Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

FIDER UTILIS
Easy mounting
Thread type
Cylindrical type
Sleeve type
Flexible R4/R2
Flexible R1/R2
Retro-reflective

Small object detection

C	Scree	0 / A M	011
	screer	1/AH	av
			J

Limited diffuse

Narrow view/ wafer mapping

Heat resistant

Chemical resistant Vacuum resistant Liquid leekliquid leakage/ water detection Lens for through-beam type Correct use

Heat resistant (180 to 200°C)



Fiber units for ambient temperatures of 180 to 200°C

Fiber units

Heat resistant (130°C or below)

• P.77

Fiber units

Heat resistant (250 to 350°C)

• P.85

New concept joint type also available

This heat resistant series offers the most models in the industry at 30 models (according to in-house survey)

Various selection

Selection is possible from among 13 types of fiber units for ambient temperatures of 180 to 200°C. A wide variation of through-beam types is available to fix customer's applications, including standard and joint types, as well as straight view and side view types.

Through-beam type (standard types)

	Straight view		Side view			
NF-TH10	NF-TH11	NF-TH02	NF-TH04S-27V2	NF-TH05S-A		
Heat resistant to 200°C	Heat resistant to 200°C	Heat resistant to 180°C	Heat resistant to 200°C	Heat resistant to 200°C		
and and			"L			
Lens attachable	Lens attachable	Free cut	ø1 sleeve	ø1.5 sleeve		

Through-beam type (joint types)

	Straight view		Side	view
NF-TH12	NF-TH13	NF-TH14	NF-TH15	NF-TH16
Heat resistant to 200°C	Heat resistant to 200°C			
	and and	all all		
Ordinary temperature fiber section is free cut	Ordinary temperature fiber section is free cu			

Diffuse type

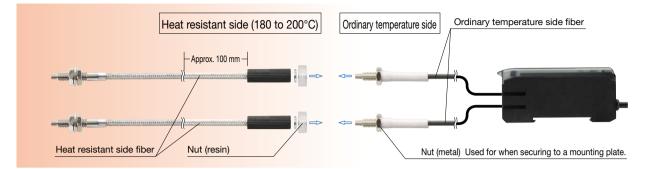
Coaxial	Standard
NF-DH07	NF-DH01
Heat resistant to 200°C	Heat resistant to 200°C
Metal sheath	Free cut

Limited diffuse reflective type
Glass substrate detection
NF-DH08
Heat resistant to 180°C
and a state
Free cut



New concept joint type

By using joints for the free cut ordinary temperature fiber and heat resistant fiber, it is easy to attach/remove the fibers, and makes it possible to adjust the fiber length.



Heat resistant <180 to 200°C or below> fiber units (through-beam type)

_			Sensing di	stance (mm)		Ambient	Bending radius		Displacement		
Ту	pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	Sensors		
		Lens attachable (P:98) 3.5 0.8 bundled fiber core x 1 M2.6 × 0.45 M4 × 0.7 brass with nickel plating) Screwing side 150 000 1000 1000 1000 1000 1000 00dinary temperature pestat side 00.8 bundled 18.3 00.8 bundled 18.3 00.8 bundled 18.3 00.8 bundled 19.5 10.6 18.3 00.8 bundled 19.5 10.6 1	7-EL 570 6-UL 540 5-PL 460 4-LG 410 3-ST 270 2-FS 160 1-HS 45	Long 3500 Std 1800 Fast 85	110	-60 to +200°C	R10	NF-TH10	Fiber Units Easy mounting Thread type Cylindrical type		
		Lens attachable (P.98) <u>M2.6 × 0.45</u> 3 1000 <u>Haitteoin</u> Ordinary temperature	^{7-EL} 1,350						Sleeve type		
		3.5	6-ÚL 1,260				R25			Flexible R4/R2	
type			5-PL 1,130 4-LG 990	Long 750 Std 450	280	-60 to +200°C		NF-TH11 Standard item	Flexible R1/R2		
am 1		M4 × 0.7	3-ST 630 2-FS	Fast 220					Retro-reflective		
Through-beam type	200°C	o1.1 bundled fiber core x 1 Screwing side Mounting bracket Tothed washer 08.5 Screwing side Mounting plug (PA)	360 ^{1-HS} 110						Small object detection		
hrou		Lens attachable (P.98), Heat resistant side: 200 mm long Only the ordinary temperature side is free cut									Screen/Array
F		23 200 6 ²⁵							Limited diffuse		
		2.5 - Heat/freezing Ordinary temperature resistant side	^{7-EL} 1,080						Narrow view/ wafer mapping		
		$\frac{W_{2}}{W_{2}} = \frac{W_{2}}{W_{2}} = \frac{W_{2}}{W$	6-UL 990 5-PL	Long		Heat resistant si	resistant side		Heat resistant		
		brass with nickel plating)/ Toothed washer Ø8.5 Ø2.7 liner + blade tube (SUS)	900 4-LG 790 3-ST	550 Std 350 Fast	220	-60 to +200°C	R18 Ordinary temperature	NF-TH12	Chemical resistant		
		185 t ³⁰ (25.8) 2000 17 (20) 02.2	510 ^{2-FS} 290	170			side R25		Vacuum resistant		
		Spring washer (SUS)	1-HS 90						Liquid level/liquid leakage/ water detection		
		Width across flats 7 thickness 3.2 ø4.0 (PVC) Width across flats 7 thickness 3.2 Fiber core ø1 × 1 core (acrylic) M4 × 0.7 sheath ø2.2 (polyethylene)							Lens for through-beam type		
●Inst	all with	an ambient humidity between 35 and 85%. In the case of 85	5% RH, the ambient tempera	ture should b	e between 0 a	and 40°C			Correct use		

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Photoelectric Sensors

Specialized Photoelectric Sensors

Laser

OPTEX

Heat resistant <180 to 200°C or below> fiber units (through-beam type)

C				Sensing dis	stance (mm)		Ambiont	Ronding radius	
	Ту	pe	Features/dimensions (mm)	D3RF	D2RF	BRF	Ambient temperature	Bending radius (mm)	Model
Photoelectric Sensors			Heat resistant side: 300 mm long. Only the ordinary temperature side is free cut 23 300 i ²⁶ 2.5- 4.2.5-	7-EL 1,080 6-UL 990 5-PL 900 4-LG 790 3-ST 510 2-FS 290 1-HS 90	Long 550 Std 350 Fast 170	220	-60 to +200°C	Heat resistant side R18 Ordinary temperature side R25	NF-TH13
Specialized Photoelectric Sensors			Heat resistant side: 500 mm long, Only the ordinary temperature side is free cut 23 500 c ²⁵						
Laser Displacement Sensors	n type		Alter the state side side side side side side side sid	7-EL 1,080 6-UL 990 5-PL		re	Heat resistant side		
Fiber Units	Through-beam type	200°C	tip bracket (brass with nickel plating) thickness 2.4 (Lock nut (polycarbonate) ø2.7 liner + blade tube (SUS) 485 0 ³⁰ (25.8) 2000 17 (20)	900 4-LG 790 3-ST 510 2-FS	550 Std 350 Fast 170	220	-60 to +200°C	R18 Ordinary temperature side	NF-TH14
Easy mounting	Thro			290 1-HS 90				R25	
Thread type			Spring washer (SUS) Width across flats 7 thickness 3.2						
Cylindrical type			Image: marked polypropylene) Fiber core ø1 × 1 core (acrylic) M4 × 0.7 sheath ø2.2 (polyethylene)						
Sleeve type			Side-view, Heat resistant side: 500 mm long, Only the ordinary temperature side is free cut						
Flexible R4/R2			Heat/freezing Ordinary temperature resistant side side (brass with nickel plating)	7-EL					
Flexible R1/R2			<u>a3.8</u> taxis <u>a4</u> <u>b3.8</u> <u>b3.8</u> <u>c3.8</u> <u>c3.5</u> <u>c3.5</u>	900 6-UL 870				Heat	
Retro-reflective			<u>e2.7 liner + blade tube (SUS)</u> <u>24</u> <u>485 °</u> ³⁰ <u>485 °</u> ³⁰ <u>485 °</u> ³⁰ <u>485 °</u> ³⁰ <u>485 °</u> ³⁰ <u>485 °</u> ³⁰	5-PL 760 4-LG	Long 500 Std	150	-60 to +200°C	resistant side R18 Ordinary	NF-TH15
Small object detection			$\begin{array}{c c} 8 \\ 2.2 \\ \hline \\ \end{array} + \begin{pmatrix} 12 \\ (Possible st screw) \\ indialing range \end{pmatrix} \qquad \begin{array}{c c} 17 \\ \hline \\ 6 \\ \hline \\ M4 \times 0.7 \\ \hline \\ M4 \times 0.7 \\ \hline \\ \end{array} \qquad \begin{array}{c} \varphi 2.2 \\ \varphi 2.2 \\ \hline \end{array}$	660 3-ST 430 2-FS	300 _{Fast} 150	130	-00 10 +200 C	temperature side	NL-1413
Screen/Array			Prism (BK7)	260 1-HS 80				R25	
Limited diffuse			Holder (brass with nickel With arross fats 7 Fiber core of x 1 core (acrylic)						
Narrow view/ wafer mapping			plating) thickness 3.2 sheath o2.2 (polyethylene) (polypropylene)						

●Install with an ambient humidity between 35 and 85%. In the case of 85% RH, the ambient temperature should be between 0 and 40°C.

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Heat resistant Chemical resistant Vacuum resistant Liquid level/liquid leakage/ water detection Lens for through-beam type Correct use



Photoelectric Sensing distance (mm) Ambient Bending radius Туре Model Features/dimensions (mm) D3RF D2RF BRF temperature (mm Sensors Side-view, Heat resistant side: 800 mm long, Only the ordinary temperature side is free cu 800 0 24 Heat/freezing Ordinary temperature Joint bracket (brass with nickel plating) resistant side side (100) ø4 Light axis ø3.8 900 ø3.5 Heat 5.4 870 resistant side ø2.7 liner + blade tube (SUS) Lock nut (polycarbonate) 760 500 R18 24 785 0 (25.8) 2000 150 -60 to +200°C Ordinary NF-TH16 300 12 660 17 (20) temperature 2.2 (Possible set screw) $M4 \times 0.7$ 430 150 ø2.2 side installing range O 260 R25 Head 80 Prism (BK7) (brass with nickel plating Photoelectric ø4.0 (PVC) Sensors Spring washer (SUS) Holder (brass with nickel Width across flats 7 Fiber core ø1 × 1 core (acrylic) plating) thickness 3.2 (polypropylene) sheath ø2.2 (polyethylene) Specialized Photoelectric ø1 sleeve: 27 mm long, Side view 1.75 1 1.5 Sensors 450 260 Laser (SUS) Displacement Through-beam type 120 Heat/fr ezing resistant side -40°C to 200°C L Ordinary temperature side 240 NF-TH04S-27V2 **Sensors** 200°C (SUS) (130)50 -40 to +200°C R30 80 200 (SUS) Made-to-order products Caulking ø2.5 ø3 o2.2 ø2.5 (ø1.6) -Note 2 50 140 Ð ۲ 70 **Fiber Units** ø ø0.5 <u>× 1</u> 20 140 *20 15 12+0.527±1 Easy mounting ø1.5 sleeve: 25 mm long. Side view 1.75 1.5 ø4 1,600 Ordinary Thread type Heat/freezing resistant side temperature side. 850 øЗ 150 Cylindrical type @1.5 (SUS) ø3 (SUS) 800 350 to NF-TH05S-A 150 -40 to +200°C R30 6+1 15 250 300 600 25+115±0.5 Made-to-order products Sleeve type Ordinary temperature type Heat/freezing resistant 400 150 øЗ 150 ø4±0.3 ø2.2 ıø1.5 200 Flexible R4/R2 ±∳ ÷ ÷ 60 6±1 15 25±1 15±0.5 400 :6 Flexible R1/R2 ø1 sleeve: 8 mm long, Side view 90 300 Detecting part detail Heat/freezing resistant side Ordinary nperature side Light axis 125 Retro-reflective 1.75 Fiber end surface 40 160 02.9 SUS 100 +1 sus SUS 50 -40 to +200°C R50 NF-TH07 90° 60 1.5 14 Small object Fast 30 ٢ ⊨____+⊛ 150 ø1.0 10 15:02 Ø2.2 ø4 12 2000 - 0 100 SUS Screen/Array Free cut 4,000 1.000 M4 × P0.7 SUS ø1.5 × 1 1,000 2.4 NF-TH02 ø2.2 2,200 550 -40 to +180°C 180°C 600 R35 Limited diffuse 1D 700 (Note) 180 1,700 350 Narrow view/ 17 2000 1,500

Heat resistant <180 to 200°C or below> fiber units (through-beam type)

●Install with an ambient humidity between 35 and 85%. In the case of 85% RH, the ambient temperature should be between 0 and 40°C. Note: Light intensity retention rate of 85% or above after 1000 continuous work hours.

detection

wafer mapping

Heat resistant

resistant Vacuum

resistant

Liquid level/liquid leakage water detection

Lens for

through-beam type



Heat resistant <180 to 200°C or below> fiber units (diffuse type)

	Turno	Fasture (dimensions (Sensing dis	stance (mm)		Ambient	Bending radius	Madal
	Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature (mm)		Model
Diffuse type		Coaxial, Metal sheath Detecting part detail Receiving: o50 µm × 440 Toothed washer entiting: o50 µm × 440 Mitting: o50 µm × 440 Mit	7-EL 1,280 6-UL 1,200 5-PL 1,050 4-L6 920 3-87 600 2-F8 230 1-H5 59	Long 850 Std 320 Fast 100	200	-60 to +200°C	R25	NF-DH07
	180°C	oritical state oritica	7-EL 3-ST 1,100 450 6-UL 2-FS 840 300 5-PL 1-HS 750 100 4-LG 650	Long 450 Std 250 Fast 150	210	-40 to +180°C (Note)	R35	NF-DH01

•The sensing distances for the diffuse type fiber units are values on 500 × 500 mm white paper.

●Install with an ambient humidity between 35 and 85%. In the case of 85% RH, the ambient temperature should be between 0 and 40°C.

Note: Light intensity retention rate of 85% or above after 1000 continuous work hours.

Heat resistant <180 to 200°C or below> fiber units (limited diffuse reflective type)

	Туре	Features/dimensions (mm)	Sensing dis	Sensing distance (mm)			Bending radius	Model
	Type	reatures/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	woder
-	Limited diffuse reflective type	Glass substrate detection, Free cut 10.75	7-EL O to 35 6-UL O to 28 5-PL O to 25 4-L6 O to 22 3-ST O to 20 2-FS O to 9 1-HS 3 to 4	Long O to 20 Std O to 10 Fast O to 8	10	-60 to +180°C	R25	NF-DH08

SW50

●Install with an ambient humidity between 35 and 85%. In the case of 85% RH, the ambient temperature should be between 0 and 40°C. Note: Light intensity retention rate of 85% or above after 1000 continuous work hours.

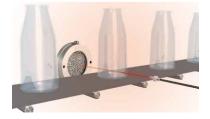
Heat resistant reflector

Possible to detect as retro-reflective type if the SW50 heat resistant reflector is used for the heat resistant diffuse type fiber. Demonstrates its strength in transparent object detection under high temperatures.

Reflector heat resistant to 300°C



Glass bottle detection under high temperatures



hotoelectric

Sensors

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Laser Displacement Sensors

Fiber Units

Easy mounting

Thread type Cylindrical type

Sleeve type Flexible R4/R2 Flexible R1/R2

Retro-reflective Small object detection Screen/Array

Limited diffuse

Narrow view/ wafer mapping

Heat resistant

Chemical

resistant Vacuum resistant

Liquid level/liquid leakage/

water detection Lens for through-beam type Correct use



Specialized Photoelectric Sensors

Laser Displacement Sensors

Fiber Units

- Easy mounting
- Thread type
- Cylindrical type
- Sleeve type
- Flexible R4/R2
- Flexible R1/R2
- Retro-reflective
- Small object detection
- Screen/Arrav
-
- Limited diffuse Narrow view/
- wafer mapping
- Heat resistant
- Chemical resistant Vacuum resistant Liquid level/liquid leakage

Lens for through-beam type

Correct use



Mounting

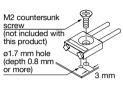
Correct use

Mounting fibers with positioning bosses

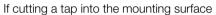
<NF-DC08>

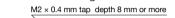
 Use an M2 countersunk screw (not included with this product).
 The positioning boss insertion holes on the bottom surface need to be ø1.7 mm and at least 0.8 mm deep.

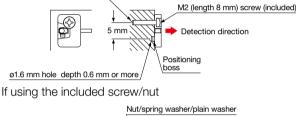
Notes for fiber sensor usage

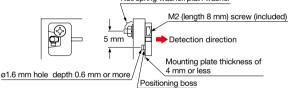


<NF-TE01/NF-DE01 (Flat ON type)>



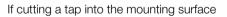


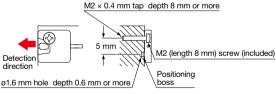




(Note 1): The above diagram shows NF-TE01. The same mounting method is used for NF-DE01. (Note 2): Through-beam type fibers have the same shape. When mounting, pay attention to the positions of the mounting screw hole and positioning boss hole.

<NF-TE02/NF-DE02 (Head ON type)>



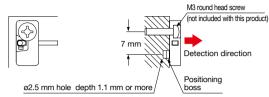






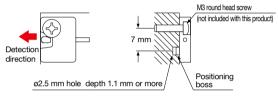
(Note 1): The above diagram shows NF-TE02. The same mounting method is used for NF-DE02. (Note 2): Through-beam type fibers have the same shape. When mounting, pay attention to the positions of the mounting screw hole and positioning boss hole.

<NF-TE03/NF-DE03 (Flat ON type)>



(Note 1): The above diagram shows NF-TE03. The same mounting method is used for NF-DE03. (Note 2): Through-beam type fibers have the same shape. When mounting, pay attention to the positions of the mounting screw hole and positioning boss hole.

<NF-TE04/NF-DE04 (Head ON type)>

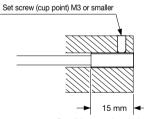


(Note 1): The above diagram shows NF-TE04. The same mounting method is used for NF-DE04. (Note 2): Through-beam type fibers have the same shape. When mounting, pay attention to the positions of the mounting screw hole and positioning boss hole.

Mounting NF-DR09/-RR01

< If not using the included mounting bracket>

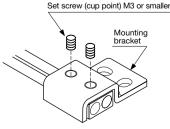
• Using a set screw (cup point of M3 or smaller), mount within 15 mm of head portion bracket edge.



Possible screw installation range

< If using the included mounting bracket>

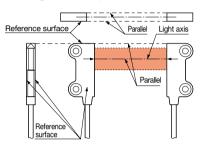
- $\cdot\,$ The head portion can be secured even without use of a set screw.
- If using a set screw, secure using a set screw with an M3 cup point.





Mounting through-beam type screen fibers (NF-TZ07/-TZ08/-TZ09/-TZ10)

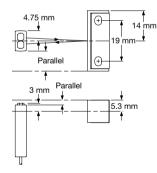
- Please be aware that because the aperture angle of this product is extremely narrow, light may not be taken in depending on installation conditions.
- When installing, determine a reference surface as shown in the diagram below while paying sufficient attention in regards to light axis shifting and slanting. Install so that emitting/receiving fibers are parallel.



Mounting NF-RB02

- Because the aperture angle of this product is extremely narrow, light may not be taken in depending on installation conditions.
- As shown in the diagram below, install so that the centers of the fiber head and reflector are aligned. Pay attention for light axis shifting and slanting.

<Side ON type/NF-RB02>



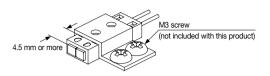
<Notes regarding NF-RB02>

• If detecting items such as transparent objects, detection may be unstable if the objects are within range of 0 to 20 mm from the window.

If mounting using the included fiber mounting bracket

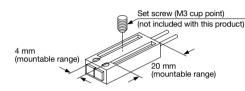
• If using the fiber mounting bracket to mount a Side ON type fiber, mount so that there is no interference with the detecting part.

- If mounting using the included fiber mounting bracket
- The fiber mounting bracket can be used to secure the fiber without use of an M3 set screw.



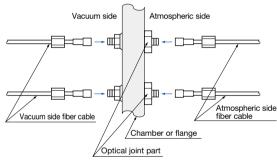
If mounting using an M3 set screw (cup point)

• Secure with an M3 set screw within the mounting range shown in the diagram below.



Mounting vacuum resistant fibers (NF-TN01/-DN01)

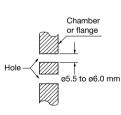
<Structure of vacuum resistant fibers>



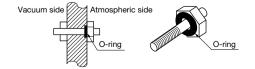
Leakage amount: 1.33 × 10⁻¹⁰ Pa·m³/s [He] or less

<Mounting>

 Drill two holes into the vacuum chamber wall (chamber or flange).
 (Note 1): Make the holes of 5.5 to of .0 mm.



 Mount the optical joint part to the vacuum chamber wall. When mounting to the vacuum chamber wall, the O-ring included with this product must be attached and the side to which it is attached must be the atmospheric side.



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Fiber Units

Easv mounting

Thread type

Cylindrical type

Sleeve type

Flexible R4/R2

Flexible R1/R2

Retro-reflective

Small object

detection

Screen/Array

Limited diffuse

Narrow view/ wafer mapping

Heat resistant

Chemical resistant

Vacuum resistant

Liquid level/liquid leakage/

water detection

through-beam type



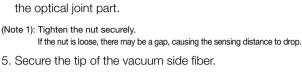
Specialized Photoelectric Sensors

Laser Displacement **Sensors**

Fiber Units

- Easy mounting Thread type Cylindrical type Sleeve type Flexible R4/R2 Flexible R1/R2 Retro-reflective Small object detection Screen/Arrav Limited diffuse Narrow view/ wafer mapping Heat resistant
- Chemical
- resistant Vacuum resistant Liquid level/liquid leakage/ water detection Lens for

through-beam type Correct use



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<For NF-DN01>

If using a mounting bracket

· Tighten using a set screw (cup point of M3 or smaller).

Notes for fiber sensor usage

3. Mount the atmospheric side fiber cable bracket to the

4. Mount the vacuum side fiber nut to the vacuum side of

If the nut is loose, there may be a gap, causing the sensing distance to drop.

No

atmospheric side of the optical joint part.

Correct use

(Note 1): Tighten the nut securely.

Good 🗂

the optical joint part.

· By mounting the mounting bracket to the housing, it is possible to automatically secure the head without using a set screw.

Set screw (cup point) M3 or smaller Included mounting bracket Ø

Set screw

 \Box

(cup point) M3 or smaller

15 mm

installation range

Possible screw

If not using a mounting bracket

 As shown in the diagram to the right, using a set screw (cup point of M3 or smaller). secure within 15 mm of head portion edge.

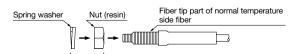
Mounting heat resistant joint fibers (NF-TH12/-TH13/-TH14/-TH15/-TH16)

<Connecting heat resistant joint fibers to Ordinary temperature side fibers>

 Use the following procedure to connect normal temperature side fibers.

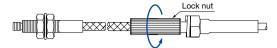
Procedure

1. Attach the plastic nut included with the heat resistant joint fiber and spring washer as far as possible on the fiber tip of the normal temperature side fiber.

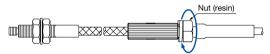


(Included with heat resistant joint fiber)

2. Mount the heat resistant joint fiber and normal temperature side fiber using a lock nut.



- (Note 1): Do not secure the lock nut using the plastic nut and spring washer from Procedure 1
- 3. To prevent the lock nut from becoming loose, secure using the plastic nut used for mounting in Procedure 1.

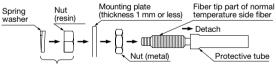


If mounting connecting parts to the mounting plate>

- · If securing parts that connect the heat resistant joint fiber and normal temperature side fiber to the mounting plate using the included metal nuts, use the procedure below.
- · The mounting plate thickness needs to be 1 mm or thinner.

Procedure

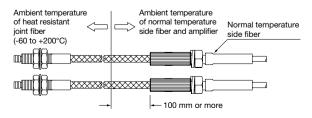
- 1. Remove the protective tube from the normal temperature side fiber, attach the included metal nut from the tip of the fiber and move it to the fiber part.
- 2. Insert the tip of the fiber into the mounting plate.
- 3. Connect the heat resistant joint fiber to the normal temperature side fiber using the same procedure from <Connecting heat resistant joint fibers to normal temperature side fibers>
- 4. Tighten the metal nut mounted in Procedure 1 to the mounting plate.



(Included with heat resistant joint fiber)

<Operating Temperature>

· In order to protect normal temperature side fibers and amplifiers, keep the heat resistant joint fiber at least 100 mm from the boundary of the normal temperature side as shown in the diagram below.



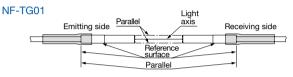


Mounting narrow view/wafer mapping fibers (NF-TG01/-TG02/-TG03/-TG04)

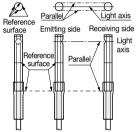
 Please be aware that because the aperture angle of this product is extremely narrow, light may not be taken in depending on installation conditions.

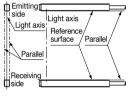
<Through-beam type>

• When installing, determine a reference surface as shown in the diagram below while paying sufficient attention in regards to light axis shifting and slanting. Install so that emitting/receiving fibers are parallel.



NF-TG02/-TG03/-TG04

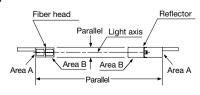




<Reflective type>

- Use the included 1.6 mm M1.4 screws to mount the fiber head and reflector to the mounting plate as shown in the diagram to the right. The mounting plate needs to have a thickness of 0.9 mm or thinner.
- Use a thread lock compound to tighten screws when mounting them in places with vibrations or shocks.
- Install the parts so that the mounting holes for the fiber head and reflector are parallel to one another and so that parts A, B and C are each parallel as shown in the diagrams below. Pay sufficient attention for light axis shifting and slanting.

<Overhead view>



M1.4 screw

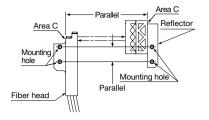
included

(length 1.6 mm)

Mounting plate

(thickness 0.9 mm or less

<Side view>

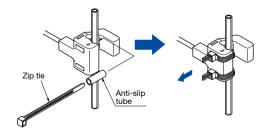


Mounting liquid leakage detection fibers (NF-DW02)

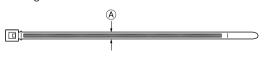
- If using an SUS mounting bracket, thread a welded M4 stud bolt through the mounting hole on the mounting bracket and attach an M4 nut (not included with this product).
- If using a PVC mounting bracket, glue it to the mounting surface so that the side with "TOP" is facing up.
 Also, weld it within the welding area as shown in the diagram to the right.
- Slide the convex portion of the mounting bracket attached to the steel case into the concave portion on the fiber until a "click" is heard.

Mounting pipe-mounted liquid level detection fibers (NF-TF01)

 Use the included zip ties and anti-slip tubes for mounting as shown in the diagram below. Also, use two zip ties on the upper and lower part to attach it securely, and cut off the any part of the zip ties that stick out.



• When additional zip ties are necessary, please use zip ties with a thickness 2.5 mm or smaller as shown by (A) in the diagram below.





Photoelectric Sensors

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Fiber Units

Concave portion Concave portion Easy mounting Thread type Cylindrical type

M4 nut

M4 stud bolt

4 mm

Welding range

TOP

11 mm

(straight type)

Sleeve type

Flexible R4/R2

Flexible R1/R2

Retro-reflective

Small object detection

Screen/Array

Limited diffuse

Narrow view/

wafer mapping Heat resistant

Chemical

resistant

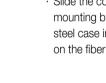
Vacuum resistant

Liquid level/liquid leakage/ water detection

Lens for through-beam type

Correct use

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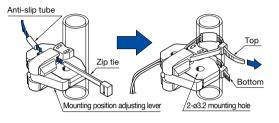
Fiber head

Reflector

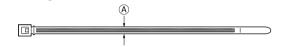
Correct use

Mounting pipe-mounted liquid level detection fibers (NF-DF04/-DF05)

• Use the included zip ties and anti-slip tubes for mounting as shown in the diagram below. When mounting the fiber, make sure that the mounting position adjusting lever is in the closed position as shown in the diagram below. Also, use two zip ties on the upper and lower part to attach it securely, and cut off the any part of the zip ties that stick out.



• When additional zip ties are necessary, please use zip ties with a thickness 2.5 mm or smaller as shown by (A) in the diagram below.



 M3 screws, plain washers and spring washers must be used when using the mounting holes.

(M3 screws, plain washers and spring washers are not included with this product.)

<Adjusting the positions of pipe-mounted liquid level detection fibers>

• The attachment position can be easily readjusted when using zip ties to mount this product.

Adjustment method

- 1. Pull the mounting position adjusting lever open in the direction of the arrow.
- 2. Push the moveable part in the direction of the arrow to loosen the zip tie, and readjust the mounting position.
- Close the mounting position adjusting lever in the direction of the arrow to return it to its original position.



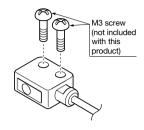




(Note 1): Sensitivity settings must be reconfigured after readjusting the mounting position. (Note 2): The positioning lever is for readjusting the mounting position on this device, not for tightening the zip ties. Tightening the zip ties while the mounting position adjusting lever is open and then closing the mounting position adjusting lever will damage the fibers.

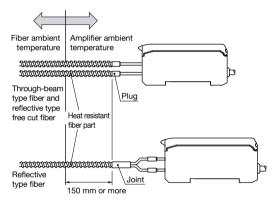
Mounting chemical resistant angled-head fibers (NF-TY05)

• Use M3 screws and tighten them to a torques of 0.3 N·m or less.



Notes regarding usage of heat resistant fibers

• In order to protect amplifiers, keep the heat resistant fiber part at least 150 mm from the boundary of the normal temperature side as shown in the diagram below.



- \cdot Do not directly expose amplifiers to radiation heat or hot air.
- The tip bracket of the heat resistant fiber (up to 350°C) and stainless steel sheath may change color when used at high temperatures, but this does not affect their detection capability.

Notes about slit masks included with NF-TZ07/-TZ08/-TZ09/-TZ10

• There are two types of slit masks included with these products (one type for NF-TZ07/-TZ08).

These slit masks can be used when detecting small objects or for preventing light saturation when using the fibers at close range. However, applying slit masks shortens the sensing distance.

Because the slit masks are of an adhesive type, when applying them to the fibers, align the slit projection with the top of the fiber as shown in the diagram on the upper right.



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Fiber Units

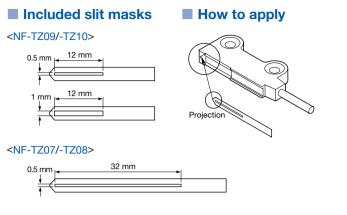
- Easy mounting Thread type
- Cylindrical type
- Sleeve type
- Flexible R4/R2
- Flexible R1/R2
- Retro-reflective
- Small object detection
- Screen/Array
- Limited diffuse Narrow view/
- wafer mapping
- Heat resistant

resistant Vacuum resistant Liquid level/liquid leakage/ water detection

Lens for through-beam type Correct use



E

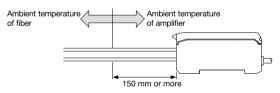


For NF-TY01(-_)/-TY02(-_)/-TY03-TF3/ -TY04/-TY05(-_)/-DY01

· Avoid use with the chemicals listed below. Chemicals that may erode PFA including fused alkali metals (sodium, potassium, lithium, etc.), fluorine gas (F2), CIF3, OF2 (including gaseous form), etc. Also, chemicals with high permeability including high temperature hydrofluoric acid, nitric acid, chlorine, etc.

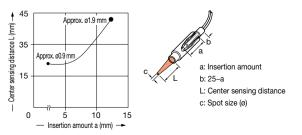
Notes regarding usage of NF-TY04/-DY01 (heat resistant type)

- · In order to protect amplifiers, keep the heat resistant fiber part at least 150 mm from the boundary of the normal temperature side as shown in the diagram on the right.
- · Do not directly expose amplifiers to radiation heat or hot air.



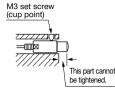
Notes regarding usage of NF-DA06

· Spot size and sensing distance can be adjusted depending on the fiber insertion amount. Be aware that if inserted too deeply, the fiber tip may become separated from the lens.



- · After setting the fiber and NF-DA06, secure using the nut included with the fiber to prevent moving caused by vibrations, etc.
- If securing NF-DA06 using a set screw, use an M3 set screw (cup point).





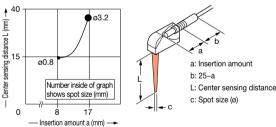
Notes regarding usage of NF-DA01/ -DA02/-DA03/-DA04/-DA05

 If inserting fibers into NF-DA01/-DA02/-DA03/ -DA04/-DA05, inserting until the fiber comes to a stop.

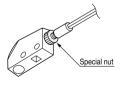


Notes regarding usage of NF-DA07

· Spot size and sensing distance can be adjusted depending on the fiber insertion amount.



· After setting the fiber and NF-DA07, secure using the special nut included with NF-DA07 to prevent moving caused by vibrations, etc.



Photoelectric Sensors

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Photoelectric Sensors

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Laser Displacement **Sensors**

Fiber Units

Easy mounting

Thread type

Cylindrical type

Sleeve type

Flexible R4/R2

Flexible R1/R2

Retro-reflective

Small object detection

Screen/Array

Limited diffuse

Narrow view/ wafer mapping

Heat resistant

Chemical resistant

Vacuum resistant

Liquid level/liquid leakage water detection

Lens for through-beam type

Specialized Photoelectric Sensors

Laser Displacement Sensors

Fiber Units
Easy mounting
Thread type
Cylindrical type
Sleeve type
Flexible R4/R2
Flexible R1/R2
Retro-reflective
Small object detection
Screen/Array
Limited diffuse
Narrow view/ wafer mapping
Heat resistant
Chemical resistant
Vacuum resistant

Liquid level/liquid leakage/ water detection Lens for through-beam type

Correct use

Correct use

Notes regarding liquid leakage/liquid level detection/chemical resistant fibers

- Clean NF-DW02 by wiping away all liquids that have adhered to the head and mounting bracket using a soft cloth. Also pay sufficient attention to any condensation that has formed on the detecting part.
- If the tips of the NF-DW02/-TF01 fibers are too short, be aware that the correct amounts of light may not be taken in, resulting in unstable detection.
- When installing NF-DW02, be sure to use the special mounting bracket as a countermeasure to human error (improper installation, etc.) Failure to use the special bracket may result in unstable detection.
 However, if using a PVC mounting bracket on the black matte part of the housing, sensing of human error (improper installation) may not be possible. Please confirm before using.
 - When cutting the protective tubes, take care not to damage the fiber sheath.
- Perform sensitivity settings for the NF-DW02 only after any liquids have been removed, the head has been mounted to the special mounting bracket, and the fiber has been attached to the amplifier. After performing the sensitivity adjustment, changing the fiber connection or installation will result in changes in the light detection volume, causing unstable detection. Changing fiber connections or installation during cleaning, etc., will have the same results. In such cases, perform amplifier sensitivity adjustments again.
- Amounts of light may decrease during extended periods
 of usage under conditions with high heat or humidity.
- Be aware that instability may occur in which a long period is necessary before detection stability can be regained if liquids incompatible with the materials of which the NF-DW02 head part is made (PFA) cause air bubbles to flood the detecting part. Always confirm the liquid to be detected before use.
- When cleaning the NF-DW02 confirm that the mounting bracket shows no scratching, contamination, or deformities.
- Water droplets adhered to the window will influence detection performance. Avoid use in areas where direct contact with water could be made.
 - Also pay sufficient attention to any condensation that has formed on the pipe exterior.

- Be aware that the NF-TF01/-DF04/-DF05 may not be able detect some low-transparency liquids and highlyviscous liquids with stability.
- Incomplete pipe mounting of NF-TF01/-DF04/-DF05 may have a severe influenced on detection performance. Use the included anti-slip tubes and install the detecting part to the pipe so it does not move.
- For the NF-TF01 to detect in a stable manner, amplifier sensitivity adjustments must be performed when there is no liquid in the pipe and after the fiber has been installed.
 Also, sensitivity must be reconfigured if the fiber installation condition on the pipe is altered, or if its routing is changed.
- The NF-DF04/-DF05 cannot properly detect through opaque pipes.
- Attach the detecting part of the NF-DF04/-DF05 so it is secured to the pipe. Failure to do so will result in malfunction.
- Because the NF-DF04/-DF05 does not have a water resistant or chemical resistant structure, avoid areas where water or chemicals could come in contact.
- Because adherence of water droplets on the window of the NF-DF04/-DF05 will affect detection, pay sufficient attention to any condensation that has formed on the pipe exterior. Also be aware that water droplets formed on the inside of pipes, as well as air bubbles adhered on the inside will affect detection.

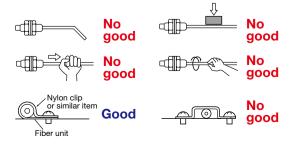
General notes

Regarding fiber units

1. Do not hit or damage the detection head surface.



2. Do not bend or apply excessive force to the fiber.

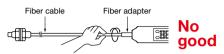




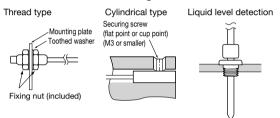
 Do not apply excessive torque to the sensor head or use tools that do not match the nuts.



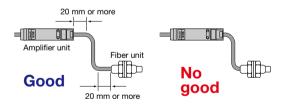
4. Do not twist in the gaps between the fiber cable and fiber adapter.



5. Depending on the bore shape of the sensor head, mount as shown in the diagrams below.

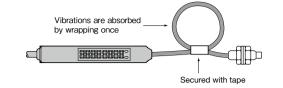


- 6. In the case of fibers that can be free cut, cut the tip with special fiber cutters before mounting to the fiber amplifier.
- 7. The fiber unit bending radius should be greater than the allowable bending radius. Excessive bending will shorted the sensing distance.
- 8. Allow for some wire to remain straight near the insertion and tip parts of the fiber unit.

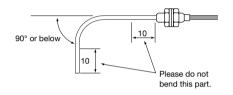


- Because sensing distance may decrease by as much as 20% depending on the conditions of cut surface of the fiber or connection conditions with the amplifier, we recommend using with sensing distance set at 80% or below.
- In areas subject to frequent vibration, secure so that the fiber unit itself will not vibrate. Especially work to limit vibrations from reaching connection points between the fiber and amplifier.

11. Use the method shown below to soften fiber head vibrations.



- 12. Do not use fiber units not protected with fluoroplastic in environments where organic solvents are used.
- 13. Do not bend the sleeve tip or base.

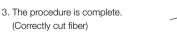


Regarding fiber cutters

Cutting procedure

- Adjust the length in the direction of the arrow, turn the stopper and lock the fiber in place.
- Insert the fiber into the fiber cutter and cut it.





Approx. 0.5 mm

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Photoelectric Sensors

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Laser Displacement Sensors

Fiber Units

Easy mounting

Thread type

Cylindrical type

Sleeve type

Flexible R4/R2

Flexible R1/R2

Retro-reflective

Small object detection

Screen/Array

Limited diffuse

Narrow view/ wafer mapping

Heat resistant

Chemical resistant Vacuum

resistant

water detection

Lens for through-beam type

