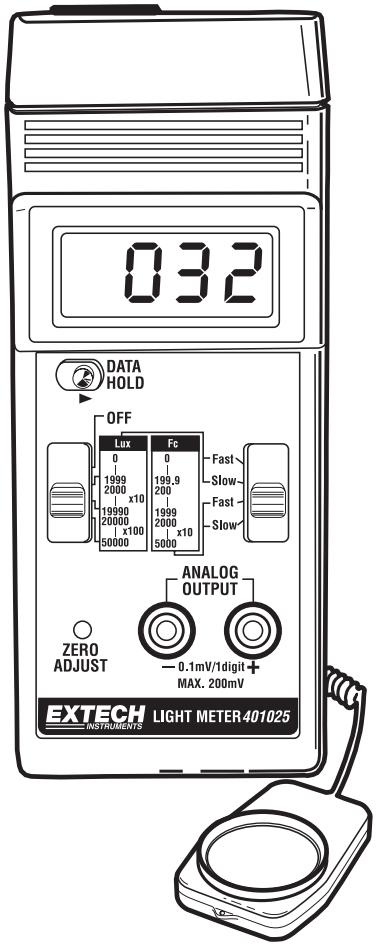
User's Manual

EXTECH INSTRUMENTS

Model 401025
Digital Light Meter



Introduction

Congratulations on your purchase of Extech's Digital Light Meter. This professional meter, with proper care, will provide years of safe reliable service.

Specifications

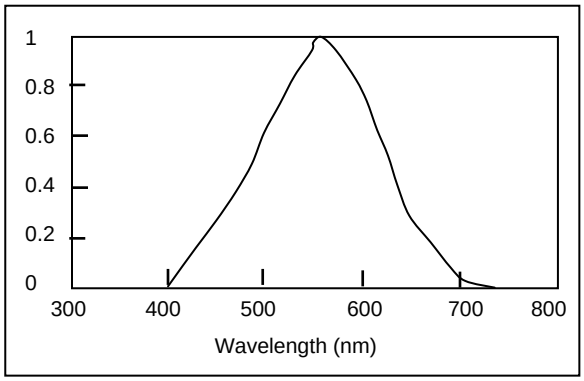
General Specifications

Display	0.5" (13 mm) LCD (Liquid Crystal Display).
Measurement	Lux, Ft-candle (Fc).
Ranges	Lux: 0 to 50,000 Lux, 3 ranges. Foot-candle: 0-5,000 Fc, 3 ranges.
Sensor	Exclusive photo diode & color correction filter, spectrum designed to meet C. I. E.
Zero Adj.	Manual adjustment.
Sampling Time	Approx. 0.4 sec.
Response Time	Fast: 0.25s; Slow: 1s
Over input indication	Indication of "1 "
Analog Output	0.1 mV/1 digit, max. output :200mV.
Operating Temperature	(32^{O}F to 122^{O}F).(0^{O}C to 50^{O}C).
Operating Humidity	Less than 80% RH.
Power Supply	006P DC 9V battery
Power Current	Approx. 2 mA DC
Weight	220 g / 0.52 LB
Dimension	Main instrument: 6.4x2.8x1.2 inch (163x70x30mm). Sensor Probe: 3.2x2.2x0.5 inch (85x55x12 mm).
Optional Accessories	Vinyl pouch carrying case, 409996

Range Specifications

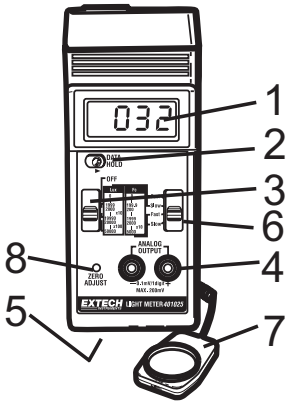
Lux			
Range	**In-range Display**	**Resolution**	**Accuracy**
2,000 Lux	0-1,999 Lux	1 Lux	± (5% + 2digits)
20,000 Lux	2,000-19,990 Lux	10 Lux	± (5 % + 2digits)
50,000 Lux	20,000-50,000 Lux	100 Lux	±- (5 % + 2digits)
Foot-candle (Fc)			
Range	**In-range Display**	**Resolution**	**Accuracy**
200 Fc	0-199.9 Fc	0.1 Fc	± (5% + 2digits)
2,000 Fc	200-1,999 Fc	1 Fc	± (5% + 2digits)
5,000 Fc	2,000-5,000 Fc	10 Fc	± (5% + 2digits)

Frequency Spectrum



Meter Description

1. LCD Display
2. Data Hold Switch
3. Power Off/Range Switch
4. Analog Output Terminal
5. Battery Compartment (rear)
6. LUX/Fc Switch & Response Switch
7. Light Sensor
8. Zero adjust



Operation

1. Select Units (Lux or Ft-candle) and Response Time (Fast or Slow) on the slide switch. Typical selection is Slow and Fc using the gray lettering.
2. Select the maximum range on the "Range Switch"
3. Hold the "Light Sensor" so that the sensor faces the light source to be measured.
4. The Display will indicate measured values. Use a range display multiplier if on the Lux 20,000 and 50,000 ranges or on the Fc 5000 range.
5. To "hold" a measurement, slide the "Data Hold Switch" to the "hold" position. The reading will "freeze" in the display until the "Data Hold Switch" is released.

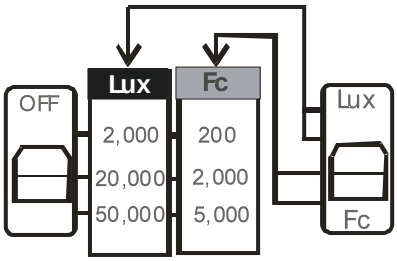
Note 1: An Over Range indication is a display of "I ". If this occurs, switch to a higher range.

Note 2: For measurements made on the Fc 5000 range, the displayed reading must be multiplied by 10.

Note 3: For measurements made on the Lux 20000 or 50000 range, the displayed reading must be multiplied by 10 and 100 respectively.

Note 4: The meter will indicate values above the maximum ranges. The accuracy of these measurements is unknown.

Range Display Multipliers		
Range	**Units**	**Multiplier**
200	Fc	Direct reading
2000	Fc & Lux	Direct reading
5000	Fc	Reading x10
20,000	Lux	Reading x10
50,000	Lux	Reading x100



Example: If a measurement on the 5000 Fc range displays 350, then the actual measured value is; 350 X 10 = 3500 Fc.

Selecting a Measurement Range

The meter has three measurement ranges (0-200, 0-2000, and 0-5000 Fc) and (0-2000, 0-20000, and 0-50000 Lux). The proper range selection will produce the most accurate reading. Always select the range that produces the maximum number of digits without exceeding the maximum count for that particular range. For example, a reading of 1456 Fc should be read on the 0 - 2000 range, not the 0-5000 range.

Zero procedure

The meter zero (display with no light input) may change with time. Occasional checking and adjustment may be required.

1. Completely cover the sensor to block out any light.
2. Set the range switch to the lowest Lux or Fc range
3. Using a small screwdriver, adjust the “Zero” control for a zero display. The last digit may change slightly. This is normal and does not affect the accuracy of the meter.

Analog Output

The analog output jacks on the front panel produce a 0.1mV DC per digit signal that can be used for recording or datalogging purposes.

Lighting Type Correction Factors

The 401025 light meter is calibrated under a precise "Standard tungsten light source of 2856^{O}K". If the meter is to be used under a different type of light the correction factor of from the table below should be applied to the readings obtained.

Mercury Lamp	x1.14
Fluorescent Lamp	X0.92 to 1.12
Daylight	x1.00
Sodium	x1.22
Metal Halide	x1.00

Replacing the Battery

When the left corner of the LCD display shows "LO BAT", it indicates the battery output is below the design limit and the battery needs to be replaced. However, reliable measurement can still be taken for another few hours before the tester becomes inaccurate.

1. Open the Battery Cover at the back of tester and remove the battery.
2. Replace with a 9V battery and install the cover.

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 one year 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 or visit our website at www.extech.com (click on 'Contact Extech' and go to 'Service Department' to request an RA number). 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.

☎

Support Hotline (781) 890-7440
Tech support: Ext. 200; Email: support@extech.com
Repair/Returns: Ext. 210; Email: repair@extech.com
Website: www.extech.com

Appendix A: 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/Dining 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

Appendix B - Common Terms and 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