

# **MANOMETERS**

840080, 840081, 840082,  
840083 and 840085

INSTRUCTION MANUAL

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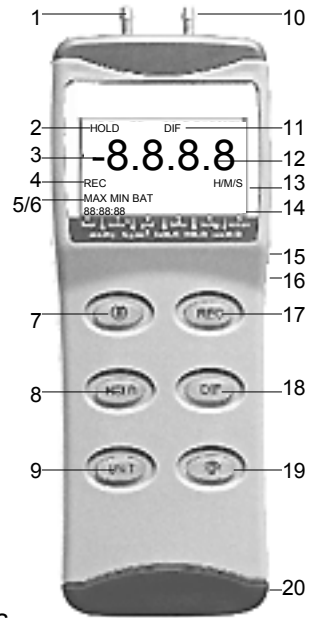
## 1. INTRODUCTION

Ideal for measuring low differential pressure in clean rooms, test and balance, medical equipment, HVAC, pneumatic systems and computer peripherals. Model 840085 reads gauge pressure and differential pressure (Imperial and Metric) in 5 units of measure: bar, psi, inH<sub>2</sub>O, mmH<sub>2</sub>O, and mbar. All other models have 11 units of measure: bar, mmHg, ozin<sup>2</sup>, kgcm<sup>2</sup>, psi, inH<sub>2</sub>O, kPa, ftH<sub>2</sub>O, inHg, cmH<sub>2</sub>O, and mbar. Features include a large backlight display, max-min, hold, and auto power off functions. The USB port enables communication with a computer. High accuracy of  $\pm 0.3\%$  fs at 25°C, repeatability:  $\pm 0.2\%$  (max  $\pm 0.5\%$ ) FSO, and combined linearity and hysteresis:  $\pm 0.2$  (Max  $\pm 1.0\%$ ) FSO.

<p><b>CAUTION:</b> During the Zero Setting (page 4). Make sure the tube is disconnected and do not apply pressure to the connector. Doing so can cause permanent damage to the unit, which is not covered by the warranty.</p>
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## 2. PANEL DESCRIPTION (Fig. A)

1. "-" Negative pressure hose plug.
2. **HOLD** Freezes pressure reading.
3. "-" Minus pressure display.
4. **REC** starts/displays max/min pressure.
5. **MAX MIN** pressure recorded.
6. **BAT** Low Battery Indicator
7. **On/Off** button
8. **Hold** button freezes pressure reading.
9. **Unit** button cycles through pressure readings.
10. "+" Positive pressure hose plug.
11. **DIF** Differential pressure mode.
12. **Primary Data Screen.**
13. **H/M/S** 88:88:88 Hr/Min/Sec.
14. **Pressure unit indicator.**
15. **USB** output port.
16. **DC** power input for AC adapter.
17. **Rec** button starts the relative clock.
18. **Dif** button displays relative zero.
19. **Backlight** button lights LCD for apx. 30 seconds.
20. **Battery Compartment.**



NOTE: Some functions shown on the display are not available.

## 3. INSTRUCTIONS

### 3-A. General Instructions

The Manometer measures “Gauge Pressure.” This combines Differential pressure with a PSI measurement as referenced to ambient pressure. When the manometer is first powered on, the entire LCD display flashes for approximately 3 seconds. The LCD is divided into two distinct sections: One large (Primary) top screen and one smaller section at the bottom-right of the LCD (Relative Clock). The pressure measurements are constantly updated in the 2 display areas. Check that the tubing is not leaking or damaged before use. The start-up mode is programmable. The display will default to the mode last used and the meter defaults to the setting used during the last operation.

- Turn the unit on with the **ON/OFF** button.
- Press the **REC** button once, and the relative clock starts in the lower right screen. "REC" is displayed in the middle-left of the LCD (Pg 6, Fig B). The **DIF** button will not operate at this time.
- Press the **REC** button repeatedly to cycle through MAX (Pg 6, Fig C) and MIN (Pg 6, Fig D) and back to the current pressure. To exit the record mode, press and hold the **REC** button for 3 seconds.

- Press **HOLD** to freeze the pressure reading (Pg 6, Fig E). Press the **HOLD** button again to release this setting.
- Press the **DIF** button and "DIF" appears near the top of the LCD and the display indicates the relative zero. Only the amount of the pressure change will be indicated (Pg 6, Fig F). Press the **DIF** button again and the unit returns to the normal mode.
- Press the **UNIT** button repeatedly to cycle through the units of measure indicated below the LCD display (Pg 6, Fig G and H)
- Press the **Backlight** button and the LCD illuminates for approx. 30 seconds then turns off automatically.

Note: Differential Pressure is a measure of the difference between two pressures, for example, 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.

### 3-B. Zero Setting

Do not apply pressure to the connector and disconnect the tube. Failure to follow this procedure can cause damage and void the warranty. To set the display to zero, turn the unit on and press the **HOLD** button for 2 seconds. The LCD displays "o o o o" one at a time, from left to right. Next, the LCD clears and displays a zero setting (Pg 6, Fig I).

### 3-C. Calibration

The meter is factory calibrated. Annual recalibration at a qualified meter calibration facility is recommended. The following information is for the calibration technician:

Use a standard manometer calibrator to calibrate this unit. Refer to the Calibration Point Reference chart on page 7. The examples are for model number 840083, with a pressure range from 0 to +100 PSI (positive pressure) or from 0 to -100 PSI (Negative pressure). The meter must be attached to a pressure source between 75.0 and 85.0.

- Turn **ON** the unit (Make sure the manometer is in PSI mode)
- Hold button for zero calibration.
- Set the calibrator to 80.00 PSI.
- Check manometer readings if it is not within specs (enter positive calibration mode by pressing **POWER** and **REC** buttons simultaneously).
- 80.00 PSI should be displayed on the LCD of the manometer and the calibrator should have the same value.
- Press the **REC** button to save the calibration point.
- Press the **UNIT** button to return to normal mode and check readings again compared the calibrator.
- Turn **OFF** the manometer.

- Negative calibration.
- Connect tube to the negative pressure connector.
- Turn **ON** the manometer.
- Hold button for **ZERO** calibration.
- Set the calibrator to 80.00 PSI.
- Check manometer readings. If it is not within specs, enter the calibration mode by pressing **POWER** and **REC** buttons simultaneously.
- Press **UNIT** button to enter negative calibration mode.
- Press **REC** button to save calibration point.
- Check the readings against the calibrator. Readings should be -80.00 PSI.
- Turn **OFF** the manometer.
- Calibration is complete.

Note: If you can not save by pressing the **REC** button, check that the calibration pressure source is between 75.0 and 85.0; and that you entered the correct positive pressure (+) or negative pressure (-).

### 3-D. Auto Power Off

This unit has a built-in Auto Power Off function to prolong battery life. The meter will power off automatically if no buttons are pressed within 20 minutes. To deactivate this feature, press **On** and **Hold** simultaneously before powering on the unit. The symbol "n" will appear in the middle of the screen, at which time you can release the **Hold** button.

### 3-E. Battery Replacement

When the "BAT" icon appears on the right side of the LCD, open the battery cover, install a fresh 9V battery and replace the cover. Remove the battery during prolonged periods of non-use.

### 3-F. USB Output

The unit features a USB output via which can be utilized by user's specific application. Connection procedures:

- Connect the optional USB cable to the USB output port.
- Plug the other end of the USB cable into computer's COM 1 or 2 port.
- Install the optional USB Software according to the procedures in the software package. Additional instructions are found in a separate Adobe PDF file in the software. Be sure to set the baud rate to 2400.

### 3-G. Optional Accessories

- |                     |   |
|---------------------|---|
| ~ 840027 AC Adaptor | ~ 840089 Rubber Holster                   |
| ~ 840054 USB Cable  | ~ 840090 Water Resistant Instrument Pouch |
| ~ 840052 Software   |   |

### 3-H. Screen Examples



### 3-I. Troubleshooting

If the power is on, but there is no display, replace the battery or attach the optional AC adaptor. Check that the tubing is tightly connected.

Error Code	Action
<b>BAT</b>	Replace the battery.
<b>Err.1</b>	The pressure value exceeds the maximum range.
<b>Err.2</b>	Measurement pressure is less than minimum range.
<b>Err.3</b>	While in the DIF function, the differential pressure value is larger than maximum display digit.
<b>Err.4</b>	During Zero Setting, make sure the tubing is disconnected with no pressure applied to the connector. If you still receive this error message after disconnecting the tubing, the sensor or meter may be damaged.
<b>E10L or E2UL</b>	While using the USB software, the pressure source is less than, or over the range of the instrument.

NOTE: Exceeding maximum pressure will cause permanent sensor damage. Before you connect the instruments to a pressure source, carefully check your fittings and hoses.

## 4. SPECIFICATIONS

4-A. Model Range and Resolution										
Model	840085		840080		840081		840082		840083	
	Range	Res	Range	Res	Range	Res	Range	Res	Range	Res
PSI:	2	0.004	5	0.003	15	0.01	30	0.02	100	0.1
inH <sup>2</sup> O:	55.4	0.01	138	0.1	415	0.3	830	0.5	2768	2
bar:	0.138	0.001	0.345	0.001	1.03	0.001	2.07	0.002	6.89	0.001
mbar:	138	0.1	345	0.2	1034	1	2068	2	6895	1
cmH <sup>2</sup> O: (840085 is in mmH <sup>2</sup> O)	1410	0.01	352	0.2	1050	1	2110	2	7030	1
mmHg:	Not Applicable		259	0.2	776	0.5	1550	1	5170	1
ozin <sup>2</sup> :			80	0.05	240	0.2	480	0.3	1600	1
kgcm <sup>2</sup> :			0.35	0.001	1.05	0.001	2.1	0.002	7.03	0.001
kPa:			34.5	0.02	183	0.1	207	0.2	684	0.1
ftH <sup>2</sup> O:			11.5	0.01	34.6	0.02	69.2	0.04	231	0.1
inHg:			10.2	0.007	30.54	0.02	61.08	0.04	203.6	0.1
max pres:	20 PSI		20 PSI		30 PSI		60 PSI		150 PSI	

4-B. General Specifications	
Dimension	7 1/8" x 2 3/4" x 1" (182 x 72 x 30 mm)
Weight	5 oz (150 g)
PSI Range	0 ~ 2, 15, 30, or 100
Accuracy	±0.3% of full scale at ±25°C
Response time	0.5 seconds
Format	Baud Rate : 2400 bit/sec, Data Bit : 8, Stop Bit : 1 P XXXXX , P - XXXXX (unit)
Storage temperature range	-4~140°F (-20 ~ 60°C)
Operating Humidity Max.	80% RH
Operating temperature	32 ~ 122°F (0 ~ 50°C)
Power	One 9.0 volt battery or AC Adaptor

4-C. Calibration Point Reference			
Model	PSI Range	Calibration	Recommended
840085	0 ~ ±2	1.6	1.5 ~ 1.7
840080	0 ~ ±5	4.000	3.900 ~ 4.100
840081	0 ~ ±15	12.00	11.70 ~ 12.30
840082	0 ~ ±30	24.00	23.40 ~ 24.60
840083	0 ~ ±100	80.00	78.00 ~ 82.00

## 5. WARRANTY

### 1 YEAR METER WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of one (1) year from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover probes, batteries, or damage resulting from accident, misuse, or abuse of the product. In order to obtain warranty service, simply ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.  
7720 East Redfield, Suite 7  
Scottsdale, Arizona 85260  
(480) 948-4448  
Email: [info@sperscientific.com](mailto:info@sperscientific.com)  
Website: [www.sperscientific.com](http://www.sperscientific.com)

Be sure to include your name, address, phone number, and a detailed explanation of why you are returning the item.