▣ Fiber Optic Amplifier

Appearance	Characteristic	LED	Model	Power supply	Response speed	Control output	Reference
	Dual display type	Red	**BF5R-D1-N**	12-24VDC	Ultra fast mode (50μs), Fast mode (150μs), Standard mode (500μs), Long distance mode (4ms), Ultra long distance mode (10ms)	NPN open collector output	**B-9 to 26**
		Green	**BF5G-D1-N**				
		Blue	**BF5B-D1-N**				
		Red	**BF5R-D1-P**			PNP open collector output	
		Green	**BF5G-D1-P**				
		Blue	**BF5B-D1-P**				
	Single display type	Red	**BF5R-S1-N**		Fast mode (150μs), Standard mode (500μs), Long mode (4ms)	NPN open collector output	
		Red	**BF5R-S1-P**			PNP open collector output	
	Standard type	Red	**BF4R**		Max. 0.5ms (Frequency 1) Max.0.7ms (Frequency 2)	NPN open collector output	**B-33 to 40**
		Green	**BF4G**				
		Red	**BF4RP**			PNP open collector output	
		Green	**BF4GP**				
	External synchronization input type	Red	**BF4R-E**			NPN open collector output	
		Green	**BF4G-E**				
	Remote sensitivity setting type	Red	**BF4R-R**				
		Green	**BF4G-R**				
	Built-in twin adjuster type	Red	**BF3RX**		Max. 1ms	NPN open collector output	**B-41 to 44**
			BF3RX-P			PNP open collector output	

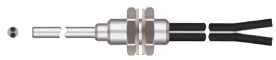
※Sensing type depends on the type of fiber cable.

▣ Fiber Optic Amplifier Communication Converter

Appearance	Characteristic	Model	Power supply	Communication speed	Control output	Reference
	Setting 32 fiber optic amplifier units simultaneously by communication converter	**BFC-N**	12-24VDC	1200, 2400, 4800, 9600, 19200, 38400bps	NPN open collector output	**B-27 to 32**
		BFC-P			PNP open collector output	

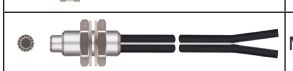
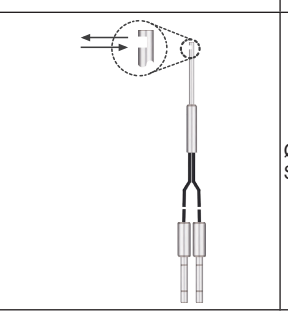
※Connectable fiber optic amplifier unit: BF5 Series

▣ Fiber Optic Cable (Diffuse Reflective Type)

Type		Appearance	Feature	Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference
Bolt type	Standard type		M3	40※2	1m (Free cut)	**FD-310-05**	B-45 to 53
			M3	40※2	2m (Free cut)	**FD-320-05**	
			M4			**FD-420-05**	
			M3 (SUS type, 90mm)	40※2	2m (Free cut)	**FDS-320-05**	
			M3 (SUS type, 45mm)			**FDS2-320-05**	
			M4 (SUS type, 90mm)			**FDS-420-05**	
			M4 (SUS type, 45mm)			**FDS2-420-05**	
			M6	120※2	2m (Free cut)	**FD-620-10**	
			M6 (SUS type, 90mm)	120※2	2m (Free cut)	**FDS-620-10**	
			M6 (SUS type, 45mm)			**FDS2-620-10**	
	Heat-resistant type		M6	120※2	2m (Free cut)	**FD-620-10H**	
			M6	160※2	2m (Free cut)	**FD-620-15H1**	
			M4 (Glass type)	100※2	2m	**GD-420-20H2**	
			M6 (Glass type)			**GD-620-20H2**	
	Flexible type※3		M3	35※1	2m (Free cut)	**FD-320-05R**	
			M4			**FD-420-05R**	
			M6	130※1	2m (Free cut)	**FD-620-10R**	
	Break-resistant type※3		M3	35※2	2m (Free cut)	**FD-320-06B**	
			M4			**FD-420-06B**	
			M6	100※2	2m (Free cut)	**FD-620-13B**	

※1: The sensing distance is a standard for BF5 Series.
※2: The sensing distance is a standard for red LED of BF4 Series and 10% of red LED is applied when it is green LED.
It is applied to 40% of sensing distance for BF3RX.
※3: • **Flexible optical fiber (Multi core):** A large number of ultra-fine cores are all surrounded by cladding. Easy to install it in the many places as the change of the intensity of radiation by bending is small.
• **Break-resistant optical fiber:** The fiber units contain a large number of independent fine fibers, by ensuring a high degree of flexibility. It can be used for moving parts (robot hand) and it is not easily broken.
※Free cut type's sensing distance can be shortened about max. 20% than the normal according to condition of the cable.
[(FC-3) should be used for cutting fiber cable.]
※Glass type is for BF5, BF4 Series.

■ Fiber Optic Cable (Diffuse Reflective Type)

Type		Appearance	Feature	Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference
Bolt type	Coaxial type		M3	40※2	2m (Free cut)	**FD-320-F**	**B-45 to 53**
			M3	60※2	2m (Free cut)	**FD-320-F1**	
			M6	120※2	2m (Free cut)	**FD-620-F2**	
Cylinder type	Standard type		Ø3mm	40※2	2m (Free cut)	**FDC-320-05**	
			Ø3mm (SUS type, 15mm)	40※2	2m (Free cut)	**FDCS-320-05**	
	Break-resistant type※3		Ø3mm	35※2	2m (Free cut)	**FDC-320-06B**	
	Standard type		Ø3mm Side view	30※1	2m	**FDCSN-320-05**	
Flat type	Flexible type		Top view	35※1	1m (Free cut)	**FDFU-210-05R**	
			Side view	30※1	1m (Free cut)	**FDFN-210-05R**	
			Flat view	30※1	1m (Free cut)	**FDF-210-05R**	
Right angle	Flexible type		M6	120※1	1m (Free cut)	**FDR-610-10R**	
Plastic	Standard type		Plastic injection molding type	120※2	2m (Free cut)	**FDP-320-10**	

■ Fiber Optic Cable (Convergent Reflective Type)

Type		Appearance	Feature	Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference
Flat type	Standard type		Convergent reflective type	8※1	2m	**FLF-320-10**	**B-45 to 53**

※1: The sensing distance is a standard for BF5 Series.

※2: The sensing distance is a standard for red LED of BF4 Series and 10% of red LED is applied when it is green LED.
It is applied to 40% of sensing distance for BF3RX.

※3: • **Break-resistant optical fiber:** The fiber units contain a large number of independent fine fibers, by ensuring a high degree of flexibility. It can be used for moving parts (robot hand) and it is not easily broken.

※Free cut type's sensing distance can be shortened about max. 20% than the normal according to condition of the cable.
[(FC-3) should be used for cutting fiber cable.]

▣ Fiber Optic Cable (Through-Beam Type)

Type		Appearance	Feature	Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference
Bolt type	Standard type		M3	150※2	1m (Free cut)	**FT-310-05**	**B-45 to 53**
			M3	150※2	2m (Free cut)	**FT-320-05**	
			M3 (SUS type, 90mm)	150※2	2m (Free cut)	**FTS-320-05**	
			M3 (SUS type, 45mm)			**FTS1-320-05**	
			M3 (SUS type, 45mm)			**FTS2-320-05**	
			M4	500※2	2m (Free cut)	**FT-420-10**	
			M4 (SUS type, 90mm)	500※2	2m (Free cut)	**FTS-420-10**	
			M4 (SUS type, 45mm)	500※2	2m (Free cut)	**FTS2-420-10**	
	Heat-resistant type		M4	300※2	2m (Free cut)	**FT-420-10H**	
			M4	500※2	2m (Free cut)	**FT-420-15H1**	
			M4 (Glass type)	400※2	2m	**GT-420-13H2**	
	Flexible type※3		M3	110※1	2m (Free cut)	**FT-320-05R**	
			M4	500※1	2m (Free cut)	**FT-420-10R**	
	Break-resistant type※3		M3	110※2	2m (Free cut)	**FT-320-06B**	
			M4	400※2	2m (Free cut)	**FT-420-13B**	
Cylinder type	Standard type		Ø1.5mm	150※2	2m (Free cut)	**FTC-1520-05**	
			Ø2mm	150※2	2m (Free cut)	**FTC-220-05**	
			Ø2mm (SUS type, 15mm)	150※2	2m (Free cut)	**FTCS-220-05**	
			Ø3mm	150※2	2m (Free cut)	**FTC-320-10**	

※1: The sensing distance is a standard for BF5 Series.

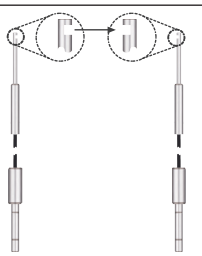
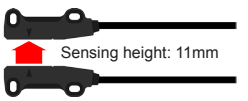
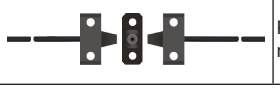
※2: The sensing distance is a standard for red LED of BF4 Series and 10% of red LED is applied when it is green LED.
It is applied to 40% of sensing distance for BF3RX.

※3: • **Flexible optical fiber (Multi core):** A large number of ultra-fine cores are all surrounded by cladding. Easy to install it in the many places as the change of the intensity of radiation by bending is small.
• **Break-resistant optical fiber:** The fiber units contain a large number of independent fine fibers, by ensuring a high degree of flexibility. It can be used for moving parts (robot hand) and it is not easily broken.

※Free cut type's sensing distance can be shortened about max. 20% than the normal according to condition of the cable.
[(FC-3) should be used for cutting fiber cable.]

※FT-420-13 was discontinued. FT-420-13B is replacement.

▣ Fiber Optic Cable (Through-Beam Type)

Type		Appearance	Feature	Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference
Cylinder type	Flexible type※3		Ø3mm	110※1	2m (Free cut)	**FTC-220-05R**	B-45 to 53
	Break-resistant type※3		Ø3mm	110※1	2m (Free cut)	**FTC-1520-06B**	
	Standard type		Ø2.47mm Side view	120※1	2m	**FTCSN-2520-05**	
Flat type	Flexible type		Top view	110※1	1m (Free cut)	**FTFU-210-05R**	
			Side view	110※1	1m (Free cut)	**FTFN-210-05R**	
			Flat view	100※1	1m (Free cut)	**FTF-210-05R**	
			Side view+ Top view (Bending)	110※1	1m (Free cut)	**FTFB-210-05R**	
			L type top view height 12.2mm	500※1	1m (Free cut)	**FTLU-310-10R**	
			L type top view height 17.2mm			**FTLU1-310-10R**	
			L type top view height 22.2mm			**FTLU2-310-10R**	
Right angle	Flexible type		M4	460※1	1m (Free cut)	**FTR-410-10R**	
Area type	Flexible type		Ø1mm	750※4	1m (Free cut)	**FTW11-210-10R**	
Plastic	Standard type		Plastic injection molding type	500※2	2m (Free cut)	**FTP-320-10**	

※1: The sensing distance is a standard for BF5 Series.
※2: The sensing distance is a standard for red LED of BF4 Series and 10% of red LED is applied when it is green LED.
It is applied to 40% of sensing distance for BF3RX.
※3: • **Flexible optical fiber (Multi core):** A large number of ultra-fine cores are all surrounded by cladding. Easy to install it in the many places as the change of the intensity of radiation by bending is small.
• **Break-resistant optical fiber:** The fiber units contain a large number of independent fine fibers, by ensuring a high degree of flexibility. It can be used for moving parts (robot hand) and it is not easily broken.
※4: The sensing distance is a standard for BF5 Series, and it is varied by operation mode.
(Ultra fast mode: 450mm / Fast mode: 750mm / Standard mode: 1400mm / Long distance mode, Ultra long distance mode: 1800mm)
※Free cut type's sensing distance can be shortened about max. 20% than the normal according to condition of the cable.
[(FC-3) should be used for cutting fiber cable.]