

## 1.1.2.7 High Power Thermal Sensors

### 1.1.2.7.4 Very High Power Water Cooled Thermal Sensor

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

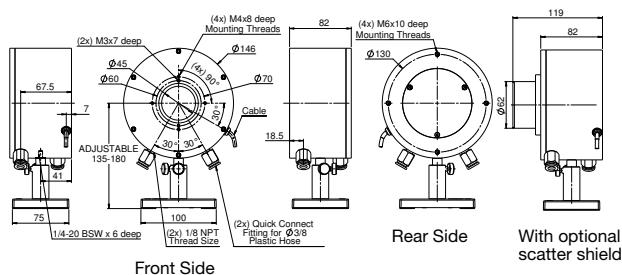


16K-W-BB-55



Model	15K-W-BB-45	16K-W-BB-55																																				
Use	High power up to 15kW	High power up to 16kW, larger aperture, over temperature alarm and interlock																																				
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, c)</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																																				
Calibration Uncertainty $\pm\%$	1.9	1.9																																				
Power Accuracy $\pm\%$	5 <sup>(d)</sup>	5 <sup>(d)</sup>																																				
Linearity with Power $\pm\%$	2	2																																				
Variation with Beam Size	$\pm 1.7\%$ from 15 to 30mm	$\pm 1\%$ from 10 to 35mm																																				
Cooling	water <sup>(d)</sup>	water <sup>(d)</sup>																																				
Minimum Water Flow Rate	12 liter/min at full power <sup>(d)</sup>	12 liter/min at full power <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, UKCA, China RoHS	CE, UKCA, China RoHS																																				
Version																																						
Part number	7Z02770	7Z02791																																				
Note: (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.																																					
Note: (b)	When scatter shield is installed, use the NIRS setting to compensate for slightly higher reading. When not installed, use the NIR setting.																																					
Note: (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.																																					
Note: (d)	Water temperature range 18-30°C. Water temperature rate of change <1°C/min. The recommended flow rate can be lowered proportionately at lower than full power but should not be below 3 liter/min. The response time will be optimum at near 12 liter/min flow rate. For solutions for prolonged usage with untreated water (tap water, non DI water), please contact Ophir.																																					
Note: (e)	For further information and other options see <b>Accessories for High Power Sensors</b> on pages 97-101.																																					
Table: (1)	<table border="1"> <thead> <tr> <th>Beam diameter</th> <th>Max power density</th> <th colspan="2">Max energy density</th> </tr> <tr> <td></td> <td></td> <th>1ms pulse width</th> <th>3ms 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> </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> </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> </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> </tr> <tr> <td></td> <td></td> <th>10ms pulse width</th> <td></td> </tr> <tr> <td></td> <td></td> <td>150J/cm<sup>2</sup></td> <td>100J/cm<sup>2</sup></td> </tr> <tr> <td></td> <td></td> <td>70J/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	<15mm	10kW/cm <sup>2</sup>	30J/cm <sup>2</sup>	60J/cm <sup>2</sup>	15 - 20mm	7kW/cm <sup>2</sup>	20J/cm <sup>2</sup>	40J/cm <sup>2</sup>	20 - 40mm	5kW/cm <sup>2</sup>	15J/cm <sup>2</sup>	30J/cm <sup>2</sup>	40 - 45mm	4kW/cm <sup>2</sup>	12J/cm <sup>2</sup>	25J/cm <sup>2</sup>			10ms pulse width				150J/cm <sup>2</sup>	100J/cm <sup>2</sup>			70J/cm <sup>2</sup>	60J/cm <sup>2</sup>
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