

**Test Equipment
Depot**
1-800-517-8431

99 Washington Street
Melrose, MA 02176
Fax 781-665-0780
TestEquipmentDepot.com

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OPERATING INSTRUCTIONS
for
AMPROBE®



**Digital Illuminance Meter
Model LM-80**



AMPROBE.
A United Dominion Company

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LIMITED WARRANTY

Congratulations! You are now the owner of an AMPROBE® Instrument. It has been quality crafted according to the highest standards of quality and workmanship. This instrument has been inspected for proper operation of all its functions and tested by qualified factory technicians according to the long-established standards of AMPROBE®.

Your AMPROBE® instrument has a limited warranty against defective materials and/or workmanship for one year from the date of purchase provided that the seal is unbroken or, in the opinion of the factory, the instrument has not been tampered with or taken apart.

Should your instrument fail due to defective materials, and/or workmanship during the one year warranty period, return it along with a copy of your dated bill of sale which must identify instrument by model number and manufacturing number.

IMPORTANT: For your protection, please use the instrument as soon as possible. If damaged, or should the need arise to return your instrument, place it in a shipping carton packed with sufficient packing material. It must be securely wrapped. Amprobe is not responsible for damage in transit. Be sure to include a packing slip (indicating model and manufacturer number) along with a brief description of the problem. Make certain your name and address appears on the box as well as the packing slip.

INTRODUCTION

The digital illuminance meter is a precision instrument used to measure illuminance (lux, footcandle) in the field. It is fully cosine corrected for the angular incidence of light. The illuminance meter is compact, tough and easy to handle owing to its construction. The light sensitive component used in the meter is a very stable, long-life silicon diode with filter.

NOMENCLATURE AND FUNCTIONS

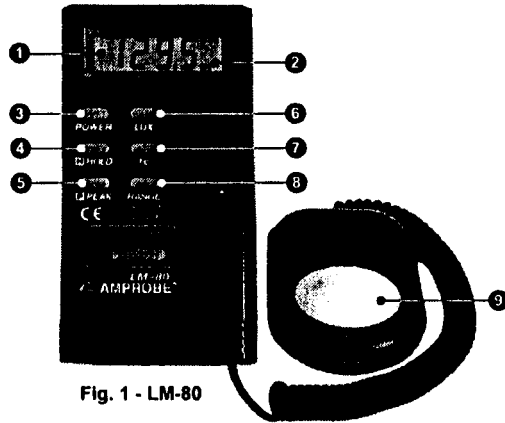


Fig. 1 - LM-80

1. LCD Display: 3-1/2 digit displays with a maximum reading of 1999, and the indicating signs of:

- A. Peak Hold: P
- B. Data Hold: H
- C. Low Battery: BT
- D. fc - footcandle
- E. Range: 20, 200 and 20,000 x10 (reading x 10)
- F. Lux

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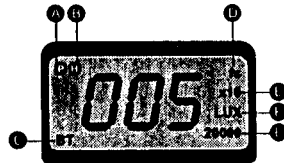
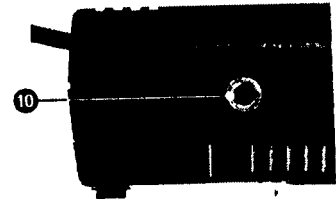


Fig. 2 - LM-80 Display

2. Range Indicator: Switches between 20, 200, 2,000 and 20,000 lux/fc ranges, respectively.
3. Power Switch: The power switch key turns the illuminance meter ON or OFF.
4. Data-Hold Switch: Pressing the HOLD key selects HOLD mode. When HOLD mode is selected, the illuminance meter stops all further measurements. Pressing the HOLD key again cancels HOLD mode, causing the illuminance meter to resume taking measurements.
5. PEAK-HOLD switch: Pressing the PEAK-HOLD key selects PEAK-HOLD mode. When PEAK-HOLD mode is selected, the meter will trace the peak signal of light pulse and hold it. Pressing the PEAK-HOLD key again cancels PEAK-HOLD mode, causing the meter to fetch general-purpose measuring.
6. Lux: Pressing the Lux key selects taking measurements of illuminance in the lux scale.
7. fc: Pressing the fc key selects taking measurement of illuminance in footcandle scale; and, 1 footcandle=10.76 lux.
8. Range Switch: Pressing the range key changes 20, 200, 2,000 and 20,000 lux/fc ranges, circularly.
9. Photo Detector:
10. Analog D.C. Output: DC+ on pin and intermediate connector, Ground on sleeve.

Fig. 3 - Analog D.C. Output



11. Tilt Stand (Back): allows the LM-80 to sit in a 45° angle for hands free measurement.

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OPERATION

1. Power-up, Press the power key to turn the meter ON or OFF.
2. Selecting the lux or fc scale: Set the range selection switch to desired lux or fc range.
3. Remove the photo detector cap and face it light source in a horizontal position
4. Read the illuminance nominal from the LCD display.
5. Overrange: If the instrument only display a one "1" in the M.S.D., the input signal is too strong, and a higher range should be selected.
6. Data-Hold mode: Press the HOLD key to select HOLD mode. When HOLD mode is selected, the illuminance meter stops all further measurements. Press the HOLD key again to cancel HOLD mode. Then it resumes normal operation.
7. Peak-Hold mode: Press the PEAK key to select PEAK mode and expose the photo detector to light pulse measuring field. Press the PEAK key again to cancel PEAK mode, then the meter will resume normal operation.
8. When the measurement is completed, replace the photo detector cap and turn the power selector OFF.

MAINTENANCE

1. The white plastic disc on the top of the detector should be cleaned with a damp cloth when necessary.
2. Do not store the instrument where temperature or humidity is excessively high.
3. The reference level, as marker on the face plate, is the tip of the photo detector globe.
4. The calibration interval for the photo detector will vary according to operational conditions, but generally the sensitivity decreases in direct proportion to the product of luminous intensity by the operational time. In order to maintain the basic accuracy of the instrument, periodic calibration is recommended.

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BATTERY REPLACEMENT

1. As the battery power is not sufficient, LCD will display "BT" and, replacement of one new battery type 9V is required.
2. After turning off the meter, press the battery cover and push in the direction of the arrow to open.
3. Disconnect the battery from the instrument and replace it with a standard 9V transistor battery and go for the cover.

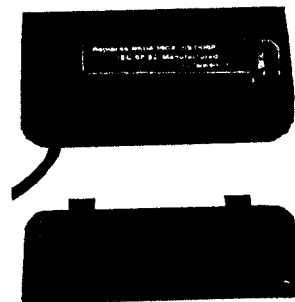


Fig. 4 - LM-80 with battery cover removed

RECOMMENDED ILLUMINATION

You may easily obtain the desired illuminance nominal about foot-candle from the product of the recommended lux, offered below in the field, divided with the factor 10.76.

| LOCATIONS | LUX | |
|----------------------------|--------|-------|
| OFFICE | | |
| Conference, Reception room | 200 ~ | 750 |
| Clerical work | 700 ~ | 1,500 |
| Typing drafting | 1000 ~ | 2,000 |

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SPECTRAL SENSITIVITY CHARACTERISTIC

The photo diode detector with filters allows the spectral sensitivity characteristic to almost meet C.I.E. (INTERNATIONAL COMMISSION ON ILLUMINATION) photopic curve $V(\lambda)$ as indicated in the following chart described.

FACTORY

| | |
|--------------------------------|--------------|
| 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 |

HOTEL

| | |
|------------------------|------------|
| Public room, Cloakroom | 100 ~ 200 |
| Reception | 200 ~ 500 |
| Cashier | 750 ~ 1000 |

STORE

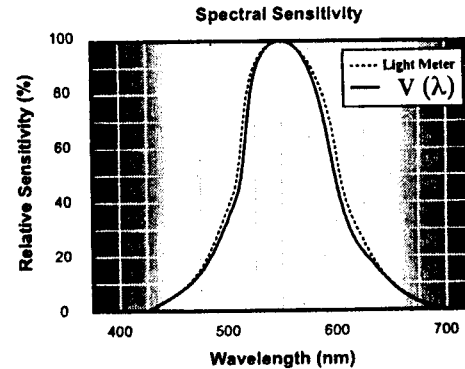
| | |
|----------------------------|--------------|
| Indoors Stairs Corridor | 150 ~ 200 |
| Show window, Packing table | 750 ~ 1,500 |
| Forefront of show window | 1500 ~ 3,000 |

HOSPITAL

| | |
|--------------------------|-------------|
| Sickroom, Warehouse | 100 ~ 200 |
| Medical Examination room | 300 ~ 750 |
| Operating room | 750 ~ 1,500 |
| Emergency Treatment | 750 ~ 1,500 |

SCHOOL

| | |
|-------------------------------------|-------------|
| Auditorium, Indoor Gymnasium | 100 ~ 300 |
| Class room | 200 ~ 750 |
| Laboratory, Library, Drafting, room | 500 ~ 1,500 |



FEATURES

- Light-measuring levers ranging from 0.01 lux/ftc to 20,000 lux/ftc, repeatedly.
- High accuracy and rapid response.
- Data-hold function for holding measuring values.
- Unit and sign display for easy reading.
- Automatic zeroing
- Meter corrected for spectral relative efficiency.
- Correction factor need not be manually calculated for non-standard light sources.
- Short rise and fall times.
- Peak-hold function for tracing the peak signal of light pulse with least duration 50.0 ms and keeping it. Approximately, the held-on nominal withers 1 digit per 10 seconds.
- Capable of selecting measuring mode in lux or ftc scale, alternatively.
- Additional analog output.

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SPECIFICATIONS

- **Display:** 3-1/2 digit LCD.
- **Measuring Range:**
20, 200, 2,000, and 20,000 lux/ftc (20,000 lux/ftc range reading $\times 10$)
- **Over range Display:** Highest digit of "1" is displayed.
- **Accuracy:** $\pm 3\%$ rdg $\pm 0.5\%$ f.s.
($\pm 4\%$ rdg ± 10 dgts as $> 10,000$ lux/ftc range).
(calibrated to standard incandescent lamp at color temperature 2856K).
- **Repeatability:** $\pm 2\%$
- **Temperature Characteristics:** $\pm 0.1\%$ / $^{\circ}\text{C}$
- **Measuring Rate:** Approximately 2.0 time/sec.
- **Operating Temperature and Humidity:**
32 $^{\circ}\text{F}$ to 104 $^{\circ}\text{F}$ (0 $^{\circ}\text{C}$ to 40 $^{\circ}\text{C}$), 0% to 80% RH.
- **Storage Temperature and Humidity:**
14 $^{\circ}\text{F}$ to 140 $^{\circ}\text{F}$ (-10 $^{\circ}\text{C}$ to 60 $^{\circ}\text{C}$), 0% to 70% RH.
- **Power Source:**
One 9 Volt battery, NEDA 1604 or JIS 006P or IEC 6F22.
- **Battery life (typical):** 200 hours (Alkaline Battery)
- **Photo Detector:** One silicon photo diode with filter.
- **Photo Detector Lead Length:** 150 cm (approx.)
- **Photo Detector Dimensions:**
94"(L) \times 2.36"(W) \times 1.06"(H) (100 \times 60 \times 27mm)
- **Dimensions:** 31"(L) \times 2.83"(W) \times 1.06"(H) (135 \times 72 \times 33mm)
- **Weight:** 250g (8.8oz)
- **Accessories:** Carry case, instruction manual, battery.

- **Analog output:**
standard jack output (3.5mm, 3pole coaxial) 1mVDC /1 digit

Range: 20 lux / ftc, 10mV per lux / ftc
200 lux / ftc, 1mV per lux / ftc
2,000 lux / ftc, 0.1mV per lux / ftc
20,000 lux / ftc, 0.1mV per 10 lux / ftc

Add basic accuracy: $\pm 0.5\%$ of LCD reading