française
d'instrumentation

FI 110LX

Universal LED portable luxmeter

Instructions for use

Summary

1 - Safety and usage instructions

- For safety reasons, this device should only be used by qualified persons who are aware of the potential dangers involved.

- Read this manual carefully before using the device.

- Under normal conditions of use, this device does not present any risk of electric shock to the operator. Its safety is guaranteed if the conditions of use and operation are respected.

- The protection provided by this device may be compromised if its use does not comply with the instructions in this manual or if technical modifications are made at the discretion of the user.

- Check that the device is clean and in good condition before using it.

- When taking a measurement, avoid lighting that is not representative of the area being studied and move away from the cell to avoid reducing the lighting in this area.

- When the device is not in use, always replace the sensor's protective cover to protect it from dirt.

Symbols visible on the instrument:

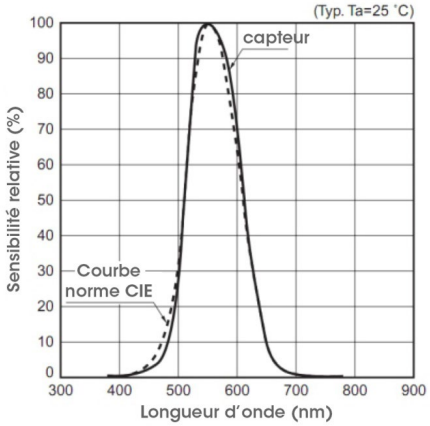
Complies with European regulations

Recycling symbol. Do not throw in the trash. The device must be taken to a collection point.

2 - Introduction

2.1 - Presentation

The FI 110LX luxmeter is a photometer designed for measuring illuminance. This device is ideal for measuring lighting conditions as defined by the NF EN 12464-1 standard "Lighting of workplaces" (indoors). It is equipped with a silicon photodiode coupled with a filter which provides it with a relative spectral sensitivity very close to that adopted by the CIE Class A JIS C 1609-1993 standard (average sensitivity of a standard human eye in daytime vision). The illuminance of a surface is the ratio of the luminous flux received to the area of this surface. Its unit is the lux, equivalent to 1 lumen/m2. The FI 110LX displays the results in Lux or in foot-candelas (1 Lux = 0.09290 FC).



Relative spectral sensitivity for human daytime vision

The Fi 110LX luxmeter is universal; it adapts to all forms of light sources, whether they come from incandescent lamps, fluorescent lamps, LEDs, tungsten, quartz hologen, tungsten, metal halide, sodium, etc.

The lux meter is primarily useful to lighting professionals, whatever their preferred field: workstation ergonomics, public places, outdoor or indoor lighting, etc.

Here are some examples of average illumination to be respected according to different zones: (Values given for information purposes according to the JIS Z 9110-1979 standard)

Areas	Average lighting to be respected Minimum value (Lux)
Traffic area and corridors	100
Stairs, loading docks	150
Stores, warehouses	100
Sales stores, sales area	300
Checkout area	500
Public spaces, entrance halls	100
Counters	300
Restaurants, hotels, reception, cash register, concierge	300
Kitchens	500
School buildings, classroom	500
Conference room	500
Office lighting:	
– Typing, reading	500
– CAD position	500
- Reception	300

2.2 - Main characteristics

• Universal luxmeter for LED and incandescent light sources:
7 pre-recorded light sources + 3 configurable sources
Standard A source and white, red, yellow, green, **blue or violet LED**

• Remote brightness sensor with 1.5 m cable for optimal measurement

• Relative spectral sensitivity equivalent to CIE Class A, JIS C 1609:1993 and CNS 5119 (average sensitivity of a standard human eye in daytime vision)
• Ideal device for measuring lighting conditions in accordance with standard NF EN 12464-1 “Lighting of workplaces” (indoors)
• Cosine angular correction
• Display of illuminance in Lux (lx) or in Foot-candelas (FC)
• Display by calculation of luminous intensity in Candela (Cd)
• Saving and recalling 99 measurements in memory
• Screen refresh rate of 2.5 times per second
• Recording MIN/MAX/AVG values
• Measurement hold function (HOLD)
• Screen backlighting
• Automatic sensor zero adjustment
• Automatic power off
• Automatic range change
• Lightweight, robust and compact housing
• Delivered in a case

2.3 Correction factor value depending on the light source

The following table shows the value of the correction factor (F) to be used depending on the type of light source. A factor of value 1 corresponds to a standard white light source with an incandescent type quartz/ tungsten halogen lamp. Each light source has its own spectral response.

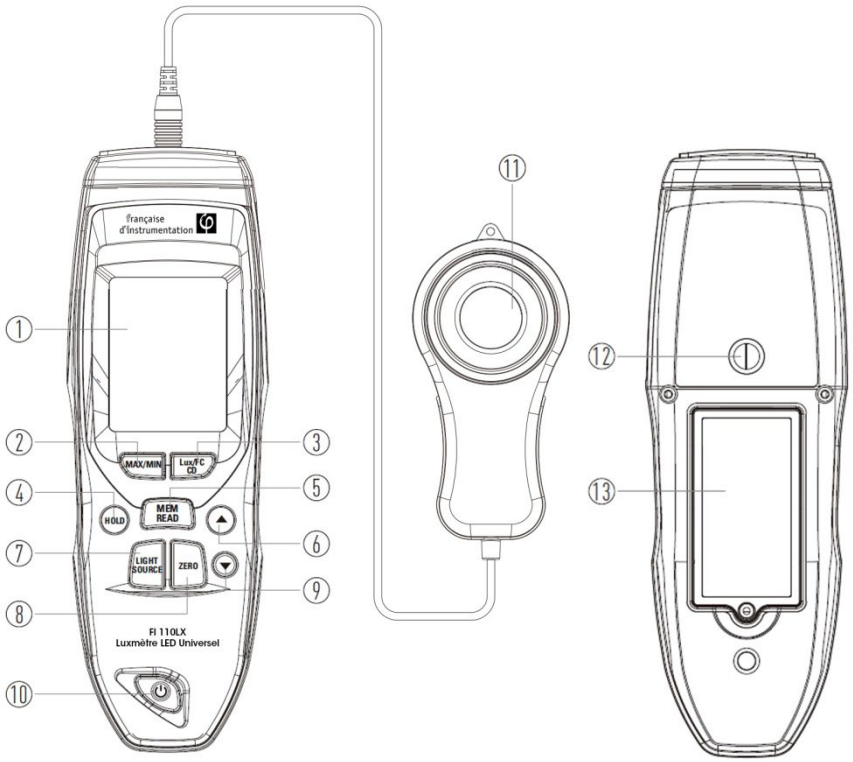
The correction is made by multiplying the measured value by the correction factor F Corrected value = F x measured value.
The FI 110LX offers 10 correction factors: 7 standard values and 3 configurable ones.

Sources	Correction factor (F)	FI 110LX
Standard light source A (standard source) Quartz/ Tungsten halogen lamp	1,000	L0
White LED	0.99	L1
Red LED	0.516	L2
Yellow LED	0.815	L3
Green LED	1,216	L4
Blue LED	1,475	L5
Purple LED	1,148	L6
Three-band fluorescent tube	1,149	*
High pressure mercury lamp	1,201	*
Sodium vapor lamp	1,179	*
Three-additive metal halide lamp	1,076	*
Rare earth metal halide lamp	0.911	*

* Values not stored in memory upon delivery. They can be entered according to the needs of each user (see section 2.5.6)

2.4 - Overall description

1- LCD display
2- MIN / MAX / AVG values display button
3- Unit of measurement selection button (LUX / FC CD – Foot candelas - Candelas)
4- [HOLD] button Holds the measurement
5- MEM/READ button
6- High value movement button
7- Light source selection button
8- Automatic zero adjustment button
9- Low value movement button
10- Device on/off button and automatic power off deactivation
11- Light sensor
12- Screw thread for tripod mounting
13- Battery compartment



2.5 – Description of functions and parameter settings

2.5.1 – [HOLD] Hold measurement

During measurement, press the [HOLD] button to hold the measured value on the screen; the display shows "Hold". Press this button again to return to measurement.

2.5.2 – [MAX/MIN] Recording of min / max / avg values

This function allows continuous recording of minimum, maximum and average values.

Press [MAX/MIN] button to enter recording mode, MAX symbol appears on the screen.

Short press the [MAX/MIN] button again to display the minimum value, the MIN symbol appears.

Short press the [MAX/MIN] button again to display the average value, the AVG symbol appears.

Press and hold the [MAX/MIN] button to exit recording mode. The device erases all values stored in memory.

2.5.3 – [Lux/FC CD] Selection of the unit of measurement

Select the unit of measurement by pressing the [Lux/FC CD] button. The display shows the unit "Lux" or "FC". For the calculation of candelas see section 3.2.

2.5.4 – [ZERO] Zero adjustment

Cover the light sensor with its cover. If the device does not display "0.00", press the [ZERO] button to automatically reset the zero point.

2.5.5 – [LIGHT SOURCE] Backlight

Press the button**[LIGHT SOURCE]**to turn the backlight on or off.

2.5.6 – [LIGHT SOURCE] Light source selection

The FI 110LX allows you to select the type of light source from among the ten available in memory: 7 pre-recorded (standard A, white LED, red LED, yellow LED, green LED, blue LED, purple LED) and three configurable ones.

Press and hold the [LIGHT SOURCE] button for one second to enter the light source selection mode. The digit X of the L symbol**X**flashes. Use the buttons [▼] And [▲]to select the source from the ten available in memory from L0 to L9.

	Source type	Correction factor
L0	Standard Source A	1,000
L1	White LED	0.99
L2	Red LED	0.516
L3	Yellow LED	0.815
L4	Green LED	1,216
L5	Blue LED	1,475
L6	Purple LED	1,148
L7	Configurable source	1,000 (default)
L8	Configurable source	1,000 (default)
L9	Configurable source	1,000 (default)

Once the source is selected, press and hold the [LIGHT SOURCE] button to exit this mode.

The FI 110LX remembers the selected source after the device is turned off.

Setting of configurable sources (L7, L8 and L9) Example with
source L7
- Select source L7 by following the previous procedure. Digit 7 flashes.
- Press the [LIGHT SOURCE] button, the 4 digits of the correction factor flash.
- Use the buttons [▼]And [▲]to set the value which must be between 0.001 and 1,999.
- Press the [LIGHT SOURCE] button, the 4 digits of the correction factor stop flashing; the value is saved. Digit 7 flashes.
- Hold the [LIGHT SOURCE] button for one second to exit the light source selection mode.

The FI 110LX remembers the new value of the correction coefficient after the device is switched off.

2.5.7 – Automatic power off

The FI 110LX is equipped with an auto power-off function to extend battery life. The device automatically turns off after 3 to 5 minutes of inactivity.

To disable this function, when the device is on, hold the button **pressed** for 1 second to enable or disable function. The power off function automatic is active when the symbol appears on the screen.

2.5.8 – [MEM READ] Saving and recalling readings in memory

The FI 110LX allows you to save the current measurement in its internal memory. Up to 99 readings can be stored in memory registers No. 01 to No. 99.

Saving readings in memory
Press the [MEM READ] button to save the current measurement. The display shows the symbol "R" and the number of the storage memory register "NO".

Reading the readings in memory
Press and hold the [MEM READ] button for more than one second to access the reading of data stored in memory. The "R" symbol is displayed. Use the [▼]And [▲]to select the memory register.

Hold the [MEM READ] button for more than one second to exit this mode.

Clearing memory readings
When the device is off, press the [MEM/READ] buttons and the button at the same time ; the screen displays "CLA" to warn the user that all readings stored in memory have been erased.

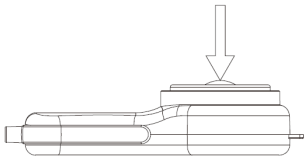
3 – Operating mode

It is advisable to refer to the chapter "Safety and operating instructions" before putting this device into operation and taking a measurement.

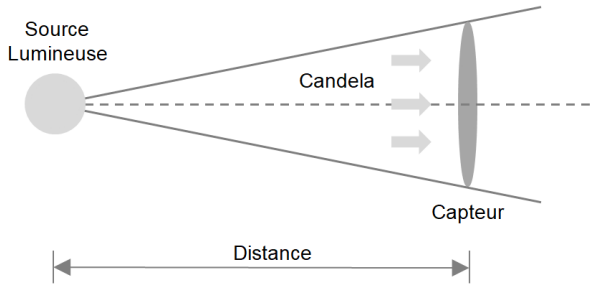
3.1 – Measurement of illuminance (lux)

- Press the On/Off button to turn on the device.
- Remove the cover from the light sensor and position the sensor perpendicular to the light source

- Select the unit of measurement with the [Lux/FC CD] button
- Select the source type with the [LIGHT SOURCE] button (L0-L9) (see section 2.5.5)
- The display shows the value of the measured illuminance.
- Replace the sensor cover once the measurements are complete to protect the filter and the sensor.



3.2 – Calculation of luminous intensity (candela / cd)



Luminous intensity is calculated using the following formula:

Luminous intensity (Cd) = Illuminance (Lx) x distance $(m)^2$

The distance between the center of the light source and the sensor must be between 0.01 and 30.47 m or 0.01 and 99.99 ft

- Press the On/Off button to turn on the device.
- Remove the cover from the light sensor and position the sensor perpendicular to the light source

- Hold the [Lux/FC CD] button for more than one second and then use the [▼]And [▲]to select the unit of measurement m (meter) or ft (foot)
- Hold the [Lux/FC CD] button for more than one second and then use the [▼]And [▲]to adjust the distance.

- Hold down the [Lux/FC CD] button for more than one second then read the value indicated by the display

- Hold the [Lux/FC CD] button for more than one second to exit this mode.
- Replace the sensor cover once the measurements are complete to protect the filter and the sensor.

4 - Maintenance and upkeep

4.1 – Maintenance

Clean the device periodically with a soft, slightly damp cloth; never use solvent-based detergents. Particular attention should be paid to the white disc covering the photodiode, the surface of which must be free of dirt and scratches. Wait until it is completely dry before using it.

When the device is not in use, always replace the sensor's protective cover to protect it from dirt.

If the device is not to be used for a long period of time, remove the battery and store it separately.

It is recommended to have the FI 110LX checked and calibrated periodically.

During normal use, if functional errors occur, contact After-Sales Service.

4.2 - Replacing the batteries

If the device displays the low battery symbol  , it is necessary to replace the battery.
- Turn off the device and unplug the sensor.
- Unscrew and remove the battery compartment cover.
- Replace the used battery with a new 9 V type 6LR61 battery
- Replace and screw the battery compartment cover back on.

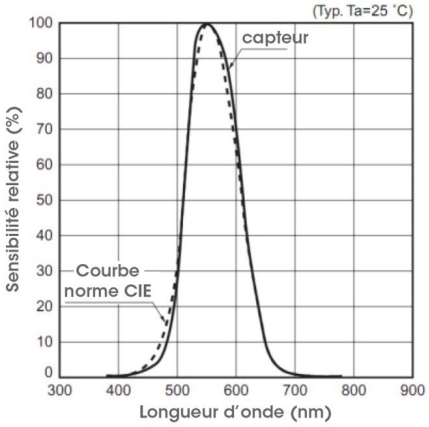
4.3 - Maintenance

Maintenance operations are not described in this manual. They must be carried out by qualified and authorized personnel. This also applies to repairs.

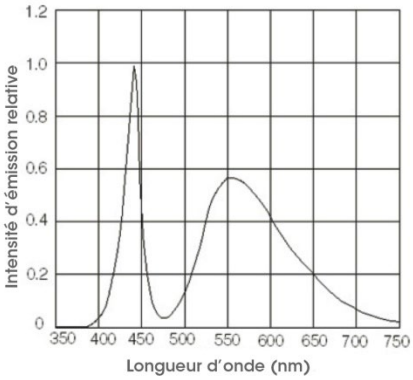
5 - Technical characteristics

Display: 4,000 points
Refresh rate: 2.5 times per second
Sensor: Silicon photodiode with filter
Range : 40, 400, 4000, 40000, 400000 Lux
40, 400, 4,000, 40,000 Footcandles
Accuracy:
±3%(calibration on standard incandescent lamp A 2856 °K and corrected white LED spectrum)
±6% on other visible light sources
Cosine angular correction:
30°: ±2%
60°: ±6%
80°: ±25%
Power supply: 9V 6LR61 battery / Low battery indicator
Operating conditions: 5 to 40°C / 0 to 70%RH
Storage conditions: -10 to 60°C / 0 to 70% RH
Pollution degree 2
Altitude up to 2000 m
Dimensions:
185 x 65 x 45 mm Weight: 248 g without the sensor

Comes with a case, a battery and instructions for use



Relative spectral sensitivity for human daytime vision



Corrected relative spectral sensitivity for a white LED

FRANÇAISE D'INSTRUMENTATION
www.francaise-instrumentation.fr

A BRAND BY DISTRAME SAS
Parc du Grand Troyes
40 rue de Vienne – 10300 Sainte-Savine - FRANCE

Tél : +33 (0)3 25 71 25 83 / infos@distrame.fr
www.distrame.fr