

FD/FT/GD/GT Series

Clarification of fiber optic cable model by type

■ Features

■ Six cable head types available

- Area Detection Type
 - Area detection sensors with wide detection area
 - Detection of vibrating or falling objects
 - 11mm beam width and 750mm maximum detection distance
- Perpendicular Type
 - Easy installation with a single nut
- Flat Type
 - Compact flat heads for installation in tight spaces
 - Various sensing directions (top view, flat view, L-type view, top+side view)
 - Integrated bracket types with simple installation
- Cylindrical Type (thread end, cylindrical end)
 - : standard cylindrical fiber optic sensors for bracket mounting
- Injection molded plastic type

■ Various Fiber cable types

- Standard type: standard fiber optic cables with efficient signal transmission
- Flexible type: Ideal to install in the environments of curves, minimized light intensity changing from bending of the cable, and proper for the tidy installation
- Break-resistant type: withstand frequent bending without breaking
- Coaxial type: excellent signal transmission at close proximity
- Heat-resistant type: withstand extreme temperature conditions from -40°C to 250°C



■ Ordering Information

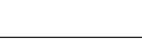
F **T** - **4** **20** - **10** **S**

Fiber material	Sensing type	Head form	Hood diameter (nut)	Cable length	Fiber diameter	Cable type	Option
							S Small hood
							No mark Standard type (-40 to 70°C)
							H Heat-resistance (-40 to 105°C)
							H1 Heat-resistance (-40 to 150°C)
							H2 Heat-resistance (-40 to 250°C)
							R Flexible type (R1, R2)
							B Break-resistant type (R5)
							05 Ø0.5mm
							06 Ø0.6mm
							10 Ø1.0mm
							13 Ø1.3mm
							14 Ø1.4mm
							15 Ø1.5mm
							20 Ø2.0mm
							F Ø0.5mm, Ø0.25mm×4 (coaxial type)
							F1 Ø0.5mm, Ø0.25mm×9 (coaxial type)
							F2 Ø1.0mm, Ø0.265mm×16 (coaxial type)
							05 0.5m
							10 1m
							20 2m
							10M 10m
							15 Ø1.5mm
							2 Ø2mm (M2)
							3 Ø3mm (M3)
							4 Ø4mm (M4)
							6 Ø6mm (M6)
							No mark Standard type (bolt type)
							W11 Area type (sensing height 11mm)
							P Plastic injection molding type
							S SUS type (SUS length 90mm)
							S1 SUS type (SUS length 35mm)
							S2 SUS type (SUS length 45mm)
							C Cylinder type
							CS Cylinder+SUS type (SUS length 15mm)
							H Fire cable protection tube
							LU L type/Top view (height 12.2mm)
							LU1 L type/Top view (height 17.2mm)
							LU2 L type/Top view (height 22.2mm)
							F Flat type/Flat view
							FN Flat type/Side view
							FU Flat type/Top view (up)
							FB Flat type/Side view+Top view (bending)
							R Right-angle
							T Through-beam type
							D Diffuse reflective type
							L Convergent reflective type
							F Plastic Fiber cable
							G Glass Fiber cable

※It might cause wrong model selection not existing in the above ordering information.

■ 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)						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
	Heat-resistant type	 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
		 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.

SENSORS

CONTROLLERS

MOTION DEVICES

SOFTWARE

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) LIDAR

(D) Door/Area Sensors

(E) Vision Sensors

(F) Proximity Sensors

(G) Pressure Sensors

(H) Rotary Encoders

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

FD/FT/GD/GT Series

■ 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
	Coaxial type	 Ø3mm	40 ^{※2}	Ø0.03	R15	2m (Free cut)	-40 to 70°C	FDC-320-F
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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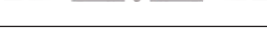
※3: Min. sensing target is a value measured opaque material in accurate output status and the sensing distance is different with the rated sensing distance ※2.

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※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
	Heat-resistant type	 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
		 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
		 M4 (Glass type)	400 ^{※2}	Ø1	R25	2m	-40 to 250°C	GT-420-13H2
Cylinder type	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
		 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
	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

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[(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.

SENSORS

CONTROLLERS

MOTION DEVICES

SOFTWARE

(A) Photoelectric Sensors

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(F) Proximity Sensors

(G) Pressure Sensors

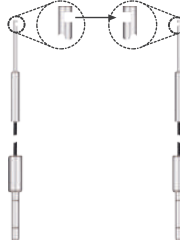
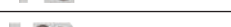
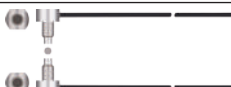
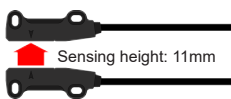
(H) Rotary Encoders

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

FD/FT/GD/GT Series

■ 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 ^{※4} type		Ø3mm	110 ^{※1}	Ø0.3	R1	2m (Free cut)	-40 to 60°C	FTC-220-05R
	Break-resistant ^{※4} type		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)
Area type	Flexible type		Ø1mm Sensing height: 11mm	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

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• **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
FDFU-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	FDC-320-06B	M3-D0.6
Free cut Adapter		Free cut Adapter	
FDFN-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	FD-420-06B	M4-D0.6
Free cut Adapter		Free cut Adapter	
FDF-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	FD-620-13B	M6-D1.3
Free cut Adapter		Free cut	
FD-310-05	M3-D0.5	FDC-320-05	Ø3-D0.5
Free cut Adapter		Free cut Adapter	
FD-320-05(R)	M3-D0.5	FDCS-320-05	Ø3-D0.5 / Stainless steel Ø1.5×15mm
Free cut Adapter		Free cut Adapter	
FD-420-05(R)	M4-D0.5	FDC-320-F	Co-axial Ø3 / Ø0.5, Ø0.25×4
Free cut Adapter		Free cut Adapter	
FD-620-10(R)	M6-D1.0	FDS-320-05	M3-D0.5 / Stainless steel Ø1.5×90mm
Free cut			

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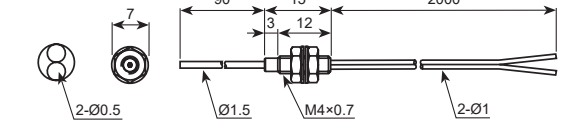
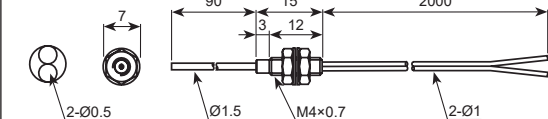
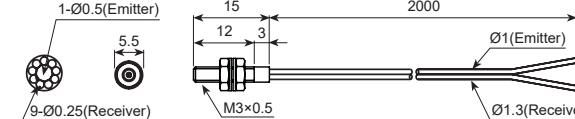
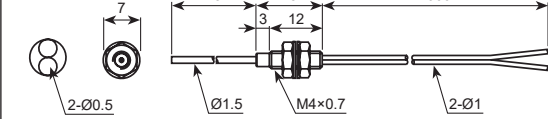
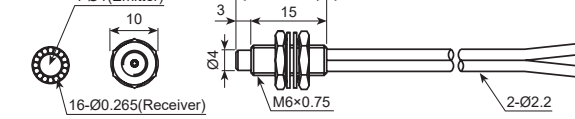
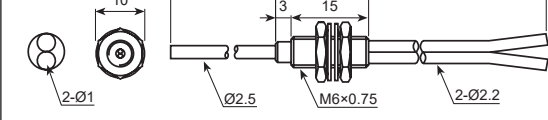
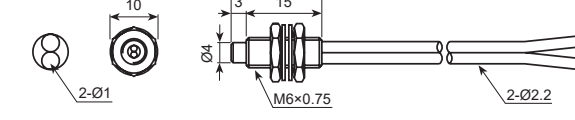
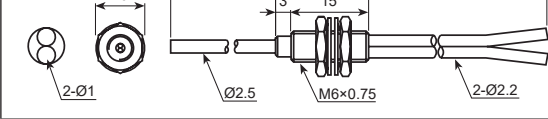
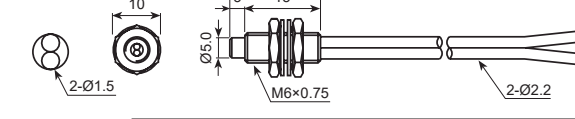
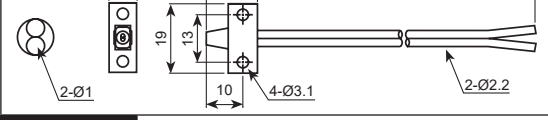
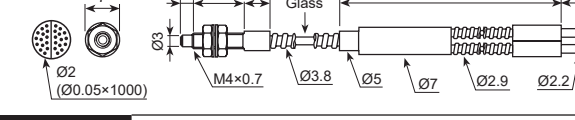
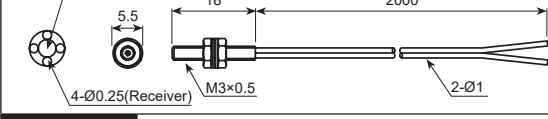
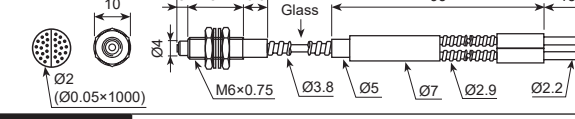
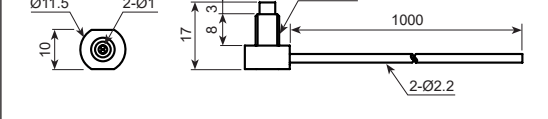
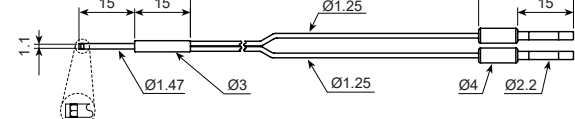
(G) Pressure Sensors

(H) Rotary Encoders

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

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■ 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 $\varnothing 1.5 \times 45\text{mm}$
			
FDS-420-05 Free cut Adapter	M4-D0.5 / Stainless steel $\varnothing 1.5 \times 90\text{mm}$	FD-320-F1 Free cut Adapter	Co-axial M3 / $\varnothing 0.5$, $\varnothing 0.25 \times 9$
			
FDS2-420-05 Free cut Adapter	M4-D0.5 / SUS $\varnothing 1.5 \times 45\text{mm}$	FD-620-F2 Free cut	Co-axial M6 / $\varnothing 1.0$, $\varnothing 0.265 \times 16$
			
FDS-620-10 Free cut	M6-D1.0 / SUS $\varnothing 2.5 \times 90\text{mm}$	FD-620-10H Free cut	M6-D1.0 / Heat-resistant 105°C
			
FDS2-620-10 Free cut	M6-D1.0 / SUS $\varnothing 2.5 \times 45\text{mm}$	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 / Glass
			
FD-320-F Free cut Adapter	Co-axial M3 / $\varnothing 0.5$, $\varnothing 0.25 \times 4$	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 $\varnothing 1.47 \times 20$ / Side view
			

■ Dimensions

Model	Convergent reflective type
FLF-320-10	M3-D1.0 / convergent reflective type

Model	Through-beam type	Model	Through-beam type
FTFU-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	FT-310-05	M3-D0.5
FTFN-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	FT-320-05(R)	M3-D0.5
FTF-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	FTC-220-05(R)	Ø2-D0.5
FTFB-210-05R	M2-D0.5 / ※Hood material: Aluminum	FT-420-10R	M4-D1.0
FTLU-310-10R	M2-D0.5 / ※Hood material: Aluminum	FT-320-06B	M3-D0.6
FTLU1-310-10R		FTC-1520-06B	Ø1.5-D0.6
FTLU2-310-10R		FT-420-13B	M4-D1.3

Model	L1	L2
FTLU-310-10R	12.2	10
FTLU1-310-10R	17.2	15
FTLU2-310-10R	22.2	20

SENSORS

CONTROLLERS

MOTION DEVICES

SOFTWARE

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) LIDAR

(D) Door/Area Sensors

(E) Vision Sensors

(F) Proximity Sensors

(G) Pressure Sensors

(H) Rotary Encoders

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

FD/FT/GD/GT Series

■ 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	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	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.

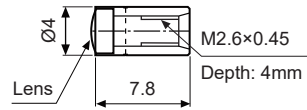
◎ Ambient temperature range of lens unit

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

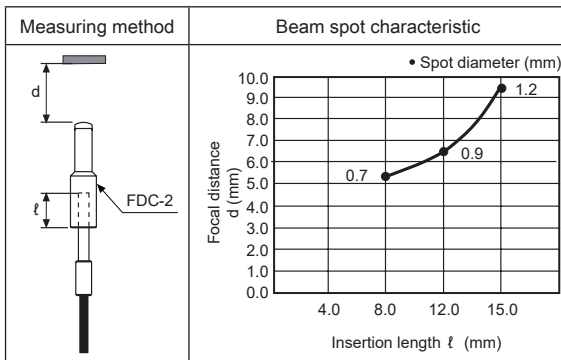


■ Micro Spot Fiber Optic Cable And Lens Unit (sold separately)

◎ Model

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

◎ Feature data

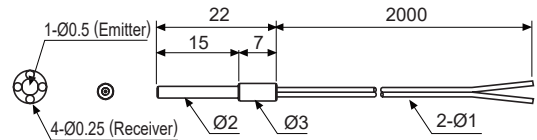


◎ Ambient temperature range of lens unit

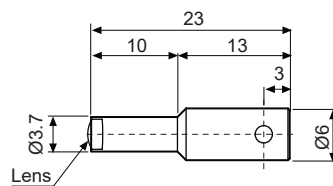
It should be used within -40 to 100°C. (not over 100°C.)

◎ Dimensions

• 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

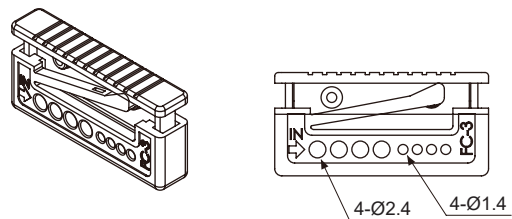
※Additional 8mm is for tube coupling.

■ Accessory

◎ Fiber cutter

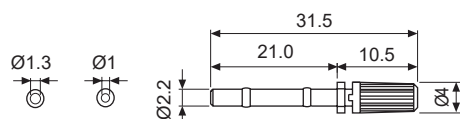
Applications: Cutting fiber optic cable, free cut type

• FC-3



◎ Adapter

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



※The inside diameter $\varnothing 1$ (standard and black)

※The inside diameter $\varnothing 1.3$ (Only applied to the receiver of FD-320-F1 and dark gray.)

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