

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

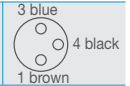
15K-W-BB-45



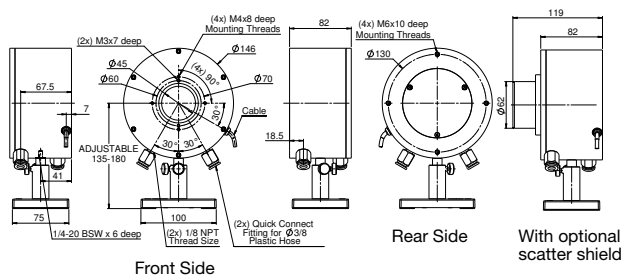
16K-W-BB-55



| Model | 15K-W-BB-45 | 16K-W-BB-55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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 μm ^(a) | 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 ^(b, c) | ~3.5% without Scatter Shield, ~1% with Scatter Shield | ~3.5% without Scatter Shield, ~1% with Scatter Shield | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Average Power Density kW/cm ² | See note ^(c) and table ⁽¹⁾ below | See note ^(c) and table ⁽¹⁾ below | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Response Time with Meter (0-95%) typ. s | 3.5 | 3.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calibration Uncertainty $\pm\%$ | 1.9 | 1.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Accuracy $\pm\%$ | 5 ^(a) | 5 ^(a) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 ^(d) | water ^(d) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Water Flow Rate | 12 liter/min at full power ^(d) | 12 liter/min at full power ^(d) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 ^(e) | 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 ^(e) | 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 μm and 10.6 μm . For other wavelengths in the range 0.8 - 2 μm , 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 ± 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 Accessories for High Power Sensors 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><15mm</td> <td>10kW/cm²</td> <td>30J/cm²</td> <td>60J/cm²</td> </tr> <tr> <td>15 - 20mm</td> <td>7kW/cm²</td> <td>20J/cm²</td> <td>40J/cm²</td> </tr> <tr> <td>20 - 40mm</td> <td>5kW/cm²</td> <td>15J/cm²</td> <td>30J/cm²</td> </tr> <tr> <td>40 - 45mm</td> <td>4kW/cm²</td> <td>12J/cm²</td> <td>25J/cm²</td> </tr> <tr> <td></td> <td></td> <th>10ms pulse width</th> <th>15ms pulse width</th> </tr> <tr> <td></td> <td></td> <td>150J/cm²</td> <td>100J/cm²</td> </tr> <tr> <td></td> <td></td> <td>100J/cm²</td> <td>70J/cm²</td> </tr> <tr> <td></td> <td></td> <td>60J/cm²</td> <td>60J/cm²</td> </tr> </tbody> </table> | | Beam diameter | Max power density | Max energy density | | | | 1ms pulse width | 3ms pulse width | <15mm | 10kW/cm ² | 30J/cm ² | 60J/cm ² | 15 - 20mm | 7kW/cm ² | 20J/cm ² | 40J/cm ² | 20 - 40mm | 5kW/cm ² | 15J/cm ² | 30J/cm ² | 40 - 45mm | 4kW/cm ² | 12J/cm ² | 25J/cm ² | | | 10ms pulse width | 15ms pulse width | | | 150J/cm ² | 100J/cm ² | | | 100J/cm ² | 70J/cm ² | | | 60J/cm ² | 60J/cm ² |
| Beam diameter | Max power density | Max energy density | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1ms pulse width | 3ms pulse width | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <15mm | 10kW/cm ² | 30J/cm ² | 60J/cm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 - 20mm | 7kW/cm ² | 20J/cm ² | 40J/cm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 - 40mm | 5kW/cm ² | 15J/cm ² | 30J/cm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 - 45mm | 4kW/cm ² | 12J/cm ² | 25J/cm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 10ms pulse width | 15ms pulse width | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 150J/cm ² | 100J/cm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 100J/cm ² | 70J/cm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 60J/cm ² | 60J/cm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



15K-W-BB-45



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