laserpoint

Plus 2

Power & Energy Meter

Quick Start Guide

1. QUICK REFERENCE

The Plus 2 is a portable and lightweight Power Meter designed to measure the optical power/energy of lasers and other light sources.

It supports Laserpoint Thermopile Head Sensors and Laserpoint Photodiode Sensors. Laserpoint products list is available at www.laserpoint.eu.

The Plus 2 is equipped with a 4.3" color touch screen display and an intuitive and ergonomic Graphical User Interface (Figure 1), that makes all the features quickly available with just one or two touches.
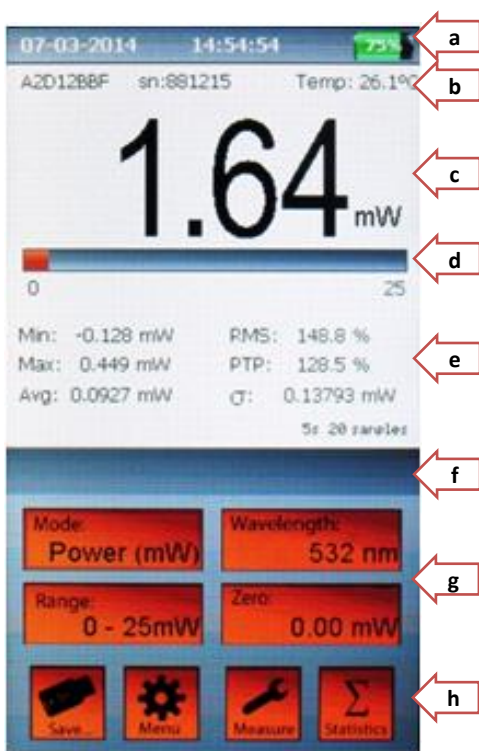
The Plus 2 offers also a configurable Analogue output, Data logging to USB memory stick, and a USB powered and rechargeable lithium battery with a runtime up to 15hrs.

2. QUICK START

2.1. THE PLUS 2 DISPLAY

As shown in Figure 1, the touch screen display of Plus 2 is divided in horizontal sections with a specific content:

Figure 1
The touch screen display

a) Date - Time - Battery/network icons

b) Sensor Head name and Serial number; Sensor Head temperature (°C)

c) Numerical 4 digits display and units of measure

d) Analog bar graph tailored on the selected full scale

e) This section is meant to display statistical elaboration of measurement (if selected), a sample counter and the elapsed time of statistics elaboration.
This area is also used for warnings and alarms/alert messages

f) Area for displaying the duration of the data logging and specific measurement settings

g) Four self-explanatory function buttons: Mode, Wavelength, Range and Zero .

h) Four functional buttons: Save, Menu, Measure and Statistic offer a quick access to specific sub-menus.

2.2. CONNECTING THE HEAD TO THE PLUS 2

Insert the measuring head IIS Connector (Intelligent Identification System) into the socket marked "Head Input" on the top panel of the Plus 2. (Figure 2)

Figure 2
Top Panel View

2.3. SWITCHING ON / OFF THE PLUS 2:

Press the on-off button on the top panel (Figure 2) **to switch on** the Plus. The main screen will be shown as in Figure 1.

> **Note:**
> *The head must be plugged in before the unit is switched on. Otherwise the blinking writing "NO HEAD" will appear and the Plus 2 will turn off in a few seconds (while in battery mode).*

To turn off the Plus 2 press the on-off button for 2-3 seconds, then release it. The current Plus 2 configuration will be automatically saved.
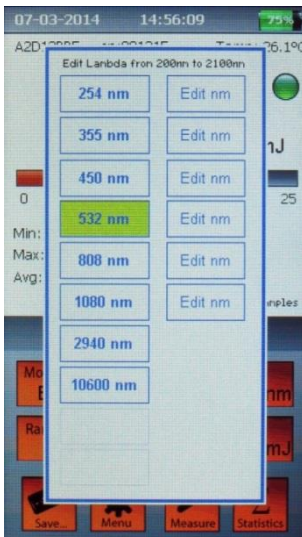
2.4. SETTING THE WAVELENGTH OF LASER BEING USED:
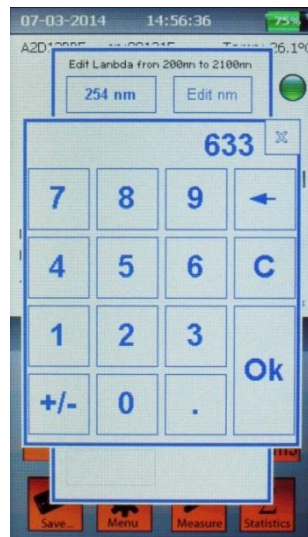

a) Touch the Wavelength button on the screen of the Plus 2.
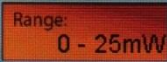
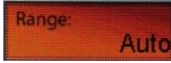b) The "edit lambda" menu (Figure 3) will be displayed.

c) Select a lambda from the list, or touch "edit nm" to input the wavelength you need (Figure 4). The wavelength must be within the available range, that is shown on top of the wavelength menu.

Figure 3   *Figure 4*

> **Note:**
> *The wavelengths available, and the editable wavelength range depend on the Sensor head characteristics and the Sensor head calibration.*
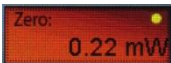
2.5. Choosing manual or automatic ranging in power measurement:

Touch the Range button ![Range: 0 - 25mW] on the screen of the Plus 2 to scroll the different ranging option.

Select the appropriate range manually, or choose the "Auto" mode ![Range: Auto] to let the Plus 2 manage the range automatically.

2.6. Offsetting current reading:

You can activate the offset by touching the "Zero" button ![Zero: 0.00 mW] on the main screen of the Plus 2.

When "offset" is activated, the button ![Zero: 0.22 mW] shows a yellow led and the offset value with its unit of measure.
To cancel the offset, press "offset" again.

2.7. Zero Adjustments

In the Plus 2, all adjustments, including ADC zeroing, are done by the software. It is recommended to re-zero the Plus 2 each time the measuring head is changed.

a) Press for more than 3 seconds the Zero button ![Zero: 0.00 mW] on the screen of the Plus 2.

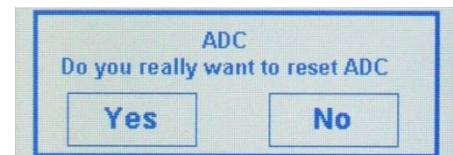b) After 3 seconds, the confirmation pop-up message (Figure 5) will be displayed.

Figure 5

> *Note:*
> *While zeroing make sure that the instrument is not affected by electrical noise and the sensor is undisturbed.*

c) Press "Yes" and wait few seconds while the "Wait for zeroing" and "Zeroing Completed" messages are displayed (Figure 6).
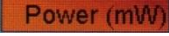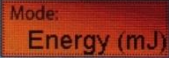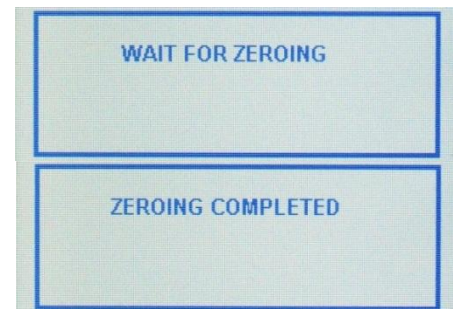

Figure 6

2.8. CHOOSING POWER OR ENERGY MEASUREMENT:

Touch the "Mode" button to switch from the Power measurement **Mode: Power (mW)** to the Energy measurement **Mode: Energy (mJ)** (shown units of measure depend on sensor and range being used).

While switching from Power mode to Energy mode if the measured signal is greater than the energy threshold, the Plus 2 will show the message "Zeroing is necessary".

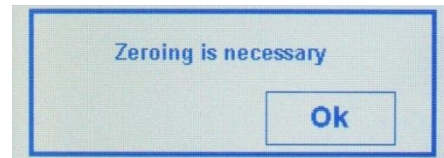Press OK and follow the steps as described in the "Zero adjustment" section.

Figure 7

> **Note: Energy Range is Manual**
> *The energy mode only permit a manual range setting: so you need to press the "Range" button to select the proper range.*

2.9. MEASURING ENERGY OF A SINGLE PULSE OR BURST PULSE:

Set the Energy Mode as described above.

The green led near the measured value means that the Plus 2 is ready to measure the energy pulse.

When firing the laser, the value display will turn blank, the LED will turn red and the writing "Acquisition" will appear (Figure 9).
The "Acquisition" time usually takes from 1 to 5 seconds (depending on the sensor head being used and the duration of pulse/burst fired).

After the acquisition, the measured energy will be displayed. The green led will immediately show back: the Plus 2 is ready to measure a new pulse (Figure 10).
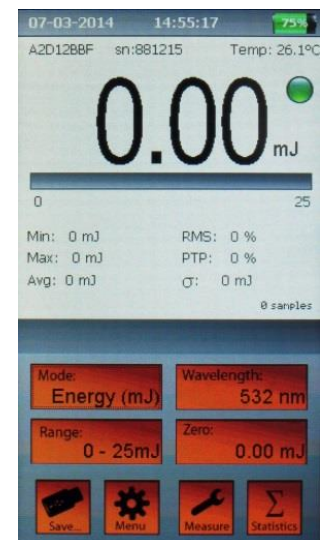

Figure 8

In case you want **to measure 2 or more pulses,** it's enough to fire the pulses with a pulse period shorter than 1 second (pulse frequency > 1Hz).
In fact, at the end of the acquisition process, the reading will be the sum of the energies of individual pulses.
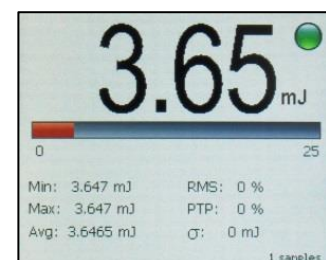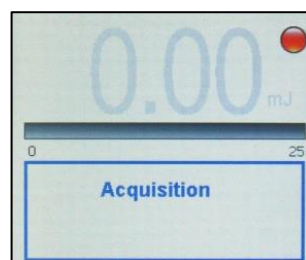

Figure 9 and 10

2.10. SETTING THE ENERGY THRESHOLD

Since there is always some degree of noise or background radiation, the instrument is designed not to respond to pulses below a preset energy threshold. To set the energy Threshold:

Figure 11

a) While in energy mode, touch the button **Measure** to open the Measure Settings window.

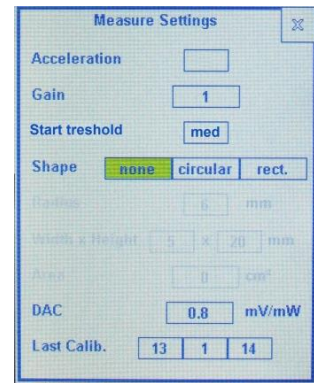b) Touch the Start threshold value to scroll and select the "high", "med" or "low" value.

> *Note: how to choose Energy Threshold*
> *The factory setting of energy threshold is "med" for medium.*
> *If the unit triggers on noise, set the threshold to "high."*
> *If you are measuring small energies and the unit does not trigger, set the threshold to "low."*

2.11. MEASURING IRRADIANCE AND FLUENCE

Figure 12

a) Touch the button "Measure" **Measure** to open "Measure Settings". Select the Shape of your beam and input the requested dimensions (Radius for a circular shape, Width and Height for rectangular shape), then close the menu.

b) Next measures in Power mode will be displayed as Irradiance (unit of measure: W/cm^2), while in Energy mode they'll be displayed as Fluence (unit of measure: J/cm^2).
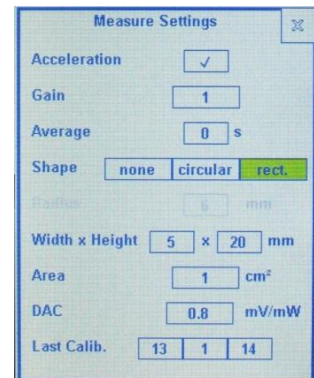
> *Note: to deactivate Irradiance/Fluence measures*
> *Open the "Measure Setting" menu, and select the Shape "none" to deactivate.*

2.12. SETTING THE STATISTICAL ELABORATION OF MEASUREMENT

a) Touch the Statistics button on the screen of the Plus 2 and the Statistics window will be displayed (Figure 13).

b) Select one of the four processing options. The options are:
   Off: no statistics.
   Continuous: the data elaboration is done 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.

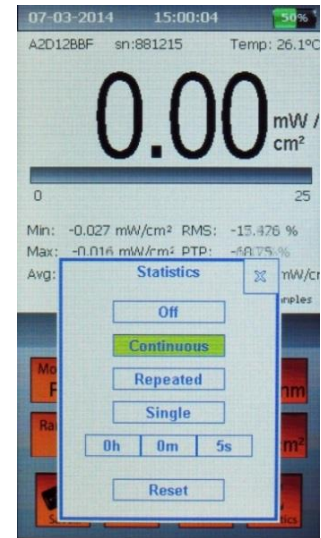

Figure 13

c) To confirm the selection, press the "Reset" button.

2.13. SETTING Data logging to USB memory stick

a) Insert the USB memory key into the connector on the left side of the Plus 2.

b) Touch the "Save…" button . The Data Logging window will be displayed.

Figure 14

c) Select which data are to be saved: values, statistics or both.

d) Select the Sample Rate value: it must be between 0.5 - 99 s.

   Note:
   The sample rate value may refer to Values and Statistics (when Continuous statistics is selected) or to Values only (when Single or Repeated statistics is selected, because in these cases Statistics are saved every time they are refreshed).
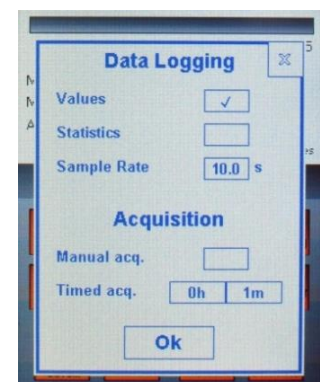

Figure 15

e) Select the acquisition mode:
- **Manual acquisition**: check this box to start and stop the acquisition manually
- **Timed acquisition**: uncheck "Manual acquisition" box and input the duration after which the acquisition will be stopped.

f) Exit the Data Logging page by clicking on the "OK" button.

> *Note:*
> *Depending on the USB flash memory speed, it may happen that the USB drive is not yet ready. In this case a "USB not ready" message will be displayed, please wait few seconds until the message disappears.*
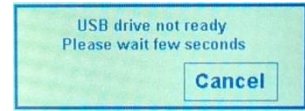
g) The "Save.." button has now a "START" green writing.

Touch to begin logging data.

h) While the data logging is active, a timer showing the elapsed time or the time left will be displayed. During data logging the "Save.." button has a "STOP" yellow writing.

Touch to stop the data logging.

> *Note:*
> *Data are saved in the USB drive, in the folder:*
> *X:\PLUS2\"head serial number"*
> *with file names:*
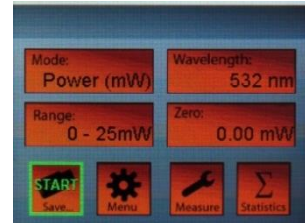> *"DATA_nnn.txt" for values*
> *"STAT_nnn.txt" for statistics*

Figure 16 and 17

2.14. THE "MENU" BUTTON

a) Touch the "Menu" button to open the Menu window.

b) The first menu lines are self-explicative: Date and Time settings, Languages and Display Colour choices (not yet available).

c) Display off: this is the inactivity time before the screen turns off, to save energy. You can select ON/OFF to activate/deactivate, and set a time from 1 to 30 minutes.

d) Auto off is the inactivity time before the Plus 2 will turn off. You can select ON/OFF to activate/deactivate, and set a time up to 600 minutes.
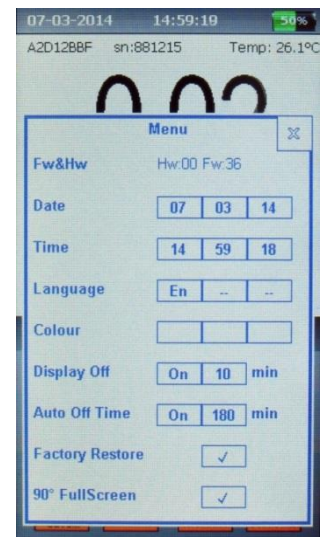

Figure 18

> *Note*
> *both the "auto off" and "diplay off" work only when in battery mode. If plugged to the power line the Plus 2 and the display will remain on.*

e) Factory restore: this function resets measure, statistics and wavelength options of all the power head that are or have been connected to the Plus 2.

f) 90° FullScreen: switch to a full screen high visibility / high contrast display (Figure 19) showing only the measure digits and the unit of measure. Click the "X" button to return to main screen.
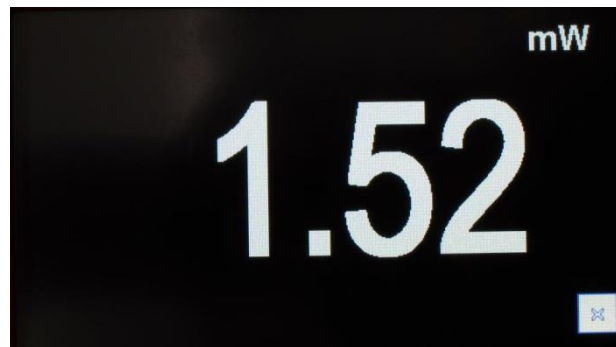

Figure 19

3.   PLUS 2 SPECIFICATIONS:

Detector Compatibility	Thermopile, photodiode, OEM
Input ranges	7 mV – 700mV full scale, in 9 ranges
A to D Sampling rate	64 Hz
A to D resolution	23 bit ADC resolution, 16bit processing resolution
Electrical accuracy	± 0.5%
Electrical input noise level	500nV Input Offset Voltage drift (typical): -4nV/°C
Dynamic range	8 decades
Analog output	0.025 - 2 Volt, with 16-bit (0.0015% resolution.)
Analog output accuracy	±0.1% ±2mV relative to display
Dimensions	170H x 100W x 36-50D (mm)
Mass	380 g
Display	4.3" TFT LCD, 480 x 272 resolution with resistive touch panel, high luminance. (96H x 55W mm)
Display digit height	15mm - 25mm Full Screen
Bargraph segments	250 pixel width
Battery	Rechargeable Li-Pol. 3.7V 3700mAh Built in.
Battery charge time	7-8 hours if not operating 15-20 if operating
Battery runtime	> 9 hours > 15 hours with stand-by display option
Supplied Charger	Input 100/240Vac 50/60Hz Out 5Vdc 1A, Charging current is 0.5A (Plus 2 may be charged through PC USB port).