

Fiber-Optic Plane Irradiance Collector

User's Manual

Revision B, June 18, 2004



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Revisions:

B – June 16, 2004: Add explanation of air-optimized version, discussion of cable waterproofing.

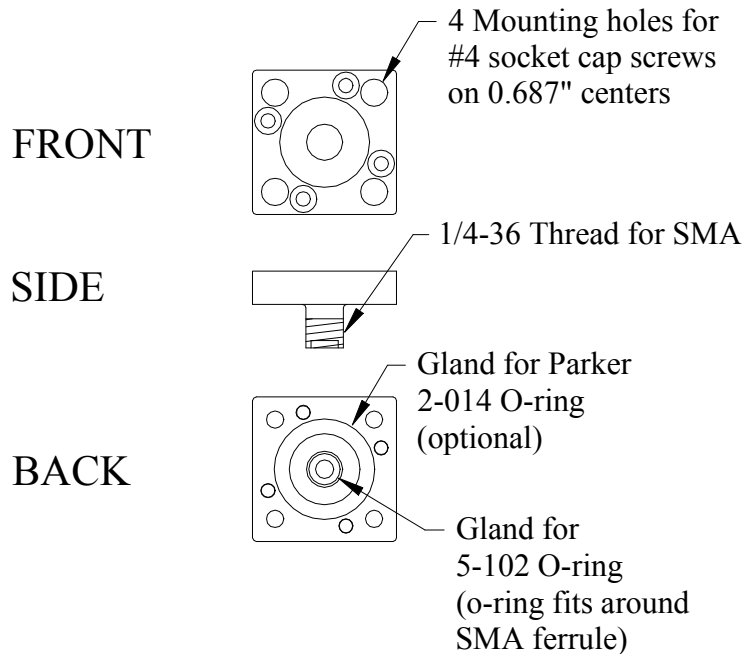
A – June 13, 2003: First release

DESCRIPTION

The HOBI Labs fiber-optic plane irradiance collector attaches to an SMA-terminated fiber optic cable to provide a cosine-weighted angular response to light. It is supplied in two versions, one whose angular response is optimized for use under water, the other optimized in air. The two are identical except that the exposed thickness of the Teflon diffuser is greater for the water- than the air-optimized version. Both have the same provisions for water-proof seals, however, and can be used underwater.

When properly assembled, the collector protects the sensitive end of the fiber optic from water. Note that the fiber optic cable itself, supplied by the user, must also be constructed so as to prevent water from entering its own outer jacket. See below for an explanation of this.

For the most robust water seals, such as those used in the underwater cables built into HOBI Labs instruments, the collector includes mounting holes and an o-ring gland for a face seal. These can be used to incorporate it into a larger structure to seal and reinforce the entire fiber optic cable. However those features are unnecessary for many "stand-alone" applications of the collector.



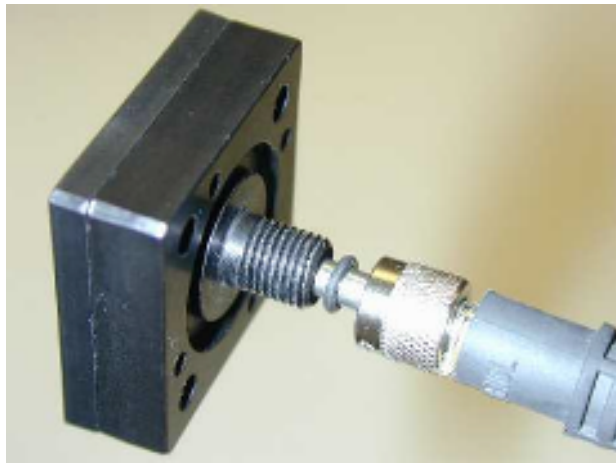
SUPPLIED PARTS

- Collector
- 2-014 o-ring and spare (needed only if mounting to a special fixture)
- 5-102 o-ring and spares

USING THE COLLECTOR

To provide a water seal, place a 5-102 o-ring around the end of the cable's SMA ferrule, as shown in the photograph below, before screwing it into place. The connector should be hand-tightened (rather than using a wrench) to avoid stripping the plastic threads.

If the collector is to be mounted onto a sealing surface, first place a lubricated Parker size 2-012 O-ring in the larger groove around the SMA thread, pass the end of the fiber optic patch cord through the sealing surface, and then attach the cord to the collector. Use #4 screws (not supplied) to attach the collector to the sealing surface.



Inserting SMA connector with 5-102 o-ring in place

PRECAUTIONS AND MAINTENANCE

- Keep the inside of the collector clean and dry.
- Cover the SMA fitting with tape or a vinyl cap whenever the fiber optic cable is detached.
- Do not use a wrench to tighten the connector so much that it could damage the plastic threads.
- Do not use acetone to clean any part of the collector.
- Upon removing the collector from salt water, before removing fiber-optic cables, rinse thoroughly with fresh water.

FIBER OPTIC CABLE CONTRUCTION & WATERPROOFING

Most off-the-shelf cables are constructed with a waterproof outer jacket, but this alone does not guarantee the assembly is watertight. The SMA connector on the end of the cable must also be properly sealed at the time of manufacture. Most high-quality cables are sealed in this way. Further, water entry into a cable will not necessarily cause problems. Nevertheless it is best avoided, and users should be aware of the following considerations.

The most likely entry point for water is where the cable's outer jacket enters the fiber optic connector. This is normally covered by a strain-relief "boot" as shown below. This boot may or may not form a seal by itself.



SMA termination with boot



SMA termination with boot removed

The arrow in the lower picture marks the point where the jacket enters the connector. At some point inside the connector the jacket ends, at which point it must be sealed. In high-quality commercial cables the connector is typically filled with epoxy, encapsulating the jacket and providing an adequate seal. However since the seal is internal the only way to be sure is to consult the manufacturer.

If in doubt, you can provide extra protection by sealing the ends of the boot, or even encapsulating it entirely, with a waterproof adhesive such as the silicone caulking that is used for sealing fish tanks.