PowerMax BB+ kW Sensors

Large Area Water-Cooled kW Thermopile Sensors with BB+ Coatings

This line of high power water-cooled kW thermopiles incorporates the BB+ broadband coating, which provides a higher power density threshold than previous kW sensors. These sensors can sustain power densities up to 14 kW/cm^2 at 1 kW and up to 2.3 kW/cm^2 at 6 kW. There are several models available with maximum power limits of 1 kW, 3 kW, and 6 kW in USB, RS-232, and DB25 cable configurations (DB25 cables are used with Coherent's stand-alone power meters).

FEATURES & BENEFITS

- Power handling up to 6 kW (model dependent)
- BB+ Coating with high power density threshold
- Broadband coating from 190 nm to 11 microns
- Large 50 mm diameter active area
- USB, RS-232, and DB25 configurations

APPLICATIONS

- Laser power monitoring of CW or modulated lasers
- Manufacturing, QA, and Engineering Applications
- Commercial OEM integration

COHERENT®

Superior Reliability & Performance

SPECIFICATIONS	PM1K+	PM3K+	PM6K+
Wavelength Range (μm)	0.19 to 11	0.19 to 11	0.19 to 11
Power Range[1,2] (W)	5 to 1000	5 to 3000	10 to 6000
Max. Intermittent Power (<5 min.)	2000	3000	6000
Noise Equivalent Power[3] (mW)	<100	<100	<100
Maximum Power Density (kW/cm^2)	20 at 500 W 10 at 1 kW	12 at 1 kW 5.8 at 2 kW 3.8 at 3 kW	14 at 1 kW 4.7 at 3 kW 2.3 at 6 kW
Recommended Minimum Beam Size (mm)	2.6 at 100 W 5 at 500 W 7 at 1 kW	6 at 1 kW 10 at 2 kW 15 at 3 kW	8 at 1 kW 17 at 3 kW 31 at 6 kW
Minimum Water Flow Rate[4] (GPM)	0.75 at 1 kW (1 GPM recommended)	2 at 3 kW	2.5 at 5 kW 3 at 6 kW

Response time (0 to 95%)
  Speed-up On (seconds)
  Speed-up Off (seconds)
	5
	14
		5
		15
			5
			20

Maximum Energy Density (mJ/cm^2) (1064 nm, 10 ns)	600	600	600
Detector Coating	BB+	BB+	BB+
Detector Element	Thermopile	Thermopile	Thermopile
Diffuser	None	None	None
Detector Diameter (mm)	50	50	50
Calibration Uncertainty (%)	±3	±3	±3
Power Linearity (%)	±2	±2	±2
Spectral Compensation Accuracy (%)	±1.5	±1.5	±1.5
Calibration Wavelength (nm)	1070 and 10,600	1070 and 10,600	1070 and 10,600
Cooling Method	Water	Water	Water
Cable Type	PM DB25, USB, RS-232 models	PM DB25, USB, RS-232 models	PM DB25, USB, RS-232 models

Cable Length (m)
  DB25
  USB
  RS-232
	2.0
	2.5
	2.5
		2.0
		2.5
		2.5
			2.0
			2.5
			2.5

Part Number
  DB25
  USB
  RS-232
	1409621
	1409622
	1409623
		1409627
		1409628
		1409629
			1402728
			1402729
			1402730

1 Lower power measurements are possible for short durations (down to ~20x electrical NEP) or when water temp is very stable. Minimum power reflects typical water flow variation with chiller in lab environment.
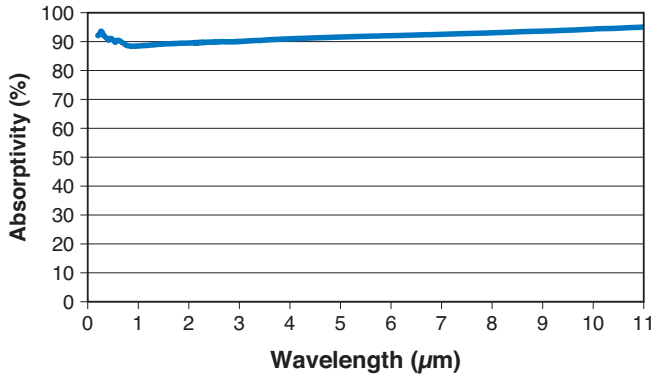2 Max power is beam size dependent at ~5 mm/kW. See Power Level by Beam Size plots.
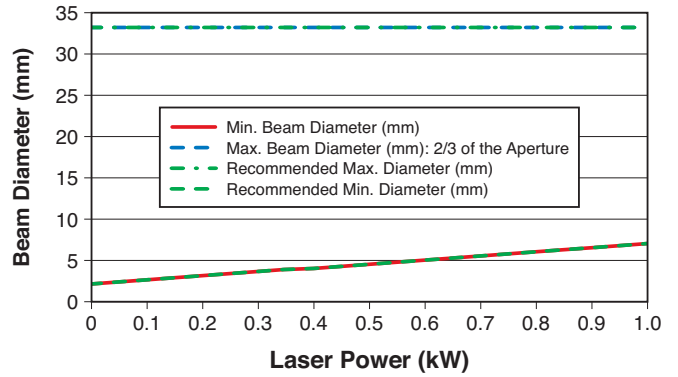3 NEP is pure electrical noise without water.
4 Water temperature should be stable to <1°C change per minute and <2% variation in flow rate per minute for greatest accuracy. Expect ~5 PSI pressure drop at 2.5 GPM and 10 PSI at 3 GPM.
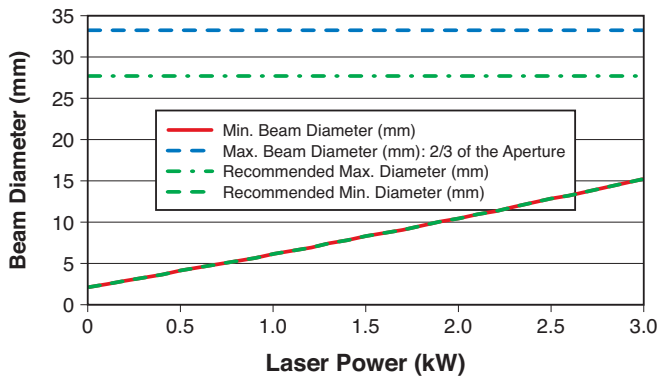
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TYPICAL PERFORMANCE DATA
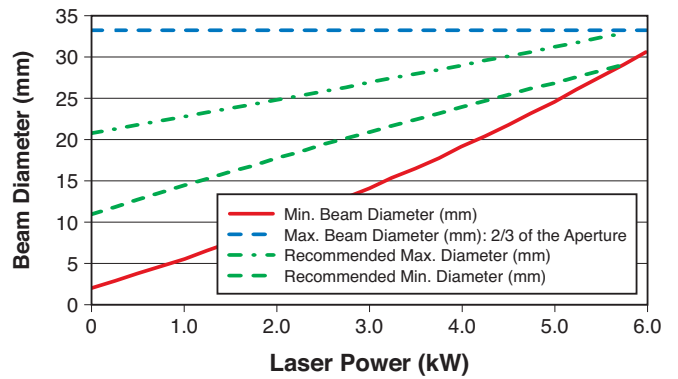
BB+ Absorber Coating Optical Absorptivity

PM1K+ Beam Size vs Power Plot

Legend:
- Min. Beam Diameter (mm)
- Max. Beam Diameter (mm): 2/3 of the Aperture
- Recommended Max. Diameter (mm)
- Recommended Min. Diameter (mm)

PM3K+ Beam Size vs Power Plot

Legend:
- Min. Beam Diameter (mm)
- Max. Beam Diameter (mm): 2/3 of the Aperture
- Recommended Max. Diameter (mm)
- Recommended Min. Diameter (mm)

PM6K+ Beam Size vs Power Plot

Legend:
- Min. Beam Diameter (mm)
- Max. Beam Diameter (mm): 2/3 of the Aperture
- Recommended Max. Diameter (mm)
- Recommended Min. Diameter (mm)

MECHANICAL SPECIFICATIONS

PowerMax BB+ DB25 kW Sensor

Front View

209.0 mm (8.21 in.)

Ø 120.0 mm (4.73 in.)

Aperture Plate

216.0 mm (8.50 in.)

Coolant Fittings

Ø 50.0 mm (1.96 in.)

Detector Surface is
19.0 mm (0.75 in.) for PM1K+
14.3 mm (0.56 in.) for PM3K+ and PM6K+
Below Face of Aperture Plate

Ø 202.0 mm (7.95 in.)

59.0 mm (2.33 in.)

Side View
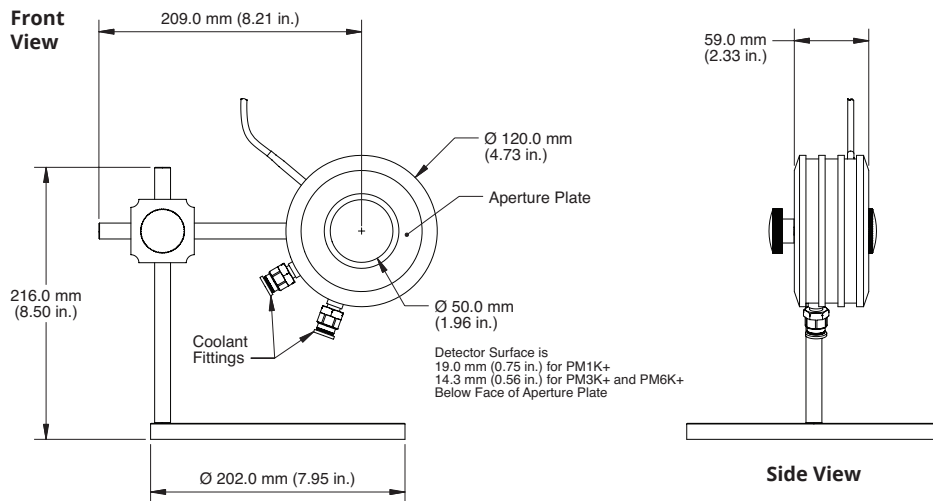
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MECHANICAL SPECIFICATIONS

PowerMax BB+ USB/RS-232 kW Sensor

Front View

209.0 mm (8.21 in.)

Ø 120.0 mm (4.73 in.)

Aperture Plate

Ø 50.0 mm (1.96 in.)

216.0 mm (8.50 in.)

Coolant Fittings

Detector Surface is
19.0 mm (0.75 in.) for PM1K+ RS, USB
14.3 mm (0.56 in.) for PM3K+ and PM6K+ RS, USB
Below Face of Aperture Plate

Ø 202.0 mm (7.95 in.)

59.0 mm (2.33 in.)

Side View