Environmental Quality Meter with Sound

850069

Instruction Manual

Eastern Energy Co., Ltd.
40/4 Vitoondumri Rd., Banbueng
Banbueng, Chonburi, Thailand

Tel: 66-3844-6117
sale@ete.co.th
www.eastern-energy.com

SPER SCIENTIFIC *Environmental Measurement Instruments*

Environmental Quality Meter with Sound 850069

Printed in the USA

SPER SCIENTIFIC *Environmental Measurement Instruments*

7720 E. Redfield Rd. Suite #7, Scottsdale, AZ 85260
Tel: (480) 948-4448 Fax: (480) 967-8736
Web: www.sperscientific.com

TABLE OF CONTENTS

MATERIALS SUPPLIED

- Meter
- Soft Carrying Case
- Six AAA 1.5 V Batteries
- Instruction Manual

INTRODUCTION

The Sper Scientific Environmental Quality Meter with Sound 850069 is a 5-in-1 instrument that functions as a:

- **Sound-Level Meter**—measures sound levels simulating the human ear using the A Weighting and Fast Time Weighting to meet the International Electrotechnical Commission (IEC) standards (61672, class 2).

- **Light Meter**—measures light using an exclusive photodiode and color-correction-filter, light sensor. Meets the Commission Internationale de l'Eclairage (CIE) photopic standards.

- **Anemometer**—measures wind-speed using a low-friction, ball bearing wheel design to provide exceptional accuracy.

- **Hygrometer**—measures relative humidity using a high-precision humidity sensor with fast response time.

- **Thermometer**—measures temperature using standard Type-K (NiCr-NiAl) thermocouple input jack for all Type-K probes (optionally available).

INTRODUCTION

The rugged, light-weight and portable design of the Environmental Quality Meter allows you to use it almost anywhere to monitor elements and maintain a healthy and safe environment.

Recommended exposure limits for the various elements have been set through government organizations such as the US Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH).

Current recommendations and guidelines are available through these organizations, as well as many others. (Refer to Environment References page 31.)

FEATURES

- Multi-Purpose 5-in-1 Meter
- Rugged, Light-Weight, and Portable
- Accurate and Easy-to-Use
- One-Button Control
- Hold
- Minimum and Maximum Recall
- Multi-Channel Display
- Tripod Mountable
- Data Analysis through PC Connection
- Zero Offset Adjustment
- Easy Calibration

UNIT DESCRIPTION

LCD DISPLAY

Sound–Level Measurement Units	
dB	The decibel (dB) is a logarithmic unit of measure that expresses the power or intensity of an acoustic sound.
Light–Level Measurement Units	
Lux **Ft-cd** **x10**	Both Lux and Ft-cd (Foot Candle) measure luminance. Lux = lumens per square meter. Ft-cd = lumens per square foot . X10 = Value displayed is 1/10 the value.
Air Velocity Measurement Units	
ft/min	Feet per minute
m/S	Meters per second
km/h	Kilometers per hour
MPH	Miles per hour
knots	Nautical miles per hour
Relative Humidity Measurement Units	
%	Relative humidity (RH) is a term used to describe the amount of water vapor that exists in the air and displays as a percentage.
Temperature Measurement Units	
°C/°F	Represents the temperature in either Celsius or Fahrenheit degrees.
Record Mode and Hold Indicators	
REC	Meter is operating in Record Mode.
MAX	Maximum value recorded.
MIN	Minimum value recorded.
HOLD	Meter display is in Hold Mode.

KEY PAD

Turns the unit **on/off**

Freezes current measurement value
Clears recorded min/max values

Enters Record Mode
Displays recorded min/max values

Changes unit of measure for anemometer
Calibrates the light sensor

Changes unit of measure for light meter and temperature scale

Selects measurement mode

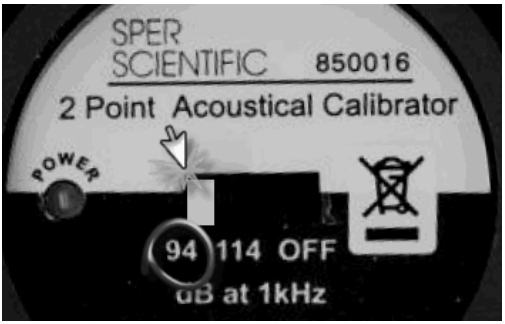
SOUND CALIBRATION

This procedure requires an optional 2-Point Acoustical Calibrator (850016):

1. Using the directions that accompany the Acoustical Calibrator, ensure that the calibrator is operational and is equipped with the ½" microphone adapter.

2. Insert meter's sound probe into the calibrator.

3. Turn the calibrator **on** and select 94 dB.

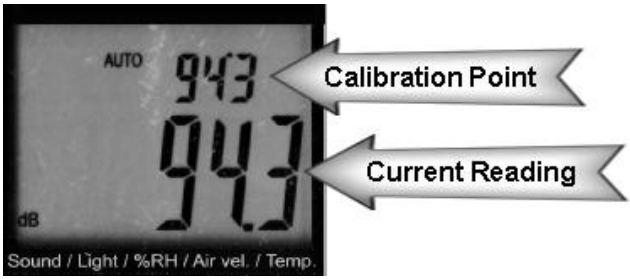


4. Turn the meter **on** and use the **FUNCTION** button to select the Sound –Level meter function.

5. Press **HOLD** and **MAX/MIN** simultaneously for 3 seconds and release.

SOUND CALIBRATION

The meter enters Calibration Mode and displays two values. The upper value is the calibration point. The lower value is the current reading.



Note…
To calibrate the sound meter, you must change the current reading to match the calibration point of the acoustical calibrator (e.g., 94 dB). Press **POWER** at any time to cancel the calibration procedure.

6. Press °**C/**°**F** to increase the calibration point value or press **Function** to decrease the value to match the desired calibration setting.

7. Press **MAX/MIN** to accept the calibration point. The meter display flashes to indicate that the meter is ready to save the calibration data.

SOUND CALIBRATION

8. Press **UNIT** to save the calibration data, exit Calibration Mode, and resume measurement.

9. To calibrate the Sound-Level meter to a second set-point (114 dB), set the Acoustical Calibrator to 114 dB and repeat steps 4 through 7.

Note…
The 114 dB calibration point displays as a double-digit decimal instead of the full value (i.e., 13.8 instead of 113.8).

MEASUREMENT PROCEDURES

Sound-Level Measurement

1. Ensure that the sound sensor at the top of the meter is free from obstruction.

2. Hold the meter with the sound sensor pointing toward the noise source and press **POWER** to turn the meter **on**.

3. Press **FUNCTION** continuously until the meter displays the dB sound-level measuring unit.

4. The meter measures the sound level of the surrounding noise and displays the value in decibels.

Light-Level Measurement

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

2. Press **FUNCTION** until the meter displays the Lux or Ft-cd light-level measuring unit.

MEASUREMENT PROCEDURES

3. Press **LUX/FT-CD** to select between Lux and Ft-cd.

4. To ensure measurement accuracy, calibrate the light meter using the Zero-Offset adjustment feature.

5. Cover the light sensor to block any light from registering on the meter. Press **ZERO** to calibrate the meter to zero.

   The meter displays the light-level value as 0 and is ready to measure light, even in low-lit and dark areas.

6. Uncover the light sensor and ensure that the light sensor on the front of the meter is pointing toward the lumination subject and is free from obstruction.

7. The meter measures the light level of the surrounding environment and displays the reading.

When measuring intense light, the meter displays x10 to indicate that the value displayed is 1/10 the actual value.

MEASUREMENT PROCEDURES

Air-Velocity Measurement

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

2. Continuously press **FUNCTION** until the meter displays the wind-speed and ambient temperature measuring units (ft/min, m/S, km/h, MPH, knots, °C, °F).

   Because the anemometer readings are taken while holding the meter upside-down, the values display upside-down on the LCD (180° from the other function displays).

3. Holding the meter upside-down, continuously press **UNIT** to select the desired wind-speed measuring unit.

4. Press °**C/**°**F** to select between a Celsius (°C) and Fahrenheit (°F) temperature reading.

MEASUREMENT PROCEDURES

5. Ensure that the air flow sensor is free from obstruction and face the air-flow sensor in the direction of the wind.

6. The meter measures the wind-speed and ambient temperature of the surrounding environment and displays the value.

Relative Humidity Measurement

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

2. Continuously press **FUNCTION** until the meter displays the relative humidity and ambient temperature measuring units (%RH, °C, °F).

   Because the hygrometer readings are taken while holding the meter upside-down, the measurement values display upside-down on the LCD (180° from the other function displays).

3. Holding the meter upside-down, press °**C/**°**F** to select between a Celsius (°C) and Fahrenheit (°F) temperature reading.

4. Ensure that the humidity sensor is free from obstruction.

5. The meter measures the relative humidity and ambient temperature of the surrounding environment and displays the value.

Note…
When moving the meter to a new environment, it may take a few minutes for the humidity readings to stabilize.

Thermocouple Temperature Measurement

This procedure requires an optional Type-K thermocouple probe.

1. Press **POWER** to turn the meter **on**.
2. Ensuring correct polarity (**+ –**), carefully plug a Type-K thermocouple probe into the Temperature Thermocouple Input Port at the bottom of the meter.

   Temperature differences between the probe and the meter may cause inaccurate results. Allow a few minutes for the probe and meter to adjust to ambient temperature.

MEASUREMENT PROCEDURES

3. Continuously press **FUNCTION** until the meter displays the temperature measuring unit (°C, °F).

4. Press °**C/**°**F** to select between a Celsius (°C) and Fahrenheit (°F) temperature reading.

5. Make contact between the thermo-couple sensor probe and the object or area you want to measure.

6. The meter measures the temperature of the object or area and displays the value.

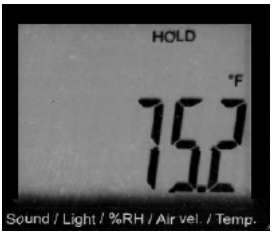
Hold Mode Selection

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

2. Using the **FUNCTION** button, select your desired measurement function (Sound, Light, Air-Velocity, Relative Humidity, or Temperature).

3. When a value displays that you want to retain, press **HOLD**.

The meter freezes the current measurement value and discontinues measurement while in Hold Mode.



4. Press **HOLD** again to exit Hold Mode and resume measurement.

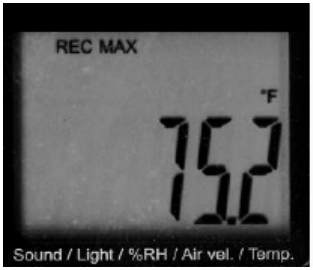
Record Mode & Auto-Off Selection

To save battery life, the Environmental Quality Meter turns **off** automatically after 10 minutes of inactivity. To override this feature:

1. With the meter turned **on**, press **MAX/ MIN**. The meter displays REC, disables the Auto-Off feature, and enters Record Mode.

2. While the meter displays REC, you can view both the maximum and minimum measured values by pressing the **MAX/ MIN** button.

   The **MAX/MIN** button toggles between the maximum and minimum measured values.



3. To clear the MAX/MIN values and continue recording, press **HOLD**. The meter clears the previously recorded MAX/MIN values and enters Record Mode.
4. To exit the Record Mode, press and hold **MAX/MIN** for 2 seconds.

   The meter exits Record Mode, displays the current reading value, and resets to automatically turn **off** after 10 minutes of inactivity.

Data Analysis

The Environmental Quality Meter includes a RS232 port (3.5 mm jack plug) to

connect your meter to a PC to store, analyze, and print data.

RS232 Cable (840057), RS232-to-USB adapter cable (840094), and Data Acquisition Software (850080) are available as optional accessories.

The software interface protocol is 9600 bps, 8 data bits, with no parity and 1 stop bit.

Format:

D15 D14 D13 D12 D11 D9 D8 D7 D6 D5 D4 D3 D2D1 D0

D15	Start Word = 02
D14	4
D13	When sending the upper display data = 1 When sending the lower display data = 2
D12 & D11	Annunciator for Display °C = 01 °F = 02 m/S = 08 km/h = 10 mph = 12 knot = 09 Ft-cd = 16 %RH = 04 LUX = 15 FPM = 11 dB = 17
D10	Polarity: 0= Positive 1= Negative
D9	Decimal Point (DP), position from right to left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP
D8 to D1	Display reading, D8 = MSD, D1 = LSD Example: Display is 1234, then D8 to D1 is 00001234
D0	End Word =0D

MEASUREMENT PROCEDURES

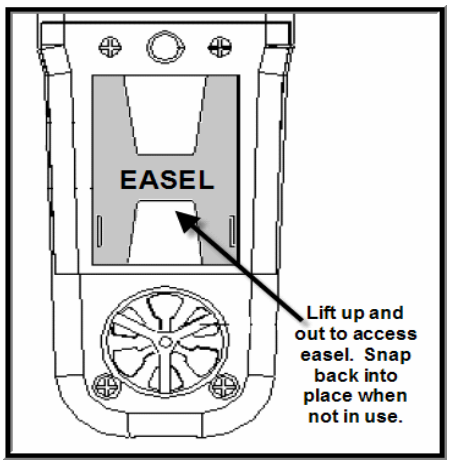
Hands-Free Operation

The Environmental Quality Meter includes both a built-in mini-easel and a tripod screw-mount for easy hands-free monitoring.

Bench-Top (840092) and Field (840093) Tripods are available as optional accessories and attach simply via the screw-mount located on the back of the meter.

To use the easel:

1. Lift up the easel's bottom edge and extend out using the easel's hinge.
2. Using the mini-easel, you can stand the meter on any stable surface for hands-free, long-term monitoring.
3. When finished monitoring, lightly collapse the easel back into place.



BATTERY REPLACEMENT

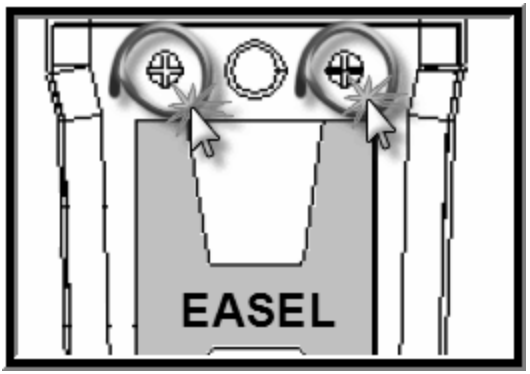
1. If the meter displays the low battery icon  , press **POWER** to turn the meter **off**.

2. Use a small Philips screwdriver to unscrew the two screws that secure the battery compartment and remove the cover.

3. Remove the old batteries and replace with 6 new AAA batteries, ensuring correct polarity.

4. Replace the compartment cover and re -secure using the two Philips-head screws.

Note…
The battery life is greater than 1000 hours when using alkaline batteries (250 hours when using general purpose batteries).



TROUBLESHOOTING

No Display:

- Ensure that you have pressed **POWER** for longer than 100mS.
- Ensure that the batteries are in good condition, have proper contact, and are in correct polarity. When in doubt, replace the batteries. (Refer to Battery Replacement page 24.)

Display Disappeared:

- If the low battery indicator appeared on the LCD before the display disappeared, replace the batteries. (Refer to Battery Replacement page 24).
- Disable the Auto-Off function and place the unit in Record Mode. (Refer to Record Mode and Auto-Off Selection page 20).

ERROR CODES

- - - - Measurement is out-of range.

 Indicates low battery, replace batteries.

SPECIFICATIONS

General Specifications	
Size	9.8” (H) x 2.8” (W) x 1.3” (D) 248 mm (H) x 70 mm (W) x 34 mm (D)
Weight	11.8 oz. (335g) Including Batteries
Power Supply	DC 1.5 V battery (UM4, AAA) x 6 Or DC 9V adapter input
Power Consumption	Anemometer: Approx. DC 11 mA. Other functions : Approx. DC 7.5 mA.
Operating Temp	0 to 50°C (32 to 122°F)
Operating Humidity	Maximum 80% RH
Display Size	1.24” (H) x 1.64” (W) 31.5 mm (H) x 41.5 mm (W)
RS232 Protocol	9600 bps, 8 data bits, no parity
Response Time	Typically 15 seconds

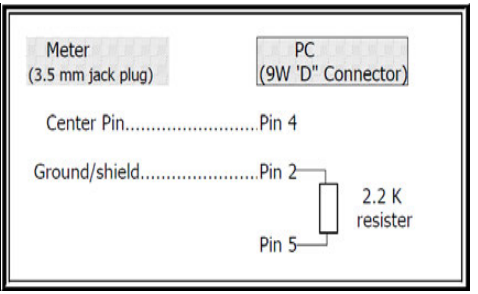
SPECIFICATIONS

Light & Sound Meter Specifications			
Unit	**Range**	**Resolution**	**Accuracy**
Lux	0 ~ 2,000 Lux 1800 ~ 20,000 Lux	1 Lux 10 Lux	±5% rdg ±8 dgt
Ft-cd	0 ~ 204.0 Ft-cd 170 ~ 1860 Ft-cd	0.1 Ft-cd 1 Ft-cd	
dB	35 ~ 130 dB	0.1 dB	± 1.5 dB @ 23±5°C
Acoustic Range		35 to 130 dB	
Acoustic Frequency		31.5 Hz to 8	
Microphone Type		Electric condenser 1/2”	
**rdg (reading), dgt (digital)*			

Anemometer Specifications			
Unit	**Range**	**Resolution**	**Accuracy**
ft/min	80 ~ 5910 ft/min	1 ft/min	≤20 m/S ±3% F.S. >20 m/S ±4% F.S.
m/S	0.4 ~ 30.0 m/S	0.1 m/S	
km/h	1.4 ~ 108.0 km/h	0.1 km/h	
MPH	0.9 ~ 67.0 MPH	0.1 MPH	
knots	0.8 ~ 58.3 knots	0.1 knots	
** F.S. =Full Scale*			

SPECIFICATIONS

Thermometer & Hygrometer Specifications			
Unit	**Range**	**Resolution**	**Accuracy**
°C (Ambient)	0 ~ 50 °C	0.1 °C	±1.2 °C
°F (Ambient)	32 ~ 122 °F	0.1 °F	±2.5 °F
°C (Type-K)	-100 ~ 1300 °C	0.1 °C	±1% rdg + 1 °C
°F (Type-K)	-148 ~ 2372 °F	0.1 °F	±1% rdg + 2 °F
%RH	10 ~ 95 %RH	0.1 %RH	<70% RH ±4% RH >70 RH ±4% rdg + 1.2% RH
** rdg (reading)*			

RS232 Interface Cable **3.5 mm Jack Plug**	

OPTIONAL ACCESSORIES

- 800060~77 Type-K Thermocouple Probes
- 840057 RS232 Cable
- 840092 Bench-Top Tripod
- 840093 Field Tripod
- 840094 RS232-to-USB Adaptor Cable
- 840097 AC Adaptor
- 850016 2-Point Acoustical Calibrator
- 850080 Software

ENVIRONMENT REFERENCES

Refer to any of the following organizations for current and reliable data regarding recommended exposure limits for the various elements.

- American Conference of Governmental Industrial Hygienists (www-acgih.org).
- American Industrial Hygiene Association (www.aiha.org).
- Canadian Centre for Occupational Health & Safety (www.ccohs.ca).
- Commission Internationale de l'Eclairage (www.cie.co.at).
- Environmental Protection Agency (www.epa.gov).
- International Electrotechnical Commission (www.iec.ch).
- International Organization for Standardization (www.iso.org).
- National Climatic Data Center (www.ncdc.noaa.gov).
- National Institute for Occupational Safety and Health (www.cdc.gov/niosh).
- US Occupational Safety and Health Administration (www.osha.gov).

WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for one (1) 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 damage resulting from accident, misuse, or abuse of the product. To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.
7720 E. Redfield Rd, Suite 7,
Scottsdale, AZ 85260
Email: info@sperscientific.com

Be sure to include a description of the problem and your return address. Register your product online at www.sperscientific.com or return your warranty card within 10 days.

RoHS Compliant
2002/95/EC

CE