

Taishio

TSDPG-LABMM2

TAISHIO HIGH ACCURACY DIGITAL PRESSURE GAUGE



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TAISHIO holds the right to make any change when necessary, without notice.

The data contained in this manual are just indicative and the manufacturer declines any responsibility for errors or discrepancies with respect to this manual.



In the following pages are identified sensitive transactions and possible sources of risk to the user or to the instrument with the following symbol

1. IDENTIFICATION

The identification takes place with the product name and manufacturer on the front panel of the instrument. The nominal flow rate and the serial number is marked at the LASER on the switch body. Sticker on the back shows the technical characteristics, the CE mark and the symbol of the disposal, and installed options.

2. USES NON PERMITTED



Environments with explosive atmosphere.

Environments with inflammable or corrosive gas.

3. DISPOSAL



The instrument is a professional apparatus compliant to the Directives 2011/65/UE (RoHS) and 2012/19/CE (RAEE/WEEE), then it must be disposed separately as electric and electronic waste. In different countries of European Community, it must be disposed as waste electric and electronic in accord to the laws of the country where the device is commercialized.

Before to remove the instrument, you disconnect first the power supply and after the cables.

The manometer does not contain batteries

4. TRANSPORT

The components are electronic.

In the case of transport packaging to the instrument.

Beware of strong shocks and moisture.

We recommend using the briefcase that can be purchased separately, see chapter accessories.

5. INTRODUCTION AND FIELD OF APPLICATION

LABDMM2 is a professional digital pressure gauge made according to the most modern technologies to guarantee a high level of reliability, versatility and practicality at the same time.

The sturdiness and a high stability over time are guaranteed by a monolithic sensor made entirely of stainless steel capable of working even in the presence of highly dynamic pressures, and by a robust housing made of painted aluminum.

Designed to be used in metrological laboratories, calibration systems, automation in general and process controls where it is necessary to monitor, record and transmit data.

During the production cycle the pressure gauge is calibrated and **Accredited** certified for the **PRESSURE** measurement to guarantee a measurement uncertainty better than 0.05% in 28 different pressure ranges, **RELATIVE, ABSOLUTE** and in **VACUUM**.

With this instrument it is possible to simultaneously measure the **PRESSURE** generated by air, gas, oil, water or any other type of non-corrosive fluid and the **TEMPERATURE** of the fluid that generates the pressure.

The pressure gauge is powered by an internal rechargeable Li-ion battery with up to 50 hours of continuous operation (without backlight). To recharge the battery you can use the USB port with a 5Vdc power supply or by connecting it directly to the PC.

For continuous operation it is possible to keep the manometer powered by the USB port or for industrial applications, it is possible to provide an external supply from 12 to 24 Vdc (option).

In the programming menu accessible from the keyboard it is possible to customize the behavior of the pressure gauge by adjusting various functions such as the **DIGITAL FILTER**, which allows to keep the measurement stable even in the presence of unsteady pressures, resolution, unit of measurement, Auto power off etc ...

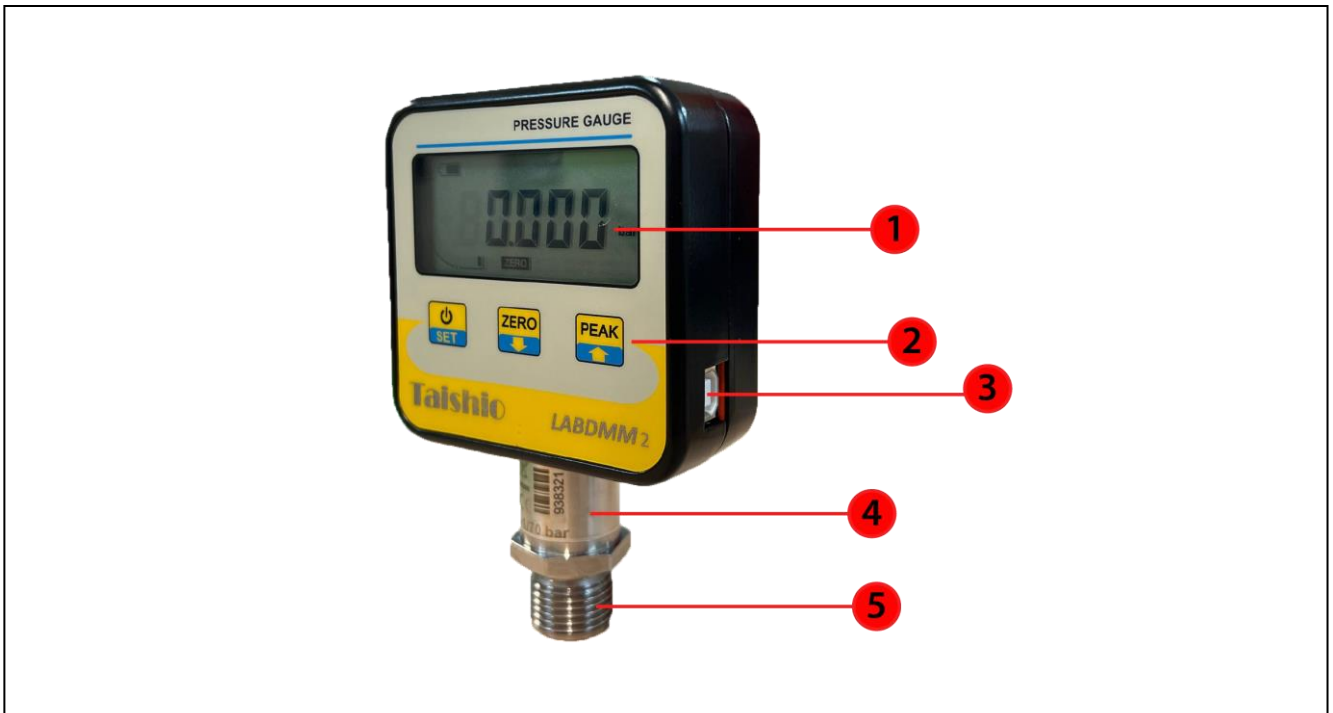
Using the keyboard it is possible to set the positive and negative **PEAK** function to record the maximum and minimum pressures detected during the test.

On the display there is an analogue indication with pressure bar always active even within the programming menu.

Main features:

- Normalized pressures from 100 mbar to 3000 bar **ABSOLUTE, RELATIVE** and **VACUUM**.
- **TEMPERATURE** measurement in ° C or ° F.
- 5-digit LCD display with backlight.
- Resolution, digital filter, conversions in units of measurement.
- Functions of **ZERO, PEAK max. and min.**
- **KEY LOCK** function to protect the use parameters from unauthorized changes.
- **LOOP** function in which the measurement of pressure and temperature are alternated on the display.

6. PART IDENTIFICATION



LCD DISPLAY



- 1) 5-digit digital display.
- 2) Keyboard with 3 function keys.
- 3) USB port for power supply, battery charger and data transmission.
- 4) Nominal flow rate expressed in bar and serial number.
- 5) Process connection 1/2 Gas MALE for ABSOLUTE and RELATIVE pressures.

7. TECHNICAL DATA

ACCURACY (linearity and hysteresis)	0,05 % F.S.
RELATIVE PRESSURE (R) Zero at atmospheric pressure.	-1 ... 40 bar -1 ... 70 bar 0 ... 700 bar
PRESSURE UNITS	bar – mbar – psi – Mpa – kPa – kg/cm ₂ – mHg mmHg – mmH ₂ O – mH ₂ O
TEMPERATURE INDICATION a) Resolution b) Accuracy REFERENCE TEMPERATURE OPERATING TEMPERATURE RELATIVE HUMIDITY	Unit °C / °F 0.1 °C 1 °C 0 ... +50 °C -10 ... +60 °C < 90 % not condensed
TEMPERATURE EFFECT (1 °C) a) on zero b) on sensitivity	0,002% 0,002%
DISPLAY HEIGHT	13 mm
RESOLUTION FUNCTION DIGITAL FILTER FUNCTION ZERO FUNCTION PEAK FUNCTION LOOP FUNCTION LOCK (LOC)	1, 2, 5, 10 from 0 to 5 100 % F.S. Positive / Negative (VACUUM) Switch between pressure and temperature To protect parameters change
COMMUNICATION PORT	USB 2.0
PROCESS COUPLING	1/2" G Male
PROTECTION CLASS (EN 60529) MATERIAL SENSOR CONTAINER MATERIAL	IP40 INOX 17-4 PH ALUMINUM
POWER SUPPLY Autonomy Battery recharge	1 Li-ion Battery 3.6V 1800mA/h 50 hours continuous FROM USB port (5Vdc)
MECHANICAL LIMIT VALUES a) service pressure b) limit pressure c) breaking pressure d) highly dynamic pressure	100 % F.S. 150 % F.S. >300 % F.S. 75 % F.S.



(1) In case of non-use or prolonged storage, we recommend recharging the battery at least once a month to prevent the battery from discharging completely

8. ACCESSORIES

Accessories supplied:

Shock resistant silicone COVER.
 USB power supply (5VDC @ 700mA)
 USB cable.
 CASE for transport.
 CD containing MANUAL and USB DRIVER.
 ½ BSPF x 3/8 BSPM
 Teflon Seal



9. STANDARD Indications

	Full Scale	Display	Resolution	Display	Resolution	Display	Resolution	Display	Resolution
TYPE ⁽¹⁾	bar	bar	bar	mbar	mbar	psi	psi	MPa	MPa
R	50	50.000	0.005	50000	5	725.00	0.10	5.0000	0.0005
R	100	100.00	0.01	99900	10	1450.0	0.2	10.000	0.001
R	700	700.00	0.05	99900	50	10000	0.2	70.000	0.005

⁽¹⁾R = Relative

10. SAFETY WARNINGS

The installation and maintenance of the product must be made only by trained personnel and after reading this manual.

It will also be observed all safety standards under current legislation in the country where it will be installed. The pressure gauge must not be used for purposes other than those indicated in the "Field of Application": otherwise TAISHIO disclaims any liability.


In particular it is noted that the product supplied is not a safety device.


TAISHIO in the design has taken every precaution to minimize the risk to your safety, but recommends that responsible for installing the analysis and removal of any residual risks. Remember that the safe use of the product requires its complete integrity: why should be paid attention to the transportation and storage.



In the following pages are identified tricky operations and / or possible sources of risk to the user or equipment with the symbol by side.

11. SWITCH ON and OFF the MANOMETER

The instrument switches on using the key 

To switch off, press the key for at least 5 seconds 

The instrument at power up

- Performs the display check (TEST).
- Displays the software release for about 1 second.
- Displays the nominal full scale.
- Switch to the display of the pressure measurement.

12. ALERT MESSAGES



With the message **UUUUU**, the instrument indicates that a **PRESSURE** greater than 150% of the pressure gauge has been generated.

With the **LLLLL** message the instrument indicates that a **VACUUM** of more than 150% full scale has been generated.

Should one of these messages occur, immediately report the atmospheric pressure gauge (zero pressure).

After an **OVERLOAD** check that the instrument calibration is not altered.

If the message remains constant, contact the manufacturer for possible sensor damage.

With the **HHHHH** message, the instrument signals that it can not display the measurement with the selected unit.

The indication exceeds the numeric limit of the 99999 display: Change the unit of measurement.

13. KEYS DESCRIPTION



Switch the manometer ON.

Keep pressed for 3 seconds gives access to the Parameter Menu

Keep pressed for 5 seconds switch the manometer OFF.

If enabled, each time the key is pressed (for a short time), the display back Light is activated for the time that has been set in the Parameter Menu.



During the measurement, if pressed for 3 seconds, it performs the ZERO of the display, the ZERO has no effect on the graphical pressure bar indication.

During the measurement, pressed for 5 seconds, disables the ZERO function showing the pressure gauge offset.

In Peak Mode, reset the measured peak value.

In the parameter menu, decrease (↓) the value on the display



During the measurement, pressed for **2 seconds**, activates the **Peak +** function (indicates the highest pressure detected after its activation).

During the measurement, pressed for **4 seconds**, activates the **Peak -** function (indicates the lowest pressure detected after its activation)..

During the measurement, pressed for **6 seconds**, displays the **TEMPERATURE**, to return to pressure press the button again.

Within the parameter menu, increase (↑) the value on the display.

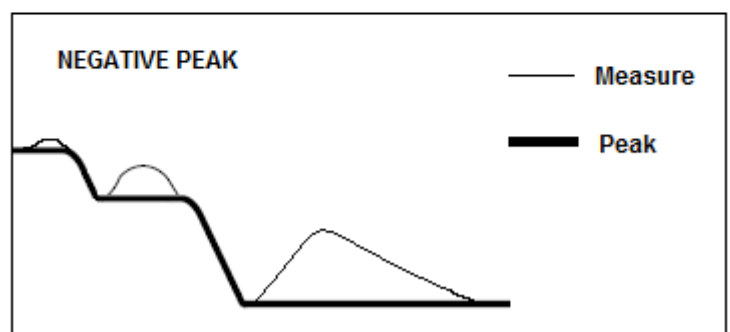
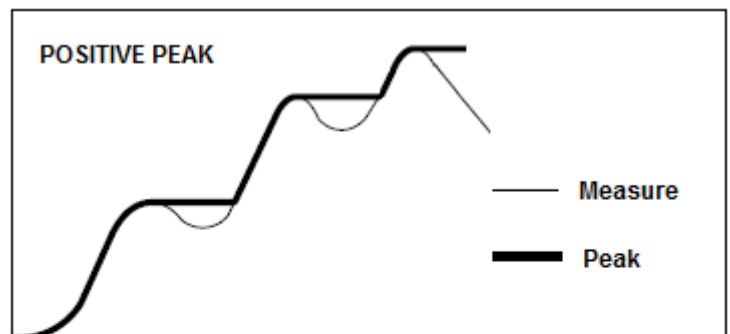
14. PEAK FUNCTION

The **PEAK** function is used to maintain the displayed value of positive or negative pressure peaks on the display.

Pressing the **PEAK** button enables the function.

The function is deactivated by pressing the **PEAK** button again, entering the main menu or when the manometer is turned off.

The **PEAK** values can be reset manually using the **ZERO** key.








15. PARAMETER MENU

To enter the Parameter Menu keep the **SET** key pressed for about 3 seconds, until the writing **Unit** appears.

Unit	<p>PRESSURE UNIT SELECTION In this step it is possible to change the pressure unit of measurement. Select the unit using the ↓ and ↑ keys. Confirm with SET to go to the next parameter.</p>
FL XX	<p>DIGITAL FILTER In this step it is possible to vary the DIGITAL FILTER effect by pressing the ↓ and ↑ keys. Increasing the XX value increases the filter effect, allowing the user to detect the mean value of unstable or pulsating measurements. The selectable values are from 0 to 5. Confirm with SET to go to the next parameter.</p>
r XX	<p>RESOLUTION In this step it is possible to program the RESOLUTION with which the instrument displays the output. Selectable values 1, 2, 5 and 10. Modify the parameter using the ↓ and ↑ keys.</p>
LOOPX	<p>The LOOP function allows you to view both pressure and temperature. By setting X=1, the LOOP function is activated. On the measurement page every 30 seconds the pressure and temperature will be displayed alternately. By setting X=0, the function is deactivated Modify the parameter using the ↓ and ↑ keys. Confirm with SET to go to the next parameter.</p>
oFFXX	<p>AUTO POWER OFF TIME Defines the number of minutes (from 1 to 90) before the automatic switch-off in case of constant pressure. The power off time starts working if the pressure gauge does not detect pressure variations greater than 10% of the full scale. Modify the parameter using the ↓ and ↑ keys. Confirm with SET to go to the next parameter.</p>
Lt XX	<p>BACKLIGHT ACTIVATION TIME This parameter defines the switching on time of the backlight activated when the SET key is pressed for a short time. The time can be set between 1s and 99s. By setting 0, the backlight is turned off. Activating the backlight will result in higher battery consumption, so it is better to deactivate the function when it is not used.</p>

16. KEY LOCK FUNCTION

The key lock function can prevent unauthorized personnel from modifying any parameters without authorization.

  	<p>Press the keys simultaneously for a few seconds SET and PEAK.</p>
<p>P0000</p>	<p>Set the password 0301 () to confirm with SET.</p>
<p>LOC X</p>	<p>LOC X will appear. Selecting X=0 the function is disabled. Selecting X=1 the function is enabled.</p> <p><small>Note: Repeat the step "P0000" then select X=1 to enabled</small></p>
	<p>This function prevents unauthorized personnel from changing the configuration of the instrument. The SET keys to access the parameter menu, the ZERO key and the PEAK key are disabled.</p>









When the function is enabled, the icon is shown on the display



17. TEMPERATURE DISPLAY UNIT

The temperature display unit can be °C or °F.

  	<p>Press the keys simultaneously for a few seconds SET and PEAK.</p>
<p>P0000</p>	<p>Set the password 0033 () to confirm with SET.</p>
<p>Unit</p>	<p>Switch the temperature unit using the keys  and  . Confirm your choice with SET.</p>

18. RECHARGE AND SUBSTITUTION OF THE BATTERY

The pressure gauge is powered by one 3.6V 1800mAh RECHARGEABLE Li-Ion battery that guarantees long battery life and a large number of recharges.

The battery level is signaled by an icon with an indication of the state of charge on 3 levels.

During the charging phase the battery icon will indicate this status with the usual variable indication.

The charging time can last up to about 8 hours. When the charging phase is finished, the battery icon will be displayed fixed.



BATTERY COMPLETELY DISCHARGE: Measurements made in this state may be altered, therefore an immediate recharge of the batteries is required.






BATTERY COMPLETELY CHARGED.

Should it be necessary, it is possible to replace the battery with an exact equivalent.

Ask **TAISHIO** for the replacement battery.

Battery replacement is very simple. Simply remove the 2 screws on the rear panel, remove the exhausted battery and insert the new battery by connecting the dedicated connector.

You can check the voltage in Volts of the battery in the following way (remember that with a fully charged battery you will have 4.2V while for low battery you mean a value below 3.5V):

 + 	Press the keys simultaneously for a few seconds SET and PEAK .
P0000	Set the password password 0055 () and confirm with SET .
3.723	The value in Volt of the battery level will be displayed. Press SET to exit the function and return to the pressure measurement



In case of non-use or prolonged storage, we recommend recharging the battery at least once a month to prevent the battery from discharging completely

19. PRESSURE CALIBRATION



ATTENTION: the incorrect execution of this procedure can make the following measurements unreliable.

This procedure is reported in this manual only as documentation, but must be performed only by authorized calibration centers and in case of actual need.

TAISHIO decline all responsibility for measurement errors or malfunctions that may result from incorrectly performed adjustments

The instrument is supplied calibrated, but if a calibration deviation is noticed over time during the periodic calibration, it is possible to correct the reading error.

The reading error is adjusted by modifying the gain factor (default 1.0000).




If the reading is higher than the reference, the gain must be reduced.

If the reading is lower than the reference, the gain must be increased.

The pressure gauge manages 2 independent gains: positive gain for the **PRESSURE** measurements and the negative gain for the **VACUUM** measurements.



The correction must be performed by evaluating the reading error on a pressure higher than 75% of the full scale measured by a reference sample with **uncertainty ≤0.020%**

  	Press the keys simultaneously for a few seconds SET and PEAK .
P0000	Set the password 8888 (↑↓) and confirm with SET .
GAI_nP X.XXXX	Positive Gain for the PRESSURE , confirm with SET . Modify the value with the keys ↑↓ and confirm with.
GAI_nn X.XXXX	Negative Gain for the VACUUM , confirm with SET . Modify the value with the keys ↑↓ and confirm with.
End	End of the procedure.

Example: Pressure gauge with nominal capacity of 5 bar

REFERENCE pressure 5.0000 bar, pressure MEASURED 5.0010 bar

Calculate the gain with following formula:

$$\text{Gain} = \frac{\text{REFERENCE pressure } 5.0000}{\text{MEASURED pressure } 5.0010} = \dots = 0.9998$$



Programmable gain value : from 0.7500 to 1.500

To reset the gain to the factory value, set the value to **1.0000**

For a better accuracy, calibrate in **PRESSURE** and **VACUUM**.

If you do not calibrate the **VACUUM**, set the same value for both the **PRESSURE** and **VACUUM**.







20. TEMPERATURE CALIBRATION

The pressure gauge has an internal temperature sensor with an accuracy of 1 ° C and a resolution of 0.1 ° C.

If the temperature reading does not fall within the specifications or if you want to improve this performance, it is possible to calibrate the sensor.

Calibration of the temperature sensor is performed at two different temperature points.

The first point at room temperature (**t1**) the second at a temperature of about 40 or 50 degrees ° C (**t2**).




  	<p>Press the keys simultaneously for a few seconds SET and PEAK.</p>
<p>P0000</p>	<p>Set the password 3126 () and confirm with SET.</p>
<p>t1</p>	<p>The message t1 will be displayed to indicate that the room temperature can be calibrated. Confirm with SET.</p>
<p>25.3 °C</p>	<p>The display shows the temperature read by the pressure gauge. With a reference thermometer, measure the ambient temperature. Correct the value displayed with the  keys until it is the same as the reference measurement. Confirm with SET.</p>
<p>t2</p>	<p>The message t2 will be displayed to indicate that the second temperature point can be calibrated. Bring the pressure gauge to the desired temperature and wait until the system is stabilized. Confirm with SET.</p>
<p>51.3 °C</p>	<p>The display shows the temperature read by the pressure gauge. With a reference thermometer measure the temperature of the chamber. Correct the value displayed with the  keys until it is the same as the reference measurement. Confirm with SET.</p>
<p>End</p>	<p>The procedure is complete.</p>

In the event that problems should arise in the calibration procedure, it is possible to return to the factory calibration using the password **3125**.

21. CALIBRATION OF THE ATMOSPHERIC PRESSURE



This calibration can only be performed only for **ABSOLUTE** manometers.

 + 	Press the keys simultaneously for a few seconds SET and PEAK .
P0000	Set the password 0022 () and confirm with SET .
1.0000	In this phase it is possible to enter the value of the atmospheric pressure. The last stored calibration atmospheric pressure value (in bar) will be displayed. It is recommended to refer to a reliable detection, in order not to invalidate the reading with an incorrect value. Press SET to exit the function and return to the pressure measurement

 **WARNING** 

The calibration procedures are reported in this manual only as documentation and must be performed only by authorized calibration centers and in case of actual need.

The incorrect alteration of these parameters will make the following measurements unreliable.

TAISHIO declines all responsibility for measurement errors or malfunctions that may result from incorrectly performed adjustment

