

Fiber-to-Fiber Coupler

High-Power Beam Delivery – 1030 nm to 1090 nm

The Fiber-to-Fiber Coupler (FFC) makes it possible to couple a laser beam from one fiber optic cable to another. This can be used for extending the range of an existing fiber cable installation, to change the beam quality by connecting a larger fiber core diameter, or to connect different mechanical fiber cable interfaces together. It can also be used to minimize down-time for laser sources with fixed output fibers that are not plug-and-play replaceable. Using the FFC it is possible to receive an exchangeable process fiber for the laser source.



FEATURES

- Up to 15 kW (CW)
- High-resolution fiber adjustment
- Fiber alignment feedback
- Eye-safe, stand-alone
- Certified safety electronics (PL e)

APPLICATIONS

- Welding
- Cutting
- Surface Treatment
- Cladding
- 3D Additive Manufacturing

Fiber-to-Fiber Coupler

Specifications	FFC wc		FFC ac
Maximum Power (kW)	15		4.5
Wavelength (nm)	1030 to 1090		
Magnification, $M = f_{roc}/f_{coll}$	0.6, 1.0, and 1.2		
Maximum NA			
M = 1.0	0.14		0.18
M = 1.2	0.14		0.18
M = 0.6	0.12		0.09
Coupling Margins			
Min. Fiber Diameter increase (μm at x kW)	<6 kW	6 to 10 kW	>10 kW
M = 1.0	≥ 50	≥ 50	≥ 100
M = 1.2	≥ 50	≥ 100	≥ 150
M = 0.6		Single-mode to multi-mode ¹	
Cooling			
Cooling Method	Water		Air (passive)
Fiber Delivery System			
Fiber Interfaces	QBH / QD / LLK-B (Q5)		
Dimensions and Weight			
Dimensions	See page 3		See page 4
Weight (kg)	4.5		2.3 to 2.5
Electronics			
Supply Voltage (V DC)	24		
Maximum Current ² (A)	100		
Fieldbus	CANopen		
Certified Safety Function	ISO 13849-1:2015 Category 3 PL e		
Environmental Conditions			
Humidity (% RH)	<80		
Operating Temperature (°C)	5 to 50 (non-condensing)		
Storage Temperature (°C)	-25 to 70		
Compliance Information			
RoHS	Directives 2011/65/EU and 2015/863/EU		
REACH	Directive EC no 1907/2006		

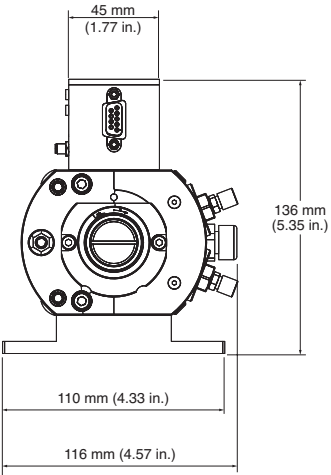
Notes:

- 1 M = 0.6 is recommended for single-mode to multi-mode fiber coupling. With M = 0.6 the NA increase by a factor 1/0.6 which lead to a better mode-mix in the multi-mode fiber. M = 0.6 is typically not recommended for multi-mode to multi-mode fiber coupling due to the large increase of NA.
- 2 The power supply source should be protected by a max. 1 A slow blow fuse.

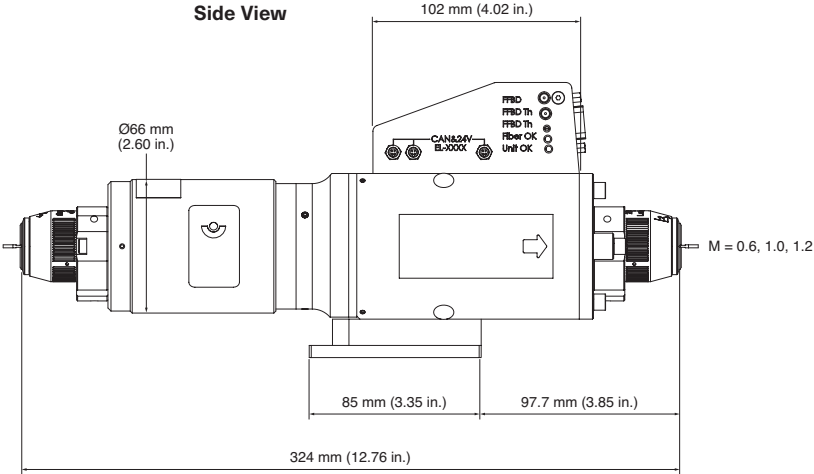
Mechanical Specifications

Fiber-to-Fiber Coupler Water-Cooled (FFC wc)

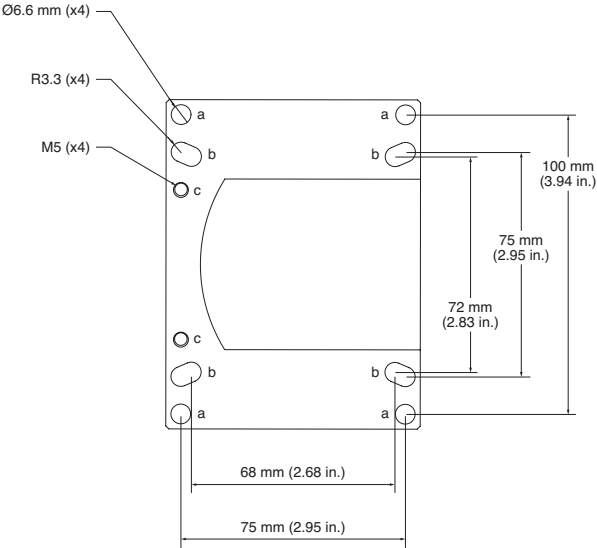
Front View
(design with QBH
Fiber Interface)



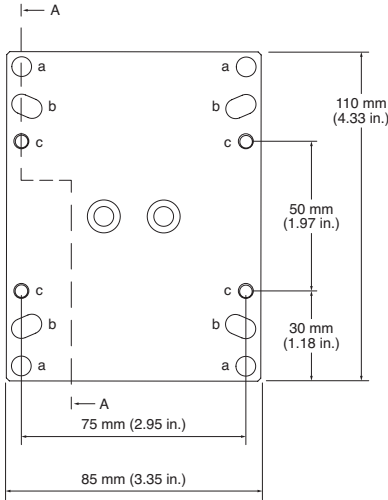
Side View



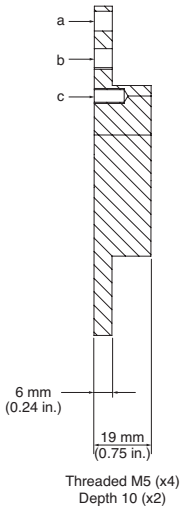
Mounting Plate



Above View
(without the FFC House)



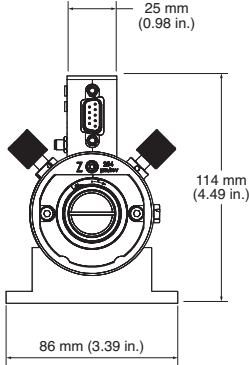
Below View
(without the FFC House)



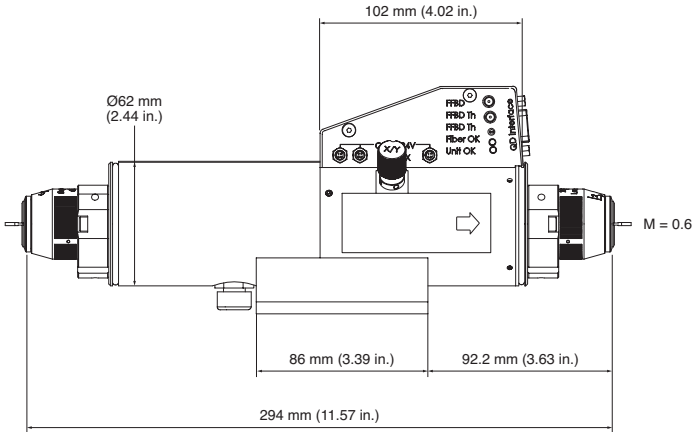
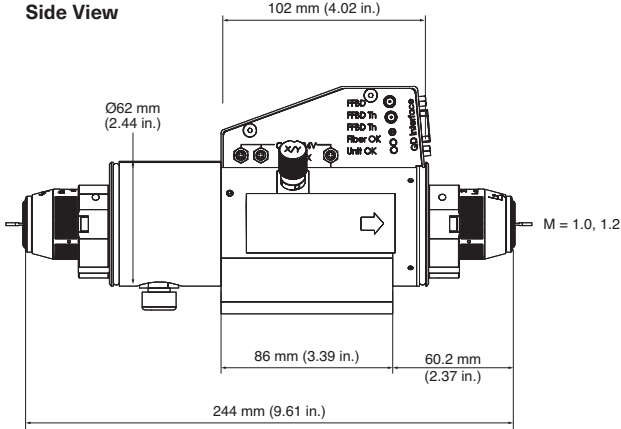
Mechanical Specifications

Fiber-to-Fiber Coupler Air-Cooled (FFC ac)

Front View
(design with QBH
Fiber Interface)

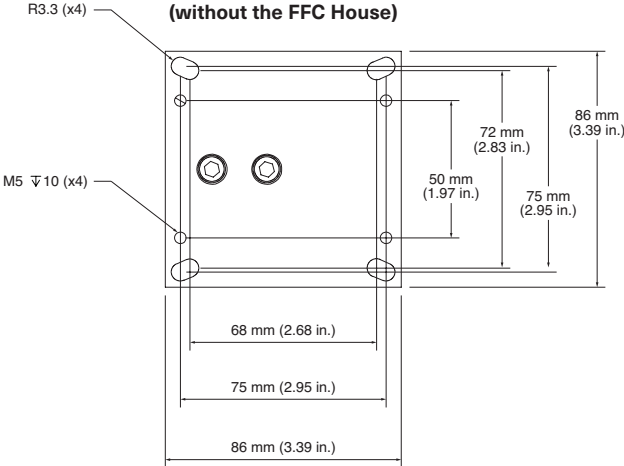


Side View



Mounting Plate

Below View
(without the FFC House)



Part Numbers

Fiber-to-Fiber Coupler Water-Cooled (FFC wc)

Specifications				
Input Interface	Output Interface	M = 0.6	M = 1.0	M = 1.2
QBH-	QBH	101623X06	101623X10	101623X12
	QD	101623X24	101623X26	101623X28
QD-	QD	103336X06	103336X10	103336X12
	QBH	103336X24	103336X26	103336X28

Note: LLK-B (Q5) interface available upon request.

Fiber-to-Fiber Coupler Air-Cooled (FFC ac)

Specifications				
Input Interface	Output Interface	M = 0.6	M = 1.0	M = 1.2
QBH-	QBH	3-9022X06	3-9022X10	3-9022X12
	QD	3-9191X06	3-9191X10	3-9191X12
QD-	QD	3-9232X06	3-9232X10	3-9232X12
	QBH	1428774	1428775	1428776

Note: LLK-B (Q5) interface available upon request.

Accessories

Accessory	Part Number
Power and Communication cable angled, 5 m	2-5053X01
Power and Communication cable angled, 10 m	2-5053X02
FFBD cable MCX (and DLD), 1500 mm	1-5135X01

Raman Filter

Stimulated Raman Scattering (SRS) can be a major limiting factor for high power, high brightness fiber lasers. As a result, overall length of the process fiber cable can be restricted.

By introducing a wavelength selective mirror between the two lenses in the Fiber-to-Fiber Coupler (FFC) it is possible to completely remove unwanted Raman radiation. This is a solution patented by Coherent and that also involve the mode-stripping technology inside the Coherent Fiber Optic Cables.

FFC Raman available upon request.

