

Operating Manual



Pressure transmitters / screw-in probes

AX12-x|act ci, AX12-x|act i, AX12-XMP ci and AX12-XMP i
AX17-XMP ci and AX17-XMP i



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

ID: BA_xact-XMP_EX_E | Version: 11.2018.0

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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
- Supplementary sheet on operation (ZUSATZ_BA_X-GERÄTE)

For specific data on the individual device, please refer to the respective data sheet.

Download these by accessing www.bdsensors.com or request them by e-mail or phone: info@bdsensors.de | phone: +49 (0) 92 35 98 11 0

The explosion-proof versions of our products are variants of the standard products.

Example:

Standard: x|act i → Explosion-proof version: AX12-x|act i

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 (VDE0160, 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:

AX12: EN60079-0:2012+A11:2013,
EN60079-11:2012,
EN60079-26:2015

AX17: EN60079-0:2009,
EN60079-1:2007

1.1 Symbols Used

	- Type and source of danger - Measures to avoid the danger
Warning word	
Warning word	Meaning
	- Imminent danger! - Non-compliance will result in death or serious injury.
DANGER	
	- Possible danger! - Non-compliance may result in death or serious injury.
WARNING	
	- Hazardous situation! - Non-compliance may result in minor or moderate injury.
CAUTION	

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:

- They know the safety concepts of metrology and 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 devices are used to convert the physical parameter of pressure into an electric signal.

The **pressure transmitters** are exclusively suited for measuring positive, negative and absolute pressures.

A device has an explosion-protection approval if this was acknowledged in the purchase order and confirmed in our order acknowledgement. In addition, the manufacturing label includes a sign.

The user must check whether the device is suited for the selected use. In case of doubt, please contact our sales department (info@bdsensors.de, phone: +49 (0) 92 35 98 11 0). BD|SENSORS assumes no liability for any wrong selection and the consequences thereof!

The fluids that can be measured are gases and liquids that are compatible with the materials in contact with the fluids, described in the data sheet.

The technical data listed in the current data sheet are engaging and must absolutely be complied with. If the data sheet is not available, please order or download it from our homepage: <http://www.bdsensors.com>

	Danger through incorrect use - In order to avoid accidents, use the device only in accordance with its intended use.
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1.4 Limitation of Liability and Warranty

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 and liability claims.

1.5 Safe Handling

NOTE – Treat the device with care both in the packed and unpacked condition!

NOTE – The device must not be altered or modified in any way.

NOTE – Do not throw or drop the device!

NOTE – Excessive dust accumulation (over 5 mm) and complete coverage with dust must be prevented!

NOTE – The device is state-of-the-art and is operationally reliable. Residual hazards may originate from the device if it is used or operated improperly.

1.6 Safety-Related Maximum Values

1.6.1 Intrinsically Safe Versions

AX 12-XMP ci / AX12-XMP i / AX 12-x|act ci / AX12-x|act i

Range of ambient temperature:
Use in zone 0 (p_{amb} 0.8 bar to 1.1 bar): -20 ... 60 °C
Use in zone 1 and 2: -40 ... 70 °C

Supply and signal circuit:

U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i ≈ 0 nF, L_i ≈ 0 μH plus Line inductance 1 μH/m and line capacity 160 pF/m (with factory cable)

With respect to the housing, the supply connections have an interior capacity of max. 27 nF

NOTE – The limit values only apply for devices with intrinsically safe circuits

1.6.2 Flameproof enclosure (only with aluminium die cast housing)

AX 17-XMP ci and AX 17-XMP i

Operating temperature range: -20 ... 70 °C

NOTE – The use of devices with flameproof enclosure is not appropriate in areas of dust!

1.7 Scope of Delivery

Check that all parts listed in the scope of delivery are included free of damage, and have been delivered according to your purchase order:

- Pressure transmitter, protective cap
- for mech. connections to DIN 3852: O-ring (remounted)
- Operating Manual, supplementary sheet / structure of the menu system

1.8 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 safety.

Observe the following points so that the device meets the requirements of the UL approval:

- The transducer must be operated via a supply with energy limitation (acc. to UL 61010) or an NEC Class 2 energy supply.
- Maximum operating range: see data sheet

2. Product Identification

The device can be identified by means of the manufacturing label with order code. The most important data can be gathered therefrom.

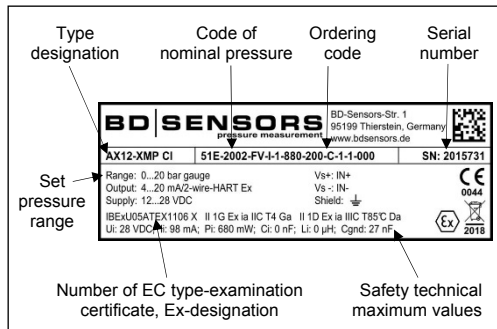


Fig. 1: Manufacturing label

NOTE – The manufacturing label must not be removed!

The marking for devices with explosion-protection approval must include the following information:

AX 12:
EC Type-examination certificate **IBExU05ATEX1106 X**
Marking:
II 1G Ex ia IIC T4 Ga or II 1/2G Ex ia IIC T4 Ga/GB or II 2G Ex ia IIB T4 Gb, II 1D Ex ia IIC T85°C Da

AX 17:
EC Type-examination certificate **IBExU12ATEX1045 X**
Marking:
II 2G Ex d IIC T5 Gb

3. Mounting

3.1 Mounting and Safety Instructions

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

NOTE – The technical data listed in the EC type-examination certificate are binding. Download these by accessing www.bdsensors.com or request them 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.

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 case of very small pressure ranges and devices with a pressure connection/port made of plastic.

NOTE – In hydraulic systems, arrange the device such that the pressure port points upwards. (venting)

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, to exclude any damage to the diaphragm and the threads! Protective caps must be kept! Dispose of the packaging properly!

NOTE – The specified tightening torques must not be exceeded!

NOTE – Provide for a cooling section if the device is used in a steam line.

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!
- A device with gauge reference in the housing (small hole next to the electrical connection) must be mounted such that the gauge reference is protected against dirt and humidity. If the transducer is exposed to liquid admission, the gauge reference will be blocked, and the equalization of air pressure will be prevented. In this condition, a precise measurement is impossible and damage to the transducer may occur.

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. Make sure that the welding socket is mounted flush inside the tank.

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
- defining adequate service intervals

3.3 Mounting Steps for Connections According to DIN 3852

NOTE – Do not use any additional sealing material such as tow, 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)
- 1 Screw the device into the mating thread by hand.
 - 2 Devices equipped with a knurled ring: only tighten by hand
 - 3 Devices with a wrench flat must be tightened using a suitable open-end wrench.
 - Wrench flat made of steel: G1/2": approx. 10 Nm; G1": approx. 20 Nm; G1 1/2": approx. 25 Nm
 - Wrench flat made of plastic: max. 3 Nm

3.4 Mounting Steps for Connections According to EN 837

- ✓ A suitable seal for the measured fluid 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)
- 1 Screw the device into the mating thread by hand.
 - 2 Then tighten it using an open-end wrench: Process connection made of steel: G1/2": approx. 50 Nm

3.5 Mounting Steps for NPT Connections

- ✓ Suitable fluid-compatible sealing material, e.g. PTFE tape, is available.
- 1 Screw the device into the mating thread by hand
 - 2 Then tighten it using an open-end wrench: 1/2" NPT: approx. 70 Nm

3.6 Mounting Steps for G1" Cone Connection

- 1 Screw the device into the mating thread by hand (seal produced metallically)
- 2 Then tighten it using an open-end wrench: P_N < 10 bar: 30 Nm; P_N ≥ 10 bar: 60 Nm

3.7 Mounting Steps for Dairy Pipe Connections

- ✓ The O-ring is undamaged and seated in the designated groove.
- 1 Centre the dairy pipe connection in the corresponding mating fitting.
 - 2 Screw the sleeve nut onto the mating fitting.
 - 3 Then tighten it using a hook wrench.

3.8 Mounting Steps for Clamp and Varicent® Connections

- ✓ A suitable seal for the measured fluid and the pressure to be measured is available.
 - ✓ Chapter "3.2 Conditions for devices with 3-A symbol" was noticed.
- 1 Place the seal onto the corresponding mating fitting
 - 2 Centre the clamp connection or Varicent® connection above the corresponding mating fitting
 - 3 Then fasten the device using a suitable fastener (e.g. half-ring or retractable ring clamp connection) according to the instructions specified by the manufacturer

3.9 Mounting Steps for DRD and Flange Connections

- ✓ A suitable seal for the measured fluid and the pressure to be measured is available. (e.g. a fiber seal)
- 1 Position the seal between the connecting flange and the mating flange
 - 2 Then attach the device to the mating flange using 4 or 8 bolts/nuts (depending on flange design)

3.10 Orientation of the Display and Operating Module (standard on x|act, optional for XMP)

	DANGER
Danger of death from explosion	
- Do not open the housing while an explosion hazard exists!	

The display and operating module can be rotated continuously so as to guarantee easy readability even in unusual mounting positions. Proceed as follows to change the position:

- Unscrew the metal cap by hand.
- Rotate the display and operating module carefully by hand into the desired position. The module is equipped with a turning limiter.
- Before screwing on the cap again, the o-ring and sealing surfaces of the housing have to be checked for damage and if necessary, have to be changed!
- Afterwards screw the metal cap on by hand and make sure that the housing is firmly locked again.

NOTE – Ensure that moisture cannot enter the device! The seals and sealing surfaces must not get dirty, as (depending on application and location) fouling can cause a reduced degree of protection and therefore lead to device failure or irreparable damage to the device.

4. Electrical Connection

4.1 Connection and Safety Instructions

	DANGER
Danger of death from electric shock or explosion	
- Explosion hazard if the operating voltage is too high (max. 28 V _{DC}) or by opening the field housing while an explosion hazard exists.	
- Always mount the device in a depressurized and de-energized condition!	
- 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 EC 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 – For devices with connection terminals, the connection must be made such that the isolation distances according to standard are observed and that loosening of the connecting lines is impossible.

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

NOTE – for devices with **cable outlet**

- When routing the cable, the following minimum bend radii must be observed:

Cable without air hose:
fixed installation: 5-fold cable diameter
flexible use: 10-fold cable diameter

Cable with air hose:
fixed installation: 10-fold cable diameter
flexible use: 20-fold cable diameter

- In case of devices with **cable outlet** and integrated ventilation hose, the PTFE filter located at the cable end on the relative pressure hose 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.

NOTE – The cover for the connection terminals and display can only be opened if a safety lock, grub screw with hexagon socket, has been removed. The screw is located on the right-hand side below the cover. After affixing the cover for the display and connection terminals, the safety lock must be screwed in again. Greasing of the threads is not necessary for this.

NOTE – In order to electrically connect the device with connection terminals, the cover must be screwed off. If the device has a display and operating module, this should be pulled out carefully. During installation, place it next to the housing such that the wires are not under stress. Afterwards, insert it again carefully and ensure that the connection wires are not twisted or pinched. Before the cover is screwed on again, the O-ring and sealing surface on the housing must be checked for damage and, if necessary, replaced! Then screw on the cover by hand and make sure that the field housing is tightly closed again.

NOTE – The cable entry on devices with flameproof enclosure is only suitable for permanent installation!

NOTE – For devices with flameproof enclosure, a **M20x1.5** cable gland **HSK-M-Ex-d / Metr.** is prescribed; this is already pre-mounted. Technical data: cable diameter Ø10 ... Ø14 mm, width across flats: 24 mm, continuous operating temperature: -60 ... 105 °C, certificate: II 2G 1D Ex d IIC.

NOTE – 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).

4.2 Conditions for the Explosion-Hazardous Area

Danger generated by electrostatic charging

	Danger of death from explosion <ul style="list-style-type: none"> - Explosion hazard due to spark formation from electrostatic charging of plastic components. - For devices with cable outlet, the cable must be installed tightly. - Do not clean the device and, if applicable, the connection cable, in a dry state! Use a moist cloth, for example.
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The following warning sign is affixed on devices with plastic components.



Fig. 2: Warning sign

NOTE – The warning sign must not be removed from the device!

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.

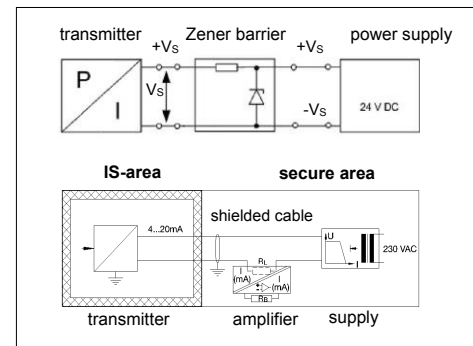


Fig. 3 circuit diagrams

NOTE – Observe item (17) of the type-examination certificate! (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 device and, depending on the pressure, a particular signal current flows.

	Danger of death from explosion <ul style="list-style-type: none"> - Operation of intrinsically safe devices as zone-0 equipment only with ungrounded and galvanically isolated power supply.
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Selection criteria for Zener barriers and power supplies

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 isolated power supply with linear limitation, it must be taken into account that the terminal voltage of the device will decrease because of the linear limitation, as with a Zener barrier. Furthermore, account must be taken of the fact that a certain voltage drop will also occur on an optionally used signal isolation amplifier, whereby the operating voltage of the pressure transmitter will decrease additionally.

Test criteria for the selection of the Zener barrier

In order not to undercut U_{S min} it is important to check which minimum supply voltage is available at full-level modulation of the device. The full-level modulation, that is, a maximum and nominal output signal (20 mA), is achieved 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 applied on the transmitter at full level control. If this voltage is smaller than the minimum supply voltage, another barrier or a higher supply voltage should be chosen.

NOTE – When selecting the barrier or power supply, you must look out for any ballasts which are not suitable for HART® communication. Most manufacturers offer a device group specially developed for this application.

NOTE – When selecting the ballasts, the maximum operating conditions according to the type-examination certificate must be observed. When assessing the ballasts, refer to their current data sheets to ensure that the entire interconnection of intrinsically safe components will remain 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:

$$V_{\text{Sup max}} = 24 \text{ V} * 1.05 = 25.2 \text{ V}$$

$$V_{\text{Sup min}} = 24 \text{ V} * 0.95 = 22.8 \text{ V}$$

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

$$V_{\text{ab barrier}} = 295 \Omega * 0.02 \text{ A} = 5.9 \text{ V}$$

$$V_{\text{KI}} = V_{\text{Sup min}} - V_{\text{ab barrier}} = 22.8 \text{ V} - 5.9 \text{ V} = 16.9 \text{ V}$$

$$V_{\text{KI min}} = 12 \text{ V}_{\text{DC}} \text{ (corresponding to } V_{\text{S min}})$$

$$V_{\text{KI}} \geq V_{\text{KI min}}$$

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_{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 taken into account.

4.3 Electrical Installation

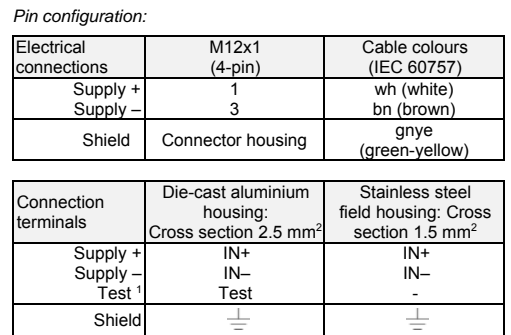
Connect the device electrically according to the information specified on the manufacturing label, the following table, and the wiring diagram.

Electrical connections	M12x1 (4-pin)	Cable colours (IEC 60757)
Supply +	1	wh (white)
Supply -	3	bn (brown)
Shield	Connector housing	gnye (green-yellow)

Pin configuration:

Connection terminals	Die-cast aluminium housing: Cross section 2.5 mm ²	Stainless steel field housing: Cross section 1.5 mm ²
Supply +	IN+	IN+
Supply -	IN-	IN-
Test 1	Test	-
Shield	—	—

NOTE – By connecting an ammeter between Supply + and Test, the output signal can be checked without disconnecting the supply voltage.



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

5. HART® communication

	Danger of death from explosion <ul style="list-style-type: none"> - when interrupting the intrinsically safe circuit where an explosion hazard exists - Only interrupt the intrinsically safe circuit for looping-in a HART® communication interface (HART® Communicator or HART® Modem) when no explosion hazard is present.
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An additional signal as per HART® specification is superimposed on the analogue output signal. The device may be configured by means of a HART® communication device. In this regard, we recommend the CIS 150 programming kit (available as accessory).

In order to ensure trouble-free operation, the following requirements must be taken into account:

Maximum cable length between measuring device and supply:

$$L_{\text{max}} = \frac{65 \cdot 10^6}{R_v \cdot C_v} - \frac{40 \cdot 10^3}{C_v}$$

Wherein L_{max}: maximum length of cable in [m]
R_v: resistance of cable together with load resistance in [Ω]
C_v: capacity of cable in [pF/m]

Resistance R:

$$R = \frac{U - 12}{0.024} \Omega$$

wherein U: supply in [V_{DC}]

The resistance must be at least 240 Ω.

6. Commissioning

	Danger of death from explosion <ul style="list-style-type: none"> - Explosion hazard if the operating voltage is too high (max. 28 V_{DC})! - Operate the device only within the specification! (according to data sheet)
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- ✓ The device has been installed properly
- ✓ The device does not have any visible defect
- ✓ The device is operated within the specification. (see data sheet and EC type-examination certificate)

7. Operation (standard with x|act, optional for XMP)

Please note additionally the "Supplementary sheet to operating manual for x|act ci, x|act i, XMP ci, XMP i, XMD". It includes the structure of the menu system as well as the menu list and error messages.

8. Maintenance

	Danger of death from airborne parts, leaking fluids, electric shock <ul style="list-style-type: none"> - Always service the device in a depressurized and de-energized condition!
	Danger of injury from aggressive fluids or pollutants <ul style="list-style-type: none"> - Depending on the measured medium, this may constitute a danger to the operator. - 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.

The cleaning medium for the media wetted parts (pressure port/diaphragm/seal) may be gases or liquids which are compatible with the selected materials.

Permitted cleaning temperature for flush mounted 3A / EHEDG certified pressure ports:
acids / bases: max. 70 °C
steam: max. 150 °C / 60 min

Deposits or contamination may occur on the diaphragm/pressure port in case of certain media. Depending on the quality of the process, suitable maintenance intervals must be specified by the operator. As part of this, regular checks must be carried out regarding corrosion, damage to the diaphragm and signal shift.

If the diaphragm is calcified, it is recommended to send the device to BD SENSORS 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

9. Troubleshooting

	Danger of death from airborne parts, leaking fluids, electric shock <ul style="list-style-type: none"> - If malfunctions cannot be resolved, put the device out of service (proceed according to chapter 8 up to 10)
	Danger of death from explosion <ul style="list-style-type: none"> - As a matter of principle, work on energized parts, except for intrinsically safe circuits, is prohibited while there is an explosion hazard.

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 malfunction, if possible.

Fault: Display does not work	
Possible cause	Fault detection / remedy
connected incorrectly	Checking of connections
Conductor/wire breakage	Checking of all line connections.
Defective energy supply	check the power pack and the supply voltage present at the transducer

Fault: no output signal	
Possible cause	Fault detection / remedy
connected incorrectly	Checking of connections
Conductor/wire breakage	Checking of all line connections.
Defective measuring device (signal input)	Checking of ammeter (miniature fuse) or of analogy input of your signal processing unit

Fault: analogue output signal too low/small	
Possible cause	Fault detection / remedy
Load resistance too high	Checking of load resistance (value)
Supply voltage too low	Checking of power pack output voltage
Defective energy supply	Checking of the power pack and the supply voltage being applied to the device

Fault: slight shift of the output signal	
Possible cause	Fault detection / remedy
Diaphragm of sensor is severely contaminated	Cleaning using a non-aggressive cleaning solution and soft paintbrush or sponge
Diaphragm of sensor is calcified or crusted	Recommendation: Have the decalcification or cleaning performed by BD SENSORS

Fault: large shift of the output signal	
Possible cause	Fault detection / remedy
Diaphragm of sensor is damaged (caused by overpressure or mechanically)	Checking of diaphragm; when damaged, send the device to BD SENSORS for repair

Fault: Measured value (display and analog output) deviates from the target value	
Possible cause	Fault detection / remedy
Over-pressure / pressure surges	recalibration or replacement of the pressure connection by BD SENSORS is required
mech. damage to the diaphragm	BD SENSORS is required

Fault: constant output signal at 4 mA	
Possible cause	Fault detection / remedy
wrong ID number	make sure that the set value under menu item "ID" is "0000"

10. Removal from Service

	Danger of death from airborne parts, leaking fluids, electric shock <ul style="list-style-type: none"> - Disassemble the device in a depressurized and de-energized condition!
	Danger of injury from aggressive media or pollutants <ul style="list-style-type: none"> - Depending on the measured medium, this may constitute a danger to the operator. - Wear suitable protective clothing e.g. gloves, goggles.

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

11. Service/Repair

Information on service / repair:

- www.bdsensors.com
- info@bdsensors.de
- Service phone: +49 (0) 92 35 98 11 0

11.1 Recalibration

The offset value or range value may shift during the life of the device. In this case, a deviating signal value in relation to the set lower or upper measuring range value is output. If one of these two phenomena occur after extended use, a recalibration in the factory is recommended. Please note the chapter "Service/Repair" about this.

11.2 Return

	Danger of injury from aggressive media or pollutants <ul style="list-style-type: none"> - 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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For every return shipment, whether for recalibration, decalcification, alteration or repair, the device must be cleaned thoroughly and packed in a break-proof manner. A return declaration with a detailed fault description must be added to the defective device. If your device has come into contact with pollutants, a declaration of decontamination is additionally required. Appropriate templates can be found on our homepage. Download these by accessing www.bdsensors.com or request them by e-mail or phone: 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.

12. Disposal

	Danger of injury from aggressive media or pollutants <ul style="list-style-type: none"> - 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!

13. 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.

14. EU Declaration of Conformity / CE

The delivered device fulfils all legal requirements. The applied directives, harmonised standards and documents are listed in the EC declaration of conformity, which is available online at: http://www.bdsensors.com. Additionally, the operational safety is confirmed by the CE sign on the manufacturing label.

BD|SENSORS
pressure measurement



EU-Konformitätserklärung
EC Declaration of Conformity

BD SENSORS GmbH erklärt hiermit in alleiniger Verantwortung, dass die Produkte BD SENSORS GmbH ausschließlich in its own responsibility that the products

HMP 321
X | act ci | x | act i | XMD, XMP ci | XMP i
mit den aufgeführten Richtlinien und Normen übereinstimmen, erfüllt die unten mentioned requirements and standards.

2014/34/EU (EMC) EN 61326-1:2013
2011/65/EU (RoHS) EN 60779-0:2012-A11:2013, EN 60079-11:2012, EN 60079-26:2015
IBEU05ATEX 1106 X EN 60079-0:2012-A11:2013, EN 60079-11:2012, EN 60079-26:2015
IBEU12ATEX 1045 X EN 60079-0:2012-A11:2013, EN 60079-11:2012

Benannte Stelle / Kennnummer
Notified Body / identification number: IBEU Institut für Sicherheit GmbH / 0637
TUV 10 ATEX 302477 G EN ISO IEC 60079-34:2011
Benannte Stelle / Kennnummer
Notified Body / identification number: TÜV NORD CERT GmbH / 0504

In Erfüllung der Druckgeräterichtlinie 2014/68/EU und als Ergebnis des darin geforderten Konformitätsbewertungsverfahrens wird folgende Modul genehmigt.
In accordance to the Pressure Equipment Directive 2014/68/EU and as result of therein demanded conformity assessment procedures the following module has been chosen:

Für Geräte mit maximal zulässigem Überdruck > 200 bar: Bewertungsverfahren Modul A
for device with maximum permissible overpressure > 200 bar assessment procedure Module A

Thesen: 2017-12-20

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Mechanical Design Manager

M. Martin Leiter Elektronenentwicklung
Electronic Design Manager

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