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The addresses of our overseas offices can be found at www.bdsensors.de. Data sheets, user manuals, ordering codes and certificates are also available for you to download from our website.

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1. General Information

1.1 Information concerning the user manual

Follow the safety and handling instructions that are set out in this user manual. Compliance with the applicable accident prevention regulations and safety regulations as well as with national installation standards and recognized codes of practice must also be ensured.

This user manual is part of the device and should be kept accessible to personnel at all times in the immediate vicinity of the installation location of the device.

– Subject to technical alteration –

1.2 Symbols used

	- Nature and source of danger - Measures to prevent danger
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Warning term	Meaning
	Immediate danger! Failure to observe will result in death or serious injury.
	Possible danger! Failure to observe may result in death or serious injury.
	Dangerous situation! Failure to observe may result in slight or moderate injury.

NOTE – Tips and information for the user in order to ensure trouble-free operation.

1.3 Qualification of personnel

Installation, commissioning, operation, maintenance, decommissioning and disposal may be carried out only by appropriately qualified specialist personnel.

Work on electrical components must be performed only by a qualified electrician and in accordance with the applicable regulations and guidelines.

1.4 Limitation of liability and warranty

Failure to follow the instructions or observe technical regulations, improper use or use of the device in a manner other than that intended, or alteration or damage to the device will void the warranty and invalidate claims for liability.

1.5 Intended use

- The battery powered digital gauge has been designed for extremely high demands in the sector of leak testing and pipeline monitoring. It can be easily and quickly installed in situ.
- It is in the responsibility of the user to verify whether the chosen device is suitable for the intended application. In case of any doubts, contact our sales department to eliminate any indistinctness. BD SENSORS does not assume any liability for an incorrect selection and its consequences!
- Permissible media are gases or liquids, which are compatible with the media wetted parts described in the data sheet. In addition it has to be ensured, that this medium is compatible with the media wetted parts.
- The technical data listed in the current data sheet are engaging. If the data sheet is not available, please order or download it from our homepage. (<http://www.bdsensors.com>)

	Danger of death through incorrect use - In order to avoid accidents, use the device only in accordance with its intended use.
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1.6 Package contents

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

The batteries are already used. The circuit is interrupted by an insulation foil. Take this before first introduction, see in addition battery change!

2. Product identification

The type plate serves to identify the device. The most important data can be taken from this. The order code is used for unique identification of your product.

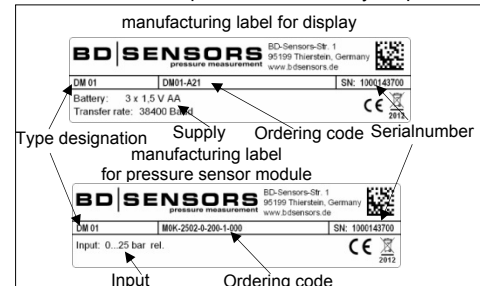


Fig. 1 Type plate

The manufacturing label must not be removed from the device!

3. Installation

3.1 Installation and safety instructions

	Danger of death from electric shock - Install the device only when the machine is depressurized and the power supply has been switched off!
	Danger of death from improper installation - Installation must be performed only by appropriately qualified specialist personnel who have read and understood the user manual.
	Destruction of the device with not material-appropriate use. - Do not use the display to tighten or solve to the mechanical connection of the pressure transmitter module!

Handle this electronic precision measuring device carefully in packed as well as in unpacked condition!

The device must not be subject to any changes or modifications.

The device may not be thrown!

To avoid damaging the diaphragm, remove packaging and protective cap only directly before starting up the device. A delivered protective cap must be stored!

Place the protective cap on the pressure port again immediately after disassembling.

Handle the unprotected diaphragm very carefully - it is very sensitive and may be easily damaged.

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

Take note that no inadmissibly high mechanical stresses occur at the pressure port as a result of the installation, since this may cause a shifting of the characteristic curve or to the damage. This is especially important for very small pressure ranges as well as for devices with a pressure port made of plastic.

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

Provide a cooling line when using the device in steam lines.

3.2 General installation instructions

- Carefully remove the device from its packaging and dispose of the packaging properly.
- Then proceed as described in the following installation instructions.

3.3 Installation instructions for DIN 3852 connectors

DO NOT USE ANY ADDITIONAL SEALING MATERIALS, SUCH AS YARN, HEMP OR TEFLON TAPE!

- Check to ensure the proper groove fitting of the o-ring and additionally to ensure no damage to the o-ring.
- Ensure that the sealing surface of the taking part is perfectly smooth and clean. (RZ 3.2)
- Screw the device into the corresponding thread by hand.
- If you have a device with a knurled ring, the transmitter has to be screwed in by hand only.
- Devices with a spanner flat have to be fully tightened with an open-end Devices (G1/4": approx. 5 Nm; G1/2": approx. 10 Nm).
- **The indicated tightening torques must not be exceeded!**

3.4 Installation instructions for EN 837 connectors

- Use a suitable seal that is compatible with the process medium and the pressure to be measured (e.g. a copper seal).
- Make sure that the sealing surface of the receiving part is perfectly clean and smooth. (Rz 6,3)
- Screw the device into the mounting thread by hand.
- Then tighten it with the open-end wrench (for G1/4": approx. 20 Nm; for G1/2": approx. 50 Nm).
- **The specified tightening torques must not be exceeded!**

3.5 Installation instructions for NPT connectors

- Additional seal materials, e.g. PTFE tape, may be used to provide sealing.
- Screw the device into the mounting thread by hand.
- Then tighten it with the open-end wrench (for 1/4" NPT: approx. 30 Nm; for 1/2" NPT: approx. 70 Nm).
- **The specified tightening torques must not be exceeded!**

4. Connection display with pressure transmitter module

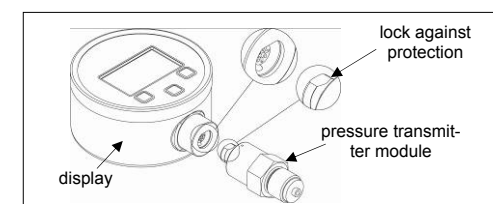


Fig. 2 Lock against protection

Connect display with pressure transmitter module as follows:

- bring together carefully the display with pressure transmitter module.
- press the display sturdy pressure transmitter module to this engages.

5. Supply / changing the batteries

As soon as in the display the announcement of "battery" is shown, carry out battery change as follows:

- unscrew three fixing screws with a suitable screwdriver.
- take the battery case cap and exchange the batteries 3 x 1.5 V AA (**remove the insulation foil before first introduction**).
- lock the device after that properly
- An incorrect usage may cause a leak out of batteries and so a damage the device!
- Never combine batteries of different types or old with new ones!
- Make sure that the batteries are connected correctly with the corresponding contacts in the battery tray.
- Never try to charge batteries, demount them, or short-circuit them.
- Keep the batteries away from heat and unshielded flame.

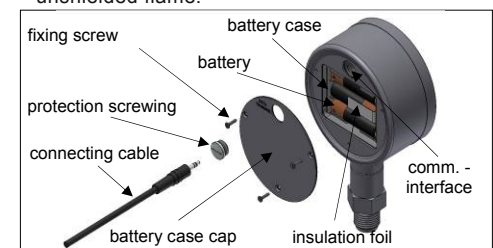


Fig. 3 Battery case cap and communication interface

6. Data logger

The battery powered digital gauge disposes of an integrated data logger. The measuring values stored away in the device can be selected above the communication interface by means of software BD|LOG (included in delivery).

6.1 PC - connection

- Connect device with a computer as follows:
- unscrew the protective screwing of the communication interface with a suitable slit screwdriver.
 - connect the handle plug of the connecting cable (included in delivery) with the interface socket of the device. Connect the side with the USB plug with a free USB connection on the computer.
 - install the COM driver and data logger software BD|LOG, receive available on CD (included in delivery).
 - after the use, disconnect the connection and lock the protection screwing again properly.

7. Initial start-up

- remove the insulation foil before first introduction.
- Before start-up, the user has to check for proper installation and for any visible defects.
- The device can be started and operated by authorized personnel only, who have read and understood the operating manual!!
- The device has to be used within the technical specifications, only (compare the data in the data sheet)!

8. Placing out of service

- When dismantling the device, it must always be done in the depressurized and currentless condition! Check also if the medium has to be drained off before dismantling!
- Depending on the medium, it may cause danger for the user. Comply therefore with adequate precautions for purification.

9. Operation

9.1 Operating and display elements

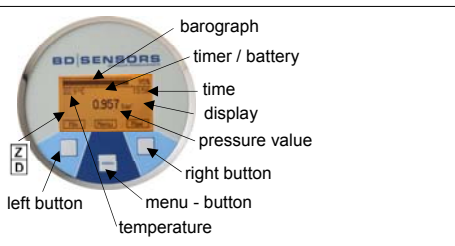
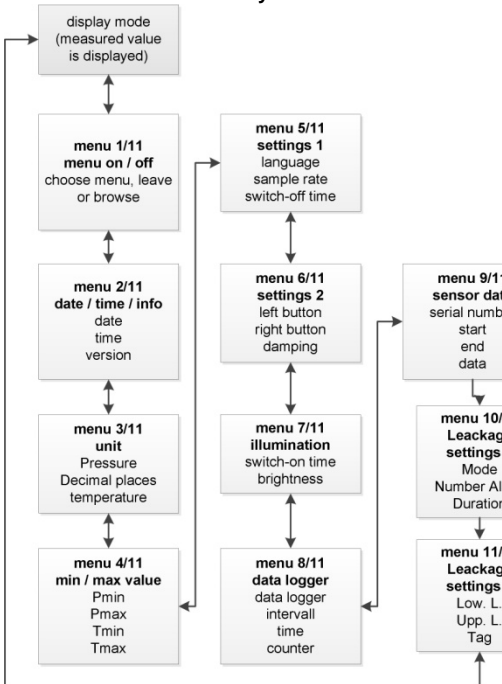


Fig. 4 Display and operating foil

The display of the measuring value as well as configuring the single parameters occurs menu-steered about a LC display capable of graphic arts. The single functions are regulated on the basis of three-front-sided arranged push buttons.

The menu system is closed, thereby one can "browse" forward as well as backward by the single setting menus to reach to the desired setting point.

9.2 Structure of the menu system



9.3 Menu list

Switch on	The device can be switched on with every button (left button, menu button, right button).
Menu 1/9 on / off	By push the menu button the operating mode will be selected / left / ("Menu" / "Exit").
Menu 2/9 date / time / info	Setting of topical time and the topical date. Software version will be showed.
Menu 3/9 Units	Setting of the pressure unit adjustable units: [bar], [mbar], [PSI], [inHg], [cmHg], [mmHg], [hPa], [kPa], [MPa], [mmH2O], [mH2O], [kg/cm ²] or [user] (the user-defined unit can be programmed only by means of the software BD[LOG], a conversation of all pressure related parameters is carried out automatically) Setting of decimal places adjustable decimal place: standard [Std], [+1], [+2] Setting of the temperature unit the unity is not adjustable. Factory setting [°C]
Menu 4/9 Min / Max Values	Displaying of Min / Max Values P _{min} - Minimum pressure display: The minimum pressure applied during measuring is shown in the display. P _{max} - Maximum pressure display: The maximum pressure applied during measuring is shown in the display. T _{min} - Minimum temperature display: The minimum temperature during measuring is shown in the display. T _{max} - Maximum temperature display: The maximum temperature applied during measuring is shown in the display. Possible options: reset value [Reset ?] (Resetting of a value: select the menu point with "Edit" → button ">>" operate. There appears the question "Reset?" → once more operate the button ">>". It seems "Sure?" additional confirmation whether the value should be put back → repeated confirming with the button ">>" takes over topically adjoining pressure as a minimum value.)
Menu 5/9 Configuration 1	Language: Setting of user languages German [DE] or English [EN] Measuring rate: here it is put how often the measurement is carried out and is indicated. Possible settings are: a measurement per second [1/sec] or two measurements per second [2/sec] Auto Off Time: Setting of the automatic switch off in minutes. The automatic switch off is able in steps from [1 min], [2 min], [3 min], [4 min] or [5 min]; 30 seconds before switching off the timer is activated and indicated in the display. By the option [Off] the device can be deactivated. After deactivation, the precision digital gauge is in the continuous operation.
Menu 6/9 Configuration 2	Button settings: left button / right button Left Button: function configurations: [Min], [Light], [Zero], [Reset] Right Button: function configurations: [Max], [Light], [Zero], [Reset] Function descriptions: - [Min] / [Max] minimum / maximum pressure value will be showed - [Light] the display backlight is activated - [Zero] the zero point is automatically put, in the display appears - [Reset] the opposed zero is put back, goes out Damping: the damping can be put in 1 second steps between [1 sec] and [10 sec] or be deactivated by option [Off]
Menu 7/9 Backlight	Backlight settings of display On Time: the backlight duration can be put in 1 second steps between [1 sec] and [10 sec] or be deactivated by option [Off] Brightness: the brightness can be put into 5% of steps between [0%] and [100%]
Menu 8/9 Data Logger	Data Logger configuration Data Logger: the following settings are possible: linearly [Linear] (value admission to the counter level 8500 is reached), cyclically ([Loop] (after the value is reached in 8500, the data logger automatically begins the values once more to grasp and, besides, headlines the old values) or [Off] (in the display appears if the data logger is activated and goes out if the data logger is off) Interval: Intervals to the memory of the measuring values (pressure / temperature) second [1-99 sec], minute [1-99 min], hour [1-99 hour] or day [1-99 days] Time: Measuring value admission: in which time the measuring value admission should occur (is only efficiently for the setting "daily"). Counter: Number of the grasped measuring values is indicated. Maximum value: 8500 (Put back counter reading: menu point with "Edit" select → button "Next" four times operate → button ">>" operate. There appears the question "Reset?" → once more operate the button ">>". It seems "Sure?" additional confirmation whether the value should be reset → repeated confirming with the button ">>" reset the grasped measuring values. Display announcement "Counter: 0/8500")
Menu 9/9 Sensor Data	[SN:] the standard number is indicated [Upper] Measuring area end [Lower] Measuring area beginning [Date] Production date
Menu 10/11 Leakage	Mode: Display on / off Number Values: Setting of the number of the measuring values [1...500] Duration: Information of the duration of the recording
Menu 11/11 Leakage	Low: Setting of the lower value of a measuring area Upp: Setting of the upper value of a measuring area Tag: Naming of the measuring point
Error	Display "No Sensor": display and pressure sensor module are separated.

- **Left Button:** if is a functional button and can be configured in the menu 6. Light-, Zero-, Reset- or Min- function can be assigned to the button. The configured function is active in the display mode. Hold the button during approx. 2 seconds to activate the function. In the operating mode you move in the menu system backward "<<" or you reduce the set value.
- **Right Button:** if is a functional button and can be configured in the menu 6. Light-, Zero-, Reset- or Max- function can be assigned to the button. Hold the button during approx. 2 seconds to activate the function. In the operating mode you move in the menu system forward ">>" or you raise the set value.
- **Menu-Button:** by pressure of this button "menu" you reach in the operating mode; moreover, she serves for the choice of the single menu points "Edit" or in the confirmation the opposed worth "Next".

To the configuration of the single menu points the desired menu point is to be put with the help of the left button "<<" or right button ">>". Confirm this afterwards with the menu button "Edit" the menu point is marked and the configuration can begin.

To store an opposed value the menu button "Next" must be also pressed. To leave the menu press the menu button so often to the mark of the single menu point and choose with the left button "<<" or right button ">>" the menu 1 and press the menu button once more "Exit". The operating mode will also leave after approx. 1 min automatically.

Changes become first after activity of the menu button "Next" and after abandonment of the menu point effective. With the abandonment of the whole menu system the opposed parameters are checked once again in dependence to each other and concerning the characteristics of the device. With the configuration of the unity a conversion of the measuring area occurs in the new unity only after abandonment of the menu system. According to pressure area not all units can be also used if necessary.

10. Maintenance

In principle, this device is maintenance-free. If desired, the housing of the device can be cleaned when switched of using a damp cloth and non-aggressive cleaning solutions. With certain media, however, the diaphragm may be polluted or coated with deposit. It is recommended to define corresponding service intervals for control. After placing the device out of service correctly, the diaphragm can usually be cleaned carefully with a non-aggressive cleaning solution and a soft brush or sponge. If the diaphragm is calcified, it is recommended to send the device to BD SENSORS for decalcification. Please read therefore the chapter "Repair" below.

A false cleaning of the device can cause an irreparable damage on the diaphragm. Therefore never use pointed objects or pressured air for cleaning the diaphragm.

11. Service / Repair

We recommend that the instrument is regularly recalibrated by BD SENSORS, with timeintervals of approx. 12 months. Before you return, the device 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 www.bdsensors.com.

Should you dispatch a device without a declaration of decontamination and if there are any doubts in our service department regarding the used medium, repair will not be started until an acceptable declaration is sent.

 Caution	Danger of injury from pollutants - If the device has come into contact with pollutants, wear suitable protective clothing, e.g. gloves, goggles, when cleaning it.
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12. Disposal

The device must be disposed of in accordance with European Directives 2002/96/EC and 2003/108/EC (Waste Electrical and Electronic Equipment). Waste electrical products may not be disposed of with household waste!

Depending on the medium used, residues on the device may constitute a hazard to the environment. You should therefore take appropriate precautions if necessary and dispose of the device properly.

13. Guarantee Conditions

The guarantee conditions are subject to the statutory warranty period of 24 months, starting from the date of dispatch. No warranty claims will be accepted if the device has been used improperly, modified or damaged. The warranty does not cover damaged diaphragms. Warranty cover also excludes any claims for defects that have arisen as a result of normal wear.

14. Declaration of Conformity / CE

The supplied device fulfills the statutory requirements. The relevant directives, harmonized standards and documents are listed in the EU Declaration of Conformity applicable to the product. This can be found at <http://www.bdsensors.de>. In addition, the operational safety of the device is confirmed by the CE mark on the type plate.