BD-Sensors-Str.1; 95199 Thierstein, Germany
Phone: +49 (0) 92 35 98 11 0 | www.bdsensors.de

Operating manual

Precision pressure transmitters

x|act ci und x|act i

x|act i:

74-07

READ THOROUGHLY BEFORE USING THE DEVICE
KEEP FOR FUTURE REFERENCE

ID: BA_xact_E | Version: 07.2021.0

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.

Complementary to this operating manual the current data sheet has to be adhered to.

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

1.1 Symbols used

Warning word	- Type and source of danger - Measures to avoid the danger

Warning word	Meaning
DANGER	- Imminent danger! - Non-compliance **will result in** death or serious injury.
WARNING	- Possible danger! - Non-compliance **may result in** death or serious injury.
CAUTION	- Hazardous situation! - Non-compliance **may result in** minor or moderate injury.

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 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 for food industry, pharmacy and biotechnology. The pressure transmitters are configurable via integrated display and operating module. Optionally the device offers HART®-communication.

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.

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 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.de

1.4 Incorrect use

WARNING	**Danger through incorrect use** - Only use the device in permissible media and in accordance with its intended use. - Do not use the device as a ladder or climbing aid. - The device must not be altered or modified in any way. - BD|SENSORS is not liable for damage caused by improper or incorrect use.

1.5 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.

1.6 Safe handling

NOTE - Do not use any force when installing the device to prevent damage of the device and the plant!

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

NOTE - Do not throw or drop the device!

NOTE - Excessive dust accumulation 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.

1.7 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
- for mech. connections to DIN 3852: O-ring (remounted)
- mounting instructions or operating manual
- for optional SIL2 version: safety data sheet

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:

- only indoor usage
- maximum operating voltage: according to data sheet
- The device must be operated via a supply with energy limitation (acc. to UL 61010) or an NEC Class 2 energy supply.

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.

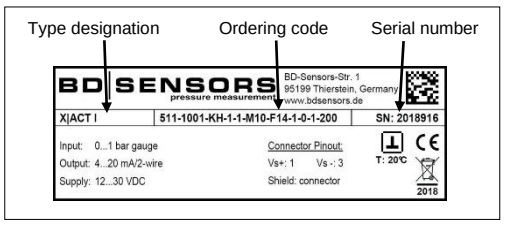


Fig. 1 Example of manufacturing label

NOTE - The manufacturing label must not be removed!

3. Mounting

3.1 Mounting and safety instructions

DANGER	**Danger of death from airborne parts, leaking fluid, electric shock** - Always mount the device in a depressurized and de-energized condition!
DANGER	**Danger of death from improper installation** - Installation must be performed only by appropriately qualified persons who have read and understood the operating manual.

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 - 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 - 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 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 - 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.
- 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 (permissible installation position 273° … 87°).

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
- 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 self-draining 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.)

3.4 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. (R_Z 3.2)

1 Screw the device into the corresponding 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. Permissible tightening torques for pressure transmitter:

- 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

3.5 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. Permissible tightening torques for pressure transmitter:
p_N < 10 bar: 30 Nm; p_N ≥ 10 bar: 60 Nm

3.6 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

1 Centre the dairy pipe connection in the counterpart.

2 Screw the cup nut onto the mounting part.

3 Then tighten it using a hook wrench.

3.7 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 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.

1 Place the seal onto the corresponding mounting part.

2 Centre the Clamp connection or Varivent® connection 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.

3.8 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 Put the seal between connecting flange and counter flange

2 Install the device with 4 resp. 8 screws (depending on flange version) on the counter flange.

3.9 Orientation of the display and operating module

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** - Always mount the device in a depressurized and de-energized condition!

✓ The supply corresponds to protection class III (protective insulation).

NOTE - For the electrical connection a shielded and twisted multicore cable is recommended.

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
  cable with ventilation tube:
  static 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 ventilation 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.

NOTE - If a transition is desired from a transmitter cable with gauge tube to a cable without gauge tube, we recommend our terminal box KL 1 or KL 2.

4.2 Electrical installation

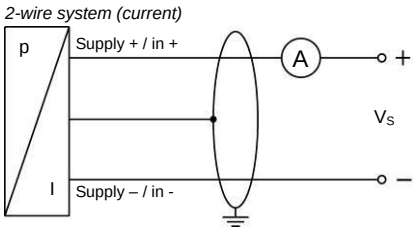
Establish the electrical connection of the device according to the technical data shown on the manufacturing label, the following table and the wiring diagram.

Pin configuration

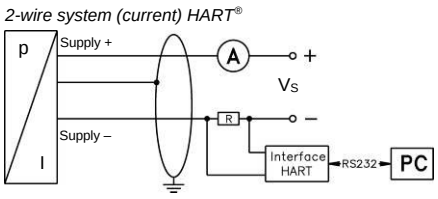
Electrical connections	M12x1 (4-pin)	cable colours (IEC 60757)
Supply +	1	WH (white)
Supply –	3	BN (brown)
Shield	plug housing	GNYE (green-yellow)

Wiring diagrams

2-wire system (current)



2-wire system (current) HART®



5. HART® communication (optionally)

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:

$$L_{max} = \frac{65 \cdot 10^6}{R_V \cdot C_V} - \frac{40 \cdot 10^3}{C_V}$$

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	**Danger of death from airborne parts, leaking fluid, electric shock** - Operate the device only within the specification! (according to data sheet)

✓ The device has been installed properly

✓ The device does not have any visible defect

7. Operation

7.1 Display and operating module

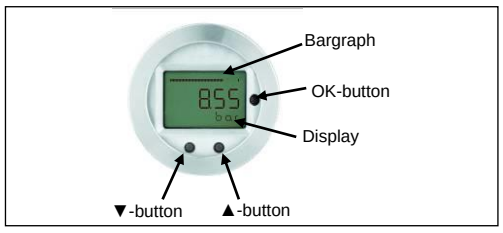


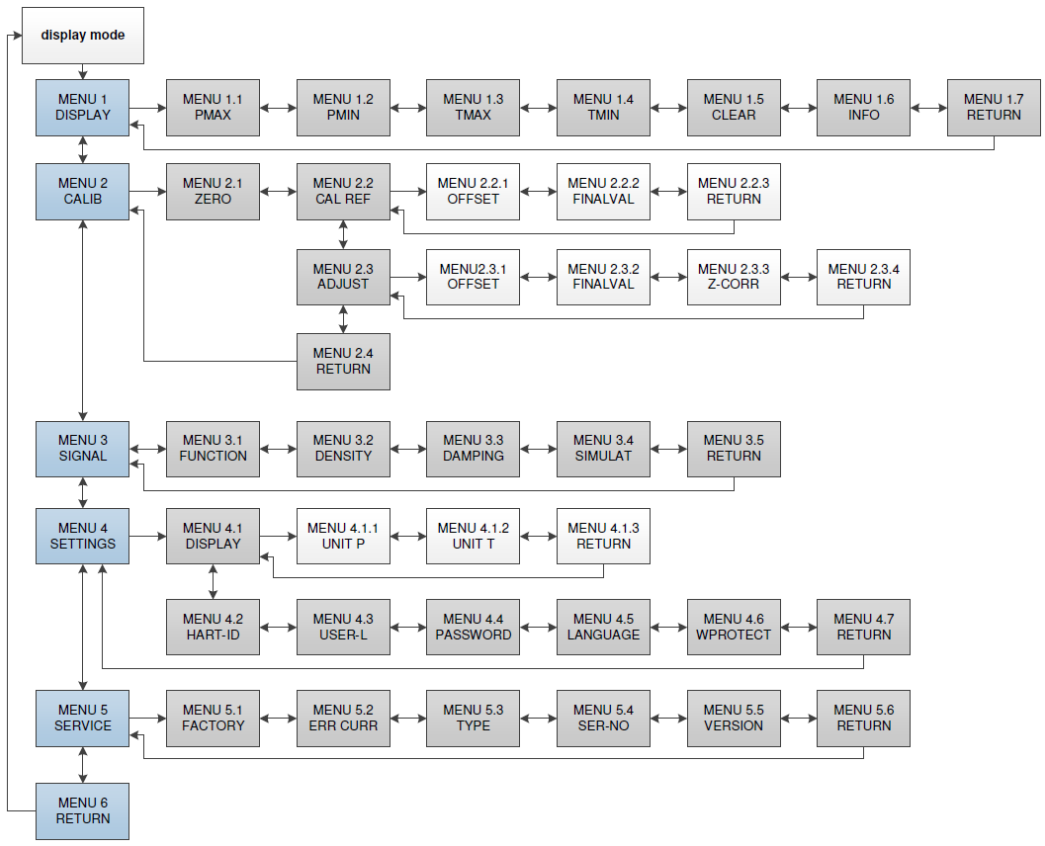
Fig. 2 Touch pad

A bar graph is shown in the display, which indicates the applied pressure as a percentage of the measuring range. The display of the measured value and the configuration of the individual parameters is performed through the menu, via the display. The individual functions can be set by means of three buttons arranged under the cap.

The menu system is a closed system allowing you to scroll both forward and backward through the individual set-up menus to navigate to the desired setting item. All settings are permanently stored in a Flash EPROM and therefore available again even after disconnecting from the supply voltage.

Button functions	
▲-button	• move forward in the menu system (beginning with menu 1) • increase the displayed value
▼-button	• move backwards in the menu system (beginning with the last menu) • decrease the displayed value
OK-button	confirm the menu items and set values

7.2 Structure of the menu system



7.3 Menu list

1 DIPLAY	Display parameter
1.1 P_{max}	**Maximum pressure display (high pressure)** The maximum pressure that occurred during the measurement is shown on the display.
1.2 P_{min}	**Minimum pressure display (low pressure)** The minimum pressure that occurred during the measurement is shown on the display.
1.3 T_{max}	**Maximum temperature display (high temperature)** The maximum temperature that occurred during the measurement is shown on the display.
1.4 T_{min}	**Minimum temperature display (low temperature)** The minimum temperature that occurred during the measurement is shown on the display.
1.5 CLEAR	Delete the values 1.1-1.4 (P_{max}, P_{min}, T_{max}, T_{min})
1.6 INFO	**Configuration of the display** Assignment of the settable digits "1": 1st line: measured pressure — 2nd set pressure unit "2": 1st line: output signal — 2nd line: mA "3": 1st line: measured temperature — 2nd line: °C "4": 1st line: measured pressure — 2nd line: change between pressure unit / output signal in mA "5": 1st line: measured pressure — 2nd line: change between pressure unit / temperature in °C" "6": 1st line: measured pressure — 2nd line: change between pressure unit / output signal in mA / temperature in °C
1.7 RETURN	**Return to menu 1 DISPLAY**
2 CALIB	**Configuration of measuring range, display and output signal**
2.1 ZERO	**Zeroing the display** The message "CONFIRM" appears on the display when selecting the subsidiary menu item with the OK button. By holding the OK button pressed for at least 2 seconds the zeroing is performed, and the message "CONFIRM" disappears from the display.
2.2 CAL REF	**Adjusts the analogue output with pressure reference**
2.2.1 OFFSET	**Adjusts the starting value for the output signal** After the reference pressure has been applied and accepted, selecting the subsidiary menu item with the OK button causes the message "CONFIRM" to appear on the display. By holding the OK button pressed for at least 2 seconds the applied pressure is specified as the starting value for the output signal (4 mA), and the message "CONFIRM" disappears from the display. The displayed value remains unchanged.
2.2.2 FINALVAL	**Adjusts the end value for the output signal** After the reference pressure has been applied and accepted, selecting the subsidiary menu item with the OK button causes the message "CONFIRM" to appear on the display. By holding the OK button pressed for at least 2 seconds the applied pressure is specified as the end value for the output signal (20 mA), and the message "CONFIRM" disappears from the display. The displayed value remains unchanged.
2.2.3 RETURN	**Return to menu 2.2 CAL REF**
2.3 ADJUST	**Sets the measuring range and the zero point**
2.3.1 OFFSET	**Sets the starting value of the measuring range** The ▲ and ▼ buttons allow you to define a starting value for the measuring range. The permitted input range is between 0 … 90% of the original measuring range (turn down max. 1:10). 4 mA is output when the value that has been entered is reached.
2.3.2 FINALVAL	**Sets the end value of the measuring range** The ▲ and ▼ buttons allow you to define an end value for the measuring range. The permitted input range is between 10 … 100% of the original measuring range (turn down max. 1:10). 20 mA is output when the value that has been entered is reached.
2.3.3 Z-CORR	**Zero-point correction of the display and output signal** The message "CONFIRM" appears on the display when selecting the subsidiary menu item with the OK button. By holding the OK button pressed for at least 2 seconds the applied pressure is specified as the starting value for the output signal (4 mA), and the display is zeroed. The message "CONFIRM" disappears from the display.
2.3.4 RETURN	**Return to menu 2.2 CAL REF**
2.4 RETURN	**Return to menu 2 CALIB**
3 SIGNAL	**Signal parameters**
3.1 FUNKTION	**Function selection** "Linear" "2SQR" $y = \sqrt{x}$ "2SQR3POW" $y = \sqrt{x^3}$ cut off 2 % "2SQR5POW" $y = \sqrt{x^5}$
3.2 DENSITY	**Input of the density** settable range: 100 … 9999 kg/m³; conversion is only applicable to the units [mFH], [cmFH] and [mmFH]
3.3 DAMP	**Configuration of the damping** settable range: 0 … 100 s
3.4 SIMULAT	**Simulation of the output signal** settable range: any, for example: 3.7 ... 22 mA
3.5 RETURN	**Return to menu 3 SIGNAL**
4 SETTINGS	**Basic settings**
4.1 DISPLAY	**Configuration of the display unit**
4.1.1 UNIT P	**Configuration of the unit for pressure** units: bar, mbar, g/cm², kg/cm², Pa, kPa, Torr, atm, mH2O, ftH2O, MPa, mFH*, cmFH*, mmFH*, mmH2O, mmHg, psi The conversion of all pressure-related parameters is performed automatically. *Input of the density is required. (see 3.2)
4.1.2 UNIT T	**Configuration of the unit for temperature** units: °C and °F
4.1.3 RETURN	**Return to menu 4.1 DISPLAY**
4.2 HART-ID	**HART-ID (only to be set with HART® devices in multi-drop mode)** Set the desired ID no. (between "0" and "15") and confirm this with the OK button. It is only necessary to configure this number if you want to operate the device in multi-drop mode (connection of a number of HART® devices). If the ID no. is set to "0", the multi-drop mode is deactivated, and the device operates in analogue mode.
4.3 USER-L	**Configuration of the user's security level** For security reasons it is necessary to enter the password before configuring the security level. Confirm this with the OK button. The password is factory-set to "0000". Security levels: "0": the whole menu system is enabled "1": the following menu items are enabled: 1 Display, 3 Signal, 4.3 USER-L "2": the following menu items are enabled: 1 Display, 4.3 USER-L
4.4 PASSWORD	**Configuration of the password** For security reasons it is necessary to enter the previous password before configuration. Confirm this with the OK button. The password is factory-set to "0000". Then set the new password and confirm this with the OK button. If you have forgotten your password, you can request the master password, which is fixed at manufacture, from BD|SENSORS.
4.5 LANGUAGE	**Selection of DE (German) or EN (English) as the user language**
4.6 WPROTECT	**Write protection (HART®-configuration)** "YES": write protection is activated, transmission of the HART® commands to the storage location is not possible "NO": write protection is deactivated
4.7 RETURN	**Return to menu 4 SETTINGS**
5 SERVICE	**Service**
5.1 FACTORY	**Reset to factory settings**
5.2 ERR CURR	**Definition of the current** settable values: 21.6 mA or 3.8 mA; the selected error current is output in response to a malfunction in the electronics
5.3 TYPE	**Display of the device type**
5.4 SER-NO	**Display of the set serial number**
5.5 VERS	**Display of the program version (firmware)**
5.6 RETURN	**Return to menu 5 SERVICE**
6 RETURN	**Return to display mode**

7.4 Configuration

If a parameter is configurable by a value, each digit may be configured separately. That means after activating such a menu item (e. g. "2.3.1 OFFSET") by pushing the OK-button, the first digit of the currently set value will start to blink. Now scroll up or down to the desired digit via the ▼- or ▲-button and confirm it with the OK-button. After that, the next digit will start to blink. Configure it in the same way. In the menu items "2.3.1 OFFSET" and "2.3.2 FINALVAL", the decimal point will then start to blink, and it is also possible to change its position by using the ▼- or ▲-button. By confirming the position with the OK-button, the total value will be stored if permissible. If the value is out of range, an error message (e. g. Error 03) will appear in the display and the set value will **not** be stored. If you intend to set a negative value, the first digit has to be configured with the ▼-button.

To configurate the device, unscrew the metal cap by hand.

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.

NOTE - 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.

execution of configuration:

- to enter the operating mode, push the ▲- or ▼-button
- set the desired menu item by pushing the ▲- or ▼-button
- activate the set menu item by pushing the OK-button
- set the desired value or select one of the offered settings by using the ▲- or ▼-button
- store / confirm the set value / selected setting and exit the menu by pushing the OK-button

8. Maintenance

DANGER	**Danger of death from airborne parts, leaking fluids, electric shock** - Always service the device in a depressurized and de-energized condition!
WARNING	**Danger of injury from aggressive fluids or pollutants** - 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.

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.

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

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.

DANGER	**Danger of death from airborne parts, leaking fluids, electric shock** - If malfunctions cannot be resolved, put the device out of service (proceed according to chapter 10 up to 12)

9.1 Error messages

PASSED PARAMETER TOO SMALL	entered parameter value is too small
PASSED PARAMETER TOO LARGE	entered parameter value is too large
LOOP CURRENT NOT ACTIVE	loop current is not active (HART ID > 0, device works in Multidrop mode)
APPLIED PROCESS TOO LOW	applied process is too low
APPLIED PROCESS TOO HIGH	applied process is too high
LOWER RANGE VALUE TOO HIGH	lower range value (OFFSET) is too high
LOWER RANGE VALUE TOO LOW	lower range value (OFFSET) is too low
UPPER RANGE VALUE TOO HIGH	upper range value (FINALVAL) is too high
UPPER RANGE VALUE TOO LOW	upper range value (FINALVAL) is too low
SPAN TOO SMALL	span too small
DEVICE MALFUNCT	internal failure → please send the device to BD|SENSORS for repair

9.2 Further errors and possible corrections

Fault: display does not work	
Possible cause	**Fault detection / remedy**
Connected incorrectly	inspect the connections
Line break	inspect all connecting lines
Defective energy supply	inspect the power supply and the applied supply voltage at the transmitter

Fault: no output signal	
Possible cause	**Fault detection / remedy**
Connected incorrectly	inspect the connection
Line break	inspect all line connections necessary to supply the device (including the connector plugs)
Defective amperemeter (signal input)	inspect the amperemeter (fine-wire fuse) or the analogue input of the PLC

Fault: analogue output signal too low	
Possible cause	**Fault detection / remedy**
Load resistance too high	verify the value of the load resistance
Supply voltage too low	verify the output voltage of the power supply
Defective energy supply	inspect the power supply and the applied supply voltage at the device

Fault: small shift of the output signal	
Possible cause	**Fault detection / remedy**
Diaphragm is highly polluted, calcified or coated with deposit	checking of diaphragm; if necessary, send the device to BD|SENSORS for repair

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 analogue output) deviates from the nominal value	
Possible cause	**Fault detection / remedy**
High pressure / pressure peaks	recalibration or replacement of the pressure port by BD|SENSORS is required
Mechanical damage to diaphragm	

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	**Danger of death from airborne parts, leaking fluids, electric shock** - Disassemble the device in a depressurized and de-energized condition!
WARNING	**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.

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

11. Service / repair

Information on service / repair:

- www.bdsensors.de
- 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

WARNING	**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.

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.de 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

WARNING	**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.

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. Declaration of conformity / CE

The delivered device fulfils all legal requirements. The applied directives, harmonised standards and documents are listed in the EU 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.