

# Fiber-to-Fiber Switch

## High-Power Beam Delivery – 1030 nm to 1090 nm

The Fiber-to-Fiber Switch (FFS) creates laser source flexibility. The FFS can offer up to four outputs from one laser source. Either working in parallel using energy sharing or one output at the time using time sharing. Connecting different fiber core diameters lead to multiple beam qualities from one laser source. The certified safety electronics in combination with short switch time and an efficient beam dump make it possible to use the FFS as a time-saving beam shutter. If using wavelength selective mirrors, the FFS can also be used for removing unwanted laser wavelengths (e.g. Raman).



### FEATURES

- Up to 15 kW (CW)
- High-resolution fiber adjustment
- Fiber alignment feedback
- High-speed switch
- Certified safety electronics (PL e)

### APPLICATIONS

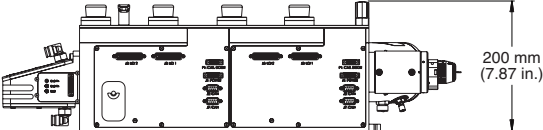
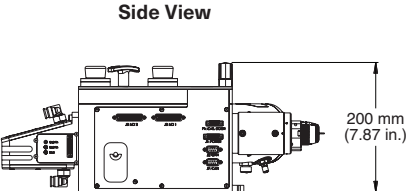
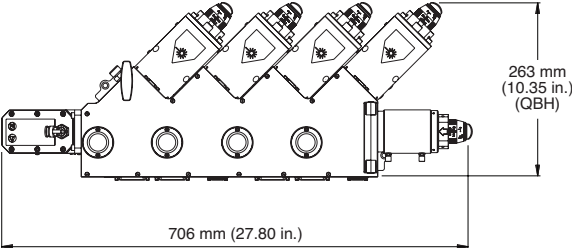
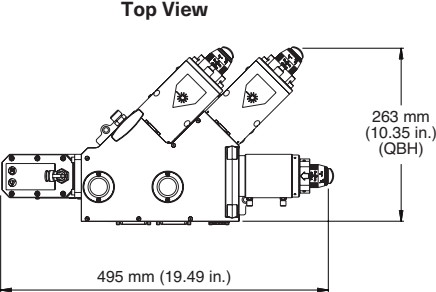
- Welding
- Cutting
- Surface Treatment
- Cladding
- 3D Additive Manufacturing

## Fiber-to-Fiber Switch

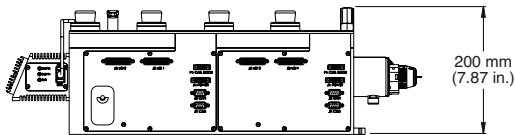
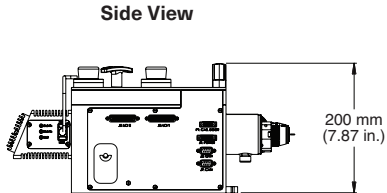
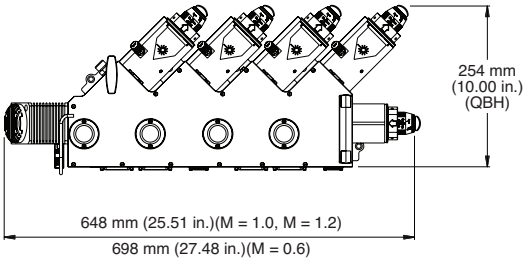
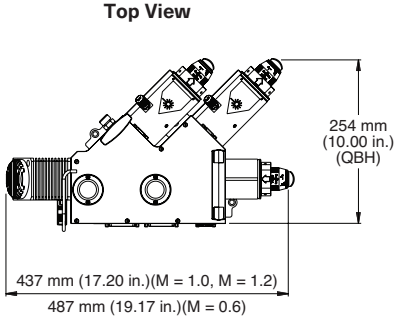
Specifications	FFS wc		FFS ac
Maximum Power CW (kW)	15		4.5
Wavelength (nm)	1030 to 1090		
Magnification, M	0.6, 1.0, and 1.2		
Maximum NA			
M = 1.0	0.14		0.18
M = 1.2	0.14		0.18
M = 0.6	0.12		0.09
Switching Time Mirrors (ms)	45		
<b>Coupling Margins</b>			
Min. Fiber Diameter increase (µm at x kW)	<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		
<b>Cooling</b>			
Cooling Method	Water		Air (passive)
<b>Fiber Delivery System</b>			
Fiber Interfaces	QBH / QD / LLK-B (Q5)		
<b>Dimensions and Weight</b>			
Dimensions	See page 3 and 4		
Weight (kg)			
2-way	16		11
4-way	27		19
<b>Electronics</b>			
Supply Voltage (V DC)	24		
Maximum Current (A)	2.5		
Fieldbus	CANopen		
Certified Safety Function	ISO 13849-1:2015 Category 3 PL e		
<b>Environmental Conditions</b>			
Humidity (% RH)	<80		
Operating Temperature (°C)	5 to 50 (non-condensing)	5 to 45 (non-condensing)	
Storage Temperature (°C)	-25 to 70		
<b>Compliance Information</b>			
RoHS	Directives 2011/65/EU and 2015/863/EU		
REACH	Directive EC no 1907/2006		

**Mechanical Specifications**

Fiber-to-Fiber Switch Water-Cooled (FFS wc)

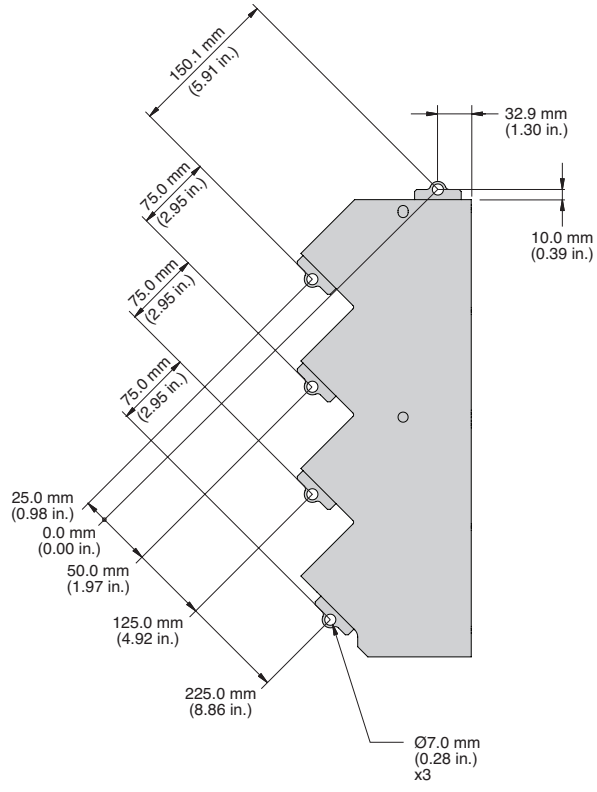
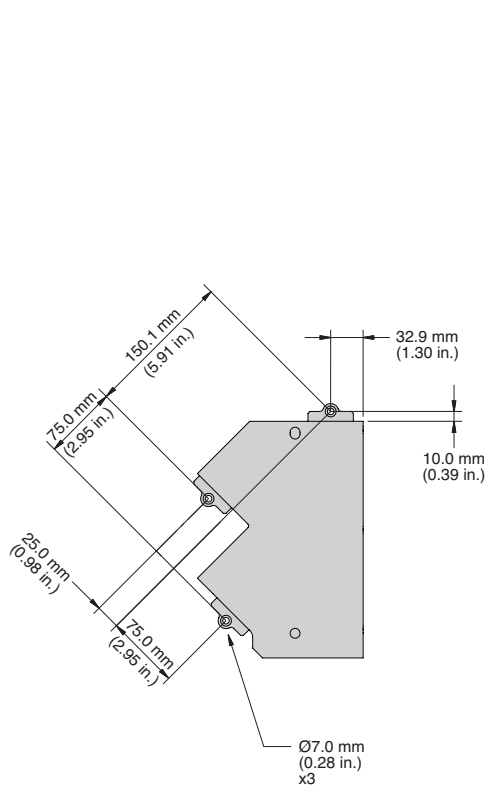


Fiber-to-Fiber Switch Air-Cooled (FFS ac)



Mechanical Specifications

Mounting Plates



Part Numbers

Fiber-to-Fiber Switch Water-Cooled (FFS wc)

Specifications					
Time Shared	Input Interface	Output Interface	M = 0.6	M = 1.0	M = 1.2
2-way	QBH-	QBH	2290984	2290985	2290986
		QD	2290987	2290988	2290989
	QD-	QD	2290996	2290997	2290998
		QBH	2290999	2291000	2291001
4-way	QBH-	QBH	2290990	2290991	2290992
		QD	2290993	2290994	2290995
	QD-	QD	2291002	2291003	2291004
		QBH	2291005	2291006	2291007

Note: LLK-B (Q5) interface and 1&3-ways FFS are available upon request.

Specifications					
Energy Shared	Input Interface	Output Interface	M = 0.6	M = 1.0	M = 1.2
2-way	QBH-	QBH	2291008	2291009	2291010
		QD	2291011	2291012	2291013
	QD-	QD	2291014	2291015	2291016
		QBH	2291017	2291018	2291019
4-way	QBH-	QBH	2291020	2291021	2291022
		QD	2291023	2291024	2291025
	QD-	QD	2291026	2291027	2291028
		QBH	2291029	2291030	2291031
4-way ES x2	QBH-	QBH	2291032	2291033	2291034
		QD	2291035	2291036	2291037
	QD-	QD	2291038	2291039	2291040
		QBH	2291041	2291042	2291043

Note: LLK-B (Q5) interface and 1&3-ways FFS are available upon request.

Part Numbers

Fiber-to-Fiber Switch Air-Cooled (FFS ac)

Specifications					
Time Shared	Input Interface	Output Interface	M = 0.6	M = 1.0	M = 1.2
2-way	QBH-	QBH	2291044	2291045	2291046
		QD	2291047	2291048	2291049
	QD-	QD	2291056	2291057	2291058
		QBH	2291059	2291060	2291061
4-way	QBH-	QBH	2291050	2291051	2291052
		QD	2291053	2291054	2291055
	QD-	QD	2291062	2291063	2291064
		QBH	2291065	2291066	2291067

Note: LLK-B (Q5) interface and 1&3-ways FFS are available upon request.

Accessories

Accessory	Part Number
FFBD cable MCX (and DLD), 1500 mm	1-5135X01
CAN-USB Adapter IXXAT	2-5022X01