MS6612T

Multi-functional Light Meter

USER MANUAL

Table of Contents

Introduction

Thank you for your purchase of the MS6612T multi-functional light meter designed and manufactured by our company. This meter will, with proper use, provide years of reliable service; therefore, it is recommended that the user read carefully the user's manual before using the light meter and keep this manual in a secure place for reference.

For more information about the product, please visit our website http://www.mastech.com.

Limited Warranty, Rights and Responsibilities

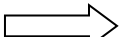
This product is guaranteed for one year from date of purchase against defects in material or workmanship. This warranty does not extend to damage caused by fire (fusing), disposable battery (exhausted), accidents, negligence, misuse, modification, pollution and abnormal operation. Dealers are not authorized to extend the warranty coverage on MASTECH's behalf. During the applicable limited warranty period, the user may contact the nearest MASTECH service center to obtain approval information and send the product to the center along with a description of the falut observed.

Package inspection

Upon reception of the light meter, inspect it to ensure no damage was caused during shipping. Check all accessories and make sure all buttons function properly. If the user finds obvious damage or malfunction in operation, please contact the supplier.

Accessories

Instruction manual
×1



One 9 V alkaline cell, GL6F22A 1604A


MASTECH®
MANU REL MAX MIN PEAK
HOLD
AUTO
FC
LUX
MS6612
Digital Lux Meter
RAN
REL
PEAK
MAX
MIN
LX/FC
HOLD
ZERO

Safety information

Warning

Do not use the light meter in an environment with dust or flammable gasses.

Safety mark description

This manual contains basic information for MS6612T safety operation and maintenance. Please read carefully following safety information before use.

Table 1: Safety information

	Important information which the user must read before using the light meter
CE	Conforms to European Union (EU) standards

Table 2: Warning message

Warning	It indicates that incorrect operation will lead to serious injury or even fatal accidents
Notice	It indicates that incorrect operation or negligence will lead to meter damage or incorrect measurement results, etc.
Tips	Operation suggestions or prompts

Operation considerations

User should observe the following notices to guarantee safe operation and obtain optimum performance.

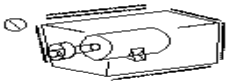
1: Preliminary check

Before initial use, please check if the light meter operates normally and if it was damaged in storage and/or transportation. In case of any damage, please contact the supplier.

2: Environment

Operational temperature and humidity range	-10～50℃ (14～122°F) <80%RH (non-condensed)
Storage temperature and humidity range	-10～+50℃ (14～122°F) <70%RH (non-condensed)

To avoid faults, please DO NOT place the light meter in following environments:

 Direct sunlight High temperature	 Corrosive or explosive gas
 Mist /splash High temperature/condensation	 Intensive electromagnetic environment
 Dust	 Mechanical vibration

3: Use

Notice

1: The operational temperature range for the light meter is -10-50℃ (14-122°F).
2: In order to avoid damage, especially falling accidents, handling and use should be avoided during severe mechanical vibration.
3: The light meter should only be calibrated and repaired by trained personnel.
4: Before each use, check the opto-sensor of the light meter for damage and dust. Make sure the meter is in good, smooth and clean conditions. If one or more functions of the light meter function irregularly or do not operate, avoid using the meter.
5: During operation of the light meter, do not allow the measurement value to stay at OL for an extend period of time.
6: Keep the meter out of direct sunlight to guarantee its normal operation and long-term service life.
7: If the meter is subject to an intensive electromagnetic field, its ability to function properly will be affected.
8: Only use the batteries specified in the technical data section.
9: Avoid exposing the batteries to damp environments. If the low battery symbol appears on the display, the user should replace batteries immidately.

Tips

1: Over time and with extensive use the sensor may shift out of calibration. It is recommended to make periodic calibrations to maintain its basic accuracy.

2: Please keep original package for future mailings (such as meter calibration).

1 Introduction

1.1 Product description

Whether you are a professional or amateur photographer, when shooting you pay more attention to the surrounding illuminance rather than the setting, because this will help you taking the best shot. Although the illuminance can be estimated by the photographer, there is a difference in perception between human eyes and a camera about the requirement for supplementing illuminance. This difference will lead to a big contrast of the expected image effect versus the actual one. In light of this, should you own a light meter? When you intend to buy a house, you usually want both a good location and indoor brightness during the day. So, should you get a light meter to measure the luminance all over the house?

With the progress of human civilization, more and more people emphasize low carbon life. Architects tend to figure out how to bring more natural light into the house while putting up a residential building. However, in many cases fluorescent lights will be used when the natural light is not enough. With the trend to move to more energy efficient lighting sources, fluroscent lamps are becoming more commonplace. So, a professional and convenient light meter can provide you with a reference regarding illuminance.

Today, LED lighting fixtures are becoming more popular and are being installed with more frequency; the photo sensor on the MS6612T is capable of measuring a variety LED light fixtures accurately.

The MS6612T multi-functional light meter has an easy to use interface and can be easily used with one hand. The buzzer sounds upon key press to indicate activation. This light meter is able to measure the visible light produced by fluorescent lamps, metal-halide lamps, high voltage sodium lamps, electric incandescent lamps, and a variety of LED lighting sources.

1.2 Features of the MS6612T multi-function light meter

- Automatic and manual range;
- Display hold for maximum and minimum values;
- Data hold function;
- Peak value measurement function;
- Relative value measurement function;
- Zero calibration function;
- 3 1/2 bit LCD display, with analog bar display;
- Fc/Lux/CD unit conversion function;
- Over-range indication (When the measured value exceeds the current range, LCD will display “OL” to indicate that the range needs to be increased);
- Switch between different lighting sources
- High precision. Measurement range (0.00～200000Lux);
- Low battery indicator;
- Button tone and mute function;
- Auto power-off function (The meter will turn itself off automatically if no operation for more than 10 minutes)
- Compact, durable, and portable design.

1.3 Name and function of components

1.3.1 Front Pannel Description

① Opto-sensor cover

② Opto-sensor

③ LCD display screen

④ Power on/off and mute key:

Power on/off: Press the key to activate the meter and hold for 1 second to shut it off.

Mute: While the meter is on, press the button to mute the button tone; press again to turn tone back on.

⑤ Max/min/source selection key (MAX/MIN/L.S.)

⑥ Unit conv./ Light intensity setting key (Lux/Fc/CD)

⑦ Key for data hold and zero calibration:

Data hold: Press the key to enter/exit data hold mode.

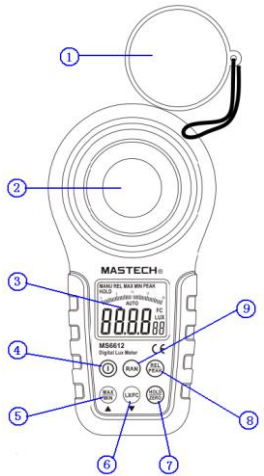
Zero calibration: Hold the key for 1 second to perform zero calibration function.

⑧ Key for relative value and peak value measurement:

Relative value measurement: Press the key to enter/exit relative value measurement mode.

Peak value measurement: Hold the key for 1 second to enter/exit peak value measurement mode.

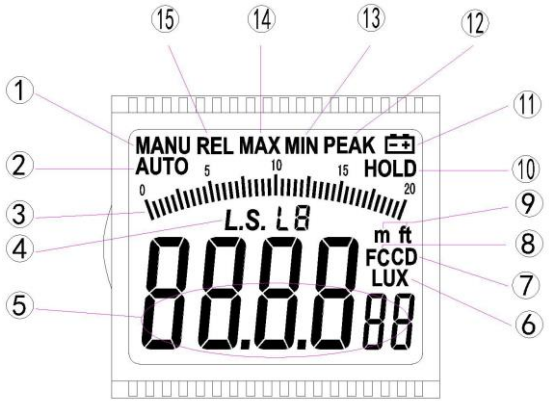
⑨ Key for manual range switching: Press the key for 20.00Lux → 200.0Lux → 2000Lux → 20000Lux → 200000Lux (or 20.00Fc → 200.0Fc → 2000Fc → 20000Fc) ranges; Hold the key for 1 second to exit manual range switching mode.



MS6612T Front pannel

1.3.2 LCD display interface

1. Manual range mode
2. Auto range mode
3. Analog bar for current measurement
4. Current source selection
5. Current measurement display
6. Lux units
7. CD units
8. Fc units
9. meter/feet units
10. Data hold mode
11. Low battery
12. Peak measurement mode
13. Minimum measurement mode
14. Maximum measurement mode
15. Relative measurement mode



LCD display interface

2 Measurement methods

2.1 Notices prior to measurement

Warning

1: Do not use the light meter in an environment with dust or flammable gasses.
2: Do not use the light meter for measurement in environments with high temperature and high humidity.
3: Do not use the light meter in environments with intense infrared or ultraviolet rays.

Tips

1: The opto-sensor of this meter is designed to simulate the sensitive curve of light obtained through human eyes. The spectral coverage is between 320mm and 730mm. When it is used for measurement within the infrared range, there will be a large deviation.
2: The opto-sensor is calibrated in accordance with CIE incandescent lamps at a color temperature of 2854°K (L0=1.000); lamps of other spectrums or types may provide different readings.

3: The reference level of light source test is at the top of the spherical illuminated surface.
4: Place the sensor under the light source for 2 minutes before taking measurement.
5: Always face the sensor toward the source for best performance and to avoid shadows.

2.2 Usage principles

2.2.1 Concepts of illuminance scales

One lux (lumen) indicates the illuminance on one square meter surface, all points of which are one meter from a uniform source of one candela.

One foot-candle (Fc) indicates the illuminance on a surface of one square foot, all points of which are one foot from a uniform source of one candela.

2.2.2 Unit conversion for illuminance scales

1 Fc = 10.764 lux
1 lux = 0.09290 Fc

2.2.3 Conversion formula for illuminance and light intensity

$$E = I / r^2$$

$$I = E*r^2$$

Where E --- illumination value (Unit: Lux)；
I --- Light intensity of the light source（Unit: cd）；
r --- Distance from the luminous surface of light source to the optical detector (Unit: m）.

During measurement, the minimum distance between the light source and the opto-sensor should be more than 15 times greater than maximum size of the luminous surface (or opto-sensor).

2.3 Using the Meter

For typical usage of the meter, stand under the light source. Remove the protection cover from the sensor and place it at a right angle to the light source, as shown in figure 2-1.

Press the MS6612T power key ④ to power on the light meter. The LCD screen will turn on and the buzzer will beep twice, with "AUTO" appearing at the top of LCD display. This indicates that the auto range measurement mode is ON. Press and hold the manual range key ⑨ of the MS6612T to switch to manual range; "MANU" will appear on the top left position of the LCD display. In this mode, each time you hold the key for a short time, the meter will switch to 20.00Lux—> 200.0Lux—> 2000Lux—> 20000Lux—> 200000Lux (or 20.00Fc—>200.0 Fc—>2000 Fc—>20000 Fc) in sequence; holding the key down in manual mode will return the meter to auto range. Press the REL/PEAK key ⑧ of the MS6612T and "REL" will appear on the top left position of the LCD display, indicating the activation of the relative value measurement mode. Press the key ⑧ again and the device will exit the relative value measurement mode and return to the original measurement mode. Hold the key for one second will switch to the peak measurement mode, "PEAK" and "MANU" will appear on top right position of LCD display; hold the key for one second again and the mode will return to auto measurement mode. Press the max/min/L.S. key ⑤ and "MAX" will appear on top position of LCD interface, switching the device to the max/min value mode; in this mode, each press of the key cycles the modes from MAX to MIN to normal display. Press the data hold/zero calibration key ⑦ of the MS6612T to enter the data hold mode, which will be indicated by the "HOLD" symbol on the top right position of the LCD display; press key again and "HOLD" will disappear and the device will exit the data hold mode. In any mode with sensor covered, hold the data hold/zero calibration key ⑦ for one second and "ADJ" will appear on the LCD display, and the device will enter the zero calibration mode. Several seconds later "ADJ" will disappear from the LCD interface, and the

device will return to auto measurement mode.

Figure 2-1

Tips

1: The reference position of light source test is at top of the surface under light.
2: In various measurement modes, analog bar in the middle of the LCD screen will change with the measured readings.
3: When reading, currently displayed data can be locked by pressing and holding "HOLD/ZERO" key.

4: In zero calibration mode, the opto-sensor must be covered by the cover before calibration.
5: After finishing measurement, the sensor protection cover should be put back on to protect the sensor.

3 Operating in the different modes

3.1 Manual range measurement mode

- Press the RAN key (manual range key) and “MANU” will appear on the top left position of the LCD interface, and the meter will enter the manual range mode (as shown in figure 3-1-1);
- When entering manual range mode, press RAN key and it will switch to 20.00Lux—> 200.0Lux—> 2000Lux—> 20000Lux—> 200000Lux (or 20.00Fc—> 200.0 Fc—> 2000 Fc—> 20000 Fc) in that sequence;
- Hold the RAN key for one second and “MANU” on the top left position of the LCD display will be replaced with “AUTO” and the device will return to auto range mode;

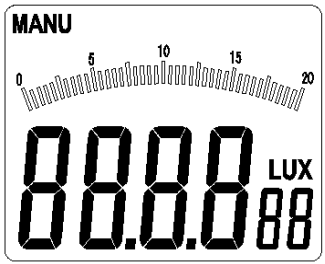
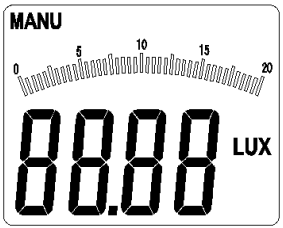
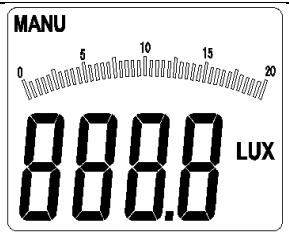


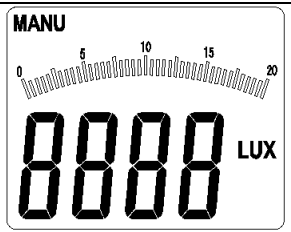
Figure 3-1-1



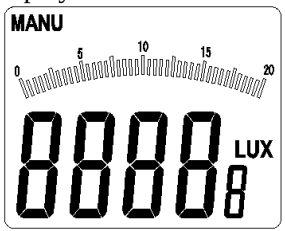
20.00Lux display



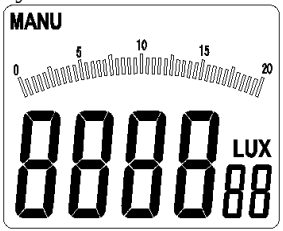
200.0Lux display



2000Lux display



20000Lux display



200000Lux display

Tips

1: In peak value measurement mode, manual range is the only mode available.
2: In relative and max/min modes, hold the key for 1 second and it will return to auto range.
3: In peak, data hold mode and calibration modes, holding the RAN button will not do anything.
4: In this mode, when the measurement value exceeds the present range, “OL” will appear on LCD display to indicate over-range, and the user should switch to a higher range at this time.

3.2 Relative/Peak value measurement mode

- Press the REL/PEAK key and "REL" will appear on the top left position of the LCD display (as shown in figure 3-1-2A), and the meter will enter relative value measurement mode.
- Press REL/PEAK key again and the meter will exit the relative value measurement mode and return to normal measurement mode.
- Hold the "REL/PEAK" key for one second and the device will enter the peak value measurement mode; "PEAK" will appear on the top right position of the LCD display and "MANU" will appear on the top left position of the LCD display (as shown in figure 3-1-2B);
- Hold the key again for one second and the meter will exit the peak value measurement mode and return to auto measurement mode (as shown in 3-1-2C).

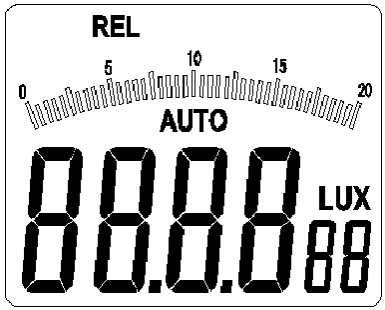


Figure 3-1-2A

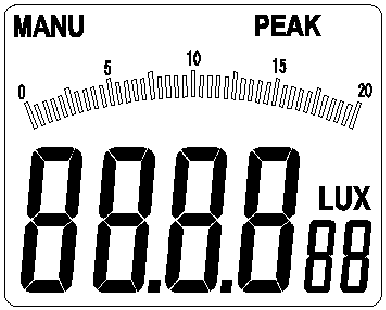


Figure 3-1-2B

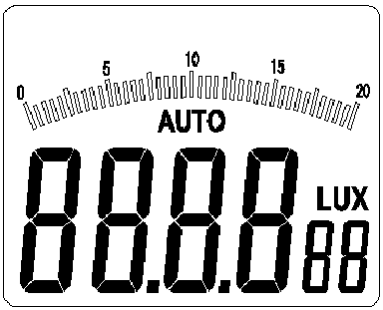


Figure 3-1-2C

Tips

1: Relative value measurement mode only works in auto measurement mode, peak value measurement mode, max/min value mode and data hold mode.
2: In non-zero calibration mode, hold “REL/PEAK” for one second and the device will enter the peak value measurement mode.

3.3 Maximum/Minimum value mode

- Press the “MAX/MIN/LS” key and “MAX” will appear on top LCD display (as shown in figure 3-1-3);
- In max/min value mode, press “MAX/MIN/LS” key to switch from MAX to MIN to normal modes.

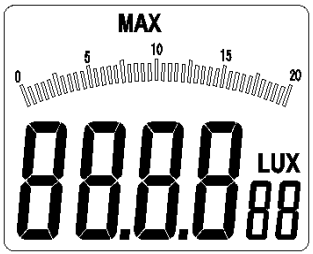


Figure 3-1-3

3.4 Data hold and zero calibration mode

- Press the “HOLD/ZERO” key and “HOLD” will appear on the top right position of the LCD display (as shown in 3-1-4A), then the device will enter the data hold mode;
- Press key again and the meter will exit the data hold mode;
- Cover the opto-sensor with the attached cover, hold “HOLD/ZERO” key for one second, and “ADJ” will appear on LCD display (as shown in figure 3-1-4B) and the device will enter the zero calibration mode. After a few seconds the meter will finish its calibration and return to auto measurement mode.

Figure 3-1-4A

Figure 3-1-4B

Notice

Make sure to cover the opto-sensor before beginning zero calibration.

Tips

1: Zero-calibration can be made in any mode.

3.5 Source selection mode

- Hold the “MAX/MIN/LS” buton for one second and the LS value will flash on the LCD display (as shown in figure 3-5-1). The meter is now in source selection mode. Press “MAX/MIN/LS” or “Lx/Fc/CD” to change the light source (L0-L9).
- Press the “RAN” button and the value of the selected light source begins to flash. Press “MAX/MIN/LS” or “Lx/Fc/CD” to change the value. Press “RAN” again to switch back to the previous step.
- Hold the “MAX/MIN/LS” button to save the light source setting and return to normal mode.
- Light source default values:

  L0 – Standard lighting: 1.000
  L1 – LED daytime light: 0.990
  L2 – LED red light: 0.516
  L3 – LED amber (yellow) light: 0.815
  L4 – LED green light: 1.216
  L5 – LED blue light: 1.475
  L6 – LED purple light: 1.148
  L7--L9 – default standard lighting: 1.000

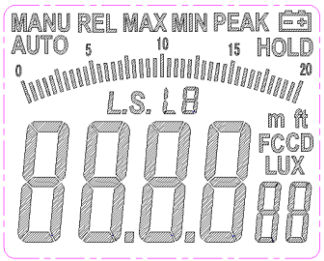


Figure 3-5-1

3.6 Light Intensity measurement mode

- Hold the “Lx/Fc/CD” button for one second and the display will switch to light intensity distance mode, where you can adjust the distance from the light source (as shown in figure 3-6-1).
- Press the “RAN” button to switch between meters and feet (as shown in figure 3-6-2).
- Press the “MAX/MIN/LS” or “Lx/Fc/CD” button to adjust the distance value.
- Hold the “Lx/Fc/CD” button to save the distance and the LCD display will now show the measaured light intensity measurement (as shown in figure 3-6-3).
- Press the “Lx/Fc/CD” button to return to illuminance measurement.
- Light intensity is calculated based on the following formula:

  Light intensity (CD) = illuminance (Lx) * distance squared (m^2)

Notice

1：Light intensity measuremend mode range: distance between 0.01~30.47m or 0.01~99.99ft.

2：If a single light source is used, the light intensity of the source can be set to calculate and siplay the distance from the light to the sensor.

Figure 3-6-1

Figure 3-6-2

Figure 3-6-3

4 Other Functions

4.1 Auto power-off

If no keys are pressed for approx. 10 minutes the MS6612T will automatically power itself off.

4.2 Mute

Press the power key ④ during operation and the meter will mute the beep when keys are pressed. Press again to un-mute.

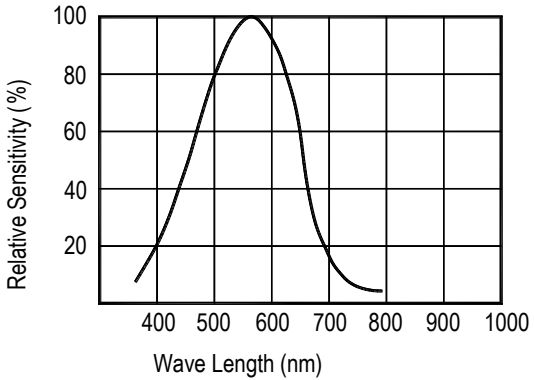
5 Specifications

- ✧ Temperature range:
  Operation:-10～50 ^{O}C, max 80 % HR(Non-Condensed)
  Storage:-10～50 ^{O}C， max 80 % HR (Non-Condensed) (without batteries)
- ✧ Sampling rate: ≥2 times/s
- ✧ Display: 3½ digits, max reading of 1999, with analog bar display;
- ✧ Sensor: silicon photoelectric diode
- ✧ Measured spectral range: 320～730nm
- ✧ Measurement ranges: Lux – 0~200000
  Fc – 0~20000
  CD – 0~999900
- ✧ Operating environment: indoor use
- ✧ Max. operating altitude: 2000m
- ✧ Battery life: Approx. 200 hours
- ✧ Power supply: 1×9 V， IEC 6LR61
- ✧ Dimensions (H×W×D): 190 mm×89 mm×42.5 mm
- ✧ Weight: Approx. 360 g without batteries
  Approx. 420 g with batteries
- ✧ Accuracy: ±3% (calibrated with incandescent lamps at 2854K)
  ±6% other visible light source

Cosine angle deviation characteristics	
Cosine angle	Deviations
30°	±2%
60°	±6%

Tips: cosine angle is corrected in accordance with JIS C 1609:1993 and CNS 5119 Grade A General Specification.

✧ Luminous sensitivity characteristics:



6 Maintenance and Service

6.1 Service

Notice

If potential failures are noticed during operation, use the following steps to check for a possible problem:

1: Check batteries. If "  " appears on the LCD display, batteries should be replaced.
2: Refer to the operation instructions to check if operation steps are followed correctly.
3: Before sending the meter in for repair, remove the batteries and describe faults in detail, and pack the meter to avoid damages during shippment. Manufacturer/distributor assumes no responsibility for damages in transit.
4: Repair on the meter should be performed by service centers or other qualified personel only.

6.2 Cleaning

First wipe the meter with a damp soft cloth with clean water or neutral detergent and then with a dry cloth.

Notice

1: Please make sure the light meter is turned off before cleaning.

2: Do not use benzene, alcohol, acetone, ethyl ether, ketones, thinners, gasoline, etc. for cleaning.

3: The light meter should only be used again when it is completely dry after cleaning.

6.3 Battery replacement

If the battery symbol appears on the LCD accompanied by buzzer alarm, batteries must be replaced.

Follow these instructions to replace the battery:

- Turn off the meter;
- Remove the screw on the battery cover and open the battery compartment;
- Remove used battery;
- Replace with new battery observing polarity;
- Replace the battery cover and replace/tighten the screw.

Warning

1: Pay attention to the correct polarity of battery when putting in or replacing batteries. In case of polarity reversal, the light meter can be damaged and can even cause explosion or fire.

2: Do not connect the two polarities of the battery together or throw battery in fire. This may cause the battery to explode.
3: Do not attempt to take apart the battery. The battery's alkaline electrolyte is highly corrosive. In case of electrolyte contact with skin or clothes, immediately rinse with clean water. In case of contact with eyes, immediately rinse eyes with clean water and seek medical advice.

Notice

1: The light meter should be turned off before replacing batteries.
2: Use batteries specified in technical data only.
3: If the meter is not to be used for a long time, take out the batteries. In case the meter is polluted due to battery leak, the meter should be sent to the manufacturer for cleaning and maintenance.
4: For disposal of used batteries, follow existing specifications on battery recycling, reuse and treatment.

6.4 Calibration

In order to ensure the accuracy of the meter, periodic calibration should be performed by trained personnel. It is recommended to have the meter calibrated once a year. If the meter is in frequent use or used in poor environments, the calibration interval should be shortened. If the meter is used less, the calibration interval can be extended up to three years.

7 Reference Table for Illumination Standard of Various Locations

Fc illuminance value can be calculated from: Lux value divided by 10.6.
CD intensity value can be calculated from: Lux value multiplied by the distance from source squared (m^2)

Schools:

Iluminance (Lux)	Locations
1500~300	Drafting classroom, sewing classroom, computer classroom
750~200	Classroom, , laboratory, practice workshop, research room, reading room, stack room, office, staff lounge, conference room, health center, restaurant, kitchen, pantry, radio room, printing room, switchboard room, guard room, indoor stadium
300~150	Large classroom, auditorium, storage cabinet room, lounge, staircase
150~75	Corridor, elevator corridor, toilet, duty room, workers room, bridge, school outdoor playground
75~30	Warehouse, garage, fire escape

Office:

Iluminance (Lux)	Locations
2000~1500	Design office, clerk's office
1500~750	Hall information channel (daytime), parlor, drawing office, punching, typing

750~300	Calculator room, conference room, printing room, switchboard room, control room, reception room, recreation room, restaurant
300~150	Stack room, entertainment room, dining room, lounge, guard room, elevator (passway), washroom, toilet
150~75	Tea room, changing room, warehouse, nightwatchmen office (entrance)
75~30	Fire escape

Factories:

Iluminance (Lux)	Locations
3000~1500	Ultra-precision operation, design, drafting, precision inspection
1500~750	Design office, analysis, assemble line, coating
750~300	Packaging, measurement, surface treatment, warehouse office
300~150	Dyeing, casting, electrical room
150~75	Entrance and exit, corridor, information channel, staircase, dressing room, toilet, 、operation warehouse
75~30	Fire escape, warehouse, outdoor power equipment (loading and unloading, inventory move operation)

Hospital:

Iluminance (Lux)	Locations
10000~5000	Visual function test chamber (ophthalmology lightroom)

1500~750	Operating room
750~300	Consulting room, treatment room, pharmacy room, prescription room, drug store, dissection room, pathological bacteria room, emergency rooms, maternity ward, dean's office, offices, nursing room, conference room
300~150	Ward, medicine room, bed reading, medicine changing, plaster bandage for fractures, infant room, record room, waiting room, consulting room, outpatient corridor
150~75	Locker room, physical therapy room, X-ray room, ward corridor, medicine room, sterilization room, ward room, stairs, endoscopy room
75~30	Animal room, dark room (photo), fire escape

Hair salon:

Iluminance (Lux)	Locations
1500~750	Haircut, perm, hair dyeing, cosmetics
750~300	Shave, hairdressing, lobby registration counter, makeup
300~150	Toilet in salon
150~75	Corridor, stairways

Hotel, restaurant, recreation ground:

Iluminance (Lux)	Locations
1500~750	Counter
750~300	Halfway, banquet hall, business room, parking lot, kitchen

300~150	Restaurant, toilet, a large Japanese-style room
150~75	Recreation room, corridor, stairways, guest room, bathroom, accent lighting for gardens, changing room
75~30	Fire escape

Shop, department store:

Iluminance (Lux)	Locations
3000~750	Indoor display, decorative window display, demonstration area, checkout counter, packaging table
750~300	Elevator lobby, escalators
300~150	Discussion room, dressing room, toilet, stairs, walkways
150~75	Lounge, general lighting in store

House:

Iluminance (Lux)	Locations
2000~750	Handcraft, tailoring
1000~500	Writing, work
750~300	Reading, makeup, kitchen table, processing area, telephone
300~150	Wash sink, entertainment room, living room, family reunion, entrance (inside) mirror
150~70	Wardrobe, bedroom, bathroom, stairs, corridor
75~30	Doorplate, mailbox, doorbell key, terrace