

ILT1000

Operation Manual



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TECHNOLOGIES

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ILT1000 Light Meter, Monitor & Data Logger

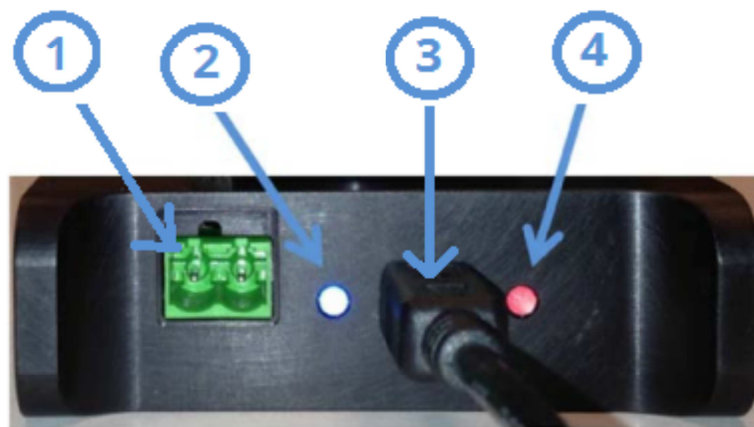
Thank you for purchasing your ILT1000 Intelligent USB-based light meter.

1. Equipment Overview: The ILT1000 Series meter does not include Filters, Optics or Optical calibrations

- A. CC400 carrying /storage case
- B. ILT1000 meter – Autoranging radiometer.
- C. USB cable – Used for charging, and software communication.
- D. 4-20mA terminal block – Wiring terminal for monitoring of PLC current levels.
- E. Additional items – if applicable, filters and optics may have been attached to the top of the ILT1000, or shipped inside the case. Calibration certificates, for any calibration ordered, will also be included.

2. Quick Reference Guide

FRONT PANEL



2.1. 4-20mA out: Output terminal for connection to a PLC. **(Warning: Improper wiring can cause board damage. It is highly recommended that a 4-20mA isolation device be used to ensure the ILT1000 is isolated from the current loop power and programmable-logic-controller. Do not exceed 50V max. Refer to section 15, 4-20mA Loop Configuration for additional instructions).**

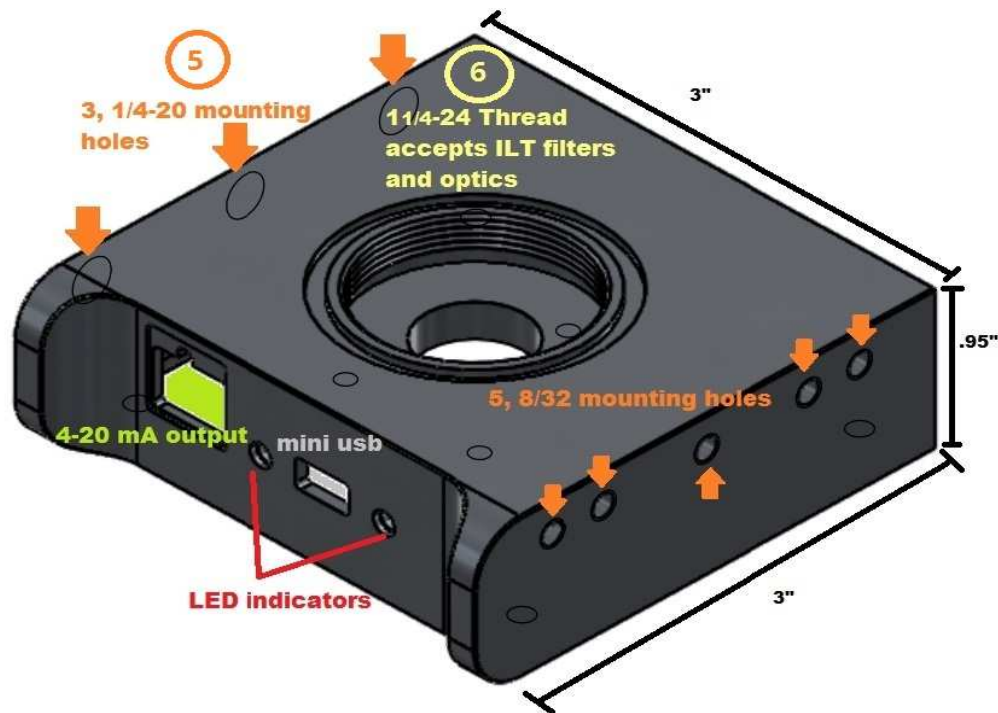
2.2. Power Indicator: Generates a continuous blue light to indicate the unit has power.

2.3. USB: USB connector for software control, Data logging and power.

2.4. Status Indicator:

- Saturated:** Steady signal indicates the sensor is saturated (light level too strong)
Consider adding a neutral density filter or increasing the distance from the source.
- Logging:** Slow Flash, Indicates data is being recorded.

2.5. Mounting: Each side of the ILT1000 has mounting threads. On the left are three, 12/20 mounting holes, on the right are five, 8/32 mounting holes



2.6. Filter

and Optics: ILT filters and optics have 1 ¼ x 24 threads and can be easily attached and/or removed from the top of the ILT1000 to allow filter swapping and use of multiple calibrations for different applications/light source testing.

2.7: Model and Serial Number: On the rear panel of the ILT1000 the model number and serial number are engraved. There are currently six different diodes used in the ILT1000. Each diode has a different model number engraved. See list below:

ILT1000 Broadband: Silicon diode 200-1100 nm

ILT1010 Lux: Silicon with built in low cost photopic correction filtration 400-700 nm

ILT1254 Narrowband: Si with built in narrow band 254 filter 240-250 nm

ILT1320 UV: GaN diode 200-320 nm

ILT1005 UV-VIS: GaAsp 250-675 nm

ILT1007 IR: InGaAs diode, 770-1400 nm

ILT1270 UV: SiC diode, 215-350 nm

Other solid state detectors are available. Please contact ilsales@intl-lighttech.com for information on additional standard, customized or OEM configurations.

3. Calibration Factor:

Each ILT1000 has the ability to store up to 20 calibration factors. If the unit is calibrated at the time of purchase, calibration factors are pre-programmed into the internal memory.

4. Dark and Zero settings:

Each ILT1000 is pre-programmed with the factory dark (“zero”) setting in a low noise environment. Because ambient environments differ, ILT software allows the user to program and select the “user dark” or “zero”. Using the user dark feature will allow the customer to subtract small amounts of current generated from their environment.

5. Saturation:

Saturation occurs when the light exposure generates more than 1 mA of current from the internal sensor. The ILT1000 provides an autorange mechanism allowing measurements of up to 8 decades of current and/or light

levels. While autoranging the ILT1000 can experience saturation. When this condition occurs the software display will provide a “SATURATION” warning. The ILT1000 saturation LED will illuminate with a steady red output. To resolve issues with saturation increase the distance from the source, or consider adding neutral density filters or apertures to reduce the incoming signal . ILT offers the QNDS1, QNDS2, and QNDS3 for attenuation by a factor of 10, 100 and 1000 respectively.

6. Response time:

The ILT1000 takes a reading every 10 usec and can store up to 270 samples/sec when using the remote datalog function. When using Datalight III PC software the system can store readings at speeds up to 500 readings per second. At lower current levels, longer measurement times are required to assure the accuracy.

Device Sampling and Data Transfer Rates

Software Package	Device Sample Period	Minimum Application Sample Period	Maximum Application Sample Period	Minimum Application Sample Frequency	Maximum Application Sample Frequency	Max On-Device Data/sample Storage	Approximate Data Transfer Rate to Computer Storage (over USB or to on-device SD drive)
Flash App DataLight III & II	10uS	20 uS	10 ms	100 Hz	50 KHz	4096	270 samples/sec
DataLight III Meter(USB & WiFi)	10us	20 ms	5 sec	0.2 Hz	50 Hz	N/A	50 samples/sec
MAC Meter(USB & WiFi)	10us	20 ms	5 sec	0.2 Hz	50 Hz	N/A	50 samples/sec
Datalog	10uS	10 ms	1 day	N/A	100 Hz	16380(2)	270 samples/sec
ILT2400	10uS	20 ms	5 sec	0.2 Hz	50 Hz	>10M (4GB)	50 samples/sec
DataLight II Meter(USB)	10uS	10 ms (4)	2 sec	0.5 Hz	100 Hz (1)	N/A	100 samples/sec (4)

Notes:

- DL II Meter version 2.3.8 or greater required to sample current or irradiance at 100 Hz, including capture to disk.
 - Requires [Device Manager...USB Serial Port] -> Port Settings -> Advanced -> Latency Timer = 1ms
- 16380 data points without real-time timestamp, 8190 with real-time timestamp

7. Datalight software for windows 7, 8 or 10 PC or MAC IOS:

Datalight III software is available for download on the ILT website: <http://www.intl-lighttech.com/support/software>.

https://www.intl-lighttech.com/sites/default/files/downloads/datalightiii_software-1.3.1-mac.zip

<https://www.intl-lighttech.com/sites/default/files/ilt-datalight-iii-win-7-8-10-app-v1.2.4-fw-v3.1.4.7.zip>

You will be brought through a simple set of “Next”, “Next”, “Finish” steps. Once you have installed the Datalight III software, Plug the ILT1000 into any available USB port or a hub connected to the computer. As you make the connection the right Status LED should flash once, indicating the connection has been made(this is a very brief flash) . The Blue LED on the left should come on and maintain a steady output. Wait up to 2 minutes for the drivers to install. You can verify a USB port has been assigned properly using device manager, under Ports (COM & LPT) as seen in the following image:



You are now ready to take readings! To learn more, download the Datalight III manual:

<https://www.intl-lighttech.com/sites/default/files/downloads/datalight-iii-meter-software-manual.pdf>

8. Confirm device driver installation: Install FTDI drivers, as needed. Device drivers are located in C:\Program Files, International Light Technologies, Datalight III, FTDI folder. To install drivers double click driver CDM.....exe as shown in the image below



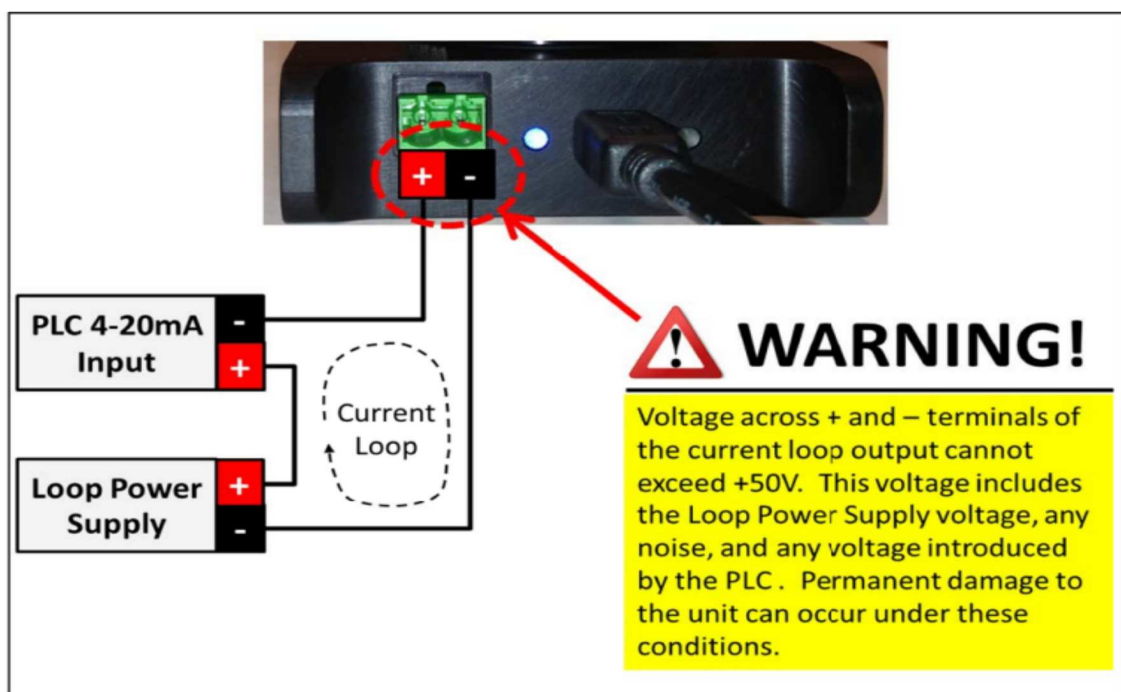
Software manuals for Datalight III can be found on the ILT website: <http://www.intl-lighttech.com/support/manuals-documentation>

9. Firmware updates: Note: All ILT1000 models should be run on FW 3.1.4.7 or higher

- Plug the ILT1000 into any available USB port. (for small tablets with a MICRO USB port an OTG cable may be required)
- Assure the red LED flashes once as the USB cord is attached and the blue LED remains steadily illuminated.
- Wait a few seconds for the ILT1000 to be recognized.
- Download the firmware from the ILT website and save the hex file.
https://www.intl-lighttech.com/sites/default/files/iltxx00_3-1-4-7_fw.zip
- Open the Datalight III folder on the desktop and click on FW Update and select the .hex file using the browse box.

10. 4-20mA Loop Configuration:

- Warning: Please note the warning below when connecting the 4-20mA output to a new or existing current loop. The preferred loop voltage is 15VDC, but can be set as high as 24VDC. While the unit does provide protection against reverse polarity and voltage noise/spikes, voltages above 50V will damage the unit.
- Connection: The 4-20mA current loop is connects as illustrated below. The Loop Power Supply provides the power for the current loop, and the ILT1000 controls the level of current that flows through the loop.



C. 4-20mA Current Loop Modes

There are four modes of output that are supported by the ILT1000, as follows:

10A. 4-20mA Current Loop Modes

There are four modes of output supported by the ILT1000, as follows:

4-20mA Current Loop Mode	"CLI" Command to Invoke Mode	Current Relationship
Log (default mode)	setcurrentloop log	$4\text{-}20\text{mA Current} = (\text{LOG}_{10}(\text{Detector Current}) + 8) * 3 + 5$ $\text{Detector Current} = 10^{((4\text{-}20\text{mA Current} - 5) / 3 - 8)}$
Linear with Min and Max	setcurrentloop [min detector current in picoamps] [max detector current in picoamps]	4-20mA Current = 4mA at [min] Detector Current 4-20mA Current = 20mA at [max] Detector Current 4-20mA Current is linear in between [min] and [max]
Linear with Midpoint	setcurrentloop midpoint	4-20mA Current = 12mA at Detector Current when setcurrentloop command was sent. 4-20mA Current = 4mA at 0 Detector Current 4-20mA Current = 20mA at 2x the Detector Current when setcurrentloop command was sent. 4-20mA Current is linear in between
Manual Current Loop Setting	setcurrentloop [0-24]	No relationship. 4-20mA Current is set to whatever the setcurrentloop command defined, i.e. setcurrentloop 8 sets the 4-20mA Current to 8mA.

11. Care and Handling

The ILT1000 internal board is a sensitive electronic device. Due to risk of board damage, only trained personnel should attempt opening the housing on the ILT1000. Opening the ILT1000 by non-ILT personnel voids all warranties and may adversely affect the calibration of the meter.

Operating Temperature: -40 to 85°C (Calibrated Irradiance 0-40°C) ILT meters and sensors have a recommended operating range of 0 to 40°C to best assure the accuracy of the calibrated measurements.

Humidity: 0-95% non-condensing.

ESD: Use basic ESD precautions and practices when handling the device. It is advisable to discharge any static buildup by touching a grounded conductive surface before making contact with devices or its connectors.

Cleaning: No chemicals or liquid solution should be used to clean the ILT1000 housing. The ILT1000 housing is made of durable anodized aluminum housing, however, the housing does not provide a sealed barrier to protect the internal components from moisture.

Submersion: The ILT1000 housing is not rated for submersion.

Calibration: ILT typically recommends an annual calibration for all equipment. Per ISO17025, the customer may, through their own QC process, create their own calibration cycle.

Service: Before returning any equipment to ILT for service (including warranty evaluations) customer should visit the ILT website and obtain an RMA:

<http://www.intl-lighttech.com/services/return-material-authorization/rma-form>

12. Warranty

The equipment you have purchased from International Light, Inc. has been expertly designed and was carefully tested and inspected before being shipped. If properly operated in accordance with the instructions furnished, it will provide you with excellent service. The equipment is warranted for a period of twelve (12) months from date of purchase to be free of defects in material or workmanship. This warranty does not apply to damage resulting from improper set up, accident, alteration, abuse, loss of parts or repair by other than International Light Technologies. The equipment will be repaired or replaced, at our option, without charge to the owner for parts or labor incurred in such repair. This warranty shall not apply unless the equipment is returned for our examination with all transportation charges prepaid to International Light Technologies, 10 Technology Drive, Peabody, MA 01960. International Light Technologies has no other obligation or liability in connection with said equipment.

ILT1000 device firmware is licensed with All Rights Reserved, with the following warranty disclaimer:

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ADDENDUM A

Installation for MAC with terminal software

The ILT1000 is based on a standard FTDI interface that provides a USB-to-Serial connection to a MAC OS X system. To interact on a MAC, perform the following steps:

1. Plug the ILT1000 into an available USB slot.
2. If the device is not being recognized automatically, please install the drivers for the Mac OS found at <http://www.ftdichip.com/Drivers/VCP.htm>

NOTE:

Once the file is downloaded, typically to the desktop, the downloaded file has to be run to install the drivers. Upon attempting to install the drivers, the system may report an error related to only allowing the execution of applications from the “Mac App Store” or the “Mac App Store and Identified developers”. To resolve this, modify the setting within System Preferences > Security & Privacy dialog. Note the lock in the lower left-hand corner of this dialog box. This will need to be unlocked, by an administrator, to change this setting. After installation of the drivers, this setting can be reverted.

3. Open a Terminal window on the MAC.
 - a. The Terminal program is found at: Applications > Utilities > Terminal
4. From within Terminal, type **ls /dev**
 - a. This will list all the devices found on the system.
5. Locate *tty.usbserial[.....]A* and *tty.usbserial[.....]B*
 - a. Note that, due to the large amount of tty devices typically available, the *tty.usbserial[...]* device may scroll off the screen. If it is not seen, simply scroll up to find it.
 - b. The device with the ‘B’ is the correct tty device.
 - c. The [...] will be a device specific string that needs to be inserted in the next line.
6. From within Terminal, type **screen /dev/tty.usbserial[.....]B 115200**
 - a. Example: **screen /dev/tty.usbserial-TIWNK5JQB 115200**
 - b. 115200 is the baud rate to be used. This value is 9600 for firmware versions earlier than 1.1.0.0.
7. Type **echoon** followed by pressing Enter.
 - a. The screen will not display the characters while typing the above command
 - b. Once entered, this command instructs the ILT1000 to echo all characters to the Terminal program.
8. Type **help** to display the ILT1000 commands.
 - a. These commands can now be executed within the Terminal program.