

LUX / FC LIGHT METER



User's manual

HB2TM2010010

CONTENTS

1. Description.....	1
2. Safety Precaution	1
3. Preface	2
4. features.....	3
5. Specifications.....	4
6. Operation Procedure	5
7. Instrument Description	6
8. Relative Spectral (SENSITIVITY).....	9
9. Attention.....	10
10. Recommended Levels of Illumination	11
11. Battery Replacement	12

1. DESCRIPTION

Measures light from visible luminaries equipped with 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: -10°C ~ 50°C, 0%~ 80%RH.
- Storage Temperature & Humidity: -10°C ~ 50°C, 0%~ 70%RH.
- EMC:EN61326(1997)+A1(1998)+A2(2001)

3. PREFACE

The flux of light received in a unit area of a certain side being shone 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 $1 \text{ Fc} = 1 \text{ Lm/ft}$, 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.

As one foot candle=10.764 Lux, 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

Foot-candle/Lux conversion

1 foot-candle=10.764 lux

1 lux=0.09290 foot-candles
(sq. foot or sq. meter)

4. FEATURES

- Low cost highest precision.
- 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 include all visible.
- 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.
- DC analog output (TM-202).
- Data hold.
- Zero adjustment.
- Large integrated circuit design.
- Auto Range (TM-205)

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5. SPECIFICATIONS

Display	2000 count, large LCD display, easier to read.	
Sensor	Silicon photodiode and filter	
Measuring Range	20(TM-202/205),200,2000, 20000,200000 Lux 20,200,2000,20000 Footcandles	
Accuracy	±3% (Calibrated to standard incandescent lamp 2856° K) 8% other visible light source, (TM-201/204) 6% other visible light source, (TM-202/205)	
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(TM-201/202) 1.5(H)x 2.2(W) x 5.1(L) inch(TM-201/202) 38 (H) x 55(W) x 172(L) mm(TM-204/205) 1.5(H)x 2.2(W) x 6.8(L) inch(TM-204/205) Sensor: 25(H) x 55(W) x 80(L) mm(TM-201/202) 9.8(H)x 2.2(W) x 3.1(L) inch(TM-201/202)	
Weight	250 g (include battery)	
Accessories	User's manual,carrying case,9V battery,3 ϕ plug (TM-202)	
Length of wring for light sensor:Approx. 1.5M (TM-201/202)		

6. OPERATION PROCEDURE

1. Open the carrying case.
2. Press the “ \odot ” button to turn power on or off
3. Remove the cap of the light sensor, Put the light sensor at the spot where the testing of source of light is to be conducted, auto testing will then be conducted by the meter, read the testing value after the reading indicated becomes stable.
4. When “OL” is shown at the highest position at the left lateral side, overload is indicated, then please choose another range that is located at a comparatively higher position.(TM-201/202/204)
5. If you want to keep the reading value on the LCD permanently after testing, press the “D-H” Key whereby the reading value will be locked permanently up. Press the “D-H” Key once again when you want to release the previous locking.
6. After testing, put the cover of the light sensor back to its former position, and turn off the switch.
7. After testing is completed, the indication value should be 000 no matter what its range would be after putting the cap of the light sensor back to its former position. Please adjust 0 ADJ to enable LCD to indicate 000 if zero cannot be recovered. If zero still cannot be recovered, it means that the meter breaks down.(TM-201/202/204)
8. Press the ZERO button for the zero adjustment if any digits appear (TM-205)
NOTE. : When the light sensor cap is not attached “CAP” is indicated. Make sure that it is attached.

If performing the zero adjustment after powering on, several digits may not disappear. In this case, perform the zero adjustment again.

7. INSTRUMENT DESCRIPTION

(See Fig.1/ Fig.2)

1. Display(LCD): Display measurements and function symbols.
2. Power Button: ON/OFF switching.
3. MAX button: Lock up MAX or MIN (TM-202/205), value of LCD. Press M-H or MAX again to resume normal measuring. (TM-201/204) Press M-H or MAX 1 second to resume normal measuring. (TM-202 or TM-205)
4. Lux/Fc button: For select Lux and Fc.
5. DATA HOLD button: The reading data shown on LCD can be locked while pressing the button.
6. Range button.
7. DC analog output terminal. (TM- 202) 3Ø plug



DC Analog Output Value

Range	Output
20 Lux/FC	1 Lux/Fc=10mV
200 Lux/FC	1 Lux/Fc=1mV
2000 Lux/FC	1 Lux/Fc=0.1mV
20000 Lux/FC	1 Lux/Fc=0.01mV
200000 Lux	1 Lux=0.001mV

Table1

8. Zero Adjustment.
9. Photo detector.

Fig.1(TM-201/202)

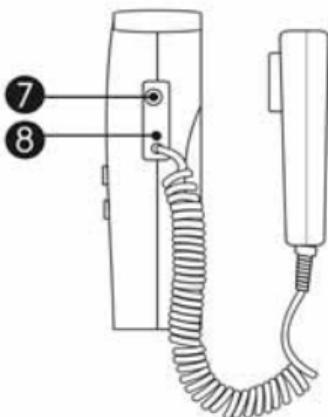
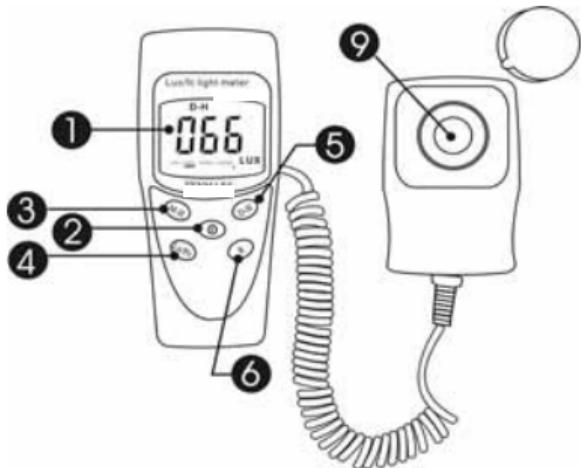


Fig.2(TM-204)

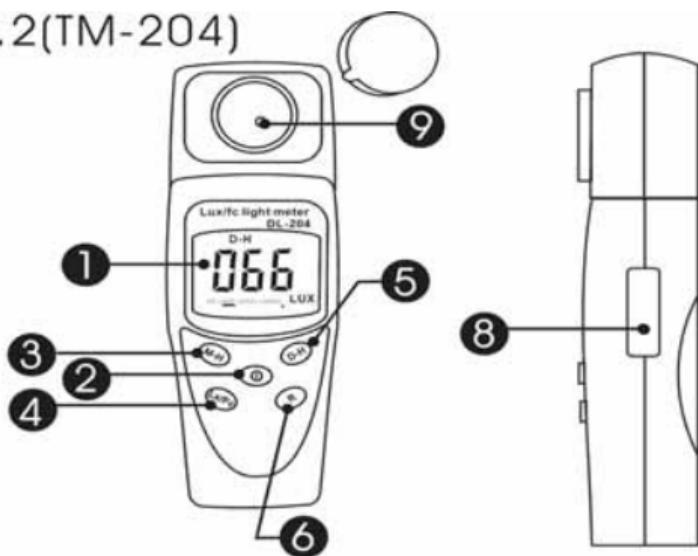
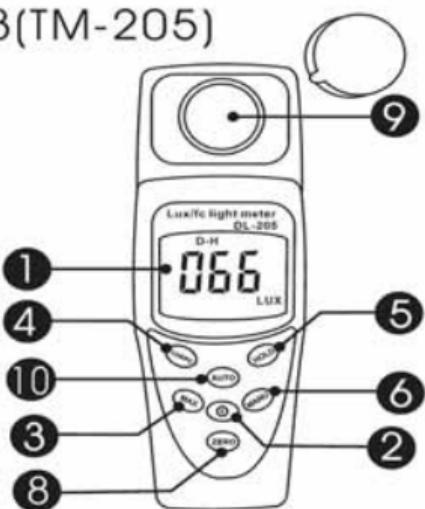


Fig.3(TM-205)

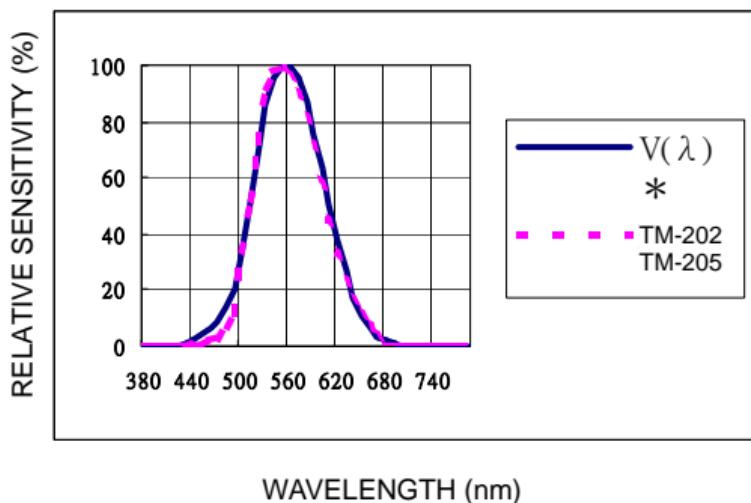


8. RELATIVE SPECTRAL (SENSITIVITY)

The deviation from the comparative standards for luminosity is determined by JIS standard C 1609-1993.

Peak sensitivity wavelength: 550nm

Typ. $T_a=23^{\circ}\text{C}$



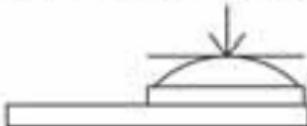
*CIE luminous spectral luminous

9. 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. (See fig. 3)
- 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.

Fig.3

Light Source 0 degree



10. 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

11. BATTERY REPLACEMENT



WARNING

If the symbol "BAT" appears on the LCD, please replace the battery immediately

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

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