TENMARS

LUX/FC LED Light Meter
TM-201L / TM-209

CE

User's manual

CONTENTS

1. Description

Measures light from visible luminaries equipped with white light LED, fluorescent, metal halide, high-pressure sodium and incandescent sources.

2. Safety Precaution

	CAUTION
⚠	Take extreme care for the following conditions while measuring

- Do not operate the meter under the environment with explosive gas (material), combustible gas (material) steam or filled with dust.
- In order to avoid reading incorrect data, please replace the battery immediately when the symbol "🔋" appears on the LCD.
- In order to avoid the damage caused by contamination or static electricity, do not touch the circuit board before you take any adequate action.
- Operating Environment: Indoors use. This instrument has been designed for being used in an environment of pollution degree 2.
- Operation Altitude: Up to 2000M.
- Operating Temperature & Humidity: 5℃ ~ 40℃, 0%~ 80%RH.
- Storage Temperature & Humidity: -10℃ ~ 60℃, 0%~ 70%RH.
- EMC: EN61326-1(2006), IEC 61000-4-2(2008, IEC 61000-4-3(2006) + (2007).

3. Preface

The flux of light received in a unit area of a certain side being show is popularly known as illumination. In both United Kingdom and America its unit is known as footcandles light, but in Europe it is known as meter candlelight.
One foot-candles light is the illumination of light that falls on one side that lies in a distance one foot away from a one foot-candlelight and exactly intersecting the light. Its abbreviated form is written as 1 Fc=1 Lm/ft, similarly, one-meter candlelight is the illumination of light that falls on a side that lies in a distance one meter away from a one meter candlelight and exactly intersects the light. It is also called Lux i,e. the flux of light being received in each sq. meter is called the illumination of one lumen.

1 FC=10.764 LUX, 1 LUX=0.09290 FC,
therefore,Nbr. of foot (meter) candlelight =

$$\frac{\text{Nbr. of Lumen}}{\text{Area(sq. foot or sq. meter)}}$$

Nbr. of Lumen=Nbr. of foot (or meter)x area

4. Features

- Overload Indication: LCD will show “OL” in the left highest position.
- Low battery Indication”  .
- Sampling Rate: 2.5 times per second for digital display.
- Spectral response close to CIE luminous spectral efficiency.
- Cosine Angular corrected.
- According to JIS C 1609:1993 and CNS 5119 general A class Specifications.
- Measuring lights source: LED white light and all visible light.
- Measuring intensities of illumination in Lux or footcandles.
- Many applications include: Warehouses, factories, office buildings, restaurants, schools, library, hospitals, photographic, many video, parking garages, museums, art galleries, stadiums, building security.
- Data hold.
- Maximum hold.(TM-201L)
- Maximum/Average/Minimum Hold.(TM-209)
- Zero adjustment.
- Auto power off and disable function.(TM-209)
- Auto ranging.(TM-209)

5. Specifications

Display of TM-201L	2000 count, maximum display 1999	
Display of TM-209	4000 count, maximum display 3999	
Sensor	Silicon photodiode and filter	
Measuring Range of TM-201L	200,2000, 20000,200000 Lux 20,200,2000,20000 Footcandles	
Measuring Range of TM-209	40,400,4000, 40000,400000 Lux 40,400,4000,40000 Footcandles	
Accuracy	±3% (Calibrated to standard incandescent lamp 2856° K and corrected LED day while light spectrum) 8% other visible light source(TM-201L) 6% other visible light source(TM-209)	
Angle deviation from cosine characteristics	30 °	±2%
	60 °	±6%
	80 °	±25%
Power Supply	9V NEDA 1604, IEC 6F22, JIS 006P battery x 1pc	
Battery life	About 200 hours	
Dimensions	**Meter: 38 (H) x 55(W) x 130(L) mm** **1.5(H)x 2.2(W) x 5.1(L) inch** **Sensor: 25(H) x 55(W) x 80(L) mm** **9.8H)x 2.2(W) x 3.1(L) inch**	
Weight	250 g (include battery)	
Accessories	User's manual, carrying case, 9V battery	
Length of wring for light sensor: Approx. 1.5M		

6. Operation

1. Press the “  ” button to turn power on or off.
2. Remove sensor cap and place the sensor perpendicular to the light.
3. Select LUX or FC.
4. When “OL” is shown at LCD, press the  button for useable reading. (TM-201L).
5. If you want to keep the reading value on the LCD permanently after testing, press the “  ” button.
6. When done testing, replace the sensor cover to protect the filter and sensor.

- **Data Hold**
  Freezes the reading present on the LCD at the moment the button is pressed.

- **R(TM-201L)**
  Press the manual ranging button for usable reading.

- **ZERO (TM-201L)**
  Adjust 0 ADJ to enable LCD to indicate 000.

- **ZERO(TM-209)**
  Press the “  ” button for the zero adjustment if any digits are appearing, when the light sensor cap is not attached “CAP” is indicated. Make sure that it is attached.

- **M-H (TM-201L)**

  Press  button to Lockup data maximal value of measure data.

- **MAX/AVG/MIN(TM-209)**

  Press  button simultaneously Lockup data maximum and average and minimum value of measure data. Press the "  " button more 1 seconds to disable this feature.

- **LX/FC(TM-201L)**
  Illuminance Lux or Foot candle measuring select.

- **LX/FC/CD(TM-209)**
  Illuminance Lux or Foot candle and luminous intensity measuring select.

- **L.S.(TM-209)**
  Light source select 1 ~ 9 features, each light source can set correction parameters, default as 1.000. Calibration parameters can be set to 0.001 to 1.999, when the pressure L.S. KEY more than 1 second, LCD L.S. below the LN flashing, pressure  or  change L1 to L9, pressure LS KEY under 1 second right corner flashing 1.000, pressure  or  , you can change the calibration parameters as to 0.995, the display changes immediately, set 350.0x0.996 = 348.6, Setup complete press "  " > 1 second.

- **L.S. (light source) factor:**

  L1➔LED white day light : 0.99.
  L2~L9 ➔Default Standard light source A: 1.00.

- **Disable Auto Power Off (TM-209)**

  When the power on, press the button more than 1 second, to cancel or recovery automatically shutdown." "This symbol representing automatic shutdown feature is enabled.

- **MEM(MOMORY) (TM-209)**

  Operate and press button <one second, store one data, LCD displayed M and NO. 01~NO.99.

  When display AVG in LCD right, operate button at this moment, LCD display AVG M and NO.01 ~ NO.99, present moment stores AVG value.

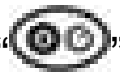
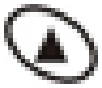
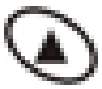
- **READ (READ MEMORY)(TM-209)**

  Pressure button > second display stored value, LCD display M and NO. 01 ~ NO.99, pressure or ,NO. 1 ➔NO. 2 until NO. 99, as at that time, store data for AVG, will display in the lower-left corner of the AVG. Press the button more 1 second to disable this feature.

- **Clear memory (TM-209)**

  When power off, press and button, then LCD display “CLr” which means the memorized data is erased.

7. **Luminous Intensity Measurement** (TM-209)

1. Press the "  " button to turn power on or off.
2. Remove sensor cap and place the sensor perpendicular to the light.
3. Press  button more than 1 second.
4. Press  或  button to select ft(feet)or m(meter).
5. Press  button < 1 second.
6. Press  or  to set the distance between the light center of lamp and measurement base level.
7. Press  button < 1 second.
8. Read the display.
9. Press the "  " button more 1 seconds to disable this feature.

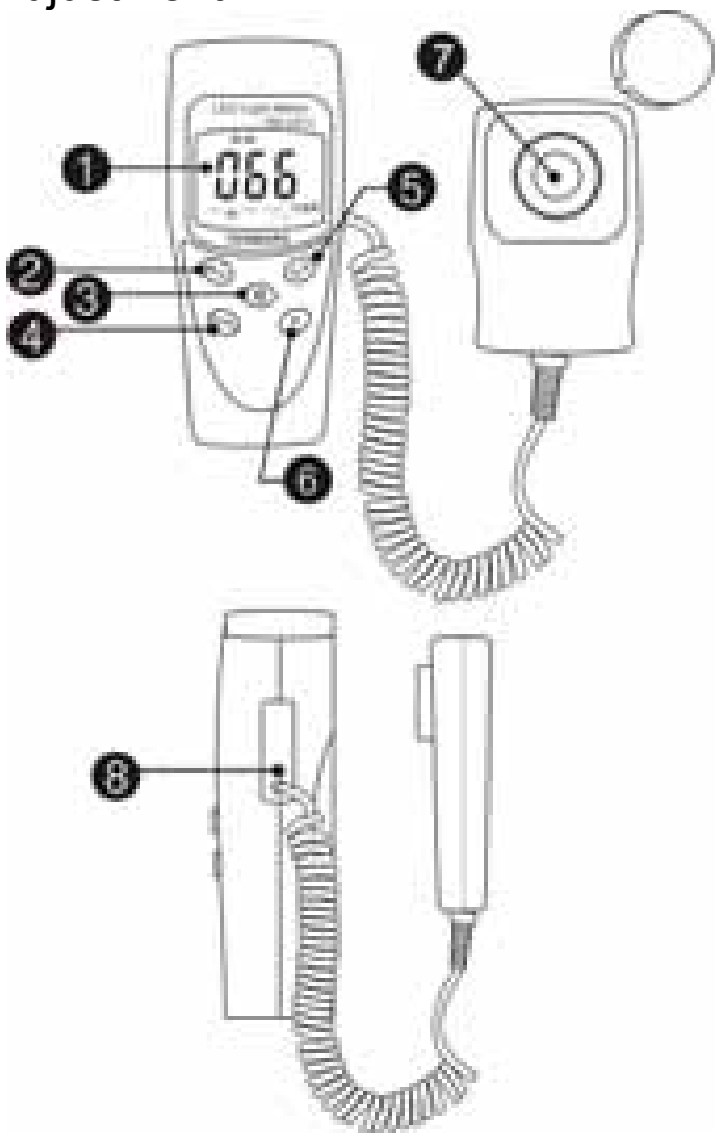
- The luminous intensity is calculated using the following formula:

Luminous intensity(cd)=illumination(Lx)x distance(m^2)

- The preset maximum distance is 0.01 ~ 30.47 m or 0.01 ~ 99.99 ft.
- If a single light source is used and is regarded as a single-point light source, the luminous intensity of the light source can be calculated and displayed, by setting the distance from the light source to the measuring point.

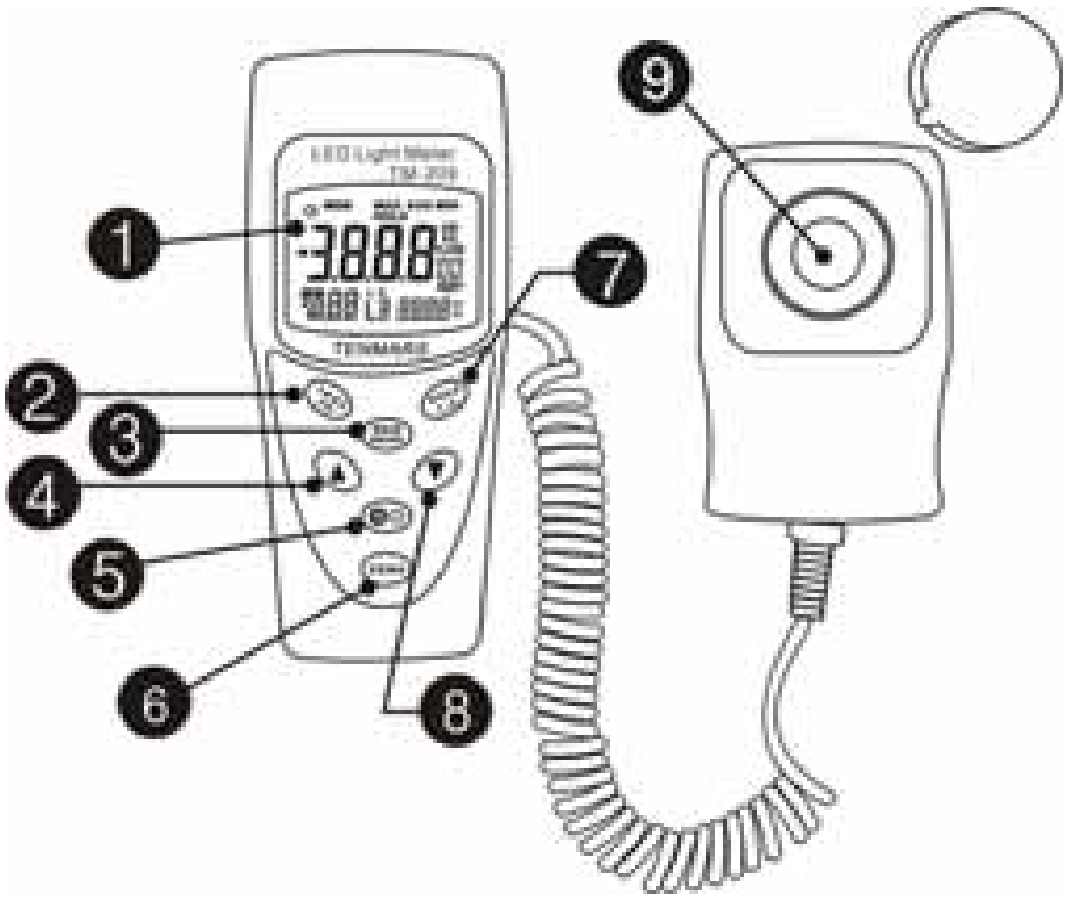
8. Instrument Description of TM-201L

1. Display (LCD).
2. MAX HOLD.
3. Power Button: ON/OFF.
4. Lux/Fc button
5. DATA HOLD button.
6. Range button.
7. Photo detector.
8. Zero Adjustment.



9. Instrument Description of TM-209

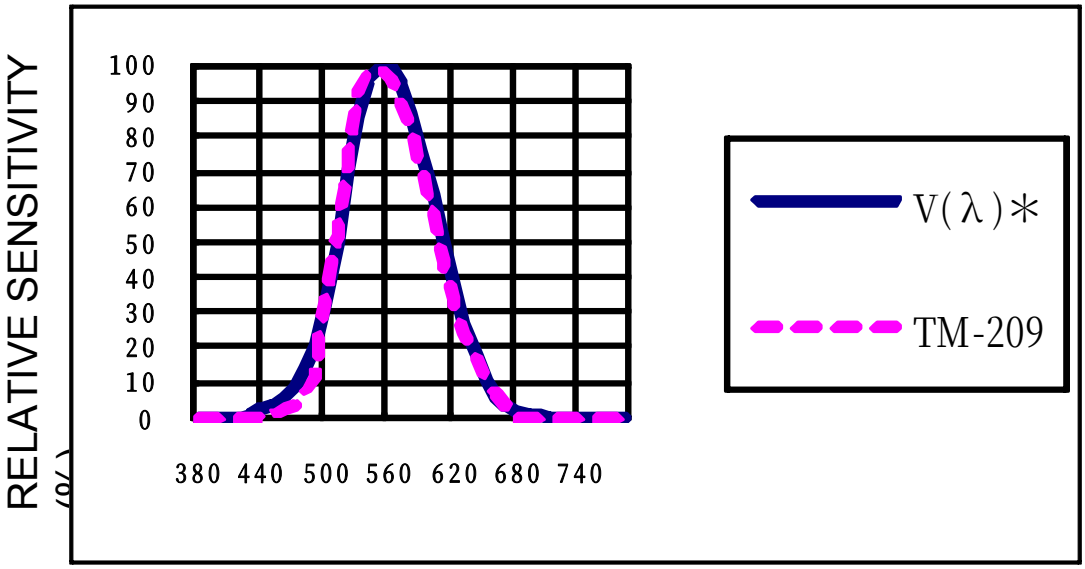
1. Display (LCD).
2. Lux/Fc/CD button
3. MEM/READ.
4. MAX/AVG/MIN and setup upward.
5. Power ON/OFF and disable auto power off.
6. Real time auto zero.
7. DATA HOLD and Light source select (L.S.).
8. Setup downward.
9. Photo detector.



● Relative Spectral (Sensitivity)

The deviation from the comparative standards for luminosity is determined by JIS standard C 1609-1993.
Peak sensitivity wavelength: 550 nm

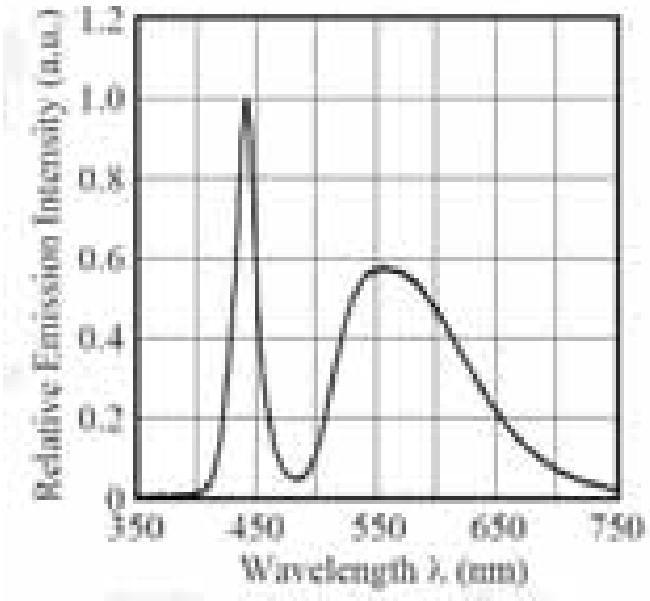
Typ. Ta=23℃



WAVELENGTH (nm)

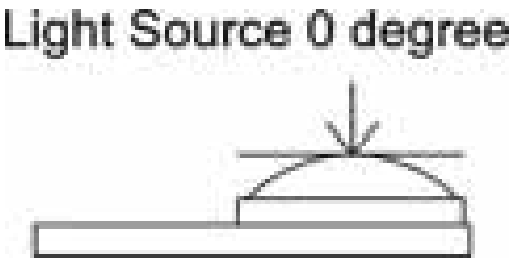
＊CIE luminous spectral luminous

■ Corrected LED day white light Spectrum



10. Attention

- Set for referring the testing of source of light is located at the right top end (0 degree) of the light sensor ball plane.



- When the meter is not in use, please keep the cap of the light sensor in its place to avoid the photo diode from wearing out.
- When it is not in use for a long time, please take the batteries away. And avoid keeping it in a place of high temperature and humidity.

11. Recommended Levels of Illumination

Suitable levels of illuminance
(According to the JIS standard Z 9110-1979)

Offices

Illuminance (lux)	Place
1500 to 750	Offices, designing, drawing rooms
750 to 300	Offices, conference rooms, computer rooms
300 to 100	Workrooms, corridors, stairways, restrooms
75 to 30	Indoor emergency stairways

Factories

Illuminance (lux)	Place
3000 to 1500	Where such work as assembling, inspecting testing, selecting, extremely precision visual work
1500 to 750	Assembling, inspecting, testing, selecting, precision visual work
750 to 300	Assembling, inspecting, testing, selecting and visual ordinary work
300 to 150	Wrapping and packing
75 to 30	Indoor emergency stairways

Schools

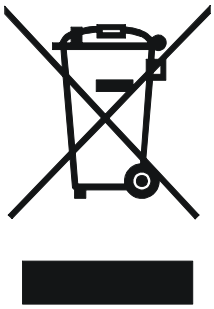
Illuminance(lux)	Place
1500 to 300	Precision drawing or drafting, precision experimenting, library
750 to 200	Classrooms, library reading rooms, staff rooms, gymnasia
300 to 75	Lecture halls, assembly rooms, locker rooms, corridors, stairways and restrooms
75 to 30	Warehouses and emergency stairways
10 to 2	School passages

12. Battery Replacement

	WARNING
	If the symbol "[-+]" appears on the LCD, please replace the battery immediately

1. Remove the battery cover
2. Replace the battery.
3. Install the battery cover.

13. END OF LIFE



Caution: this symbol indicates that equipment and its accessories shall be subject to a separate collection and correct disposal

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