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</tbody>
</table>
INTRODUCTION

This Sper Scientific Environmental Meter with SD Card Datalogger (Model 850071) is an extremely fast and accurate meter with multiple functions. The meter reads humidity, air temperature, air velocity, and measures light in Lux or Ft-cd. Optional Type K/J thermocouple probes available.

This meter features a real time SD memory card datalogger. Standard, portable SD memory cards provide unlimited data storage and upload pre-formatted data directly to Excel. Each data set includes the measured value along with the time and date. Sampling time can be set from 1 second to 3600 seconds. Alternatively, manual datalogging is available to record 99 readings.
FEATURES

• Functions as a light meter, anemometer, and humidity/temperature meter. Optional adapter enables Type K/J thermometer.
• Measures humidity in both %RH and temperature
• Displays air velocity in five units of measure
• Lux or Foot Candles unit selection
• Zero Adjustment
• Highly accurate microcomputer circuit
• Direct upload of data to Excel
• SD memory card datalogger
• Manual datalogger option
• Internal clock and calendar
• Touch-tone
• Tripod mounting screw
• Built-in tabletop stand
• Maximum and Minimum
• Hold function
• Auto power off
• Low battery indicator
• Backlight
MATERIALS SUPPLIED

• Meter
• Sensor
• SD Card
• 6 AA Batteries
• Instruction Manual
• Hard Carrying Case

OPTIONAL ACCESSORIES

840058    USB Power Cable
840097    AC Adapter
840059    SD Card
840093    Field Tripod
840090    Water Resistant Instrument Pouch
POWER SUPPLY

This meter can be powered by six AA (1.5V, UM3) batteries or an optional 9 Volt DC adapter. See p. 28 for battery replacement instructions.

Plug the adapter into the power port labeled “DC 9V,” located on the side of the meter.

Note…
When using the adapter, the meter will remain permanently on and the POWER button will be disabled.
METER COMPONENTS

Keypad
1. LCD Display
2. POWER/ESC
3. FUNCTION /HOLD/NEXT
4. REC/ENTER
5. SET/▼ (TIME CHECK)
6. LOGGER/▲ (SAMPLING TIME CHECK)

Side of Meter
7. RESET
8. DC9V Power Adapter Input Socket

Back of Meter
9. Battery Cover Screws
10. Tripod Mounting Screw
11. Battery Compartment / Cover Stand
Top of Meter
12. Type K/J Thermometer Socket
13. Probe Input Socket

Bottom of Meter
14. SD Card Socket

Sensor Probe
15. Anemometer Vane
16. Humidity/Temperature Sensor
17. Light Sensor
SETUP MODE

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

• Real Time Clock
• Decimal Type
• Auto Power Off
• Touch-Tone
• Thermometer Type K/J
• Temperature Units
• Sampling Time
• SD Memory Card Format

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 **NEXT** to cycle through the setup functions.

**Note…**
Press **ESC** to exit Setup Mode. The meter will return to Normal Mode.

Real Time Clock

1. Enter the clock function from Setup Mode (see above). “dAtE” appears on the LCD.
2. Press **ENTER**. The year will appear on the LCD.
3. Press ▲ or ▼ to adjust the value. Press **ENTER** to save the value.
4. Repeat Step 3 to adjust the month, date, hour, minute, and second.

**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.
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 11). “DEC” appears on the LCD.
2. Press ▲ or ▼ to select Basic (.) or Euro (,). Press ENTER to save the selection.

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 11). “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.

Touch-Tone

1. Enter the touch-tone function from Setup Mode (see page 11). “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.

Thermometer Type K/J

1. Enter the thermometer type function from Setup Mode (see page 11). “tYPE” appears on the LCD.
2. Press ▲ or ▼ to select K or J. Press ENTER to save the selection.

Temperature Units

1. Enter the temperature units function from Setup Mode (see page 11). “t-CF” appears on the LCD.
2. Press ▲ or ▼ to select C (degrees Celsius) or F (degrees Fahrenheit). Press ENTER to save the selection.

Sampling Time

The 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 11). “SP-t” appears on the LCD.
2. Press ▲ or ▼ to adjust the value (1, 2, 5, 10, 30, 60, 120, 300, 600, 1800, or 3600 seconds). Press ENTER to save the value.
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 11). “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.
MEASUREMENT PROCEDURES

Turning the Unit On/Off

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

Selecting the Function

Press and hold **FUNC** to cycle through the options listed below. Release **FUNC** when you reach the desired function.

<table>
<thead>
<tr>
<th>Code on Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>An</td>
<td>Air velocity/temperature</td>
</tr>
<tr>
<td>rH</td>
<td>Humidity/temperature</td>
</tr>
<tr>
<td>tP</td>
<td>Type K/J thermometer</td>
</tr>
<tr>
<td>Lıght</td>
<td>Light meter</td>
</tr>
</tbody>
</table>

**Note…**
The meter will default to the last function setting used when it is turned off and on again.
Air Velocity and Air Temperature

1. Plug the anemometer probe plug into the probe input socket.

2. Press **POWER** to turn the meter on.

3. Press and hold **FUNC** to cycle through the options until “An” appears on the LCD. Release the **FUNC** button.

4. Hold the probe handle and point the probe head toward the air flow. The air velocity value appears on the upper display and the air temperature value appears on the lower display.

Selecting the Air Velocity Unit

1. Press and hold **UNIT**. The meter will cycle through m/s, Km/h, mph, Knot, and FPM.

2. Release **UNIT** when the desired unit appears on the LCD.

Note…
To change the temperature unit, see page 13.
Humidity and Temperature

1. Plug the probe plug into the probe input socket.
2. Press POWER to turn the meter on.
3. Press and hold FUNC to cycle through the options until “rH” appears on the LCD. Release the FUNC button.
4. The humidity value appears on the upper display and the air temperature value appears on the lower display.

Note…
To change the temperature unit, see page 13.

Type K/J Thermometer

Note…
The anemometer probe must be disconnected from the meter to obtain accurate Type K/J readings.

1. Press POWER to turn the meter on.
2. Press and hold FUNC to cycle through the options until “tP” appears on the LCD. Release the FUNC button.
3. Plug a thermocouple temperature probe (type K or J, optional) into the type K/J thermometer socket. The LCD will display the measurement value from the temperature probe.
4. “K” or “J” appears on the LCD to indicate the type of thermometer.

Notes…
When using the meter for the first time, the meter will default to K type thermocouple. See page 13 for instructions on selecting the thermocouple type.

To change the temperature unit, see page 13.

Light Meter

1. Press POWER to turn the meter on.

2. Press and hold FUNC to cycle through the options until “LIght” appears on the LCD. Release the FUNC button.

3. Plug the probe plug into the probe input socket.

4. While holding the sensor handle, point the light sensor directly toward (facing) the light source. The light measurement will appear on the LCD.

Note…
This meter measures light in LUX or Foot Candles (Ft-cd). To change the light unit, press and hold REC ENTER. Release REC ENTER when the desired unit appears on the LCD.
Zero Adjustment

During light measurement, if the display does not show a value of 0 when the light sensor is completely covered, zero adjustment is needed.

1. With the sensor covered, press LOGGER for >3 seconds. “0” appears on the LCD.
2. Uncover the sensor to resume normal measurement.

Sound Meter

The optional sound adapter permits the meter to measure sound in decibels.

1. Press and hold POWER for 2 seconds to turn the meter off.
2. Plug the sound adapter plug into the probe input socket.
3. Turn on the sound adapter.
4. Press POWER to turn the meter on. “Sound” will appear on the LCD, and then the meter will return to Normal Mode. Sound levels will be displayed in “db”.
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 any parameter, 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. When you are viewing the maximum or minimum value, you may press HOLD to delete the value. “REC” appears on the LCD and the meter will begin recording maximum and minimum values again.

5. To exit the max/min function, press and hold REC for 2 seconds. The meter will return to Normal Mode.
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

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

1. Press TIME CHECK. The time information (Year, Month/Date, Hour/Minute) will appear on the LCD.

View Sampling Time

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

1. Press SAMPLING CHECK. The sampling time (in seconds) will appear 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 11).

4. Set the decimal type if using the meter for the first time (see page 12).

Auto Datalogging

1. Set the sampling time to ≥ 1 second (see page 13).

2. Press REC. “REC” will appear on the LCD.

3. Press LOGGER. “REC” will flash on the LCD. The tone will sound as the measurement data and time information are saved to memory.

4. To pause datalogging, press LOGGER. The meter will temporarily stop recording and “REC” will stop flashing on the LCD. Press LOGGER again to resume datalogging.

5. To finish datalogging, pause the datalogger. Press REC for ≥ 2 seconds. “REC” will disappear from the LCD to indicate that datalogging has ended.
Note...
To enable/disable the touch-tone feature, see page 12.

Manual Datalogging

1. Set the sampling time to 0 seconds (see page 13).
2. Press **REC**. “REC” will appear on the LCD.
3. Press **LOGGER**. “REC” will flash on the LCD. 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. To change the position number, press ▼. The position number will flash on the LCD.
5. Press ▲ or ▼ to set the position number (from 1 to 99).
6. To indicate the position location, P x (x= 1 to 99) will appear on the LCD.
7. Select the position number and press **ENTER** to confirm.
8. To finish datalogging, press **REC** for ≥ 2 seconds. “REC” will disappear from the LCD to indicate that datalogging has ended.

Note...
To enable/disable the touch-tone feature, see page 12.
SD Card Data Structure

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

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

• 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 columns. A new file will then be generated (i.e. EMA01002.XLS).

• 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.XLS

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.
<table>
<thead>
<tr>
<th><strong>SPECIFICATIONS</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circuit</strong></td>
<td>Custom one-chip of microprocessor LSI circuit</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>LCD size: 52 mm x 38 mm</td>
</tr>
<tr>
<td></td>
<td>LCD with green backlight (ON/OFF)</td>
</tr>
<tr>
<td><strong>Measurement Unit</strong></td>
<td>• Type K/J thermometer</td>
</tr>
<tr>
<td></td>
<td>• Humidity/Temp. meter</td>
</tr>
<tr>
<td></td>
<td>• Anemometer with Temp.</td>
</tr>
<tr>
<td></td>
<td>• Light Meter</td>
</tr>
<tr>
<td></td>
<td>• Sound level meter (optional adaptor)</td>
</tr>
<tr>
<td><strong>Datalogger Sampling Time Setting Range</strong></td>
<td><strong>Auto</strong> 1 second to 3600 seconds</td>
</tr>
<tr>
<td></td>
<td>@ For anemometer measurement, the sampling time setting value should be ≥ 2 seconds.</td>
</tr>
<tr>
<td></td>
<td>@ Sampling time can set to 1 second, but memory data may loss.</td>
</tr>
<tr>
<td></td>
<td><strong>Manual</strong> Push the data logger button once will save data one time.</td>
</tr>
<tr>
<td></td>
<td>@ Set the sampling time to 0 second</td>
</tr>
<tr>
<td></td>
<td>@ Manual mode, can also select the 1 to 99 position (Location) no.</td>
</tr>
<tr>
<td><strong>Memory Card</strong></td>
<td>SD memory card. 1 GB to 16 GB.</td>
</tr>
</tbody>
</table>
| Advanced setting | • Set clock time (Year/Month/Date/Hour/Minute/Second)  
|                  | • Decimal point of SD card setting  
|                  | • Auto power OFF management  
|                  | • Set beep Sound ON/OFF  
|                  | • Set thermometer type to Type K or Type J  
|                  | • Set temperature unit to C or F  
|                  | • Set sampling time  
|                  | • SD memory card Format  
| Temperature Compensation | Automatic Temp. Compensation for the Anemometer function and the type K/J thermometer  
| Data Hold | Freeze the display reading  
| Memory Recall | Maximum & Minimum value  
| Sampling Time of Display | Approx. 1 second  
| Operating Temperature | 0 to 50 C  
| Operating Humidity | Less than 85% RH  

<table>
<thead>
<tr>
<th><strong>Power Supply</strong></th>
<th>• Alkaline or heavy duty DC 1.5 V battery (UM3, AA) x 6 PCs, or equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• DC 9V adapter input (AC/DC power adapter is optional)</td>
</tr>
<tr>
<td><strong>Power Current</strong></td>
<td>Normal operation (w/o SD card save data and LCD Backlight if OFF): Appox. DC 15 mA.</td>
</tr>
<tr>
<td></td>
<td>When SD card save the data and LCD Backlight is OFF: Appox. DC 36mA.</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>515 g (1.13 lbs)</td>
</tr>
</tbody>
</table>
**Anemometer**

**A. Air Velocity**

<table>
<thead>
<tr>
<th>Meas.</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>m/S</td>
<td>0.4 ~ 25.0 m/S</td>
<td>0.1 m/S</td>
<td>± (2% + 0.2 m/S)</td>
</tr>
<tr>
<td>km/h</td>
<td>1.4 ~ 90.0 km/h</td>
<td>0.4 kn/h</td>
<td>± (2% + 0.8 km/h)</td>
</tr>
<tr>
<td>mph</td>
<td>0.9 ~ 55.9 mile/h</td>
<td>0.1 mile/h</td>
<td>± (2% + 0.4 mile/h)</td>
</tr>
<tr>
<td>knot</td>
<td>0.8 ~ 48.6 knots</td>
<td>0.1 knots</td>
<td>± (2% + 0.2 m/S)</td>
</tr>
<tr>
<td>FPM</td>
<td>80 ~ 4930 ft/min</td>
<td>1 ft/min</td>
<td>± (2% + 40 ft/min)</td>
</tr>
</tbody>
</table>

*Note:* m/S - meters per second  
km/h - kilometers per hour  
mph - miles per hour  
knot - nautical miles per hour (international knot)  
FPM - feet per minute

**B. Temperature**

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>32 ~ 122 F (0 ~ 50 C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.1 C / 0.1 F</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.8 C / 1.5 F</td>
</tr>
</tbody>
</table>
Humidity/Temp. Meter

A. Humidity

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>0% to 95% RH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.1 %R.H.</td>
</tr>
<tr>
<td>Accuracy</td>
<td>≥ 70% RH: ± (3% reading + 1% RH)</td>
</tr>
<tr>
<td></td>
<td>&lt; 70% RH: ± 3% RH</td>
</tr>
</tbody>
</table>

B. Temperature

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>32 ~ 122 F (0 ~ 50 C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.1 C / 0.1 F</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.8 C / 1.5 F</td>
</tr>
</tbody>
</table>

Light Meter

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>LUX</th>
<th>Ft-cd</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 to 20,000 LUX</td>
<td>0 to 1,860 ft-cd</td>
</tr>
<tr>
<td>Resolution</td>
<td>LUX</td>
<td>Ft-cd</td>
</tr>
<tr>
<td></td>
<td>1 LUX</td>
<td>0.1 Ft-cd</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± (5% rdg ± 8 dgt)</td>
<td></td>
</tr>
</tbody>
</table>
## Type K/J Thermometer

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Res</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type K</td>
<td>0.1 C</td>
<td>-50.0 ~ 1300.0 C</td>
<td>± (0.4% + 0.8 C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50.1 ~ 100.0 C</td>
<td>± (0.4% + 1 C)</td>
</tr>
<tr>
<td></td>
<td>0.1 F</td>
<td>-58.0 ~ 2372.0 F</td>
<td>± (0.4% + 1.5 F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-58.1 ~ 148.0 F</td>
<td>± (0.4% + 1.8 F)</td>
</tr>
<tr>
<td>Type J</td>
<td>0.1 C</td>
<td>-50.0 ~ 1200.0 C</td>
<td>± (0.4% + 0.8 C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50.1 ~ 100.0 C</td>
<td>± (0.4% + 1 C)</td>
</tr>
<tr>
<td></td>
<td>0.1 F</td>
<td>-58.1 ~ 2192.0 F</td>
<td>± (0.4% + 1.5 F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-58.1 ~ 148.0 F</td>
<td>± (0.4% + 1.8 F)</td>
</tr>
</tbody>
</table>

- Accuracy value is specified for the meter only.
- Type K probes are optional accessories.
- Above specification tests under the environment RF Field Strength less than 3 V/M & frequency less than 30 MHz only.
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 within 10 days of purchase.