BD SENSORS
pressure measurement

Operating Manual CE

Digital Field Display PA 440

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1. General information

1.1 Information on the operating manual

This operating manual contains important information on proper usage of the device. Read this operating manual carefully before installing and starting up the pressure measuring device.

Adhere to the safety notes and operating instructions which are given in the operating manual. Additionally applicable regulations regarding occupational safety, accident prevention as well as national installation standards and engineering rules must be complied with!

This operating manual is part of the device, must be kept nearest its location, always accessible to all employees.

1.2 Symbols used

⚠ DANGER! – dangerous situation, which may result in death or serious injuries

⚠ WARNING! – potentially dangerous situation, which may result in death or serious injuries

⚠ CAUTION! – potentially dangerous situation, which may result in minor injuries

! CAUTION! – potentially dangerous situation, which may result in physical damage

☞ NOTE – tips and information to ensure a failure-free operation

1.3 Target group

⚠ WARNING! To avoid operator hazards and damages of the device, the following instructions have to be worked out by qualified technical personnel.

1.4 Limitation of liability

By non-observance of the operating manual, inappropriate use, modification or damage, no liability is assumed and warranty claims will be excluded.

1.5 Intended use

- The field display PA 440 is supplied by the analogue current loop and shows the measured value on the display. For monitoring the limit values optionally up to two PNP open collector-contacts are available. As standard the PA 440 is equipped with a LC-display, optionally a LED-display is deliverable.
- The configuration is menu-driven via two push buttons located in the front. Following parameters could be configured: decimal point, zero point, end point, switch-on and switch-off points, etc. Those parameters are being stored in an EEPROM and, thus, are being kept also in case of power breakdown. Limit exceeding in both directions can be displayed as a message. Furthermore an access protection is provided.
- It is the operator's responsibility to check and verify the suitability of the device for the intended application. If any doubts remain, please contact our sales department in order to ensure proper usage. BD SENSORS is not liable for any incorrect selections and their effects!
- The technical data listed in the current data sheet are engaging and must be complied with. If the data sheet is not available, please order or download it from our homepage. (http://www.bdsensors.com/products/download/datasheets)

⚠ WARNING! Danger through improper usage!

1.6 Package contents

Please verify that all listed parts are undamaged included in the delivery and check for consistency specified in your order:

- field display PA 440
- sheet of unit labels
- mounting instructions

2. Product identification

The device can be identified by its manufacturing label. It provides the most important data. By the ordering code the product can be clearly identified. The programme version of the firmware, (e. g. P06) will appear for about 1 second in the display after starting up the device. Please hold it ready for inquiry calls.

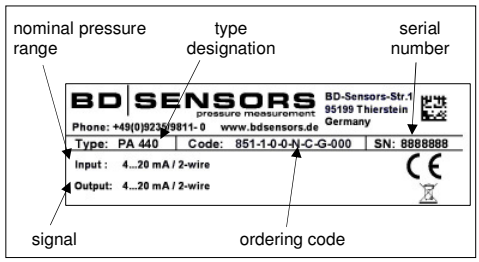


Fig. 1 manufacturing label

! The manufacturing label must not be removed from the device!

3. Mechanical installation

3.1 Mounting and safety instructions

⚠ WARNING! Install the device only when currentless!

⚠ WARNING! This device may only be installed by qualified technical personnel who has read and understood the operating manual!

! Handle this high-sensitive electronic precision measuring device with care, both in packed and unpacked condition!

! There are no modifications/changes to be made on the device.

! Do not throw the package/device!

! Remove packaging only directly before starting up the device to avoid any damage!

! Do not use any force when installing the device to prevent damage of the device and the transmitter!

3.2 General installation steps

- Carefully remove the pressure measuring device from the package and dispose of the package properly.
- Next the field display has to be mount stationary on a suitable fixing location via two appropriate fastening screws.

3.3 Lead in the transmitter cable

- Lead in the connecting cable of the transmitter through the cable gland on the left side. The cable length inside the terminal box has to be long enough for connecting the cords with the terminal clamps on the left (SENSOR).
- Then tighten the cable gland by hand. Take care that the cable is strain-relieved.
- Pay attention that the PTFE-filter on the gauge reference of BD SENSORS-transmitters may not be damaged or removed.

3.4 Lead in the supply line

- Lead the supply line through the cable gland on the right side. The cable length inside the terminal box has to be long enough for connecting the cords with the terminal clamps on the right (SUPPLY).
- Then tighten the cable gland by hand. Take care that the cable is strain-relieved.

4. Electrical Installation

⚠ WARNING! Install the device only when currentless!

Open the top cover; establish the electrical connection of the device according to the following table and the wiring diagram. Screw the top cover onto the box again.

Pin configuration:

Designation	Terminal block	Electrical connection (cable colours of BD SENSORS transmitters)	to connected with
GND	SENSOR	Potential reference clamp (yellow/green)	cable shield of transmitter
VS-	SENSOR	Supply - (brown)	neg. connecting cable of transmitter
VS+	SENSOR	Supply + (white)	pos. connecting cable of transmitter
SP2	SP	Contact 1	connecting cable of transmitter for contact 1
SP1	SP	Contact 2	connecting cable of transmitter for contact 2
VS+	SUPPLY	Supply +	pos. connecting cable for pressure signal
VS-	SUPPLY	Supply -	neg. connecting cable for pressure signal
GND	SUPPLY	Potential reference clamp	cable shield of supply line

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

☞ The ground wires of all components have to be connected when installing!

Supply:

The supply created by the electronics of the device is approx. 6.5 V_{DC}. Please take this into consideration when planning your power supply. The tolerances for the power supply can be calculated as follows:

Minimum supply: $V_{Smin} = V_{minTR} + 6.5V$

Maximum supply: $V_{Smax} = V_{maxTR} + 6.5V$

$V_{min\,TR}$ = minimum supply of the used 2-wire transmitter

V_{maxTR} = maximum supply of the used 2-wire transmitter

5. Initial start-up

⚠ WARNING! Before the initial start-up, the user has to check that the device has been properly installed and make sure that it does not have any visible defects.

⚠ WARNING! The device must only be started up by qualified technical personnel that has read and understand the operating manual!

⚠ WARNING! The device must only be used within the technical specifications (compare the data in the data sheet)!

6. Operation

6.1 Configuration

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 an EEPROM and therefore available again even after disconnecting from the supply voltage. The structure of the menu system is the same for all types of devices, regardless of the number of contacts. However, they only differ by the number of menus. Following figure and the menu list shows all possible menus.

☞ Please follow the manual meticulously and remember that changes of the adjustable parameters (switch-on point, switch-off point, etc.) become only effective after pushing both buttons simultaneously and leaving the menu item.

6.2 Password system

To avoid a configuration by unauthorized persons, the possibility is given to lock the device by an access protection. More information is given in menu 1 of the menu list.

6.3 Unit

The unit of the values to be measured is determined on ordering. But it is also possible to change the unit later by using one of the enclosed unit labels.

6.4 Description of hysteresis and compare mode

To invert the respective modes, you have to exchange the values for the switch-on and switch-off points.

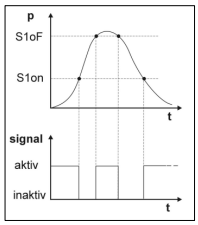


Fig. 2 compare mode

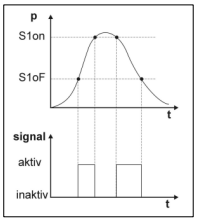


Fig. 3 compare mode inverted

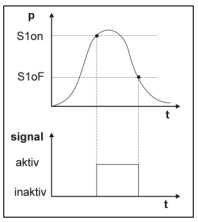


Fig. 4 hysteresis mode

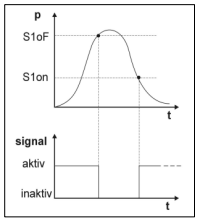
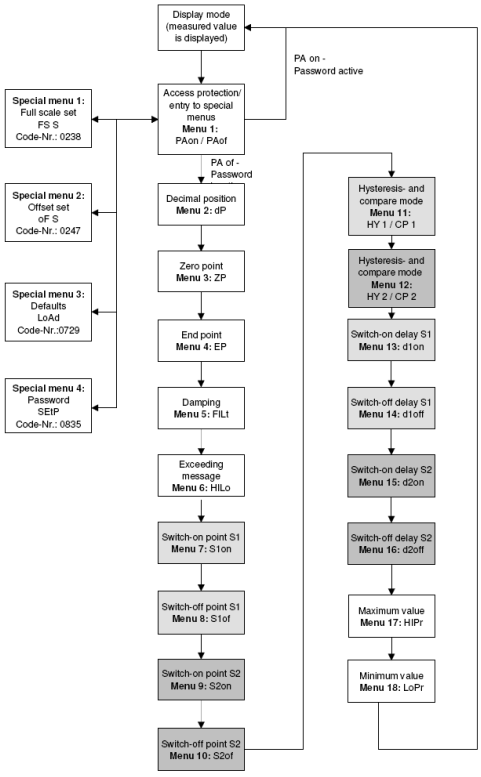


Fig. 5 hysteresis mode inverted

6.5. Structure of the menu system



6.6 Menu list

- ▲-button: move in the menu system (forward) or increase the displayed value
- ▼-button: move in the menu system (backward) or decrease the displayed value
- both buttons simultaneously: confirm the menu items and set values or change between display and configuration mode

☞ to increase the counting speed, when setting the values: keeping the respective button pushed for more than 5 seconds

Execution of configuration:

- set the desired menu item by pushing the ▲- or ▼-button
- activate the set menu item by pushing both buttons simultaneously
- set the desired value or select one of the offered settings by using the ▲- or ▼-button
- store the set value / selected setting and exit the menu by pushing both buttons simultaneously

PAon PAoF	**menu 1 – access protection** PAon ➔ password **active** ➔ to deactivate: set password PAof ➔ password **inactive** ➔ to activate: set password ☞ default setting for the password is "0005"; modification of the password is described in special menu 4
dP	**menu 2 – set decimal point position**
ZP EP	**menus 3 and 4 – set zero point / end point** **the device has been configured correctly before delivery, so a later setting of a 2-wire device is only necessary, if a differing displayed value is desired (e. g. 0 ... 100 %)**
FILt	**menu 5 – set damping** this function allows getting a constant display value although the measuring values may vary considerably; the time constant for a simulated low-pass filter can be set (0.3 up to 30 sec permissible)
HILo	**menu 6 – exceeding message** set "on" or "off"
S1on	**menus 7 and 9 – set switch-on points** set the particular values, for the activation of contact 1 (S1on) up to 2 (S2on)
S1oF	**menus 8 and 10 – set switch-off points** set the particular values, for the deactivation of contact 1 (S1oF) up to 2 (S2oF)
HY 1 CP 1	**menus 11 and 12 – select hysteresis or compare mode** select the hysteresis mode (HY 1 up to HY 2) or compare mode (CP 1 up to CP 2) for the contacts 1 up to 2 (no. corresponds to the contact) ☞ compare "6.4. Description of hysteresis and compare mode"
d1on	**menus 13 and 15 – set switch-on delay** set the particular value of the switch-on delay after reaching contact 1 (d1on) up to 2 (d2on) (0 up to 100 sec permissible)
d1oF	**menus 14 and 16 – set switch-of delay** set the particular value of the delay after reaching the switch-of point 1 (d1of) up to 2 (d2of) (0 up to 100 sec permissible)
HIPr LoPr	**menus 17 and 18 – maximum / minimum pressure display** view high pressure (HIPr) or low pressure (LoPr) during the measurement process (the value will not remain stored if the power supply is interrupted) ☞ to erase: push both buttons again within one second
special menus (to access a special menu, select the menu item "PAof" with the ▲- or ▼-button and confirm it; "1" appears in the display)	
FS S	**special menu 1 – full scale compensation** for full scale compensation, which is necessary if the indicated value for full scale differs from the real full scale value in the application (a compensation is only possible with a respective reference source, if the deviation of the measured value is within defined limits); set "0238"; confirm with both buttons; "FS S" will appear in the display; now it is necessary to place the device under pressure (the pressure must correspond to the end point of the pressure measuring range); push both buttons, to store the signal being emitted from the device as full scale; in the display the set end point will appear although the full scale sensor signal is displaced ☞ the analogue output signal (for devices with analogue output) is not affected by this change
oF S	**special menu 2 – offset compensation / position correction** set "0247"
LoAd	**special menu 3 – load defaults** set "0729"
SEtP	**special menu 4 – set password** set "0835"; confirm with both buttons; "SEtP" appears in the display; set the password using the ▲- or ▼-button (0 ... 9999 are permissible, the code numbers 0238, 0247, 0729, 0835 are exempt); confirm the password by pushing both buttons simultaneously

7. Placing out of service

⚠ WARNING! Disassemble the device only in current and pressure less condition!

8. Maintenance

⚠ DANGER! The operator is obligated to observe the information concerning operation and maintenance work on the warning signs possibly affixed to the device.

In principle, this device is maintenance-free. If desired, the housing of the device can be cleaned using a damp cloth and non-aggressive cleaning solutions, in switched-off state.

9. Service / Repair

Upon every return of the device, no matter if for recalibration, decalcification, modifications or repair, it is necessary to contact us to guarantee a quick execution of your request. Please inform us by sending an email to: return@bdsensors.de. Include the number of devices sent and request a RMA. Afterwards clean the device, pack it shatterproof and send it to BD SENSORS indicating the RMA.

10. Disposal

The device has to be disposed of according to the European Directives 2002/96/EG and 2003/108/EG (on waste electrical and electronic equipment). It is prohibited to place electrical and electronic equipment in domestic refuse!

11. Warranty conditions

The warranty conditions are subject to the legal warranty period of 24 months from the date of delivery. In case of improper use, modifications of or damages to the device, we do not accept warranty claims. Damaged diaphragms will also not be accepted. Furthermore, defects due to normal wear are not subject to warranty services.

12. 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/products/download/certificates.
Additionally, the operational safety is confirmed by the CE sign on the manufacturing label.