

Use of the 30K-W-BB-74 (P/N 7Z07136) Using the Optional Scatter Shield (P/N 7Z08293) and 30K-W Rubber Feet Assembly (P/N 7Z08217)

Wavelength Settings

The 30K-W sensor is calibrated at wavelength 1.070 μ m but since it is relatively flat spectrally throughout the near infrared, it can be used anywhere in the spectral range 0.8 – 2 μ m with minor variation in reading (see table below).

Wavelength μ m	Relative Response
0.8	0.984
0.85	0.987
0.9	0.991
0.95	0.996
1.07	1.000
1.5	1.006
2	1.009

Scatter Shield

Approximately 4.3% of the light impinging on the 30K-W is backscattered in a diffuse manner. The Ophir 30K-W Scatter Shield (P/N 7Z08293) is available to reduce this affect. When it is installed on the front flange of the 30K-W, it will reduce the backscatter to below 1.4%.

The shield works in two ways:

1. By absorbing much of the backscattered light.
2. By reflecting some of it back into the sensor where that light is absorbed.

The increased absorption with the shield causes the reading on the sensor to be about 1.5% higher than without the shield. We have introduced a laser setting called 107S to compensate for this. At maximum power, the shield will heat up to approximately 65degC.

When using the scatter shield, set the laser setting to 107S. Otherwise, leave it at 107



Ophir Scatter Shield P/N 7Z08293



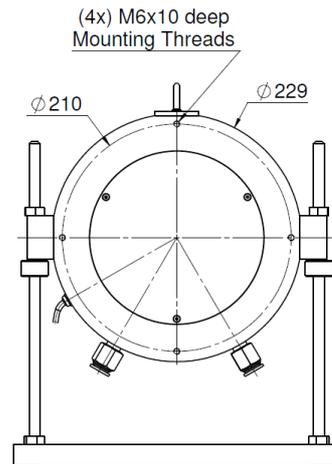
Scatter Shield with Protective Cover

Assembly of the Scatter Shield

- Remove the protective cover from the scatter shield (If another cover is needed it can be ordered as P/N 7Z08346).
- Make sure the mating surface of the shield and the front flange are clean and free of foreign particles.
- Using the screws provided, tightly fasten the shield to the front flange.
- Set the Wavelength setting of the 30K-W to 107S for measurement. If your 30K-W does not have a 107S setting, please be in touch with your Ophir representative to have it installed.

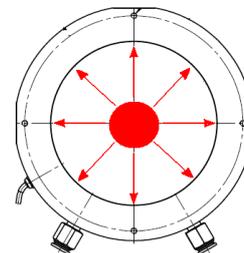
Positioning

The 30K-W can be positioned vertically as mounted on the stand it comes with or the stand can be removed, and the 30K-W can be used horizontally lying on its back. It can be permanently mounted using the mounting threads on its back as shown in the drawing here.

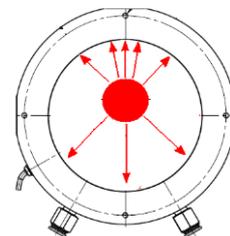


Damage Threshold and Beam Shape

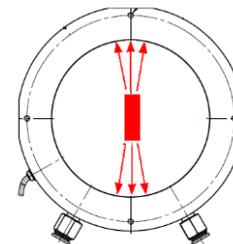
The 30K-W has a highly reflective cone in the center that deflects the beam radially onto the absorbing surface. Since the beam that falls on the annual absorbing surface is now much larger than the original beam, the power density falling on the absorber is lower and thus the sensor can take a much higher power density than if the power fell directly on the absorber surface.



The damage threshold of the 30K-W is specified to be $10\text{kW}/\text{cm}^2$ where this maximum power is either the same over the main part of the beam as in a top hat beam or the power in the center for a Gaussian beam. This damage threshold is based on the assumption that the beam is circular or near circular and is centered within $\frac{1}{4}$ of the beam diameter on the reflecting cone. If this is so, the beam will be spread uniformly around the absorbing annulus. When the beam has a flat top profile with uniform power density up to its' edge - it is best to limit the diameter of the beam to within 55 mm to avoid high power densities on the absorber.



If the beam is not centered, the beam will be concentrated to one side and can cause damage. The same thing can happen if the beam is not circular but for instance rectangular and again the beam will be deflected into a small fraction of the circumference and the damage threshold will be much lower. You should consult your Ophir representative for non-circular beams.



Water Flow

The following are the guidelines for the cooling water flow:

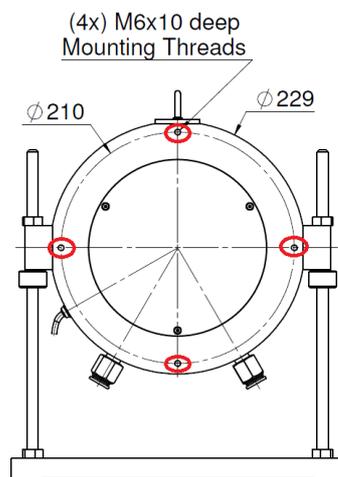
- The minimum water flow rate at maximum power is 25 liter/min. It is proportionally less at lower power e.g. 12.5 liter/min at 15kW but should not be less than about $\frac{1}{4}$ of the maximum water flow rate i.e. 6 liter/min.
- The pressure drop across the sensor at maximum flow rate is approximately 1.8 atm and in addition will be 0.7 atm for every 2 meters of $\frac{3}{8}$ " water lines.
- The water temperature and flow rate should be constant with no sudden changes in either flow rate or temperature. The water temperature rate of change should be < 1 degC per minute.
- DI water is preferred to tap water as coolant. Water with $< 10\%$ ethylene glycol or similar is also OK to use. When stored for long periods without use, the water should be removed from the sensor.

Care of the 30K-W

The 30K-W is designed to withstand high laser powers and power densities without damage. However, in order to do so, it must be properly cared for. In particular, the gold coated reflecting cone should be kept clean so the laser beam will not burn impurities into the surface. The protective cover should be in place when the sensor is not in use to keep dust off the cone. Dust can be blown off with dry nitrogen if necessary. If the cone gets some impurity on it that cannot be blown off, it can be gently wiped with Kleenex tissue and isopropyl alcohol. However, the gold coating is soft and easily scratches so care should be taken. (Very light scratches should not impair performance).

How to Assemble the 30K-W Rubber Feet Assembly Accessory

Please screw each rubber foot to the designated thread at the back of the sensor (see threads circled in red in the picture below)



Make sure the sensor is leveled.

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