

## 1.1.2.7 High Power Thermal Sensors

### 1.1.2.7.4 Very High Power Water Cooled Thermal Sensors

#### 100W to 16kW

##### Features

- Very high powers
- Water cooled
- Up to 16kW
- Up to Ø55mm apertures
- Over temperature alarm and interlock

15K-W-BB-45



16K-W-BB-55



Model	15K-W-BB-45	16K-W-BB-55																												
<b>Use</b>	<b>High power up to 15kW</b>	<b>High power up to 16kW, larger aperture, over temperature alarm and interlock</b>																												
Absorber Type	Beam deflector + broadband absorber	Beam deflector + broadband absorber																												
Spectral Range $\mu\text{m}$ <sup>(a)</sup>	0.8 - 2, 10.6	0.8 - 2, 10.6																												
Aperture mm	Ø45mm	Ø55mm																												
Power Range	100W – 15kW	100W – 16kW																												
Power Scales	15kW / 4kW / 400W	16kW / 4kW / 400W																												
Power Noise Level	1W	1W																												
Backscattered Power <sup>(b, e)</sup>	~3.5% without Scatter Shield, ~1% with Scatter Shield	~3.5% without Scatter Shield, ~1% with Scatter Shield																												
Maximum Average Power Density kW/cm <sup>2</sup>	See note <sup>(c)</sup> and table <sup>(1)</sup> below	See note <sup>(c)</sup> and table <sup>(1)</sup> below																												
Response Time with Meter (0-95%) typ. s	3.5	3.5																												
Power Accuracy +/--%	5 <sup>(a)</sup>	5 <sup>(a)</sup>																												
Linearity with Power +/--%	2	2																												
Variation with Beam Size	+/-1.7% from 15 to 30mm	+/-1% from 10 to 35mm																												
Cooling	water <sup>(d)</sup>	water <sup>(d)</sup>																												
Minimum Water Flow Rate	12 liter/min at full power, proportionally less at lower power. Min flow rate 3 liter/min <sup>(d)</sup>	12 liter/min at full power, 8 liter/min at 12kW, proportionally less at lower power. Min flow rate 3 liter/min <sup>(d)</sup>																												
Water Pressure Requirements at Max Flow Rate	Pressure drop across sensor ~0.2MPa	Pressure drop across sensor at full flow rate <0.1MPa																												
Water Connectors <sup>(e)</sup>	Quick connector for 3/8" OD nylon tubing	Quick connector for 1/2" OD nylon tubing																												
Over Temperature Warning / Interlock	N.A.	Module on sensor near output cable with over temperature LED, loud audible signal and M8 3 connector interlock																												
Cable Length and Connections	5 meters terminated in Ophir DB15 smart connector	Signal: 5 meters terminated in DB15 Interlock: M8 connector with 1.5 meter cable terminated in flying leads: Brown - common, Black - N.C., Blue - N.O.																												
Optional Scatter Shield Accessory <sup>(e)</sup>	10K-W / 15K-W Scatter Shield (P/N 7Z08295)	16K-W Scatter Shield (P/N 7Z08355)																												
Weight kg	6	8																												
Compliance	CE, China RoHS	CE, China RoHS																												
Version																														
<b>Part number</b>	<b>7Z02770</b>	<b>7Z02791</b>																												
Notes: (a)	Calibrated at 1.07 $\mu\text{m}$ and 10.6 $\mu\text{m}$ . For other wavelengths in the range 0.8 – 2 $\mu\text{m}$ , the calibration error may be up to $\pm 2\%$ more.																													
Notes: (b)	When scatter shield is installed, use the NIRS setting to compensate for slightly higher reading. When not installed, use the NIR setting.																													
Notes: (c)	For circular beam centered within 1/4 of beam diameter, IMPROPERLY CENTERED BEAM CAN CAUSE DAMAGE TO SENSOR. Maximum tilt angle $\pm 5$ degrees. For rectangular beam please consult Ophir representative.																													
Notes: (d)	Water temperature range 15-30°C. Water temperature rate of change <1°C/min.																													
Notes: (e)	For further information and other options see <b>Accessories for High Power Sensors</b> on pages 76-79.																													
Table: (1)	<table border="1"> <thead> <tr> <th rowspan="2">Beam diameter</th> <th rowspan="2">Max power density</th> <th colspan="3">Max energy density</th> </tr> <tr> <th>1ms pulse width</th> <th>3ms pulse width</th> <th>10ms pulse width</th> </tr> </thead> <tbody> <tr> <td>&lt;15mm</td> <td>10kW/cm<sup>2</sup></td> <td>30J/cm<sup>2</sup></td> <td>60J/cm<sup>2</sup></td> <td>150J/cm<sup>2</sup></td> </tr> <tr> <td>15 - 20mm</td> <td>7kW/cm<sup>2</sup></td> <td>20J/cm<sup>2</sup></td> <td>40J/cm<sup>2</sup></td> <td>100J/cm<sup>2</sup></td> </tr> <tr> <td>20 - 40mm</td> <td>5kW/cm<sup>2</sup></td> <td>15J/cm<sup>2</sup></td> <td>30J/cm<sup>2</sup></td> <td>70J/cm<sup>2</sup></td> </tr> <tr> <td>40 - 45mm</td> <td>4kW/cm<sup>2</sup></td> <td>12J/cm<sup>2</sup></td> <td>25J/cm<sup>2</sup></td> <td>60J/cm<sup>2</sup></td> </tr> </tbody> </table>		Beam diameter	Max power density	Max energy density			1ms pulse width	3ms pulse width	10ms pulse width	<15mm	10kW/cm <sup>2</sup>	30J/cm <sup>2</sup>	60J/cm <sup>2</sup>	150J/cm <sup>2</sup>	15 - 20mm	7kW/cm <sup>2</sup>	20J/cm <sup>2</sup>	40J/cm <sup>2</sup>	100J/cm <sup>2</sup>	20 - 40mm	5kW/cm <sup>2</sup>	15J/cm <sup>2</sup>	30J/cm <sup>2</sup>	70J/cm <sup>2</sup>	40 - 45mm	4kW/cm <sup>2</sup>	12J/cm <sup>2</sup>	25J/cm <sup>2</sup>	60J/cm <sup>2</sup>
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