

# Plus 2: Power & Energy Meter

## • Introduction

Plus 2 is a handheld, lightweight, touch screen Meter designed by Laserpoint to measure the optical power/energy of lasers and other light sources.

The Plus 2 meter is compatible with all released of Laserpoint thermopile and photodiode sensors; it features a 4.3" color touch screen display and an intuitive and ergonomic Graphical User Interface which allows to exploit all its characteristics by just one or two touches. The instrument is powered by a USB rechargeable lithium battery for a run time of up to 15hrs.

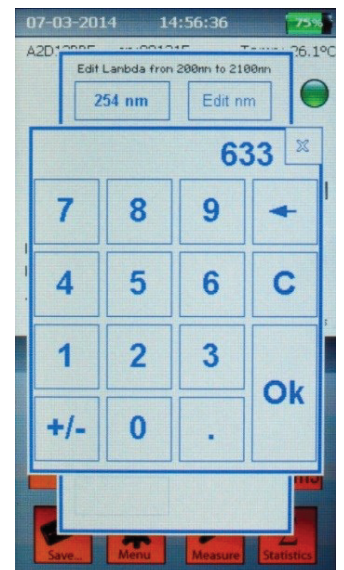
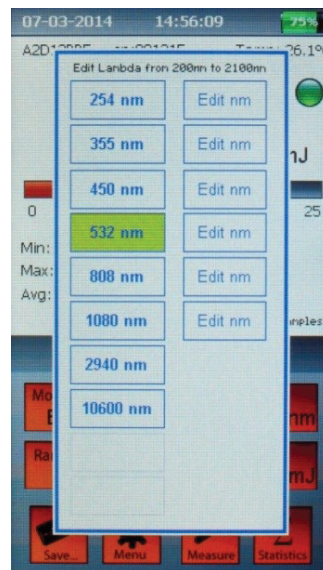
Among its features, the Plus 2 offers a configurable Analogue Output and easy Data Saving/



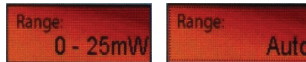
- a** Date - Time - Battery/network icons
- b** Head model, serial number and operating temperature (°C)
- c** 4 digits numerical display and measurement function units
- d** Analog bar graph normalized to the selected full scale
- e** Sample counts and time considered for the statistical elaboration, if selected. Also warnings and alarms/alert messages are displayed in this section.
- f** Mode ( Power- Energy), Wavelength Selection
- g** Range and Zero
- h** Duration of the data logging and specific measurement settings when selected

## Wavelength Settings

Wavelengths can be selected by first opening the “edit lambda” window where a set of most popular laser wavelengths are displayed. To input a specific wavelength not shown in the list it is sufficient click on “edit nm” and select the desired wavelength on the keyboard that pops up



**Manual or Automatic Power Range**

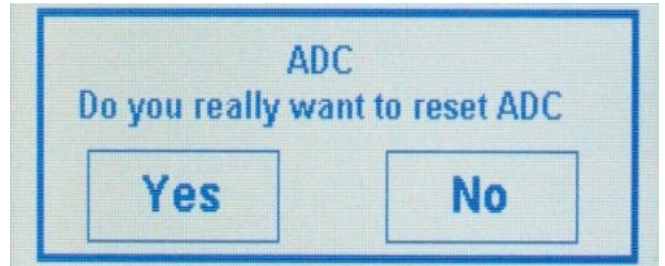


The measurement full scale or range can be adjusted according to user's needs by touching the "Range" screen button and scrolling to choose the range option. Selection can be done manually, or by choosing the "Auto" mode.

**Offset and Zero**



The offset level in a measurement can be activated by touching the "Zero" screen button to acquire the presently measured power value as offset level. All meter adjustments, including ADC zeroing, are carried out by the Plus 2 firmware. However, a manual zeroing can be done, eg every time a new sensor head is plugged onto the Plus 2 by a longer press on the Zero button. If "Yes" is selected the display will show the "Wait for zeroing" notice and when the ADC has been reset the notice "Zeroing Completed" will be displayed.

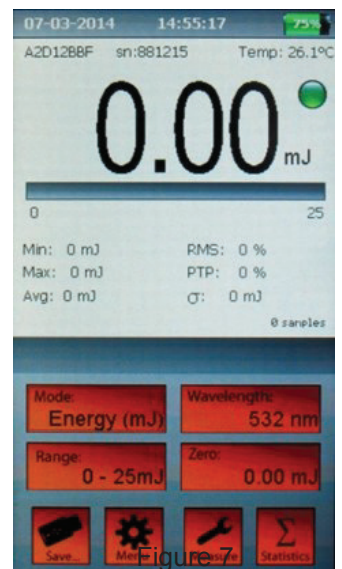
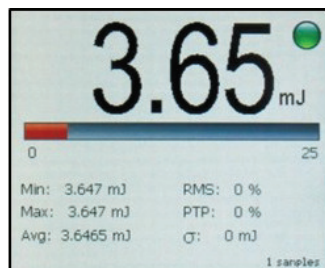


**Power and Energy Mode**

The "Mode" screen button easily switches from Power measurement mode to Energy measurement mode; measurement units are according to sensor head type and expected range.

**Measurement of Single Shot or Burst Energy**

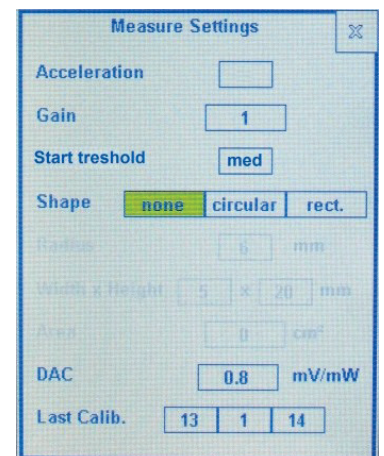
The Plus 2 can measure the single shot or the integral energy of a burst of 2 or more pulses. Once the Energy Mode has been chosen, the green led on the display indicates that the Plus 2 is ready to measure an energy pulse. During the laser pulse, the message "Acquisition" is displayed for a time ranging between 1 to 5 seconds depending on the sensor and whether a single pulse or multiple pulses are recorded. When a pulse/burst energy acquisition is completed, the measured energy will be displayed as shown in Figure 8. Once the led returns to green, a new measure can then be done.



**Setting the energy threshold**



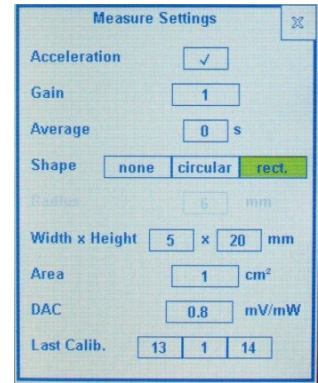
To avoid unwanted contribution of thermal noise or background radiation to the measured pulse energy, the instrument has been designed not to respond to pulses below a preset energy threshold. Hence an Energy Threshold has to be set and to do so follow the instructions below:



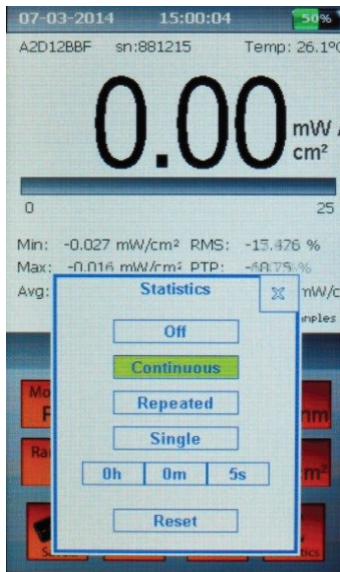
● **Measure Irradiance and Fluence**



Measures in Power mode can be displayed as Irradiance (W/cm<sup>2</sup>), as well as measures in Energy mode can be displayed as Fluence (J/cm<sup>2</sup>) by inserting the beam Shape (Radius for a circular shape, Width and Height for rectangular shape) on "Measure Settings" .



● **Statistics**



The Statistics key opens the corresponding window . Four processing options are available:

- Continuous**: the elaboration is carried out on a continuous data collection basis.
- Repeated**: the data are repeatedly collected and elaborated within a user's defined time period.
- Single**: the data are collected and elaborated only once within a user's defined time period.
- Off**



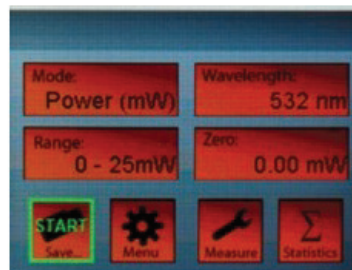
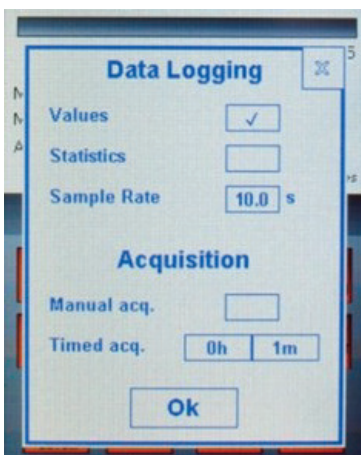
● **Data logging to a USB memory stick**

By inserting the USB memory key into the port on Plus 2 left side and touching the "Save..." button the Data Logging window is open.

A selection of both the desired data to be saved (Values, statistics or both) and Sample Rate (between 0.5 s and 99 s) together with the acquisition mode can be done. This latter can be :

**Manual** or

**Timed**: if a defined time acquisition period is needed The "START" button starts data logging. During data logging a timer shows the elapsed time if the selected acquisition mode is Manual or the time left if the selected acquisition mode is Timed.

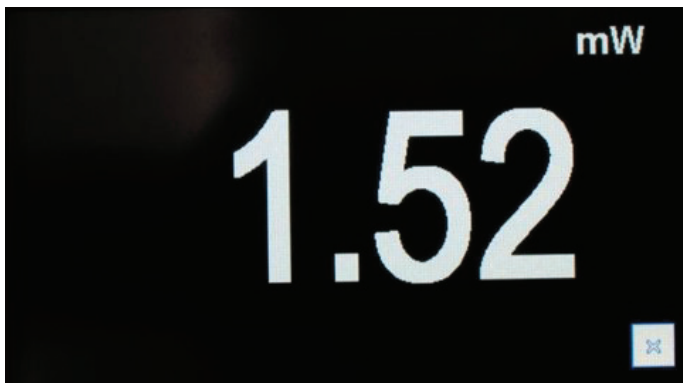
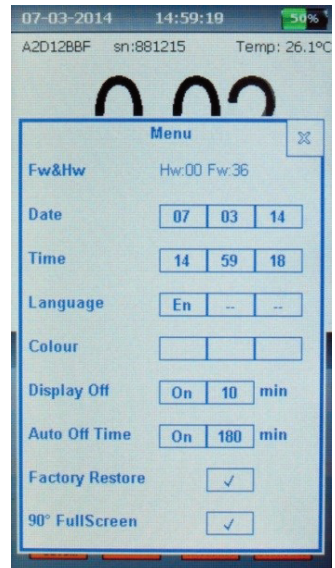


● The “Menu” Button



Menu” button opens to:

- Date and Time settings.** -**Language and Display Colour** choices (soon ready).
- **Display Off** :Display off time can be set from 1 to 30 minutes
- Auto off**: after a certain time of inactivity Plus 2 turns off. By selecting Auto off, time can be set from 1 to 600 minutes.
- Factory restore**: this function resets measurement, statistics and wavelength settings to the factory conditions
- 90° Full Screen**: this option switches the screen to a 90° turned full screen high visibility / high contrast display showing only the measurement value and related units.



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## Plus 2 Specifications

*For customers who like to write their own software or for system integrators sensors can be supplied with an easy to access command set with DLL drivers that support simple ASCII host commands*

• <b>Detector Compatibility</b>	Laserpoint Thermopile, Photodiode and OEM heads
• <b>Input ranges</b>	7 mV – 700mV full scale, in 9 ranges
• <b>A to D Sampling rate</b>	64 Hz
• <b>A to D resolution</b>	23 bit ADC resolution, 16bit processing resolution
• <b>Electrical accuracy</b>	± 0.5%
• <b>Electrical input noise level</b>	500nV Input Offset Voltage drift (typical): -4nV/°C
• <b>Dynamic range</b>	8 decades
• <b>Analog output</b>	0.025 - 2 Volt, with 16-bit (0.0015% resolution.)
• <b>Analog output accuracy</b>	±0.1% ±2mV relative to display
• <b>Dimensions</b>	170Hx100W x36-50D (mm)
• <b>Weight</b>	380 g
• <b>Display</b>	4.3" TFT LCD high brightness, 480 x 272 resolution, resistive touch panel (96H x 55W mm).
• <b>Display digit height</b>	15mm - 25mm Full Screen
• <b>Bargraph segments</b>	250 pixel width
• <b>Battery</b>	Built in rechargeable Li-Pol. 3.7V 3700mAh
• <b>Battery charge time</b>	7-8 hours if not working 15-20 hours if working
• <b>Battery run time</b>	> 9 hours in normal operation > 15 hours in stand-by display mode
• <b>Supplied Battery Charger</b>	Input 100/240Vac 50/60Hz Out 5Vdc 1A, Charging current is 0.5A (Plus 2 may be charged through a PC USB port).

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