AMPROBE®

MAN02
Digital Manometer

Users Manual

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English

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Hand Held Digital Manometer

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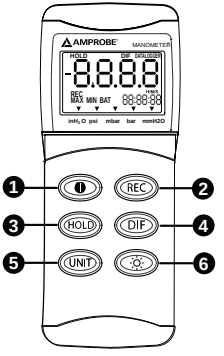
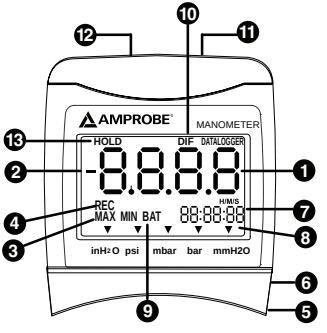
MAN02_Rev002



1. ON/OFF Pushbutton
2. Record pushbutton
3. Data Hold pushbutton
4. Differential pushbutton
5. Unit Selector pushbutton
6. Backlight pushbutton



Indicator

1. Primary data screen displays pressure value
2. "-" Minus pressure display
3. MAX MIN pressure recorded
4. REC starts recording mode and displays max./min. pressure recorded
5. DC power input jack
6. RS232 output port (RS232 cable not included)
7. H/M/S 88:88:88 displays time in Hour/ Minute/Second
8. ▼ Pressure unit indication
9. BAT Low battery indicator
10. DIF Differential pressure mode
11. "+" Positive pressure connection input
12. "-" Negative pressure connection input
13. Data Hold freezes pressure reading

CONTENTS

Congratulations on your purchase of the Amprobe MAN02 manometer. This instrument is a portable, battery operated pressure measuring device. The MAN02 is ideal for HVAC/R technicians measuring pressure level, Medical equipment, Computer peripherals, Pneumatic controls.

INTRODUCTION

- The meter will display all LCD segments when it is first turned on for approx. 3 seconds.
- The LCD is divided into two distinct sections : One large (primary) top screen and one smaller right bottom screen (relative Clock). The two display areas will constantly update with the pressure measurements.

FEATURES

The meter measures:

- **Gauge pressure -** a measurement of pressure that is referred to ambient pressure.
- **Differential pressure** - a measurement of difference of two pressures .
- MAN02 has 5 selectable units of measure: InH_2O, psi, mbar, bar, mmH_2O.
- Please check that the tubing is not leaking or damaged before use.

STANDARD ACCESSORIES

The package contains:

- MAN02
- 1 9V battery
- Users manual
- 2X connection hoses 4mm(ID) x 6mm(OD) x 500mm

OPTIONAL ACCESSORY

- TM-SWA, Download Suite Software with RS232 cable

QUICK START

Unscrew battery compartment on the rear of the instrument and insert the battery. Replace cover and secure with screw.

1. Press ⏻ to switch the instrument on.
2. Press (UNIT) to select unit of pressure measurement required. For zeroing, press (HOLD) for three seconds.
3. Press (DIF) for differential pressure measurement.
4. Press (HOLD) to freeze the reading on the display. Press again to cancel feature.
5. Press (REC) to start a recording; press again to display MAX value of the recording session; press again to display MIN value of the recording session; and press again to return to real time recording mode.

The Instrument records only the Max and the Min values for each session. To record all values for a recording session, use the Download Suite Software.

Press (REC) and hold for 3 seconds to turn clock feature off.

Note: Clock feature available with gauge pressure only, not differential. The instrument will automatically switch off after 20 minutes unless sleep mode is disabled.

6. Press ☼ to turn ON the back-light. It automatically switches off after 30 seconds.

AUTO POWER OFF

(Sleep mode function)

This instrument will turn off automatically in approx. 20 minutes after power-on if there are no key activations. For recording or operating over longer periods of time, you can disable the sleep mode by pressing ⓘ and (HOLD) simultaneously before powering on.

An "n" will appear in the middle of the screen at which time you can release the button. (See Fig. 1) The disable sleep mode will be invalid after power off.

OPERATION MODE

(See Fig. 18.)

1. Turns instrument on and off.
2. Press momentarily and relative clock starts in the lower right screen.

   REC is displayed in the middle left of screen (Fig.2).The other functions are locked out except **Power** and **Backlight.**

   Press momentarily again and the unit cycles through **MAX** (Fig. 3) and **MIN** (Fig.4) and back to current pressure reading; the record mode is displayed on the LCD.

   Press and hold for 3 seconds to turn off the record function and return to normal mode.
3. Press momentarily to freeze the pressure reading (Fig. 5).
4. Press momentarily, **DIF** appears on top of the LCD and the display indicates the relative zero (relative zero causes the value of the display to show as "0.0") - only the amount of pressure change will be indicated. Press momentarily again and the unit returns to the normal mode of pressure differential (see Fig.6).

Differential Pressure: a measurement of the difference between two pressures, i.e. use differential pressure sensor to measure gauge pressure by leaving one process connection open to atmosphere and connecting the second sensor port to your system.

5. Press momentarily and the units will cycle through **"InH_2O","psi", "mbar", " bar", "mmH_2O"** which are indicated on the bottom of the display (See Fig.7 & 8).
6. Press momentarily and the backlight illuminates for approx. 30 seconds, then turns off automatically.

   Press momentarily to decrease the figure when calibration is being performed.

CALIBRATION MODE

Calibration mode is only applicable for a standard manometer calibrator or any qualified meter calibration facility for annual calibration.

1. First, manually set the display to zero (no pressure applied to the connector), refer to the manual zero procedure.
2. Turn the meter off.
3. Press ⏻ & (REC) simultaneously, **"CA"** appears on the display, (See Fig. 9) the meter enters to the calibration mode, make sure the units setting on **"PSI"** to start positive (+) pressure calibration.
4. The meter has defaulted as 1.6 psi calibration point, the adjustable pressure range is from 1.5 to 1.7.

   If calibration pressure source is not 1.6 psi, increase by pressing (DIF) key, or decrease by pressing ☼ key to set calibration point as required.
5. Save the calibration point by pressing (REC) key, **"SA"** and small **"CA"** appears on the display in 2 seconds (See Fig. 10). The meter auto-skips to the negative pressure (-) point for next calibration mode.
6. Follow the same procedure as step 4 for the negative pressure calibration point.

   The LCD now displays" -1.600 " and small**"CA"** (See Fig.11). Perform the necessary calibration figure. Refer to your pressure standard if needed.
7. Again save the calibration point by pressing (REC) key, **"SA"** and **"CA"** appears in 2 seconds and then press (UNIT);**"End"**and **"CA"** appear in another 2 seconds. The meter turns back to the normal mode (See Fig. 12).

   If you can't save by pressing (UNIT) key, i.e. no **"SA"** appeared, please check the followings:

   • the calibration pressure source is between 1.5 and 1.7. or

   • if you entered the right positive pressure (+) or negative pressure (-).

If you want to skip positive (+) calibration when in the calibration mode, press (UNIT) key to skip to negative (-) calibration point.

Calibration point reference

Psi Range	Calibration point (+/-)	Recommended (+/-)
0~+/-2	1.6	1.5~1.7

MANUAL ZERO SETTING

When you set the display to zero(no pressure applied to the connector), press the (HOLD) key for 2 seconds. The meter should display **"- 0 .000"** from right to left (See Fig.13). Then, the LCD display shows normal mode.

TROUBLESHOOTING

Cannot Power on.

Check the battery connections. Replace the battery or attach Optional AC adaptor.

Low BAT indication.

Replace the battery when LCD displays **BAT**.

No Display.

- Make sure the battery is functional.
- check if sleep mode is active. Refer to disable sleep mode on page.6 to turn it off.
- check if the tubing is connected to the meter tightly.

Err.1.

For the pressure value exceeding the maximum range, **" Err.1"** appears on the display (See Fig. 14). Do not exceed rated over pressure range of manometer. Sensor may be damaged.

Err.2.

For the measurement pressure less than minimum range, **"Err. 2"** will appear (See Fig. 15).

Err.3.

For a differential pressure value larger than maximum display, **"Err.3"** appears on the display (See Fig.16).

Err.4.

When you set zero, make sure you have disconnected the tubing. If you see an **"Err.4"** appear on the display, it means the manometer is damaged (See Fig.17)

Note. Err.4 Will be also appear If the tubing is connected during zero set.

E1OL or E2UL.

When you see these errors while operating RS232 software, it means pressure source is less or over than the range of the instrument.

Replace your 9-volt battery when:

- The BAT icon appears on the right of the screen.
- The meter will not power on.
- Use of the back-light causes the BAT icon to appear.

Replacing The Battery

Even if the battery was recently replaced, check its voltage level if you get no response from your instrument.

To replace the battery:

1. Remove the tubing from the instrument.
2. Lay the instrument face-down on a clean, flat surface.
3. Remove battery cover.

Remove battery from instruments that you do not plan to use for a month or more.

Do not leave battery in instrument.

RS232 PC INTERFACE CAPABILITIES

The RS232 cable and the Download Suite software are required to transfer data to a PC. The RS232 port is located on the right side of the instrument. There is an optional USB converter kit (RS-USB) available for PCs with no available RS232 port. The RS232 Cable is not included. It can be purchased separately as an optional accessory.

Download Suite Software installation

Insert the Download Suite CD into the CD-ROM drive.

To install the software, follow the on-screen instructions.

Operation

To open the program, double-click the Download Suite icon.

To transfer data to a PC, follow the on-screen instructions.

MAINTENANCE

The meter is calibrated in house before shipping. When properly maintained, the meter will maintain its accuracy as specified.

Cleaning

Use a damp cloth and mild soap to clean the case of the MAN02 Manometer, do not use harsh detergents or abrasives as these may mar the finish or damage the unit's case with an adverse chemical reaction.

SPECIFICATIONS

Operating Conditions

- Compensated temperature range: 0~50 °C (32~122 °F)
- Operating temperature range: 0~50 °C (32~122 °F)
- Storage temperature range: -20~60 °C (-4~140 °F)
- Operating Humidity Max. 80% RH

Power Supply : 1 x 9.0 volt battery

Exceeding Maximum pressure will cause permanent sensor damage.

Range: 0 ~ ±2 psi

Resolution:

Conversion & Resolution

1 mbar =		Resolution
inch of H_2O	0.401	0.01
psi	0.0145	0.001
mbar	1	0.1
bar	0.001	0.001
mm of H_2O	10.2	1

Accuracy: ±0.3% of full scale at ±25°C (77°F)

Dimension: 72 x 182 x 30mm (meter)

Unit Weight: Approx. 220 gram (with battery)

Response Time: 0.5 seconds

Format: Baud rate: 2400 bit/sec
Data bit: 8, Stop bit: 1
Parity: none

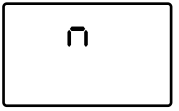


Fig. 1

Fig. 2

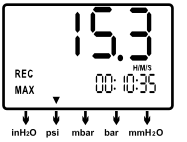


Fig. 3

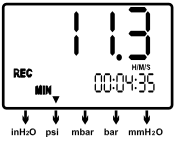


Fig. 4

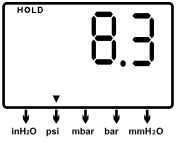


Fig. 5

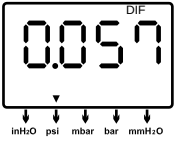


Fig. 6

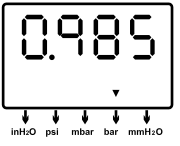


Fig. 7

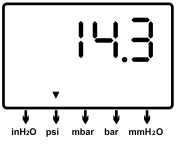


Fig. 8

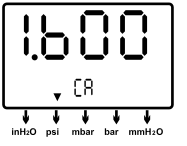


Fig. 9

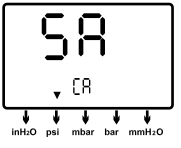


Fig. 10

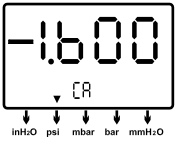


Fig. 11

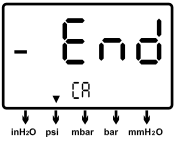


Fig. 12

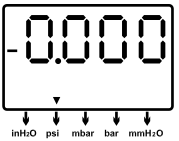


Fig. 13

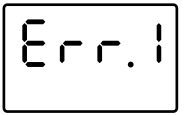


Fig. 14

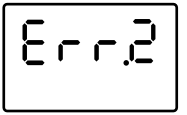


Fig. 15

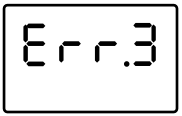


Fig. 16

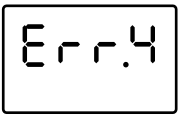


Fig. 17

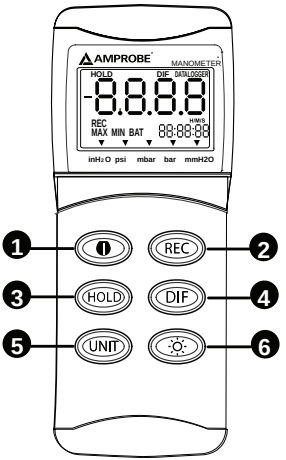


Fig. 18