

Pulsed Laser Power Measurement Systems

Accurate, reproducible tool for hard to measure VCSELs and lasers



Ideal for beam power measurement

Labsphere's Pulsed Laser Power Measurement Systems ensure 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 just off 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 tens of watts. The system's calibrations are traceable to the National Institute of Standards and Technology (NIST).

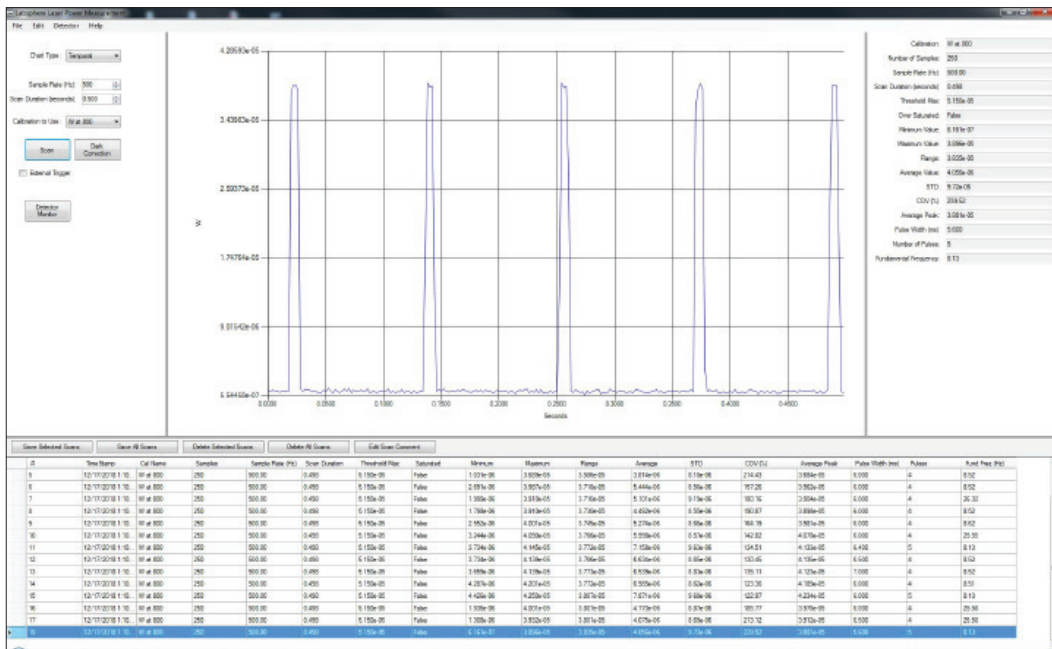
The 2, 4, or 6 inch diameter integrating spheres are coated with Labsphere's Spectrafect[®] or Infragold[®], or fabricated from Spectralon[®], our highly reflective diffuse material. All options are durable and highly stable over time. These diffuse reflective interiors ensure the accurate integration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

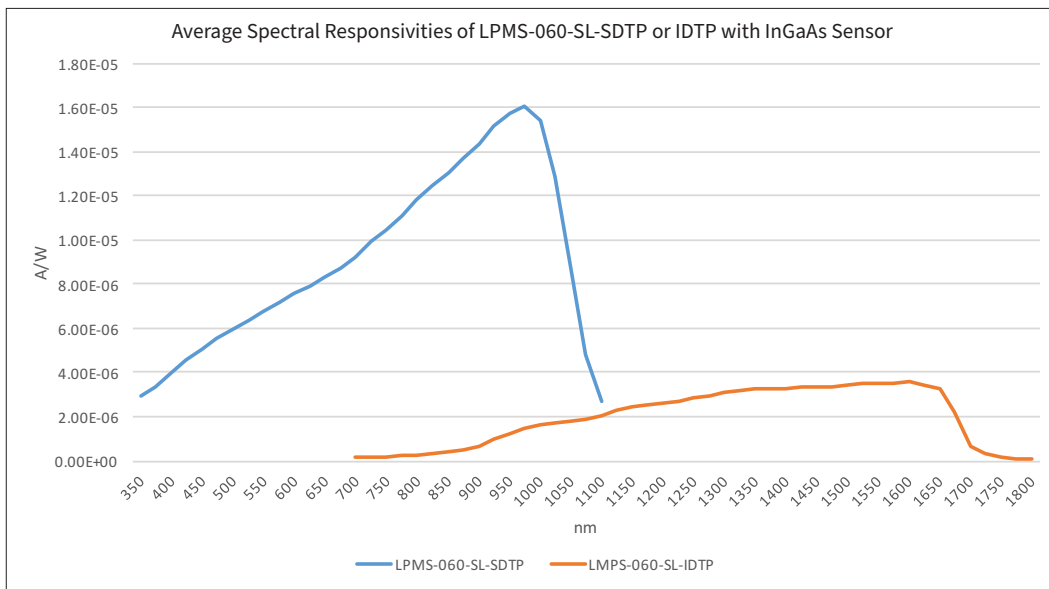
- VCSELs
- Lasers
- Laser diodes
- Laser diode modules
- Pulsed laser
- Divergent monochromatic sources



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

	LPMS-020-SF-SDTP	LPMS-040-SF-SDTP	LPMS-060-SF-SDTP
Model Number:	AA-01548-100	AA-01551-100	AA-01554-100
Order Number:	AA-01548-100	AA-01551-100	AA-01554-100
Sphere Material:	Spectrafect	Spectralect	Spectralect
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)	5.69E-04 @ 975 nm	1.42E-04 @ 975 nm	6.33E-05 @ 975 nm
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
Triggering:	5V TTL female BNC	5V TTL female BNC	5V TTL female BNC
Computer Interface:	USB-A	USB-A	USB-A
Power Requirements:	USB-A, 5V	USB-A, 5V	USB-A, 5V
Operating Temperature:	20° – 40° C	20° – 40° C	20° – 40° C

For mid-power lasers in VIS NIR, more robust

	LPMS-020-SL-SDTP	LPMS-040-SL-SDTP	LPMS-060-SL-SDTP
Model Number:	AA-01549-100	AA-01552-100	AA-01555-100
Order Number:	AA-01549-100	AA-01552-100	AA-01555-100
Sphere Material:	Spectralon	Spectralon	Spectralon
Sphere Diameter:	2 inch	4 inch (I.D.)	6 inch (I.D.)
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)	9.66E-05 @ 975 nm	3.55E-05 @ 975 nm	5.05E-06 @ 975 nm
Minimum Power at 975 nm:	10 nW	28 nW	20 nW
Maximum Power* at 975 nm:	10 W	28 W	20 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
Triggering:	5V TTL female BNC	5V TTL female BNC	5V TTL female BNC
Computer Interface:	USB-A	USB-A	USB-A
Power Requirements:	USB-A, 5V	USB-A, 5V	USB-A, 5V
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

	LPMS-020-SF-IDTP	LPMS-040-SF-IDTP	LPMS-060-SF-IDTP
Model Number:	AA-01548-400	AA-01551-400	AA-01554-400
Order Number:	AA-01548-400	AA-01551-400	AA-01554-400
Sphere Material:	Spectrafect	Spectralect	Spectralect
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)	800 - 1700	800 - 1700	800 - 1700
Spectral Peak: (nm)	1300	1300	1300
Spectral Responsivity: (A/W)	9.43E-05 @ 1300 nm	1.87E-05 @ 1300 nm	1.05E-05 @ 1300 nm
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
Triggering:	5V TTL female BNC	5V TTL female BNC	5V TTL female BNC
Computer Interface:	USB-A	USB-A	USB-A
Power Requirements:	USB-A, 5V	USB-A, 5V	USB-A, 5V
Operating Temperature:	20° – 40° C	20° – 40° C	20° – 40° C

For mid-power lasers in NIR, more robust

	LPMS-020-SL-IDTP	LPMS-040-SL-IDTP	LPMS-060-SL-IDTP
Model Number:	AA-01549-400	AA-01552-400	AA-01555-400
Order Number:	AA-01549-400	AA-01552-400	AA-01555-400
Sphere Material:	Spectralon	Spectralon	Spectralon
Sphere Diameter:	2 inch	4 inch (I.D.)	6 inch (I.D.)
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)	800 - 1700	800 - 1700	800 - 1700
Spectral Peak: (nm)	1600	1600	1600
Spectral Responsivity: (A/W)	2.49E-05 @ 1600 nm	9.16E-06 @ 1600 nm	3.55E-06 @ 1600 nm
Minimum Power at 1600 nm:	40 nW	109 nW	50 nW
Maximum Power* at 1600 nm:	40 W	109 W	50 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
Triggering:	5V TTL female BNC	5V TTL female BNC	5V TTL female BNC
Computer Interface:	USB-A	USB-A	USB-A
Power Requirements:	USB-A, 5V	USB-A, 5V	USB-A, 5V
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

Model Number:	LPMS-040-IG-IDTP	LPMS-060-IG-IDTP
Order Number:	AA-01550-400	AA-01553-400
Sphere Material:	Infragold	Infragold
Sphere Diameter:	4 inch	6 inch
Sphere Entrance Port Diameter: (port frame)	1.0 inch	1.0 inch
Sphere Sensor Port: (nominal)	2, 0.5 inch port frames	2, 0.5 inch port frames
Sensor:	InGaAs	InGaAs
Spectral Range: (nm)	800 - 1800	800 - 1800
Spectral Peak: (nm)	1600	1600
Spectral Responsivity: (A/W)	3.41E-06 @ 1600 nm	1.52E-06 @ 1600 nm
Minimum Power at 1600 nm:	290 nW	659 nW
Maximum Power* at 1600 nm:	290 W	659 W
Sampling Rate:	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
Recording Interval:	0.1 to 0.0002 sec	0.1 to 0.0002 sec
Computer Interface:	USB-A	USB-A
Power Requirements:	USB-A, 5V	USB-A, 5V
Operating Temperature:	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.

Ordering Information

Model Number	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 800 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 800 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 800 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 800 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 800 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 800 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 800 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 800 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
SDA-050-HS1	Silicon detector assembly - high speed. Mounts on PF-050 0.5 inch port frame	AS-81067-000
IDA-050-HS1	InGaAs 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