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Operating Manual

Pressure Transmitter for Shipbuilding and Offshore

EP 500

READ THOROUGHLY BEFORE USING THE DEVICE
KEEP FOR FUTURE REFERENCE

ID: BA_EP500_E | Version: 01.2024.0

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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.

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

Download this by accessing *www.bdsensors.de* or request it: info@bdsensors.de | phone: +49 (0) 92 35 / 98 11 0

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.

The pressure transmitter EP 500 has been designed for hard conditions especially in shipbuilding and offshore applications. EP 500 is intended for the pressure measurement of gauge or absolute pressure, depending on the ordered pressure range. A typical application is e. g. level measurement via air bubbling. EP 500 fulfils the requirements of DNV (Det Norske Veritas) as standard.

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. - 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
- 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.

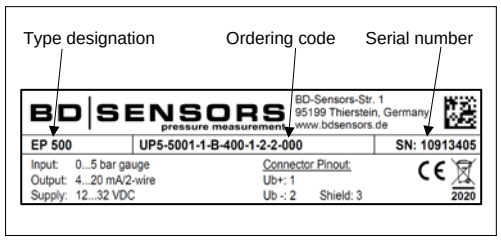


Fig. 1: Example of manufacturing label

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, in order 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/overpressure protection must additionally be provided!

NOTE - By factory, the device has an ingress protection of IP 00. Therefore, the mounting / installation has to be performed carefully. Additionally, the device has to be protected from the environmental effects by the installation in a ventilated housing, with a much higher ingress protection than the device. Check, if the desired ingress protection is sufficiently for your application. (recommendation: IP 65 at least)

NOTE - 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.

NOTE - 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.

NOTE - Provide a cooling line when using the device in steam piping and clarify the material compatibility.

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.

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!

3.2 Installation steps for tube nozzle ($p_N \leq 3$ bar)

Slip your flexible tubes (∅4 mm) onto the tube nozzles as far as possible.

3.3 Mounting steps for connection 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. (R_z 6.3)

1 Screw the suitable fitting onto the corresponding thread by hand.

2 Then tighten it using an open-end wrench. Permissible tightening torques for pressure transmitter: approx. 20 Nm

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!

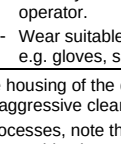
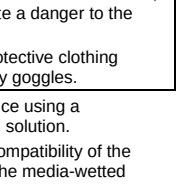
✓ The supply corresponds to protection class III (protective insulation).

NOTE - For the electrical connection a shielded and twisted multicore cable has to be used.

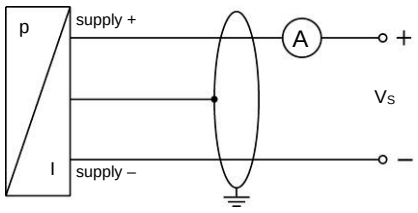
4.2 Electrical installation

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	Terminal clamps	M12x1 (8-pin), metal
Supply +1	1	-
Supply +2	-	4
Supply -	2	2
Tx	-	5
Rx	-	6
GND	-	7
NC	-	1
Shield	3	3
Figure		

Wiring diagram:



5. Function indication

A green SMD LED lights when the signal flows through the transmitter.

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. 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.

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.

8. Troubleshooting

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 9 up to 11)

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: 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 analogue input of your signal processing unit

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

Fault: shift of the output signal	
Possible cause	**Fault detection / remedy**
Diaphragm of senor is severely contaminated, calcified/crusted or damaged	send the device to BD|SENSORS for cleaning or repair

9. 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.

10. Service / repair

Information on service / repair:

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

10.1 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 furthermore high accuracy.

10.2 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.

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 request them:

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!

11. 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!

12. 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.

13. 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.de.

Additionally, the operational safety is confirmed by the CE sign on the manufacturing label.

Appendix:

The pressure transmitter EP 500 fulfils the requirements of
DNV (Det Norske Veritas) as standard.

The certificate is available for download on our homepage: *http://www.bdsensors.de*.

DNV

TYPE APPROVAL CERTIFICATE

Certificate No:
TAA00001GM
Revision No:
2

This is to certify:

That the Level Transmitter

with type designation(s)
LMK 457, DX14-LMK 457, LMK 458, DX14A-LMK 458, LMK 458H, DX15A-LMK 458H, EP 500, EP 500-500

Issued to
BD SENSORS GmbH
Thierstein, Germany

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

Application :

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

Location classes:

Type	Temperature	Humidity	Vibration	EMC	Enclosure
LMK 457, DX14-LMK 457, LMK 458, DX14A-LMK 458, LMK 458H, DX15A-LMK 458H	D	B	B	B	D
EP 500, EP 500-500	B	B	A	B	-

Issued at **Hamburg** on **2023-02-13**

This Certificate is valid until **2028-02-12**.
DNV local station: **Augsburg**

Approval Engineer: **Dariusz Lesniewski**

for **DNV**

DNV
Digitally Signed By: Papanuskas, Joannis
Location: DNV GL SE Hamburg, Germany

Joannis Papanuskas
Head of Section

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

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Note: