



Model 407026 Heavy Duty Light Meter



Introduction

Congratulations on your purchase of Extech's 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	Dual function 0.5" (13 mm) 3-1/2 digit (1999 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 Display
Lighting Types	Sodium, Daylight/Tungsten, Fluorescent or 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 sec. approx.
Zero Adjust	Push button
Auto Power Off	After approx. 10 min
Data Output	RS 232 PC serial interface (optional software)
Operating conditions	32 °F to 122 °F (0 °C to 50 °C); <80% RH
Power Supply	DC 9V battery (Heavy duty type).
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) (% full scale)
	20,000 LUX	1,800-19,990 LUX	10 LUX	
	50,000 LUX	18,000-50,000 LUX	100 LUX	
Foot Candle	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.

Meter Description

- 1 LCD Display
- 2 Keypad
- 3 Light sensor
- 4 Battery compartment (rear)
- 5 Sensor input socket
- 6 RS232 output socket
- 7 Protective Holster



Operation

- 1 Press the "Power Off/On" key to power the meter. Check the battery if display does not indicate characters.
- 2 Zero Calibration for Sensor
 - a) Place the "Sensor Cover" over the "Light Sensor".
 - b) Select the "2,000 LUX" range via the "Range Switch".
 - c) Press the "Zero" key. The display will null (display zero).
 - d) Remove the Sensor Cover from the Light Sensor.
- 3 Select the desired unit of measure by pressing the "LUX/Fc" key. The display will indicate "LUX" or "Fc" as selected.
- 4 Select the type of lighting to be measured by pressing the "Light Source Select" key. The display will indicate the lighting type icon from the list below:
L = Tungsten/Daylight; F = Fluorescent; S = Sodium; C = Mercury
(For Halogen and Metal Halide light use the Tungsten setting)
- 5 When making measurements always start at the highest range and work down (use the "Range Switch" to select ranges). If the display indicates "----", the input exceeds the maximum for the range; Select a higher range. If the display indicates " _ _ _ _", the input is too low; Select a lower range.
- 6 Hold the "Light Sensor" so that the sensor faces the light source to be measured. The display will indicate the light intensity value. In the 20,000 LUX and 5,000 Fc ranges, the last digit will appear on the lower line of the LCD display. In the 50,000 LUX range, the last two digits will appear on the lower line of the LCD display.

Data Hold: During the measurement, pressing "Data Hold" will freeze the displayed value and the LCD will display the "D.H" indicator. Press "Hold" again to release the data hold function.

Relative % Mode: During measurements, pressing the "%" key causes the display to read 100%. This means that the reading on the LCD at the time of the key-press = 100% and all subsequent readings will be relative to that reading. For example if 100 Fc was on the display at the time of the key-press and the next reading was 50 Fc, the display would read 50% since 50 Fc is 50% of 100 Fc. New % values are calculated as:

$$\frac{\text{Measured Light Value}}{\text{Reference Light Value (when \% is pressed)}} \times 100$$

Press the "%" key again to release the relative % light function and return to normal operation.

Data Record (MAX/MIN/AVG Readings)

When selected, the DATA RECORD function records and stores the maximum, minimum and average readings. To start the DATA RECORD function:

- a) Press "RECORD" once. The "REC" indicator will appear on the display.
- b) Press "RECALL" once to retrieve the "Max" reading. The "Max" indicator along with the maximum values will appear on the LCD display.
- c) Press "RECALL" once, the "Min" indicator along with the minimum values will appear on the LCD display.
- d) Press "RECALL" once, the "AVG" indicator along with the average values will appear on the LCD display.
- e) To disable the "Data Record" function, press "Record" again. The display indicators "REC", "Max", "Min", "AVG" will disappear.

Measurement Considerations

- 1 The meter is designed with an "Auto shut off" feature to conserve battery life. The meter will automatically turn off if a function button is not pressed in any 10 minutes period. To disable "Auto shut off", press the "RECORD" button to engage the record function.
- 2 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.
- 3 The Zero recalibration procedure described in a previous section should be followed whenever the meter is powered up.
- 4 When recalibrating use a tungsten lamp (2856 °K) and be sure to select "Tungsten" as the light source.

RS232 PC Interface

The meter has a RS232 serial data port. This interface was designed to operate with the Extech Data Acquisition Software (p/n 407000) and enables the user to capture, store and display readings on a PC. For more information, contact Extech or refer to the 407000 user's manual for details on the PC interface.

Battery Replacement

The low battery indication appears as a "LBT" on the left corner of the display. When the "LBT" appears, 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 Pry the Battery Cover off using a small coin or screwdriver and remove the battery.
- 3 Replace the 9V battery (heavy duty type) and reinstall the cover.
- 4 Make sure the battery cover is secured after changing the battery.

Calibration and Repair Services

Extech offers complete repair and calibration services for all of the products we sell. For periodic calibration, NIST certification or repair of any Extech product, call customer service for details on services available. Extech recommends that calibration be performed on an annual basis to insure calibration integrity.

Warranty

EXTECH INSTRUMENTS CORPORATION warrants this instrument to be free of defects in parts and workmanship for three years from date of shipment (a six month limited warranty applies on sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization. A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product.

The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

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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



Tech Support Hotlines

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