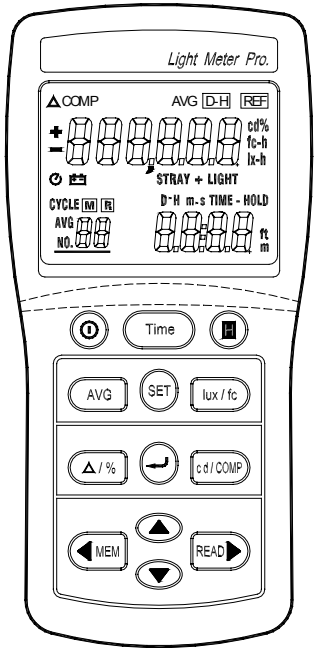
TES-1339

INSTRUCTION MANUAL



CONTENTS

1. INSTRUCTION

- The digital illuminance meter is a precision instrument used to measure illuminance （ lux, footcandle ）in the field.
- It meets CIE photopic spectral response, $f'_1 \leqq 6\%$.
- 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 phote diode and spectral response filter.
- U.S. Pat. No. Des. 446,135
- U.S. Pat. No. Des. 469,025

2. FEATURES

- Dual Display, 4 digit LCD reading.
- Spectral Sensitivity close to CIE photopic Curve.

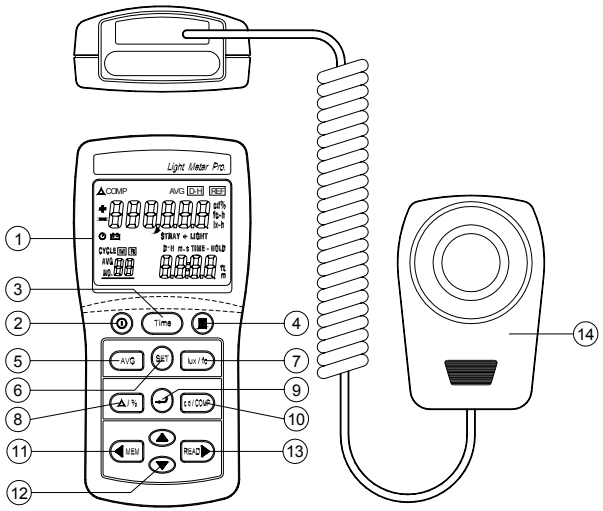
- ❑ Measuring Levels Ranging 0.01 to 999900 Lux, 0.001 to 99990 fc, Autoranging 5 step.
- ❑ Accurate and Instant response.
- ❑ Integral illuminance measurement.
- ❑ Luminous intensity measurement.
- ❑ Data Hold function.
- ❑ Data memory and read function.
- ❑ Reference value store for relative or percentage deviation measurement.
- ❑ Ripple measurement for STRAY + LIGHT function.
- ❑ Time-hold function.
- ❑ Point - average function.
- ❑ Comparator function.
- ❑ Auto power off function.

3. SPECIFICATIONS

- **Display**：Dual display, 4 digit LCD reading.
- **Measuring Range**： 99.99 lux, 999.9 lux, 9999 lux, 99990 lux, (Autoranging 5 step) 999900 lux / 9.999 fc, 99.99 fc, 999.9 fc, 9999 fc, 99990 fc.
  Note : 1fc =10.76 lux .
- **Overrange Display**：LCD will show “OL” symbol.
- **Spectral Response** : CIE Photopic. (CIE human eye response curve).
- **Spectral Accuracy** : CIE Vλ function $f'_1 \leqq 6\%$
- **Cosine Response**： $f'_2 \leqq 2\%$
- **Accuracy**：±3% rdg ±5digits
  (calibrated to standard incandescent lamp at color temperature 2856 K) .
- **Temperature Characteristics**：±0.1%/℃.

- **Sampling Rate** : 5 times/sec.
- **Photo Detector**：One silicon photo diode and spectral response filter.
- **Manual Data Memory Capacity**：50 sets.
- **Operating Temperature & Humidity**：
  0℃ to 40℃ (32℉ to 104℉) & 0% to 80% RH.
- **Storage Temperature and Humidity**：
  -10℃ to 50℃ (14℉ to 140℉) & 0% to 70% RH.
- **Power Source**：6 pcs size AAA battery.
- **Battery life (typical)** ：200 hours (carbon zinc).
- **Photo detector Lead Length**：150 cm (approx.).
- **Photo detector Dimensions**：92L×60W×29H (mm);
- **Meter Dimensions**：150L×72W×35H (mm);
- **Weight**：320g .
- **Accessories**：Carry case, instruction manual, battery.

4. NAME OF PARTS AND POSITIONS



1. LCD Display : 4 digit displays with a maximum reading of 999900 , and the indicating signs of measured values, unit function symbols, and decimal points etc are display.

2. ⏻ Power Control key : The power switch key turns the illuminance meter ON or OFF.

3. Time key : Switch between minute : second (m:s) and Day-Hour (D-H) time display.

4. [H] **Data-Hold key** : Freeze or unfreeze the displayed readings.

5. AVG key : Active the point-average mode.

6. SET key : Start setting mode.

SEt01 : Ripple measurement for STARY + LIGHT mode.
SEt02 : Time hold mode.
SEt03 : Real time setting mode.
SEt04 : Integral illuminance measurement mode.

SEt05 : Comparator High / Low value setting mode.

7. Lux/fc key : Illuminance scale selects. 1 footcandle = 10.76 lux.

8. △/ % : Press △/ % key to enter the Relative mode, zero the display, and store the displayed reading as a reference value. The annunciator "△" is displayed, press △/ % key again to enter the Relative percentage compute. The annunciator "[REF] % " is displayed. Press ↵ key exit the Relative mode.

9. ↵ key : Enter / Exit a setting mode or store the displayed setting. Exit the point – average mode; Relative mode and Luminous intensity mode.

10. cd / COMP key : Enter the Luminous intensity mode or comparator mode.

11. MEM key : Press one time store the one set LCD logging to memory.

12. ▲▼ key : Scroll to a setting mode or increase / decrease the displayed setting.

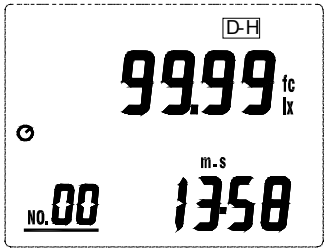
13. READ key : Enter the memory data reading mode.

14. Photo Detector.

5. OPERATING INSTRUCTIONS

5-1 Illuminance Measurement

1. Press the ⏻ power key to turn on the meter.
2. Press lux/fc key selection to the desired lux or fc unit.
3. Remove the photo detector cap and face detector to the light source in a horizontal position.
4. Read the illuminance value from the LCD display.
5. Press the [H] key, if the displayed value needs to be hold. Press [H] key again to exit the data held mode.

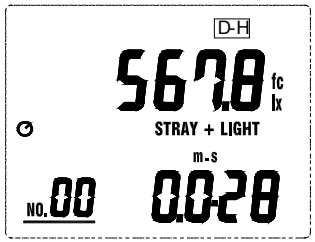


5-2 Ripple Measurement

Use ripple measurement function in the day-time, user can measure light source actual illuminance at night, so user doesn't need to work at night.

1. Press the ⏻ power key to turn on the meter.
2. Press lux/fc key selection to the desired lux or fc unit.
3. Turn on the desired measure light source.
4. Remove the photo detector cap and face to light source in a horizontal position.

5. Press SET key, the annunciator "SEt01" is displayed.
6. Press ↵ key, the annunciator "STRAY + LIGHT" is displayed, the illuminance value from the LCD display is other STRAY light source plus desired measure LIGHT source illuminance value.
7. Press ↵ key to store the STRAY + LIGHT illuminance value, the annunciator "STRAY" is displayed.
8. Turn off the light source.
9. Press ↵ key again to store the STRAY illuminance value and display compute actual LIGHT source illuminance value at night, the annunciator "LIGHT" and " D-H " is displayed.
10. Press ↵ key to exit this mode.



5-3 Time – Hold Measurement

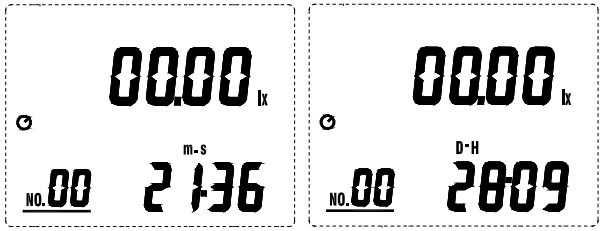
Time – Hold measurement is free from a man's shadow effect the illuminance measurement value.

1. Press ⏻ the power key to turn on the meter.
2. Press lux/fc key selection to the desired lux or fc unit.
3. Remove the photo detector cap and face the detector to the light source in a horizontal position
4. Press SET key the annunciator "SEt01" is displayed.
5. Press ▼ key to change the setting mode to "SEt02".
6. Press ↵ key to enter to the second setting of the stopwatch .
7. Press ▲▼ keys to set to the desired seconds.

8. Press ↵ key to enter to minute setting of the stop – watch.
9. Press ▲▼ key to set the desired minute.
10. Press ↵ key to start count down, you must leave the light source area, free from shadow effect measurement value.
11. When stop – watch counts to zero, the meter will auto hold the last measured value, the annunciator "TIME - HOLD" is displayed.
12. Press ↵ key to exit this mode.

5-4 Real Time Setting

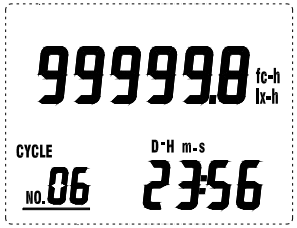
1. Press the ⏻ power key to turn on the meter.
2. Press SET key, the annunciator “SEt01” is displayed.
3. Press ▼ key for two times to change the setting mode to “SEt03”.
4. Press ↵ key to enter to the real seconds setting.
5. Press ▲▼ keys to set the real seconds.
6. Repeat procedure 4 and 5 setting the real minute;hour and day setting.
7. Press ↵ key finish the real time setting.
8. Press TIME key step through the day-hour (D-H) and minute-second (m-s) displayed.



5-5 Integral Illuminance Measurement

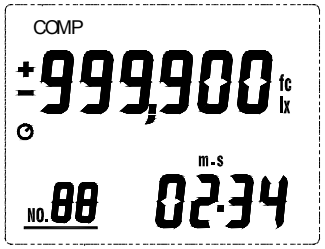
Integral illuminance means luminous energy measurement that is a measure of the rate of flow of flux, and so is expressed in lumen-seconds. It is also possible to measure any photometric quantity on a time dependent basis. For instance, the illuminance could be integrated over time to yield lux-hour or footcandle – hour.

1. Press the ⏻ power key to turn on the meter.
2. Press lux/fc key selection switch to the desired lux or fc unit.
3. Remove the photo detector cap and face the detector to the light source in a horizontal position.
4. Press SET key, the annunciator “SEt01” is displayed.
5. Press ▼ key for three times to change the setting mode to “SEt04”.
6. Press ↵ key to start the integral illuminance measurement and the meter will set to the fixed measurement range. The annunciator “lx-h” or “fc-h” will be displayed and the timer will be started.
7. If measured illuminance value is over the fixed measurement range, the measurement will be stopped and LCD display will be frozen, the annunciator “+” will be displayed.
8. The maximum indication of integral illuminance is 999999. When this maximum indication value is exceeded, the number of integration can be checked by annunciator “CYCLE NO.XX”. The maximum number of CYCLE is up to 99.
9. Press ↵ key to exit this mode.



5-6 Comparator Setting and Operation

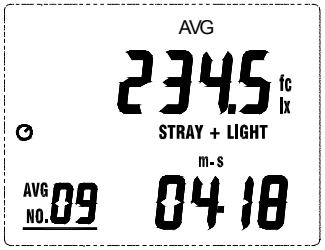
1. Press the ⏻ power key to turn on the meter.
2. Press lux/fc key selection to the desired lux or fc unit.
3. Remove the photo detector cap and face the detector to light source in a horizontal position.
4. Press SET key, the annunciator “SEt01” is displayed.
5. Press ▼ key for four times to change the setting mode to “SEt05”.
6. Press ↵ key to enter to the comparator setting mode.
7. Press ▼ key to select the desired lx or fc unit.
8. Press ↵ key to enter to setting the measurement range.
9. Press ▼ key to select the desired measurement range.
10. Press ↵ key to enter to setting the comparator High limit value the annunciator “+” is displayed.
11. Press ▲▼ keys to adjust the desired High limit value.
12. Press ↵ key to enter to setting the comparator Low limit value.
13. Press ▲▼ keys to adjust the desired Low limit value, the annunciator “-” will be displayed.
14. Press ↵ key, the comparator setting mode is finished15. Press cd/COMP key for three seconds enter to the comparator function. The annunciator “COMP” is displayed.
16. If measurement value exceeds the setting value, the annunciator “+” or “-” will be displayed and the beeper will sound
17. Press ↵ key to exit the comparator mode.



5-7 Point Average Measurement

Illuminance is a measurement of the amount of visible light incident upon a prescribed surface area. Due to detector doesn’t have such large areas, so the area of the detector is multiplied proportionally. You can use point average function to do it.

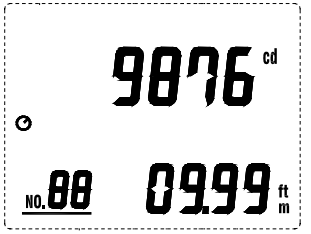
1. Press the ⏻ power key to turn on the meter.
2. Press lux/fc key selection to the desired lux or fc unit.
3. Remove the photo detector cap and face the detector to the light source in a horizontal position.
4. Press AVG key to enter to point illuminance value average function, the maximum measurement is 99 points, the annunciator “AVG” is displayed.
5. Press MEM key each time, stores one measured point value to memory. The annunciator “AVG NO.XX” is displayed.
6. Press READ key perform the point average compute, the second annunciator “AVG” is displayed.
7. Press MEM key to continuously add the illuminance measured value for average, but the LCD will display he average value only, the point measured value will not shows. Press READ key again will change display shown the measured value.
8. Press ↵ key to exit the mode.



5-8 Luminous Intensity Measurement

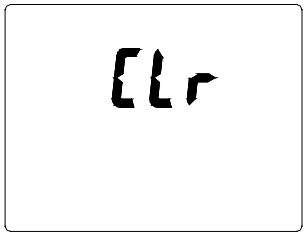
Luminous intensity is a light source property. Defined as the quantity of luminous flux emitted uniformly into a solid angle, the basic unit of luminous intensity is the candela, equal to one lumen per steradian. To calculate luminous intensity, the detector's area and its distance from the light source must be known.

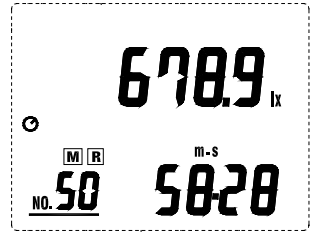
1. Press the ⏻ power key to turn on the meter.
2. Press lux/fc key selection to the desired lux or fc unit.
3. Remove the photo detector cap and face to light source in a horizontal position.
4. Press cd/COMP key to enter to setting of the distance, the annunciator "m" or "ft" is displayed.
5. Press ▲▼ key to set the distance between the "light center of lamp" and "measurement base level", the preset maximum distance is 0.01 ~ 9.99m or 0.01 ~ 9.99ft. Measurement should be made in a dark room or equivalent thereof, where the brightness other than light source gives no influence to the meter. The unit shall be set at a position distant from the light source by more than 10 times of the size of such a light source.
6. Press ↵ key to perform luminous intensity measurement, the annunciator "cd" is displayed.
7. Press ↵ key to exit the mode.



5-9 Manual Data Memory and Read Mode :

1. Clear the manual memorized data
   ① Press " ⏻ " key to turn off the meter.
   ② Press and hold down "MEM" key, then press " ⏻ " key to turn on the meter. When LCD shows "CLr" which means the memorized data is erased.
2. Manual data memory
   Press "MEM" key each time, one set of reading to will be stored to the memory. At this moment, LCD will show the "M" mark and the memory address number. Total memory size is 50 sets.
3. Manual memory data READ
   ① Press "READ" key to enter the READ mode, the LCD will show "R" mark and the memory address number.
   ② Press " ▲ " or " ▼ " key to select the desired memory address number data for display.
   ③ Press " ↵ " enter key to exit this mode.





5-10 How to Disable Auto Power off Function

The meter enters sleep mode if no key pressed occurs for 30 minutes.

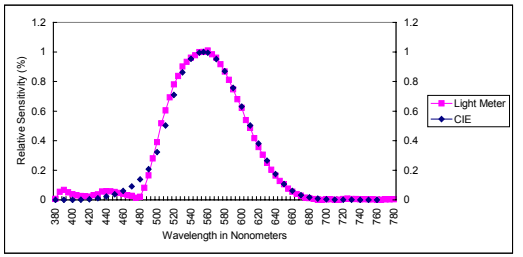
1. Press " ⏻ " key to turn off the meter.
2. Press and hold down "HOLD " key then press " ⏻ " key to turn on the meter, the auto power off function will be disabled.
   The time display auto power off mark " ⊘ " will disappeared.
   Auto power off mode is enabled each time you turn on the meter and is automatically disabled in the integral illuminance measurement mode.

6. BATTERY CHECK-UP & REPLACEMENT

1. As the battery power is not sufficient, LCD will display " ▭ " ; and, replacement of one new battery type 6×1.5V 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 6×1.5V battery and go for the cover.

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) photopic curve V(λ) as the following chart described.



8. 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 faceplate, 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.

9. RECOMMENDED ILLUMINATION

1fc = 10.76 lux

LOCATIONS	lux	fc
• **OFFICE**		
Conference, Reception room.	200 ~ 750	18 ~ 70
Clerical work	700 ~ 1,500	65 ~ 140

Typing drafting	1000 ~ 2,000	93 ~ 186

- **FACTORY**

Visual work at production line	300 ~ 750	28 ~ 70
Inspection work	750 ~ 1,500	70 ~ 140
Electronic parts assembly line	1500 ~ 3,000	140 ~ 279
Packing work, Entrance passage	150 ~ 300	14 ~ 28

- **HOTEL**

Public room, Cloakroom	100 ~ 200	9 ~ 18
Reception	200 ~ 500	18 ~ 47
Cashier	750 ~ 1000	70 ~ 93

- **STORE**

Indoors Stairs Corridor	150 ~ 200	14 ~ 18
Show window, Packing table	750 ~ 1,500	70~140
Forefront of show window	1500 ~ 3,000	140 ~279

- **HOSPITAL**

Sickroom, Warehouse	100 ~ 200	9 ~ 18
Medical Examination room	300 ~ 750	28 ~ 70
Operating room Emergency Treatmet	750 ~ 1,500	70 ~ 140

- **SCHOOL**

Auditorium, Indoor Gymnasium	100 ~ 300	9 ~ 28
Class room	200 ~ 750	18 ~ 70
Laboratory, Library, Drafting, room	500 ~ 1,500	47 ~ 140