



Manometer

(Over- /Under- And Difference Pressure)

Operating Manual

GDH 200-13



Made in
Germany

WEEE-Reg.-No. DE93889386

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1 General Note

Read this document carefully and get used to the operation of the device before you use it. Keep this document within easy reach near the device for consulting in case of doubt.

Mounting, start-up, operating, maintenance and removing from operation must be done by qualified, specially trained staff that have carefully read and understood this manual before starting any work.

The manufacturer will assume no liability or warranty in case of usage for other purpose than the intended one, ignoring this manual, operating by unqualified staff as well as unauthorized modifications to the device.

The manufacturer is not liable for any costs or damages incurred at the user or third parties because of the usage or application of this device, in particular in case of improper use of the device, misuse or malfunction of the connection or of the device.

The manufacturer is not liable for misprints.

2 Safety

2.1 Intended Use

The safety requirements (see below) have to be observed.

The device must be used only according to its intended purpose and under suitable conditions.

Use the device carefully and according to its technical data (do not throw it, strike it, ...)
Protect the device from dirt.

2.2 Safety signs and symbols

Warnings are labelled in this document with the followings signs:



Caution! This symbol warns of imminent danger, death, serious injuries and significant damage to property at non-observance.



Attention! This symbol warns of possible dangers or dangerous situations which can provoke damage to the device or environment at non-observance.






Note! This symbol point out processes which can indirectly influence operation or provoke unforeseen reactions at non-observance.

2.3 Safety guidelines

This device has been designed and tested in accordance with the safety regulations for electronic devices. However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under "Specification".
If the device is transported from a cold to a warm environment, condensation may cause in a failure of the function. In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.

2.  This device must not be used at potentially explosive areas! The usage of this device at potentially explosive areas increases danger of deflagration, explosion or fire due to sparking.
3.  If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.
Operator safety may be at risk if:
 - there is visible damage to the device
 - the device is not working as specified
 - the device has been stored under unsuitable conditions for a longer time.
 In case of doubt, please return device to manufacturer for repair or maintenance.
4.  Do not use these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury or material damage.
Failure to comply with these instructions could result in death or serious injury and material damage.

3 Product Specification

3.1 Scope of supply

The scope of supply includes:

- Device, incl. 9V battery block
- Operation manual

3.2 Operation and maintenance advice

- **Battery operation:**

If the symbol "BAT" is displayed at the left side of display, the battery is weak, measuring can be continued for a certain time.

If "bAt" is displayed in the main display the battery is used up and needs to be replaced. Measuring is no more possible.



The battery has to be taken out, when storing device above 50 °C.

We recommend taking out battery if device is not used for a longer period of time.

4 Configuration of the Device

To configure the instrument proceed like follows:

1. Switch off the instrument.
2. Press the 'Mode' key while switching on the instrument, keep 'Mode' key pressed until 'P.oF' appears (after about 3 seconds).

Auto Power Off Time „P.oF“

The auto power off time is entered in minutes. If no key is pressed during a measuring, the instrument switches itself off automatically after the entered period of time.

3. Press 'up' or 'down' key, the currently selected power off time will be displayed (off, 1..120min)
4. Enter the desired time by pressing 'up' or 'down' key. **(factory setting: 20)**

Possible input:	off:	The auto power off function is deactivated (permanent operation)
	1...120:	auto power off time in minutes.
5. Confirm the value by pressing left key, 'Uni' appears in the display

Display Unit „Uni“

6. Press 'up' or 'down' key, the currently selected unit will be displayed:
mbar = hPascal ('hPA'), mmHg ('nHG'), PSI ('PSI') or Pascal ('PA')
7. Enter the desired unit by pressing 'up' or 'down' key. **(factory setting: hPa)**
8. Confirm the value by pressing left key, 'dyn' appears in the display

Measuring static / fast varying pressures "dyn" (= dynamic)

9. Press 'up' or 'down' key, the currently selected measuring mode will be displayed
(see chapter 5: "The Pressure Measuring")
 - dyn = off: standard measuring of static pressures, optimum battery life
 - dyn = on: measuring of dynamic pressures
10. Enter the desired mode by pressing 'up' or 'down' key. **(factory setting: off)**
11. Confirm with left key: values will be stored, the instrument will restart (segment test). End of configuration.

Please note: If during the configuration no key is pressed within 60 seconds, the configuration will be aborted. Eventually made changes won't be stored!

5 The Pressure Measuring

The device measures the **difference pressure** between the two pressure ports:

("+" = higher pressure, "-" = lower pressure)

An automatic zero point adjustment is performed, when switching on the device! If a pressure is connected when switching on, the high accuracy cannot be reached! As long as no pressure is connected additionally the zero-point is automatically stabilised. If a fast varying pressure should be measured (chimneys, etc.) the "dyn"-measuring should be activated (see below). This function is filtering the variations. Attention: "dyn"-measuring increases the power consumption more than 10 times.

Over pressure measuring: Connect to "+"-port.

Under pressure measuring: Connect to "-" port, under pressure will be displayed without negative sign.

6 Notes to Special functions

6.1 Min-/Max-Value Memory

watch MIN value (Lo): press key 'Mode' shortly once

watch MAX value (Hi): press key 'Mode' shortly once again

restore current value: press key 'Mode' shortly once again

clear MIN-/MAX- value: press key 'Mode' for 2 seconds

display changes between 'Lo' and MIN value

display changes between 'Hi' and MAX value

current value is displayed

MIN and MAX values are cleared. The display shows shortly 'CLr'.

6.2 Zero-Function

By means of the zero-function the display will be set to zero. This is mainly intended to correct position dependency and drift of the sensor. Disconnect both pressure ports before zeroing

press "zero"-key for 2 seconds –the display will be set to 0, press "zero" for 5 seconds: Zero function will be reset.

Relative measuring can also be performed by this function (= "tare").

6.3 Scale Adjustment

The scale adjustment is intended to be used to compensate errors of the internal pressure sensor.

The display value is given by following formula:

$$\text{Display} = \text{measured value} * (1 + \text{scale adjustment}/100)$$

To adjust a measuring scale proceed like follows:

1. Switch off the device.
2. Press the 'Zero' key while switching on the instrument, keep 'Zero' key pressed until 'SCL' appears (after about 3 seconds).
3. Press 'up' or 'down' key, the currently selected scale adjustment appears. (**factory setting: off = 0%**)
4. Choose the desired value by pressing 'up' or 'down' key. (max. input range: $\pm 5.00\%$, off = 0%). The input is displayed in %.

Example: *scale adjustment is 1.00 \Rightarrow scale is increased by 1.00% \Rightarrow Scale = 101%*

At a measured value of 100 (without offset correction) the instrument would show 101

5. Store the value by pressing left key. The instrument will restart (segment test).

Please note: If during the changing of the scale adjustment no key is pressed within 60 seconds, the input will be aborted. Eventually made changes won't be stored!!

7 Systemmessages

Er. 1 = measuring range has been exceeded

Er. 2 = meas. value has fallen below perm. range

Er. 3 = display range has been exceeded (>1999)

Er. 4 = meas. value has fallen below displayable range (<-1999)

Er. 7 = System fault - the device has detected a system fault (defective or far outside allowable ambient temperature range)

--- = Sensor error or value could not be calculated

"bAt" = battery is used up \Rightarrow replace with a new battery

8 Specification

Measuring Range: 0.00 ...199.9 mbar, resolution 0.1 mbar 200...1999 mbar, resolution 1 mbar;
 0.00 ...199.9 mmHg, resolution 0.1 mmHg 200...1500 mmHg, resolution 1 mmHg;
 0.00...19.99 PSI, resolution 0.01 PSI;
 Measuring range for underpressure: same as above;
 just switch connections -> display without neg. sign.
 Because of automatic offset adjustment, not suitable for pressures smaller than ±0.04mbar (4Pa).
 Suitable instrument for such measurings: GMH3110 + GMSD 2,5 (0,001mbar or 0,1Pa resolution!)

Max. Overpressure: 4000 mbar

Measuring medium: non corrosive gases

Accuracy: (at nominal temperature = 25°C, ±1 digit, offset adjustment)
 200 ...1999mbar: ±0.2%FS hysteresis and linearity
 ±0.4%FS temperature dependency 0 to 50°C
 0.0 ...199.9mbar: ±1%FS hysteresis and linearity
 ±2%FS temperature dependency 0 to 50°C

Pressure Connections: 2 metal pressure ports for connection to 6 x 1 mm tubes at the top of device (4mm inner tube Ø) standing out approx. 11mm
 „+“ = higher pressure, „-“ = lower pressure

Measuring Frequency: 1 measuring per second (at 'dyn'-measuring integrating, for quickly changing pressures)

Display: approx. 13 mm high, 3½-digit LCD

Operation Elements: 3 keys for ON/OFF, min-/max-value display, zero setting

Min-/Max-Value Memory: Min and max measured value are stored

Zero Function: The display value is set to zero per keypress, identical to an autom. zero adjustment

Scale: digital scale correction for pressure measuring

Ambient Conditions: -25 to 50°C; 0 to 80% RH. (not condensing)

Storage Temperature: -25 to 70°C

Power Supply: 9V-battery (in scope of supply)

Power Consumption: approx. 250µA at standard measuring of static pressures, 3mA at 'dyn'-measuring

Battery Life: Standard zinc carbon battery more than 1200 hours at standard measuring!

Battery Change Indicator: automatically if battery is used up: "BAT"

Auto-Off-Function: when the Auto Off Function is activated, the device switches automatically off, if keypad is not attended for a longer time (selectable 1...120min).

Housing: impact-resistant ABS, transparent panel, front side IP65

Dimensions: approx. 106 x 67 x 30 mm (L x W x D) without pressure ports

Weight: approx. 135g, incl. battery

EMC: The device corresponds to the essential protection ratings established in the Regulations of the Council for the Approximation of Legislation for the member countries regarding electromagnetic compatibility (2004/108/EC) Additional fault: <1%

9 Reshipment and Disposal

9.1 Reshipment



All devices returned to the manufacturer have to be free of any residual of measuring media and other hazardous substances. Measuring residuals at housing or sensor may be a risk for persons or environment



Use an adequate transport package for reshipment, especially for fully functional devices. Please make sure that the device is protected in the package by enough packing materials.

9.2 Disposal instructions



Batteries must not be disposed in the regular domestic waste but at the designated collecting points.

The device must not be disposed in the unsorted municipal waste! Send the device directly to us (sufficiently stamped), if it should be disposed. We will dispose the device appropriate and environmentally sound.