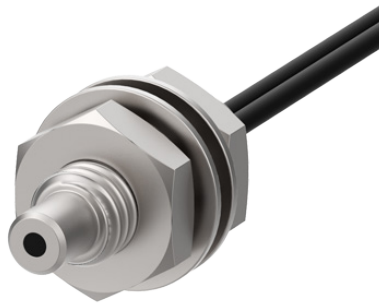


# Retroreflective Type Fiber Optic Units








## FD/GD Series PRODUCT MANUAL






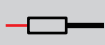

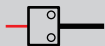




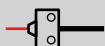





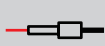


**For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

### Icon Overview

-  **Std.** Standard:  
Fiber optic units for general purpose
-  **Heat-resistant:**  
Fiber optic units for the high-temperature environment (-60 to 350°C)
-  **Vacuum-resistant:**  
Fiber optic units for the high-temperature (-60 to 250°C) and vacuum environment
-  **Bending-resistant (R5):**  
Fiber optic units for withstanding repeated bending
-  **Flexible (R1, R2):**  
Fiber optic units for withstanding repeated flexing

### Line Up

	Standard	Heat-resistant	Vacuum-resistant	Bending-resistant	Flexible
<b>Threaded head</b> 	Std.				
<b>Cylindrical head</b> 	Std.				
<b>Flat head</b> 					
<b>L-shaped head</b> 					
<b>Molded plastic head</b> 	Std.				
<b>Perpendicular head</b> 					
<b>SUS head</b> 	Std.				
<b>Wide area head</b> 					

### Selection Guide

- The model starts with F is plastic, G is glass optical fibers. Glass fibers are for BF5 and BF4 series.
- Be sure to use the vacuum-resistant fiber mounting with the fiber optic coupler and the atmospheric side fiber (sold separately). For more information on the fiber optic coupler, refer to the 'fiber optic sensor guide.'
- The testing environments for sensing distance vary depending on the amplifiers.

Amplifier	Testing environment
<b>BF5</b>	Red LED, Standard (STD) mode, Non-glossy white paper
<b>BF4</b>	Red LED, Maximum sensitivity, Non-glossy white paper Green LED has 10% of sensing distance compare to the Red LED. In case of BF3, apply 40% of sensing distance.

- The minimum detectable target came out with the maximum sensitivity of the BF4 series.
- For the detailed drawings and dimensions, follow the Autonics website.
- Be sure to use offered fiber cutter (FC-3) for FREE CUT models.
- Be sure to connect offered fiber optic adaptor for Adaptor models.
- The installation of the fiber optic unit may vary depending on the fiber optic amplifier. See the manual of the amplifier that you are using.

## Retroreflective Type: Threaded head

### ■ Standard

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FD-310-05	R15	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FD-320-05	R15	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FD-420-05	R15	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FD-620-10	R25	-40 to 70 °C	120 mm (BF4)	Ø 0.03 mm		FREE CUT
FD-320-F	R10	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FD-320-F1	R10	-40 to 70 °C	60 mm (BF4)	Ø 0.03 mm	<p>• Be sure not to change the cable of the emitter/receiver when mounting to the amplifier. Emitter adaptor (black), receiver adaptor (dark gray)</p>	FREE CUT / Adaptor
FD-620-F2	R30	-40 to 70 °C	120 mm (BF4)	Ø 0.03 mm		FREE CUT

# Retroreflective Type: Threaded head

## ■ Heat-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FD-620-10H	R25	-40 to 105 °C	300 mm (BF5)	Ø 0.08 mm		FREE CUT
FD-620-15H1	R35	-40 to 150 °C	275 mm (BF5)	Ø 0.08 mm		FREE CUT
GD-420-20H2	R25	-40 to 250 °C	330 mm (BF5)	Ø 0.08 mm		—
GD-620-20H2	R25	-40 to 250 °C	300 mm (BF5)	Ø 0.08 mm		—
GD-620-12H3	R25	-60 to 350 °C	270 mm (BF5)	Ø 0.08 mm		—

## Retroreflective Type: Threaded head

### ■ Vacuum-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
GD-610-12V2	R25	-60 to 250 °C	180 mm <sup>01)</sup> (BF5)	Ø 0.08 mm		—
			120 mm <sup>02)</sup> (BF5)	Ø 0.08 mm		

01) Equipped with the atmospheric-side fiber optic unit (FU-VA01)

02) Equipped with the atmospheric-side fiber optic unit (FU-VA02)

### ■ Bending-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FD-320-06B	R5	-40 to 60 °C	35 mm (BF4)	Ø 0.0125 mm		FREE CUT/ Adaptor
FD-420-06B	R5	-40 to 60 °C	35 mm (BF4)	Ø 0.0125 mm		FREE CUT/ Adaptor
FD-620-13B	R5	-40 to 60 °C	100 mm (BF4)	Ø 0.0125 mm		FREE CUT

### ■ Flexible

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FD-320-05R	R1	-40 to 60 °C	35 mm (BF5)	Ø 0.0125 mm		FREE CUT/ Adaptor
FD-420-05R	R1	-40 to 60 °C	35 mm (BF5)	Ø 0.0125 mm		FREE CUT/ Adaptor
FD-620-10R	R1	-40 to 60 °C	130 mm (BF5)	Ø 0.04 mm		FREE CUT

## Retroreflective Type: Cylindrical head

### ■ Standard

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDC-320-05	R15	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FDC-320-F	R10	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor

### ■ Bending-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDC-320-06B	R5	-40 to 60 °C	35 mm (BF4)	Ø 0.0125 mm		FREE CUT / Adaptor

## Retroreflective Type: Flat head

### Flexible

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDf-210-05R	R1	-40 to 60 °C	30 mm (BF5)	Ø 0.0125 mm	<p>• Hood material: SUS303, flat view</p>	FREE CUT / Adaptor
FDfN-210-05R	R1	-40 to 60 °C	30 mm (BF5)	Ø 0.0125 mm	<p>• Hood material: SUS303, side view</p>	FREE CUT / Adaptor
FDfU-210-05R	R1	-40 to 60 °C	35 mm (BF5)	Ø 0.0125 mm	<p>• Hood material: SUS303, top view</p>	FREE CUT / Adaptor

## Retroreflective Type: L-shaped head

### ■ Heat-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
GDL-620-12H2	R25	-60 to 250 °C	260 mm (BF5)	Ø 0.08 mm		—
GDL-620-12H3	R25	-60 to 350 °C	260 mm (BF5)	Ø 0.08 mm		—

### ■ Vacuum-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
GDL-610-12V2	R25	-60 to 250 °C	180 mm <sup>01)</sup> (BF5) 130 mm <sup>02)</sup> (BF5)	Ø 0.08 mm Ø 0.08 mm		—

01) Equipped with the atmospheric-side fiber optic unit (FU-VA01)

02) Equipped with the atmospheric-side fiber optic unit (FU-VA02)

## Retroreflective Type: Molded plastic head

### ■ Standard

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDP-320-10	R25	-40 to 70 °C	120 mm (BF4)	Ø 0.03 mm		FREE CUT

### ■ Flexible

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDPF-210-05R	R1	-30 to 70 °C	70 mm (BF5)	Ø 0.08 mm		FREE CUT / Adaptor



## Retroreflective Type: Perpendicular head

### ■ Heat-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
GDR-620-17H2	R25	-60 to 250 °C	250 mm (BF5)	Ø 0.08 mm		—
GDR-620-17H3	R25	-60 to 350 °C	260 mm (BF5)	Ø 0.08 mm		—

### ■ Bending-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDRT-420-02B	R5	-30 to 70 °C	230 mm (BF5)	Ø 0.08 mm		FREE CUT

### ■ Flexible

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDR-610-10R	R1	-40 to 60 °C	120 mm (BF5)	Ø 0.04 mm	<p>• Hood material: SUS303</p>	FREE CUT

# Retroreflective Type: SUS head

## Standard

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDS-320-05	R15 (SUS part R10)	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT
FDS-420-05	R15 (SUS part R10)	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FDS-620-10	R25 (SUS part R10)	-40 to 70 °C	120 mm (BF4)	Ø 0.03 mm		FREE CUT
FDS2-320-05	R15 (SUS part R10)	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FDS2-420-05	R15 (SUS part R10)	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FDS2-620-10	R25 (SUS part R10)	-40 to 70 °C	120 mm (BF4)	Ø 0.03 mm		FREE CUT
FDCS-320-05	R15 (SUS part R10)	-40 to 70 °C	40 mm (BF4)	Ø 0.03 mm		FREE CUT / Adaptor
FDCSN-320-05	R15	-40 to 60 °C	30 mm (BF5)	Ø 0.0125 mm	<p>• Side view</p>	—

## Retroreflective Type: Wide area head

### ■ Bending-resistant

Model	Bend radius	Ambient temperature	Sensing distance (Testing amplifier)	Min. target size	Dimensions (unit: mm)	FREE CUT / Adaptor
FDW10-320-02B	R5	-30 to 70 °C	230 mm (BF5)	Ø 0.08 mm	<p>CORE - OPTICAL AXIS OF EMITTER : 16 x Ø0.265 OPTICAL AXIS OF RECEIVER : 16 x Ø0.265</p>	FREE CUT
FDW10T-320-02B	R5	-30 to 70 °C	230 mm (BF5)	Ø 0.08 mm	<p>CORE - OPTICAL AXIS OF EMITTER : 16 x Ø0.265 OPTICAL AXIS OF RECEIVER : 16 x Ø0.265</p>	FREE CUT

**Sold Separately**

■ **Lens unit for micro spot**

• Supported fiber optic unit: FDC-320-F

Model	Ambient temperature	Dimensions (unit: mm)	Feature data				
FDC-2	-40 to 100 °C		<table border="1"> <thead> <tr> <th>Measuring method</th> <th>Beam spot characteristic</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Measuring method	Beam spot characteristic		
Measuring method	Beam spot characteristic						

■ **Fiber optic coupler (vacuum fiber optics component)**

Model	Ambient temperature	Dimensions (unit: mm)
FU-VC01	-60 to 200 °C	
FU-VC02	-60 to 300 °C	

**Sold Separately**

■ Atmospheric-side fiber optic units

Model	Bend radius	Ambient temperature	Dimensions (unit: mm)	FREE CUT
FU-VA01	R30	-30 to 70 °C		FREE CUT
FU-VA02	R20	-30 to 70 °C		FREE CUT

■ Protection tube for cable

Model	Dimensions (unit: mm)
FDH-605	
FDH-610	

## Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

• Example of ordering information: FD-620-10H

F	D	□	-	6	20	-	10	H	□
①	②	③	-	④	⑤	-	⑥	⑦	⑧

①	Fiber material	F	Plastic
		G	Glass
②	Sensing type	D	Retroreflective type
		L	Convergent reflective type
		T	Through-beam type
③	Head shape		
		· Threaded head	No mark Standard
	· Cylindrical head	C	Standard
		CS	Cylinder+SUS head (SUS length 15 mm)
		CSN	Cylinder+SUS head (SUS length 15 mm, side view)
	· Flat head	F	Flat view
		FB	Side view+Top view (bending)
		FN	Side view
		FU	Top view (up)
		LU	L-shaped head top view (height 12.2 mm)
		LU1	L-shaped head top view (height 17.2 mm)
	· L-shaped head	LU2	L-shaped head top view (height 22.2 mm)
		L	Standard
		P	Standard
	· Molded plastic head	PF	Flat view
		R	Standard
	· Perpendicular head	RT	Protection tube mounted
		S	SUS length 90 mm
	· SUS head	S1	SUS length 35 mm
		S2	SUS length 45 mm
		U3	Beam width 3 mm
	· U-shaped head	W5	Beam width 5 mm
		· Wide area head	W10
	W10T		Beam width 10 mm, protection tube mounted
	W11		Beam width 11 mm
	· Protection tube	H	Protection tube for fiber cable (sold separately)
		④	Hood diameter
2	∅ 2 mm (M2)		
3	∅ 3 mm (M3)		
4	∅ 4 mm (M4)		
6	∅ 6 mm (M6)		

⑤	Cable length	5	0.5 m
		10	1 m
		20	2 m
		10M	10 m
⑥	Fiber diameter	2	∅ 0.2 mm
		5	∅ 0.5 mm
		6	∅ 0.6 mm
		10	∅ 1.0 mm
		12	∅ 1.2 mm
		13	∅ 1.3 mm
		14	∅ 1.4 mm
		15	∅ 1.5 mm
		17	∅ 1.7 mm
		20	∅ 2.0 mm
		F	∅ 0.5 mm, ∅ 0.25 mm×4 (coaxial type)
		F1	∅ 0.5 mm, ∅ 0.25 mm×9 (coaxial type)
		F2	∅ 1.0 mm, ∅ 0.265 mm×16 (coaxial type)
		⑦	Unit type
B	Bending-resistant (R5)		
R	Flexible (R1, R2)		
H	Heat-resistant (40 to 105 °C)		
H1	Heat-resistant (40 to 150 °C)		
H2	Heat-resistant (60 to 250 °C)		
H3	Heat-resistant (60 to 350 °C)		
V	Vacuum-resistant (60 to 100 °C)		
V1	Vacuum-resistant (60 to 150 °C)		
V2	Vacuum-resistant (60 to 250 °C)		
V3	Vacuum-resistant (60 to 350 °C)		
⑧	Convergent reflective type size option	A	R20 / 12×18×3
		L	Over 30 mm of the product length
		Waterproof sealing	WP