

# **Manometer SD Card Loggers**

**850097, 850098, 850099**  
Instruction Manual

SPER  
SCIENTIFIC

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Environmental Measurement Instruments



# **Manometer SD Card Loggers 850097, 850098, 850099**

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## **INTRODUCTION**

Sper Scientific Manometer SD Card Loggers read differential pressure in air and in non-corrosive and non-ionized gas but they are not to be used with liquids. They record data with date and time onto standard SD memory cards (like a digital camera). When full, simply exchange SD cards for unlimited data storage. The removable SD card is easy to transport and insert into your computer's memory card slot or SD card reader. Uploads pre-formatted data to Excel, without the need for additional software and cables. Additional SD cards are readily available in a variety of memory sizes. The meter comes fully calibrated from the factory. N.I.S.T. traceable recalibration is available from Sper Scientific.

## FEATURES

- 10 units of measure
- Maximum and Minimum
- Auto power off
- Low battery indicator
- Hold function
- Zero Adjustment
- Backlight
- Touch-tone
- Direct upload of data to Excel
- SD memory card datalogger
- Manual datalogger option
- Internal clock and calendar
- Tripod mounting screw
- Built-in tabletop stand
- Audible overload alarm

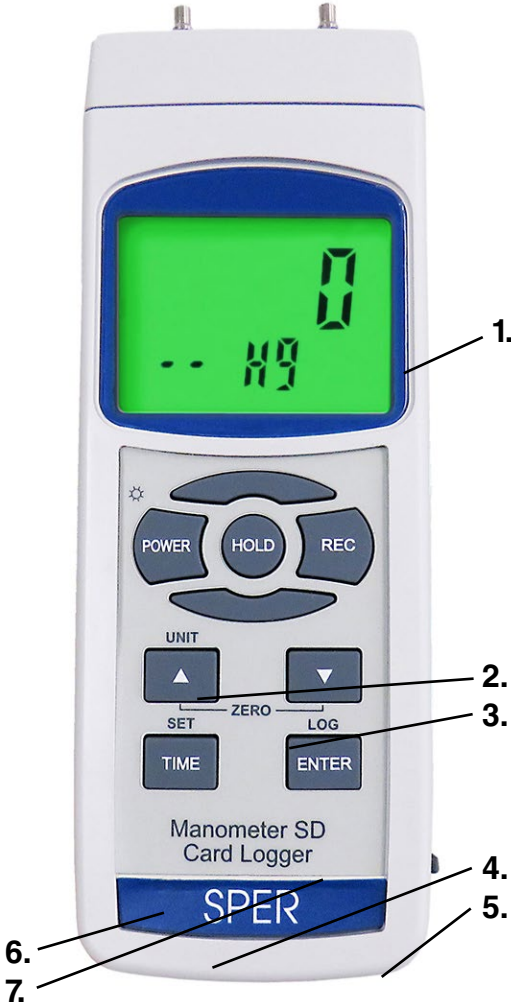
## **MATERIALS SUPPLIED**

- Meter
- Tubing and pipe connection lugs
- SD Card
- 6 AA Batteries
- Instruction Manual
- Soft Carrying Case

## **OPTIONAL ACCESSORIES**

|        |                                  |
|--------|----------------------------------|
| 840058 | USB Power Cable                  |
| 840097 | AC Adapter                       |
| 840059 | Additional SD Card               |
| 840093 | Field Tripod                     |
| 840090 | Water Resistant Instrument Pouch |

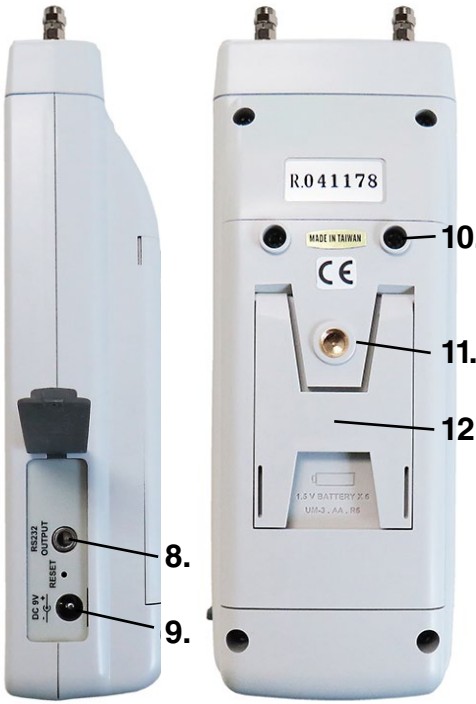
# METER COMPONENTS



## Keypad

1. LCD Display
2. POWER
3. HOLD/ ESC
4. SET/▼ (TIME CHECK)
5. LOG/ENTER
6. ▲/UNIT
7. ▼





**Side of Meter**

- 8. RESET
- 9. DC9V Power Adapter Input Socket

**Back of Meter**

- 10. Battery Cover Screws
- 11. Tripod Mounting Screw
- 12. Tripod Stand

**Top of Meter**

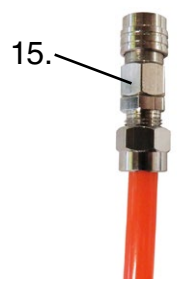
- 13. Tubing Inputs

**Bottom of Meter**

- 14. SD Card Socket



- 15. Tubing Couplers



Please Note: Tubing Not Included

## SETUP MODE

The advanced Setup Mode allows you to customize the following meter preferences and defaults:

- dATE - Set time & date
- SP-T - Sampling time interval
- PoFF - Auto Power Off
- bEEP - Touch-Tone On/Off
- dec - Set SD card decimal type
- Sdf - Format SD memory

### **Note...**

The setup functions can be performed under any parameter, but not while utilizing the datalogger function. Once selections are saved, the meter will default to the selected preferences.

## Entering Setup Mode

1. Press **POWER** to turn the meter on.
2. Press and hold **SET** for at least 2 seconds to enter Setup Mode.
3. Press **SET** again to cycle through the setup functions.

### Note...

Press **HOLD** to exit Setup Mode. The meter will return to Normal Mode.

## Date & Time

1. Enter the clock function from Setup Mode (see above). "dAtE" appears on the LCD.
2. Press ▲ or ▼ to adjust the date, then press **ENTER** to save and adjust the next value.
3. Repeat Step 2 to adjust the month, date, hour, minute, and second.
4. Press **SET** to save and move to the next setting.

### Note...

This procedure adjusts the meter's internal clock. The internal clock will function when the meter is turned **off** as long as the batteries have adequate power.

## Sampling Time

Sampling time is the time allotted between successive measurements. To adjust the sampling time (in seconds):

1. Enter the sampling time function from Setup Mode (see page 10). "SP-t" appears on the LCD.
2. Press ▲ or ▼ to adjust the value.
3. Press **SET** to save the value, move to the next setting.

## Auto Power Off

The meter automatically turns off after 10 minutes of inactivity. To disable this function:

1. Enter the auto power off function from Setup Mode (see page 10). "PoFF" appears on the LCD.
2. Press ▲ or ▼ to select yes (auto power off enabled) or no (auto power off disabled). Press **ENTER** to save the selection.
3. Press **SET** to move to the next setting.

## Touch-Tone

1. Enter the touch-tone function from Setup Mode (see page 10). “bEEP” appears on the LCD.
2. Press ▲ or ▼ to select yes (touch-tone enabled) or no (touch-tone disabled). Press **ENTER** to save the selection.
3. Press **SET** to move to the next setting.

## Decimal Type

Although the decimal is commonly expressed as the “.” symbol (i.e., 20.6 or 1000.53), some European countries use a “,” symbol to represent the decimal (i.e., 20,6 or 1000,53). The meter defaults to the period symbol.

To adjust:

1. Enter the decimal type function from Setup Mode (see page 10). “dEC” appears on the LCD.
2. Press ▲ or ▼ to select Basic (.) or Euro (,). Press **ENTER** to save the selection.
3. Press **SET** to move to the next setting.

## SD Memory Card Format

This function will format the SD memory card to work specifically with your meter. New SD cards should always be formatted before first use. Formatting the SD card will erase any previous memory on the card.

1. Enter the SD memory card format function from Setup Mode (see page 10). “Sd F” appears on the LCD.
2. Press ▲ or ▼ to select yes (format the SD memory card) or no (do not format the SD memory card). Press **ENTER** to confirm the selection.
3. If you selected yes in step 2 the display will show “yES Ent.” Press **ENTER** again and the meter will format the SD card and return to normal mode.

# MEASUREMENT PROCEDURES

## Turning the Unit On/Off

1. Press **POWER** to turn the meter on.
2. Press and hold **POWER** for  $\geq 2$  seconds to turn the meter off.

## Selecting the Unit of Measure

Press and hold the **UNIT** button to cycle through the options listed below. Release the button when you've reached your desired unit of measure.

PSI.....psi  
In H2O.....Inch Hg  
In H2O.....Inch H2O  
h PA.....hPA  
PA.....kPA  
\_bAr.....Mbar  
\_gc2.....Kg/cm2  
\_\_Hg.....mm Hg  
+H2O.....Meters H2O  
A+P.....Atmospheres

### Note...

The meter will default to the last unit of measure when it is turned off and on again.

## Zero Adjustment

If the display does not show a value of 0 with no pressure source connected to the meter zero adjustment is needed.

1. Press and hold ▲ and ▼ simultaneously for at least 2 seconds until the display shows zero.

**Caution: Not for use with liquids. Use with non-corrosive and non-ionized air and gas only. An audible alarm will sound if you exceed your model's maximum pressure.**

1. Connect your tubing to the tubing couplers (see Fig 15 pg. 9). Next attach the couplers to inputs P1 and P2 on top of the meter (Fig 13 pg. 9).

### Note....

If P1 pressure > P2 pressure you will obtain a positive reading.  
If P1 pressure < P2 pressure you will obtain a negative reading.

## Hold Function

1. When measuring any parameter, press **HOLD** to freeze the reading on the display. "HOLD" will appear on the LCD.
2. Press HOLD again to release the hold function. "Hold" will disappear from the LCD.



## Maximum and Minimum

To record maximum and minimum readings:

1. When measuring press **REC** to begin recording the maximum and minimum values. “REC” appears on the LCD.
2. Press **REC**. The maximum value and “REC MAX” appears on the LCD.
3. Press **REC**. The minimum value and “REC MIN” appears on the LCD.
4. Press **REC** again to continue updating maximum and minimum values.
5. To exit the max/min function, press and hold **REC** for 2 seconds. The meter will return to Normal Mode and clear the max/min values.

### Note...

The meter cannot be turned off from the memory record function. Exit the function, then press and hold **POWER** to turn the meter **off**.

## **Backlight**

The backlight turns on automatically when the meter is turned **on**.

1. Press **POWER** once to turn the backlight **off**.
2. Press **POWER** again to turn the backlight **on**.

## **View Real Time Clock and Sampling**

To view the time function during normal measurement (not during datalogging):

1. Press **TIME**. The calendar, clock and sampling time (in seconds) will appear in sequence on the LCD.

## DATALOGGER

### Preparing the Datalogger

1. Insert the SD card into the SD card socket on the bottom of the meter, ensuring that the front of the SD card faces the back of the meter.
2. Format the SD card as needed (see page 14).
3. Set the clock if using the meter for the first time (see page 10).
4. Set the decimal type if using the meter for the first time (see page 13).

### Auto Datalogging

1. Set the sampling time to  $\geq 1$  second (see page 12).
2. Press and hold **LOG**. “Datalogger” will flash at the bottom of the LCD. The tone will sound each time measurement data and time information are saved to memory.
3. To pause datalogging, press **LOG**. The meter will temporarily stop recording. Press LOG again to resume datalogging.
4. To finish datalogging, press **LOG** for  $\geq 2$  seconds. “Datalogger” will disappear from the LCD to indicate that datalogging has ended.

## Manual Datalogging

1. Set the sampling time to 0 seconds (see page 12).
2. Press **LOG** for 2 seconds, “Datalogger” will appear on the LCD.
3. Press **LOG** again each time you wish to record a measurement. The tone will sound as the measurement data and time information are saved to memory. The position (location) number will appear on the bottom of the LCD and will also be recorded on the SD card.
4. Press **▲** or **▼** to set the position number (from 1 to 99).
5. To indicate the position location, P x (x= 1 to 99) will appear on the LCD. To change the position number, press **▼**. The position number will flash on the LCD.
6. Select your position number and press **ENTER** to confirm.
7. To finish datalogging, press **LOG** for  $\geq 2$  seconds. “REC” will disappear from the LCD to indicate that datalogging has ended.

## SD Card Data Structure

1. The first time a SD card is used in this meter, a folder EMA01 will be generated.

2. If the datalogger is being used for the first time, a new file EMA01001.XLS will be generated under the route EMA01\ columns.

3. After exiting the datalogger and executing the function again, the data is saved to the EMA01001.XLS file until the data reach 30,000 data. A new file will then be generated (i.e. EMA01002.XLS).

4. The folder EMA01\ will hold 99 files. A new route will be generated when exceeding 99 files (i.e. EMA02\).

### The file's route structure:

EMA01\  
EMA01001.XLS  
EMA01002.XLS  
.....  
EMA010099.XLS

EMA02\  
EMA02001.XLS  
EMA02002.XLS  
.....  
EMA020099.XL  
EMAXX\  
EMAXX\

### Note...

XX: Maximum value is 10.

## **BATTERY REPLACEMENT**

This meter uses six AA (1.5V, UM3) batteries. When the low battery indicator appears on the LCD, battery replacement is needed. After the icon appears on the LCD, in-spec measurement can still be made for several hours before becoming inaccurate.

1. Press and hold **POWER** for 2 seconds to turn the meter off.
2. Unscrew the battery cover and remove from the meter.
3. Remove the old batteries and replace with six new AA batteries, ensuring correct polarity.
4. Replace the battery cover. Tighten the screws on the battery cover to secure to the meter.

## **TROUBLESHOOTING**

If the meter is not functioning properly during use (i.e. the system is frozen and the keypad is non-operational), reset the meter:

1. Use a small tool (such as a disassembled paperclip or a pin) to press the RESET button (located on the right side of the meter under the protective black cover).
2. Press **POWER** to turn the meter on.

# SPECIFICATIONS

|  |  |  |
|--|--|--|
| Circuit                                      | Custom one-chip of microprocessor LSI circuit                |  |
| Display                                      | LCD size: 52 mm x 38 mm<br>LCD with green backlight (ON/OFF) |  |
| Datalogger<br>Sampling Time<br>Setting Range | Auto   | 1 second to 8 hours 59 minutes and 59 seconds.<br><br>Sampling time can set to 1 second, but memory data may loss.   |
|  | Manual   | Push the data logger button once will save data one time.<br>@ Set the sampling time to 0 second<br>@ Manual mode, can also select the 1 to 99 position (Location) no. |
| Memory Card                                  | SD memory card. 1 GB to 16 GB.                               |  |
| Sampling Time of Display                     | Approx. 1 second   |  |
| Operating Temperature                        | 0 to 50 C  |  |
| Operating Humidity                           | Less than 85% RH   |  |

|              |   |
|--------------|---|
| Power Supply | <ul style="list-style-type: none"> <li>• Alkaline or heavy-duty DC 1.5 V battery (UM3, AA) x 6 PCs, or equivalent</li> <li>• DC 9V adapter input (AC/DC power adapter is optional)</li> </ul> |
| Power Usage  | <p>Normal operation (w/o SD card memory usage and LCD Backlight off): Approx.. DC 15 mA.</p> <p>With SD card in use and LCD Backlight of: Approx. DC 36mA.</p>                                |
| Weight       | 1 lb (0.45 kg)  |
| Dimensions   | 7" x 2¾" x 1¾" (178 x 70 x 44 mm)   |



|                 | <b>850097</b>  |       | <b>850098</b> |       | <b>850099</b> |       |
|-----------------|--|-------|---------------|-------|---------------|-------|
| Unit of Measure | Range +/-  | Res.  | Range +/-     | Res.  | Range +/-     | Res.  |
| mbar            | 2  | 0.1   | 2000          | 1     | 7000          | 5     |
| psi             | 2.9  | 0.001 | 29            | 0.01  | 101.5         | 0.05  |
| kg/cm2          | 0.204  | 0.001 | 2.04          | 0.001 | 7.135         | 0.005 |
| mm Hg           | 150  | 0.1   | 1500          | 1     | 5250          | 5     |
| inch Hg         | 5.905  | 0.002 | 59.05         | 0.02  | 206.7         | 1     |
| Meters H2O      | 2.040  | 0.001 | 20.4          | 0.01  | 71.35         | 0.05  |
| H PA            | 200  | 0.1   | 2000          | 1     | 7000          | 5     |
| K PA            | 20   | 0.01  | 200           | 0.1   | 700           | 0.5   |
| Inc H2O         | 80   | 0.05  | 802           | 0.5   | 2810          | 2     |
| Atmospheres     | 0.197  | 0.001 | 1.974         | 0.001 | 6.905         | 0.005 |
| Accuracy        | +/-2 fs% NOTE: 23°C +/-5°C F.S. Full Scale<br>Included linearity, hysteresis and repeatability |       |               |       |               |       |

## WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of **five (5) years** 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, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will break the waterproof seal and void the warranty. To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.  
8281 E. Evans Rd., Suite #103  
Scottsdale, AZ 85260  
(480) 948-4448

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at [www.sperwarranty.com](http://www.sperwarranty.com) within 10 days of purchase.

*Please note: The most current version of the manual can always be found at [www.sperdirect.com](http://www.sperdirect.com)*



