

Fiber Collimator series 60FC-L

for collimating large beam diameters



FEATURES

The fiber collimator series 60FC-L are designed for collimating radiation exiting from an optical fiber cable (fiber port) or used in reverse as a fiber coupler for coupling a beam into an optical fiber cable.

- Large beam diameters: Focal lengths up to 200 mm
- Choice of monochromats, achromats and apochromats
- Various AR coatings for UV - IR
- Choice of fiber receptacles: FC PC or FC APC (standard), many others available
- Front connector accepts attachment optics

DESCRIPTION

The fiber collimators series 60FC-L are designed for collimating radiation exiting optical fiber cables with high pointing stability and large beam diameters. They can also be used in reverse-mode as fiber incouplers. 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 mechanism to adjust the focus depends on the collimator housing. For collimators with diameter Ø 25 mm the distance between fiber end-face and collimating optics is adjusted by manually shifting the lens tube. For collimators with diameter Ø 32 or larger 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 for both cases. The final focus setting is locked by means of two radially arranged clamping screws. Additionally attachment optics can be mounted to the front of the collimator.

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*), SMA-905 (F-SMA), ST or LSA (compatible with fiber connectors type DIN, AVIO and AVIM) [receptacles](#). 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 black anodized aluminum.

Mounting

The collimators series 60FC-L all possess a flange for low-strain mounting e.g. using the clamp collars series [CC](#).

TECHNOTES

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[Article - Fiber Coupling to Polarization-Maintaining Fibers and Collimation](#)
[How measured fiber parameters help to choose the best coupling and collimation optics.](#)

- [Connecting single-mode and PM fibers to a fiber coupler](#)
[How to correctly insert a fiber into the receptacle of a fiber coupler](#)

FAQ

Order Code

How do I read the Order Code?

The Order Code of standard Fiber Couplers is fairly easy to read.

Example: 60FC-xxx-L-M125-54

60FC-L denotes the series of the Fiber Coupler, in this case series 60FC-L. You can find an overview of available series [here](#).

xxx stands for the receptacle type. Standard is FC and the xxx is left out. SMA stands for receptacle type F-SMA, LSA stands for a receptacle type LSA compatible with fiber connectors type DIN, AVIO and AVIM.

4 stands for the collimator coupling axis. It is either 4 (standard) for 8°-polished fibers or 0 for 0°-polished fibers. For SMA couplers there is also 23 which is for 5°-polished fibers.

M125 denotes the optics type and the focal length. M stands for monochromat or achromat, A for asphere and S for singlet lens. The focal length is given in mm, in this case 125 mm.

54 describes the AR-Coating of the lens. Specifics on the coatings can be downloaded on the individual product pages of the fiber couplers.

Adjustment

How much can I change the focus setting?

If the focus setting is changed manually by shifting the lens tube (housing diameter Ø 25/28 mm or focal lengths ≤ 40 mm) you can adjust the focus setting about ± 0.3 mm. For all other collimators the focus setting can be changed ± 2 mm using an eccentric key.

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

Of course, 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](#).

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.

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 ≤ 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".

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 receptacle 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.

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 µm) when swapping a standard fiber cable for a fiber cable with end cap.

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 ≤ 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



[Article_FibercouplingNAe2.pdf \(Technote\)](#)

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

**CLAMP COLLARS
SERIES CC** for all collimators with flange, different sizes

IRIS DIAPHRAGMS BL for collimators

MICRO FOCUS OPTICS Micro Focus Optics for Fiber Collimators of all series

POLARIZATION FILTERS

RETARDATION OPTICS

Retardation optics for fiber collimators

RELATED PRODUCTS

**FIBER COLLIMATOR
SERIES 60FC-T**

for collimating large beam diameters and with
additional TILT adjustment

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