## **■** Fiber Optic Amplifier

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

XSensing type depends on the type of fiber cable.

# ■ Fiber Optic Amplifier Communication Converter

Appearance	Characteristic	Model	Power supply	Communication speed	Control output	Reference
(2) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	Setting 32 fiber optic amplifier	BFC-N	12-24VDC		NPN open collector output	B-27 to 32
	units simultaneously by communication converter	BFC-P	12-24VDC		PNP open collector output	B-27 to 32

XConnectable fiber optic amplifier unit: BF5 Series

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(A) Photoelectric Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(F) Rotary Encoders

(G) Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets

(I) SSRs / Power Controllers

(J) Counters

(M) Tacho / Speed / Pulse Meters

(N) Display Units

(O) Sensor Controllers

(P) Switching Mode Power Supplies

(Q) Stepper Motors & Drivers & Controllers

(R) Graphic/ Logic Panels

## **■** Fiber Optic Cable (Diffuse Reflective Type)

Ту	ре	Appearance	Feature	Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference
		• =====================================	М3	(F	1m (Free cut)	FD-310-05	
		• =====================================	M3		2m	FD-320-05	
		•	M4	40	(Free cut)	FD-420-05	
			M3 (SUS type, 90mm)			FDS-320-05	
	Standard type		M3 (SUS type, 45mm)	40 <sup>×2</sup>	2m	FDS2-320-05	
	Standa		M4 (SUS type, 90mm)	40	(Free cut)	FDS-420-05	
			M4 (SUS type, 45mm)			FDS2-420-05	
		•	M6	120 <sup>**2</sup>	2m (Free cut)	FD-620-10	
			M6 (SUS type, 90mm)	120*2	2m	FDS-620-10	
		• == #	M6 (SUS type, 45mm)	120	(Free cut)	FDS2-620-10	
Bolt type	0	•	M6	120 <sup>**2</sup>	2m (Free cut)	FD-620-10H	– B-45 to 53
Bolt	tant typ	• -	M6	160 <sup>×2</sup>	2m (Free cut)	FD-620-15H1	
	Heat-resistant type	000000	M4 (Glass type)	100 <sup>*2</sup>	2m	GD-420-20H2	
		00000	M6 (Glass type)	100	2111	GD-620-20H2	
	* * *	• =	М3	35 <sup>×1</sup>	2m	FD-320-05R	
	Flexible type**3	•	M4		(Free cut)	FD-420-05R	
	Flex	• -	М6	130 <sup>×1</sup>	2m (Free cut)	FD-620-10R	
	Break-resistant type*3	• 🍿	МЗ		2m	FD-320-06B	
		•	M4	35 <sup>×2</sup>	(Free cut)	FD-420-06B	
	Break⊦	• -	M6	100 <sup>×2</sup>	2m (Free cut)	FD-620-13B	

X1: 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.

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## ■ Fiber Optic Cable (Diffuse Reflective Type)

				Sensing distance (mm)	Cable		D (
Ту	pe	Appearance	Feature	(based on Non-glossy white paper)	length (L)	Model	Reference
Ф	,be	+ =	M3	40 <sup>*2</sup>	2m (Free cut)	FD-320-F	
Bolt type	Coaxial type	• •	M3	60 <sup>×2</sup>	2m (Free cut)	FD-320-F1	
ğ	Coa	•	M6	120 <sup>*2</sup>	2m (Free cut)	FD-620-F2	
	Standard type	• ====	Ø3mm	40*2	2m (Free cut)	FDC-320-05	
		•	Ø3mm (SUS type, 15mm)	40*2	2m (Free cut)	FDCS-320-05	
ф	Break-resistant type *3	•	Ø3mm	35 <sup>×2</sup>	2m (Free cut)	FDC-320-06B	
Cylinder type	Standard type		Ø3mm Side view	30 <sup>×1</sup>	2m	FDCSN-320-05	B-45 to 53
	0		Top view	35 <sup>*1</sup>	1m (Free cut)	FDFU-210-05R	
Flat type	Flexible type	• •	Side view	30 <sup>**1</sup>	1m (Free cut)	FDFN-210-05R	
Ĕ	Flex	0	Flat view	30 <sup>×1</sup>	1m (Free cut)	FDF-210-05R	
Right	Flexible type	• 1	M6	120 <sup>×1</sup>	1m (Free cut)	FDR-610-10R	
Plastic	Standard type	. :	Plastic injection molding type	120 <sup>×2</sup>	2m (Free cut)	FDP-320-10	

### ■ Fiber Optic Cable (Convergent Reflective Type)

		•	•	<b>31</b> /			
Туј	pe	Appearance		Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference
Flat type	Standard type		Convergent reflective type	<b>■</b> 8 <sup>×1</sup>	2m	FLF-320-10	B-45 to 53

X1: The sensing distance is a standard for BF5 Series.

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<sup>※2:</sup> 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.

<sup>\*\*</sup>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)

■ Fiber Optic Cable (Through-Beam Type)										
Ту	ре	Appearance	Feature	Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference			
			M3	150 <sup>*2</sup>	1m (Free cut)	FT-310-05				
			M3	150 <sup>*2</sup>	2m (Free cut)	FT-320-05				
			M3 (SUS type, 90mm)			FTS-320-05				
	Standard type	—=   =	M3 (SUS type, 45mm)	150 <sup>*2</sup>	2m (Free cut)	FTS1-320-05				
	Standa		M3 (SUS type, 45mm)			FTS2-320-05				
			M4	500 <sup>×2</sup>	2m (Free cut)	FT-420-10				
			M4 (SUS type, 90mm)	500 <sup>*2</sup>	2m (Free cut)	FTS-420-10				
ype			M4 (SUS type, 45mm)	500 <sup>*2</sup>	2m (Free cut)	FTS2-420-10				
Bolt type	type		M4	300 <sup>×2</sup>	2m (Free cut)	FT-420-10H				
	Heat-resistant type		M4	500 <sup>*2</sup>	2m (Free cut)	FT-420-15H1				
	Heat-		M4 (Glass type)	400 <sup>*2</sup>	2m	GT-420-13H2	B-45 to 53			
	Flexible type ***		М3	110 <sup>*1</sup>	2m (Free cut)	FT-320-05R				
	Fle		M4	500 <sup>×1</sup>	2m (Free cut)	FT-420-10R				
	Break-resistant type <sup>®3</sup>		М3	110 <sup>×2</sup>	2m (Free cut)	FT-320-06B				
	Break-re type		M4	400 <sup>×2</sup>	2m (Free cut)	FT-420-13B				
			Ø1.5mm	150 <sup>%2</sup>	2m (Free cut)	FTC-1520-05				
Cylinder type	rd type		Ø2mm	150 <sup>%2</sup>	2m (Free cut)	FTC-220-05				
	Standard type		Ø2mm (SUS type, 15mm)	150 <sup>×2</sup>	2m (Free cut)	FTCS-220-05				
			Ø3mm	150 <sup>%2</sup>	2m (Free cut)	FTC-320-10				

 $\ensuremath{\,\mathbb{X}}$  1: The sensing distance is a standard for BF5 Series.

- - 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.

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

Pressure Sensors

(F) Rotary Encoders

(G) Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets

(H) Temperature Controllers

(I) SSRs / Power Controllers

(J) Counters

(L) Panel Meters

(M) Tacho / Speed / Pulse Meters

Display Units

(O) Sensor Controllers

(P) Switching Mode Power Supplies (Q) Stepper Motors

& Drivers & Controllers

(R) Graphic/ Logic Panels (S) Field

Field Network Devices

(T) Software

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<sup>%2:</sup> 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.

#### **■** Fiber Optic Cable (Through-Beam Type)

Ту	ре	Appearance	Feature	Sensing distance (mm) (based on Non-glossy white paper)	Cable length (L)	Model	Reference
	Flexible type *3	=:	Ø3mm	110 <sup>*1</sup>	2m (Free cut)	FTC-220-05R	
ype	Break-resistant Flexible type *3		Ø3mm	110 <sup>×1</sup>	2m (Free cut)	FTC-1520-06B	
Cylinder type	Standard type		Ø2.47mm Side view	120 <sup>×1</sup>	2m	FTCSN-2520-05	
			Top view	110 <sup>*1</sup>	1m (Free cut)	FTFU-210-05R	
		00	Side view	110 <sup>×1</sup>	1m (Free cut)	FTFN-210-05R	
	e e	0	Flat view	100 <sup>×1</sup>	1m (Free cut)	FTF-210-05R	B-45 to 53
Flat type	Flexible type	0	Side view+ Top view (Bending)	110 <sup>×1</sup>	1m (Free cut)	FTFB-210-05R	
			L type top view height 12.2mm			FTLU-310-10R	
			L type top view height 17.2mm	500 <sup>*1</sup>	1m (Free cut)	FTLU1-310-10R	
			L type top view height 22.2mm			FTLU2-310-10R	
Right	Flexible type	(a) (b)	M4	460 <sup>*1</sup>	1m (Free cut)	FTR-410-10R	
Area type	Flexible type	Sensing height: 11mm	Ø1mm	750*4	1m (Free cut)	FTW11-210-10R	
Plastic	Standard type		Plastic injection molding type	\$ 500 <sup>×2</sup>	2m (Free cut)	FTP-320-10	

 $<sup>\</sup>ensuremath{\mathbb{X}}$ 1: The sensing distance is a standard for BF5 Series.

X2: 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.

 <sup>#3: •</sup> 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.

<sup>•</sup> 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.

X4: The sensing distance is a standard for BF5 Series, and it is varied by operation mode.

<sup>(</sup>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.]