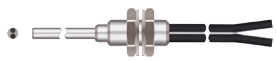
▣ Diffuse Reflective Type

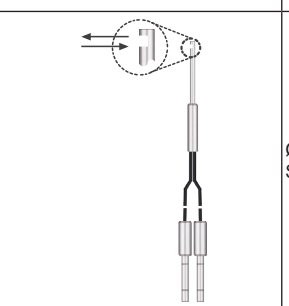
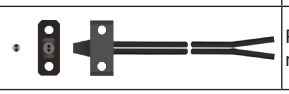
(based on Non-glossy white paper)

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℃	**FD-310-05**
			M3	40※2	Ø0.03	R15	2m (Free cut)	-40 to 70℃	**FD-320-05**
			M4	40※2	Ø0.03	R15	2m (Free cut)	-40 to 70℃	**FD-420-05**
			M3 (SUS type, 90mm)	40※2	Ø0.03	R15 (SUS part R10)	2m (Free cut)	-40 to 70℃	**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℃	**FD-620-10**
			M6 (SUS type, 90mm)	120※2	Ø0.03	R30 (SUS part R10)	2m (Free cut)	-40 to 70℃	**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℃	**FD-620-10H**
			M6	160※2	Ø0.03	R50	2m (Free cut)	-40 to 150℃	**FD-620-15H1**
			M4 (Glass type)	100※2	Ø0.03	R50	2m	-40 to 250℃	**GD-420-20H2**
			M6 (Glass type)						**GD-620-20H2**
	Flexible type※4		M3	35※1	Ø0.0125	R1	2m (Free cut)	-40 to 60℃	**FD-320-05R**
			M4						**FD-420-05R**
			M6	130※1	Ø0.04	R1	2m (Free cut)	-40 to 60℃	**FD-620-10R**
	Break-resistant type※4		M3	35※2	Ø0.0125	R5	2m (Free cut)	-40 to 60℃	**FD-320-06B**
			M4						**FD-420-06B**
			M6	100※2	Ø0.0125	R5	2m (Free cut)	-40 to 60℃	**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.

▣ 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℃	**FD-320-F**
			M3	60※2	Ø0.03	R30	2m (Free cut)	-40 to 70℃	**FD-320-F1**
			M6	120※2	Ø0.03	R30	2m (Free cut)	-40 to 70℃	**FD-620-F2**
Cylinder type	Standard type		Ø3mm	40※2	Ø0.03	R15	2m (Free cut)	-40 to 70℃	**FDC-320-05**
			Ø3mm (SUS type, 15mm)	40※2	Ø0.03	R15 (SUS part R10)	2m (Free cut)	-40 to 70℃	**FDCS-320-05**
	Break-resistant type※4		Ø3mm	35※2	Ø0.0125	R5	2m (Free cut)	-40 to 60℃	**FDC-320-06B**
	Standard type		Ø3mm Side view	30※1	Ø0.0125	R15	2m	-40 to 60℃	**FDCSN-320-05**
Flat type	Flexible type		Top view	35※1	Ø0.0125	R1	1m (Free cut)	-40 to 60℃	**FDFU-210-05R**
			Side view	30※1	Ø0.0125	R1	1m (Free cut)	-40 to 60℃	**FDFN-210-05R**
			Flat view	30※1	Ø0.0125	R1	1m (Free cut)	-40 to 60℃	**FDF-210-05R**
Right angle	Flexible type		M6	120※1	Ø0.04	R1	1m (Free cut)	-40 to 60℃	**FDR-610-10R**
Plastic	Standard type		Plastic injection molding type	120※2	Ø0.03	R30	2m (Free cut)	-40 to 70℃	**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℃	**FLF-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.

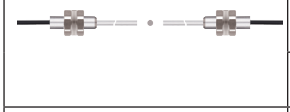
※3: Min. sensing target is a value measured opaque material in accurate output status and the sensing distance is different with the rated sensing distance ※2.

※4: • **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℃	**FT-310-05**
			M3	150※2	Ø0.5	R15	2m (Free cut)	-40 to 70℃	**FT-320-05**
			M3 (SUS type, 90mm)	150※2	Ø0.5	R15 (SUS part R10)	2m (Free cut)	-40 to 70℃	**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℃	**FT-420-10**
			M4 (SUS type, 90mm)	500※2	Ø1	R30 (SUS part 10)	2m (Free cut)	-40 to 70℃	**FTS-420-10**
			M4 (SUS type, 45mm)	500※2	Ø1	R30 (SUS part 10R)	2m (Free cut)	-40 to 70℃	**FTS2-420-10**
	Heat-resistant type		M4	300※2	Ø1	R30	2m (Free cut)	-40 to 105℃	**FT-420-10H**
			M4	500※2	Ø1	R50	2m (Free cut)	-40 to 150℃	**FT-420-15H1**
			M4 (Glass type)	400※2	Ø1	R25	2m	-40 to 250℃	**GT-420-13H2**
	Flexible type※4		M3	110※1	Ø0.3	R1	2m (Free cut)	-40 to 60℃	**FT-320-05R**
			M4	500※1	Ø0.5	R1	2m (Free cut)	-40 to 60℃	**FT-420-10R**
	Break-resistant type※4		M3	110※1	Ø0.3	R5	2m (Free cut)	-40 to 60℃	**FT-320-06B**
			M4	400※1	Ø0.6	R5	2m (Free cut)	-40 to 60℃	**FT-420-13B**
Cylinder type	Standard type		Ø1.5mm	150※2	Ø0.5	R15	2m (Free cut)	-40 to 70℃	**FTC-1520-05**
			Ø2mm	150※2	Ø0.5	R15	2m (Free cut)	-40 to 70℃	**FTC-220-05**
			Ø2mm (SUS type, 15mm)	150※2	Ø0.5	R15 (SUS part10R)	2m (Free cut)	-40 to 70℃	**FTCS-220-05**
			Ø3mm	150※2	Ø1	R30	2m (Free cut)	-40 to 70℃	**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.

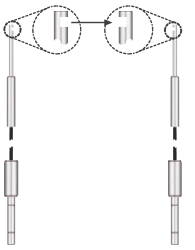
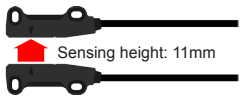
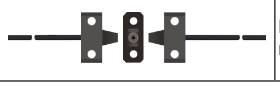
※Free cut type's sensing distance can be shortened about max. 20% than the normal according to condition of the cable.
[(FC-3) should be used for cutting fiber cable.]

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

※Glass type is for BF5R, BF4R Series.

▣ Through-Beam Type

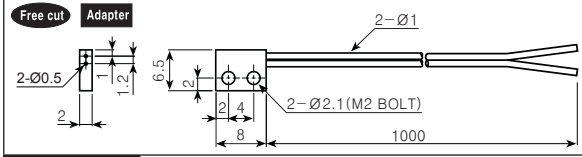
(based on Non-glossy white paper)

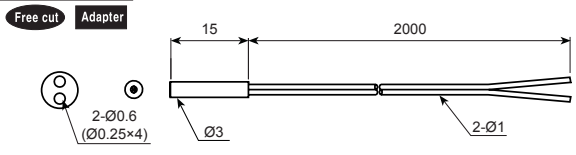
Type		Appearance	Feature	Sensing distance (mm)	Min. Sensing Target※3	Allowable Bend Radius	Cable length (L)	Ambient Temperature	Model
Cylinder type	Flexible type※4		Ø3mm	110※1	Ø0.3	R1	2m (Free cut)	-40 to 60℃	**FTC-220-05R**
	Break-resistant type※4		Ø3mm	110※2	Ø0.3	R5	2m (Free cut)	-40 to 60℃	**FTC-1520-06B**
	Standard type		Ø2.47mm Side view	120※1	Ø0.0125	R15	2m	-40 to 60℃	**FTCSN-2520-05**
Flat type	Flexible type		Top view	110※1	Ø0.04	R1	1m (Free cut)	-40 to 60℃	**FTFU-210-05R**
			Side view	110※1	Ø0.04	R1	1m (Free cut)	-40 to 60℃	**FTFN-210-05R**
			Flat view	100※1	Ø0.04	R1	1m (Free cut)	-40 to 60℃	**FTF-210-05R**
			Side view+ Top view (Bending)	110※1	Ø0.04	R1	1m (Free cut)	-40 to 60℃	**FTFB-210-05R**
			L type Top view height 12.2mm	500※1	Ø0.06	R1	1m (Free cut)	-40 to 60℃	**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℃	**FTR-410-10R**
Area type	Flexible type		Ø1mm	750※5	Ø0.07	R2	1m (Free cut)	-40 to 60℃	**FTW11-210-10R**
Plastic	Standard type		Plastic injection molding type	500※2	Ø1	R30	2m (Free cut)	-40 to 70℃	**FTP-320-10**

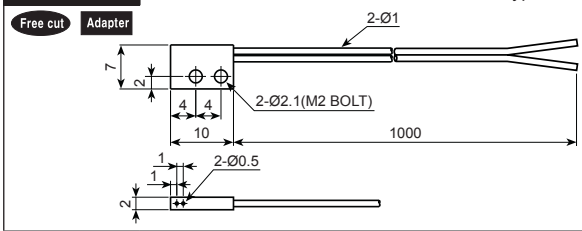
※1: The sensing distance is a standard for BF5 Series.
※2: The sensing distance is a standard for red LED of BF4 Series and 10% of red LED is applied when it is green LED. It is applied to 40% of sensing distance for BF3RX.
※3: Min. sensing target is a value measured opaque material in accurate output 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.]

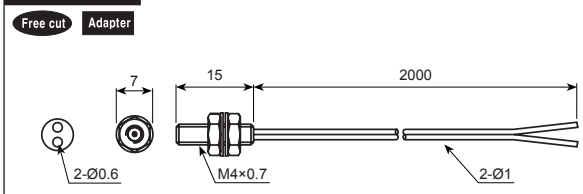
▣ Dimensions

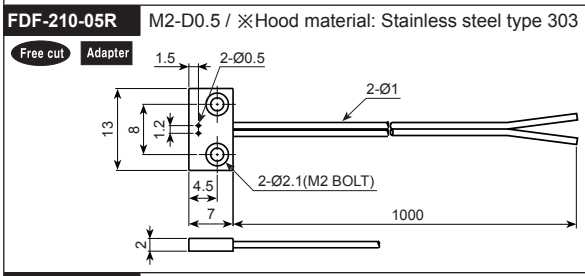
Model	Diffuse reflective type	Model	Diffuse reflective type
FDFU-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	**FDC-320-06B**	M3-D0.6
FDFN-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	**FD-420-06B**	M4-D0.6
FDF-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303	**FD-620-13B**	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 Ø1.5×15mm
FD-420-05(R)	M4-D0.5	**FDS-320-05**	M3-D0.5 / Stainless steel Ø1.5×90mm
FD-620-10(R)	M6-D1.0		

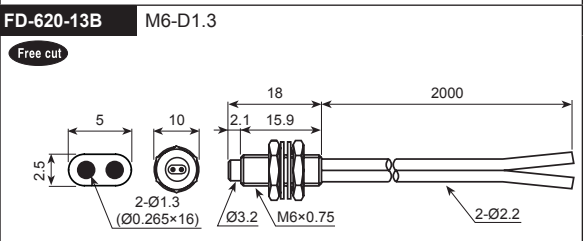


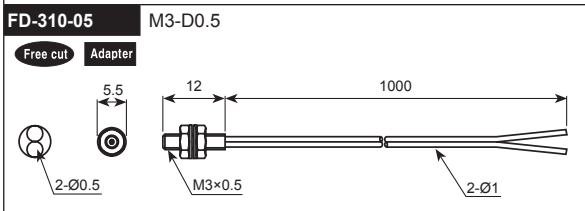


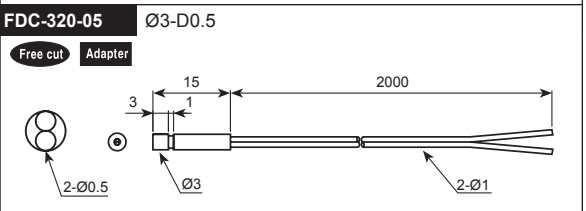


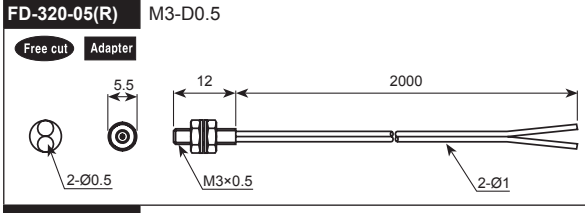


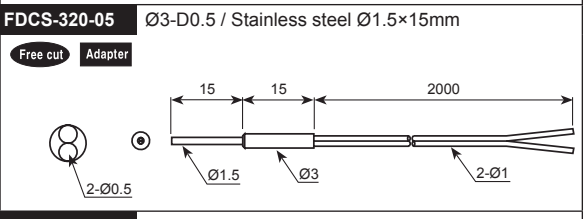


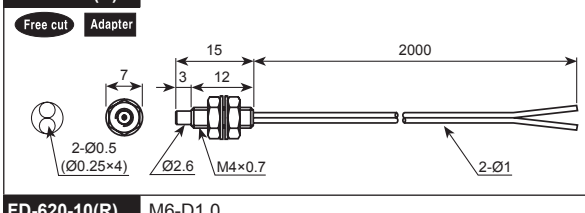


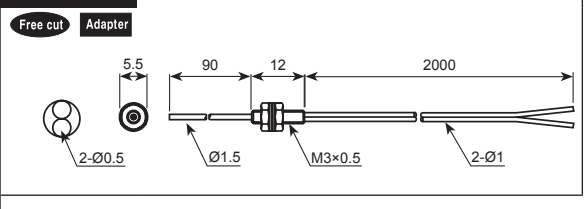


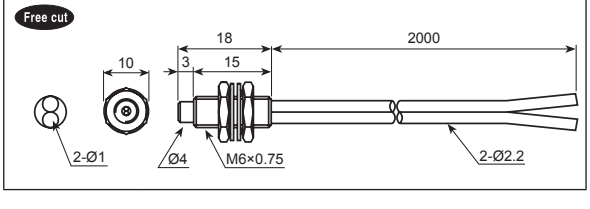








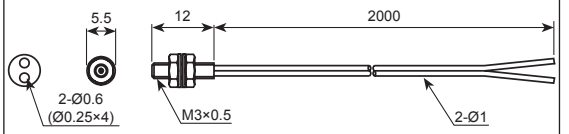




▣ Dimensions

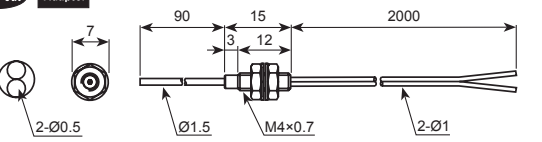
Model	Diffuse reflective type
FD-320-06B	M3-D0.6

Free cut Adapter



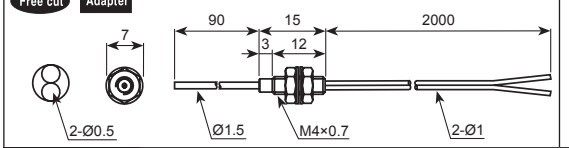
Model	Diffuse reflective type
FDS2-320-05	M3-D0.5 / Stainless steel Ø1.5×45mm

Free cut Adapter



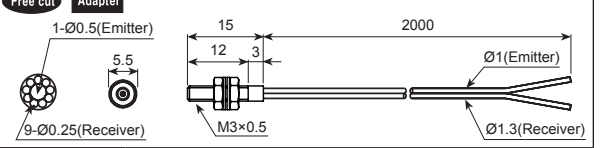
Model	Diffuse reflective type
FDS-420-05	M4-D0.5 / Stainless steel Ø1.5×90mm

Free cut Adapter



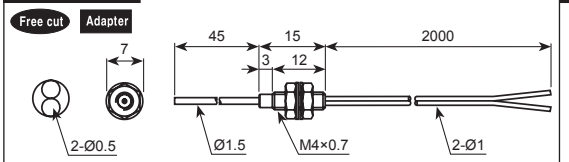
Model	Diffuse reflective type
FD-320-F1	Co-axial M3 / Ø0.5, Ø0.25×9

Free cut Adapter



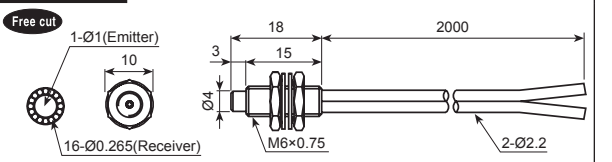
Model	Diffuse reflective type
FDS2-420-05	M4-D0.5 / SUS Ø1.5×45mm

Free cut Adapter



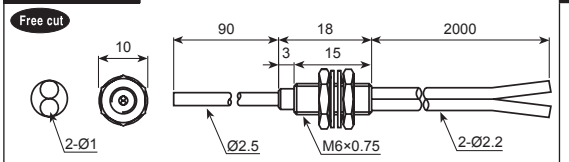
Model	Diffuse reflective type
FD-620-F2	Co-axial M6 / Ø1.0, Ø0.265×16

Free cut



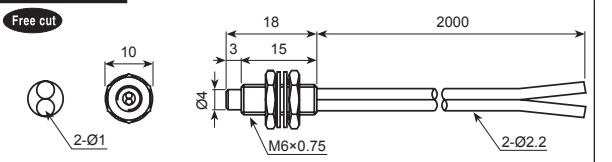
Model	Diffuse reflective type
FDS-620-10	M6-D1.0 / SUS Ø2.5×90mm

Free cut



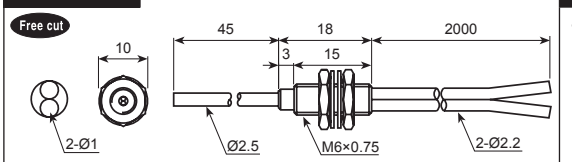
Model	Diffuse reflective type
FD-620-10H	M6-D1.0 / Heat-resistant 105℃

Free cut



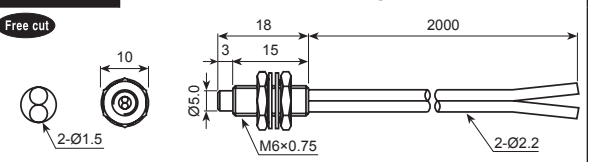
Model	Diffuse reflective type
FDS2-620-10	M6-D1.0 / SUS Ø2.5×45mm

Free cut



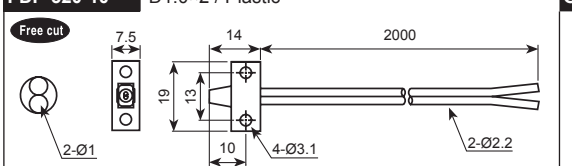
Model	Diffuse reflective type
FD-620-15H1	M6-D1.5 / Heat-resistant 150℃

Free cut

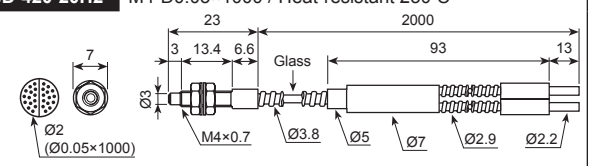


Model	Diffuse reflective type
FDP-320-10	D1.0×2 / Plastic

Free cut

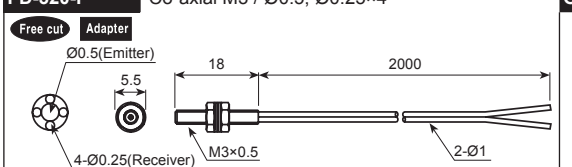


Model	Diffuse reflective type
GD-420-20H2	M4-D0.05×1000 / Heat-resistant 250℃

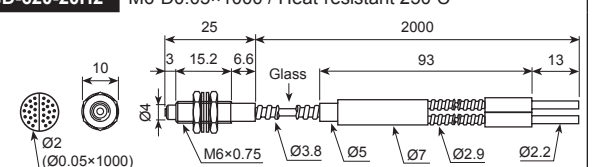


Model	Diffuse reflective type
FD-320-F	Co-axial M3 / Ø0.5, Ø0.25×4

Free cut Adapter

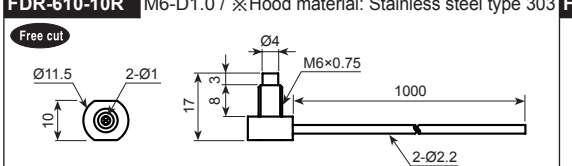


Model	Diffuse reflective type
GD-620-20H2	M6-D0.05×1000 / Heat-resistant 250℃

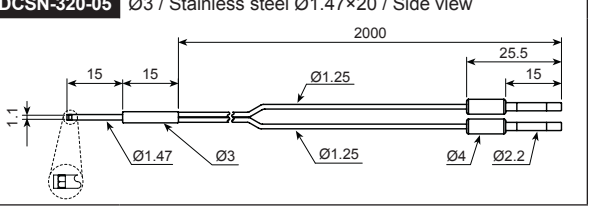


Model	Diffuse reflective type
FDR-610-10R	M6-D1.0 / ※Hood material: Stainless steel type 303

Free cut

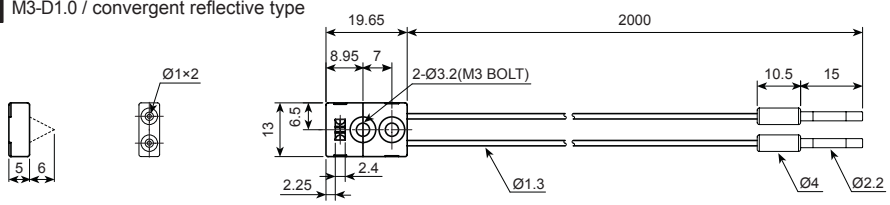


Model	Diffuse reflective type
FDCSN-320-05	Ø3 / Stainless steel Ø1.47×20 / Side view

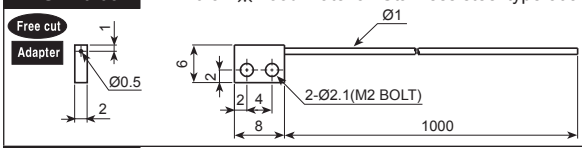


▣ Dimensions

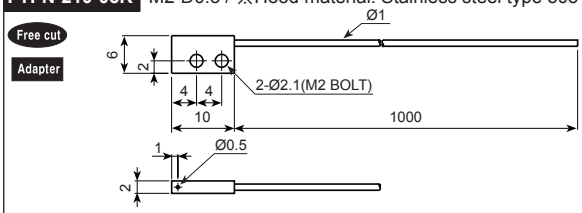
Model	Convergent reflective type
FLF-320-10	M3-D1.0 / convergent reflective type



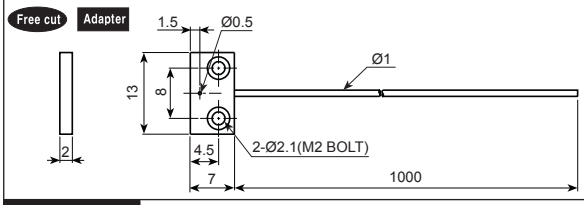
Model	Through-beam type
FTFU-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303



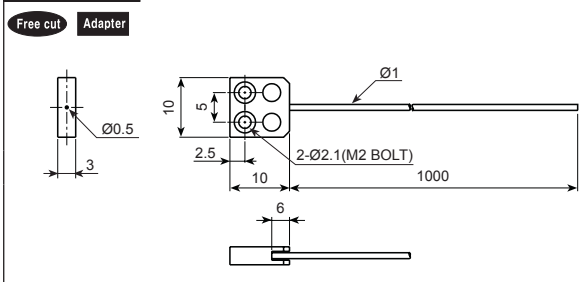
Model	Through-beam type
FTFN-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303



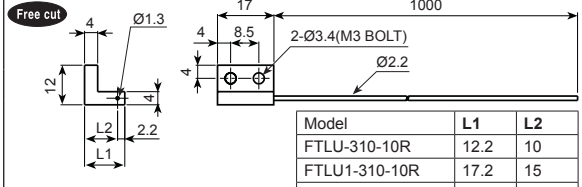
Model	Through-beam type
FTF-210-05R	M2-D0.5 / ※Hood material: Stainless steel type 303



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

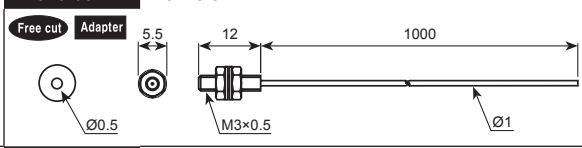


Model	Through-beam type
FTLU-310-10R FTLU1-310-10R FTLU2-310-10R	M2-D0.5 / ※Hood material: Aluminum

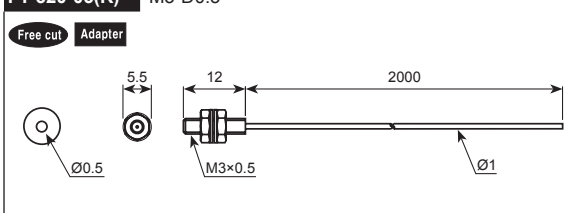


Model	L1	L2
FTLU-310-10R	12.2	10
FTLU1-310-10R	17.2	15
FTLU2-310-10R	22.2	20

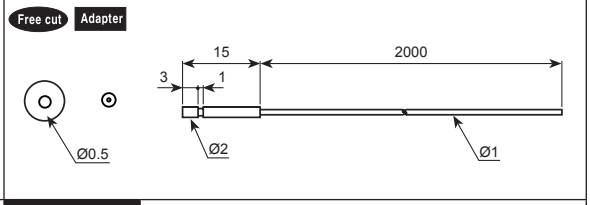
Model	Through-beam type
FT-310-05	M3-D0.5



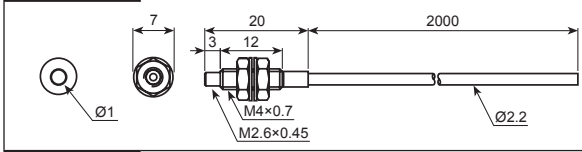
Model	Through-beam type
FT-320-05(R)	M3-D0.5



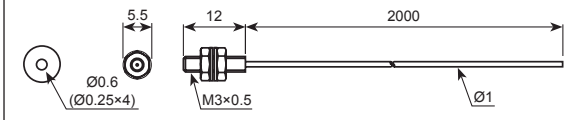
Model	Through-beam type
FTC-220-05(R)	Ø2-D0.5



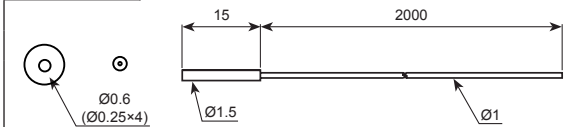
Model	Through-beam type
FT-420-10R	M4-D1.0



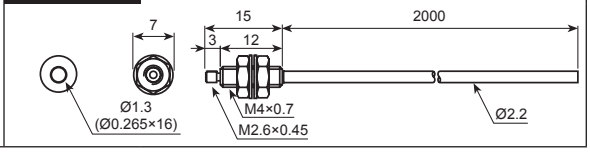
Model	Through-beam type
FT-320-06B	M3-D0.6



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

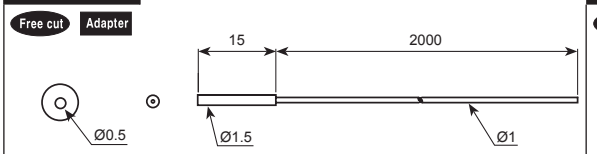


Model	Through-beam type
FT-420-13B	M4-D1.3

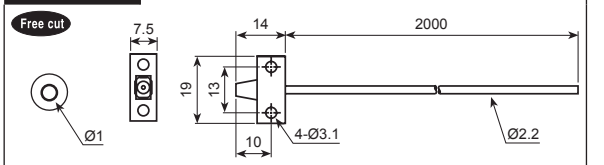


▣ Dimensions

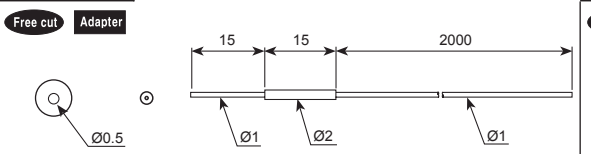
Model	Through-beam type
FTC-1520-05	Ø1.5-D0.5



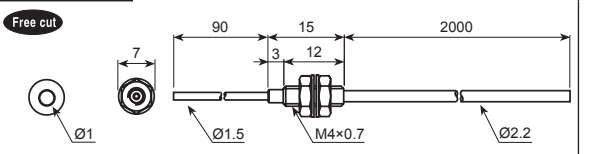
Model	Through-beam type
FTP-320-10	D1.0 / Plastic



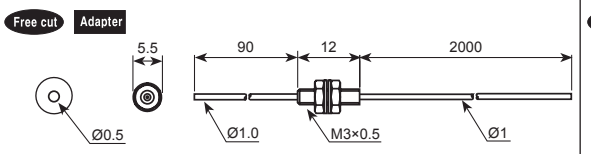
Model	Through-beam type
FTCS-220-05	Ø2-D0.5 / SUS Ø1.0×15mm



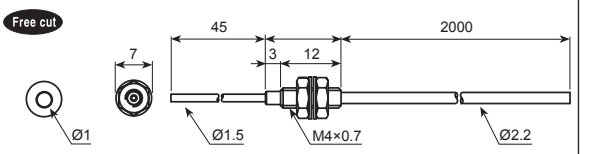
Model	Through-beam type
FTS-420-10	M4-D1.0 / Stainless steel Ø1.5×90m



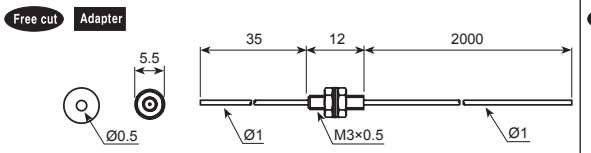
Model	Through-beam type
FTS-320-05	M3-D0.5 / SUS Ø1.0×90mm



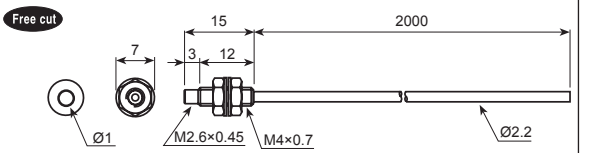
Model	Through-beam type
FTS2-420-10	M4-D1.0 / Stainless steel Ø1.5×45m



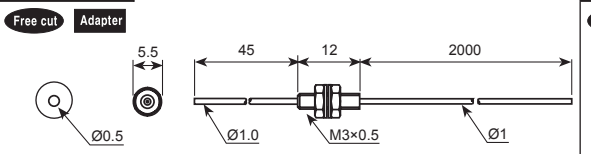
Model	Through-beam type
FTS1-320-05	M3-D0.5 / SUS Ø1.0×35mm



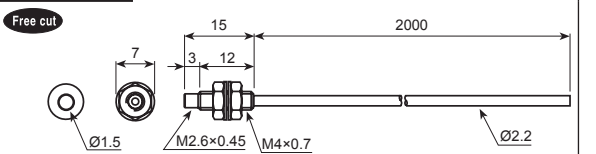
Model	Through-beam type
FT-420-10H	M4-D1.0 / Heat-resistant 105℃



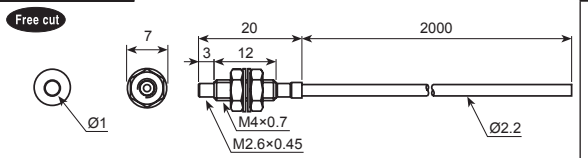
Model	Through-beam type
FTS2-320-05	M3-D0.5 / SUS Ø1.0×45mm



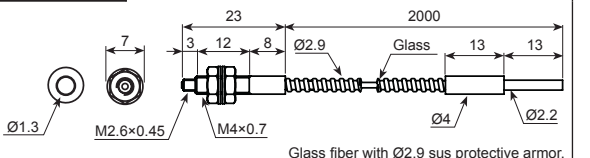
Model	Through-beam type
FT-420-15H1	M4-D1.5 / Heat-resistant 150℃



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

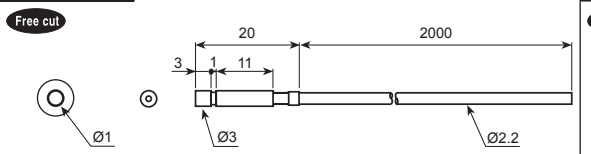


Model	Through-beam type
GT-420-13H2	M4-D1.3 / Heat-resistant Max. 250℃ / Glass

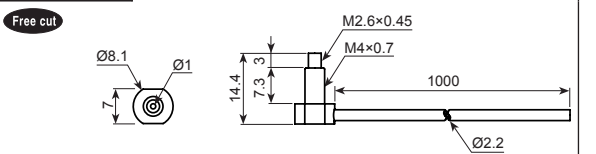


Glass fiber with Ø2.9 sus protective armor.

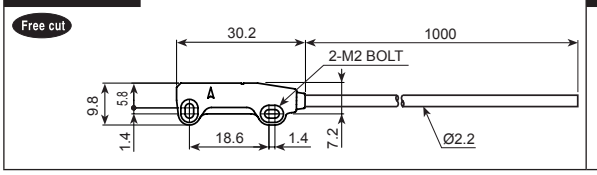
Model	Through-beam type
FTC-320-10	Ø3-D1.0



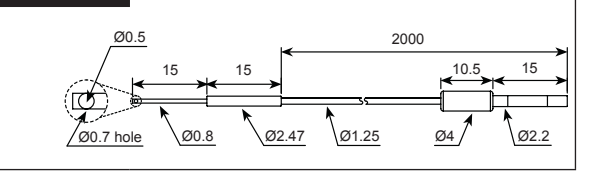
Model	Through-beam type
FTR-410-10R	M4-D1.0 ※Hood material: Stainless steel type 303



Model	Through-beam type
FTW11-210-10R	M2-D1.0



Model	Through-beam type
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



<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

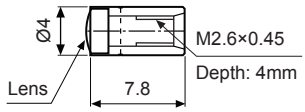
It should be used within -40 to 100℃. (not over 100℃.)

◎ Applicable fiber optic cable and max. mounting distance

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

◎ Dimensions

(unit: mm)

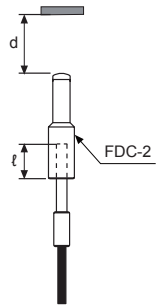
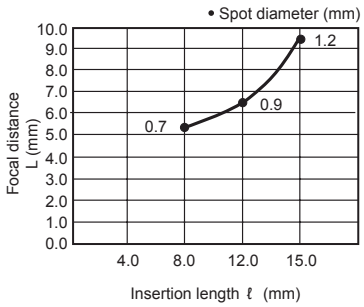


▣ Micro Spot Fiber Optic Cable And Lens Unit (sold separately)

◎ Model

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

◎ Feature data

Measuring method	Beam spot characteristic
	

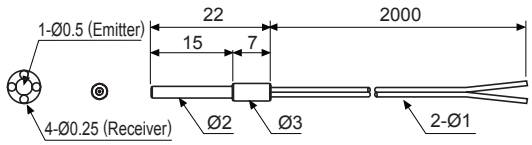
◎ Ambient temperature range of lens unit

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

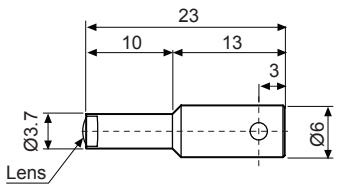
◎ Dimensions

(unit: mm)

- **FDC-320-F**



- **FDC-2**

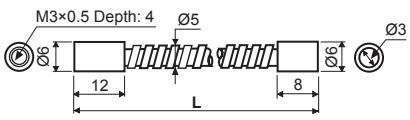
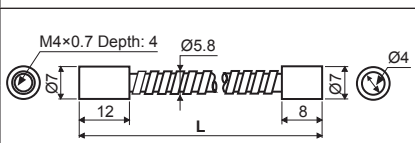
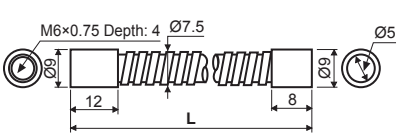


▣ Protection Tube For Fiber Optic Cable (sold separately)

◎ Application

: Protect cable from impact or cutting

(unit: mm)

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

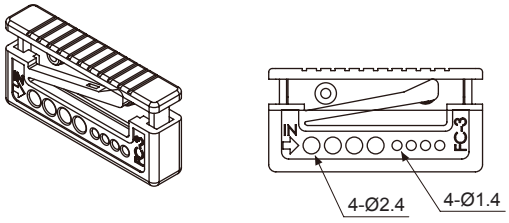
※Additional 8mm is for tube coupling.

▣ Accessory

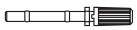
◎ Fiber cutter

Applications: Cutting fiber optic cable, free cut type

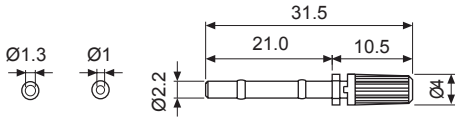
- **FC-3**



◎ 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.)