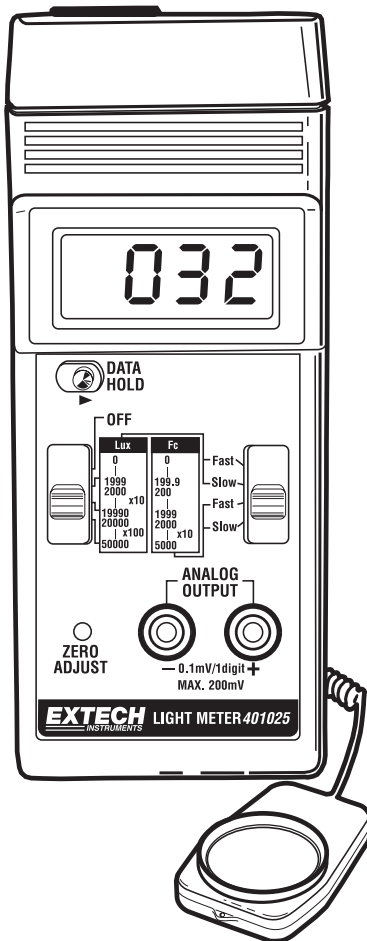


# User's Manual



## 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

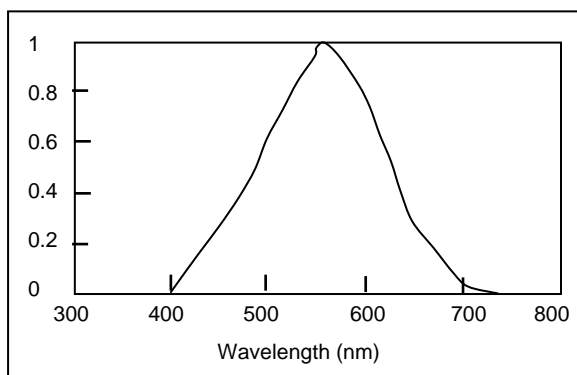
## General Specifications

|                       |   |
|-----------------------|---|
| 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°F to 122°F).(0°C to 50°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).<br>Sensor Probe: 3.2x2.2x0.5 inch (85x55x12 mm). |
| Optional Accessories  | Vinyl pouch carrying case, 409996   |

## Range Specifications

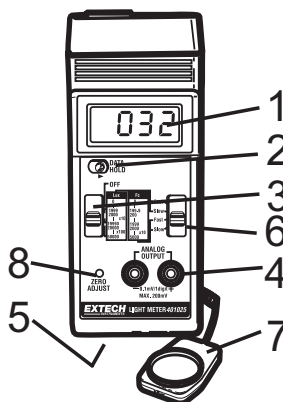
| Lux              |                   |            |                    |
|------------------|-------------------|------------|--------------------|
| Range            | In-range Display  | Resolution | Accuracy           |
| 2,000 Lux        | 0-1,999 Lux       | 1 Lux      | ± (5% + 2digits)   |
| 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.

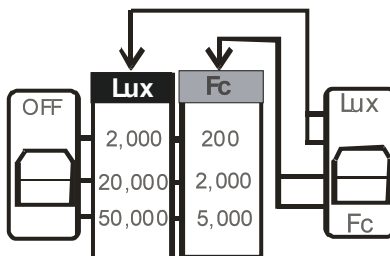
Note 1: An Over Range indication is a display of "1". If this occurs, switch to a higher range.

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;  $350 \times 10 = 3500$  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

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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

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The 401025 light meter is calibrated under a precise "Standard tungsten light source of 2856°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

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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**

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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**

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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](http://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.

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Website: [www.extech.com](http://www.extech.com)

## Appendix A: Typical Light Levels

| Lux         | Foot Candles |                               | Lux          | Foot Candles |                         |
|-------------|--------------|-------------------------------|--------------|--------------|-------------------------|
|             |              | <b>Factories</b>              |              |              | <b>Home</b>             |
| 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                  |
|             |              | <b>Office</b>                 |              |              | <b>Restaurant</b>       |
| 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              |              |              |                         |
|             |              | <b>Store</b>                  |              |              | <b>Hospital</b>         |
| 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 <sup>2</sup> =     | 1 lux (lx)                                  |
|   |                           | 10 <sup>-4</sup> lm/cm <sup>2</sup>         |
|   |                           | 10 <sup>-4</sup> phot (ph)                  |
|   |                           | 9.290 x 10 <sup>-2</sup> lm/ft <sup>2</sup> |
|   |                           | 9.290 x 10 <sup>-2</sup> foot-candles       |
| Luminance (Visible Flux Density per Solid Angle)  | 1 lm/m <sup>2</sup> /sr = | 1 candela/m <sup>2</sup>                    |
| Luminous Intensity (Visible Flux per Solid Angle) | 1 lm/sr =                 | 1 candella                                  |
| Luminous Flux (Visible Flux)                      | 1 lumen (lm) =            | 1.464 x 10 <sup>-3</sup> watts @ 555 nm     |