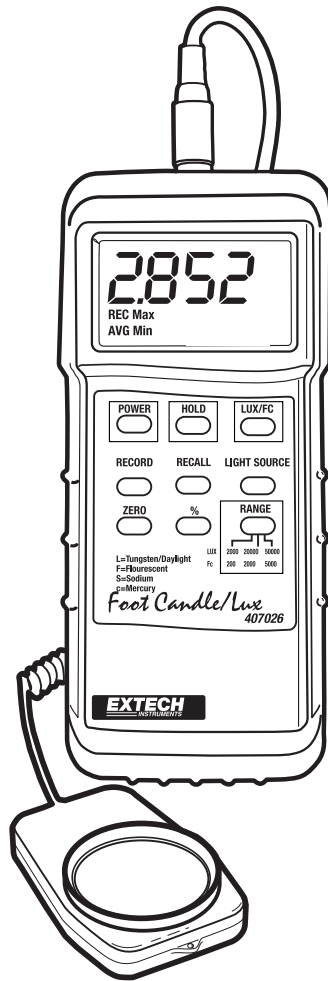


User's Guide

EXTECH
INSTRUMENTS

Heavy Duty Meter

Model 407026



**Test Equipment
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Introduction

Congratulations on your purchase of the Extech Heavy Duty Light Meter. This light meter offers selectable lighting types, data record/recall, relative display mode, and PC interface. This professional meter, with proper care, will provide years of safe reliable service.

Specifications

General Specifications

Circuit	Custom one-chip LSI microprocessor circuit
Display	3-1/2 digit (2000 count) LCD display with contrast adjustment
Measurement ranges	LUX: 0 to 50,000 LUX (3 range); Fc: 0 to 5000 Fc (3 range); Relative mode: 0 to 1999%
Data Hold	Freezes displayed reading
Lighting Types	Sodium, Daylight/Tungsten, Fluorescent and Mercury
Sensor Structure	Cosine/color corrected photo-diode meets C.I.E.
Memory Store/Recall	Records/Recalls Max/Min/Avg readings
Sample rate	0.4 seconds (approx.) per reading
Zero Adjust	Push-button procedure
Auto Power Off	After approx. 10 minutes
Data Output	RS-232 PC serial interface (optional software/cable PN 407001)
Operating conditions	32 °F to 122 °F (0 °C to 50 °C); <80% RH
Power Supply	9V battery
Power consumption	Approx. 5 mA DC. (approx. 200 hr battery life)
Weight	0.71 lbs. (320 g)
Dimensions	Instrument: 7.1 x 2.8 x 1.3" (180 x 72 x 32 mm) Sensor: 3.3 x 2.2 x 0.7" (85 x 55 x 17.5 mm)

Range Specifications

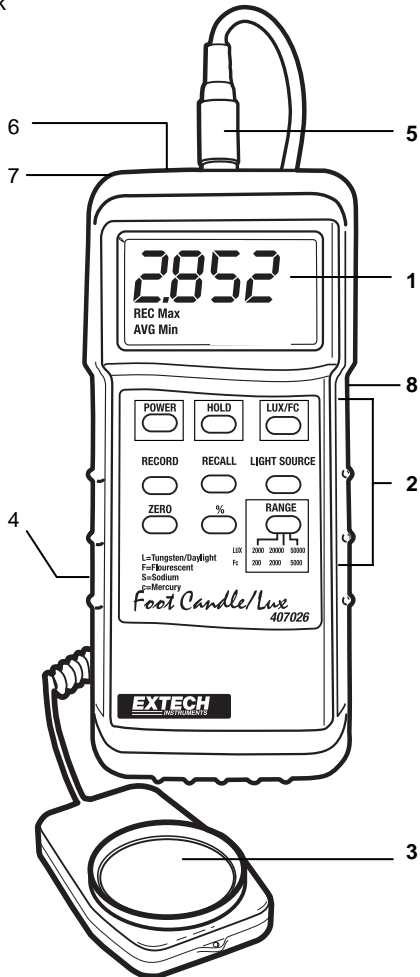
Measurement	Range	Display	Resolution	Accuracy
LUX	2,000 LUX	0-1,999 LUX	1 LUX	± (4% + 2 digits) of full scale
	20,000 LUX	1,800-19,990 LUX	10 LUX	
	50,000 LUX	18,000-50,000 LUX	100 LUX	
Foot Candles	200 Fc	0-186.0 Fc	0.1 Fc	
	2,000 Fc	167-1,860 Fc	1 Fc	
	5,000 Fc	1,670-5,000 Fc	10 Fc	
Relative mode	0-1999%		1%	

Note: The accuracy specification above applies to calibration performed using a precision standard incandescent tungsten light source of 2856°K with meter on the tungsten setting.

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Meter Description

- 1 LCD Display
- 2 Keypad
- 3 Light sensor
- 4 Battery compartment (rear)
- 5 Sensor input
- 6 RS-232 PC Interface jack
- 7 Protective Holster
- 8 LCD Contrast Adjust



Operation

Meter Power and Automatic Power Off

1. Press the POWER button to turn the meter on. If the display does not switch on, check the 9V battery.
2. Press the POWER button again to turn the meter off.
3. The meter has an automatic power off feature that conserves battery energy. After 10 minutes the meter automatically shuts off. To defeat this feature, press the RECORD button to put the meter in the recording mode.

Display ZERO Calibration

Please perform a zero calibration before each use. This will ensure the highest accuracy.

1. Place the sensor cover over the light sensor, effectively blocking all light to the sensor.
2. Select the 2,000 LUX range using the RANGE switch.
3. Press the ZERO button. The reading should be zero.
4. Remove the sensor cover from the light sensor and proceed.

Selecting the unit of measure

Press the LUX/Fc button to select the desired unit of measure. The display icons will reflect the current setting.

Selecting a light source

Select the type of lighting to be measured by pressing the LIGHT SOURCE button. The display will indicate the lighting type icon (see icon list below).

L = Tungsten/Daylight (use this setting when calibrating with a Tungsten lamp)

F = Fluorescent

S = Sodium

C = Mercury

Note: For Halogen and Metal Halide light use the Tungsten setting

Taking Measurements

Hold the light sensor in the area where light is to be collected. The light being measured must encompass the entire surface of the light sensor dome (pin point lighting such as with LED light cannot be measured).

The display will indicate the light intensity value in LUX or Foot candles (Fc). Note that since the main display area is limited to a reading of '1999', the right-most digit in the 20,000 LUX and 5,000 Fc ranges appears on the lower LCD line. In the 50,000 LUX range, the last two digits appear on the lower LCD line

It may be necessary to adjust the display contrast due to a change in viewing angle or voltage drift. Use the LCD Contrast adjustment located on the right side of the meter to set the preferred contrast.

Display Range Selection

Take a measurement starting at the highest range and then work down using the RANGE switch. If the display shows dashes along the top of the reading area (---), the input exceeds the maximum value for the selected range; select a higher range. If the display shows dashes along the bottom of the reading area (_ _ _), the input is too low; select a lower range.

Data Hold

While measuring, press the HOLD button to freeze the reading. The LCD will display D.H. indicating that the Data Hold function is engaged. Press HOLD again to return to normal operation.

Relative % Mode

In the RELATIVE mode of operation, the meter displays light level as a comparison to a reference value. The reference value is stored by pressing the '%' button while the desired light level reference is on the display. When the button is pressed, '100%' will be displayed and the '%' icon will appear.

After the '%' button is pressed, light measurements will be displayed as a percentage of the reference value. For example, if the light level reference is 1000 LUX, a display of 500 LUX will be represented as 50%. Further, a light level of 250 LUX will display as 25%. Use the equation below:

$$\text{Display \%} = \frac{\text{Light measurement}}{\text{Stored reference light measurement}} \times 100$$

Press the '%' button again to return to normal operation.

Maximum (MAX), Minimum (MIN), and Average (AVG) readings

The meter can keep track of the highest, lowest, and average readings for later recall.

1. Press the RECORD button to start tracking the MAX, MIN, and AVG readings. The REC display will switch on.
2. When desired, press the RECALL button.
3. The MAX display icon appears next to the REC display icon. The reading shown is the highest reading encountered since the RECORD button was pressed.
4. Press RECALL twice more to view the MIN and AVG readings.
5. Press the RECORD button to return to normal operation.

RS-232 PC Interface

This meter is equipped with a RS-232 serial data port. This interface is for use with the Exttech Data Acquisition Software (Part number 407001) and enables the user to capture, store and display readings on a PC. Contact Exttech or refer to the 407001 user manual for details on the PC interface.

Battery Replacement

When the low battery indicator appears (LBT), replace the battery as soon as possible. Reliable readings can be obtained for several hours after the first appearance of the low battery indication. To replace the battery:

1. Remove the meter's rubber protective holster.
2. The battery compartment is located on the lower back of the meter. Pry the battery compartment cover off using a small coin or screwdriver and remove the battery.
3. Replace the 9V battery and reinstall the cover.
4. Ensure that the battery cover is secured after replacing the battery.



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Typical Light Levels

Lux	Foot Candles		Lux	Foot Candles	
		Factories			Home
20-75	2-7	Emergency Stairs, Warehouse	100-150	10-15	Washing
75-150	7-15	Exit/Entrance Passages	150-200	15-20	Recreational Activities
150-300	15-30	Packing Work	200-300	20-30	Drawing Room, Table
300-750	30-75	Visual Work: Production Line	300-500	30-50	Makeup
750-1,500	75-150	Typesetting: Inspection Work	500-1,500	50-150	Reading, Study
1,500-3,000	150-300	Electronic Assembly, Drafting	1,000-2,000	100-200	Sewing
		Office			Restaurant
75-100	7-10	Indoor Emergency Stairs	75-150	7-15	Corridor Stairs
100-200	10-20	Corridor Stairs	150-300	15-30	Entrance, Wash Room
200-750	20-75	Conference, Reception Room	300-750	30-75	Cooking/Dinning Room
750-1,500	75-150	Clerical Work	750-1,500	75-150	Show Window
1,500-2,000	150-2000	Typing, Drafting			
		Store			Hospital
75-150	7-15	Indoors	30-75	3-7	Emergency Stairs
150-200	15-20	Corridor/Stairs	75-100	7-10	Stairs
200-300	20-30	Reception	100-150	10-15	Sick Room, Warehouse
300-500	30-50	Display Stand	150-200	15-20	Waiting Room
500-750	50-75	Elevator	200-750	20-75	Medical Exam Room
750-1,500	75-150	Show Window, Packing Table	750-1,500	75-150	Operating Room
1,500-3,000	150-300	Storefront, Show Window	5,000-10,000	500-1000	Eye Inspection

Common Conversion Factors

Illuminance (Visible Flux Density)	1 lm/m ² =	1 lux (lx)
		10 ⁻⁴ lm/cm ²
		10 ⁻⁴ phot (ph)
		9.290 x 10 ⁻² lm/ft ²
		9.290 x 10 ⁻² foot-candles
Luminance (Visible Flux Density per Solid Angle)	1 lm/m ² /sr =	1 candela/m ²
Luminous Intensity (Visible Flux per Solid Angle)	1 lm/sr =	1 candella
Luminous Flux (Visible Flux)	1 lumen (lm) =	1.464 x 10 ⁻³ watts @ 555 nm