

The PC-Plug-USB/RS232: the Meterless Sensors Family with Many Advantages



Technology evolves toward simplification, makes cheaper and reduced-size working tools.

Instrumentation for laser power measurement is subject to the same process. Traditionally the complete measurement set is made of a detector head connected to separate electronics and display unit: Laser Point has developed the next generation of laser power measurement instruments introducing a new microelectronics circuitry that has reduced the complete electronics to the size of a USB or RS-232 stick.

The result is new family of measurement tools that are smaller, more economical, easy to be embedded in laser systems either they are machines or in laboratory set-ups.

The PC-Plug series of sensors has been specifically developed for all those applications that do not require a display but where readings can be analysed and displayed on the now ubiquitous computer.

With simple plug and play functionality, no additional meter and at a lower cost, the PC-Plugs-USB or RS 232 sensors have all the power and sophistication of signal processing and software of a traditional power meter.

The RS-232 version is the most convenient platform to have power measurement integrated inside laser processing systems.

The PC-Plug-USB sensors get their supply power from the USB connection while the only requirement for RS-232 version is a + 12VDC input.

In conclusion, PC-Plugs sensors are another step forward in offering more convenience and ease of use in laser power measurement. The unique blend of low cost, compactness, high performance will provide additional benefits to all laser users, in particular systems integrators and field service engineers .

■ Who will need the PC-Plugs?



The PC-Plug sensors have been primarily developed for applications that need a power measurement station on board of laser machines, like those for marking, cutting, welding, micro-machining; those instruments are also the perfect monitoring tool for other industrial applications such as laser burn-in or long-term reliability testing.

Service engineers and technicians who always travel with a laptop computer will also enjoy the PC-Plugs because they will no longer need to carry separate instruments and additional weight.

Finally, thanks to their lower cost and smaller size, these sensors can be also successfully integrated in more standard laboratory applications that already use computer controlled instrumentation.

Laser Point has many years of experience in providing sensors and heads to OEM customers,

worldwide. Many of these users prefer to solve their laser measurement problem by purchasing bare sensors and design a dedicated electronics for signal processing. This is obviously a method but it has some limitations: for example, users must have both the tools and the know-how of adding accurate calibrations, the capacity of designing very low noise amplification and accurate A/D conversion, which will drive to good stability and low noise measurements. Often, a dedicated Software has to be implemented as well.

PC-Plugs sensors now offer to system integrators or machine builders a real opportunity to save precious resources in developing their own electronics and software: the work of designing a calibrated power measurement instrument is now made easy by the PC-Plugs that provide to system designers the possibility of an immediate integration of a power meter with other devices of his system.

■ A Functional and Flexible Platform

Despite their apparent greater simplicity and lower cost, PC-Plugs sensors still retain high performance. First of all they exploit the speed, calculation capacities, large display, etc. of PCs. Furthermore their internal A/D converter provides the high resolution and an accuracy of measurement comparable to those found in most of power meters.

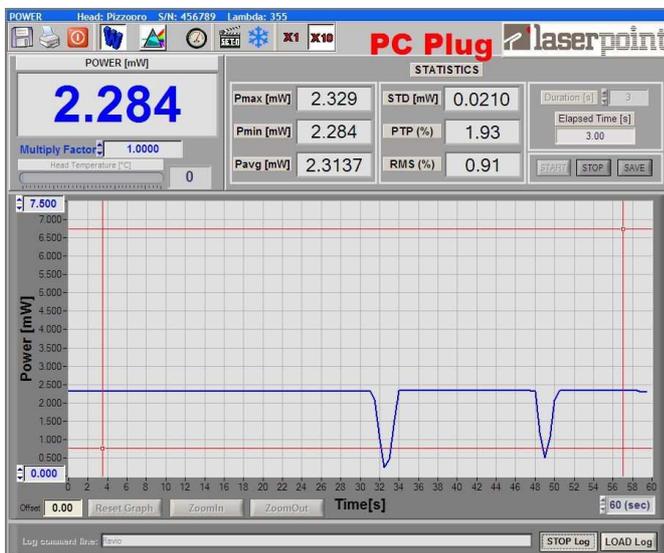
Spectral compensation is provided for up to 5 wavelengths chosen by customer and each sensor is supplied with calibrated wavelengths bearing NIST/PTB traceability (available on request on OEM heads).

The PC-Plug platform is compatible with all of thermal, photodiode heads and OEM Power Probes (FIT-H series) manufactured by Laser Point.

Nevertheless the platform can be adapted to other sensors, either standard from Laser Point's catalogue or designed on customer specifications. From UV to Far IR and up to 6KW of laser power, the PC-Plugs provide accurate measurements of all types of CW and pulsed sources.



■ The PC-Plugs Software



The applications software for PC-Plugs is supplied free with each sensor. It enables the operator to get instantaneous readings of power, to monitor laser stability, to get statistical information (minimum, maximum, mean, standard deviation), to log power data.

Low power measurements can be done by enabling the X10 function that will increase resolution 10 times.

To those integrators that require an in-house written software, Laser Point will provide a DLL driver that supports simple ASCII remote interfacing host commands.

The *Main panel* permits measurements of laser powers with direct display of their actual values. The screen also shows the evolution of power over time allowing long term stability measurements as long as 12 hours.

■ Data Saved on a File

By the simple click on the "SAVE" key, measured data can be saved as a text (*.txt) file.

The structure of saved files includes sensor model, calibration wavelength, sensor serial number, date and time of file generation. Each acquisition records date, time, statistical data, sensor temperature, duration of sampling interval, generated alarms. Data can later be imported into a spread-sheet (e.g.Excel).

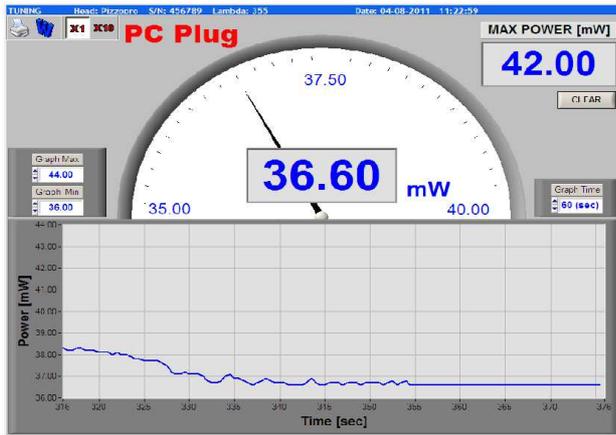
A200-D25 lambda 355 SN 456789
Fri Apr 08 11:05:12 2011

Date	Time	Pmax (mW)	Pmin (mW)	Pavg (mW)	PTP	STD	RMS	Temp (°C)	Alarms	Samp. Time (s)	Gain
Apr 08 2011	11:05:13	39.95	38.55	39.030	3.50	0.8507	1.67	n.a		3	10
Apr 08 2011	11:05:16	38.52	38.46	38.483	0.16	0.0262	0.07	n.a		3	10
Apr 08 2011	11:09:14	39.89	39.87	39.877	0.05	0.0094	0.02	n.a		3	10
Apr 08 2011	11:09:24	39.87	39.84	39.857	0.08	0.0125	0.03	n.a		3	10
Apr 08 2011	11:09:30	40.02	39.98	40.000	0.10	0.0163	0.04	n.a		3	10
Apr 08 2011	11:09:41	40.02	37.70	39.233	5.80	10.844	2.76	n.a		3	10
Apr 08 2011	11:09:48	39.89	39.86	39.873	0.08	0.0125	0.03	n.a		3	10
Apr 08 2011	11:09:58	39.84	39.84	39.840	0.00	0.0000	0.00	n.a		3	10
Apr 08 2011	11:10:23	39.34	39.27	39.303	0.18	0.0287	0.07	n.a		3	10
Apr 08 2011	11:10:26	39.25	39.23	39.237	0.05	0.0094	0.02	n.a		3	10
Apr 08 2011	11:10:36	39.13	39.09	39.117	0.10	0.0189	0.05	n.a		3	10
Apr 08 2011	11:10:44	39.04	39.02	39.027	0.05	0.0094	0.02	n.a		3	10
Apr 08 2011	11:10:50	39.06	39.04	39.053	0.05	0.0094	0.02	n.a		3	10
Apr 08 2011	11:10:57	38.92	37.76	38.527	2.98	0.5422	1.41	n.a		3	10
Apr 08 2011	11:11:04	38.94	38.25	37.797	6.91	11.346	3.00	n.a		3	10
Apr 08 2011	11:11:12	38.73	33.23	36.893	14.20	25.904	7.02	n.a		3	10

■ Log Comment Line

This software feature allows to log power data up to 12 hours, automatically. Loaded data are saved in text file that can be delivered together with the laser/machine as a proof of its performance, saved by manufacturer as an internal record or used by service technicians to restore initial conditions.

■ Laser Tuning



The Laser Tuning page is available to reach fine laser alignments. The analogue needle shows the direction of tuning; the actual power is displayed on the central box displays, while the maximum value reached during the tuning procedure is kept in the Power Max box. The lower graph plots laser power as it evolves during the alignment procedure.

■ Warning Messages

Each time the laser power or energy exceeds the head full scale the OVERFLOW alarm is displayed. Should a measurement head reach its limit temperature (overheating of a head may be due to problems to the cooling circuit such as low water pressure, lack of fluid, obstructions, etc, or poor heat exchange in air cooled heads), the COOL message will be displayed on the main

window and the data displayed in the graph are pinned to the last power value acquired before the alarm .

■ Technical Specifications

■ GENERAL

- Platform compatible with Thermal and Photodiode sensors
- Sensors are supplied with NIST/PTB traceable calibration.
- Measurement Resolution: 4 digits

■ Power Meter Mode

Power Ranges: 1mW to 6 kW
 Resolution: 0.5‰ for any Full Scale
 Response Time <1-5 sec.(depends on specific head)

■ Energy Mode

Energy Ranges: 1mJ to 300J
 Resolution: 0.5‰ for any Full Scale
 Response Time <1-5 sec.(depends on specific head)

■ Photodiode Mode

Power Ranges: 1μW to 500mW
 Resolution: 0.5‰ for any Full Scale
 Response Time 1-6sec.(depends on specific head)

■ Power Probe Mode

Power Ranges: 1mW to 6 kW
 Resolution: 0.5‰ for any Full Scale
 Response Time 1-6 sec.(depends on specific head)

■ Tuning

- Displays a Digital Bargraph for Tuning Direction
- Displays Actual Power Value
- Displays Variations (as %) form Tuning Initial Value)

■ Wavelength Selections:

Customers can select up to 5 different wavelengths. Spectral compensation is provided for wavelengths different from calibration wavelength.

- High resolution A/D converter
- Software: Full Windows application software
- Communication: -PC-Plugs-USB provide USB connection to PC.
 -PC-Plugs-RS232 provide RS232 connection to PC
- Display: Computer Screen
- Speed up Algorithm to accelerate detector's natural response time
- Data Log: up to 12h
- Data Displays: Trend, Full Statistics, Tuning, Alarms
- Additional Input Gain: 10X
- Dimensions 75 (L) x 22 (W) x 13 (H) mm
- Power : -provided via USB connection for PC-Plug-USB
 : -provided by external +12 VDC input for PC-Plug-RS-232
- Operating environment:
 °Storage Temperature:-10 to 60 °C
 ° Range of Use :5 to 45 °C
 °Reference Conditions : 21 ± 4 °C ;RH 20-80%

