












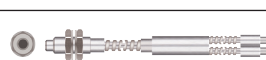








■ Diffuse Reflective Type

(based on Non-glossy white paper)

Type	Appearance	Feature	Sensing distance (mm)	Min. Sensing Target ^{※3}	Allowable Bend Radius	Cable length (L)	Ambient Temperature	Model
Bolt type	Standard type	 M3	40 ^{※2}	Ø0.03	R15	1m (Free cut)	-40 to 70°C	FD-310-05
		 M3	40 ^{※2}	Ø0.03	R15	2m (Free cut)	-40 to 70°C	FD-320-05
		 M4	40 ^{※2}	Ø0.03	R15	2m (Free cut)	-40 to 70°C	FD-420-05
		 M3 (SUS type, 90mm)	40 ^{※2}	Ø0.03	R15 (SUS part R10)	2m (Free cut)	-40 to 70°C	FDS-320-05
		 M3 (SUS type, 45mm)						FDS2-320-05
		 M4 (SUS type, 90mm)	40 ^{※2}	Ø0.03	R15 (SUS part R10)	2m (Free cut)	-40 to 70°C	FDS-420-05
		 M4 (SUS type, 45mm)						FDS2-420-05
	 M6	120 ^{※2}	Ø0.03	R30	2m (Free cut)	-40 to 70°C	FD-620-10	
	 M6 (SUS type, 90mm)	120 ^{※2}	Ø0.03	R30 (SUS part R10)	2m (Free cut)	-40 to 70°C	FDS-620-10	
							 M6 (SUS type, 45mm)	FDS2-620-10
	Heat-resistant type	 M6	120 ^{※2}	Ø0.03	R30	2m (Free cut)	-40 to 105°C	FD-620-10H
		 M6	160 ^{※2}	Ø0.03	R50	2m (Free cut)	-40 to 150°C	FD-620-15H1
		 M4 (Glass type)	100 ^{※2}	Ø0.03	R50	2m	-40 to 250°C	GD-420-20H2
		 M6 (Glass type)						GD-620-20H2
	Flexible type ^{※4}	 M3	35 ^{※1}	Ø0.0125	R1	2m (Free cut)	-40 to 60°C	FD-320-05R
 M4		FD-420-05R						
 M6		130 ^{※1}	Ø0.04	R1	2m (Free cut)	-40 to 60°C	FD-620-10R	
Break-resistant type ^{※4}	 M3	35 ^{※2}	Ø0.0125	R5	2m (Free cut)	-40 to 60°C	FD-320-06B	
	 M4						FD-420-06B	
	 M6	100 ^{※2}	Ø0.0125	R5	2m (Free cut)	-40 to 60°C	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: Min. sensing target is a value measured opaque material in accurate output status and the sensing distance is different with the rated sensing distance ※2.

※4: • **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.







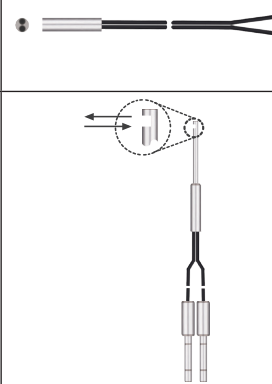





[(FC-3) should be used for cutting fiber cable.]

※Glass type is for BF5, BF4 Series.

Fiber Optic Cable


■ Diffuse Reflective Type

(based on Non-glossy white paper)

Type	Appearance	Feature	Sensing distance (mm)	Min. Sensing Target ^{※3}	Allowable Bend Radius	Cable length (L)	Ambient Temperature	Model	
Bolt type	Coaxial type		M3	40 ^{※2}	Ø0.03	R15	2m (Free cut)	-40 to 70°C	FD-320-F
			M3	60 ^{※2}	Ø0.03	R30	2m (Free cut)	-40 to 70°C	FD-320-F1
			M6	120 ^{※2}	Ø0.03	R30	2m (Free cut)	-40 to 70°C	FD-620-F2
Cylinder type	Standard type		Ø3mm	40 ^{※2}	Ø0.03	R15	2m (Free cut)	-40 to 70°C	FDC-320-05
			Ø3mm (SUS type, 15mm)	40 ^{※2}	Ø0.03	R15 (SUS part R10)	2m (Free cut)	-40 to 70°C	FDCS-320-05
	Break-resistant type ^{※4}		Ø3mm	35 ^{※2}	Ø0.0125	R5	2m (Free cut)	-40 to 60°C	FDC-320-06B
	Standard type		Ø3mm Side view	30 ^{※1}	Ø0.0125	R15	2m	-40 to 60°C	FDCSN-320-05
Flat type	Flexible type		Top view	35 ^{※1}	Ø0.0125	R1	1m (Free cut)	-40 to 60°C	FDFU-210-05R
			Side view	30 ^{※1}	Ø0.0125	R1	1m (Free cut)	-40 to 60°C	FDFN-210-05R
			Flat view	30 ^{※1}	Ø0.0125	R1	1m (Free cut)	-40 to 60°C	FDF-210-05R
Right angle	Flexible type		M6	120 ^{※1}	Ø0.04	R1	1m (Free cut)	-40 to 60°C	FDR-610-10R
Plastic	Standard type		Plastic injection molding type	120 ^{※2}	Ø0.03	R30	2m (Free cut)	-40 to 70°C	FDP-320-10

■ Convergent Reflective Type

(based on Non-glossy white paper)

Type	Appearance	Feature	Sensing distance (mm)	Min. Sensing Target ^{※3}	Allowable Bend Radius	Cable length (L)	Ambient Temperature	Model	
Flat type	Standard type		Convergent reflective type	8 ^{※1}	Ø0.0125	R25	2m	-40 to 60°C	FLF-320-10

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※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.















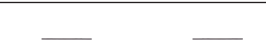
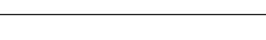
※3: Min. sensing target is a value measured opaque material in accurate output status and the sensing distance is different with the rated sensing distance ※2.

※4: **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.]

■ Through-Beam Type

(based on Non-glossy white paper)

Type	Appearance	Feature	Sensing distance (mm)	Min. Sensing Target ^{※3}	Allowable Bend Radius	Cable length (L)	Ambient Temperature	Model	
Bolt type	Standard type		M3	150 ^{※2}	Ø0.5	R15	1m (Free cut)	-40 to 70°C	FT-310-05
			M3	150 ^{※2}	Ø0.5	R15	2m (Free cut)	-40 to 70°C	FT-320-05
			M3 (SUS type, 90mm)	150 ^{※2}	Ø0.5	R15 (SUS part R10)	2m (Free cut)	-40 to 70°C	FTS-320-05
			M3 (SUS type, 45mm)						FTS1-320-05
			M3 (SUS type, 45mm)						FTS2-320-05
			M4	500 ^{※2}	Ø1	R30	2m (Free cut)	-40 to 70°C	FT-420-10
		M4 (SUS type, 90mm)	500 ^{※2}	Ø1	R30 (SUS part 10)	2m (Free cut)	-40 to 70°C	FTS-420-10	
		M4 (SUS type, 45mm)	500 ^{※2}	Ø1	R30 (SUS part 10R)	2m (Free cut)	-40 to 70°C	FTS2-420-10	
	Heat-resistant type		M4	300 ^{※2}	Ø1	R30	2m (Free cut)	-40 to 105°C	FT-420-10H
			M4	500 ^{※2}	Ø1	R50	2m (Free cut)	-40 to 150°C	FT-420-15H1
			M4 (Glass type)	400 ^{※2}	Ø1	R25	2m	-40 to 250°C	GT-420-13H2
	Flexible type ^{※4}		M3	110 ^{※1}	Ø0.3	R1	2m (Free cut)	-40 to 60°C	FT-320-05R
			M4	500 ^{※1}	Ø0.5	R1	2m (Free cut)	-40 to 60°C	FT-420-10R
	Break-resistant type ^{※4}		M3	110 ^{※1}	Ø0.3	R5	2m (Free cut)	-40 to 60°C	FT-320-06B
		M4	400 ^{※1}	Ø0.6	R5	2m (Free cut)	-40 to 60°C	FT-420-13B	
Cylinder type	Standard type		Ø1.5mm	150 ^{※2}	Ø0.5	R15	2m (Free cut)	-40 to 70°C	FTC-1520-05
			Ø2mm	150 ^{※2}	Ø0.5	R15	2m (Free cut)	-40 to 70°C	FTC-220-05
			Ø2mm (SUS type, 15mm)	150 ^{※2}	Ø0.5	R15 (SUS part 10R)	2m (Free cut)	-40 to 70°C	FTCS-220-05
			Ø3mm	150 ^{※2}	Ø1	R30	2m (Free cut)	-40 to 70°C	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: Min. sensing target is a value measured opaque material in accurate output status and the sensing distance is different with the rated sensing distance ※2.

※4: • **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.]



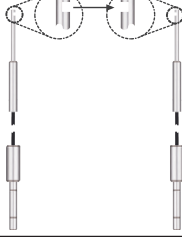






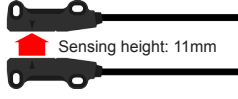

※FT-420-13 was discontinued. FT-420-13B is replacement.

※Glass type is for BF5R, BF4R Series.

Fiber Optic Cable

■ Through-Beam Type

(based on Non-glossy white paper)

Type	Appearance	Feature	Sensing distance (mm)	Min. Sensing Target ^{※3}	Allowable Bend Radius	Cable length (L)	Ambient Temperature	Model	
Cylinder type	Flexible type ^{※4}		Ø3mm	110 ^{※1}	Ø0.3	R1	2m (Free cut)	-40 to 60°C	FTC-220-05R
	Break-resistant type ^{※4}		Ø3mm	110 ^{※2}	Ø0.3	R5	2m (Free cut)	-40 to 60°C	FTC-1520-06B
	Standard type		Ø2.47mm Side view	120 ^{※1}	Ø0.0125	R15	2m	-40 to 60°C	FTCSN-2520-05
Flat type	Flexible type		Top view	110 ^{※1}	Ø0.04	R1	1m (Free cut)	-40 to 60°C	FTFU-210-05R
			Side view	110 ^{※1}	Ø0.04	R1	1m (Free cut)	-40 to 60°C	FTFN-210-05R
			Flat view	100 ^{※1}	Ø0.04	R1	1m (Free cut)	-40 to 60°C	FTF-210-05R
			Side view+ Top view (Bending)	110 ^{※1}	Ø0.04	R1	1m (Free cut)	-40 to 60°C	FTFB-210-05R
			L type Top view height 12.2mm	500 ^{※1}	Ø0.06	R1	1m (Free cut)	-40 to 60°C	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}	Ø0.5	R1	1m (Free cut)	-40 to 60°C	FTR-410-10R
Area type	Flexible type		Ø1mm	750 ^{※5}	Ø0.07	R2	1m (Free cut)	-40 to 60°C	FTW11-210-10R
Plastic	Standard type		Plastic injection molding type	500 ^{※2}	Ø1	R30	2m (Free cut)	-40 to 70°C	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: Min. sensing target is a value measured opaque material in accurate output status and the sensing distance is different with the rated sensing distance ※2.

※4: • **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.

※5: 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.]

Dimensions

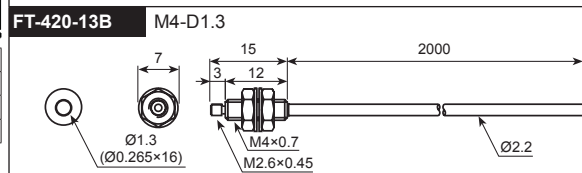
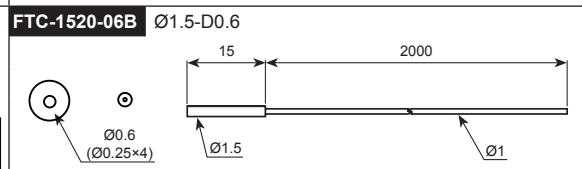
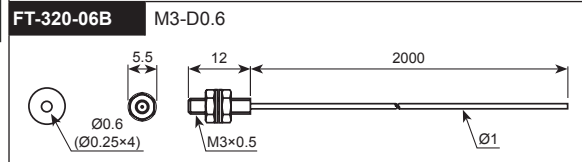
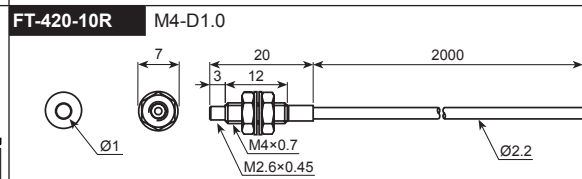
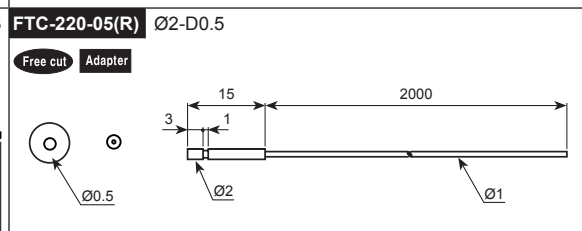
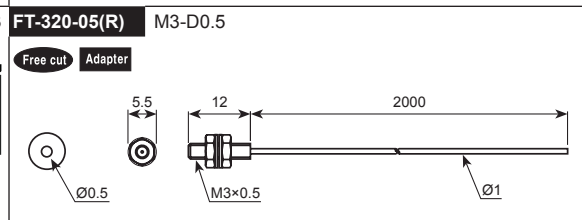
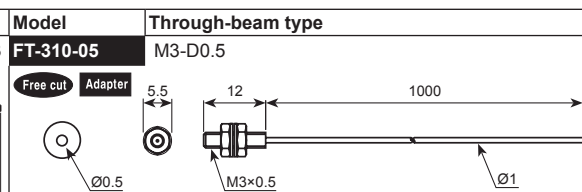
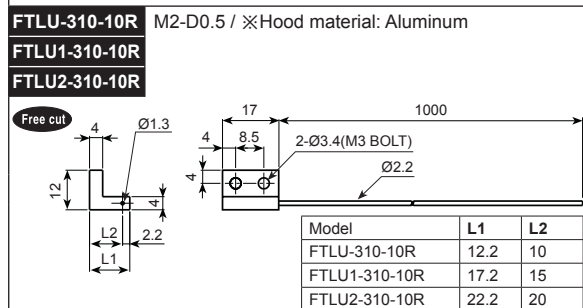
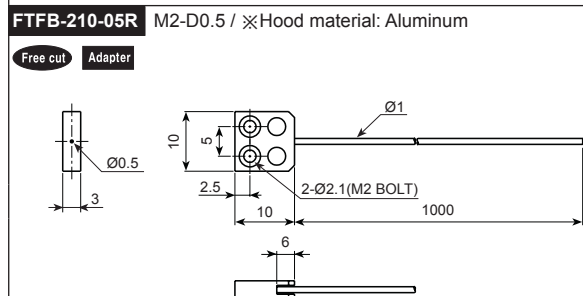
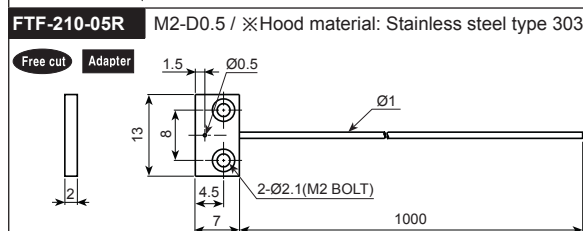
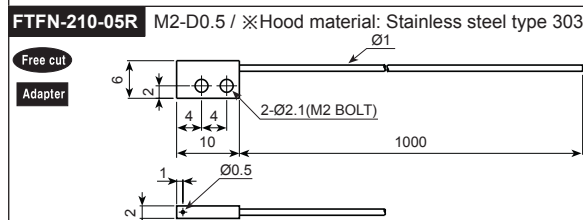
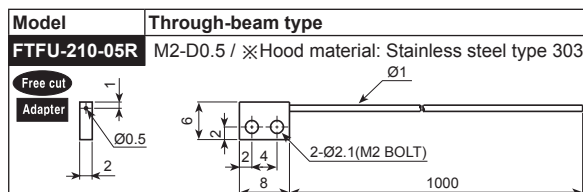
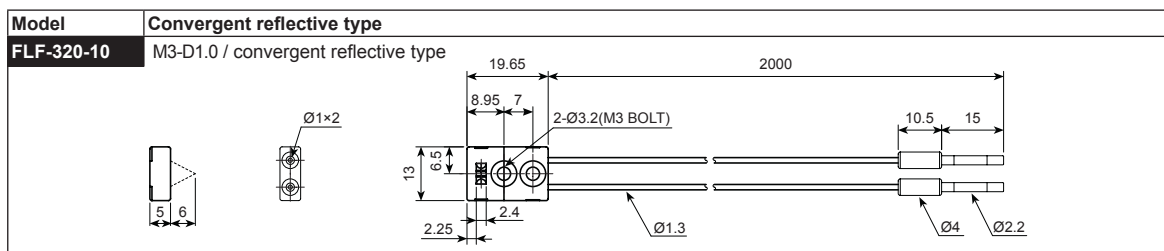
Model	Diffuse reflective type	Model	Diffuse reflective type
FDU-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303 	FDC-320-06B	M3-D0.6
FDN-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303 	FD-420-06B	M4-D0.6
FDF-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303 	FD-620-13B	M6-D1.3
FD-310-05	M3-D0.5 	FDC-320-05	Ø3-D0.5
FD-320-05(R)	M3-D0.5 	FDCS-320-05	Ø3-D0.5 / Stainless steel Ø1.5x15mm
FD-420-05(R)	M4-D0.5 	FDS-320-05	M3-D0.5 / Stainless steel Ø1.5x90mm
FD-620-10(R)	M6-D1.0 		

Fiber Optic Cable

Dimensions

Model	Diffuse reflective type	Model	Diffuse reflective type
FD-320-06B Free cut Adapter	M3-D0.6 	FDS2-320-05 Free cut Adapter	M3-D0.5 / Stainless steel Ø1.5x45mm
FDS-420-05 Free cut Adapter	M4-D0.5 / Stainless steel Ø1.5x90mm 	FD-320-F1 Free cut Adapter	Co-axial M3 / Ø0.5, Ø0.25x9
FDS2-420-05 Free cut Adapter	M4-D0.5 / SUS Ø1.5x45mm 	FD-620-F2 Free cut	Co-axial M6 / Ø1.0, Ø0.265x16
FDS-620-10 Free cut	M6-D1.0 / SUS Ø2.5x90mm 	FD-620-10H Free cut	M6-D1.0 / Heat-resistant 105°C
FDS2-620-10 Free cut	M6-D1.0 / SUS Ø2.5x45mm 	FD-620-15H1 Free cut	M6-D1.5 / Heat-resistant 150°C
FDP-320-10 Free cut	D1.0x2 / Plastic 	GD-420-20H2 Free cut	M4-D0.05x1000 / Heat-resistant 250°C
FD-320-F Free cut Adapter	Co-axial M3 / Ø0.5, Ø0.25x4 	GD-620-20H2 Free cut	M6-D0.05x1000 / Heat-resistant 250°C
FDR-610-10R Free cut	M6-D1.0 / ※Hood material: Stainless steel type 303 	FDCSN-320-05 Free cut	Ø3 / Stainless steel Ø1.47x20 / Side view

■ Dimensions



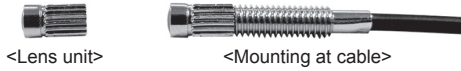
Fiber Optic Cable

Dimensions

Model	Through-beam type	Model	Through-beam type
FTC-1520-05 Free cut Adapter	Ø1.5-D0.5 	FTP-320-10 Free cut	D1.0 / Plastic
FTCS-220-05 Free cut Adapter	Ø2-D0.5 / SUS Ø1.0×15mm 	FTS-420-10 Free cut	M4-D1.0 / Stainless steel Ø1.5×90m
FTS-320-05 Free cut Adapter	M3-D0.5 / SUS Ø1.0×90mm 	FTS2-420-10 Free cut	M4-D1.0 / Stainless steel Ø1.5×45m
FTS1-320-05 Free cut Adapter	M3-D0.5 / SUS Ø1.0×35mm 	FT-420-10H Free cut	M4-D1.0 / Heat-resistant 105°C
FTS2-320-05 Free cut Adapter	M3-D0.5 / SUS Ø1.0×45mm 	FT-420-15H1 Free cut	M4-D1.5 / Heat-resistant 150°C
FT-420-10 Free cut	M4-D1.0 	GT-420-13H2 Free cut	M4-D1.3 / Heat-resistant Max. 250°C / Glass
FTC-320-10 Free cut	Ø3-D1.0 	FTR-410-10R Free cut	M4-D1.0 ※Hood material: Stainless steel type 303
FTW11-210-10R Free cut	M2-D1.0 	FTCSN-2520-05 Free cut	Ø2.47-D0.5 / Stainless steel Ø0.8×15mm / Side view

■ Lens Unit For Long Distance Detection (sold separately)

◎ Model : FTL-M26



◎ Mounting of lens

Mount the lens unit on the 3mm projecting point of the front hood.

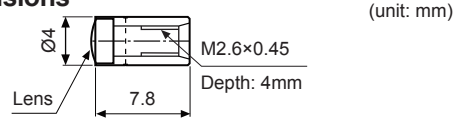
◎ Ambient temperature range of lens unit

It should be used within -40 to 100°C. (not over 100°C.)

◎ Applicable fiber optic cable and max. mounting distance

- FT-420-10 : 2500mm
- FT-420-10H : 1500mm

◎ Dimensions

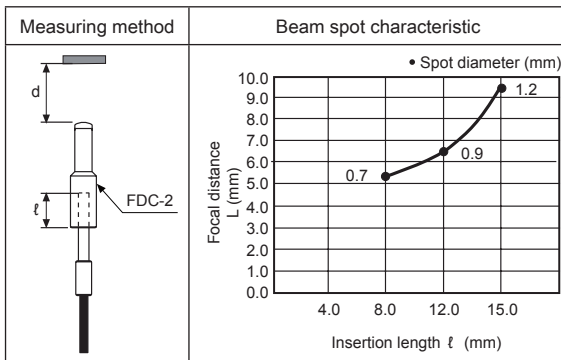


■ Micro Spot Fiber Optic Cable And Lens Unit (sold separately)

◎ Model

- Fiber optic cable: FDC-320-F
- Micro spot lens: FDC-2

◎ Feature data



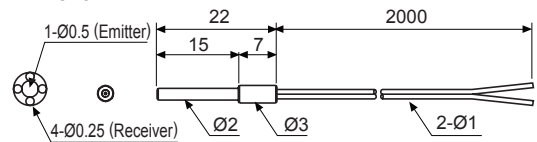
◎ Ambient temperature range of lens unit

It should be used within -40 to 100°C. (not over 100°C.)

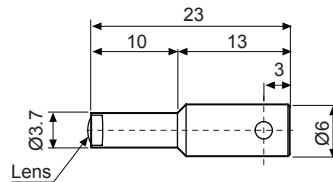
◎ Dimensions

(unit: mm)

• FDC-320-F



• FDC-2



■ Protection Tube For Fiber Optic Cable (sold separately)

◎ Application

: Protect cable from impact or cutting (unit: mm)

Model	Appearance and Dimension	L
FTH-305		500
FTH-310		1000
FTH-405		500
FTH-410		1000
FDH-605		500
FDH-610		1000

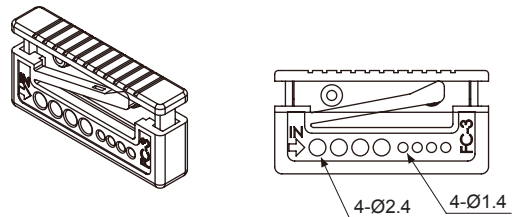
※Additional 8mm is for tube coupling.

■ Accessory

◎ Fiber cutter

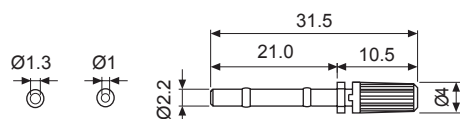
Applications: Cutting fiber optic cable, free cut type

• FC-3



◎ Adapter

Adapter: Adapter marked fiber optic cable should be used with adapter (unit: mm)



※The inside diameter Ø1 (standard and black)

※The inside diameter Ø1.3(Only applied to the receiver of FD-320-F1 and dark gray.)