



Pulsed Laser Power Measurement Systems

Accurate, reproducible method of determining total laser and laser diode power

Ideal for Beam Power Measurement

Labsphere's Pulsed Laser Power Measurement Systems assure an accurate, reproducible method of determining the total power from a collimated or divergent laser or laser diode. Specifically designed for laser applications, the spheres are ideal for measuring the total power of a beam of optical radiance. Because of the unique geometry of the sphere, beam power measurements are independent of beam polarization, and are insensitive to beam alignment.

The attenuation which accompanies the sphere throughput also alleviates detector saturation. The systems can be used with an open port and can be apertured with an array of optional fiber adaptors for laser diode modules or port reducers.

Flexible Design

Each system consists of a laser power measurement sphere, post, post holder and base assembly, a detector assembly, and multi-wavelength calibration. A second detector port gives the user the flexibility to add an additional detector assembly for broader spectral sensitivity, or add a spectrometer for spectral characterization.

An input port that permits a beam of radiation is machined into the sphere. A detector, located 45° from the entrance port, views the sphere wall next to the entrance port. The field of view of the detector is designed to limit the viewing area so that highly divergent sources may be input without effecting measurement accuracy.

The systems provide options for laser power measurement over the 350 to 1700 nm wavelength region for optical powers ranging from nW to hundreds of watts. The system's calibrations are traceable to the National Institute of Standards and Technology (NIST).

The 2, 4, or 6 inch diameter integrating spheres are coated with either Labsphere's Spectrafect® or Infragold®, or fabricated from Spectralon®, our highly reflective diffuse material. All options are durable and highly stable over time. These diffuse reflective interiors ensure the accurate integration of light.

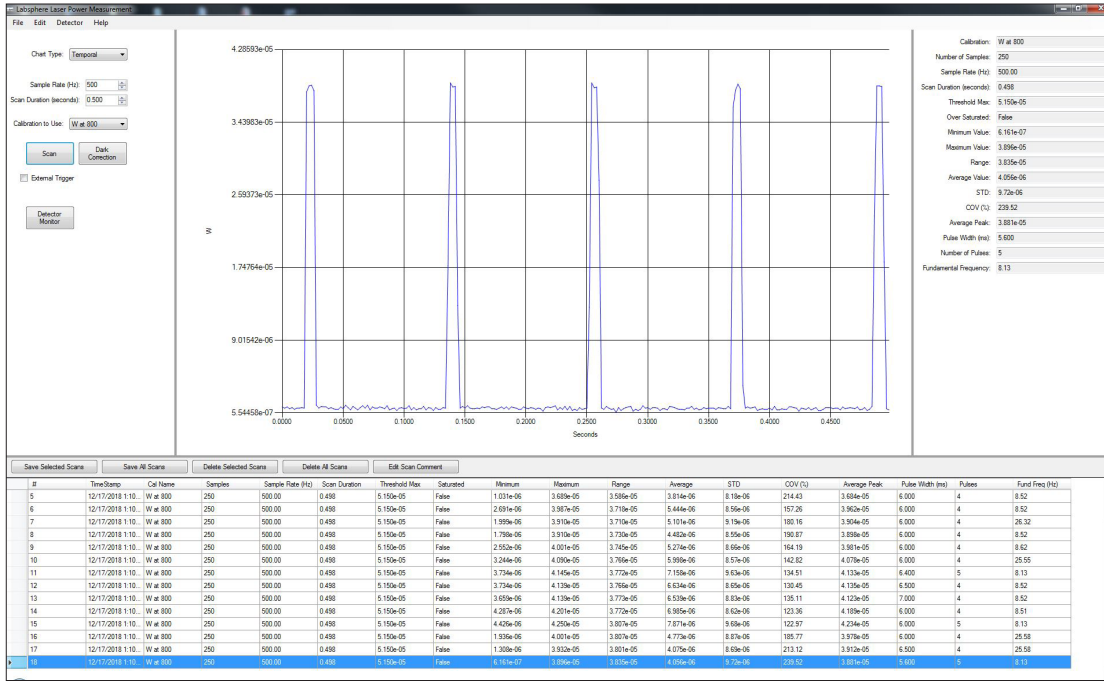
Value

- Spectrafect, Infragold or Spectralon sphere interiors for reduced alignment sensitivity
- Sturdy port frames for mounting fiber accessories
- Second detector port for a spectrometer or additional fiber
- Three integrating sphere size options
- Two detector options
- NIST traceable system calibrations

Measures

- Lasers
- Laser diodes
- Laser diode modules
- Divergent monochromatic sources
- Pulsed laser

Example of Labsphere's Laser Power Measurement Software



Reported values include:

- Average Radiant Power at nth wavelength (CW)
- Average Peak Radiant Power at nth wavelength (pulsed)
- COV (CW)
- Detector Sampling Rate (Hz)
- Detector Scan Interval (sec)
- Laser Power Density: the instantaneous laser beam power per unit area. W/cm² with option to beam area in cm²
Require input of beam area
- Max Power (CW)
- Min Power (CW)
- Overrange Warning
- Peak Radiant Power (Pulsed)
- Pulse width or interval of duration of a pulse
- Radiant Power Range (CW)
- Radiant Power (W)
- Repetition Rate/Frequency (Pulsed)
- Standard Deviation (CW)
- Threshold Max for given LPMS detector sensitivity range and system responsivity
- Threshold Min for given LPMS detector sensitivity range and system responsivity
- Total Measurement Time: not necessarily the same as the laser emission duration during the measurement. sec
- Total Pulses
- Wavelength (chosen by customer based on laser output and data table from calibration)

For lower power VIS NIR lasers

Part Number	LPMS-020-SF-SDTP	LPMS-040-SF-SDTP	LPMS-060-SF-SDTP
Sphere Material:	Spectrafect	Spectrafect	Spectrafect
Sphere Diameter:	2 inch	4 inch	6 inch
Sphere Entrance Port Diameter: (port frame)	0.5 inch	1.0 inch	1.0 inch
Sphere Sensor Port: (nominal)	2, 0.5 inch port frames	2, 0.5 inch port frames	2, 0.5 inch port frames
Sensor:	Silicon	Silicon	Silicon
Spectral Range: (nm)	350 – 1100	350 – 1100	350 – 1100
Spectral Peak: (nm)	975	975	975
Spectral Responsivity: (A/W)	5.7E-4 @975	1.4E-4 @975	6.3E-5 @975
Minimum Power at 975 nm:	1.8 nW	7.0 nW	1.6 nW
Maximum Power at 975 nm:	1.8 W	7 W	16 W
Sampling Rate:	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz
Date Recording Rate:	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz
Recording Interval:	0.1 to 0.0002 sec	0.1 to 0.0002 sec	0.1 to 0.0002 sec
Computer Interface:	USB	USB	USB
Power Requirements:	USB	USB	USB
Operating Temperature:	20° – 40° C	20° – 40° C	20° – 40° C

For mid-power lasers in VIS NIR, more robust

Part Number	LPMS-020-SL-SDTP	LPMS-040-SL-SDTP	LPMS-060-SL-SDTP
Sphere Material:	Spectralon	Spectralon	Spectralon
Sphere Diameter:	2 inch	3.3 inch	5.3 inch
Sphere Entrance Port Diameter: (port frame)	0.5 inch	1.0 inch	1.0 inch
Sphere Sensor Port: (nominal)	2, 0.5 inch port frames	2, 0.5 inch port frames	2, 0.5 inch port frames
Sensor:	Silicon	Silicon	Silicon
Spectral Range: (nm)	350 – 1100	350 – 1100	350 – 1100
Spectral Peak: (nm)	975	975	975
Spectral Responsivity: (A/W)	9.7E-5 @975	3.6E-5 @975	5.0E-6 @975
Minimum Power at 975 nm:	10 nW	28 nW	200 nW
Maximum Power* at 975 nm:	10 W	28 W	200 W
Sampling Rate:	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz
Date Recording Rate:	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz
Recording Interval:	0.1 to 0.0002 sec	0.1 to 0.0002 sec	0.1 to 0.0002 sec
Computer Interface:	USB	USB	USB
Power Requirements:	USB	USB	USB
Operating Temperature:	20° – 40° C	20° – 40° C	20° – 40° C

* Actual maximum power based on thermal limits of sphere coating and/or material. Contact our sales engineers for further information.

For lower power NIR lasers

Part Number	LPMS-020-SF-IDTP	LPMS-040-SF-IDTP	LPMS-060-SF-IDTP
Sphere Material:	Spectrafect	Spectrafect	Spectrafect
Sphere Diameter:	2 inch	4 inch	6 inch
Sphere Entrance Port Diameter: (port frame)	0.5 inch	1.0 inch	1.0 inch
Sphere Sensor Port: (nominal)	2, 0.5 inch port frames	2, 0.5 inch port frames	2, 0.5 inch port frames
Sensor:	InGaAs	InGaAs	InGaAs
Spectral Range: (nm)	900 - 1700	900 - 1700	900 - 1700
Spectral Peak: (nm)	1300	1300	1300
Spectral Responsivity: (A/W)	9.4E-5 @1300	2.0E-5 @1300	1.0E-5 @1300
Minimum Power at 1300 nm:	10 nW	50 nW	100 nW
Maximum Power* at 1300 nm:	10 W	50 W	100 W
Sampling Rate:	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz
Date Recording Rate:	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz
Recording Interval:	0.1 to 0.0002 sec	0.1 to 0.0002 sec	0.1 to 0.0002 sec
Computer Interface:	USB	USB	USB
Power Requirements:	USB	USB	USB
Operating Temperature:	20° – 40° C	20° – 40° C	20° – 40° C

For mid-power lasers in NIR, more robust

Part Number	LPMS-020-SL-IDTP	LPMS-040-SL-IDTP	LPMS-060-SL-IDTP
Sphere Material:	Spectralon	Spectralon	Spectralon
Sphere Diameter:	2 inch	3.3 inch	5.3 inch
Sphere Entrance Port Diameter: (port frame)	0.5 inch	1.0 inch	1.0 inch
Sphere Sensor Port: (nominal)	2, 0.5 inch port frames	2, 0.5 inch port frames	2, 0.5 inch port frames
Sensor:	InGaAs	InGaAs	InGaAs
Spectral Range: (nm)	900 - 1700	900 - 1700	900 - 1700
Spectral Peak: (nm)	1600	1600	1600
Spectral Responsivity: (A/W)	2.5E-5 @1600	9.2E-6 @1600	3.6E-6 @1600
Minimum Power at 1600 nm:	40 nW	109 nW	280 nW
Maximum Power* at 1600 nm:	40 W	109 W	280 W
Sampling Rate:	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz
Date Recording Rate:	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz
Recording Interval:	0.1 to 0.0002 sec	0.1 to 0.0002 sec	0.1 to 0.0002 sec
Computer Interface:	USB	USB	USB
Power Requirements:	USB	USB	USB
Operating Temperature:	20° – 40° C	20° – 40° C	20° – 40° C

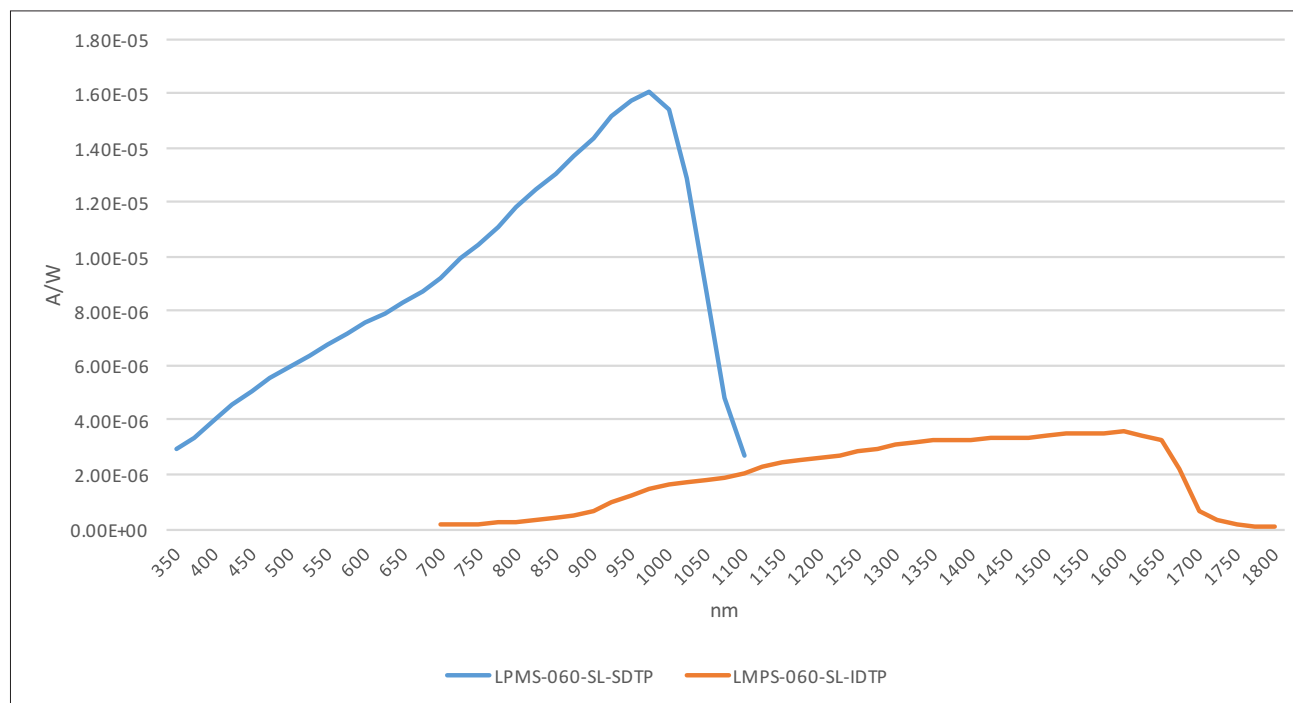
* Actual maximum power based on thermal limits of sphere coating and/or material. Contact our sales engineers for further information.

For high-power lasers in NIR, higher heat threshold, robust

Part Number	LPMS-020-IG-IDTP	LPMS-040-IG-IDTP	LPMS-060-IG-IDTP
Sphere Material:	Infragold	Infragold	Infragold
Sphere Diameter:	2 inch	3 inch	6 inch
Sphere Entrance Port Diameter: (port frame)	0.5 inch	1.0 inch	1.0 inch
Sphere Sensor Port: (nominal)	2, 0.5 inch port frames	2, 0.5 inch port frames	2, 0.5 inch port frames
Sensor:	InGaAs	InGaAs	InGaAs
Spectral Range: (nm)	900 - 1800	900 - 1800	900 - 1800
Spectral Peak: (nm)	1600	1600	1600
Spectral Responsivity: (A/W)	1.4E-5 @1600	3.4E-6 @1600	1.5E-6 @1600
Minimum Power at 1600 nm:	73 nW	290 nW	659 nW
Maximum Power* at 1600 nm:	73 W	290 W	659 W
Sampling Rate:	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz	Low 10Hz, High: 5000Hz
Date Recording Rate:	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz	5kHz with internal sample rate of 20kHz
Recording Interval:	0.1 to 0.0002 sec	0.1 to 0.0002 sec	0.1 to 0.0002 sec
Computer Interface:	USB	USB	USB
Power Requirements:	USB	USB	USB
Operating Temperature:	20° – 40° C	20° – 40° C	20° – 40° C

* Actual maximum power based on thermal limits of sphere coating and/or material. Contact our sales engineers for further information.

Average Spectral Responsivities of LPMS-060-SL-SDTP or IDTP with InGaAs Sensor



Ordering Information

Model	Description	Order Number
LPMS-020-SF-IDTP	Spectrafect 2 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01548-400
LPMS-020-SF-SDTP	Spectrafect 2 inch, 3 port CW and pulsed laser power measurement system with high speed Silicon detector and control software and UI 350 nm to 1100 nm every 10 nm. Watts at X nm	AA-01548-100
LPMS-020-SL-IDTP	Spectralon 2 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01549-400
LPMS-020-SL-SDTP	Spectralon 2 inch, 3 port CW and pulsed laser power measurement system with high speed Silicon detector and control software and UI 350 nm to 1100 nm every 10 nm. Watts at X nm	AA-01549-100
LPMS-040-IG-IDTP	Infragold 4 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01550-400
LPMS-040-SF-IDTP	Spectrafect 4 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01551-400
LPMS-040-SF-SDTP	Spectrafect 4 inch, 3 port CW and pulsed laser power measurement system with high speed Silicon detector and control software and UI 350 nm to 1100 nm every 10 nm. Watts at X nm	AA-01551-100
LPMS-040-SL-IDTP	Spectralon 4 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01552-400
LPMS-040-SL-SDTP	Spectralon 4 inch, 3 port CW and pulsed laser power measurement system with high speed Silicon detector and control software and UI 350 nm to 1100 nm every 10 nm. Watts at X nm	AA-01552-100
LPMS-060-IG-IDTP	Infragold 6 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01553-400
LPMS-060-SF-IDTP	Spectrafect 6 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01554-400
LPMS-060-SF-SDTP	Spectrafect 6 inch, 3 port CW and pulsed laser power measurement system with high speed Silicon detector and control software and UI 350 nm to 1100 nm every 10 nm. Watts at X nm	AA-01554-100
LPMS-060-SL-IDTP	Spectralon 6 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01555-400
LPMS-060-SL-SDTP	Spectralon 6 inch, 3 port CW and pulsed laser power measurement system with high speed Silicon detector and control software and UI 350 nm to 1100 nm every 10 nm. Watts at X nm	AA-01555-100
LPMS-100-IGC-IDTP	Water-cooled Infragold 10 inch, 3 port CW and pulsed laser power measurement system with high speed InGaAs detector and control software and UI 900 nm to 1700 nm every 10 nm. Watts at X nm	AA-01556-400
LPMS-100-IGC-SDTP	Water-cooled Infragold 10 inch, 3 port CW and pulsed laser power measurement system with high speed Silicon detector and control software and UI 700 nm to 1100 nm every 10 nm. Watts at X nm	AA-01556-100
SDA-050-HS1	Silicon Detector Assembly - High Speed. Mounts on PF-050 0.5 inch port frame	AS-81067-000
IDA-050-HS1	Silicon Detector Assembly - High Speed. Mounts on PF-050 0.5 inch port frame	AS-81067-001

Optional Accessories

SMA-050-SF/SL	Adaptor, SMA, 0.5", SF/SL	AS-02428-004
SMA-100-SF/SL	Adaptor, SMA, 1.0", SF/SL	AS-02428-008
SMA-050-IG	Adaptor, SMA, 0.5", Infragold	AS-02432-004
SMA-100-IG	Adaptor, SMA, 1.0", Infragold	AS-02432-008
SMA-050-FB	Adaptor, SMA, 0.5", Flat Black	AS-02436-004
SMA-100-FB	Adaptor, SMA, 1.0", Flat Black	AS-02436-008