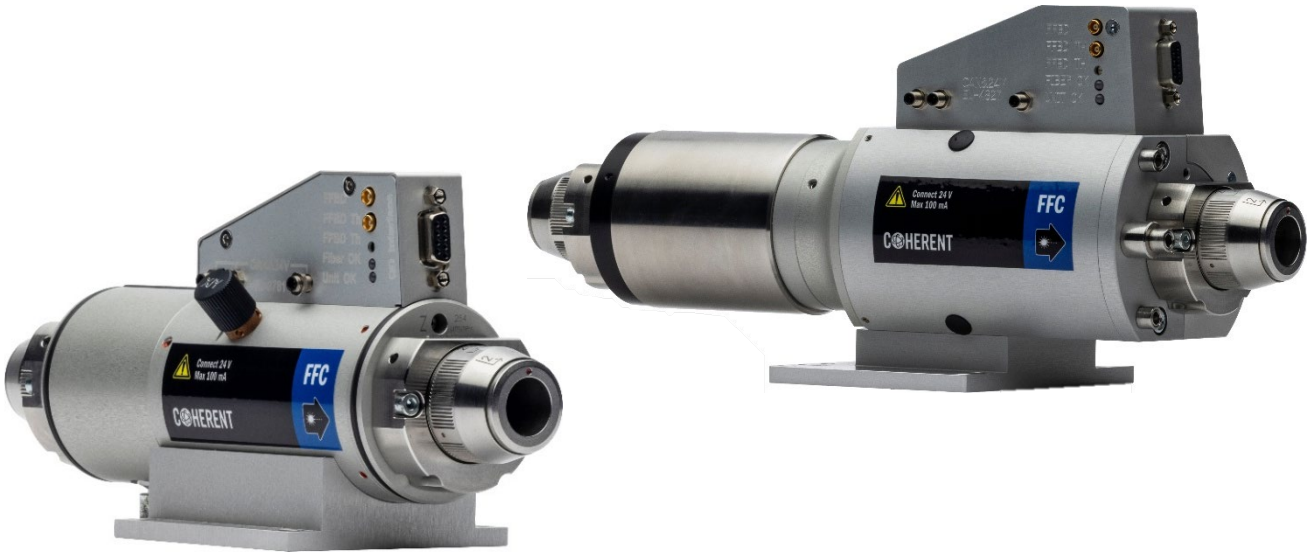
Beam Delivery Components for High-Power Lasers

FIBER-TO-FIBER COUPLER

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 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 minimize down-time by allowing the use of plug-and-play exchangeable process fibers.

For high-power, high-brightness applications where Stimulated Raman Scattering (SRS) limit process fiber length, the FFC is also available in a dedicated FFC Raman configuration. This patented solution effectively suppresses unwanted Raman radiation and enables improved system performance and extended process fiber lengths.



FEATURES

- Up to 20 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

COHERENT

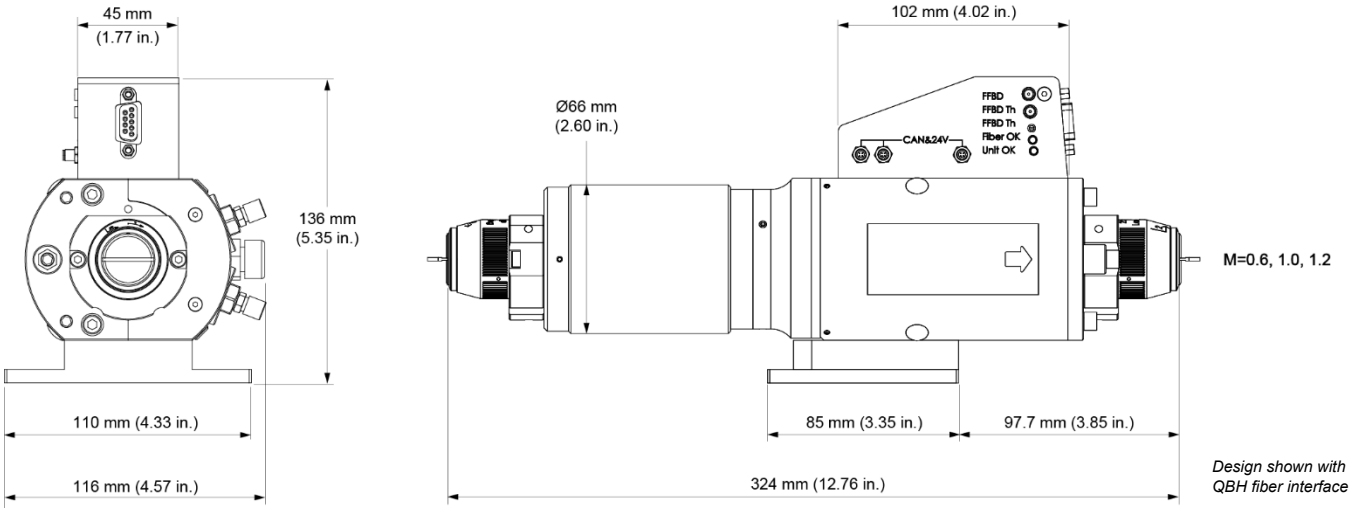
Specifications	FFC Water-cooled	FFC Air-cooled
Maximum Power (kW)	20	4.5
Wavelength (nm)	1030 to 1090	
Magnification, M = f_{foc}/f_{coll}	0.6, 1.0, and 1.2	
Maximum NA		
M = 1.0	0.14	0.18
M = 1.2	0.14	0.18
M = 0.6	0.12	0.09
Coupling Margins		
Minimum Fiber Diameter Increase (µm)	**<6 kW**	**6 to 10 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 & 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] (mA)	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 (EU) 2015/863	
REACH	Regulation (EC) No. 1907/2006	
CE	EMC Directive 2014/30/EU; RoHS Directive 2011/65/EU	
UKCA	EMC Regulations SI 2016/1091; RoHS Regulations SI 2012/3032	

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.

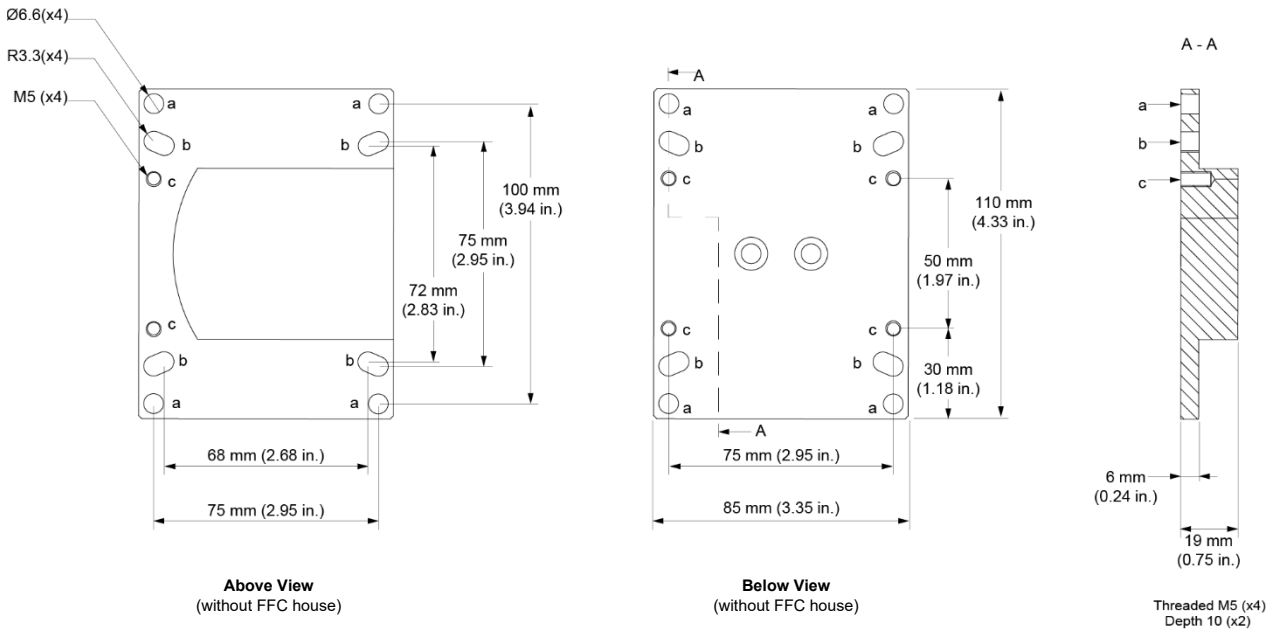
2. The power supply source should be protected by a max. 1 A slow blow fuse.

Mechanical Specifications

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



Mounting Plate



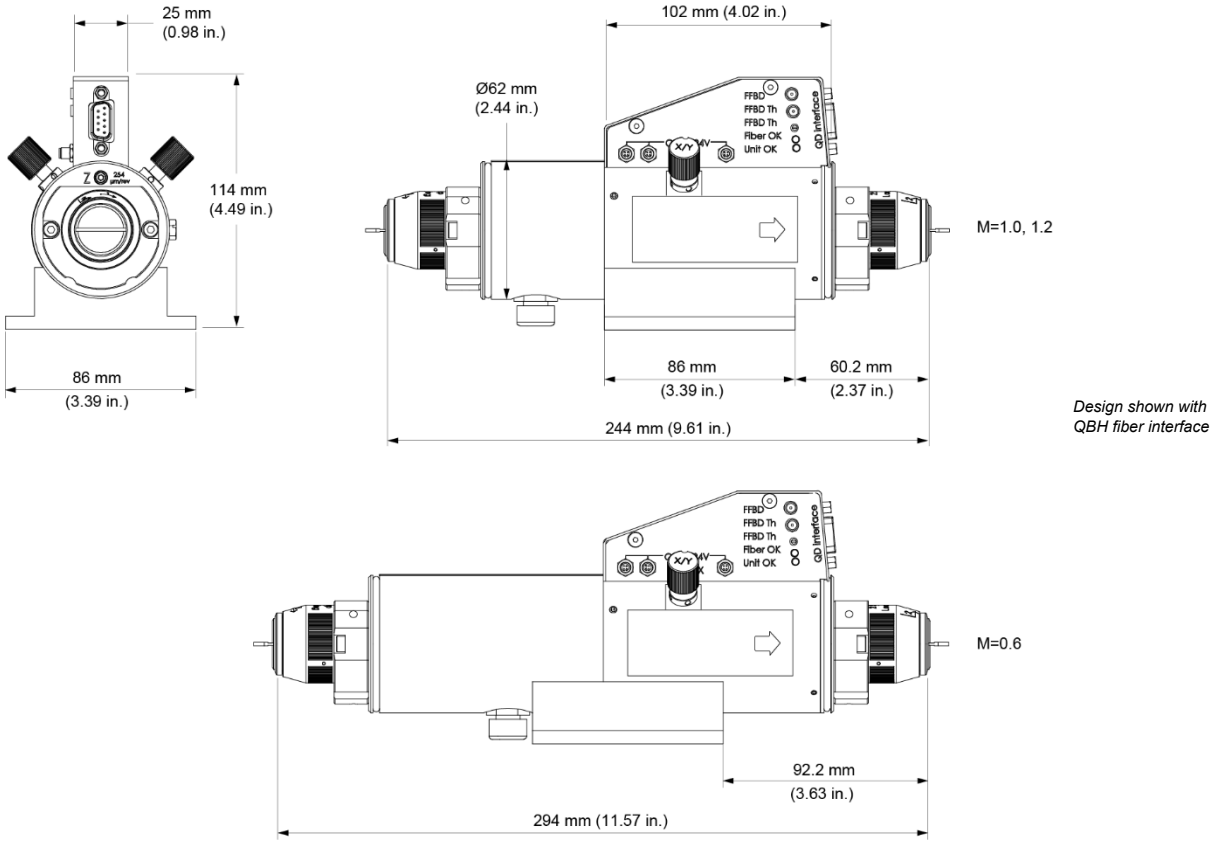
Above View
(without FFC house)

Below View
(without FFC house)

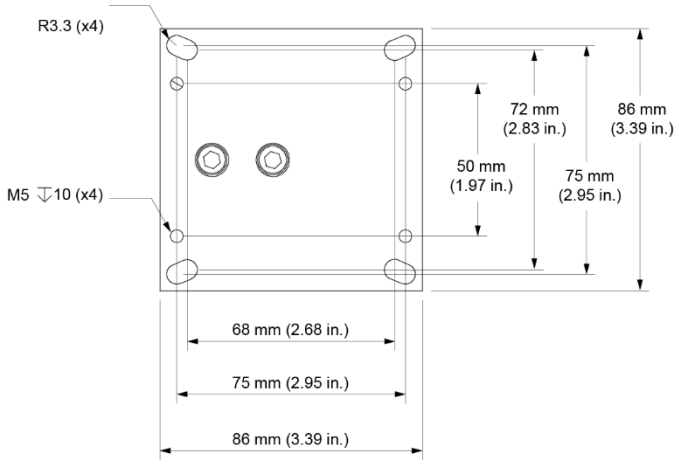
Threaded M5 (x4)
Depth 10 (x2)

Mechanical Specifications

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



Mounting Plate



Below View
(without FFC house)

Part Numbers

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

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

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

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

Accessories

Accessories	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

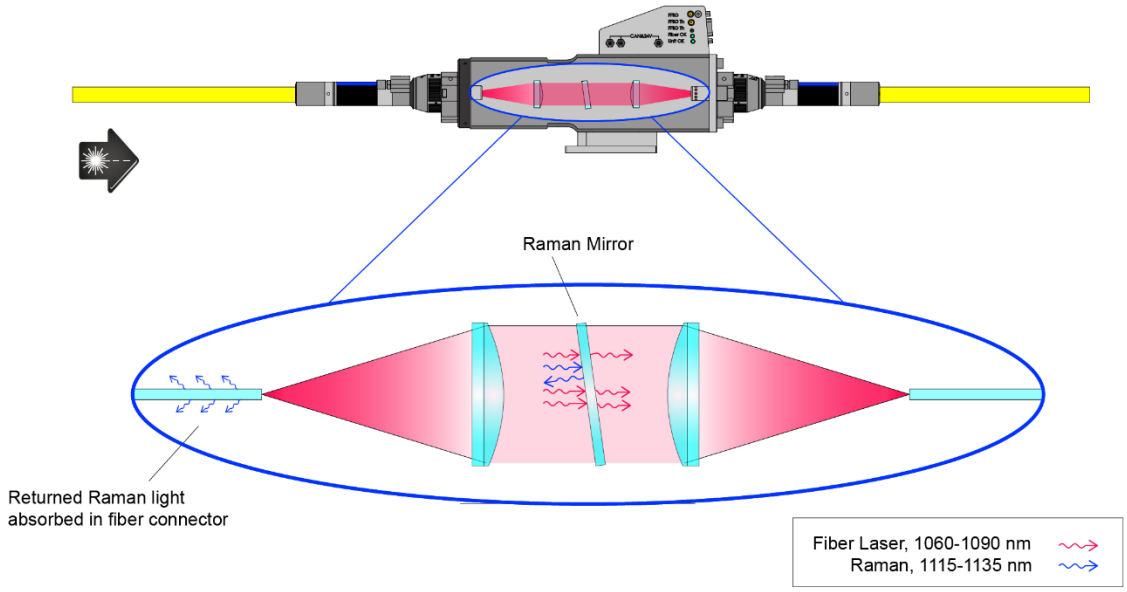
Raman Suppression with FFC Raman

Stimulated Raman Scattering (SRS) is a significant limiting factor in high-power, high-brightness fiber lasers. As a consequence, the allowable length of the process fiber may be restricted.

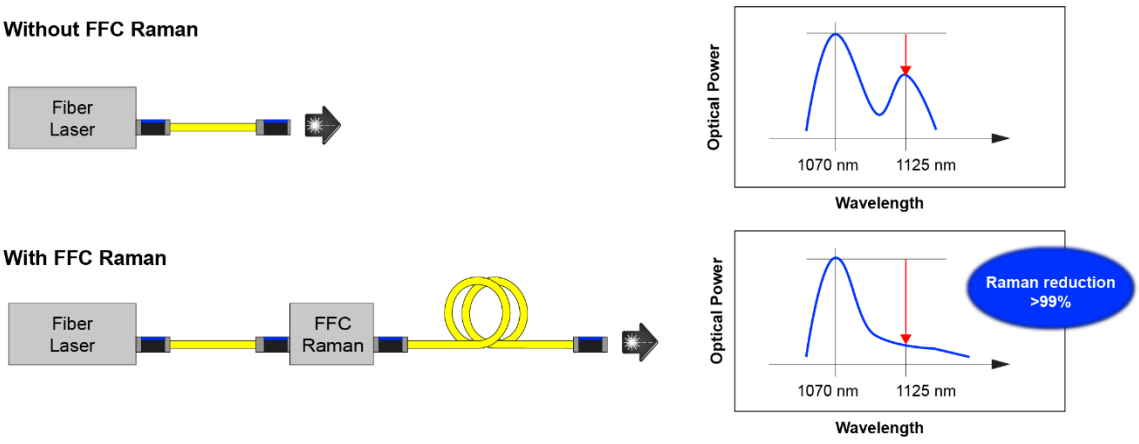
By integrating a wavelength-selective mirror between the two lenses of the Fiber-to-Fiber Coupler (FFC), unwanted Raman radiation can be effectively and completely suppressed. This patented Coherent solution also incorporates Coherent's mode-stripping technology within the fiber optic cable assembly.

The FFC Raman option is available upon request.

OPTICAL PRINCIPLE



PERFORMANCE IMPROVEMENT



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