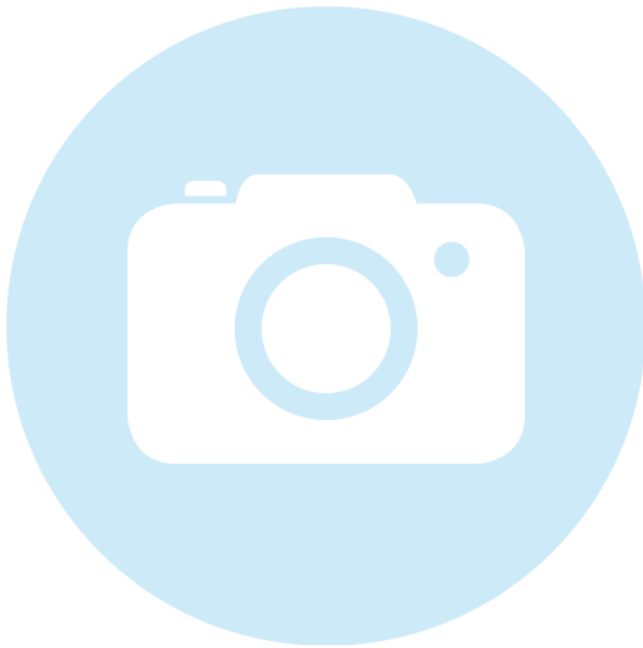


Fiber Collimator Series 60FC-BC-Q

with two fiber input ports, a dichroic beam combiner and circular state of polarization



FEATURES

Schäfter+Kirchhoff fiber collimators of series 60FC-BC are designed for dichroic beam combination and collimation. They possess two fiber receptacles and an integrated dichroic beam combiner. They additionally have an integrated quarter-wave plate in order to generate a circular state of polarization.

- Two input ports
- Spectral range 400 nm - 1000 nm
- Choice of different focal length for the two wavelengths (e.g. for choosing different collimated beam diameters, or for compensating different fiber NAs)
- Circular state of polarization for both wavelengths
- Gaussian intensity profiles
- Compatible with the multicube™ and cage system
- Rugged and compact design
- A front-fitting for attachments, such as a diaphragm

DESCRIPTION

Schäfter+Kirchhoff fiber collimators of series 60FC-BC-Q are designed for dichroic beam combination and collimation. They possess two fiber receptacles, an integrated dichroic beam combiner and integrated quarter-wave plate. The fiber collimators of series 60FC-BC-Q are used when the wavelengths for combination are so different that they cannot be transmitted by a common single-mode or PM fiber.

An optics for each application

A large variety of optical designs allows that the optimum focal lengths for the individual sources you need can be selected for each application. All lenses are AR-coated.

Optical design

The radiation of the two input fibers is collimated to a beam with a diameter in the range \varnothing 1 - 4 mm, respectively. Either an adjacent dichroic beam combining optics or a polarization beam splitter superimposes the two sources to a common beam. In this collimated beam a dichroic quarter-wave plate changes the state of polarization from linear to left-handed or to right-handed circular for both of the sources simultaneously. Finally the common beam is expanded to the desired diameters. Since the focal lengths can be chosen independently for the two input wavelengths, the resulting collimated beam diameters can be chosen to differ. Or the focal lengths can be chosen in such a way so that they compensate for different fiber NAs. By defocussing one of the input channels, it is also possible to compensate for chromatic aberration of the output optics.

Adjustment of focus

All fiber collimators of series 60FC-BC-Q are aligned for the specified wavelengths.

In case of need you can change the distance between fiber end-face and the first collimating optics 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. 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.

Material

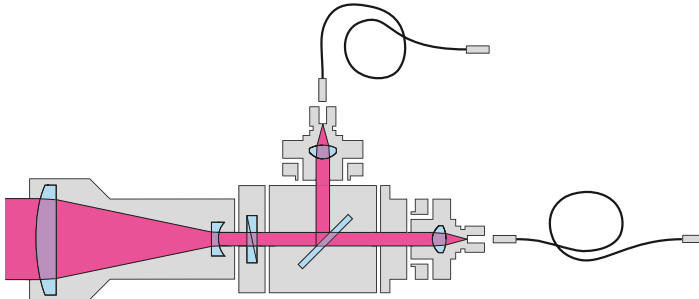
The fiber collimators are made of nickel silver, black anodized aluminum and stainless steel.

Mounting

The collimators series 60FC-BC-Q all are compatible to the multicube™ system (microbench or cage system).

Option

Besides these series 60FC-BC-Q fiber collimators there is the series [60FC-BC](#). These fiber collimators generate a common collimated beam for two sources. The polarization of the superimposed output beam is linear for both wavelengths.



ORDER OPTIONS

Order Code	Wavelength	Eff. Focal	Wavelength	Eff. Focal	Clear Aperture	For Connector Type
	1	Length 1	2	Length 2		
60FC-BC-Q461/689-4-F41-24	461 nm	41 mm	689 nm	41 mm	12 mm	FC APC

TECHNOTES

- [Article - Specialized fiber collimators](#)
[Cooling and trapping atoms using specially developed fiber collimators](#)

FAQ

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 ≥ 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 wavelegths 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 ≤ 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_FiberCollimators.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.

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SERIES 60FC-E**

Fiber Collimator series 60FC-E for an elliptical beam cross-section

FIBER CABLES PMC

Polarization-maintaining fiber cables

This is a printout of the page <https://sukhamburg.com/products/fiberoptics/fibercoupler/series/60fc-bc-q.html> from 4/26/2024

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