

Fiber Optic Cable

■ Specifications(Diffuse reflective type)

(Based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target ^{※3}	Allowable bend radius	Cable length(L) ^{※4}	Temperature
Flexible type ※5		Flat type/ Top view(Up)	FDFU-210-05R	35 ^{※1}	∅0.0125	R1	1m Free cut	-40 to 60°C
		Flat type/ Side view	DFDN-210-05R	30 ^{※1}				
		Flat type/ Flat view	FDF-210-05R	30 ^{※1}				
		M3 Bolt	FD-320-05R	35 ^{※1}	∅0.0125	R5	2m Free cut	
		M4 Bolt	FD-420-05R	35 ^{※1}				
		M6 Bolt	FD-620-10R	130 ^{※1}				
Break-resistant type ※5		M3 Bolt	FD-320-06B	35 ^{※2}	∅0.0125	R5	2m Free cut	-40 to 70°C
		∅3 Cylinder type	FDC-320-06B					
		M4 Bolt	FD-420-06B					
		M6 Bolt	FD-620-13B	100 ^{※2}				
Standard type		M3 Bolt	FD-320-05	40 ^{※2}	∅0.03	R15	2m Free cut	-40 to 70°C
		M4 Bolt	FD-420-05					
		∅3 Cylinder type	FDC-320-05					
		∅3 Cylinder type SUS type (90mm)	FDCS-320-05					
		M3 Bolt SUS type (90mm)	FDS-320-05					
		M3 Bolt SUS type (45mm)	FDS2-320-05					
		M4 Bolt SUS type (90mm)	FDS-420-05					
		M4 Bolt SUS type (45mm)	FDS2-420-05					
		M6 Bolt	FD-620-10	120 ^{※2}	R30	R30 (SUS part R10)		
		M6 Bolt SUS type (90mm)	FDS-620-10					
	M6 Bolt SUS type (45mm)	FDS2-620-10						
	Plastic type	FDP-320-10			R30			

※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: Fiber optic cable out of the rated length can be customizable.

※5: ● **Flexible optical fiber (Multi core)** : A large number of ultrafine cores are all surrounded by cladding. Easy to install the many places where are bending areas because 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, ensuring a high degree of flexibility. It can be used for moving parts(robot hand) and it is not easily broken.

※ **Free cut**. The sensing distance can be shortened about max. 20% than the normal according to condition of the cable. [(FC-2) should be used for cutting fiber cable.]

(A) Photo electric sensor

(B) Fiber optic sensor

(C) Door/Area sensor

(D) Proximity sensor

(E) Pressure sensor

(F) Rotary encoder

(G) Connector/Socket

(H) Temp. controller

(I) SSR/Power controller

(J) Counter

(K) Timer

(L) Panel meter

(M) Tacho/Speed/ Pulse meter

(N) Display unit

(O) Sensor controller

(P) Switching power supply

(Q) Stepping motor& Driver&Controller

(R) Graphic/ Logic panel

(S) Field network device



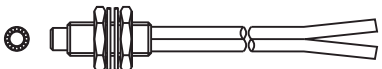
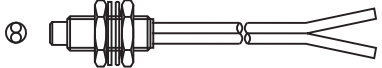
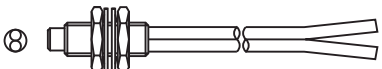

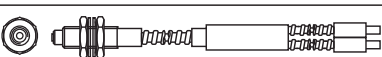
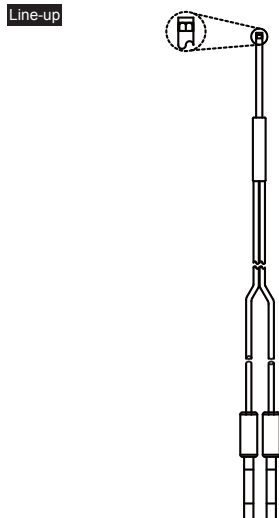
(T) Software

(U) Other

Fiber Optic Cable

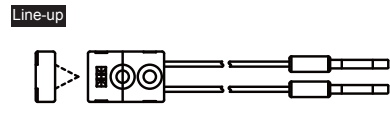
■ Specifications(Diffuse reflective type)

(Based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target ^{※3}	Allowable bend radius	Cable length(L) ^{※4}	Temperature
Coaxial type		M3 Bolt	FD-320-F	40 ^{※2}	ø0.03	R15	2m Free cut	-40 to 70°C
		M3 Bolt	FD-320-F1	60 ^{※2}				
		M6 Bolt	FD-620-F2	120 ^{※2}				
Heat-resistant type		M6 Bolt	FD-620-10H	120 ^{※2}		R30	-40 to 105°C	
		M6 Bolt	FD-620-15H1	160 ^{※2}		R30		-40 to 150°C
		M4 Bolt Glass type	GD-420-20H2	100 ^{※2}		R50	2m	-40 to 250°C
		M6 Bolt Glass type	GD-620-20H2					
Side view type		ø3 Cylinder type	FDCSN-320-05	30 ^{※1}	ø0.0125	R15	2m	-40 to 60°C

■ Specifications(Convergent reflective type)

(Based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target ^{※3}	Allowable bend radius	Cable length(L) ^{※4}	Temperature
Convergent reflective type		Convergent reflective type	FLF-320-10	8 ^{※1}	ø0.0125	R25	2m	-40 to 60°C

※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: Fiber optic cable out of the rated length can be customizable.

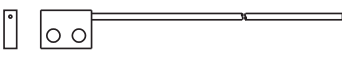
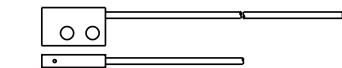
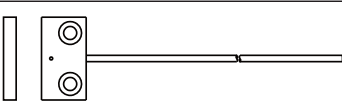
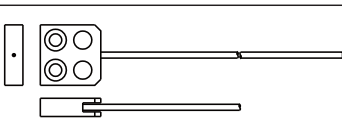



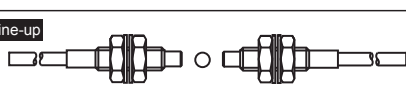


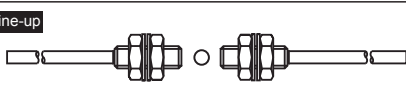
※ Free cut The sensing distance can be shortened about max. 20% than the normal according to condition of the cable. [(FC-2) should be used for cutting fiber cable.]

※ Glass type is for BF5R, BF4R Series.

Fiber Optic Cable

■ Specifications(Through-beam type)

(Based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target ^{※3}	Allowable bend radius	Cable length(L) ^{※4}	Temperature
Flexible type ※5	 Line-up	Flat type/ Top view(Up)	FTFU-210-05R	110 ^{※1}	∅0.04	R1	1m Free cut	-40 to 60°C
	 Line-up	Flat type/ Side view	FTFN-210-05R					
	 Line-up	Flat type/ Flat view	FTF-210-05R	100 ^{※1}				
	 Line-up	Flat type/ Top view(Up)+ Side view	FTFB-210-05R	110 ^{※1}				
	 Line-up	Integrated bracket(L type)/ Top view(Up)	FTLU-310-10R	500 ^{※1}				
			FTLU1-310-10R					
			FTLU2-310-10R					
	 Line-up	M3 Bolt	FT-320-05R	110 ^{※1}				
 Line-up	∅2 Cylinder type	FTC-220-05R						
 Line-up	M4 Bolt	FT-420-10R	500 ^{※1}	∅0.5				
Break-resistant type ※5	 Line-up	M3 Bolt	FT-320-06B	110 ^{※2}	∅0.3	R5	2m Free cut	
	 Line-up	∅1.5 Cylinder type	FTC-1520-06B					
	 Line-up	M4 Bolt	FT-420-13B	400 ^{※2}				∅0.6

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※4: Fiber optic cable out of the rated length can be customizable.

※5: ● **Flexible optical fiber (Multi core)** : A large number of ultrafine cores are all surrounded by cladding. Easy to install the many places where are bending areas because 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, ensuring a high degree of flexibility. It can be used for moving parts(robot hand) and it is not easily broken.

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

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(C) Door/Area sensor

(D) Proximity sensor

(E) Pressure sensor

(F) Rotary encoder

(G) Connector/Socket

(H) Temp. controller

(I) SSR/ Power controller

(J) Counter

(K) Timer

(L) Panel meter

(M) Tacho/ Speed/ Pulse meter

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(O) Sensor controller

(P) Switching power supply

(Q) Stepping motor& Driver&Controller

(R) Graphic/ Logic panel

(S) Field network device













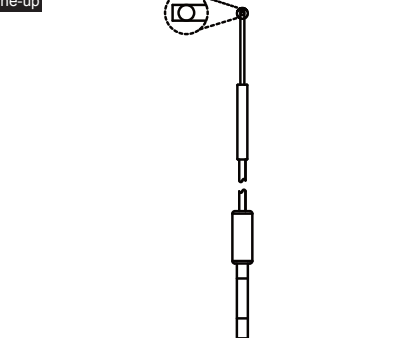
(T) Software

(U) Other

Fiber Optic Cable

■ Specifications(Through-beam type)

(Based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target ^{※3}	Allowable bend radius	Cable length(L) ^{※4}	Temperature
Standard type		M3 Bolt	FT-320-05	150 ^{※2}	ø0.5	R15	2m Free cut	-40 to 70°C
	Line-up 	ø1.5 Cylinder type	FTC-1520-05					
		ø2 Cylinder type	FTC-220-05					
		ø2 Cylinder type SUS type (90mm)	FTCS-220-05					
		M3 Bolt SUS type (90mm)	FTS-320-05					
		M3 Bolt SUS type (35mm)	FTS1-320-05					
		M3 Bolt SUS type (45mm)	FTS2-320-05					
		M4 Bolt	FT-420-10	500 ^{※2}	ø1	R30		
		ø3 Cylinder type	FTC-320-10					
		Plastic type	FTP-320-10					
	M4 Bolt SUS type (90mm)	FTS-420-10						
	M4 Bolt SUS type (45mm)	FTS2-420-10						
Heat-resistant type		M4 Bolt	FT-420-10H	300 ^{※2}	ø1	R30	2m	-40 to 105°C
		M4 Bolt	FT-420-15H	500 ^{※2}		R50		-40 to 150°C
		M4 Bolt Glass type	GT-420-13H2	400 ^{※2}		R25	2m	-40 to 250°C
Side view type	Line-up 	ø2.47 Cylinder type	FTCSN-2520-05	120 ^{※1}	ø0.0125	R15	2m	-40 to 60°C

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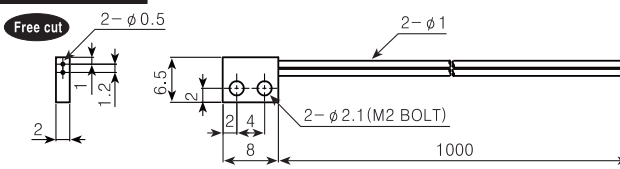
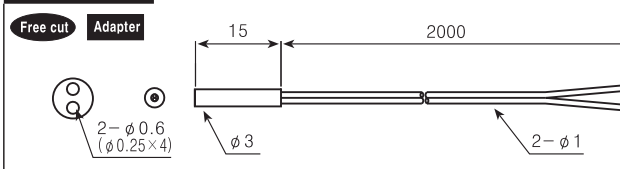
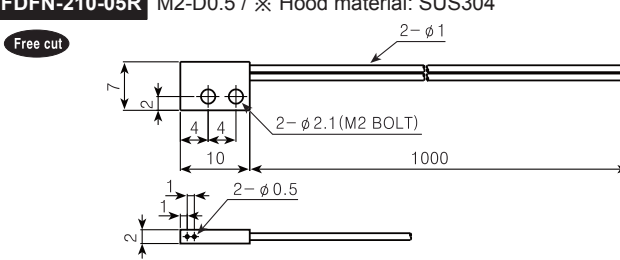
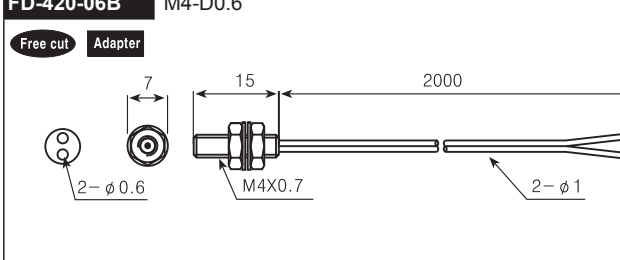
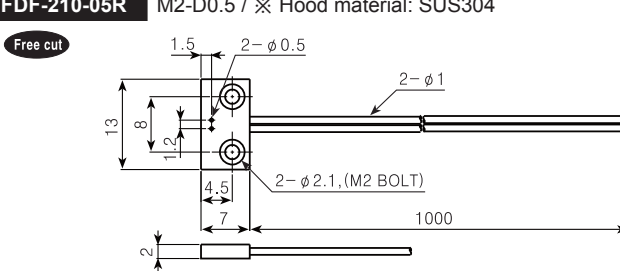
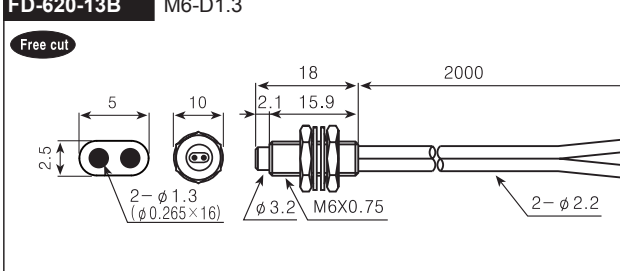
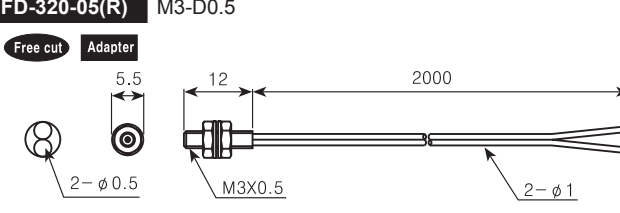
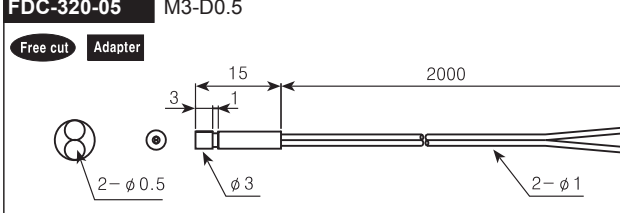
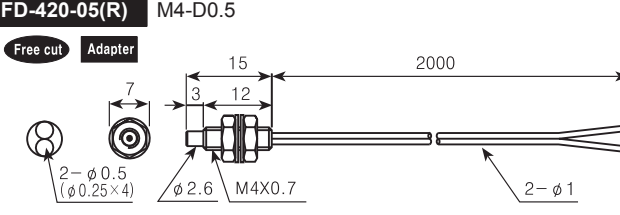
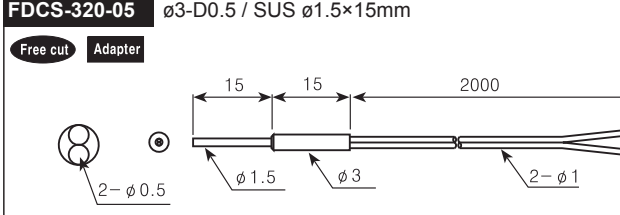
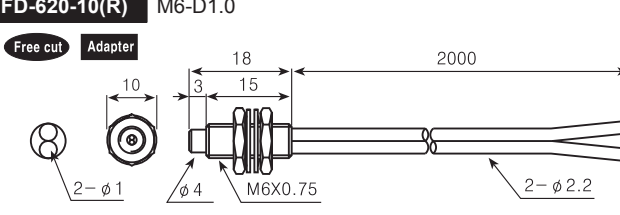
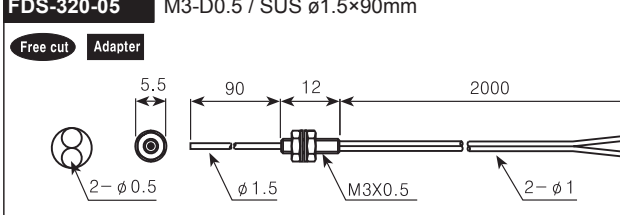
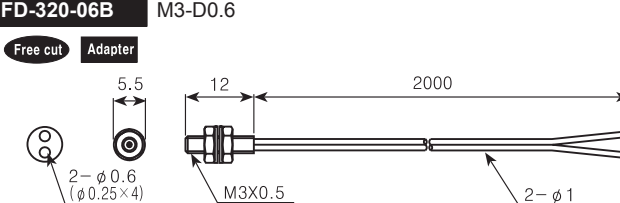
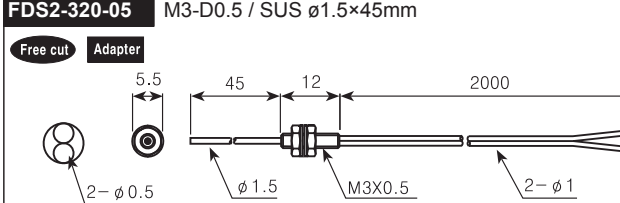
※ **Free cut** The sensing distance can be shortened about max. 20% than the normal according to condition of the cable. [(FC-2) should be used for cutting fiber cable.]

※ **Glass type** is for BF5R, BF4R Series.

Fiber Optic Cable

Dimensions

(Unit:mm)

Model	Diffuse reflective type	Model	Diffuse reflective type
FDFU-210-05R	M2-D0.5 / ※ Hood material: SUS304 	FDC-320-06B	M3-D0.6 
FDFN-210-05R	M2-D0.5 / ※ Hood material: SUS304 	FD-420-06B	M4-D0.6 
FDF-210-05R	M2-D0.5 / ※ Hood material: SUS304 	FD-620-13B	M6-D1.3 
FD-320-05(R)	M3-D0.5 	FDC-320-05	M3-D0.5 
FD-420-05(R)	M4-D0.5 	FDCS-320-05	φ3-D0.5 / SUS φ1.5×15mm 
FD-620-10(R)	M6-D1.0 	FDS-320-05	M3-D0.5 / SUS φ1.5×90mm 
FD-320-06B	M3-D0.6 	FDS2-320-05	M3-D0.5 / SUS φ1.5×45mm 

(A) Photo electric sensor

(B) Fiber optic sensor

(C) Door/Area sensor

(D) Proximity sensor

(E) Pressure sensor

(F) Rotary encoder

(G) Connector/Socket

(H) Temp. controller

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(S) Field network device

(T) Software

(U) Other

Fiber Optic Cable

Dimensions

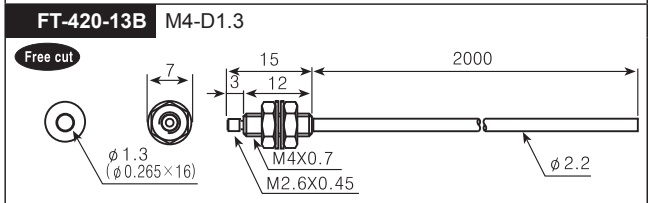
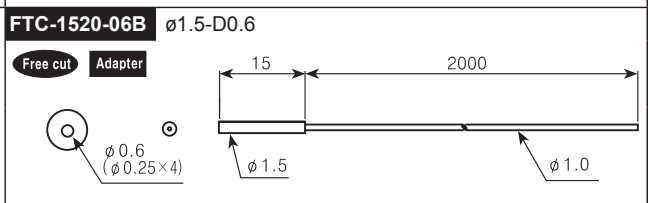
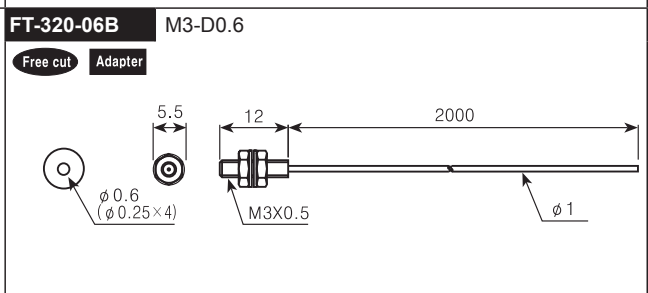
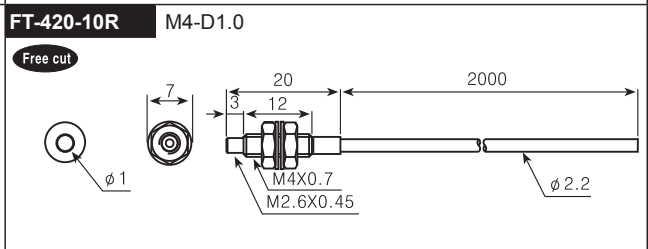
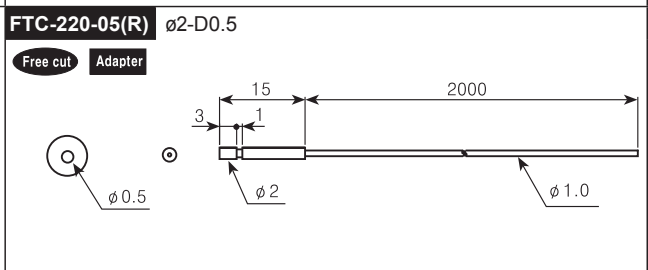
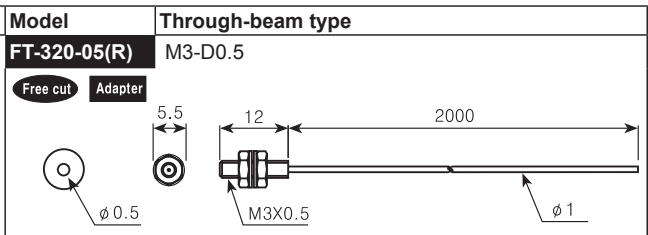
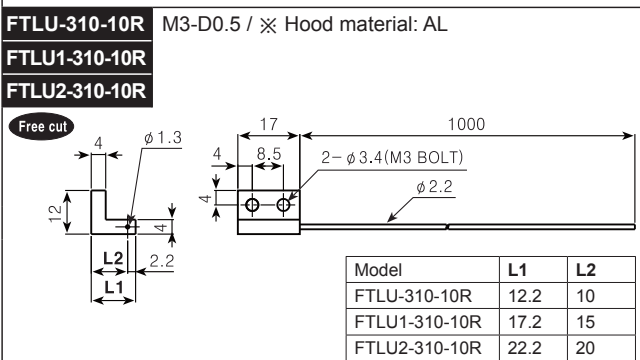
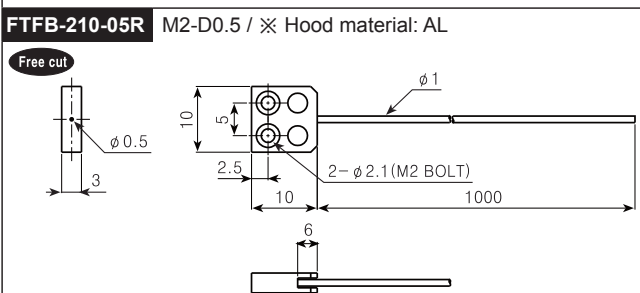
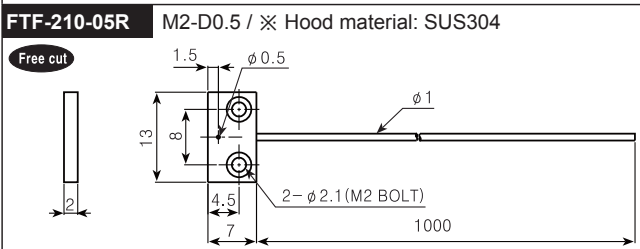
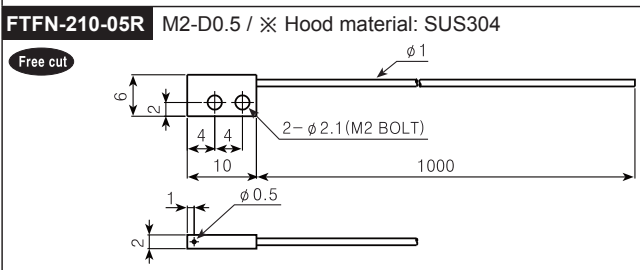
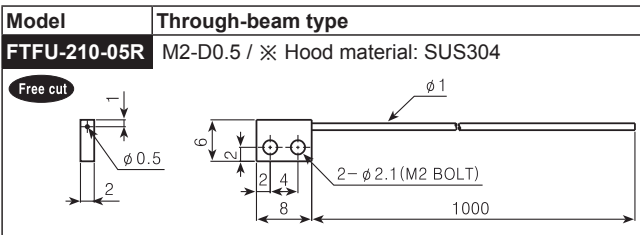
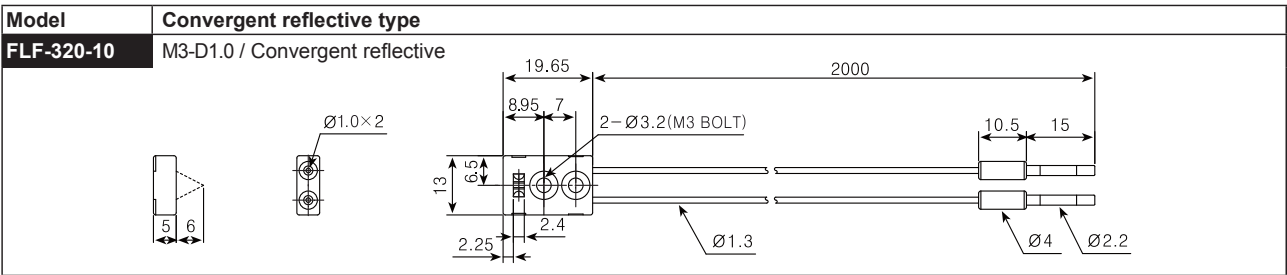
(Unit:mm)

Model	Diffuse reflective type	Model	Diffuse reflective type
FDS-420-05 Free cut Adapter	M4-D0.5 / SUS $\phi 1.5 \times 90$ mm 	FD-320-F1 Free cut Adapter	Co-axial M3 / $\phi 0.5, \phi 0.25 \times 9$
FDS2-420-05 Free cut Adapter	M4-D0.5 / SUS $\phi 1.5 \times 45$ mm 	FD-620-F2 Free cut	Co-axial M6 / $\phi 1.0, \phi 0.265 \times 16$
FDS-620-10 Free cut	M6-D1.0 / SUS $\phi 2.5 \times 90$ mm 	FD-620-10H Free cut	M6-D1.0 / Heat-resistant 105°C
FDS2-620-10 Free cut	M6-D1.0 / SUS $\phi 2.5 \times 45$ mm 	FD-620-15H1 Free cut	M6-D1.5 / Heat-resistant 150°C
FDP-320-10 Free cut	D1.0x2mm / Plastic 	GD-420-20H2	M4-D0.05x1000 / Heat-resistant 250°C
FD-320-F Free cut Adapter	Co-axial M3 / $\phi 0.5, \phi 0.25 \times 4$ 	GD-620-20H2	M6-D0.05x1000 / Heat-resistant 250°C
FDCSN-320-05	$\phi 3$ / SUS $\phi 1.47 \times 20$ / Side view 		

Fiber Optic Cable

Dimensions

(Unit:mm)



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(T) Software

(U) Other

Fiber Optic Cable

Dimensions

(Unit:mm)

Model	Through-beam type	Model	Through-beam type
FTC-1520-05	ø1.5-D0.5 	FTP-320-10	D1.0 / Plastic
FTCS-220-05	ø2-D0.5 / SUS ø1.0×15mm 	FTS-420-10	M4-D1.0 / SUS ø1.5×90m
FTS-320-05	M3-D0.5 / SUS ø1.0×90mm 	FTS2-420-10	M4-D1.0 / SUS ø1.5×45mm
FTS1-320-05	M3-D0.5 / SUS ø1.0×35mm 	FT-420-10H	M4-D1.0 / Heat-resistant 105°C
FTS2-320-05	M3-D0.5 / SUS ø1.0×45mm 	FT-420-15H1	M4-D1.0 / Heat-resistant 150°C
FT-420-10	M4-D1.0 	GT-420-13H2	M4-D1.3 / Heat-resistant Max. 250°C / Glass
FTC-320-10	ø3-D1.0 	FTCSN-2520-05	ø2.47-D0.5 / SUS 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**

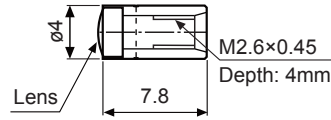
It should be used within -40 to 100°C.(not over 100°C.)

◎ **Applicable fiber optic cable and max. mounting distance**

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

◎ **Dimensions**

(unit: mm)

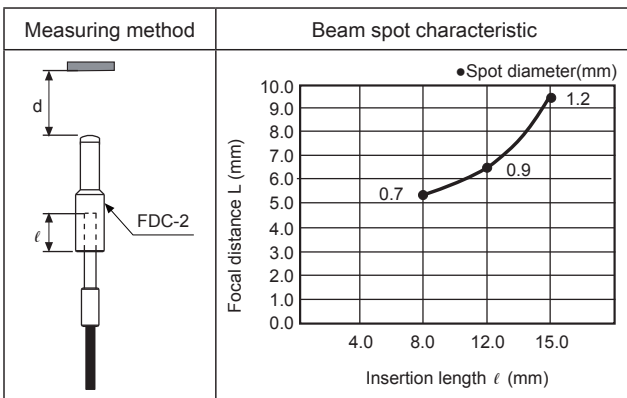


■ **Micro spot fiber optic cable and lens unit(sold separately)**

◎ **Model**

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

◎ **Feature data**



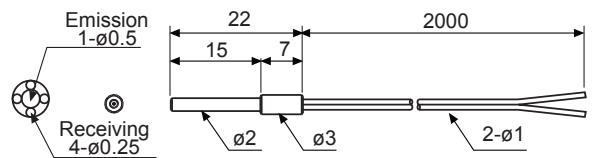
◎ **Ambient temperature range of lens unit**

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

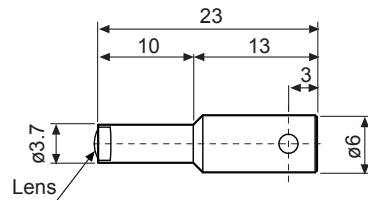
◎ **Dimensions**

(unit: mm)

● **FDC-320-F**



● **FDC-2**



■ **Protection tube for fiber optic cable (sold separately)**

◎ **Usage : Protect cable from impact or cutting**

(unit: mm)

Model	Dimension
FTH-310	
FTH-410	
FDH-610	

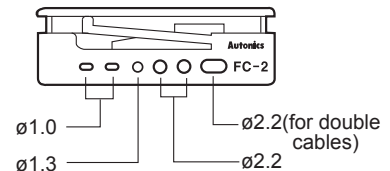
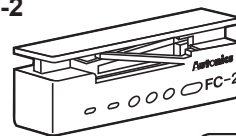
- ※ 500mm of protection tube can be customized.
- ※ Additional 8mm is for tube coupling.

■ **Accessory**

◎ **Fiber cutter**

Applications: Cutting fiber optic cable, free cut type

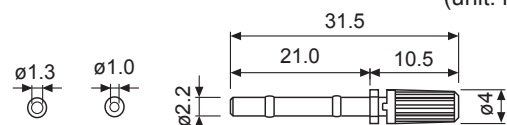
● **FC-2**



◎ **Adapter**

Adapter : Adapter marked fiber optic cable should be used with adapter

(unit: mm)



- ※ The inside diameter ø1.0(Standard and black)
- ※ The inside diameter ø1.3(Only applied to the receiver of FD-320-F1 and dark gray.)

(A) Photo electric sensor

(B) Fiber optic sensor

(C) Door/Area sensor

(D) Proximity sensor

(E) Pressure sensor

(F) Rotary encoder

(G) Connector/Socket

(H) Temp. controller

(I) SSR/Power controller

(J) Counter

(K) Timer

(L) Panel meter

(M) Tacho/Speed/ Pulse meter

(N) Display unit

(O) Sensor controller

(P) Switching power supply

(Q) Stepping motor& Driver&Controller

(R) Graphic/ Logic panel

(S) Field network device

(T) Software

(U) Other