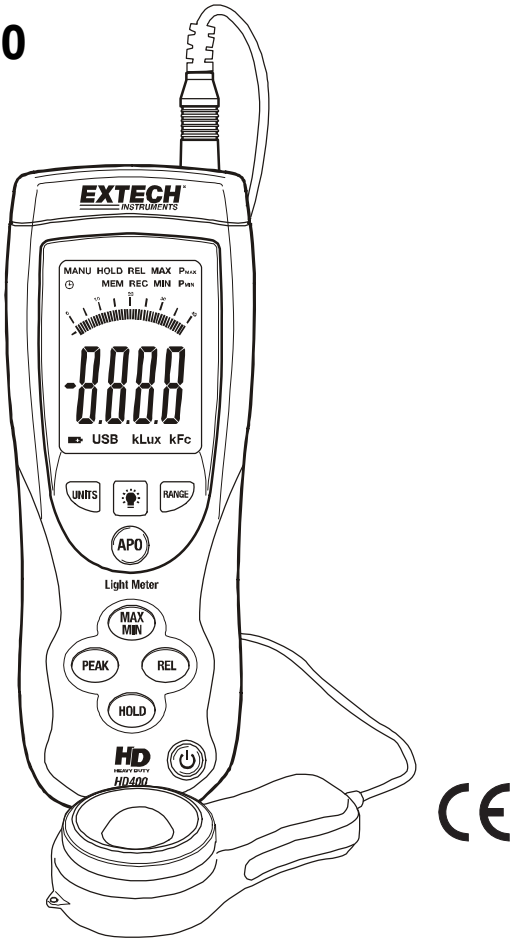
User's Guide

EXTECH®
INSTRUMENTS
A FLIR COMPANY

Heavy Duty Digital Light Meter with PC Interface

Model HD400



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Introduction

Congratulations on your purchase of the Extech HD400 Digital Light Meter. The HD400 measures illuminance in Lux and Foot candles (Fc). The HD400 includes a PC interface and Windows™ compatible software for real-time monitoring and storage of light level data. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

Features

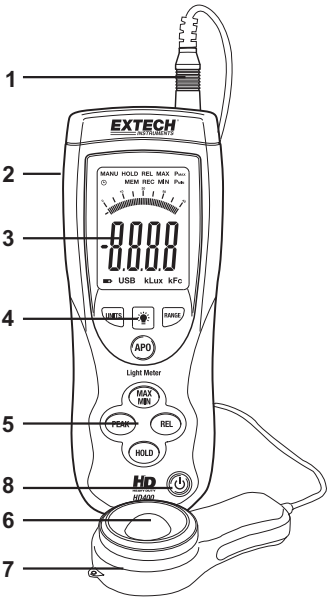
- Precision instrumentation for the measurement of light illuminance
- Large, 4000 count, backlit LCD display with fast 40 segment bargraph
- Data Hold function
- Meets CIE Photopic spectral response
- Fully cosine corrected for angular incidence of light
- Stable, long-lasting silicon photo diode sensor with spectral response filter
- Fast responding
- High accuracy
- Automatic zero function
- Peak Hold function for capturing fast changes in light levels down to 10mS
- Auto power off after 20 minutes of inactivity
- Maximum and Minimum light level memory
- Relative reading feature
- USB PC Interface for Data acquisition
- Four (4) range levels
- Heavy Duty, rugged, double molded housing

Description

Meter Description

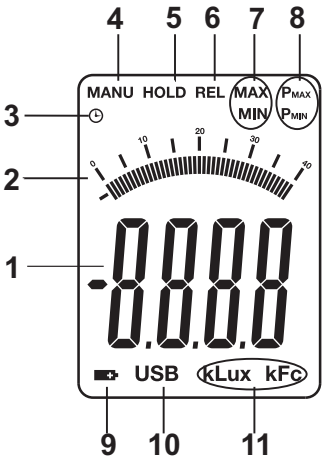
1. Sensor cable plug shown connected to meter jack
2. USB jack for PC interface (under the flip-down cover)
3. LCD Display
4. Upper Push Button set
5. Lower Push Button set
6. Sensor's light collector dome
7. Sensor housing (protective cover not shown)
8. Power ON-OFF button

NOTE: The battery compartment, tripod mount, and tilt stand are located on the rear of the instrument and are not pictured



Display Description

1. Digital measurement reading
2. Bargraph measurement reading
3. Auto Power OFF active icon
4. MANU icon
5. DATA HOLD icon
6. RELATIVE mode icon
7. MAXIMUM and MINIMUM reading mode
8. PEAK HOLD mode
9. Low Battery symbol
10. PC connection icon
11. Range units of measure



Operation

Meter Power

1. Press the Power button ⏻ to turn the meter ON or OFF
2. If the meter does not switch on when the power button is pressed or if the low battery icon is displayed on the LCD, replace the 9V battery

Auto Power Off (APO)

1. The meter is equipped with an automatic power off (APO) feature that turns the meter off after 20 minutes of inactivity
2. To defeat the APO feature, press and hold the APO button. While holding down the APO button, press the RANGE button to switch off the circular APO symbol on the upper left-hand corner of the LCD. Repeat this step to re-activate the APO feature. The APO icon will reappear.

Unit of Measure

Press the UNITS button to change the unit of measure from Lux to Fc or from Fc to Lux

Range Selection

Press the RANGE button to select the measurement range. There are four (range) selections for each unit of measure. The units display and decimal point location identify the range selected. Refer to the Range Specifications section of this User Guide for detailed range information.

Taking a Measurement

1. Remove the sensor's protective cap to expose the white sensor dome
2. Place the sensor in a horizontal position under the source of light to be measured
3. Read the illuminance measurement on the LCD display.
4. The meter will display 'OL' when the measurement is outside of the meter's specified range or if the meter is set to the wrong range. Change the range by pressing the RANGE button.
5. Replace the protective sensor cap when the meter is not in use.

Data Hold

To freeze the LCD display, momentarily press the HOLD button. 'MANU HOLD' will appear on the upper left-hand side of the LCD. Momentarily press the HOLD button again to return to normal operation ('MANU HOLD' will switch off).

Peak Hold

The Peak Hold function allows the meter to capture short duration light flashes. The meter can capture peaks down to 10mS in duration.

1. Press the PEAK button to activate the Peak Hold feature. 'MANU Pmax'' will appear on the display. Press the PEAK button again and 'MANU Pmin' will appear. Use 'Pmax' to capture positive peaks. Use 'Pmin' to capture negative peaks.
2. To exit the Peak Hold mode and return to the normal operating mode, press the PEAK button a third time.

Maximum (MAX) and Minimum (MIN) Reading Memory

The MAX-MIN function allows the meter to store the highest (MAX) and lowest (MIN) readings.

1. Press the MAX-MIN button to activate the feature. ‘MANU MAX’ will appear on the top of the display and the meter will only display the highest reading encountered.
2. Press the MAX-MIN button again. ‘MANU MIN’ will appear on the top of the display and the meter will only display the lowest reading encountered.
3. To exit this mode and return to the normal operating mode, press the MAX-MIN button a third time.

Relative Mode

The Relative Mode function allows the user to store a reference value in the meter for which to compare subsequent readings. For example, if the user stores a reading of 100 Lux, all subsequent readings will be displayed as actual reading minus 100.

1. Take the measurement, and when the desired reference value is displayed, press the REL button.
2. ‘MANU REL’ will appear at the top of the LCD display.
3. All subsequent readings will be offset by an amount equal to the reference level. For example, if the reference level is 100 Lux, all subsequent readings will equal the actual reading plus 100 Lux.
4. To exit the Relative Mode, press the REL button. ‘MANU REL’ will switch off indicating that the meter has returned to the normal operating mode.

LCD Backlight

The meter is equipped with a backlight feature that lights up the LCD display.

1. Press the backlight button to activate the backlight
2. Press the backlight button again to switch the backlight off. Note that the backlight will turn off automatically after a short period of time in order to save battery energy.
3. The backlight function uses extra battery energy. To conserve energy, use the backlight feature sparingly.

USB PC Interface

Description

The HD400 meter can be connected to a PC via its USB interface. A USB cable, along with Windows™ software, is included with the meter. The software allows the user to view, store, and print readings from the PC.

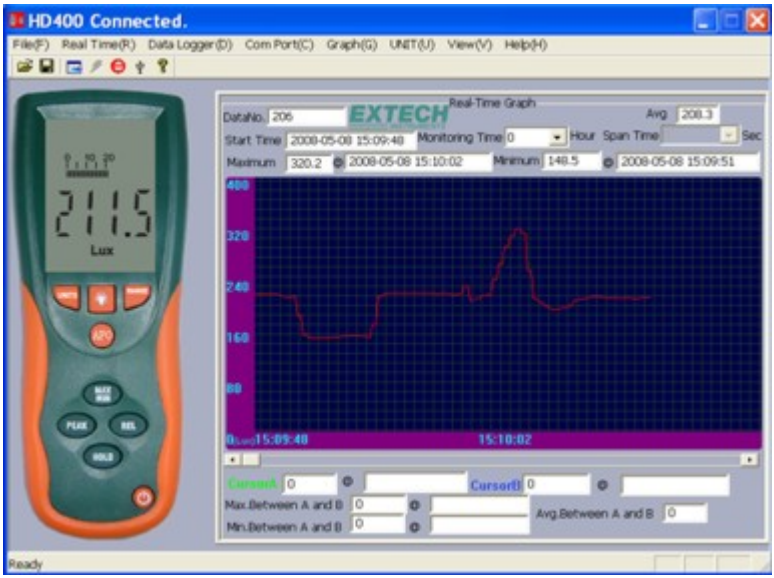
Note that the HD400 does not datalog readings, meaning that it does not store readings in an internal memory; it simply displays readings on the PC as they are taken in real-time; after which the readings can be analyzed, stored as text, or printed.

Meter to PC Connection

The supplied USB cable is used to connect the meter to a PC. Connect the smaller connector end of the cable to the meter's interface port (located under the tab at the left-hand side of the meter). The larger connector end of the cable connects to a PC USB port.

Program Software

The supplied software allows the user to view readings in real-time on a PC. The readings can be analyzed, zoomed, stored, and printed. Please refer to the HELP UTILITY available from inside the software program for detailed software instructions



Specifications

Range Specifications

Units	Range	Resolution	Accuracy
Lux	400.0	0.1	± (5% rdg + 10 digits)
	4000	1	
	40.00k	0.01k	± (10% rdg + 10 digits)
	400.0k	0.1k	
Foot candles	40.00	0.01	± (5% rdg + 10 digits)
	400.0	0.1	
	4000	1	± (10% rdg + 10 digits)
	40.00k	0.01k	
Notes: 1. Sensor Calibrated to standard incandescent lamp (color temperature: 2856K) 2. 1Fc = 10.76 Lux			

General Specifications

Display	4000 count LCD display with 40 segment bargraph
Ranging	Four ranges, manual selection
Over range indication	LCD displays 'OL'
Spectral response	CIE photopic
Spectral accuracy	Vλ function (f'_1 ≤6%)
Cosine response	f'_2 ≤2%; Cosine corrected for angular incidence of light
Measurement Repeatability	±3%
Display rate	Approximately 750 msec for digital and bargraph displays
Photo detector	Silicon photo-diode with spectral response filter
Peak capture	10mS minimum
Operating conditions	Temperature: 0 to 40°C (32 to 104°F); Humidity: < 80%RH
Storage conditions	Temperature: -10 to 50°C (14 to 140°F); Humidity: < 80%RH
Meter Dimensions	170 x 80 x 40mm (6.7 x 3.1 x 1.6")
Detector Dimensions	115 x 60 x 20mm (4.5 x 2.4 x 0.8")
Weight	Approx. 390g (13.7 oz.) with battery
Sensor lead length	1m (3.2')
Low battery indication	Battery symbol appears on the LCD
Power supply	9V battery

Maintenance

Cleaning

The meter and its sensor can be cleaned with a damp cloth. A mild detergent may be used but avoid solvents, abrasives, and harsh chemicals.

Battery Installation / Replacement

The battery compartment is located on the back of the meter. The compartment is easily accessed by pressing and sliding the rear battery compartment cover off of the meter in the direction of the molded arrow. Replace or install the 9V battery and close the battery compartment by sliding the compartment cover back onto the meter.

You, as the end user, are legally bound (**EU Battery ordinance**) to return all used batteries, **disposal in the household garbage is prohibited!** You can hand over your used batteries / accumulators at collection points in your community or wherever batteries / accumulators are sold!

Disposal: Follow the valid legal stipulations in respect of the disposal of the device at the end of its lifecycle

Storing

When the meter is to be stored, please remove the battery and affix the sensor's protective cover. Avoid storing the meter in areas of extreme temperature and humidity.