

# 激光热功率传感器

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### 说明:

热传感器具有一系列称为热电堆的双金属结。通过传感器的径向或轴向热流在通过热电堆时,产生与吸收的功率成比例的电压。由于仅测量温差,未测量绝对温度,读数并不依赖于环境温度。热电堆元件的布置方式使读数几乎独立于光束尺寸和位置。通常,Ophir规定 $\pm 2\%$ 或更好的表面读数一致性。

### High sensitivity sensors - Radiometer

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
RM9 sensor	Radiometer for extremely low powers w/o chopper	Ø8mm	0.15-1.2 $\mu$ m	100nW-100mW	NA
RMC1 Chopper	Extra chopper for RM9	Ø22mm	NA	NA	NA
RM9 sensor and	Complete set, RM9 with chopper	Ø8mm	0.15 $\mu$ m-1.2 $\mu$ m	100nW-100mW	NA

### High sensitivity thermal sensors - 8 $\mu$ W - 12W

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
3A	Very low powers	Ø9.5mm	0.19-20 $\mu$ m	10 $\mu$ W-3W	20 $\mu$ J-2J
3A-P	Low powers and energies	Ø12mm	0.15-8 $\mu$ m	15 $\mu$ W-3W	20 $\mu$ J-2J
3A-P-THz	3A-P sensor calibrated for Terahertz wavelengths	Ø12mm	0.3-10THz	15 $\mu$ W-3W	20 $\mu$ J-2J
3A-FS	Lowest powers, Fused Silica window	Ø9.5mm	0.19-20 $\mu$ m	8 $\mu$ W-3W	15 $\mu$ J-2J
3A-P-FS-12	For divergent beams, window blocks infrared	Ø12mm	0.22 - 2.1 $\mu$ m	15 $\mu$ W - 3W	20 $\mu$ J-2J
12A	Wide dynamic range to 12W	Ø16mm	0.19-20 $\mu$ m	2mW-12W	1mJ-30J
12A-P	Short pulse lasers to 12W	Ø16mm	0.15-8 $\mu$ m	2mW-12W	1mJ-30J

### Low power thermal sensors - 20mW - 50W (Continuous) / 150W (Intermittent)

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
10A	General purpose to 10W	Ø16mm	0.19-20 $\mu$ m	20mW-10W	6mJ-2J
30A-BB-18	General purpose to 30W	Ø17.5mm	0.19-20 $\mu$ m	20mW-30W	6mJ-30J
L30A-10MM	Thin Profile to 30W	Ø26mm	0.15-20 $\mu$ m	80mW-30W	20mJ-60J
50(150)A-BB-26	General purpose to 50W, 150W intermittent	Ø26mm	0.19-20 $\mu$ m	40mW-150W	20mJ-100J
10A-P	Pulsed lasers up to 10W	Ø16mm	0.15-8 $\mu$ m	40mW-10W	10mJ-10J
30A-P-17	Short pulse lasers to 30W	Ø17mm	0.15-8 $\mu$ m	60mW-30W	40mJ-30J
50A-PF-DIF-18	High energy density pulsed beams	Ø17.5mm	0.24 - 2.2 $\mu$ m	140mW-50W	60mJ-200J
15(50)A-PF-DIF-18	As above, compact for intermittent use	Ø17.5mm	0.24 - 2.2 $\mu$ m	140mW-50W	60mJ-200J
30A-N-18	High power density pulsed YAG	Ø17.5mm	0.532, 1.064 $\mu$ m	60mW-30W	30mJ-200J

**Low-medium power thermal sensors - apertures 12mm to 35mm, 10mW - 150W**

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
30(150)A-BB-18	CW to 30W, intermittent to 150W	Ø17.5mm	0.19-20µm	30mW-150W	20mJ-100J
30(150)A-LP1-18	As above, high damage threshold for long pulses and CW	Ø17.5mm	0.25-2.2µm	30mW-150W	20mJ-300J
L50(150)A-BB-35	CW to 50W, intermittent to 150W	Ø35mm	0.19-20µm	100mW-150W	40mJ-300J
L50(150)A-LP1-35	CW to 50W, intermittent to 150W high damage threshold for long pulses	Ø35mm	0.25-2.2µm	100mW-150W	40mJ-300J
L50(150)A-PF-35	CW to 50W, intermittent to 150W for short pulse lasers	Ø35mm	0.15-20µm	100mW-150W	50mJ-300J
30(150)A-SV-17	Very high damage threshold, 30W continuous 150W intermittent	Ø17mm	0.19-12µm	100mW-150W	50mJ-300J
30(150)A-HE-17	High energy and average power YAGs and harmonics 30W continuous 150W intermittent	Ø17mm	0.19-0.625µm, 1.064µm, 2.1µm, 2.94µm	50mW-150W	60mJ-200J
30(150)A-HE-DIF-17	For highly concentrated Q switched pulses to 30W, intermittent to 150W	Ø17mm	0.19-3µm except for 625-900nm	50mW-150W	60mJ-200J
20C-SH	Compact smart sensor	Ø12mm	0.19-20µm	10mW-20W	6mJ-10J
L30C-SH	Medium aperture, smart sensor	Ø26mm	0.19-20µm	80mW-50W	30mJ-30J
100C-SH	Low profile, smart sensor	Ø18mm	0.19-20µm	60mW-100W	N.A
150C-SH	High power, smart sensor	Ø18mm	0.19-20µm	60mW-60W	20mJ-100J
150W-SH	High power, water cooled smart sensor	Ø18mm	0.19-20µm	60mW-150W	50mJ-100J

**Medium power thermal sensors - apertures 50 to 65mm, 100mW - 300W**

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
L40(150)A	CW to 35W, intermittent to 150W, large aperture	Ø50mm	0.19-20µm	100mW-150W	100mJ-200J
L40(150)A-LP1	As above, high damage threshold for long pulses	Ø50mm	0.25-2.2µm, 2.94µm	100mW-150W	100mJ-300J
L40(150)A-EX	As above for excimer lasers	Ø50mm	0.15-0.7µm, 10.6µm	100mW-150W	100mJ-200J
L50(150)A	CW to 50W, intermittent to 150W	Ø50mm	0.19-20µm	100mW-150W	100mJ-300J
L50(300)A	CW to 50W, intermittent to 300W, very large aperture	Ø65mm	0.19-20µm	400mW-300W	200mJ-300J
L50(300)A-LP1	As above, high damage threshold for CW and long pulses	Ø65mm	0.25-2.2µm	400mW-300W	200mJ-300J
L50(300)A-PF-65	CW to 50W, intermittent to 300W, large beam short pulses	Ø65mm	0.15-20µm	400mW-300W	200mJ-300J
L50(300)A-IPL	For gel coupled IPL sources	Ø65mm	0.5-1.1µm	400mW-300W	120mJ-300J

**Medium-high power fan cooled thermal sensors - 50mW - 1100W**

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
F100A-PF-DIF-33	High average power, short pulse lasers	Ø33mm	0.24-2.2µm	50mW-100W	60mJ-200J
F150A-BB-26	Fan cooled to 150W	Ø26mm	0.19-20µm	50mW-150W	20mJ-100J
FL250A-BB-35	Fan cooled to 250W	Ø35mm	0.19-20µm	150mW-250W	50mJ-300J
FL250A-LP1-35	As above, high damage threshold for long pulses and CW	Ø35mm	0.25-2.2µm	150mW-250W	50mJ-300J
FL250A-LP1-DIF-33	Fan cooled to 250W with diffuser for high power and energy density	Ø33mm	0.4-3µm	400mW-250W	400mJ-600J
FL250A-BB-50	Fan cooled to 250W, large aperture	Ø50mm	0.19-20µm	150mW-250W	80mJ-300J
FL400A-BB-50	Fan cooled to 400W	Ø50mm	0.19-20µm	300mW-500W	75mJ-600J
FL400A-LP1-50	Fan cooled to 400W, high power densities and long pulses	Ø50mm	0.35-2.2µm, 10.6µm	300mW-500W	75mJ-600J
FL500A	Fan cooled to 500W, very large aperture	Ø65mm	0.19-20µm	500mW-500W	100mJ-600J
FL500A-LP1	Fan cooled to 500W, high power densities and long pulses	Ø65mm	0.35-2.2µm	500mW-500W	100mJ-600J
FL600A-BB-65	Fan cooled to 600W	Ø65mm	0.19µm-20µm	500mW-600W	250mJ-600J
FL600A-LP1-65	Fan cooled to 600W for long pulsed lasers	Ø65mm	0.35µm-2.2µm	500mW-600W	250mJ-600J
FL1100A-BB-65	Fan cooled to 1100W	Ø65mm	0.19µm-20µm	1W-1100W	250mJ-600J

**High power water cooled thermal sensors - 1W – 10kW**

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
L250W	Thin profile, 20mm thick, water cooled to 250W	Ø50mm	0.19-20µm	1W-250W	120mJ-200J
L300W-LP1-50	Thin profile, 20mm thick, water cooled to 300W	Ø50mm	0.35-2.2µm, 10.6µm	1W-300W	200mJ-300mJ
1000W-BB-34	Water cooled to 1000W	Ø34mm	0.19-20µm	5W-1000W	400mJ-300J
1000WP-BB-34	Water cooled to 1000W with non contaminating water circuit	Ø34mm	0.19µm-20µm	5W-1000W	400mJ-300J
1000W-LP1-34	Water cooled to 1000W, high power densities and long pulses	Ø34mm	0.35-2.2µm, 10.6µm	5W-1000W	400mJ-300J
L1000W-BB-120	Water cooled to 1000W. Very large aperture 120mm	Ø120mm	0.19µm-20µm	1W-1000W	2J-600J
L1500W-BB-50	Water cooled to 1500W	Ø50mm	0.19-20µm	15W-1500W	500mJ-200J
L1500W-LP1-50	As above, high power densities and long pulses	Ø50mm	0.35-2.2µm, 10.6µm	15W-1500W	500mJ-200J
5000W-BB-50	Water cooled to 5000W	Ø50mm	0.19-20µm	20W-5000W	N.A.
5000W-LP1-50	As above, high power densities and long pulses	Ø50mm	0.35-3.2µm	20W-5000W	N.A.
10K-W-BB-45	Water cooled to 10,000W, very high power densities	Ø45mm	0.8-2µm, 10.6µm	100W-10KW	N.A.
5000W / 10K-W	Housing with shutter to protect 5000W and 10K-W	Ø52mm	N.A.	N.A.	N.A.

Protective Housing sensors from contamination by debris with Shutter

**Very high power water cooled thermal sensors 100W – 120kW**

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
30K-W-BB-74	Water cooled to 30,000W, high power densities	Ø74mm	0.8-2µm, 10.6µm	100W-30kW	N.A.
120K-W	Water cooled to 100,000W. Highest powers	Ø200mm	0.8-1.1µm	10kW-120kW	N.A.

**Power pucks 20W – 10kW**

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
Comet 1K	Portable low-cost power probe with low powers	Ø50mm	0.2-20µm	20W-1000W	N.A.
Comet 10K	Portable low-cost power probe with high powers	Ø100mm	1.06µm and 10.6µm	200W-10,000W	N.A.
Comet 10K-HD	Portable low-cost power probe with high damage threshold	Ø55mm	1.06µm and 10.6µm	200W-10,000W	N.A.

**Beam dumps up to 10kW**

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
BDFL500A-BB-50	fan cooled beam dump up to 500W	Ø50mm	0.19-20µm	up to 500W	N.A.
BD5000W-BB-50	Water cooled beam dump up to 5000W	Ø50mm	0.19-20µm	up to 5000W	N.A.
BD10K-W	Water cooled beam dump up to 10,000W	Ø45mm	0.8-20µm	up to 10,000W	N.A.

**BeamTrack - Power / Posion / Size Sensors**

Sensor	Features	Aperture	Spectral Range	Power Range	Energy Range
3A-QUAD	Power & position, very low powers up to 3W	Ø9.5mm	0.19-20µm	100µW-3W	20µJ-2J
3A-P-QUAD	As above for short pulse lasers	Ø12mm	0.15-8µm	160µW-3W	30µJ-2J
10A - PPS	Power, position & size to 10W	Ø16mm	0.19-20µm	20mW-10W	6mJ-2J
50(150)A-BB-26-PPS	Power, position & size to 50W, 150W intermittent	Ø26mm	0.19-20µm	40mW-150W	20mJ-100J
F150A-BB-26-PPS	Power, position & size to 150W	Ø26mm	0.19-20µm	50mW-150W	20mJ-100J
FL250A-BB-50-PPS	Power, position & size to 250W, large aperture	Ø50mm	0.19-20µm	150mW-250W	80mJ-300J
1000W-BB-34-QUAD	Power & position, high powers up to 1000W	Ø34mm	0.19-20µm	5W-1000W	500mJ-300J