electrostatic charging of plastic components. For devices with cable, the cable mus be installed tightly. Generally, a shielded cable must be used. Do not clean the device and, if applicable, the connection cable, in a dry state! Use a moist cloth, for example.

Danger of death from explosion - Explosion hazard due to spark

The following warning sign is affixed on devices with plastic omponents



Fig. 2: Warning sign

 $\ensuremath{\textbf{NOTE}}$ - The warning sign must not be removed from the device

Particularity for TRIM TRIO® connector (code 5T2)

For devices with TRIM TRIO® connector by SOURIAU, the use in explosion-hazardous areas is restricted. This design type can be identified by the code "5T2" in the "Electrical Connection" segment of the order code. The identification on the manufacturing label of the device as well as the order documents provide information on the approved areas of application

Overvoltage protection

If the pressure transmitter is used as electrical equipment of category 1 G, then a suitable overvoltage protection device must be connected in series (attend the valid regulations for operating safety as well as EN60079-14).

Schematic circuit

The operation of an intrinsically safe transmitter in intrinsic safe areas requires special care when selecting the necessary Zener barrier or transmitter repeater devices to allow the utilization of the device's properties to the full extent. The following diagram shows a typical arrangement of power supply, Zener barrier and transmitter

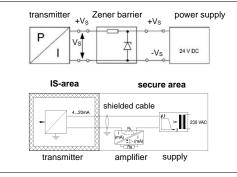


Fig. 3 circuit diagrams

NOTE - Observe item (17) of the type-examination certificate which specifies special conditions for intrinsically safe operation. Exemplary circuit description

The supply voltage of e.g. 24 V_{DC} provided by the power supply is led across the Zener barrier. The Zener barrier contains series resistances and breakdown diodes as protective components. Subsequently, the operating voltage is applied to the transmitter and, depending on the pressure, a particular signal current flows.

Danger of death from explosion

NOTE - When selecting the ballasts, the maximum operating conditions according to the EU-type examination certificate must be observed. When assessing these, refer to their current data sheets to ensure that the entire interconnection of intrinsically safe components remains intrinsically safe Calculation example for the selection of the Zener

barrier

The nominal voltage of the power supply in front of the Zener barrier is 24 V_{DC} ± 5 %. This results in:

- maximum supply voltage: V_{Sup max} = 24 V * 1.05 = 25.2 V
- minimum supply voltage:
- V_{Sup min} = 24 V * 0.95 = 22.8 V

The series resistance of the Zener barrier is listed with 295 ohm. The following values must still be calculated:

voltage drop at the barrier (with full conduction): $V_{ab\;barrier}\!$ = 295 Ω * 0.02 A = 5.9 V

- terminal voltage at the transmitter with Zener barrier: V_{KI} = V_{S up min} - V_{ab Barriere} = 22.8 V - 5.9 V = 16.9 V

minimum supply voltage of the transmitter (according to data sheet):

 $V_{KI min}$ = 12 V_{DC} (corresponding to $V_{S min}$)

Condition: $V_{KI} \geq V_{KI\,min}$

Result:

The terminal voltage of the transmitter with Zener barrier lies at 16.9 V and is therefore higher than the minimum supply voltage of the transmitter which lies at 12 $V_{\text{DC}}.$ This means, the Zener barrier has been selected correctly regarding the supply voltage

NOTE - Note that no line resistances have been listed in this calculation. However, these will lead to an additional voltage drop that must be considered.

4.3 Electrical installation

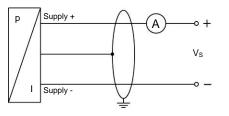
Establish the electrical connection of the device according to the technical data shown on the manufacturing label, the following table and the wiring diagram.

Pin configuration:

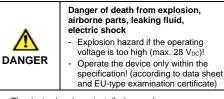
•					
Electrical connections	ISO 4400	Binder 723 (5-pin)		M12x1 (4-pin)	
Supply + Supply –	1 2	3 4		1 2	
Shield	ground pin 🕀	5		4	
Electrical connections Supply + Supply – Shield	Buccane (4-pin) 1 2 4	er	(4-pi 1 2		
Electrical	4 4 Bayonet MIL-C-26482 (10-6)			· · ·	
Supply + Supply – Shield	A B pressure port				
Electrical connections	Field hous	(IEC 60757)		EC 60757)	
Supply +	IN + IN -	WH (white) BN (brown)			

Shield GNYE (green-yellow)

Wiring diagram:



5. Commissioning



The device has been installed properly.

The device does not have any visible defect

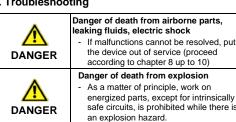
In case of highly precise devices with an accuracy of 0.1 % FSO, a microcontroller-controlled electronic system is used for signal processing. This electronic system is used for signal improvement. Due to the principle, the processing of measured values requires a longer time than with purel analogue sensors, which only comprise amplification circuitry. Due to the longer processing time, the output signal follows the measured value not continuously but in jumps. In case of relatively stable and slowly changing measured values, this property plays a minor role. Compare this with the information on the adjusting time in the data sheet.

In the case of i-devices with optional communication interfaces can also be configured by these electronics. Offset. span and damping are programmable within the limits given in the data sheet. For configuring the device, the programming kit CIS 510 consisting of Adapt 1, Windows® compatible programming software P-Scale 510, power supply and connecting cable is necessary. This can be ordered additionally

If the diaphragm is calcified, it is recommended to send the device to BDISENSORS for decalcification. Please note the chapter "Service / repair" below.

NOTE - Wrong cleaning or improper touch may cause an irreparable damage on the diaphragm. Therefore, never use pointed objects or pressured air for cleaning the diaphragm.

7. Troubleshooting



In case of malfunction, it must be checked whether the device has been correctly installed mechanically and electrically. Use the following table to analyse the cause and resolve the if nossible

maifunction, if possible.			
Fault: no output signal			
Possible cause	Fault detection / remedy		
Connected incorrectly	Checking of connections		
Conductor/wire breakage	Checking of all line		
Conductor/wire breakage	connections.		
	Checking of ammeter		
Defective measuring device	(miniature fuse) or of analogue		
(signal input)	input of your signal processing		
	unit		
Fault: analogue output signal to	oo low		
Possible cause	Fault detection / remedy		
Load resistance too high	Checking of load resistance		
Load resistance too high	(value)		
Supply voltage too low	Checking of power supply		
Supply voltage too low	output voltage		
	Checking of the power supply		
Defective energy supply	and the supply voltage being		
	applied to the device		
Fault: slight shift of the output s	signal		
Possible cause	Fault detection / remedy		
Diaphragm of senor is	Checking of diaphragm; if		
severely contaminated,	necessary, contact		
calcified or crusted	BD SENSORS		
Fault: large shift of the output s	ignal		
Possible cause	Fault detection / remedy		
Diaphragm of sensor is	Checking of diaphragm; when		
damaged (caused by	damaged, contact		
overpressure or mechanically)	BDISENSORS		
Fault: wrong or no output signa	al		
Possible cause	Fault detection / remedy		
	Checking of cable; pitting		
Cable damaged mechanically,	corrosion on the stainless-steel		
thermally or chemically	housing as a result of damage		
anormally of onermotally	on cable; when damaged,		



contact BD|SENSORS

NOTE - After dismounting, mechanical connections must be fitted with protective caps.

9. Service / repair

Information on service / repair:

www.bdsensors.de info@bdsensors.de

- Service phone: +49 (0) 92 35 98 11 0
- 9.1 Recalibration

During the life-time of a transmitter, the value of offset and span may shift. As a consequence, a deviating signal value in reference to the nominal pressure range starting point or end point may be transmitted. If one of these two phenomena occurs after prolonged use, a recalibration is recommended to ensure ermore high accuracy. furthe

9.2 Return



media or pollutants Depending on the measured medium, this may constitute a danger to the operator. Wear suitable protective clothing

Danger of injury from aggressive

e.g. gloves, goggles. Before every return of your device, whether for recalibration. decalcification, modifications or repair, it has to be cleaned carefully and packed shatter-proofed. You have to enclose a notice of return with detailed defect description when sending the device. If your device came in contact with harmful substances, a declaration of decontamination is additionally required. Appropriate forms can be downloaded from our homepage. Download these by accessing www.bdsensors.de or

the EC declaration of conformity, which is available online at: http://www.bdsensors.de. Additionally, the operational safety is confirmed by the CE sign on the manufacturing label.

DX14-...: BD SENSORS

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Operation of intrinsically safe devices as zone-0 equipment only with ungrounded and galvanically isolated power supply.

Functional selection criteria for Zener barriers and galvanic power supply

The minimum supply voltage V_{S min} of the transmitter must not fall short since a correct function of the device can otherwise not be guaranteed. The minimum supply voltage has been defined in the respective product-specific data sheet under "Output signal / supply"

When using a galvanically insulated amplifier with linear bonding, note that the terminal voltage of the transmitter will decrease like it does with a Zener barrier. Furthermore, you have to note that the supply will additionally decrease with an optionally used signal amplifier.

Test criteria for the selection of the Zener barrier

In order not to fall below V_{S min}, it is important to verify which minimum supply voltage is available at full level control of the transmitter. The full level control, i.e. a maximum or nominal output signal (20 mA), can be reached by applying the maximum physical input signal (pressure).

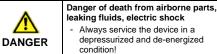
The technical data of the barrier will usually provide the information needed for the selection of the Zener barrier. However, the value can also be calculated. If a maximum signal current of 0.02 A is assumed, then - according to Ohm's law - a particular voltage drop will result from the series resistance of the Zener barrier.

This voltage drop is subtracted by the voltage of the power supply and as a result, the terminal voltage is obtained which is ed on the transmitter at full level control. If this voltage is appli smaller than the minimum supply voltage, another barrier or a higher supply voltage should be chosen.



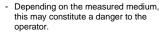
WARNING

6. Maintenance



Always service the device in a depressurized and de-energized

Danger of injury from aggressive fluids or pollutants



Wear suitable protective clothing e.g. gloves, safety goggles

If necessary, clean the housing of the device using a moist cloth and a non-aggressive cleaning solution.

During the cleaning processes, note the compatibility of the cleaning media used in combination with the media-wetted materials of the pressure measuring devices. Permissible concentrations and temperatures must be observed. Verification/validation by the user is essential.

For EHEDG certified devices in tanks, the cleaning device must be positioned in such a way that the sensor is directly assessed and wetted for cleaning. The device has been developed for Cleaning in Place (CIP) applications and must not be dismantled for cleaning.

Deposits or contamination may occur on the diaphragm/ pressure port in case of certain media. Depending on kind and quality of the process, suitable cyclical maintenance intervals must be specified by the operator. As part of this, regular checks must be carried out regarding corrosion, damage of diaphragm/seal(s) and signal shift. A periodical replacement of the seal(s) may be necessary.

info@bdsensors.de | phone: +49 (0) 92 35 / 98 11 0

In case of doubt regarding the fluid used, devices without a declaration of decontamination will only be examined after receipt of an appropriate declaration!

10. Disposal



Danger of injury from aggressive media or pollutants Depending on the measured medium, this may constitute a danger to the operator. Wear suitable protective clothing e.g. gloves, goggles.

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The device must be disposed of according to the European Directive 2012/19/EU (waste electrical and electronic equipment). Waste equipment must not be disposed of in household waste!

NOTE - Dispose of the device properly!

11. Warranty terms

The warranty terms are subject to the legal warranty period of 24 months, valid from the date of delivery. If the device is used improperly, modified or damaged, we will rule out any warranty claim. A damaged diaphragm will not be accepted as a warranty case. Likewise, there shall be no entitlement to services or parts provided under warranty if the defects have arisen due to normal wear and tear.

12. EU declaration of conformity / CE

The delivered device fulfils all legal requirements. The applied directives, harmonised standards and documents are lis

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