

Operating Manual

Digital Gauge DM 10, DM 17



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

ID: BA_DM1X_E | Version: 03.2022.0

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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 the data sheet 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

	- 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.
	- Possible danger! - Non-compliance may result in death or serious injury.
	- 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.
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All work with this product must be carried out by qualified persons!

1.3 Intended use

The battery powered digital pressure gauge DM 1X has been designed for applications in hydraulics and pneumatics as well as for mechanical engineering. It can be easily and quickly installed in situ.

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) 9235 9811 0). BD|SENSORS assumes no liability for any wrong selection and the consequences thereof!

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.

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 Incorrect use

	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.
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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:

- digital gauge
- this operating manual

1.8 UL approval (for devices with UL marking)

The UL approval was affected 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 use
- maximum operating voltage: see technical data
- use only batteries with UL certification

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.

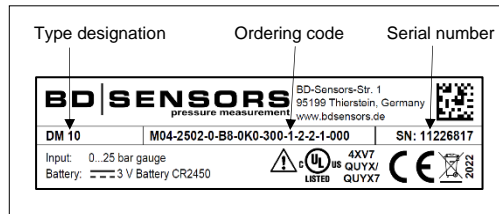


Fig. 1 Example of manufacturing label

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 condition!
	WARNING - Danger of death from improper installation - This device may only be installed by qualified technical personnel who has read and understood the operating manual! - Do not use the display to tighten or solve to the mechanical connection!

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

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

NOTE - The device may not be thrown!

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

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

NOTE - Never use the display as a mounting / dismantling aid, otherwise the device or the plug-in connections will be irreparably damaged. For mounting or dismantling the device, only use the hexagon on the pressure port.

NOTE - 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.

NOTE - The permissible tightening torque depends on the conditions on site (material and geometry of the mounting point). The specified tightening torques for the device must not be exceeded!

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

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

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 device. There are specially protected pressure measuring devices for these operating conditions. Please contact us in such case.
- Select the mounting position such that splashed and condensed water can drain off. Stationary liquid on sealing surfaces must be excluded!
- 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 oxygen applications

	DANGER - Danger of death from explosion - when used improperly
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Make sure that your device was ordered for oxygen applications and delivered accordingly. (see manufacturing label - ordering code ends with the numbers "007")

Unpack the device directly prior to the installation.

Skin contact during unpacking and installation must be avoided to prevent fatty residues remaining on the device. Wear safety gloves!

The entire system must meet the requirements of BAM (DIN 19247)!

For oxygen applications > 25 bar, devices without seals are recommended.

Device with o-rings of FKM (Vi 567): permissible maximum values: 25 bar / 150° C (BAM approval)

3.3 Mounting steps for connections according to DIN 3852

NOTE - Do not use any additional sealing material such as yarn, 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. Permissible tightening torques for digital gauge:
G1/4": approx. 5 Nm
G1/2": approx. 10 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. Permissible tightening torques for digital gauge:
G1/4": approx. 20 Nm
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. Permissible tightening torques for digital gauge:
1/4" NPT: approx. 30 Nm
1/2" NPT: approx. 70 Nm

3.6 Mounting steps for 7/16"-20 UNF (DM 17)

NOTE - Do not use any additional sealing material such as yarn, hemp, or Teflon tape!

- 1 Screw the device into the corresponding thread by hand.
- 2 Tighten it with a wrench. Permissible tightening torques for digital gauge:
approx. 20 Nm

3.7 Positioning of the display module

The display module of the pressure gauge is rotatable so that clear readability is guaranteed even on unusual installation positions.



Fig. 2 Rotatability

4. Supply / changing the battery

The digital pressure gauge is supplied by a 3 V lithium-battery (type CR 2450). Stored values / parameters are also kept after changing the battery.

As soon as in the display the announcement of "battery" is shown, a battery change is necessary. This has only to be done in switched-off condition.

The battery case is located in the removable display of the digital pressure gauge DM 10 / DM 17.

To change the battery go ahead as follows:

- 1 Remove the cap and change the battery.
- 2 Make sure that the wires are not damaged when changing the battery. Prevent twisting as well as tensile stress.
- 3 Cap and the housing are sealed by an o-ring 55x1.5. Check the sealing surfaces - these must be clean and free of scratches. Make sure that the o-ring is seated in the designated groove in the cap and is not squeezed.
- 4 Lock the device after that properly.



Fig. 3 battery case

NOTE - An incorrect usage may cause a leak out of batteries and so a damage the device!

NOTE - Only use a battery of type CR 2450.

NOTE - Make sure that the battery is connected correctly with the corresponding contacts in the battery tray.

NOTE - Never try to charge battery, demount or short-circuit it.

NOTE - Use only batteries with UL certification.

NOTE - Keep the battery away from heat and unshielded flame.

5. Commissioning

- ✓ The device has been installed properly.
- ✓ The device does not have any visible defect.
- ✓ The device is operated within the specification (according to the data sheet).

6. Operation

6.1 Operating and display elements

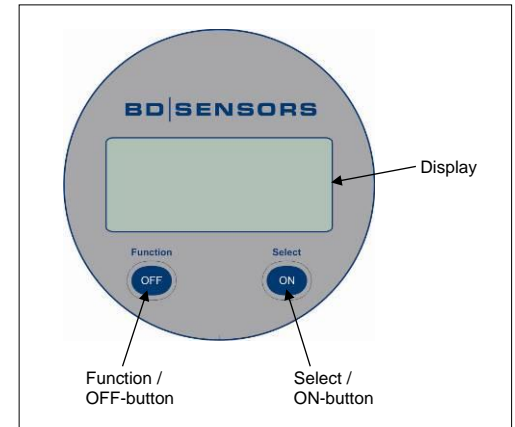


Fig. 4 Touch pad

Select / ON-button:

- switch-on of the device
- choosing of the pressure units
- calibration of starting point
- configuration of the switch-off automatic

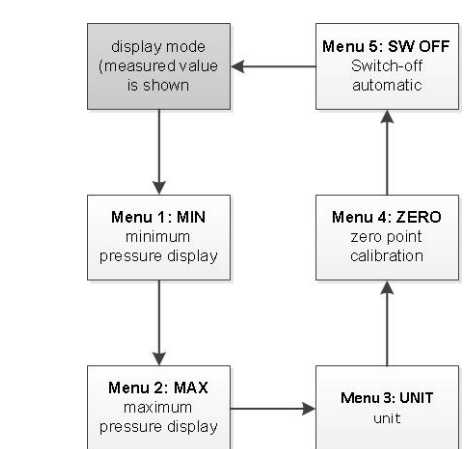
Function / OFF-button:

- switch-off of the device
- scrolling in the menu system

The indication of the measured value as well as the configuration of the individual parameters occurs menu-driven via the LC display. The individual functions can be set with the help of two miniature push buttons located in the front.

The menu system is a closed system allowing you to scroll forward 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 a battery change.

6.2 Structure of the menu system



6.3 Menu list

1 MIN	Minimum pressure display The minimum pressure during the measurement process will be shown in the display. To delete the stored value push the Select/ON-button. It appears SEt in the display, the value has been recessed.
2 MAX	Maximum pressure display The maximum pressure during the measurement process will be shown in the display. To delete the stored value push the Select/ON-button. It appears SEt in the display, the value has been recessed.
3 UNIT	Setting of the pressure unit Possible units are: bar, mbar, psi, MPa, mH ₂ O The desired unit may be selected and activated with the Select/ON-button. Depending on the nominal pressure range and the accuracy of the device, perhaps not all available units could be used.
4 ZERO	Zero point If you detect a shifting of the measured value deviating from the offset, the display can be re-calibrated via pushing the Select/ON-button. The display shows SEt , the value has been recessed. Differs the zero point from the ambient pressure, it is a pressure reference necessary.
5 SW OFF	Configuration of the switch-off automatic The desired switch-off automatic may be selected through the Select/ON-button. Allocation of the programmable values: "0": switch-off automatic is not active "1" - "5": switch-off automatic after 1 up to 5 minutes

The menu system will be leaved automatically after 10 seconds; the last sett value has been saved. If you scroll all menu points you will leave the menu system after **SW OFF**.

After configuring the unit, the conversion of the pressure range into the new unit will only occur after leaving the menu system. Depending on the pressure range, probably not all available units can be used.

