Fiber Collimators Series 60FC-LSA

This document provides assistance in installing the fiber collimators series 60FC-LSA. 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:

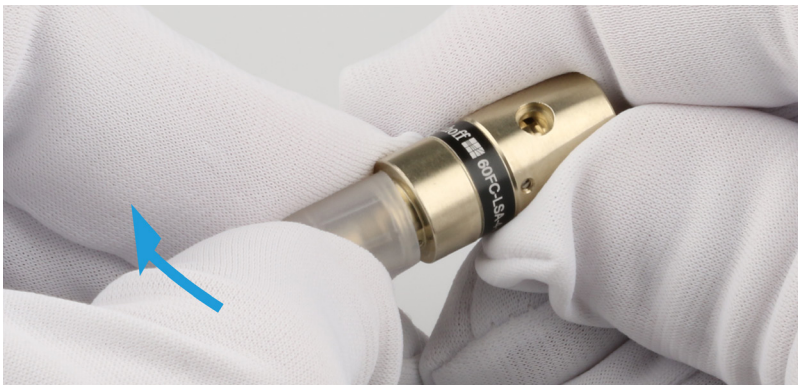

Figure 1:

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

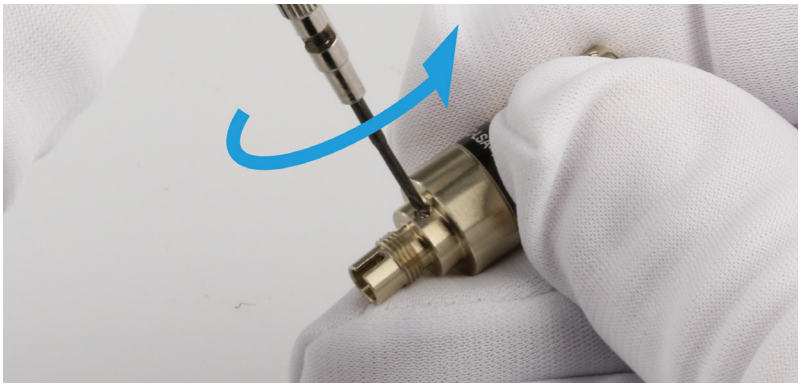

Figure 2:

Then, slightly loosen the small pin screw. Use the screwdriver 9D-12. Make sure to not loosen it too far, as it is small and easily lost.

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

- Use fibers with APC (8°-polish) connectors for laser beam couplers with an inclined coupling axis (60SMF-LSA-4).
- Use fibers with PC (0°-polish) connectors for laser beam couplers with a coaxial axis (60SMF-LSA-0).

The laser beam couplers are compatible to all fiber connectors of type LSA, DIN, AVIO and 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.

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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.

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2. Attaching a Fiber Cable to the Fiber Collimator

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

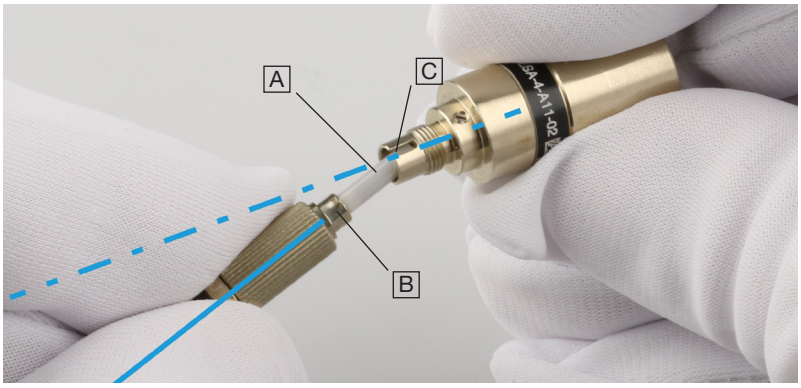

Figure 3:

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

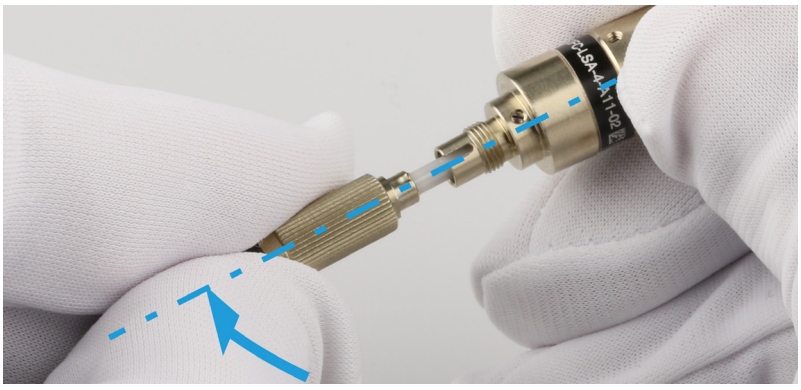

Figure 4:

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 5:

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

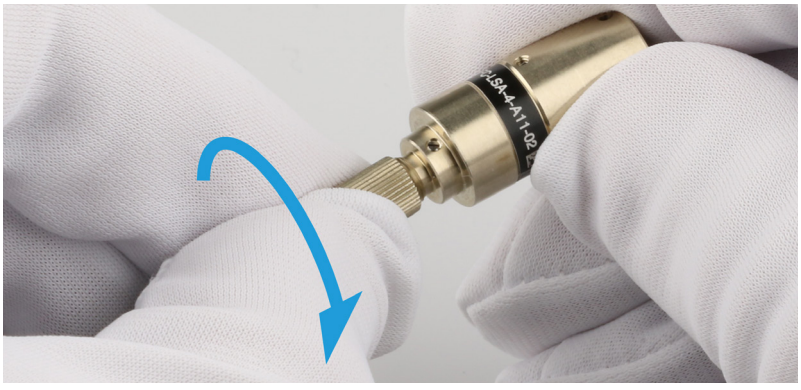

Figure 6:

Gently screw on the connector cap nut onto the receptacle until it is finger-tight.

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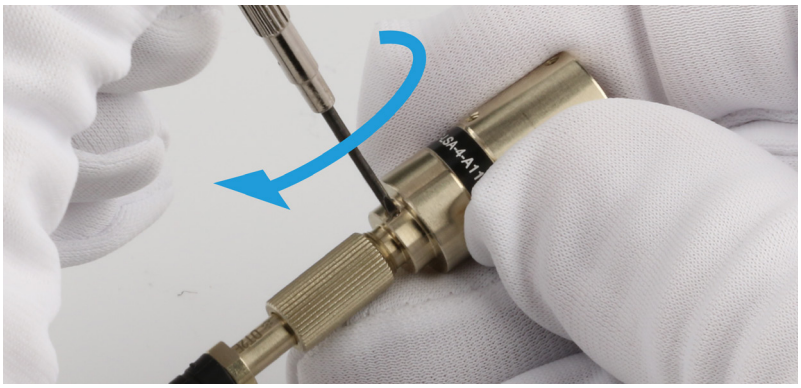

Figure 7:

Finally, gently tighten the fiber grub screw to reduce the free play of the ferrule in the receptacle.

The free play in between the connector ferrule and receptacle is only a few microns, but necessary for inserting the ferrule without force.

The tightened grub screw and the right-hand orientation rule for the connector, ensure a high reproducibility in mode field position and angle, which is especially important for attaching and reattaching polarization-maintaining fibers reproducibly.

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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.

To check 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:

$$\frac{z_R}{2} = \frac{\pi \cdot \varnothing^2_{beam}}{\lambda \cdot 8}$$

Here λ is the optical wavelength and $\varnothing_{beam}$ the collimated beam diameter ($1/e^2$ level).

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- 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.

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 $z_R/2$.

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:

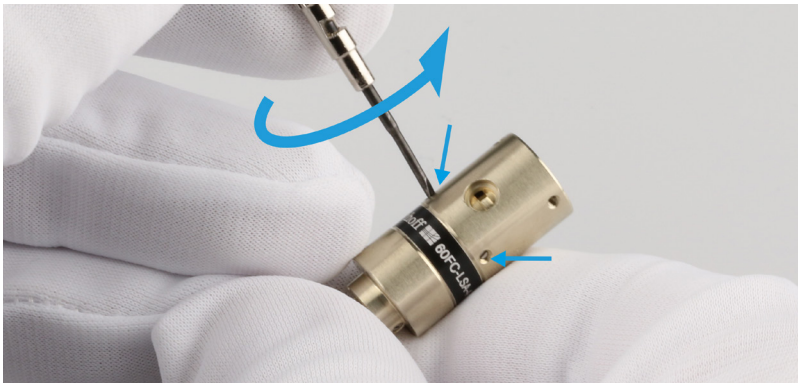

Figure 8:

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

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Figure 9:

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.

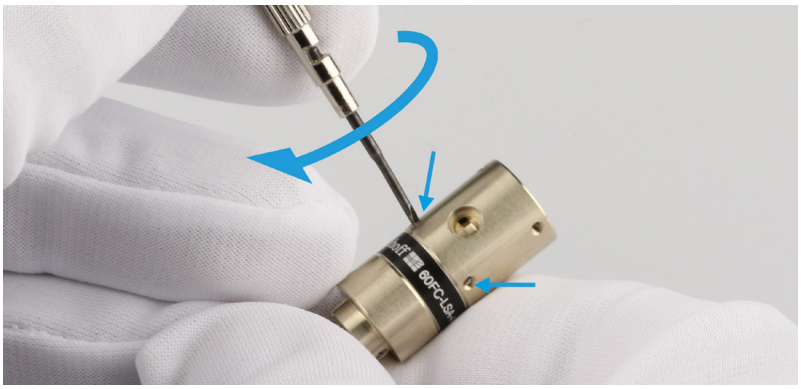

Figure 10:

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

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4. Adjustment tools

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

Figure 11:

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

Figure 12:

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

5. Accessories

Figure 13:

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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