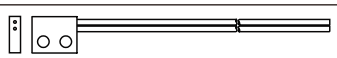
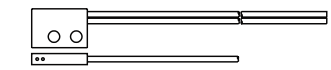
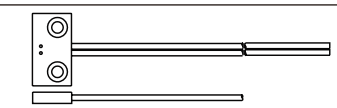
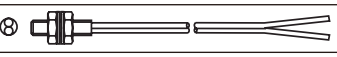
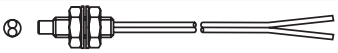
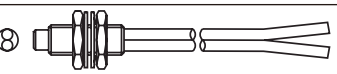
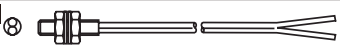
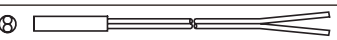
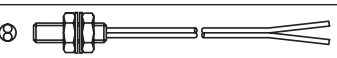
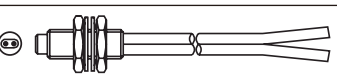
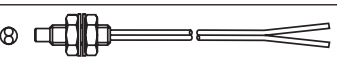
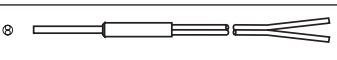
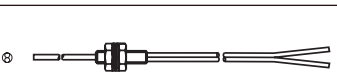
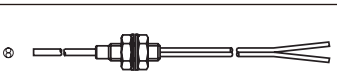
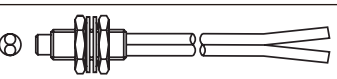
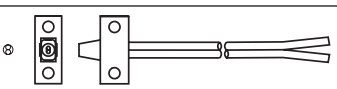
▣ Specifications (diffuse reflective type)

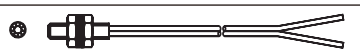
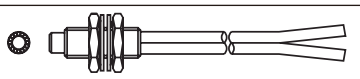
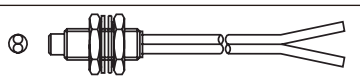
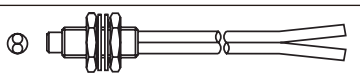
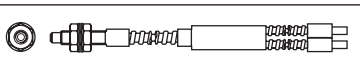
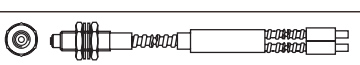
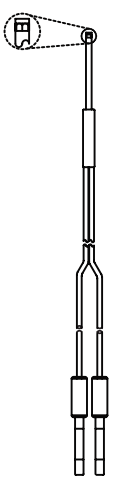
(based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target※3	Allowable bend radius	Cable length(L)※4	Temp.
Flexible type※5	Line-up 	Flat type /Top view	**FDFU-210-05R**	35※1	Ø0.0125	R1	1m Free cut	-40 to 60℃
	Line-up 	Flat type /Side view	**FDFN-210-05R**	30※1				
	Line-up 	Flat type /Flat view	**FDF-210-05R**					
	Line-up 	M3 Bolt	**FD-320-05R**	35※1	Ø0.0125		2m Free cut	
	Line-up 	M4 Bolt	**FD-420-05R**					
	Line-up 	M6 Bolt	**FD-620-10R**	130※1	Ø0.04			
Break-resistant type※5	Line-up 	M3 Bolt	**FD-320-06B**	35※2	Ø0.0125	R5		
	Line-up 	Ø3 Cylinder type	**FDC-320-06B**					
	Line-up 	M4 Bolt	**FD-420-06B**					
	Line-up 	M6 Bolt	**FD-620-13B**	100※2				
Standard type		M3 Bolt	**FD-320-05**	40※2	Ø0.03	R15		-40 to 70℃
		M4 Bolt	**FD-420-05**					
		Ø3 Cylinder type	**FDC-320-05**					
		Ø3 Cylinder type SUS type(90mm)	**FDCS-320-05**			15R (SUS part 10R)		
		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		
		M6 Bolt SUS type(90mm)	**FDS-620-10**			30R (SUS part 10R)		
		M6 Bolt SUS type(45mm)	**FDS2-620-10**					
		Plastic	**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 ultra-fine 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.]

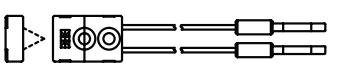
▣ Specifications (diffuse reflective type)

(based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target※3	Allowable bend radius	Cable length(L)※4	Temp.
Coaxial type		M3 Bolt	**FD-320-F**	40※2	Ø0.03	R15	2m Free cut	-40 to 70℃
		M3 Bolt	**FD-320-F1**	60※2				
		M6 Bolt	**FD-620-F2**	120※2		R30		
Heat-resistant type		M6 Bolt	**FD-620-10H**			R30		-40 to 105℃
		M6 Bolt	**FD-620-15H1**	160※2		R50		-40 to 150℃
		M4 Bolt Glass type	**GD-420-20H2**	100※2			2m	-40 to 250℃
		M4 Bolt Glass type	**GD-620-20H2**					
Side view	Line-up 	Ø3 Cylinder type	**FDCSN-320-05**	30※1	Ø0.0125	R15	2m	-40 to 60℃

▣ Specifications (convergent reflective type)

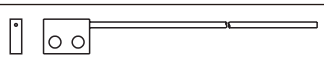
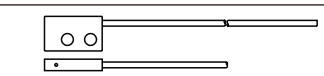
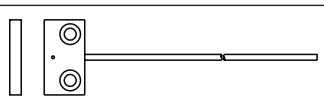
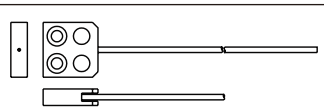
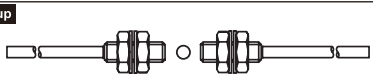
(based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target※3	Allowable bend radius	Cable length(L)※4	Temp.
Convergent reflective type	Line-up 	Convergent reflective type	**FLF-320-10**	8※1	Ø0.0125	R25	2m	-40 to 60℃

※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.

▣ Specifications (through-beam type)

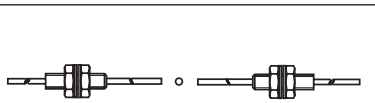
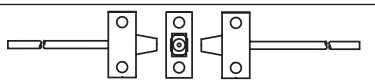
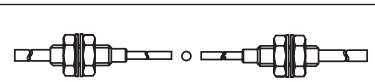
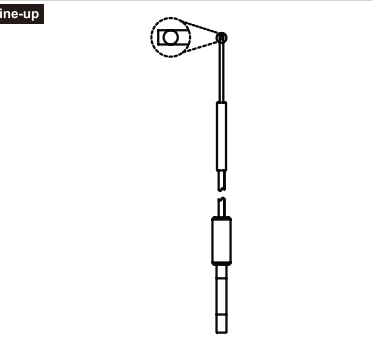
(based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target※3	Allowable bend radius	Cable length(L)※4	Temp.
Flexible type※5	Line-up 	Flat type /Top view	**FTFU-210-05R**	110※1	Ø0.04	R1	1m Free cut	-40 to 60℃
	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+Side view	**FTFB-210-05R**	110※1				
	Line-up 	Integrated bracket(L type) /Top view	**FTLU-310-10R**	500※1	Ø0.06			
			FTLU1-310-10R					
			FTLU2-310-10R					
	Line-up 	M3 Bolt	**FT-320-05R**	110※1	Ø0.3		2m Free cut	
	Line-up 	Ø2 Cylinder type	**FTC-220-05R**					
	Line-up 	M4 Bolt	**FT-420-10R**	500※1	Ø0.5			
Flexible type※5	Line-up 	M3 Bolt	**FT-320-06B**	110※2	Ø0.3	R5		
	Line-up 	Ø1.5 Cylinder type	**FTC-1520-06B**					
	Line-up 	M4 Bolt	**FT-420-13B**	400※2	Ø0.6			

※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 ultra-fine 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.]
※FT-420-13 was discontinued. FT-420-13B is replacement.

▣ Specifications (through-beam type)

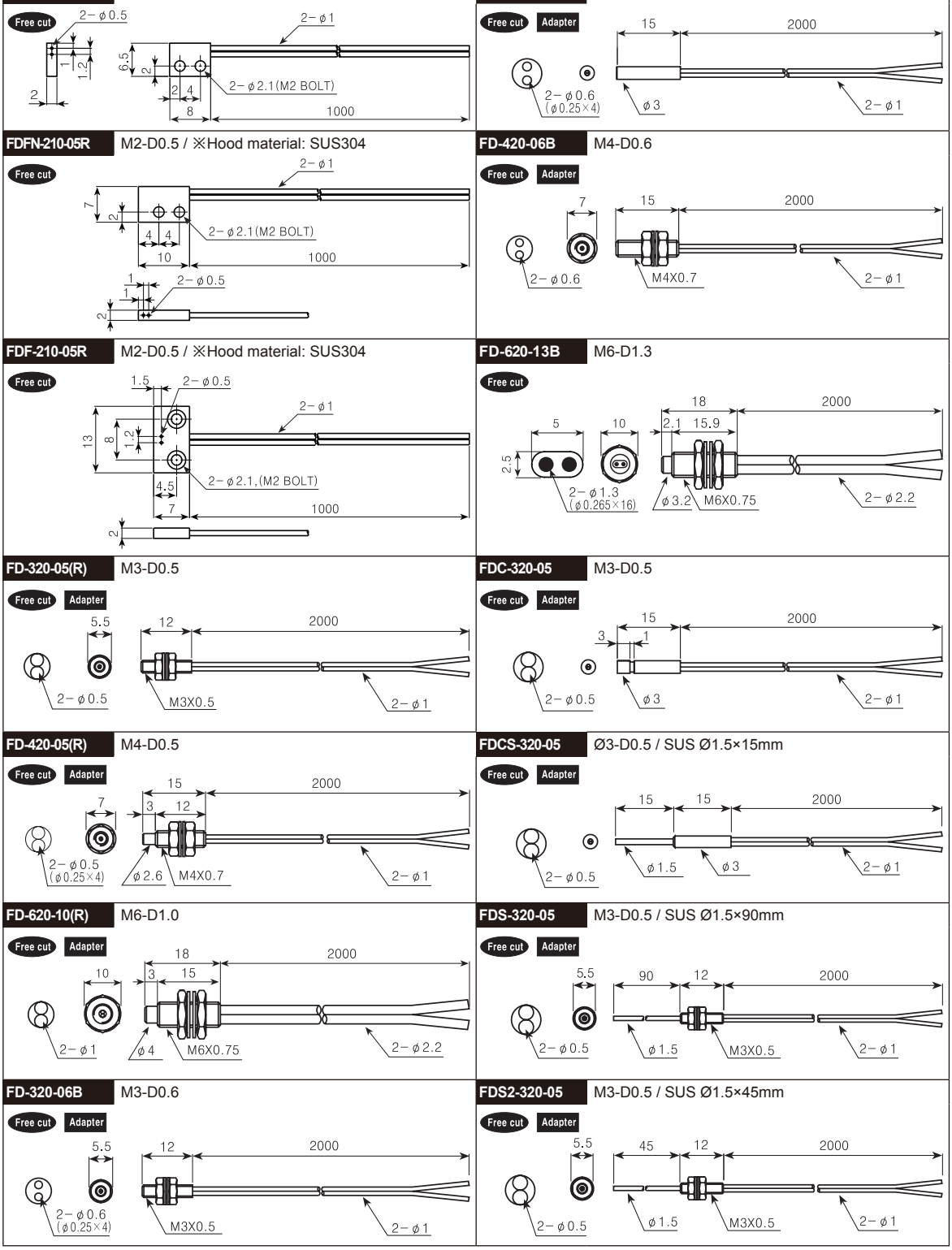
(based on Non-glossy white paper)

Type	Appearance	Feature	Model	Sensing distance (mm)	Min. sensing target※3	Allowable bend radius	Cable length(L)※4	Temp.
Standard type	 Line-up	M3 Bolt	**FT-320-05**	150※2	Ø0.5	R15	2m Free cut	-40 to 70℃
		Ø1.5 Cylinder type	**FTC-1520-05**					
		Ø2 Cylinder type	**FTC-220-05**					
		Ø2 Cylinder type SUS type(90mm)	**FTCS-220-05**			R15 (SUS part 10R)		
		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	**FTP-320-10**					
		M4 Bolt SUS type(90mm)	**FTS-420-10**			R30 (SUS part 10R)		
		M4 Bolt SUS type(45mm)	**FTS2-420-10**					
Heat-resistant type		M4 Bolt	**FT-420-10H**	300※2		R30		-40 to 105℃
		M4 Bolt	**FT-420-15H1**	500※2		R50		-40 to 150℃
		M4 Bolt Glass type	**GT-420-13H2**	400※2		R25	2m	-40 to 50℃
Side view	Line-up 	Ø2.47 Cylinder type	**FTCSN-2520-05**	120※1	Ø0.0125	R15	2m	-40 to 60℃

※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.

▣ Dimensions

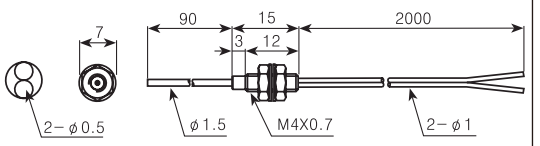
Model	Diffuse reflective type	Model	Diffuse reflective type
FDFU-210-05R	M2-D0.5 / ※Hood material: SUS304	FDC-320-06B	M3-D0.6
FDFN-210-05R	M2-D0.5 / ※Hood material: SUS304	FD-420-06B	M4-D0.6
FDF-210-05R	M2-D0.5 / ※Hood material: SUS304	FD-620-13B	M6-D1.3
FD-320-05(R)	M3-D0.5	FDC-320-05	M3-D0.5
FD-420-05(R)	M4-D0.5	FDCS-320-05	Ø3-D0.5 / SUS Ø1.5×15mm
FD-620-10(R)	M6-D1.0	FDS-320-05	M3-D0.5 / SUS Ø1.5×90mm
FD-320-06B	M3-D0.6	FDS2-320-05	M3-D0.5 / SUS Ø1.5×45mm



▣ Dimensions

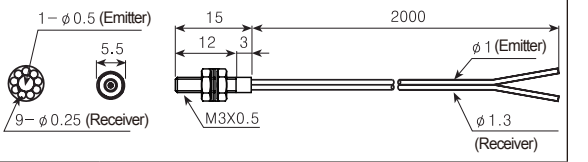
Model	Diffuse reflective type
FDS-420-05	M4-D0.5 / SUS Ø1.5×90mm

Free cut Adapter



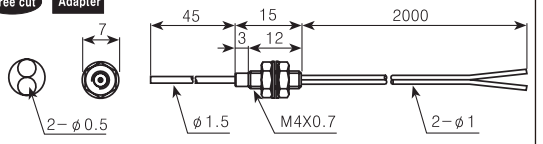
Model	Diffuse reflective type
FD-320-F1	Co-axial M3 / Ø0.5, Ø0.25×9

Free cut Adapter



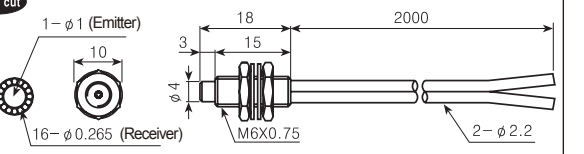
Model	Diffuse reflective type
FDS2-420-05	M4-D0.5 / SUS Ø1.5×45mm

Free cut Adapter



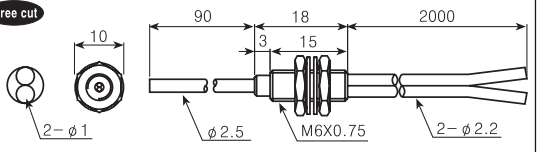
Model	Diffuse reflective type
FD-620-F2	Co-axial M6 / Ø1.0, Ø0.265×16

Free cut



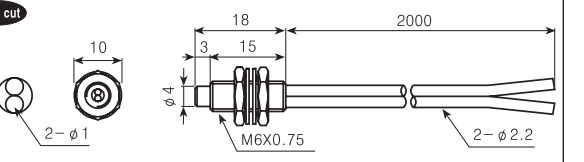
Model	Diffuse reflective type
FDS-620-10	M6-D1.0 / SUS Ø2.5×90mm

Free cut



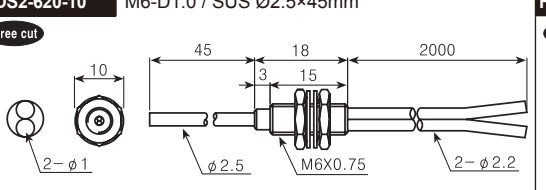
Model	Diffuse reflective type
FD-620-10H	M6-D1.0 / Heat-resistant 105℃

Free cut



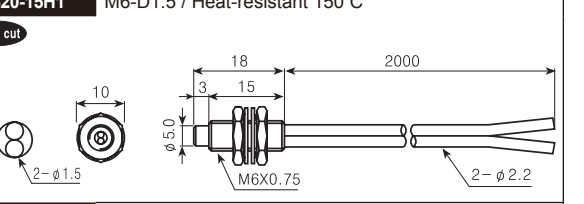
Model	Diffuse reflective type
FDS2-620-10	M6-D1.0 / SUS Ø2.5×45mm

Free cut



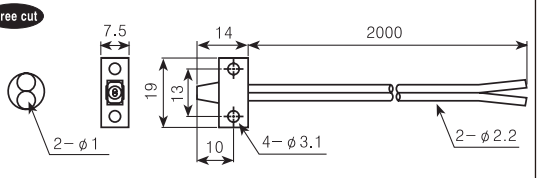
Model	Diffuse reflective type
FD-620-15H1	M6-D1.5 / Heat-resistant 150℃

Free cut

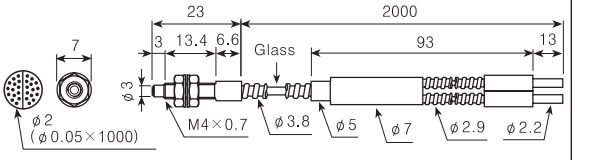


Model	Diffuse reflective type
FDP-320-10	D1.0×2 / Plastic

Free cut

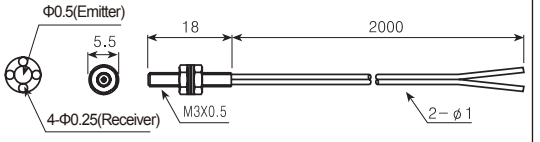


Model	Diffuse reflective type
GD-420-20H2	M4-D0.05×1000 / Heat-resistant 250℃

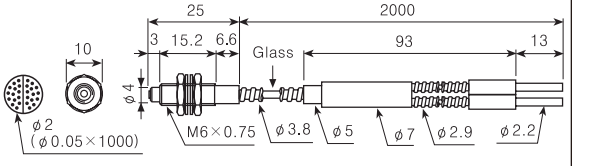


Model	Diffuse reflective type
FD-320-F	Co-axial M3 / Ø0.5, Ø0.25×4

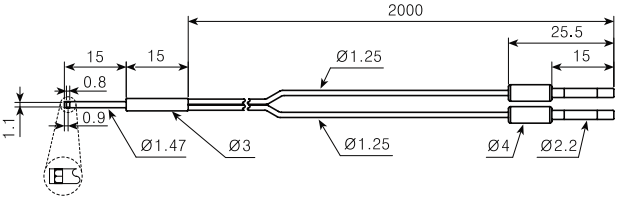
Free cut Adapter



Model	Diffuse reflective type
GD-620-20H2	M6-D0.05×1000 / Heat-resistant 250℃

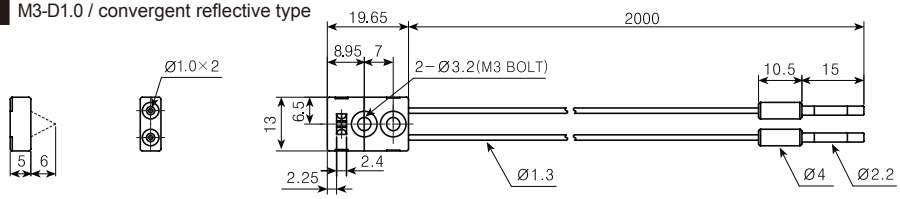


Model	Diffuse reflective type
FDCSN-320-05	Ø3 / SUS Ø1.47×20 / Side view



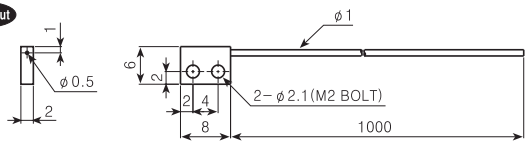
▣ Dimensions

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



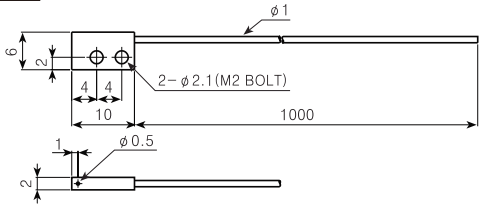
Model	Through-beam type
FTFU-210-05R	M2-D0.5 / ※Hood material: SUS304

Free cut



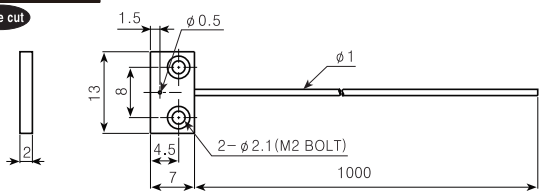
Model	Through-beam type
FTFN-210-05R	M2-D0.5 / ※Hood material: SUS304

Free cut



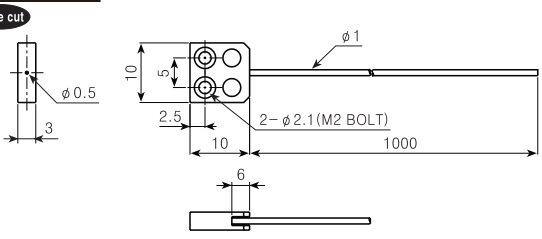
Model	Through-beam type
FTF-210-05R	M2-D0.5 / ※Hood material: SUS304

Free cut



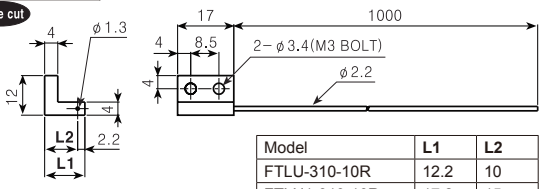
Model	Through-beam type
FTFB-210-05R	M2-D0.5 / ※Hood material: AL

Free cut



Model	Through-beam type
FTLU-310-10R	M2-D0.5 / ※Hood material: AL
FTLU1-310-10R	
FTLU2-310-10R	

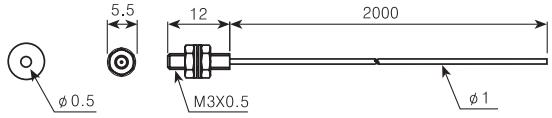
Free cut



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

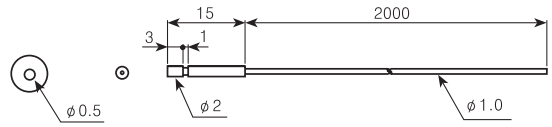
Model	Through-beam type
FT-320-05(R)	M3-D0.5

Free cut Adapter



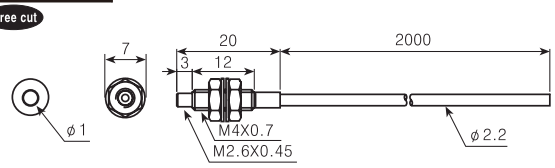
Model	Through-beam type
FTC-220-05(R)	Ø2-D0.5

Free cut Adapter



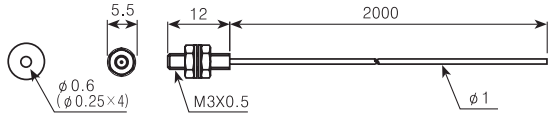
Model	Through-beam type
FT-420-10R	M4-D1.0

Free cut



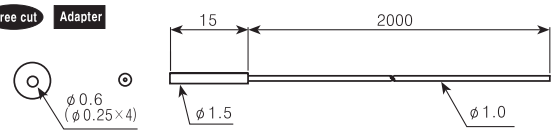
Model	Through-beam type
FT-320-06B	M3-D0.6

Free cut Adapter



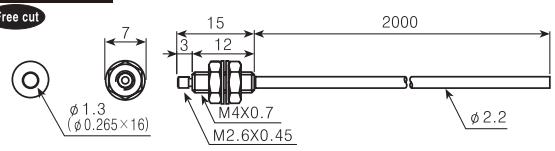
Model	Through-beam type
FTC-1520-06B	Ø1.5-D0.6

Free cut Adapter



Model	Through-beam type
FT-420-13B	M4-D1.3

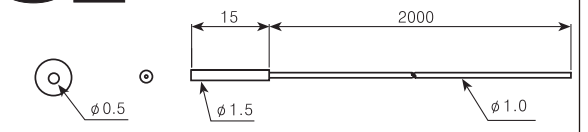
Free cut



▣ Dimensions

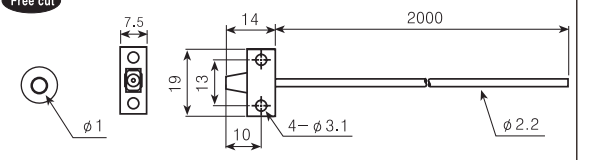
Model	Through-beam type
FTC-1520-05	Ø1.5-D0.5

Free cut Adapter



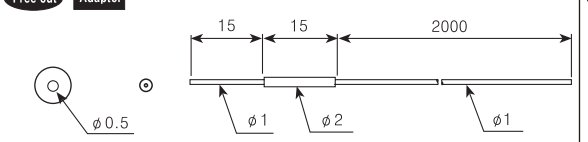
Model	Through-beam type
FTP-320-10	D1.0 / Plastic

Free cut



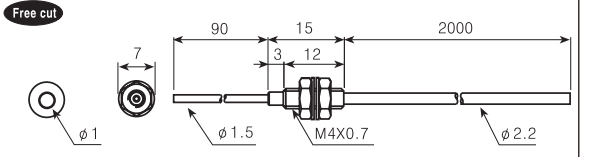
Model	Through-beam type
FTCS-220-05	Ø2-D0.5 / SUS Ø1.0×15mm

Free cut Adapter



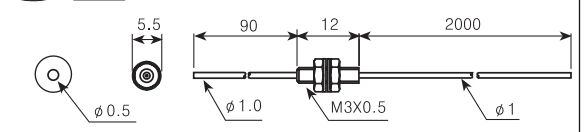
Model	Through-beam type
FTS-420-10	M4-D1.0 / SUS Ø1.5×90m

Free cut



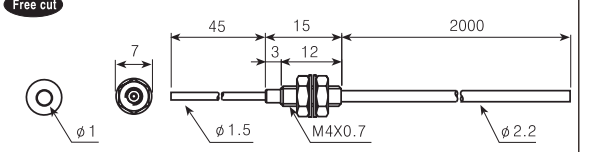
Model	Through-beam type
FTS-320-05	M3-D0.5 / SUS Ø1.0×90mm

Free cut Adapter



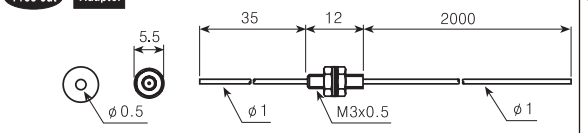
Model	Through-beam type
FTS2-420-10	M4-D1.0 / SUS Ø1.5×45m

Free cut



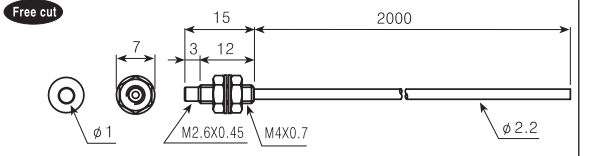
Model	Through-beam type
FTS1-320-05	M3-D0.5 / SUS Ø1.0×35mm

Free cut Adapter



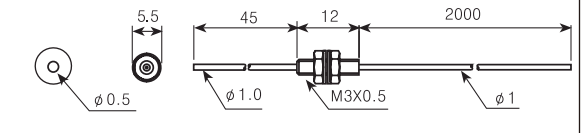
Model	Through-beam type
FT-420-10H	M4-D1.0 / Heat-resistant 105℃

Free cut



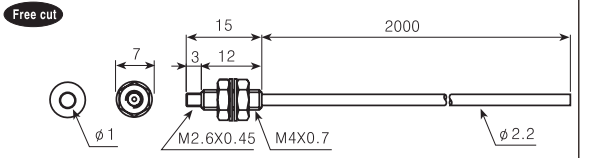
Model	Through-beam type
FTS2-320-05	M3-D0.5 / SUS Ø1.0×45mm

Free cut Adapter



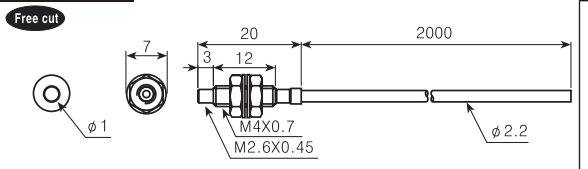
Model	Through-beam type
FT-420-15H1	M4-D1.0 / Heat-resistant 150℃

Free cut

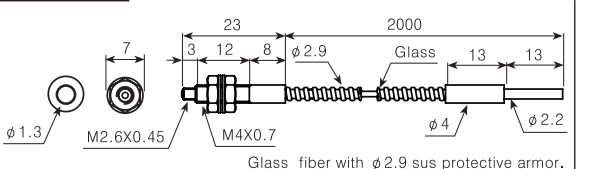


Model	Through-beam type
FT-420-10	M4-D1.0

Free cut



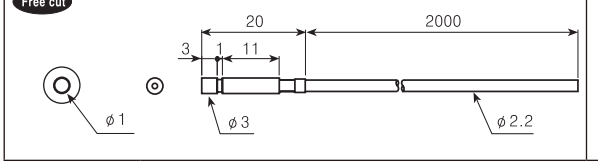
Model	Through-beam type
GT-420-13H2	M4-D1.3 / Heat-resistant Max. 250℃ / Glass



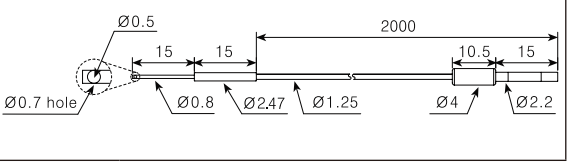
Glass fiber with ø2.9 sus protective armor.

Model	Through-beam type
FTC-320-10	Ø3-D1.0

Free cut



Model	Through-beam type
FTCSN-2520-05	Ø2.47-D0.5 / SUS Ø0.8×15mm / Side view



▣ Lens unit for long distance detection(sold separately)

◎ Model : FTL-M26


<Lens unit>


<Mounting at cable>

◎ Mounting of lens

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

◎ Ambient temperature range of lens unit

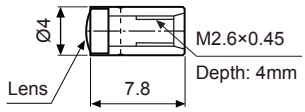
It should be used within -40 to 100℃.(not over 100℃.)

◎ Applicable fiber optic cable and max. mounting distance

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

◎ Dimensions

(unit: mm)

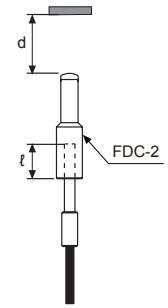
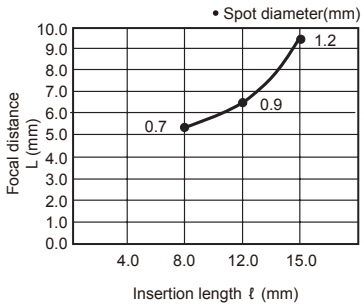


▣ Micro spot fiber optic cable and lens unit(sold separately)

◎ Model

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

◎ Feature data

Measuring method	Beam spot characteristic
	

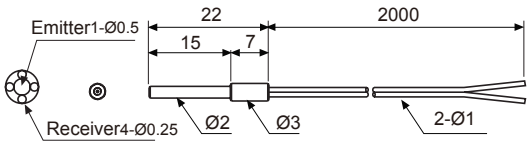
◎ Ambient temperature range of lens unit

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

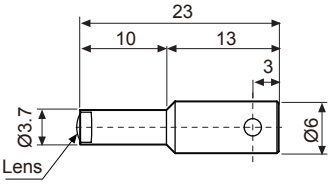
◎ Dimensions

(unit:mm)

- **FDC-320-F**



- **FDC-2**

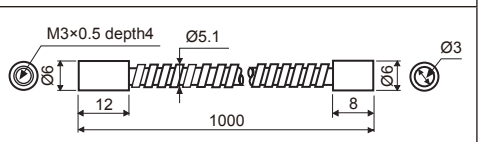
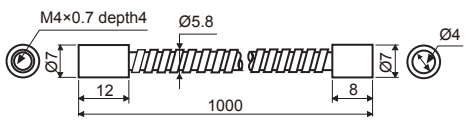
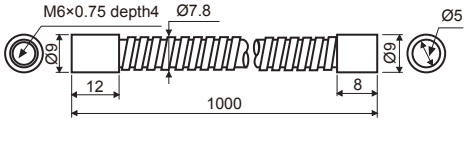


▣ Protection tube for fiber optic cable (sold separately)

◎ Application

: Protect cable from impact or cutting

(unit:mm)

Model	Appearance and Dimension
FTH-310	
FTH-410	
FDH-610	

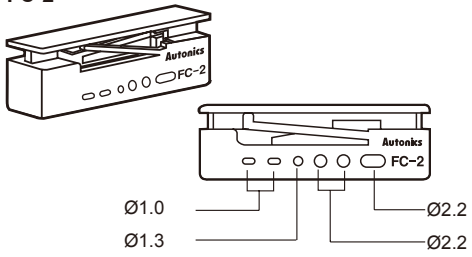
※500mm of protection tube can be customized.
※Additional 8mm is for tube coupling.

▣ Accessory

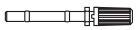
◎ Fiber cutter

Applications: Cutting fiber optic cable, free cut type

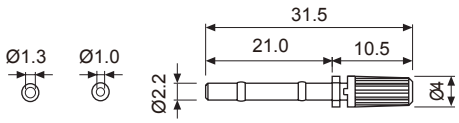
- **FC-2**



◎ 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.)