

## Fiber Coupler series 60FC-K

compatible with the kinematix® optomechanics



### FEATURES

The fiber couplers series 60FC-K are compatible with the kinematix® optomechanics and can be used for coupling into single-mode or polarization-maintaining fiber cables or as a fiber collimator.

- Focal lengths up to 18 mm
- Choice of aspheres, monochromats, achromats and apochromats
- Various AR coatings for UV - IR
- Choice of fiber receptacles: FC PC or FC APC (standard), many others available
- Compatible with kinematix® optomechanics

## DESCRIPTION

The fiber collimators series 60FC-K are compatible with the kinematix® optomechanics and can be used for coupling into single-mode or polarization-maintaining fiber cables or as a fiber collimator. They are suitable for single-mode and polarization-maintaining fiber cables leading to collimated beams with a Gaussian intensity profile. Please note that for multimode collimation the intensity profile is not Gaussian and depends on specific fiber and radiation properties.

### An optics for each application

A large variety of collimating optics allows that the optimum focal length and the best lens type for a single wavelength ([monochromat](#)) or a wavelength range ([achromat](#) or [apochromat](#)) can be selected for each application. All lenses are AR-coated.

### Adjustment of focus

The distance between fiber end-face and collimating optics is adjusted by means of an eccentric key. The lens does not rotate when adjusting the focus. The final focus setting is locked by means of two radially arranged clamping screws.

### Optimum lens performance

The angled polish of connectors of type APC is considered by a [pre-angled mechanical coupling axis](#) that compensates the beam deflection and you can use the lens centrally. This minimizes aberrations simply resulting from a non-ideal beam path through the lens.

### Connector Type

The fiber collimator can be equipped with FC PC (wide key\*), FC APC (wide key\*), or LSA (compatible with fiber connectors type DIN, AVIO and AVIM) receptacles. SMA-905 (F-SMA) type receptacles are available for 0° and 5° or 8°-polish e.g. for SMA-905 High Power connectors. In case of FC or LSA with a spring loaded ferrule the fiber coupler has an additional grub screw to increase pointing stability. \*Even though the fiber coupler has a wide key receptacle it still can be used with both narrow key and wide key fibers. More information can be found [here](#).

### Material

The fiber collimators are made of nickel silver and stainless steel.

### Mounting

The fiber coupler needs to be placed into kinematix® optomechanics (not included) in order to be used as in- or outcouplers.

## TECHNOTES

- [Lens Types](#)  
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- [Fiber Connector Options](#)  
[FC PC, FC APC etc.](#)
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  - [Single-mode and PM fiber Coupling](#)  
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- [Beam divergence](#)  
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- [Article - Fiber Coupling to Polarization-Maintaining Fibers and Collimation](#)  
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## FAQ

### Adjustment

#### How much can I change the focus setting?

You can change the focus setting  $\pm 2.0$  mm.

#### I do not have a collimating telescope to collimate. Can you give me practical advice?

Of coarse, a collimating telescope is the best way to collimate. But there are other methods depending on the type of fiber (single-mode and PM vs. multimode) you can use. Please refer to our practical collimating tips [here](#).

#### My collimator is shipped "prealigned". What does this mean?

Schäfter+ Kirchhoff ships all collimators prealigned and collimated for either a specific wavelength defined by the customer or a typical wavelength. The collimation is performed using professional collimating telescopes.

**Please note:** The fibers used in the standard adjustment procedure are all equipped with an [end cap](#) when aligning for wavelengths  $\leq 520$  nm. The adjustment wavelength is given on the label for each collimator/coupler. If a fiber with end cap was used it is marked by "EC".

#### I am unsure how to correctly adjust my coupler/collimator. Where do I find details about the adjustment procedure?

Please refer to the manual in the Downloads section for a detailed adjustment procedure.

### Fiber Receptacle

#### FC PC and FC APC

#### What type of receptacle does my collimator with receptacle type FC have? Narrow key or wide key?

All our fiber collimators and couplers with a receptacle type FC have a so called wide key receptacle (2.14 mm).

These are suitable for connecting fibers with connector type FC (wide key) but also with those of type narrow key! You can find the details in the FAQs below.

## How do I attach a fiber cable?

To prevent damage to the sensitive fiber end-face, always insert the fiber connector's ferrule at an angle, with the connector key properly aligned to the receptacle notch.

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 coupler.

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

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

Gently tighten the fiber grub screw to reduce the free play of the ferrule in the receptacle.

## What is the "right-hand orientation rule"?

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 coupler.

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

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.

## Can I attach a narrow key fiber cable to a fiber coupler with a wide key receptacle?

Yes, you can- without any problem. Simply adhere to the "right-hand orientation rule".

Generally, with any FC PC or FC APC type connector there is a freeplay when inserting the fiber into the fiber coupler. The free play in between the connector ferrule and receptacle is only a few microns, but necessary for inserting the ferrule without force. There is a difference between the receptable and key width for wide key (2.14 mm) and narrow key (2.0 mm) fibers. If you follow the so-called "right-hand orientation rule" you can reproducibly attach and reattach even PM fibers with narrow key receptacle to fiber couplers with wide key receptacle without difficulty.

"Right-hand orientation rule":

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

## Troubleshooting

### I can't collimate the radiation out of a coupler. Why?

**Have you loosened the grub screws?**

The clamp screws have to be loosened before changing the focus setting, Please refer to the adjustment instructions of the individual couplers for more details.

**Have you checked, if the fiber is correctly placed within the fiber receptacle of the coupler?**

The fiber connector might not be placed correctly within the receptacle of the coupler/collimator. In particular, please check the small grub screw holding the connector's ferrule (e.g. for FC PC and FC APC type couplers). It might be in the way. Please refer to the adjustment instructions of the individual couplers/collimators for more details.

**Have you tried another eccentric key?**

Please check, if the eccentric key is damaged or broken.

Please also check, if you are using the appropriate eccentric key. The eccentric key type 60EX-5 has a larger stroke compared to the key type 60EX-4. The 60EX-5 is used for couplers/collimators with focal length  $\geq 12$  mm. The 60EX-4 is used for focal lengths  $< 12$  mm.

In some very rare cases (e.g. shorter wavelengths and end cap fibers) the stroke of the original eccentric key may be too small for the coupler in your application. (See FAQ "Difference between 60EX-4 and 60EX-5"). Try using the 60EX-5 in this case.

**Have you checked the eccentric key for damage?**

The eccentric key might be damaged or broken. If that is the case, try another eccentric key of the same type and (or) contact Schäfter+Kirchhoff for replacement.

**Are you using a fiber with an end cap?**

Collimating/coupling with an end cap fiber cable is no different than with a standard fiber cable. However, the focus position might vary a little ( $< 200 \mu\text{m}$ ) when swapping a standard fiber cable for a fiber cable with end cap.

The eccentric key 60EX-4 is used to adjust the focus position. In some cases the stroke is not large enough.

This includes working with very small wavelengths or very large wavelengths. Please try using the eccentric key 60EX-5 with a larger stroke instead.

**It says my coupler/collimator was "precollimated" but the collimation setting seems to not be alright. What might be the problem?**

### Are you using the same wavelength as the adjustment wavelength?

Schäfter+ Kirchhoff ships all collimators/couplers prealigned and collimated/preadjusted for either a specific wavelength defined by the customer or a typical wavelength. The prealigned is performed using professional collimating telescopes.

The adjustment wavelength is given on the label for each collimator/coupler. If you are using another wavelength you need to change the focus setting. Please refer to the manual for more details.

### Are you using the same fiber type as in the adjustment procedure?

The fibers used in the standard adjustment procedure are all equipped with an [end cap](#) when aligning for wavelengths  $\leq 520$  nm. The adjustment wavelength is given on the label for each collimator/coupler. If a fiber with end cap was used it is marked by "EC".

If you are not using a fiber with an end cap but the preadjustment at Schäfter+Kirchhoff was done using an end cap ("EC") or you are using a fiber with an end cap and the preadjustment at Schäfter+Kirchhoff was done without, you might need to change the focus setting. Please refer to the manual for more details.

## DOWNLOADS



[Adjustment\\_60FC-K.pdf \(Manual\)](#)

**This downloads section only includes general downloads for the complete series.**

Please access the individual product pages (using the product configurator, the product list, order options or the search button if you have a complete order code). Here you will find specific downloads including technical drawings or stepfiles.

## ACCESSORIES

### ADJUSTMENT TOOLS FIBER OPTICS

## RELATED PRODUCTS

#### LASER BEAM COUPLERS SERIES 60SMS

for coupling into single-mode and polarization-maintaining fiber cables

#### FIBER COLLIMATOR SERIES 60FC

for collimating radiation exiting an optical fiber or as an incoupler

This is a printout of the page <https://sukhamburg.com/products/fiberoptics/fibercoupler/series/60fc-k.html> from 3/28/2024

## CONTACT

For more information please contact:

**Schäfter + Kirchhoff GmbH**

**Kieler Str. 212**

**22525 Hamburg**

**Germany**

**Tel: +49 40 85 39 97-0**

**Fax: +49 40 85 39 97-79**

**[info@sukhamburg.de](mailto:info@sukhamburg.de)**

**[www.sukhamburg.com](http://www.sukhamburg.com)**

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