

Fiber Collimators Series 60FC-MAV

This document provides assistance in installing the fiber collimators series 60FC-MAV. It describes how a fiber cable is attached and how the collimation setting is adjusted.

1. Before You Start

The laser beam coupler is shipped with a protection cap for the fiber receptacle and with a front cap.

**Notice:**

Please remove all the protection caps first and do not use them as beam dumps (risk of photo contamination).

There is a polymer cap on the receptacle. Please perform the following steps in order to remove this cap:



Figure 1:

First, remove the small cap from the fiber receptacle of the fiber collimator.

Now, make sure that the connector of the fiber you want to attach matches the receptacle type of the laser beam coupler:

- Use fiber cables with APC (8°-polish) connectors for laser beam couplers with an inclined coupling axis (60FC-MAV-4).
- Use fiber cables with PC (0°-polish) connectors for laser beam couplers with a coaxial axis (60FC-MAV-0).

The laser beam couplers are compatible to all fiber connectors of type Mini AVIM and Midi AVIM.

**Notice:**

- Do not touch either the optical surface of the lens or the fiber end-face.
- If the coupler is not in use, reattach both rear and front protection caps.

**Caution!**

Refer to the laser instruction manual for all instructions regarding laser safety!

- Do not stare directly into the laser beam (which can cause permanent damage to the eyes).
- Do not stare at the reflected beam from reflective objects.
- Do not point the laser beam to other individuals.

2. Attaching a Fiber Cable to the Fiber Collimator

For attaching a fiber cable to the fiber collimator perform the following steps:

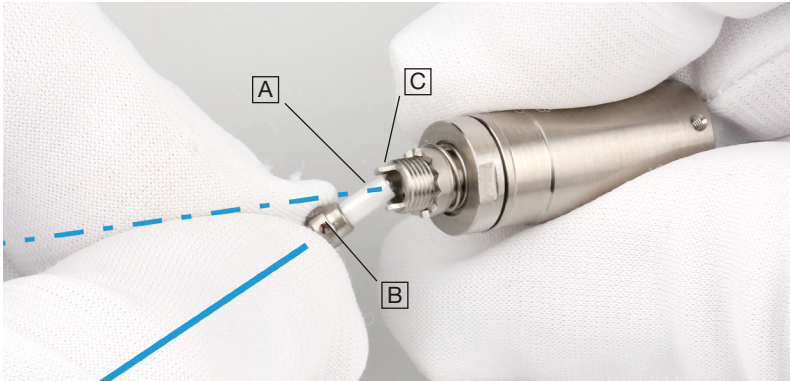


Figure 2:

To prevent damage to the sensitive fiber end-face, always insert the fiber connector's ferrule [A] at an angle, with the two connector notches [B] properly aligned to the two receptacle notches [C].



Figure 3:

When the ferrule tip is safely located in the inner cylinder of the receptacle, align the connector to the receptacle axis and carefully introduce the connector into the fiber collimator.

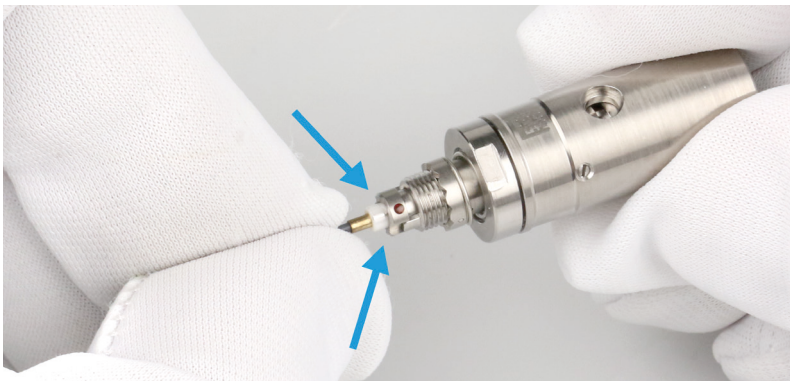


Figure 4:

Then, orient the connector key in a way that it is pressed gently onto the right-hand side of the two notches, respectively.

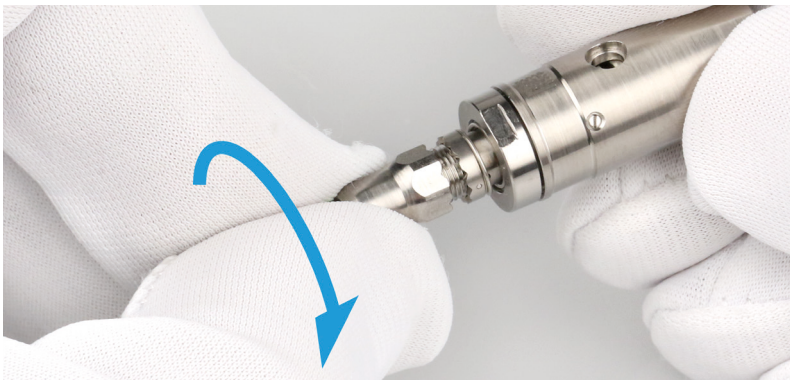


Figure 5:

Screw on the connector cap nut onto the receptacle.



Notice:

In case of fiber connectors of type Mini AVIM we recommend to fasten the hex nut of the connector with a torque of 0.3 Nm.

3. Adjusting the Collimation Setting

Collimation adjustment (adjustment of the collimating lens in z-direction) is a demanding task and should be performed preferably using a collimating telescope.



Notice: The fiber collimator is shipped pre-adjusted for the labeled wavelength and, often, it is not necessary for the customer to readjust the lens position. This is why you can skip this step in most cases.

When adjusting the focus setting without a collimating telescope, the criterion for a proper collimation is different for single-mode or polarization-maintaining fibers compared to multimode fibers.

The fiber collimators series 60FC-LSA are typically used for single-mode or polarization-maintaining fibers. Therefore, only the adjustment of single-mode or polarization-maintaining fibers is described in this document.



Notice: For the adjustment of the collimation setting in case of multimode fiber, please refer to www.sukhamburg.com/support/technotes/fiberoptics/coupling/collimatingism/practicalcollimation.html

3.1 Focus setting for single-mode or polarization-maintaining fiber cables

For rating the collimation setting of the fiber collimator, couple a radiation source of appropriate wavelength into the fiber connected to the fiber collimator. Direct the beam to a target about half a Rayleigh length z_R away:

$$\frac{z_R}{2} = \frac{\pi \cdot \varnothing_{\text{beam}}^2}{\lambda \cdot 8}$$

Here λ is the optical wavelength and $\varnothing_{\text{beam}}$ the collimated beam diameter (1/e² level).

When correctly collimated, the laser spot diameter on a target about $z_R/2$ away must have approximately the same diameter such as the beam directly behind the fiber collimator. Additionally, make sure that there is no focused spot between the fiber collimator and the target at $z_R/2$.

3.2 Changing the focus setting

For changing the collimation setting of the fiber collimator, couple a radiation source of appropriate wavelength into the fiber connected to the fiber collimator.



Caution! Refer to the laser instruction manual for all instructions regarding laser safety!

- Do not stare directly into the laser beam (which can cause permanent damage to the eyes).
- Do not stare at the reflected beam from reflective objects.
- Do not point the laser beam to other individuals.

The collimation setting is adjusted by means of an eccentric key. The eccentric key type 60EX-4 is used for fiber collimators with focal lengths ≤ 11 mm. For fiber collimators with focal lengths ≥ 12 mm please use the eccentric key type 60EX-5.

For adjusting the collimation setting perform the following steps:



Figure 6:

Loosen the two grub screws fixing the lens position by means of a screwdriver type 9D-12.



Figure 7:

Insert the eccentric key into the large hole. Now, adjust for the focus setting by rotating the eccentric key. Adjust the collimation by minimizing the size of the laser spot on the target about half the Rayleigh length z_R away.



Figure 8:

Finally, fix the two grub screws in order to lock the collimation setting.

4. Adjustment tools

For adjusting the fiber collimators series 60FC you need the following tools:



Figure 9:

Screw driver type 9D-12 and eccentric key type 60EX-4 or type 60EX-5.



Figure 10:

Eccentric key type 60EX-4 or type 60EX-5.

5. Accessories



Figure 11:

Adapter ring type 12C-AM25 with an outer diameter 25 mm for placing the fiber collimator into a standard mirror mount.

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