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# Manual Sound Level Meter PCE-EM 882



## 4 IN 1

**SOUND LEVEL**

**LIGHT**

**HUMIDITY**

**TEMPERATURE**

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## 1. INTRODUCTION

The 4 in 1 digital multi- Multi-Function Environment Meter has been designed to combine the functions of Sound Level Meter, Light Meter, Humidity Meter, and Temperature Meter. It is an ideal Multi-Function Environment Meter Instrument with scores of practical applications for professional and home use.

The Sound Level function can be used to measure noise in factories, schools, offices, airports, home, etc., checking acoustics of studios, auditoriums and hi-fi installations.

The Light function is used to measure illuminance in the field. It is fully cosine corrected for the angular incidence of light. The light sensitive component used in the meter is a very stable, long life silicon diode.

The Humidity/Temperature is for use a humidity/semiconductor sensor and K type thermocouple. This operations manual contains general information and specification

## 2. FEATURES

- 4 functions measure Sound level, Light, Humidity and Temperature
- 3 1/2 large LCD display with units of Lux, °C , %RH and C & dB, A & dB indication.
- Easy to use
- Light measuring levers ranging from 0.01 lux to 20,000 lux.
  
- Sound level range:
  - A LO (low) – Weighting: 35-100 dB
  - A HI (High)- Weighting: 65-130 dB
  - C LO (low) – Weighting: 35-100 dB
  - C HI (High)- Weighting: 65-130 dB
 Resolution: 0.1 dB
- Humidity measurement from 25%RH to 95%RH with 0.1%RH resolution and fast time response.
- Temperature measuring levers ranging from – 20.0°C ~ + 750°C / -4°F ~ + 1400°F

### 3. SPECIFICATIONS

**Display:** Large 1999 counts LCD display with function of Lux,  $\times 10$  Lux,  $^{\circ}\text{C}$ ,  $^{\circ}\text{F}$ , %RH and dB, A & dB, C & dB, Lo & dB, Hi & dB, MAX HOLD, DATA HOLD indication.

**Polarity:** Automatic, (-) negative polarity indication.

**Over-range:** "OL" mark indication.

**Low battery indication:** The "BAT" is displayed when the battery voltage drops below the operating level.

**Measurement rate:** 1.5 times per second, nominal.

**Storage temperature:**  $-10^{\circ}\text{C}$  to  $60^{\circ}\text{C}$  ( $14^{\circ}\text{F}$  to  $140^{\circ}\text{F}$ ) at  $< 80\%$  relative humidity

**Auto Power Off:** Meter automatically shuts down after approx. 10 minutes of inactivity.

**Power:** One standard 9V, NEDA1604 or 6F22 battery.

**Dimensions/Wt.:** 251.0 (H) x 63.8 (W) x 40 (D) mm/250g

**Photo Detector Dimensions:** 115 X 60 X 27 mm

#### Sound Level

Measurement range:

A LO (low) – Weighting: 35-100 dB

A HI (High)- Weighting: 65-130 dB

C LO (low) – Weighting: 35-100 dB

C HI (High)- Weighting: 65-130 dB

Resolution: 0.1 dB

**Typical instrument frequency range:** 30Hz-10KHz

**Frequency Weighting:** A, C –weighting

**Time Weighting:** Fast

**Maximum Hold:** Decay  $< 1.5\text{dB}/3$  min

**Accuracy:**  $\pm 3.5$  dB at 94 dB sound level, 1KHz sine wave.

**Microphone:** Electric condenser microphone.

#### Light

**Measuring Range:** 20, 200, 2000, 20,000lux

(20,000lux range reading  $\times 10$ )

**Overrate Display:** Highest digit of "1" is displayed.

**Accuracy:**  $\pm 5\%$  rdg + 10 dgts (calibrated to standard incandescent lamp at colour temperature 2856k).

**Repeatability:**  $\pm 2\%$ .

**Temperature Characteristic:**  $\pm 0.1\%/^{\circ}\text{C}$

**Photo detector:** One silicon photo diode with filter.

#### Humidity/Temperature

**Measurement Range:**

Humidity 25% ~ 95%RH

**Temperature**  $-20.0^{\circ}\text{C}$  -  $+ 50.0^{\circ}\text{C}$   $-4^{\circ}\text{F}$  -  $+ 122^{\circ}\text{F}$

**(K-type)**  $-20.0^{\circ}\text{C}$  -  $+ 200.0^{\circ}\text{C}$   $-20^{\circ}\text{C}$  -  $+ 750^{\circ}\text{C}$ ;

$-4.0^{\circ}\text{C}$  -  $+ 200^{\circ}\text{C}$ ,  $-4^{\circ}\text{F}$  -  $+ 1400^{\circ}\text{F}$ .

**Resolution:** 0.1%RH, 0.1 $^{\circ}\text{C}$ , 1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ , 1 $^{\circ}\text{F}$ .

**Accuracy (after calibration):**

**Humidity:**  $\pm 5\%$  RH (at  $25^{\circ}\text{C}$ , 35% ~ 95%RH)

**Response time of the humidity sensor:** approx. 6min.

**Temperature:**

$\pm 3\%$ rdg  $\pm 2^{\circ}\text{C}$  (at  $-20.0^{\circ}\text{C}$  ~  $+200.0^{\circ}\text{C}$ )

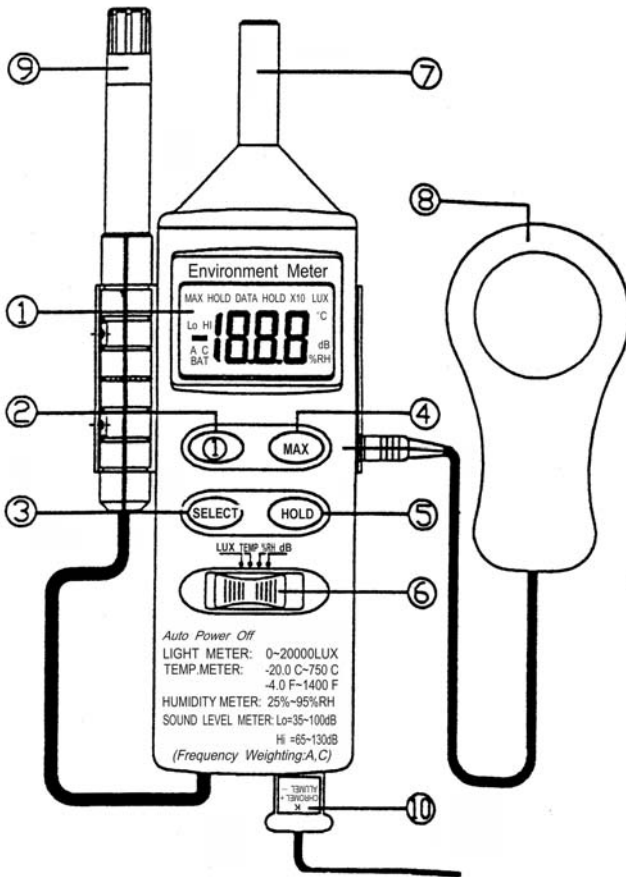
$\pm 3.5\%$ rdg  $\pm 2^{\circ}\text{C}$  (at  $-20.0^{\circ}\text{C}$  ~  $+750^{\circ}\text{C}$ )

$\pm 3\%$ rdg  $\pm 2^{\circ}\text{F}$  (at  $-4.0^{\circ}\text{F}$  ~  $+200.0^{\circ}\text{F}$ )

$\pm 3.5\%$ rdg  $\pm 2^{\circ}\text{F}$  (at  $-4^{\circ}\text{F}$  ~  $+1400^{\circ}\text{F}$ )

Input Protection: 60V dc or 24V ac rms.

## 4. PANEL DESCRIPTION



1. LCD display: 3 1/2 digits LCD display with units of Lux, x10 Lux, , %RH, dB, A, C, Lo, Hi and low battery "BAT" MAX HOLD, DATA HOLD indication.
2. Power Button: Selects meter's power ON or power OFF.
3. Selection Button: Selects meter's Functions and ranges.
4. MAX HOLD: If you press the MAX button, the maximum reading will be held. Press once again the button, will release the hold and allow a further measurement.
5. DATA HOLD: The reading will be held when Data Hold button Switch is pressed. If the button Switch is pressed once again, will release the hold and allow a further measurement.
6. Function Switch: Selects measurement functions of Lux, Temperature, Humidity and Sound Level.
7. Microphone: Electric condenser microphone inside.
8. Photo Detector: Long life silicon photo diode inside.
9. Humidity at Temperature: Humidity Sensor and Semiconductor Sensor inside.
10. Temperature Terminal: Insert the temperature probe in this terminal.

## 5. OPERATING INSTRUCTION

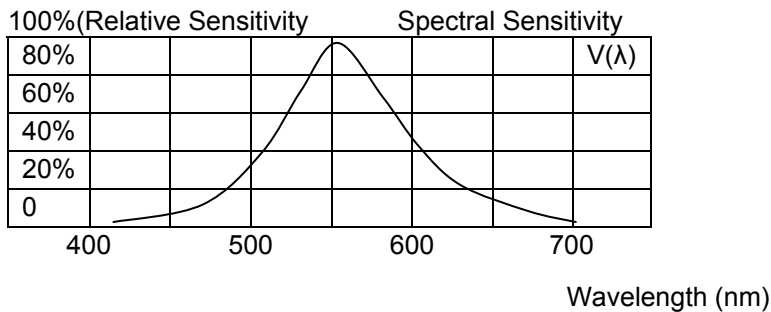
### Measuring Sound Level

1. Turn the function Switch to "dB" position.
2. Remove the meter and face the microphone to sound source in a horizontal position.
3. Press Select Button: Selects A & dB, C & dB, Lo & dB and Hi & dB.
4. The A, C-weighting curve is nearly uniform over the frequency range form 30 to 10 KHz, thus giving an indication of overall Sound level.
5. The Fast response is suitable to measure shout bursts and peak values form sound source.
6. The sound level will be displayed.
7. Note: Strong wind (over 10m/sec.) striking the microphone can cause misreading for measurement in windy locations; a windscreen should be used in front of microphone.

### Measuring Light

1. Turn the function Switch to select the "Lux"
2. Remove the detector and face the photo detector to light source in a horizontal position.
3. Press Select Button: Selects 20, 200, 2000, 20,000 LUX ranges.
4. Read the illuminance nominal from the LCD display.
5. Over-range: If the instrument only display one "1" in the M.S.D. the input signal is too strong, and a higher range should be selected.
6. When the measurement is completed. Replace the photo detector from the light source.

7. Spectral sensitivity characteristic: To the detector, the applied photo diode with filters makes the spectral sensitivity characteristic almost meet C.I.E. (International Commission on Illumination) photopia curve  $V(\lambda)$  as the following chart described.



8. Recommended Illumination:

Locations	Lux
<b>*Office</b>	
Conference, Reception room.	200 ~ 750
Clerical work	700 ~ 1,500
Typing drafting	1000 ~ 2,000
<b>*Factory</b>	
Packing work, Entrance passage	150 ~ 300
Visual work at production line	300 ~ 750
Inspection work	750 ~ 1,500
Electronic parts assembly line	1500 ~ 3,000
<b>*Hotel</b>	
Public room, Cloakroom	100 ~ 200
Reception, Cashier	200 ~ 1,000
<b>*Store</b>	
Indoors Stairs Corridor	150 ~ 200
Show window, Packing table	750 ~ 1,500
Forefront of show window	1500 ~ 3,000
<b>*Hospital</b>	
Sickroom, Warehouse	100 ~ 200
Medical Examination room	300 ~ 750
Operation room	
Emergency Treatment	750 ~ 1,500
<b>*School</b>	
Auditorium, Indoor Gymnasium	100 ~ 300
Class room	200 ~ 750
Laboratory Library Drafting room,	500 ~ 1,500

Measuring Humidity / Temperature

1. Humidity Measurement:

- ① Set the function Switch to "%RH" position.
- ② Then the display will show the humidity reading value (%RH) directly.
- ③ When the tested environment humidity value changed. It need to a few minutes to get the stable "%RH" reading.

**Warning:**

Don't expose the humidity sensor to direct sunlight.  
Don't touch or manipulate the humidity sensor.

2. Temperature Measurement:

- ① Set the function Switch to "TEMP"
- ② Press Select Button: Selects "0.1°C or 1°C and 0.1°F or 1°F" range.
- ③ Then the display will show the environment temperature reading value (°C/°F) directly.



- ④ Insert the temperature probe into the K-type thermocouple socket.
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- ⑤ Touch the end of the temperature sensor to the area or surface of the object to be measured. The display will show the temperature reading value (°C/°F) directly.

**Warning:**

When function switch on temperature "0.1°C or 1°C and 0.1°F or 1°F" range, never attempt a voltage measurement with the test leads inserted into the K-type thermocouple socket. You might be injured or damage the meter.

## 6. MAINTENANCE

### ***Battery Replacement***

If the sign "BAT" appears on the LCD display, it indicates that the battery should be replaced. Open the battery case and replace the exhausted battery with new battery. (1 x 9V battery NEDA 1604, 6F22 or equivalent)

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**NOTE:** "This instrument doesn't have ATEX protection, so it should not be used in potentially explosive atmospheres (powder, flammable gases)."