

User Notes

Using the Ophir L1500W-LP2-50 (P/N 7Z02772) / L1500W-BB-50 (P/N 7Z02752) / 5000W-LP2-50 (P/N 7Z02773) / 5000W-BB-50 (P/N 7Z02754) Sensors with the Ophir QBH-L-Fiber Adapter (P/N 7Z08348) or QBH-S-Fiber Adapter (P/N 7Z08349) Accessories

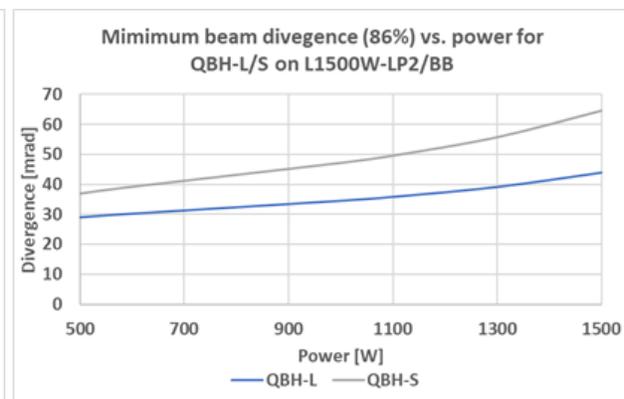
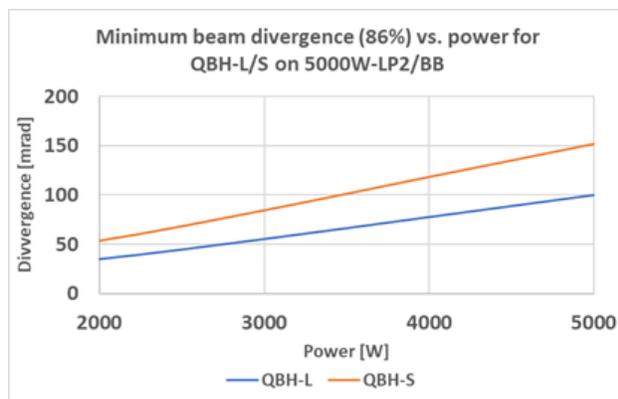
1. QBH-L/S Fiber Adapters

The QBH-L/S fiber adapters are designed to enable power measurements directly from QBH terminated fibers. Right adapter to be used is determined by 3 factors.

- The type of sensor attached to the adapter.
- The laser power.
- The beam divergence from the fiber output.

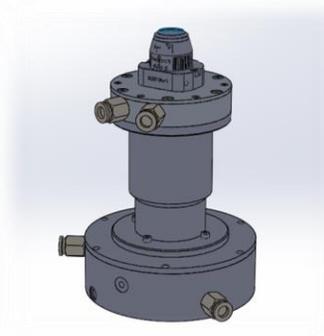
For a laser power of less than 1500W an L1500W sensor can be used, for higher powers a 5000W sensor is required. Knowledge of the beam divergence is also critical because a low divergence beam can make small spot on the sensor with an intensity above the damage threshold. A highly divergent beam, on the other hand, can be larger than the active area and part of the beam will be clipped. The tables and graphs below summarize the measurement limits for the different sensor + adapter configurations.

Model	QBH-L-Fiber Adapter	QBH-S-Fiber Adapter
Maximum Beam divergence half angle divergence angle given defines radius of beam containing 86% of power, the divergence of 98% of the power is given in brackets.	120 mrad (180 mrad)	180 mrad (270 mrad)
Minimum Beam divergence half angle	See graphs below	See graphs below

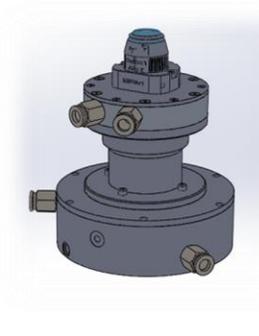


It should also be noted that when using a BB type sensor with an adapter the high reflectance of the coating results in a small offset in the reading of the sensor and a reading ~1% higher should be expected.

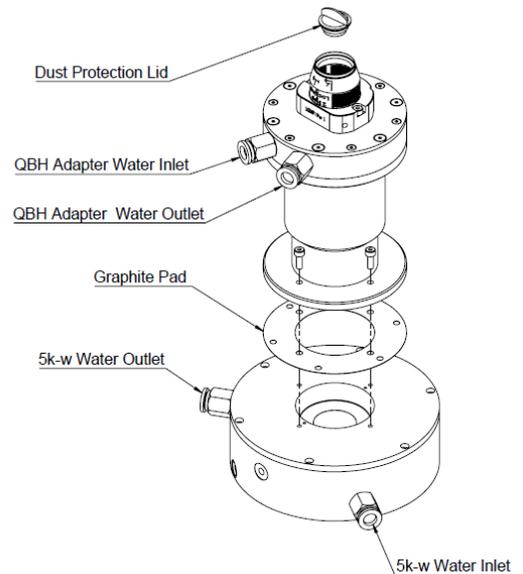
2. Assembly and Operation



Ophir QBH-L-Fiber Adapter
P/N 7Z08348
Assembled on
5000W-LP2/BB-50 sensor



Ophir QBH-S-Fiber Adapter
P/N 7Z08349
Assembled on
5000W-LP2/BB-50 sensor



2.1 Assembly of the Fiber Adapter to the Sensor

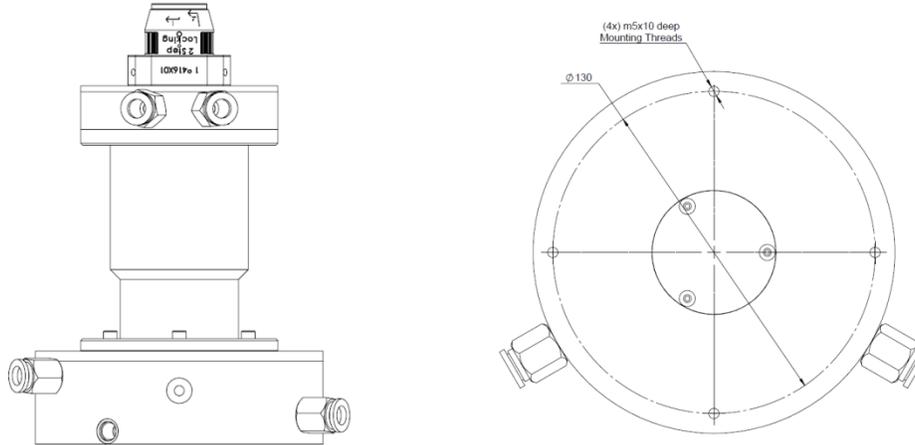
The Assembly of the fiber should be done in a clean environment to ensure that no dust or particles will fall on the Fiber adapter throughout the entire process.

- Make sure the mating surface of the front flange is clean and free of foreign particles & dust.
- Remove the dust protection lid, using a filtered air pressure gun, clean all around and inside of the fiber adapter & the lid, place the lid back in its place at the end of the process.
- Clean the attached graphite pad from any particles or dust, handle it carefully - The pad is fragile.
- Place the graphite pad on the front flange of the sensor, make sure that the 4 mounting holes on sensor are aligned with the holes on the graphite pad. Make sure no particles of the pad fall on the absorber.
- Place the fiber adapter on the graphite pad, align the mounting holes, make sure the orientation of the water connectors of both sensor and adapter are as in the drawing.
- Using the screws and the hexagon key provided, tightly fasten the fiber adapter to the front flange.

2.2 Positioning the fiber adapter before connecting the fiber

- Place the L1500W-LP2/BB-50 or 5000W-LP2/BB-50 sensor facing up as shown in the drawing.
- It can be permanently mounted using the mounting threads on its back as shown in the drawing.

c. Do not use the mounting stand while using the fiber adapter.



2.3 Water Connections

There are 2 options to connect the water to the adapter,

- 1) Connecting the fiber adapter with a separate water line.
- 2) Connecting both sensor and QBH adapter in series.

When connecting with separate lines:

- a. Connect one of the connectors of the QBH adapter to the water supply and the other to the water supply return. The direction of the adapter's water flow does not matter.

When Connecting in series:

- a. Connect the water inlet of the sensor to the water supply.
- b. Connect the water outlet of the sensor to the water inlet of the fiber adapter (the direction of the adapter's water flow does not matter)
- c. Connect the water outlet of the adapter to the water supply return.
- d. Make sure the flow rate is according to the recommendations in the table below
- e. 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 $<1^{\circ}\text{C}/\text{min}$.

Sensor	Recommended flow rate at full power	Minimum flow rate at full power	Absolute minimum flow rate	pressure drop across device at maximum flow rate	
				Bar	MPa
Units	Liters/Minute	Liters/Minute	Liters/Minute		
L1500W-LP2/BB-50	6	3.5	3	0.3	0.03
5000W-LP2/BB-50	8	5	3	0.6	0.06
QBH adapter	>2	>2	2	0.15	0.015

2.4 Connecting the Fiber Termination.

The connection of the fiber should be done in a clean environment to ensure that no dust or particles will fall into the bayonet or on the fiber window while following the connection procedure.

- a. Carefully handle and make sure the fiber termination is clean according to all manufacturer's instructions & precautions.
- b. Remove the dust protection lid, and make sure the bayonet is in its fully opened position – both red marks on the bayonet should be aligned.
- c. Align the red dot on the fiber termination with the two red dots on the bayonet & insert the fiber termination to the bayonet while making sure the fiber is held as centered as possible in relation to the bayonet to prevent any collision of fiber with the bayonet.
Avoid friction while connecting, friction can be caused by misalignment or by inserting the fiber at an angle. (see step 2)
- d. Make sure the fiber is fully inserted into the bayonet. (see step 3)
- e. Twist the sleeve of the bayonet 37° clockwise (see step 4)
- f. Pull the sleeve out for about 2 mm (see step 5)
- g. To finalize the locking procedure, tighten the sleeve by twisting it clockwise once more while it is pulled out – the sleeve won't move more than a couple of degrees. – use hand power only. (see step 6)
- h. Please notice that all moving parts should connect smoothly in this procedure. If you have encountered resistance or friction when connecting, we recommend contacting Ophir representatives before continuing this procedure.



3. Measurement

Once the fiber is attached to the adapter and the water is on, power measurement can begin. To avoid unwanted damage to the fiber laser and sensor, care must be taken to work within the specifications of the adapter. Working at powers above the permitted can damage the coating and eject particulates towards the fiber output facet. Working with a water flow rate lower than recommended can cause the adapter to heat up to high temperatures which can damage the fiber and be dangerous to touch.

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