



Fiber Optic Sensors

Digital Display, Fiber Optic Amplifier / High Performance, Fiber Optic Amplifier /

Series	Type	Light Source	Response Time	Power Supply	Current Consumption	Operation Mode	Control Output	
Digital Display, Fiber Optic Amplifier BF5 Series <BF5-D>  W10×H30×L70mm <BF5-S>  W10×H30×L70mm	Dual display	Red LED (660nm)	50μs, 150μs, 500μs, 4ms, 10ms	12-24VDC	Max. 50mA	Light ON/Dark ON (set by parameter)	NPN open collector	
			Green LED (530nm)	50μs, 150μs, 500μs, 4ms, 10ms	12-24VDC	Max. 50mA	Light ON/Dark ON (set by parameter)	PNP open collector
			Blue LED (470nm)	50μs, 150μs, 500μs, 4ms, 10ms	12-24VDC	Max. 50mA	Light ON/Dark ON (set by parameter)	NPN open collector
	Single display		Red LED (660nm)	150μs, 500μs, 4ms	12-24VDC	Max. 50mA	Light ON/Dark ON (set by parameter)	PNP open collector
								NPN open collector

High Performance, Fiber Optic Amplifier BF4 Series  W12×H32.8×L62mm	Standard type	Red LED (660nm)	Frequency 1 : Max. 0.5ms Frequency 2 : Max. 0.7ms	12-24VDC	Max. 45mA	Light ON/Dark ON (set by ON/OFF button)	NPN open collector
			Green LED (525nm)	Frequency 1 : Max. 0.5ms Frequency 2 : Max. 0.7ms	12-24VDC	Max. 45mA	Light ON/Dark ON (set by ON/OFF button)
	External synchro. type	Red LED (660nm)	Frequency 1 : Max. 0.5ms Frequency 2 : Max. 0.7ms	12-24VDC	Max. 45mA	Light ON/Dark ON (set by ON/OFF button)	NPN open collector
		Green LED (525nm)	Frequency 1 : Max. 0.5ms Frequency 2 : Max. 0.7ms	12-24VDC	Max. 45mA	Light ON/Dark ON (set by ON/OFF button)	PNP open collector
	External input sensitivity setting type	Red LED (660nm)	Frequency 1 : Max. 0.5ms Frequency 2 : Max. 0.7ms	12-24VDC	Max. 45mA	Light ON/Dark ON (set by ON/OFF button)	NPN open collector
		Green LED (525nm)	Frequency 1 : Max. 0.5ms Frequency 2 : Max. 0.7ms	12-24VDC	Max. 45mA	Light ON/Dark ON (set by ON/OFF button)	PNP open collector

General-Purpose, Fiber Optic Amplifier BF3 Series  W15×H38.9×L69.1mm	Built-in twin volume type	Red LED (660nm)	Max. 1ms	12-24VDC	Max. 40mA	Light ON/Dark ON (set by control wire)	NPN open collector
							PNP open collector

Series	Type	Power Supply	Communication	Communication Speed	Input
Communication Converter for Fiber Optic Amplifier BFC Series ^{※1}  W10×H30×L70mm	Communication converter for fiber optic amplifier	12-24VDC ^{※2}	RS485 communication, Serial communication, SW input	1200, 2400, 4800, 9600, 19200, 38400bps	NPN solid-state
					PNP solid-state
















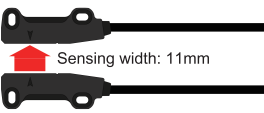
※1. BFC is communication converter only for fiber optic amplifier, BF5 Series.

※2. BFC power is from the connected amplifier unit via side connector.

Timer Function	Sensitivity Setting	Environment		Protection Structure	Approval	Model
		Ambient Illumination	Ambient Temperature			
OFF, OFF Delay, ON Delay, One-shot (1 to 5000ms)	Manual sensitivity setting Teaching sensitivity setting (auto-tuning, 1-point, 2-point, positioning)	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000 (received illumination)	-10 to 50°C	IP40	CE	BF5R-D1-N
						BF5R-D1-P
OFF, OFF Delay, ON Delay, One-shot (1 to 5000ms)	Manual sensitivity setting Teaching sensitivity setting (auto-tuning, 1-point, 2-point, positioning)	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	IP40	CE	BF5G-D1-N
						BF5G-D1-P
OFF, OFF Delay, ON Delay, One-shot (1 to 5000ms)	Manual sensitivity setting Teaching sensitivity setting (auto-tuning, 1-point, 2-point, positioning)	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	IP40	CE	BF5B-D1-N
						BF5B-D1-P
OFF, OFF Delay (10ms, 40ms)	Manual sensitivity setting Teaching sensitivity setting (auto-tuning)	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	IP40	CE	BF5R-S1-N
						BF5R-S1-P
OFF Delay (40ms)	Manual sensitivity setting	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	—	CE	BF4R
						BF4RP
OFF Delay (40ms)	Manual sensitivity setting	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	—	CE	BF4G
						BF4GP
—	Manual sensitivity setting	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	—	CE	BF4R-E
						BF4G-E
OFF Delay (40ms)	Manual sensitivity setting External input sensitivity setting (SW1, SW2)	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	—	CE	BF4R-R
						BF4G-R
—	Built-in VR (coarse adjustment, fine adjustment)	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	—	—	BF3RX
—	Built-in VR (coarse adjustment, fine adjustment)	Sunlight : Max. 11,000lx Incandescent lamp : Max. 3,000lx (received illumination)	-10 to 50°C	—	—	BF3RX-P
Application		Ambient Temperature	Protection Structure	Approval	Model	
BFC Series makes for 32 units of fiber optic amplifier, BF5 Series, to connect. BFC Series helps for BF5 Series to execute all functions, to set parameters, to monitor real-time data (received light level, output status) via external device (PC, PLC, etc.).		-10 to 50°C	IP40	CE	BFC-N	
					BFC-P	

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Through-Beam Type										
Appearance	Type	Sensing Distance (mm)	Min. Sensing Target (mm) ^{※3}	Allowable Bend Radius	Cable Length (m)	Free cut ^{※4}	Adapter	Ambient Temperature	Model	
	Flexible type	Flat type / Top view	110 ^{※1}	Ø0.04	R1	1	●	●	-40 to 60°C	FTFU-210-05R
		Flat type / Side view	110 ^{※1}	Ø0.04	R1	1	●	●	-40 to 60°C	FTFN-210-05R
		Flat type / Flat view	100 ^{※1}	Ø0.04	R1	1	●	●	-40 to 60°C	FTF-210-05R
		Flat type / Top view+ Side view	110 ^{※1}	Ø0.04	R1	1	●	●	-40 to 60°C	FTFB-210-05R
		Integrated bracket type (L type) / Top view	500 ^{※1}	Ø0.06	R1	1	●	—	-40 to 60°C	FTLU-310-10R
			500 ^{※1}	Ø0.06	R1	1	●	—	-40 to 60°C	FTLU1-310-10R
			500 ^{※1}	Ø0.06	R1	1	●	—	-40 to 60°C	FTLU2-310-10R
		M3 bolt	110 ^{※1}	Ø0.3	R1	2	●	●	-40 to 60°C	FT-320-05R
		Ø2 cylinder type	110 ^{※1}	Ø0.3	R1	2	●	●	-40 to 60°C	FTC-220-05R
		M4 bolt	500 ^{※1}	Ø0.5	R1	2	●	—	-40 to 60°C	FT-420-10R
	Break-resistant type	M3 bolt	110 ^{※2}	Ø0.3	R5	2	●	●	-40 to 60°C	FT-320-06B
		Ø1.5 cylinder type	110 ^{※2}	Ø0.3	R5	2	●	●	-40 to 60°C	FTC-1520-06B
		M4 bolt	400 ^{※2}	Ø0.6	R5	2	●	—	-40 to 60°C	FT-420-13B
	Heat-resistant type	M4 bolt	300 ^{※2}	Ø1	R30	2	●	—	-40 to 105°C	FT-420-10H
		M4 bolt	500 ^{※2}	Ø1	R50	2	●	—	-40 to 150°C	FT-420-15H1
		M4 bolt / glass type ^{※5}	400 ^{※2}	Ø1	R25	2	—	—	-40 to 250°C	GT-420-13H2
	Flexible type	M4 bolt / Right angle	460 ^{※1}	Ø0.5	R1	1	●	—	-40 to 60°C	FTR-410-10R
	Flexible type	Area type	750 ^{※6}	Ø0.07	R2	1	●	—	-40 to 60°C	FTW11-210-10R

※1. The sensing distance is based on BF5 Series.

※2. The sensing distance is based on red light of BF4 Series. In case of green light, apply 10% value of the red light value. In case of BF3 Series, apply 40% of the sensing distance.

※3. Min. sensing target is based on max. sensitivity. The sensing distance is not same with the rated sensing distance.

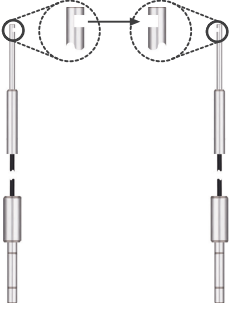













※4. In case of free-cut type model, the sensing distance may be shorten up to 20% due to fiber cutting side status. (use the dedicated fiber cutter (FC-3) for free-cut type.)

※5. The glass type model is only for BF5 Series, BF4 Series.

※6. 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)

Through-Beam Type

Appearance	Type	Sensing Distance (mm)	Min. Sensing Target (mm) ^{※3}	Allowable Bend Radius	Cable Length (m)	Free cut ^{※4}	Adapter	Ambient Temperature	Model
	Standard type Ø2.47 cylinder type / Side view	120 ^{※1}	Ø0.0125	R15	2	—	—	-40 to 60°C	FTCSN-2520-05
	M3 bolt	150 ^{※2}	Ø0.5	R15	1	●	●	-40 to 70°C	FT-310-05
	M3 bolt	150 ^{※2}	Ø0.5	R15	2	●	●	-40 to 70°C	FT-320-05
	Ø1.5 cylinder type	150 ^{※2}	Ø0.5	R15	2	●	●	-40 to 70°C	FTC-1520-05
	Ø2 cylinder type	150 ^{※2}	Ø0.5	R15	2	●	●	-40 to 70°C	FTC-220-05
	Ø2 cylinder type (SUS type, 15mm)	150 ^{※2}	Ø0.5	R15 (SUS part 2 10R)	2	●	●	-40 to 70°C	FTCS-220-05
	M3 bolt (SUS type, 90mm)	150 ^{※2}	Ø0.5	R15 (SUS part 2 10R)	2	●	●	-40 to 70°C	FTS-320-05
	M3 bolt (SUS type, 35mm)	150 ^{※2}	Ø0.5	R15 (SUS part 2 10R)	2	●	●	-40 to 70°C	FTS1-320-05
	M3 bolt (SUS type, 45mm)	150 ^{※2}	Ø0.5	R15 (SUS part 2 10R)	2	●	●	-40 to 70°C	FTS2-320-05
	M4 bolt	500 ^{※2}	Ø1	R30	2	●	—	-40 to 70°C	FT-420-10
	Ø3 cylinder type	500 ^{※2}	Ø1	R30	2	●	—	-40 to 70°C	FTC-320-10
	Plastic	500 ^{※2}	Ø1	R30	2	●	—	-40 to 70°C	FTP-320-10
	M4 bolt (SUS type, 90mm)	500 ^{※2}	Ø1	R30 (SUS part 2 10R)	2	●	—	-40 to 70°C	FTS-420-10
	M4 bolt (SUS type, 45mm)	500 ^{※2}	Ø1	R30 (SUS part 2 10R)	2	●	—	-40 to 70°C	FTS2-420-10

※1. The sensing distance is based on BF5 Series.



















※2. The sensing distance is based on red light of BF4 Series. In case of green light, apply 10% value of the red light value. In case of BF3 Series, apply 40% of the sensing distance.

※3. Min. sensing target is based on max. sensitivity. The sensing distance is not same with the rated sensing distance.

※4. In case of free-cut type model, the sensing distance may be shorten up to 20% due to fiber cutting side status. (use the dedicated fiber cutter (FC-3) for free-cut type.)

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Diffuse Reflective Type										
Appearance	Type	Sensing Distance (mm)	Min. Sensing Target (mm) ^{※3}	Allowable Bend Radius	Cable Length (m)	Free cut ^{※4}	Adapter	Ambient Temperature	Model	
	Flexible type	Flat type / Top view	35 ^{※1}	Ø0.0125	R1	1	●	●	-40 to 60°C	DFDU-210-05R
		Flat type / Side view	30 ^{※1}	Ø0.0125	R1	1	●	●	-40 to 60°C	DFDN-210-05R
		Flat type / Flat view	30 ^{※1}	Ø0.0125	R1	1	●	●	-40 to 60°C	FDF-210-05R
		M3 bolt	35 ^{※1}	Ø0.0125	R1	2	●	●	-40 to 60°C	FD-320-05R
		M4 bolt	35 ^{※1}	Ø0.0125	R1	2	●	●	-40 to 60°C	FD-420-05R
		M6 bolt	130 ^{※1}	Ø0.04	R1	2	●	—	-40 to 60°C	FD-620-10R
	Break-resistant type	M3 bolt	35 ^{※2}	Ø0.0125	R5	2	●	●	-40 to 60°C	FD-320-06B
		Ø3 cylinder type	35 ^{※2}	Ø0.0125	R5	2	●	●	-40 to 60°C	FDC-320-06B
		M4 bolt	35 ^{※2}	Ø0.0125	R5	2	●	●	-40 to 60°C	FD-420-06B
		M6 bolt	100 ^{※2}	Ø0.0125	R5	2	●	—	-40 to 60°C	FD-620-13B
	Coaxial type	M3 bolt	40 ^{※2}	Ø0.03	R15	2	●	●	-40 to 70°C	FD-320-F
		M3 bolt	60 ^{※2}	Ø0.03	R15	2	●	●	-40 to 70°C	FD-320-F1
		M6 bolt	120 ^{※2}	Ø0.03	R30	2	●	—	-40 to 70°C	FD-620-F2
	Heat-resistant type	M6 bolt	120 ^{※2}	Ø0.03	R30	2	●	—	-40 to 105°C	FD-620-10H
		M6 bolt	160 ^{※2}	Ø0.03	R50	2	●	—	-40 to 150°C	FD-620-15H1
		M4 bolt / glass type ^{※5}	100 ^{※2}	Ø0.03	R50	2	—	—	-40 to 250°C	GD-420-20H2
		M6 bolt / glass type ^{※5}	100 ^{※2}	Ø0.03	R50	2	—	—	-40 to 250°C	GD-620-20H2
	Flexible type	M6 bolt / Right angle	120 ^{※1}	Ø0.04	R1	1	●	—	-40 to 60°C	FDR-610-10R

※1. The sensing distance is based on BF5 Series.

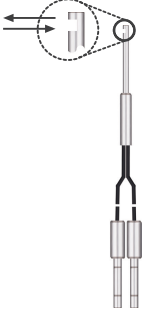













※2. The sensing distance is based on red light of BF4 Series. In case of green light, apply 10% value of the red light value. In case of BF3 Series, apply 40% of the sensing distance.

※3. Min. sensing target is based on max. sensitivity. The sensing distance is not same with the rated sensing distance.


※4. In case of free-cut type model, the sensing distance may be shorten up to 20% due to fiber cutting side status. (use the dedicated fiber cutter (FC-3) for free-cut type.)

※5. The glass type model is only for BF5 Series, BF4 Series.

Diffuse Reflective Type

Appearance	Type	Sensing Distance (mm)	Min. Sensing Target (mm) ^{※3}	Allowable Bend Radius	Cable Length (m)	Free cut ^{※4}	Adapter	Ambient Temperature	Model	
	Standard type Ø3 cylinder type / Side view	30 ^{※1}	Ø0.0125	R15	2	—	—	-40 to 60°C	FDCSN-320-05	
	Standard type	M3 bolt	40 ^{※2}	Ø0.03	R15	1	●	●	-40 to 70°C	FD-310-05
		M3 bolt	40 ^{※2}	Ø0.03	R15	2	●	●	-40 to 70°C	FD-320-05
		M4 bolt	40 ^{※2}	Ø0.03	R15	2	●	●	-40 to 70°C	FD-420-05
		Ø3 cylinder type	40 ^{※2}	Ø0.03	R15	2	●	●	-40 to 70°C	FDC-320-05
		Ø3 cylinder type (SUS type, 15mm)	40 ^{※2}	Ø0.03	15R (SUS part 10R)	2	●	●	-40 to 70°C	FDCS-320-05
		M3 bolt (SUS type, 90mm)	40 ^{※2}	Ø0.03	15R (SUS part 10R)	2	●	●	-40 to 70°C	FDS-320-05
		M3 bolt (SUS type, 45mm)	40 ^{※2}	Ø0.03	15R (SUS part 10R)	2	●	●	-40 to 70°C	FDS2-320-05
		M4 bolt (SUS type, 90mm)	40 ^{※2}	Ø0.03	15R (SUS part 10R)	2	●	●	-40 to 70°C	FDS-420-05
		M4 bolt (SUS type, 45mm)	40 ^{※2}	Ø0.03	15R (SUS part 10R)	2	●	●	-40 to 70°C	FDS2-420-05
		M6 bolt	120 ^{※2}	Ø0.03	R30	2	●	—	-40 to 70°C	FD-620-10
		M6 bolt (SUS type, 90mm)	120 ^{※2}	Ø0.03	R30 (SUS part 10R)	2	●	—	-40 to 70°C	FDS-620-10
		M6 bolt (SUS type, 45mm)	120 ^{※2}	Ø0.03	R30 (SUS part 10R)	2	●	—	-40 to 70°C	FDS2-620-10
		Plastic	120 ^{※2}	Ø0.03	R30	2	●	—	-40 to 70°C	FDP-320-10

Convergent Reflective Type

Appearance	Type	Sensing Distance (mm)	Min. Sensing Target (mm) ^{※3}	Allowable Bend Radius	Cable Length (m)	Free cut	Adapter	Ambient Temperature	Model
	Convergent type	8 ^{※1}	Ø0.0125	R25	2	—	—	-40 to 60°C	FLF-320-10

- ※1. The sensing distance is based on BF5 Series.
- ※2. The sensing distance is based on red light of BF4 Series. In case of green light, apply 10% value of the red light value. In case of BF3 Series, apply 40% of the sensing distance.
- ※3. Min. sensing target is based on max. sensitivity. The sensing distance is not same with the rated sensing distance.
- ※4. In case of free-cut type model, the sensing distance may be shorten up to 20% due to fiber cutting side status. (use the dedicated fiber cutter (FC-3) for free-cut type.)