

## Fiber Collimators Series 60FC-SF

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

### 1. Before You Start

The fiber collimator 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 two-part protection cap on the receptacle. For removing this cap perform the following steps in order to remove this cap:



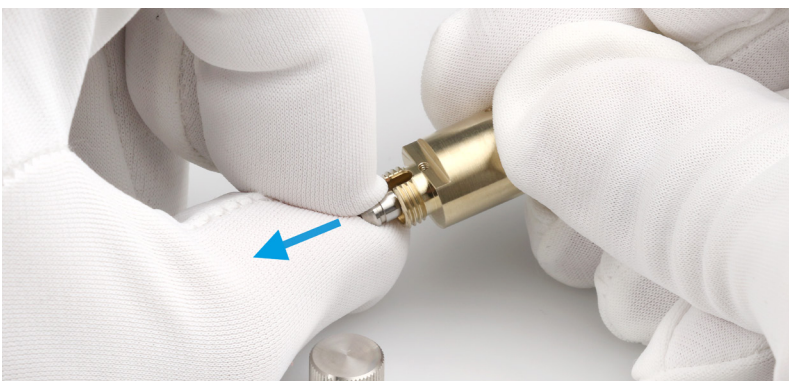
**Figure 1:**

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



**Figure 3:**

*Now please pull out the plug.*

Now make sure that the connector of the fiber you want to attach matches the receptacle type of the fiber collimator:

- Use fibers with FC-APC (8°-polish) connectors for fiber collimators with an inclined coupling axis (60FC-SF-4).
- Use fibers with FC-PC (0°-polish) connectors for fiber collimators with a coaxial axis (60FC-SF-0).

The fiber collimators are compatible to all fiber connectors type FC including fiber connectors with end caps.

**Notice:**

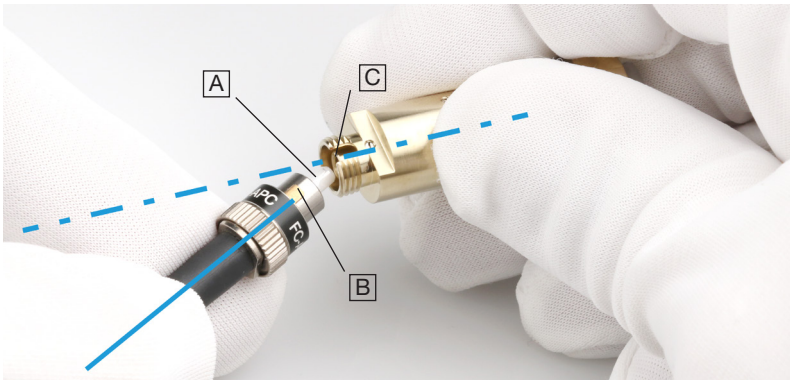
- Do not touch either the optical surface of the lens or the fiber end-face.
- If the collimator is not in use, reattach both rear and front protection caps.

**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.

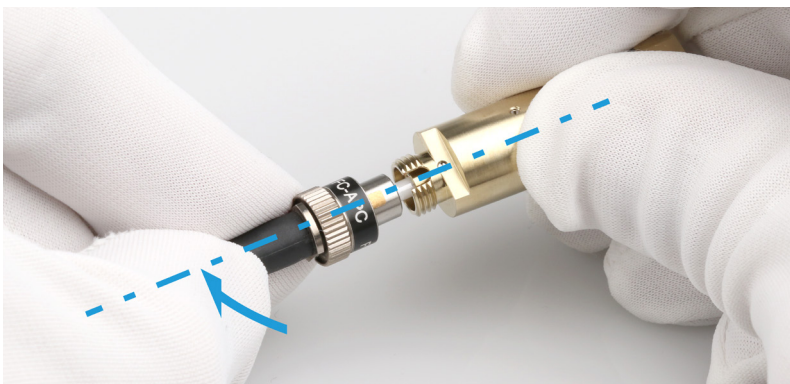
## 2. Attaching a Fiber Cable to the Fiber Collimator

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



**Figure 4:**

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 5:**

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 collimator.



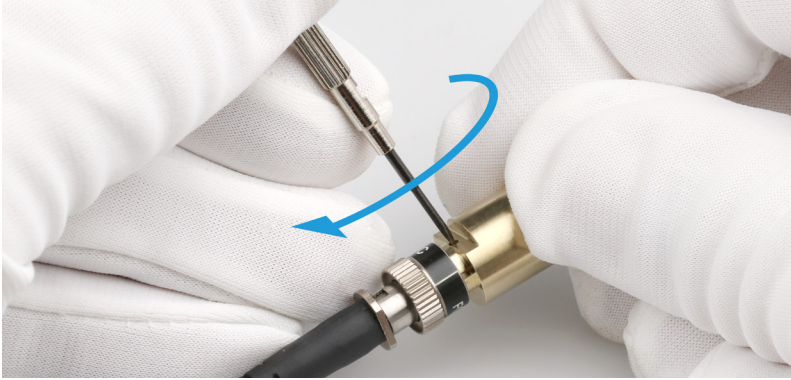
**Figure 6:**

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



**Figure 7:**

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



**Figure 8:**

*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 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.



### 3. Adjusting the Collimation Setting

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

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:

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

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



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

- Avoid staring directly into the laser beam (which can cause permanent damage to the eyes).
- Avoid staring at the reflected beam from reflective objects.
- Avoid pointing 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 collimator and the target at  $z_R/2$ .

The collimation setting is adjusted by gently rotating the knurled ring. Adjust the collimation by minimizing the size of the laser spot on the target about half the Rayleigh length  $z_R$  away.



**Figure 9:**  
Adjust the focus setting by gently rotating the knurled ring.




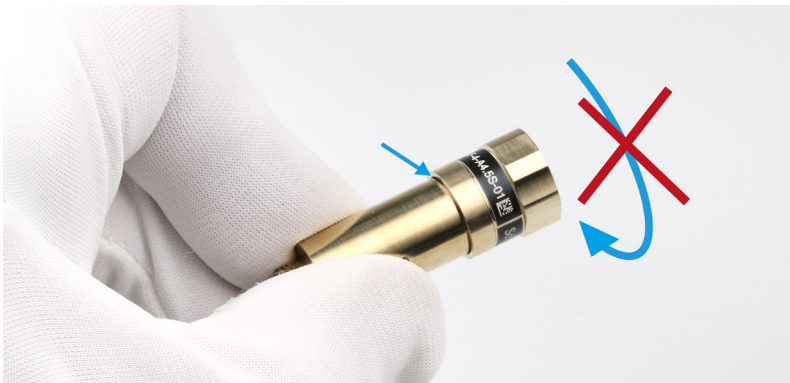
**Notice:**

Please do not use the two radially arranged screws. These pin screws are now used for a different purpose in the 60FC-SF fiber couplers than for the previous version of the fiber couplers with fine-focusing mechanism 60FC-F. They are to be used by Schäfter+Kirchhoff only! They are used for adjusting the backlash of the fine adjustment mechanics and are NOT used for fixing the collimation setting.



**Figure 10:**  
Please do not use the two radially arranged screws [X].

 **Notice:** There is no limit stop for the threaded nut. Stop rotating it further (clockwise) as soon as a groove becomes visible beyond the threaded nut.



**Figure 11:**  
If a groove becomes visible beyond the threaded nut you must stop rotating it further.

## 4. Adjustment Tools

For assembling and adjusting the fiber collimators series 60FC-SF you need the following tools:



*Figure 12:  
Screw driver type 9D-12*

## 5. Accessories



*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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Date of issue: 10.12.2020

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