BRF

• P.130

Fiber amplifier

O1 Easy mounting



Square type with mounting hole that can be installed easily

Related

products

Fiber amplifier

D3RF

• P.110

An adjustable mounting type that switches between Head ON/Side ON switchable type is also available
Head ON, Side ON and Flat ON types are available.
Bending radius of R1 mm or R4 mm

Head ON/Side ON switchable type Switchable direction

Because the direction of the cable from the sensor head can be switchable, you can switch from Head ON to Side ON easily. It will help reducing inventory of the fiber cable. The bending radius is R1 mm which helps flexibility of installing the fiber cable. For Side ON



2

For Head ON

Through-beam type: NF-TE02, NF-TE04 Diffuse type: NF-DE02, NF-DE04

Line up of Head ON, Side ON and Flat ON types

Compact and long-distance detecting Head ON, Side ON, and Flat ON types are available. Selection from among these easy-to-mount types.



Line up of R1 mm and R4 mm type

Available fiber cables include an easy-to-handle flexible R1 mm and a flexible R4 mm optimal for mounting to moving parts. Selectable based on the application.

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Photoelectric Sensors

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

through-beam type



Fiber units Easy mounting

Easy mounting fiber units (through-beam type)

_		Sensing c	Sensing distance (mm) Ambie			Bending radius	Model
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
	Flexible, Head ON, Free cut Detecting part detail Lens e1 2.5 + 3 + + + + + + + + + + + + + + + + + +	7-EL 3,600 6-UL 3,600 5-PL 3,580 4-LG 3,060 3-ST 1,980 2-FS 1,350 1-HS 530	Long 2,700 Std 1,600 Fast 850	1,600	-40 to +60°C	R1	NF-TR11
	Flexible, Side ON, Free cut Detecting part detail at detail (20) (2) (2) (2) (2) (2) (2) (2) (2	7-EL 3,600 6-UL 3,600 5-PL 3,600 4-UG 3,150 3-ST 2,000 2-FS 1,200 1-HS 540	Long 2,700 Std 1,500 Fast 1,000	1,300	-40 to +60°C	R1	NF-TR12
Through-beam type	Flexible, Flat ON, Free cut 0.5 + -2 3.5 + 7 + 1000 1.2 + 1.2 + 1.2 + 1000 5 + 10 + 10 + 12 + 1000 10 + 10 + 12 + 1000 10 + 10 + 12 + 1000 10 +	7-EL 1,190 6-4L 1,120 5-PL 980 4-LG 850 3-ST 550 2-FS 310 1-HS 100	Long 600 5d 350 Fast 200	220	-40 to +60°C	R1	NF-TEO1
	Flexible, Flat ON, Free cut 2000 1 3.5 3.5 7 2000 1 12 13.5 12 14 14 12 12 12 12 12 12 12 12 12 12 12 12 12	7-EL 1,890 6-UL 1,770 5-PL 1,540 4-G 1,350 3-ST 880 2-FS 520 1-HS 170	Long 9000 Std 500 Fast 350	450	-40 to +60°C	R1	NF-TEO3
	Flexible, Flat ON, Free cut 3 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1	7-EL 2,450 6-UL 2,300 5-PL 2,010 4-LG 1,710 3-ST 1,150 2-FS 650 1-HS 220	Long 1,200 Std 650 Fast 330	500	-40 to +60°C	R1	NF-TR13

●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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Photoelectric Sensors

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



Easy mounting fiber units (through-beam type)

_	Sensing distance (mm)				Ambient B			3
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	Bending radius (mm)	Model	Ë.
Through-beam type	Flexible, Head ON/Side ON switchable type, Free cut 1000 0.5-1-2 3.5-1-2 3.5-1-1000 1.05 1-2 3.5-1-2 0.5-1-1000 1.05 1-2 3.5-1-2 0.5-1000 1.05 1-2 0.5-1-2 0.5-1000 0.5-1-2 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000 0.5-1000	$\begin{array}{c} \textbf{7-EL} \\ \textbf{430} \\ \textbf{6-UL} \\ \textbf{400} \\ \textbf{5-PL} \\ \textbf{350} \\ \textbf{4-LG} \\ \textbf{3000} \\ \textbf{3-ST} \\ \textbf{190} \\ \textbf{2-FS} \\ \textbf{120} \\ \textbf{1-HS} \\ \textbf{36} \end{array}$	Long 250 Stat 120 Fast 55	110	-40 to +60°C	R1	NF-TEO2 Switchable direction	Photoelectric Sensors
	Flexible, Head ON/Side ON switchable type, Free cut 2000 1.05 1	7-EL 1,340 6-UL 1,260 5-PL 1,090 4-L6 960 3-ST 630 2-FS 390 1-HS 130	Long 750 Std 450 Fast 250	280	-40 to +60°C	R1	NF-TEO4 Switchable direction	Photoelectric Sensors Specialized Photoelectric Sensors Laser Displacement Sensors
	Flexible, Head ON, Free cut	7-EL 3,600 6-UL 3,600 5-PL 3,580 4-L6 3,060 3-ST 1,980 2-FS 1,400 1-HS 500	Long 2,700 Std 1,600 Fast 850	1,100	-40 to +60°C	R4	NF-TRO6	Fiber Units Easy mounting Thread type Cylindrical type
	Flexible, Side ON, Free cut Detecting 8 2.5 part detail Housing 1.75 (Polycarbonate) Light axis 2.0.25 × 7 Those for emitting and receiving are symmetrical in shape.	7-EL 3,600 6-UL 3,600 5-PL 3,600 4-U6 3,150 3-ST 2,000 2-FS 1,100 1-HS 320	Long 2,700 Stid 1,300 Fast 600	1,100	-40 to +60°C	R4	NF-TR05	Sleeve type Flexible R4/R2 Flexible R1/R2 Retro-reflective Small object detection
	Flexible, Flat ON, Free cut Detecting 8.5 Light axis 11 122 122 13.9 1.75 1.25 1.	7-EL 1,600 6-UL 1,510 5-PL 1,320 4-L6 1,150 3-ST 750 2-FS 410 1-HS 130	Long 750 Std 450 Fast 280	300	-40 to +60°C	R4	NF-TE05	Screen/Array Limited diffuse Narrow view/ wafer mapping Heat resistant Chemical resistant Vacuum

●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.

resistant Liquid level/liquid leakage/ water detection

Lens for through-beam type

Fiber units Easy mounting

Easy mounting fiber units (diffuse type)

T		Sensing dis	Sensing distance (mm)		Ambient	Bending radius	3 Model	
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	
	Flexible, Flat ON, Free cut	7-EL 140 6-UL 135 5-PL 110 4-LG 99 3-ST 70 2-FS 34 1-HS 10	Long 60 Std 30 Faat 10 to 16	30	-40 to +60°C	R1	NF-DE01	
type	Flexible, Flat ON, Free cut	7-EL 490 6-JIL 450 5-FL 400 4-LG 350 3-ST 225 2-FS 117 1-HS 41	Long 250 Std 100 Fast 60	100	-40 to +60°C	R1	NF-DE03	
Diffuse type	Flexible, Head ON/Side ON switchable type, Free cut 10 10 10 10 10 10 10 10 10 10	7-EL 160 6-UL 150 5-PL 130 4-LG 117 3-ST 77 2-FS 43 1-HS 12	Long 65 Std 35 Fabi 20	30	-40 to +60°C	R1	NF-DE02 Switchable direction	
	Flexible, Head ON/Side ON switchable type, Free cut 2000 1 1 1 1 2 2001 1 2 2 2 2 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	7-EL 480 6-UL 450 5-PL 390 4-LG 3-ST 225 2-FS 2-FS 117 1-HS 45	Long 250 Std 120 Fast 80	100	-40 to +60°C	R1	NF-DE04 Switchable direction	

The sensing distances for the diffuse type fiber units are values on 500 \times 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.

Photoelectric Sensors

Photoelectric Sensors

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



BRF

• P.130

Fiber amplifier

Fiber amplifier

D3RF

• P.110

02 Thread type



Type that can be mounted with a threaded nut Fiber units

Related

products

- Adjustable mounting type that switches between straight view and side view also available
- A metal sheath type that protects against cable breakage, as well as lens attachable models are available.

New concept Straight view/side view switchable type Switchable direction

The NF-TR14 can be used as a side view type by bending the fiber cable to fit the slit in the side of the nut. This fiber unit is a completely new concept that allows switching between side view and straight view according to mounting conditions.



Metal sheath type Breakage prevention

Stainless steel mesh structure sheath protects the fiber cable and prevents fiber cable breakage due to snagging. The bending radius R10 mm allows the cable to bend in tight areas without breaking.



Through-beam type: NF-TJ01 Diffuse type: NF-DJ01, NF-DJ02

Photoelectric Sensors

Photoelectric Sensors

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

through-beam type

Thread type fiber units (through-beam type)

Type	Foatures (dimensions ()	Sensing d	Sensing distance (mm)			Bending radius	Model
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	Ambient temperature	(mm)	Model
	Stree cut M3 × P0.5 (brass with nickel plating) 01 × 1 5.5 2.5 10	7-EL 3.5T 3,500 4.00 2.458 2,100 550 5.50 5.5L 1.48 1,600 175 4.46 1,400	Long 1,000 Std 500 Fast 250	450	-40 to +70°C	R25	NF-TM
M	Free cut 00.5 × 1 2.4 5.5 M3 × P0.5 SUS 1.8 01 1.8 01 2.000	7-EL 3-ST 900 250 6-UL 2-F6 550 140 5-PL 1-HS 400 45 4-L6 350	Long 350 Std 200 Fast 90	120	-40 to +70°C	R15	NF-TM
	Lens attachable (P.98), Free cut <u>M2.6 × P0.45 SUS</u> <u>01.5 × 1</u> <u>01.5 × 1</u>	7-EL 3-ST 4,000 6-UL 2-FS 3,000 750 5-FL 1-HS 2,200 250 4-UG 1,900	Long 1,800 Std 800 Fast 450	700	-40 to +70°C	R30	NF-TB(
	Lens attachable (P.98), Free cut	7-EL 3-ST 4,000 1,000 6-UL 2-FS 2,000 550 5-PL 1-HS 1,600 175 4-LG 1,400	Long 1,000 Std 500 Fast 250	450	-40 to +70°C	R25	NF-TB(
Through-beam type ≅	Metal sheath, Lens attachable (P.98)	- 3-st 740 2-FS 410	Long 350 Std 220 Fast 110	300	-40 to +60°C	R10	NF-TJ(Breakage prev
ordT	Nut type, Straight view/side view switchable type, Flexible, Free cut 7 Multi core fiber 00.075×151 00.075×151	7-EL 3-ST 3,800 1,200 6-UL 2-FS 2,700 800 5-FL 1-HS 2,200 300 4-LG 300	Long 1,300 Std 600 Fast 300	400	-40 to +60°C	R2	NF-TR Switchable dire
	Nut type, Free cut 14.4 14.4 14.4 14.4 Polyamide (PA6) 10.5 2000 04.4 04.4 02.2 02.2	7-EL 3-ST 2,500 2-FS 1,400 350 5-PL 1-HS 1,300 100 4-LG 1,000	Long 800 Std 600 Fast 200	350	-40 to +70°C	R25	NF25 Space-sav
	Elbow type, Lens attachable (P98), Free cut Toothed washer a8.5 b1.2 (SUS) Widh across fits 7 thickness 2.4 $M4 \times 0.7$ nckel plating) $M2.6 \times 0.45$ a1.2 (SUS) masher $a2.2$ (PVC) a2.2 2000 a2.2 2000 a2.2 2000 a2.2 2000 a2.2 2000 a2.2 2000 a2.2 a3.2 a3	7-EL 1,440 6-UL 1,350 5-PL 1,170 4-16 1,060 3-ST 6-90 2-FS 4-30 1-HS 130	Long 750 Std 450 Fast 200	350	-40 to +70°C	R25	NF-TB
M1	Super long distance with large lens, Fiber length 20 m, Free cut M12 × 1.0 (SUS) 010.4 Glass lens (BK7)	7-EL 38,000 6-UL 25,000 5-PL 20,000 4-US 18,000 3-ST 12,000 2-FS 7,000 1,800 4-US 1,800	Long 12,000 Std 6,500 Fast 3,500	2,800	-40 to +70°C	R30	NF-TX

through-beam type Correct use

OPTEX F R ●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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Photoelectric Sensors

Photoelectric Sensors

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

Thread type fiber units (through-beam type/diffuse type)

_		Sensing di	stance (mm)		Ambient	Bending radius	us	C
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	Ë,
	Free cut 2.7 nickel pleting 3 (10) 5 100 Detecting 02.3 $CO.2$ $M3 \times P0.5$ $CO.2$ $M3 \times P0.5$	7-EL 3-ST 300 80 6-UL 2-FS 160 40 5-PL 1-HS 150 10 4-LG 120	Long 100 Std 50 Fast 25	35	-40 to +70°C	R15	FD-TT2 Low cost	Photoelectric Sensors
	Standard, Free cut <u>00.5 × 2</u> <u>2.5</u> <u>01</u> <u>12</u> <u>2000</u>	7-EL 3-ST 400 100 6-UL 2-FS 200 50 5-PL 1-HS 190 10 4-LG 160	Long 100 Std 60 Fast 30	45	-40 to +70°C	R15	NF-DS06	Pho
	Coaxial, Lens attachable (P.64), Free cut o0.25 × 9 o0.5 × 1 (receiving part) (emitting part) Detecting part detail	7.EL 9-ST 500 150 6-UL 2-FS 300 100 5-PL 1-HS 250 30 4-LG 225	Long 250 Std 120 Fast 50	70	-40 to +70°C	R15	NF-DT01	Photoelectric Sensors Specialized
МЗ	Coaxial, Free cut Detecting part detail Receiving: 00.265 × 9 installing side	7-EL 310 6-UL 290 5-PL 260 4-LG 220 3-ST	Long 170 Std 80 Fast	55	-40 to +60°C	R25	NF-DB07	Photoelectric Sensors Laser Displacement Sensors
olliuse type	2.8-1 - 2.8-3 M3 × 0.5 (brass with nickel plating) Emitting: 00.5 × 1 Toothed washer 06.5	140 2-FS 70 1-HS 20	45					Fiber Units
	Coaxial, Lens attachable (P.64) SUS303 25	7-EL 3-ST 180 60 6-UL 2-FS	Long					Easy mounting
5	00.125 × 10 (receiving part) 0025 × 1 (emitting part) Detecting part detail	6-UL 2-FS 110 40 5-PL 1-HS 100 12 4-LG 85	70 Std 40 Fast 15	20	-40 to +70°C	R15	NF-DK21	Thread type Cylindrical type
	Coaxial, Metal sheath	7-EL						Sleeve type
	Detecting part detail Receiving: -12 - 300 700 00.25 × 9 1.2 - (cut table range)	180 ^{6-UL} 170						Flexible R4/R2
		5-PL 150 4-LG	Long 120 Std	50	-40 to +60°C	R10	NF-DJ01	Flexible R1/R2
	<u>e2.3</u> <u>/emitting:</u> <u>M3 × 0.5</u> <u>03.5</u> <u>04.5</u> <u>01.3</u> Intermediate	130 3-st 80 2-FS	50 Fast 30			KIU	Breakage prevention	Retro-reflective
	o0.5 x 1 (SUS) Toothed washer o6.5 Liner + blade tube (SUS) Width across flats 5.5 thickness 1.8	40 1-HS 10						Small object detection
	Standard, Free cut M4 × P0.7 SUS	7-EL 3-ST 1,100 350 6-UL 2-FS	Long					Screen/Array
		650 200	400 Std 250	160	-40 to +70°C	R25	NF-DM01	Limited diffuse
M4	3 12 2000	550 60 ^{4-LG} 450	Fast 100					Narrow view/ wafer mapping
	$\begin{array}{c} \text{Coaxial, Lens attachable (P.64), Free cut} \\ 0.25 \times 9 & 0.5 \times 1 \\ (\underline{\text{receiving part}}) & (\underline{\text{emitting part}}) & \sqrt{\underline{\text{44} \times \text{P0.7 (SUS)}}} \\ 0.12 & \underline{\text{6}1.3} \end{array}$	7-EL 3-ST 500 150 6-UL 2-FS	Long 250					Heat resistant
	Detecting part detail 3	300 100 5-PL 1-HS 250 30 4-LG 225	Std 120 Fast 50	70	-40 to +70°C	R15	NF-DM02	Chemical resistant
	ng distances for the diffuse type fiber units are values on 500	4						Vacuum resistant

●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.

through-beam type Correct use

Liquid level/liquid leakage/ water detection Lens for



Thread type fiber units (diffuse type)

Tunc	Footuros/dimensions ()	Sensing of	Sensing distance (mm)			Bending radius	dius Model
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
M 4	Coaxial, Lens attachable (P.64), Free cut 8-00.265 (receiving part) 0.5 (emitting part) Detecting part detail	7-EL 3-ST 680 150 6-UL 2-FS 370 90 5-PL 1-HS 270 20 4-LG 230	Long 140 Std 70 Fast 30	70	-40 to +70°C	R15	NF-DM02-(
	Standard, Free cut	7-EL 3-ST 1,200 400 6-UL 2-FS 750 250 5-PL 1-HS 650 80 4-LG 550	Long 400 Std 250 Fast 100	160	-40 to +70°C	R25	NF-DK0
	Coaxial, Free cut o0.25 x 16 o1 x 1 o2.5 SUS M6 x P0.75 (SUS) (receiving part) (enitting part) 2.4 o2.2 Detecting part detail 5 15 2000	7-EL 3-ST 1,200 400 6-UL 2-FS 750 250 5-PL 1-HS 650 75 4-LG 550	Long 450 Std 250 Fast 100	150	-40 to +70°C	R25	NF-DB0 Low cost
	Coaxial, Free cut 0.25 × 16 (receiving part) Detecting part detail 5 0.25 × 16 0.22	7-EL 3-ST 1,200 400 6-UL 2-FS 750 250 5-PL 1-HS 650 75 4-LG 575	Long 450 Std 250 Fast 100	150	-40 to +70°C	R25	NF-DB0
	Coaxial, Free cut a025 × 16 (receiving part) a1 × 1 (emitting part) Detecting part detail M4 × P0.7	7-EL 3-ST 1,200 300 6-UL 2-FS 650 150 5-PL 1-HS 550 50 4-LG 500	Long 450 Std 250 Fast 100	80	-40 to +70°C	R25	NF-DBC
M6	Nut type, Free cut 10 12 12 6.8 Lens: PC M6 P=1.0 Polyamide (PA6)	7-EL 550 6-UL 330 6-PL 240 4-L6 200 3-ST 150 2-FS 90	Long 120 Std 80 Fast 25	45	-40 to +70°C	R25	NF25-I Space-savi
	14.4 4.4 (20) Elbow type, Free cut (20)	1-HS 23 7-EL 540					
	$\begin{array}{c} \underline{05} & \underline{0511(\text{PVC})} & \underline{(60)} \\ \underline{01.5 \times 2(\text{SUS})} & \underline{\text{R5}} & \underline{5} & \underline{2000} \\ \underline{01.5 \times 2(\text{SUS})} & \underline{\text{R5}} & \underline{5} & \underline{2000} \\ \underline{13} & \underline{000^{+} \pm 5^{-}} \\ \underline{13} & \underline{000^{+} \pm 5^{-}} \\ \underline{000^{+} \pm 5^{-}} & \underline{02.2 \times 2} \\ \underline{000^{+} \pm 5^{-}} & \underline{02.2 \times 2} \\ \underline{01 \times 2} & \underline{100^{+} \pm 5^{-}} \\ \underline{01 \times 2} & \underline{100^{+} \pm 5^{-}} \\ \underline{8} & \underline{\text{Screwing side}} \\ \underline{\text{Screwing side}} & \underline{\text{Screwing side}} \\ \end{array}$	6-UL 5-10 5-14 4-50 4-16 390 3-51 2-15 2-15 2-15 140 1-45 40	Long 300 Std 150 Fast 60	100	-40 to +70°C	R25	NF-DB0
	Metal sheath 19 1000 Screwing side 15 15 100 5.5- 15 04.5 18.3 Detecting (brass with part detail nickel plating) 02.2 Part detail nickel plating) 0.15 + blade 1000 Part detail nickel plating) With access fats 10 1000 Intermediate bracket trass with nickel plating) 1000	7-EL 440 6-UL 410 5-PL 360 4-L6 310 8-ST 200 2-45 100 1-H5 30	Long 280 Std 150 Fast 70	100	-40 to +70°C	R10	NF-DJO Breakage prevent

The sensing distances for the diffuse type fiber units are values on 500 × 500 mm white paper (1000 × 1000 mm white paper for NF25-D).
 Install use with an ambient humidity between 35 and 85%. In the case of 85% RH, the ambient temperature should be between 0 and 40°C.

Photoelectric Sensors

Photoelectric Sensors

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



O3 Cylindrical type





Set screw mounted compact fiber unit



Compact and space-saving.

Selection is possible from among three types including fine core, side view and standard.

Choose from following three types according to the application



Through-beam type: NF-TR04, NF-TM03 NF-TR03, NF-TP01 Diffuse type: NF-DP01, NF-DR05

Fiber unit with a core diameter of Ø0.25 to 0.5 mm. Recommended for small object detection or high accuracy positioning purposes.

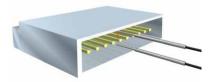
Side view type



Through-beam type: NF-TG05, NF-TS08 NF-TV08, NF-TS22V Diffuse type: NF-DR12

Can be installed in narrow spaces. Sleeve type is also available.

Connector pin detection



Standard type



Standard straight view type.

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Photoelectric Sensors

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

Fiber units Cylindrical type

Cylindrical fiber units (through-beam type)

35

2000

1000

Ø4.33 (PA)

18.3

V///

\ø1

01

Ø2.2

Ø2.2

2000

\ ø2.2

2000

\ø2.2

35

18.3

ø2.2

ø2.2

Sensing distance (mm)

D2RF

30

18

ast 8

350

200

90

350

200

90

900

550

250

Long 2,300

1,300

800

400

200

1,800

Fast

800

450

Long 6

Std 3.5 Fast 2

550

BRF

10

120

110

350

550

360

700

1

D3RF

54

6-UL 50

5-PL 44

4-LG 38 3-ST 25 2-FS 15 1-HS 5

250

140

45

275

150

50

900

550

400

350 850

550

450

400

1,710

1,530

1,350

1,230

800

480 1-HS 160

1.800

1,000

340

1,000

550

180

1,500

800

220

3,600

3,600

3,150

2,790 4,000

2,000

1,600

1,400 4,000

3,000

2,400

2,100

27

6-UL 25 5-PL 21 4-LG 18 3-ST 12 2-FS 7 1-HS 2

Ambient

temperature

-40 to +60°C

-40 to +70°C

-40 to +70°C

-40 to +70°C

-40 to +60°C

-40 to +70°C

-40 to +70°C

-40 to +70°C

Bending radius

(mm)

R4

R15

R4

R25

R1

R2

R30

R5

Model

NF-TRO4

Fine core

NF-TM03

Fine core

Low cost

NF-TRO3

Fine core

NF-TB07

Low cost

NF-TR10

NF-TK05

NF-TS07

NF-TP01

Fine core

iric	Ту	/pe	Features/dimensions (mm)
Photoelect Sensors		ø1	Fine core, Flexible 500 500 500 500 500 500 500 50
Photoelectric Sensors			Fine core, Flexible
Specialized Photoelectric Sensors		ø1.5	Fine core, Flexible, Free cut 0.25×4
Laser Displacement Sensors			Free cut
Fiber Units	be		- 8 → - 2000 - (20) →
Easy mounting Thread type	eam ty	ø2.5	
Cylindrical type	Through-beam type		<u>ø1 x 1</u> <u>ø2.5 (SUS)</u>
Sleeve type	Thro		Lens installed, Flexible, Free cut
Flexible R4/R2			Detecting part detail C
Flexible R1/R2			ø1 Multi core fiber ø0.075 x 151 Flexible, Free cut
Retro-reflective			<u>ø1.0 × 1</u> ↓ 14
Small object detection			
Screen/Array			Free cut
Limited diffuse		ø3	
Narrow view/ wafer mapping			
Heat resistant			00.25 fine sleeve: 5 mm long
Chemical resistant			<u>0.25 (SUS)</u>
Vacuum resistant			00.125 01.2
Liquid level/liquid leakage/ water detection			Fiber × 1 (brass with nickel plating) Ø3.2 (PVC)
Lens for through-beam type			

Correct use

●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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Cylindrical fiber units (through-beam type: side view type)

-		-	Sensing di	stance (mm)		Ambient	Bending radius	
IJ	pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
Side view Through-beam type	ø2	o1 sleeve: 15 mm long, Side view, Flexible, Free cut 15 + 15 + 2000 02.5 (PVC) o1 00.5 02 (SUS) 01 (SUS) Multi core fiber 00.05 × 151 Light axis	7-EL 160 6-UL 150 5-PL 130 4-LG 110 3-ST 76 2-FS 45 1-HS 11	Long 90 Std 50 Fast 25	20	-40 to +60°C	R1	NF-TG05
	ø3	Side view, Free cut Detecting part detail 1.8 1.5 2.8 Chamfering 30 2000 1.8 2000 0.2 0.2 0.2 0.2 0.2 0.2 0.	7-EL 3-ST 2,500 800 6-UL 2-FS 1,900 400 5-PL 1-HS 1,300 140 4-L6 1,100	Long 800 Std 400 Fast 200	180	-40 to +70°C	R25	NF-TS08
	04	Side view, Free cut Light 25 200 12 + (Screw installing range) 3.77 Set screw installing Detecting part (e2.5) e4 (PVC) e2.2	7-EL 3,600 6-UL 3,600 5-PL 3,600 1,600 1+HS 530 4-L6 3,240	Long 2,800 Std 2,100 Fast 1,000	1,000	-40 to +60°C	R25	NF-TV08
		Side view, Flexible, Free cut 2.8 3.6 5.6	7-EL 3,500 6-UL 3,500 5-PL 3,500 1,000 1-HS 3,000 3,000	Long 1,800 Std 1,000 Fast 500	700	-40 to +70°C	R1	NF-TS22V

●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.

L Cylindrical fiber units (diffuse type)

	_		Sonsing di	stance (mm)		A	Den alla an an alla a		
Ţ	ype	Features/dimensions (mm)	D3RF	D2RF	BRF	Ambient temperature	Bending radius (mm)	Model	Flexible R4/R
		00.5 sleeve: 3 mm long, Fine	7-EL 28 6-UL						Flexible R1/R
		o0.5 + 3 + 15 + + 1000 +	26 5-PL	Long		-40 to +60°C		NF-DP01 Fine core	Retro-reflectiv
		(SUS) + (20) + 20 + 100 <u>65.3</u> + 18.3 + 18.3 +	23 4-LG 20 3-ST	Std 5	5 3		R10		Small object detection
e	ø1.5	.5 $(brass with nickel plating)$ Detecting $\Phi_{o0.125 \times 4}$ $o4.33$ (PA)	13 2-FS 3						Screen/Array
e type			1-нs 1						Limited diffus
Diffuse		Flexible 0.25 × 2 (receiving part) 0.25 × 2 (emitting part) 0.25 × 2 (emitting part) 0.25 × 2 (emitting part) 0.1.5 SUS 0.25 × 2 0.25 ×	7-EL 3-ST 300 80 6-UL 2-FS	300 80 Long UL 2-FS 70 180 45 Std VPL 1-HS 30 150 18 Fast	20	-40 to +70°C	R4		Narrow view wafer mappin
Δ			5-PL 1-HS 150 18						Heat resistan
		Detecting part detail	4-LG 130 7-EL 3-ST	15					Chemical resistant
	ø2.5	2.5 Free cut $ao(.5 \times 2)$ $ao(.5 \times 2)$ ao	400 100 6-UL 2-FS 200 50	Long 100 Std 60	45	-40 to +70°C	R15	NF-DT03	Vacuum resistant
			5-PL 1-HS 190 10 4-LG 160	Fast 30					Liquid level/liquid leakag water detection
		1	1	I.	1	1	1	1	Lens for

•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.

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement **Sensors**

Fiber Units

Easy mounting

Thread type

Cylindrical type

Sleeve type

R2

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Lens for through-beam type

Fiber units Cylindrical type

Cylindrical fiber units (diffuse type)

Phe	
Photoelectric Sensors	
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

Туре		Features/dimensions (mm)	Sensing dis	stance (mm)		Ambient	Bending radius	Model
	he	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
		Free cut 2.7 7 $(20)Detecting apart detail aa1 \times 2 a3 a2 (PVC) a1.3 \times 2Screwing side$	7-EL 9-ST 690 320 6-UL 2+S 640 190 5-PL 1-HS 560 60 4-LG 490	Long 400 Std 200 Fast 100	150	-40 to +70°C	R25	NF-DB10 Standard item
Diffuse type		Coaxial, Flexible, Free cut 15 + 2000 15 + 01 15 + 2000 15 + 15 + 200001.25 Receiving side 01.25 Receiving side 01.25 Receiving side 1.25 Receiving side 1.25 - Rec	7-EL 270 6-UL 250 5-PL 210 4-LG 180 3-ST 120 2-FS 60 1-HS 20	Long 120 Std 70 Fast 35	55	-40 to +60°C	R2	NF-DR11
	ø3	Free cut	7-EL 3-ST 1,200 400 6-UL 2-FS 750 200 5-PL 1-HS 650 80 4-LG 550	Long 400 Std 250 Fast 100	160	-40 to +70°C	R25	NF-DK04 Low cost
		Flexible, Free cut 01.0 × 2 (8) 03 03 01.3	7-EL 3-ST 850 275 0-UL 2-FS 550 170 5-P-L 1-HS 450 55 4-L6 375	Long 300 Std 180 Fast 80	110	-40 to +70°C	R2	NF-DK04Z
		Flexible, Free cut a0.25 × 4 (receiving part) Detecting part detail	7-EL 3-ST 450 3-ST 20 6-UL 2-FS 250 70 5-P-L 1-HS 190 25 4-L6 25 160	Long 120 Std 50 Fast 25	35	-40 to +70°C	R4	NF-DR03
		$\begin{array}{c} 00.82 \text{ sleeve: 5 nm long, Flexible} \\ 00.25 \times 1 \\ (receiving part) \\ (receiving $	7-EL 3-ST 190 45 6-UL 2-FS 125 25 5-PL 1-HS 75 8 4-LG 65	Long 40 Std 15 Fast 5	10	-40 to +70°C	R4	NF-DR05 Fine core
The	sensin	og distances for the diffuse type fiber units are values on 500.	x 500 mm white paper					

•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.

Cylindrical fiber units (diffuse type: side view type)

Limited diffuse	Tur		Features/dimensions (mm)	Sensing dis	stance (mm)		Ambient	Bending radius	Model	
Narrow view/	Тур	be	Features/ dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Woder	
wafer mapping			ø2 sleeve: 15 mm long, Flexible, Free cut							
Heat resistant	Q			7-EL 53 6-UL 50						
Chemical resistant	e type	ø3	02 (SUS) 03 (SUS) 03.2 (PVC)	5-PL 43 4-LG	Long 25 Std	10	-40 to +60°C	R1	NF-DR12	
Vacuum resistant	Diffuse	00	Light axis	36 3-st 20 2-FS	12 Fast 5		-40 10 +00 0			
Liquid level/liquid leakage/ water detection			o0.5 Detecting part detail	12 1-HS 4						
Lens for through-beam type		onoin								

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.

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toelectric sensors



Fiber units

(Side view P.47

Sleeve type

Fiber amplifier

D3RF

• P.110

Sleeve type (straight view) Related products The fine tip makes mounting highly flexible and adjusting position very easy

Long sleeve type can be bent

Thread type and cylindrical type available

Bendable sleeve type

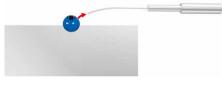
Flexible mounting Bendable sleeve

Long sleeve type can be bent (up to R10 mm). Fine tuning of the sensing position is possible even after the mounting position has been determined.

No sleeve



Difficult to change detection point after mounting



Fine tuning possible even after mounting

Bendable sleeve type Through-beam type: NF-TB05, NF-TB03, NF-TH09 Diffuse type: NF-DB08, NF-DM03, NF-DR10, NF-DH05, NF-DB06, NF-DB02, NF-DH04 *Please bend the sleeve at an angle of 90° or less.

Easy position adjustment

Position adjustment for the detection point can be easily performed when mounting due to the fact that the sleeve type has a fine tip and the workpiece is not hidden by the tip even when approaching the workpiece for detection.

The tip does not get in the way, making position

No sleeve



Difficult to see small workpieces and difficult to adjust position.

Fine sleeve type

adjustment easy.



Fine sleeve type Through-beam type: NF-TF 5, NF-TP01, NF-TT01 Diffuse type: NF-DB05, NF-DT04, NF-DT02, NF-DP01 NF-DR05, NF-DR07

Photoelectric Sensors

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Photoelectric Sensors

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

resistant

Vacuum resistant

Liquid level/liquid leakage

water detection

Lens for through-beam type

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

Narrow view/

Chemical

resistant

Vacuum

resistant

water detection

Lens for

through-beam type

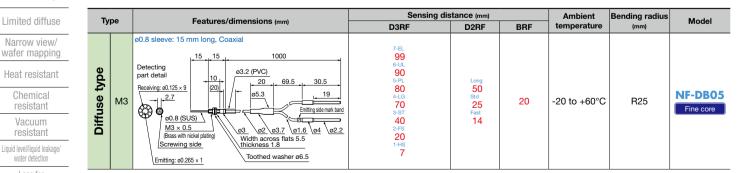
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L Sleeve fiber units (through-beam type)

_			Sensing dis	stance (mm)		Ambient	Bending radius	
Туре		Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
	M3	00.88 sleeve: 40 mm long, Free cut 40 10 10 10 10 10 10 10 2000 01 Width across flat 5.5 thickness 1.8 Tothed washer o6.5 (SUS)	7-EL 470 6-UL 450 5-FL 380 4-LG 340 3-ST 220 2-FS 120 1-HS 45	Long 270 Std 140 Fast 80	100	-40 to +70°C	Fiber R25 Sleeve R10	NF-TBO5 Bendable sleeve
ype	M4	o1.5 sleeve: 90 mm long, Free cut 01 × 1 01 × 1 01.5 SUS 02.5 SUS 02.5 SUS 02.5 SUS 02.5 SUS 02.5 SUS	7-EL 4,000 6-UL 1,900 5-FL 1,900 5-FL 1,900 1-HS 180 4-L6 1,600	Long 1,000 Std 600 Fast 250	450	-40 to +70°C	Fiber R25 Sleeve R15	NF-TB03 Bendable sleeve
Through-beam type	ø3	o2.1 sleeve: 60 mm long, Heat resistant 60 27 2000 1.2 bundled fiber core x 1 03 (SUS) M4 x 0.7 (SUS) Mounting bracket Wdth across fats 7 thickness 2.4 (SUS) Toothed washer e8.5 (SUS) Mounting plug (PA)	7-EL 1,350 6-UL 1,260 5-FL 1,120 4-L6 900 3-ST 630 2-FS 410 1-HS 120	Long 750 Std 450 Fast 220	300	-30 to +350°C or -60 to +200°C	Fiber R25 Sleeve R10	NF-TH09 Bendable sleeve
		e0.25 fine sleeve: 5 mm long e0.25 (SUS) 5 10 500 35 e0.125 × 1 0 35 18.3 e0.125 × 1 0 03 (Proc) 01.2 0 02.2 (PVC) 04.33 (PA) 02.2 02.2 02.2 02.2 02.2 02.2 02.2 02.	7:EL 3-ST 27 12 6-UL 2-ES 25 7 5-PL 1-HS 21 2 4-LG 18	Long 6 Std 3.5 Fast 2	1	-40 to +70°C	R5	NF-TP01 Fine core
		00.5 fine sleeve: 5 mm long, Free cut 00.25 × 1 00.25 × 1 00.5 SUS \ 03 SUS \ 01	7-EL 3-ST 170 50 6-UL 2-FS 110 25 5-PL 1-HS 80 4-LG 70	Long 80 Std 40 Fast 20	30	-40 to +70°C	R15	NF-TT01 Low cost

●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.

Sleeve fiber units (diffuse type)



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.

Correct use



Sleeve fiber units (diffuse type)

			Sensing dis	stance (mm)		Ambient	Bending radius		ن
Ту	ype	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	
	М3	00.82 sleeve: 15 mm long, Flexible Coaxial	7-EL 240 6-UL 120 5-PL 100 4-LG 85 3-ST 60 2-FS 35 1-HS 10	Long 70 Std 40 Fast 15	15	-40 to +70°C	R4	NF-DT04	Photoelectric Sensors
		00.82 sleeve: 15 mm long Flexible, Free cut Receiving: 00.25 × 1 Emitting: 00.25 × 1 2.4 0.82 SUS 0.82 SUS 0.82 SUS 0.82 SUS 0.82 SUS 0.82 SUS	7-EL 3-ST 190 45 6-UL 2-FS 125 25 5-PL 1-HS 70 8 4-LG 65	Long 40 Std 15 Fast 5	10	-40 to +70°C	R4	NF-DT02	Photoelectric Sensors Specialized
		o1.48 sleeve: 40 mm long, Free cut Detecting part detail 3.5 01.48 (SUS) 01.48 (SUS)	7-EL 195 6-UL 180 5-FL 160 4-LG 140 3-ST 90 2-FS 50 1-HS 15	Long 110 Std 50 Fast 30	40	-40 to +70°C	Fiber R25 Sleeve R10	NF-DB08 Bendable sleeve	Photoelectric Sensors Laser Displacement Sensors Fiber Units Easy mounting
Diffuse type		01.5 sleeve: 28 mm long, Free cut 0.5 × 1 (receiving part) 0.5 × 1 (emitting part) 3 0.5 × 1 0.5 × 1 0 0 0 0 0 0 0 0 0 0 0 0 0	7.4L 3.5T 450 120 6-UL 2.4S 240 60 5-PL 1+HS 220 16 44.6 190	Long 100 Std 60 Fast 30	45	-40 to +70°C	R15	NF-DT05	Thread type Cylindrical type
	M4	o1.5 sleeve: 90 mm long, Free cut 00.5 × 1 (receiving part) 00.5 × 1 (emitting part) 3 00.5 × 1 00.5 × 1 00.	7-EL 3-ST 450 120 6-UL 2-FS 240 60 5-PL 1-HS 220 16 4-LG 190	Long 120 Std 50 Fast 30	45	-40 to +70°C	Fiber R15 Sleeve R10	NF-DM03 Bendable sleeve	Sleeve type Flexible R4/R2 Flexible R1/R2
	IVI-+	o1.48 sleeve: 40 mm long, Flexible, Free cut 40 12 2000 10 Bendable 10 5 width across flats 7 M4 × 0.7 (SUS) Detecting part detail 3.5 Multi core fiber (e0.05 × 151) × 2 Context across flats 7 thickness 2.4 Context across flats 7 thickness flats	7-EL 140 6-UL 135 5-PL 110 4-LG 95 3-ST 65 2-FS 30 1-HS 10	Long 60 Std 355 Fast 17	30	-40 to +60°C	Fiber R1 Sleeve R10	NF-DR 10 Bendable sleeve	Retro-reflective Small object detection Screen/Array Limited diffuse Narrow view/ wafer mapping
		c2.1 sleeve: 90 mm long, Heat resistant Bendable range 90 27 1000 60 16, 718.3 60 µm × 380 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3-57 520 2-F8 190 1-H8 50	Long 750 Std 250 Fast 80	200	-30 to +350°C or -60 to +200°C	Fiber R25 Sleeve R10	NF-DH05 Bendable sleeve	Heat resistant Chemical resistant Vacuum resistant Liquid level/liquid leakage/ water detection Lens for through-beam type

 \bullet The sensing distances for the diffuse type fiber units are values on 500 \times 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.

Sleeve fiber units (diffuse type)

Photoelectric Sensors Photoelectric Sensors 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

Ту	pe	Features/dimensions (mm)	Sensing dis			Ambient	Bending radius	Model
		ø2.5 sleeve: 40 mm long, Free cut	D3RF	D2RF	BRF	temperature	(mm)	
		$\begin{array}{c} 40 & 15 & 2000 \\ \hline 10 & \text{Berdable} & 10 & 5 & (20) & (75) \\ \hline 02.5 & \text{(SUS)} & \text{(20)} & \text{(75)} \\ \hline 02.5 & \text{(SUS)} & \text{(20)} & \text{(75)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} & \text{(20)} & \text{(20)} & \text{(20)} & \text{(20)} \\ \hline 03.5 & \text{(20)} \\ \hline 03.5 & \text{(20)} &$	7-EL 680 6-UL 630 5-PL 550 4-L6 4-80 3-ST 320 2-FS 180 1-HS 50	Long 400 Std 240 Fast 110	130	-40 to +70°C	Fiber R25 Sleeve R10	NF-DB06 Bendable sleeve
	M6	02.5 sleeve: 90 mm long, Free cut Detecting part detail receiving part 01 1 0 2.5 SUS 01 x 1 (emitting part) 0 x 4 x P0.7 SUS	7-EL 1,100 6-UL 750 5-PL 1-HS 80 4-L6 650	Long 450 Std 250 Fast 100	150	-40 to +70°C	Fiber R25 Sleeve R20	NF-DB02 Bendable sleeve
Diffuse type		o2.8 sleeve: 60 mm long, Heat resistant Detecting part detail of the core x 1 intercence x 2 intercence x 3	7-EL 950 6-UL 900 5-PL 780 4-LG 680 3-ST 450 2-FS 200 1-HS 59	Long 650 Std 250 Fast 80	300	-30 to +350°C or -60 to +200°C	Fiber R25 Sleeve R10	NF-DH04 Bendable sleeve
Diffus	ø1.5	$\begin{array}{c} \text{o0.5 sleeve: 3 mm long} \\ \hline 3.7 \\ \hline 0.5 \\ \text{(SUS)} \\ \hline 0.5 \\ \text{(SUS)} \\ \hline 0.5 \\ \text{(SUS)} \\ \hline 0.5 \\ \text{(20)} \\ \hline 0.5 \\ \hline 0.$	7-EL 28 6-UL 26 5-PL 23 4-L6 20 3-ST 13 2-H5 3 1-H5 1	Long 18 Std 5 Fast Unusable	3	-40 to +60°C	R10	NF-DP01 Fine core
	63	00.82 sleeve: 5 mm long, Flexible Detecting part detail 0.25 × 1 (receiving part) 0.25 × 1 (emitting part) 0.82 SUS 0.82	7-EL 3-ST 190 45 6-UL 2-FS 125 25 5-PL 1-HS 75 8 4-LG 65	Long 40 Std 15 Fast 5	10	-40 to +70°C	R4	NF-DR05
	ø3	0.82 sleeve: 80 mm long Detecting part detail 0.25 × 2 0.82 0.82 0.25 0	7-EL 3-ST 90 25 6-UL 2-FS 50 10 5-FL 1-HS 4-UG 40	Long 35 Std 18 Fast 10	7	-40 to +70°C	R25	NF-DR07
	ø4	01.5 sleeve: 20 mm long, Free cut Detecting part detail (())) (0.5 × 2) 01.5 (0.1 × 2) 01	7-EL 3-ST 400 100 6-UL 2-FS 200 50 5-PL 1-HS 190 16 4-LG 160	Long 100 Std 60 Fast 12	45	-40 to +70°C	R15	NF-DK43 Low cost

•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.

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Vacuum resistant

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

Fiber amplifier

D3RF

P.110

Sleeve type (side view)



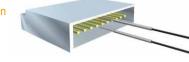
Side angle light beam provides optimal detection in narrow places

A wide range of variations including flexible types and heat resistant types

Possible to detect objects in narrow space Thin sleeve

The fine tipped side view sleeve type eliminates mounting space problems. Optimal for detection in complex areas, such as for connector pin detection.

Connector pin detection



Fiber Units

Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors Laser Displacement

Easy mounting

Thread type

rical type

Sleeve fiber units (through-beam type)

Т				Sensing d	istance (mm)		Ambient	Bending radius		Cylindrical type
	Ту	pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	Sleeve type
		M3	o1 sleeve: 10 mm long, Free cut	7-EL 3-ST 650 200 6-UL 2-FS 450 100 5-PL 1-HS 300 25 4-LG 250	Long 2000 Std 150 Fast 60	75	-40 to +70°C	R15	NF-TV04 Thin sleeve	Flexible R4/R2
		ø2	o1 sleeve: 15 mm long, flexible, Free cut	7-EL 160 6-UL 150 5-PL	Long				NF-TG05 Thin sleeve	Retro-reflective Small object detection
	Through-beam type		e1 e2.5 (PVC) o2.5 (PVC) o2.5 (SUS) o1 (SUS) o1 (SUS)	130 ^{4-LG} 110 ^{3-ST} 76 2-FS	90 Std 50 Fast 25	20	0 -40 to +60°C	R1		Screen/Array Limited diffuse
	h-bea		Light axis 0.05×151	45 ^{1-HS} 11						Narrow view/ wafer mapping
	Throug		o1 sleeve: 10 mm long, Free cut 1	7-EL 3-ST 650 200 6-UL 2-FS 450 100 5-PL 1-HS 300 25 4-LG 250	Long 2000 Std 150 Fast 60	75	-40 to +70°C	R15	NF-TV02 Thin sleeve	Heat resistant Chemical resistant Vacuum resistant
			o1 sleeve: 27 mm long, Heat resistant Detecting part detail 1.75 Heat/freezing resistant 0rdinary temperature type 02.5 02.5 02.5 02.5 02.5 02.5 02.5 02.5 02.5 02.5 02.5 02.5 0.5 x1 1.5 0.5 x1 0.5 x1 0	7-EL 3-ST 450 140 6-UL 2-FS 260 70 5-PL 20 4-LG 20	Long 120 Std 80 Fast 50	50	-40 to +200°C	R30	NF-TH045-27V2 Made-to-order products Thin sleeve	Liquid level/liquid leakage/ water detection Lens for through-beam type Correct use

●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.



Photoelectric

Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors Laser

Sleeve fiber units (through-beam type)

т		-	Sensing dis	stance (mm)		Ambient	Bending radius	Model
L,	pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
eam type	-0	o1.5 sleeve: 25 mm long, Heat resistant Detecting part detail Fiber length: 300 mm and 400 mm (each fiber) 1.75 Heat/freezing resistant Ordinary 03 01.5 (SUS) 03 150 04±0.3 01.5 (SUS) 03 150 04±0.3 02.2 03 150 04±0.3 01.5 (SUS) 03 150 04±0.3 01.5 (SUS) 03 150 04±0.3 01.5 (SUS) 04±0.3 01.5 (SUS)	7-EL 1,600 6-UL 850 5-PL 800 4-LG 600 3-ST 400 2-FS 200 1-HS 60	Long 350 Std 250 Fast 150	150	-40 to +200°C	R30	NF-THO5S-A Mede-to-order products
Through-beam type	ø3	o2 sleeve: 20 mm long, Free cut Chamfering 1.5 2 Detecting part detail 2.8 2 02 sleeve: 20 mm long, Free cut 02 SUS o3 SUS 02.2 20 15 2000	7-EL 3-ST 2,000 600 6-UL 2-FS 1,300 300 5-PL 1-HS 1,000 100 4-LG 900	Long 800 Std 400 Fast 200	320	-40 to +70°C	R25	NF-TV01
		o2 sleeve: 20 mm long 5 m long, Free cut	7-EL 3-ST 1,700 500 6-UL 2-FS 1,100 250 5-PL 1-HS 850 85 4-LG 750	Long 600 Std 300 Fast 150	200	-40 to +70°C	R25	NF-TV01-5

●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.

Sleeve fiber units (diffuse type)

-		Frature (dimensions (Sensing di	stance (mm)		Ambient	Bending radius	Model	
	Гуре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	
	M6	02.7 sleeve: 20 mm long, Free cut 1.5 2.5 Detecting part detail	7-EL 3-ST 680 200 6-UL 2-FS 400 100 5-PL 1-HS 350 30 4-US 300	Long 200 Std 120 Fast 50	90	-40 to +70°C	R25	NF-DV0	
		o2.7 sleeve: 20 mm long, Free cut 1.5 Chamfering 2 2 20 15 2000 Detecting part detail	7.EL 9-ST 680 200 6-UL 2-FS 400 100 5.PL 1-HS 350 30 4-US 30	Long 200 Std 120 Fast 50	90	-40 to +70°C	R25	NF-DV0	
Diffuse type	ø3	o2 sleeve: 15 mm long, Flexible, Free cut 15 15 2000 0 1 × 2 0 0.5 03 (SUS) 0 0.5 × 151 1 Uight axis	7-EL 53 6-UL 50 5-PL 43 36 3-ST 20 2-PS 12 1-HS 4	Long 25 Sid 12 Fast 5	10	-40 to +60°C	R1	NF-DR 1	
		o2.8 sleeve: 10 mm long, Free cut 1 1.5 Detecting part detail 02.8 sleeve: 10 mm long, Free cut 03.5 fiber (2) 03.5 SUS 03.5 SUS 01.5 SUS 10 10 15 2.8 10 10 15 2.000	7.EL 9-ST 230 55 6-UL 2-FS 110 30 5-PL 1-HS 85 8 4-LG 75	Long 80 Std 30 Fast 7	15	-40 to +70°C	R15	NF-DV0	
	ø5	a2.7 sleeve: 65 mm long, Free cut SUS303 2.5 Chamfering a2.7 a2.7 a2.7 a5 a2.7 a2.7 a5	7.EL 3-ST 600 200 6-UL 2-FS 400 100 5.PL 1-HS 350 30 4-LG 300	Long 200 Std 120 Fast 50	90	-40 to +70°C	R25	NF-DK3	

 $\bullet \mbox{The sensing distances for the diffuse type fiber units are values on 500 <math display="inline">\times$ 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.



Fiber Units

Easy mounting

Thread type

Cylindrical ty

Sleeve type

Flexible R4/R2

Flexible R1/R2

Retro-reflectiv

Small object

detection

Screen/Array

Limited diffuse

Narrow view/ wafer mapping

Heat resistant

Chemical resistant Vacuum resistant Liquid leek/liquid leakage/ water detection Lens for

through-beam ty Correct use



06 Flexible R4/R2 (R4 mm, R2 mm)

	• P.52
roducts	(R1 mm)
Related	Flexible R1
	Fiber units



Flexible type fiber units can be mounted at moving parts

Withstands 800,000 cycle bending test

Limited diffuse reflective types optimized for glass substrate alignment is also available



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Photoelectric Sensors

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

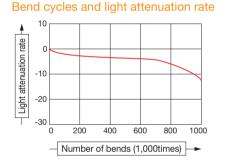
through-beam type Correct use

Withstands 800,000 cycle bending test

Withstands 800,000 cycle bending test at a load of 50 g !*

Because of high photo-conductivity with a less than 10% light deterioration rate, this sensor is optimal for mounting on moving parts such as robot arms.

*Measurement conditions: Bending angle of 90°, load of 50 g, bending radius of 4 mm, light attenuation rate of less than 10%



Flexible fiber units (through-beam type)

т	/pe	Features/dimensions (mm)	Sensing dis	stance (mm)		Ambient	Min. bending	Model	
13	ype		D3RF	D2RF	BRF	temperature	radius (mm)	woder	_
Through-beam type	M3	Free cut 00.25 × 4 2.5 2.5 00.25 × 4 00.25 × 4 00	7-EL 3-ST 8-50 275 6-UL 2-FS 550 150 5-PL 1-148 450 50 4-G 400	Long 350 Std 200 Fast 90	110	-40 to +70°C	R4	NF-TR02	_
	M4	Lens attachable (P.98), Free cut 0.265×16 0.265×16 0.265×16 0.265×10 0.265×10^{-1} 0.2	7-EL 3-ST 4,000 850 6-UL 2-FS 1,800 500 5-PL 1-HS 1,400 175 4-LG 1,200	Long 8000 Std 4000 Fast 250	330	-40 to +70°C	R4	NF-TRO1 Standard item	_
	ø1	Fine 500 Detecting part detail 00.265 × 1 01 00.7 01 00.7 01.4 (PVC) 01 02.2 01.4 (PVC)	7-EL 3-ST 54 25 6-UL 2-FS 50 15 5-PL 1-14S 444 5 	Long 30 Std 18 Fast 8	10	-40 to +60°C	R4	NF-TRO4	_
	ø1.5	Fine, Free cut <u>00.25 fiber (4)</u> <u>01.5 SUS</u> <u>01</u> <u>01.5 SUS</u> <u>01</u> <u>10</u> <u>1000</u>	7-EL 8-51 850 275 6-UL 2-FS 550 150 5-PL 1-148 450 50 4-L6 400	Long 350 Std 200 Fast 90	110	-40 to +70°C	R4	NF-TRO3	_

●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.



Fiber units Flexible R4/R2 (R4 mm, R2 mm)

Flexible fiber units (through-beam type)

Photoelectric Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Fibe	r Uni	tS

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

Туре			Sensing	distance (mm)		Ambient	Min. bending	Madal
Iy	pe	Features/dimensions (mm)	D3RF D2F		BRF	temperature	radius (mm)	Model
Through-beam type		Flat ON, Free cut Detecting part detail 0.25 × 7 (Polycarbonate) Those for entiting and receiving are symmetrical in stage.	7-EL 3-ST 1,600 750 6-UL 2-FS 1,510 410 5-PL 1-HS 1,320 130 4-LG 1,150	Long 750 Std 450 Fast 280	300	-40 to +60°C	R4	NF-TE05
	Square	Side ON, Free cut Detecting part deal 25 00.25 × 7 (Polycarbonate) Detecting 11 2-000 12 2-00 0 2-02.2 0 0 0 0 0 0 0 0 0 0 0 0 0	7-EL 3,600 6-UL 3,600 5-PL 3,600 1,110 1-HS 3,600 4-L6 3,150	Long 2,700 Std 1,300 Fast 600	1,100	-40 to +60°C	R4	NF-TR05
Thre		Head ON, Free cut Detecting part detail 1.25 0.25 × 7 Housing 0.25 × 7 (Polycarbonate) Housing (Polycarbonate)	7-EL 3-ST 3,600 1,980 6-UL 2-FS 3,600 1,400 5-PL 1,400 1-HS 3,580 500 4-LG 3,060	Long 2,700 Std 1,600 Fast 850	1,100	-40 to +60°C	R4	NF-TR06

•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.

Flexible fiber units (diffuse type)

Tre		Features/dimensions (mm)	Sensing dis	stance (mm)		Ambient	Min. bending	Model
Iy	ре	reatures/unitensions (mm)	D3RF	D2RF	BRF	temperature	radius (mm)	woder
Diffuse type	M3	Free cut Detecting part detail Receiving: 0.25 × 2 Emitting: 0.25 × 2 M3 × 0.5 (SUS) M3 × 0.5 (SUS) Toothed washer e6.5	7-EL 88 6-UL 80 5-PL 70 4-L6 60 3-ST 40 2-45 20 1-H5 7	Long 40 Std 20 Fast 14	20	-40 to +70°C	R4	NF-DR08
		Free cut M3 × P0.5 SUS M3 × P0.5 SUS M3 × P0.5 SUS 1.8 01 1.8 01 1.3 1000	3-FEL 3-SFT 300 80 6-UL 2-FS 180 45 5-PL 1-HS 130 16 4-LG 100	Long 70 Std 30 Fast 15	20	-40 to +70°C	R4	NF-DR02

 \bullet The sensing distances for the diffuse type fiber units are values on 500 \times 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.

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Flexible fiber units (diffuse type/limited diffuse reflective type)

			Sensing dis	stance (mm)		Ambient	Min. bending		<u>e</u>
Ту	pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	radius (mm)	Model	
	MO	e0.82 sleeve: 15 mm long, Free cut M3 × P0.5 SUS e0.82 SUS e0.82 SUS e0.82 SUS 1.8 e0.25 × 1 (receiving part) 5.5 e0.25 × 1 (emitting part) 15 2.4 15	7-EL 3-ST 190 45 6-UL 2-FS 5-PL 1-HS 70 8 4-LG 65	Long 40 Std 15 Fast 5	10	-40 to +70°C	R4	NF-DT02	Photoelectri Sensors
	M3	Coaxial e0.82 sleeve: 15 mm long e0.125 × 9 (receiving part) e0.82 M3 × P0.5 SUS o3 SUS e1.2 (erniting)e2.1 (ernit	7-EL 3-ST 240 60 6-UL 2-FS 120 35 5-PL 1-HS 100 10 4-LG 85	Long 70 Std 40 Fast 15	15	-40 to +70°C	R4	NF-DT04	Pho
	M4	Bit Stress M2.6 × P0.45 SUS 0.25 × 4 (receiving part) 0.25 × 4 (emitting part) 2.4 0.25 3 12 2000	7-EL 3-ST 300 80 2-FS 180 45 5-FL 1-HS 140 16 4-LG 120	Long 120 Std 50 Fast 25	35	-40 to +70°C	R4	NF-DR06	Photoelectric Sensors Specialized
Diffuse type	M6	Bit Stress M6 × P0.75 (brass with nickel plating) 00.265 × 16 (receiving part) 00.265 × 16 (emitting part) 00 10 10 12 00 12	7-EL 3-ST 1,100 350 6-UL 2-F8 700 230 5-PL 230 1-H8 600 70 4-L6 500	Long 350 Std 200 Fast 80	130	-40 to +70°C	R4	NF-DR01 Standard item	Photoelectric Sensors Laser Displacement Sensors
	ø1.5	00.25 × 2 (receiving part) 00.25 × 2 (emitting part) 01.5 SUS 01.2 (emitting part) 01.2 01.2 01.2 01.2 01.2 01.2 01.2 01.2	7-EL 3-ST 300 80 6-UL 2-FS 180 45 5-PL 1-HS 150 18 4-LG 130	Long 70 Std 30 Fast 15	20	-40 to +70°C	R4	NF-DR04	Fiber Units
		Free cut	7-EL 3-ST 450 120	Long					Easy mounting
		0.25 × 4 (receiving part)	6-UL 2-FS 250 70 5-PL 1-HS	120 Std 50	35	-40 to +70°C	R4	NF-DR03	Thread type
			190 25 ^{4-LG} 160	Fast 25					Cylindrical type
	ø3	Detecting part detail	100 3-sr 190 45 6-UL 2-F8 125 25 5-PL 1-H8 75 8 4-L6 65	Long 40 Std 15 Fast 5	10	-40 to +70°C	R4	NF-DR05	Sleeve type Flexible R4/R2 Flexible R1/R2
		Glass substrate alignment, Flat ON, Free cut <u>2</u> -M3 flush screw hole	7-EL						Retro-reflective
		29 2000	0 to 23 6-UL 0 to 23						Small object
type		Emitting/ receiving part 18 6.5 (20) $\sigma 1.3 \times 2$ 10	5-PL 0 to 22 4-LG	0 to 23					detection
		17 Emilting side Receiving side	0 to 22 ^{3-ST} 0 to 21	0 to 17 Fast 0 to 12	15	0 to +70°C	R4	NF-DC06	Screen/Array
ectiv		Housing (Heat resistant ABS) -2.5	^{2-FS} 0 to 20	01012					Limited diffuse
Limited diffuse reflective	are		^{1-HS} 5 to 13						Narrow view/ wafer mapping
iuse	Square	Glass substrate alignment, Flat ON, Free cut Detecting part detail	7-EL						Heat resistant
l diff		Emitting/receiving fiber Ø0.25 × 9 29 3000	0 to 38 ^{6-UL} 0 to 38						Chemical
nitec		$2.5+\frac{18}{1+}6.5+\frac{2-M3 \text{ flush screw hole}}{(20)} \underline{\sigma}1.3 \times 2$	5-PL 0 to 38 4-LG	0 to 36 Std		0.1 7000	54		resistant Vacuum
Lin			0 to 38 ^{3-ST} 0 to 34	0 to 30 Fast 0 to 15	Unusable	0 to +70°C R4	NF-DC04	resistant	
		part 2 e Detection Housing side	2-FS 0 to 31 1-HS						Liquid level/liquid leakage/ water detection
		3.8 tdirection (Heat resistant ABS)	4 to 22						Lens for through-beam type
The	sensin	d distances for the diffuse type fiber units are values on 500	× 500 mm white paper.						

 \bullet The sensing distances for the diffuse type fiber units are values on 500 \times 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.

Correct use

OPTEX F R

²hotoelectric Sensors

Photoelectric Sensors

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

Thanks to highly-flexible fibers

The fiber unit for the flexible type (R1 mm) has an allowable bending radius of 1 mm ! Cable can be installed without worrying about damaging the fiber.

*If fibers are to be bent repeatedly, such as when mounted on moving parts, please select a flexible fiber→P.49

Standard fiber

Flexible fiber

Space is needed because the bending radius is large. Also, you may have problems when snagged.

Extra space is unnecessary as the bending radius is 1 mm. No more worrying about snagging.

Flexible R1 (R1 mm)

Fiber with 1 mm bending radius for the smallest possible bends

Related

products

Fiber units

(R4 mm, R2 mm)

P.49

Flexible R4/R2

Fiber units

(R2 mm)

O P.58

Flexible R2

Extra space is unnecessary as the bending radius is 1 mm. Also prevents snagging.

Over 20 types are available, including through-beam types and diffuse types

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Flexible R1 mm fiber units (through-beam type)

Туре	Features/dimensions (mm)		istance (mm)	1	Ambient	Bending radius	Model	
	Lens attachable (P.98), Free cut	D3RF	D2RF	BRF	temperature	(mm)	Woder	S II
	Let is attached (1.50), resolut Screwing side M2.6 \times 0.45 Detecting M4 \times 0.7 part detail (Brass with nickel plating) Multi core fiber 0.075 \times 151	7-EL 3-ST 4,000 6-UL 2,000 5-PL 1,600 4-L6 1,400 3-ST 1,000 2-FS 550 1-HS 180	Long 800 Std 400 Fast 200	360	-40 to +60°C	R1	NF-TK77 Low cost	Photoelectric Sensors
M4	Nut type, Free cut 7.5 or more (Thread) 8.5 133 129 129 129 120 120 120 120 120 120 120 120	7-EL 1,530 6-JL 1,440 5-PL 1,260 4.6 1,000 3-ST 720 2-FS 420 1-HS 140	Long 800 804 450 Fast 250	300	-40 to +60°C	R1	NF-TR08	Photoelectric Sensors Specialized Photoelectric Sensors Laser Displacement Sensors
Through-beam type	Nut type, Lens installed, Free cut 7.5 or more (Thread) 2000 4.5 4.4 1.2.9 4.4 1.2.0 Control washer ø8.5 4.4 1.2 Control washer ø8.5 Lens (acrylic) Detecting part detail 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	7-EL 3,600 6-UL 3,600 5-PL 3,600 4-L6 3,150 3-ST 1,980 2-FS 1,900 1-HS 320	Long 2,300 Std 1,300 Fast 550	800	-40 to +60°C	R1	NF-TR09	Fiber Units Easy mounting Thread type Cylindrical type
ø2	o1 sleeve: 15 mm long, Side view, Free cut 15 2000 1 4 2.5 (PVC) 0 1 (SUS) Light axis 0.5 x 151	7-EL 160 6-UL 150 5-FL 130 4-UG 110 3-ST 76 2-FS 45 1-HS 11	Long 90 Sid 50 Fast 25	20	-40 to +60°C	R1	NF-TG05	Sleeve type Flexible R4/R2 Flexible R1/R2 Retro-reflective Small object detection
ø3	Lens installed, Free cut e2 lens Detecting part detail e1. Multi core fiber e0.075 × 151	7-EL 3-ST 3,600 1,800 6-UL 2-FS 3,600 1,000 5-PL 1+HS 3,150 340 4-LG 2,790	Long 2,300 Std 1,300 Fast 550	550	-40 to +60°C	R1	NF-TR10	Screen/Array
ø4	Side view, Free cut Rod prism (glass) lens (material PC) 2.8 3.6 SUS303 @2.2 3.0 Detecting part detail	2,100 3-ST 7-EL 3-ST 3,500 2,000 6-UL 2-FS 3,500 1,000 5-PL 1+HS 3,500 300 4-LG 3,000	Long 1,800 Std 1,000 Fast 500	700	-40 to +70°C	R1	NF-TS22V	Heat resistant Chemical resistant
ø5	Narrow view, Side view, Free cut Detecting part detail 3.7 25 2000 01 02.2 $02.2Multi core fiber0.075 \times 151 Holder // (20) 02.2$	7-EL 3,600 6-UL 3,600 5-PL 3,600 1,500 5-PL 1-HS 3,600 4-LG	Long 2,500 Std 1,600 Fast 800	1,000	-40 to +60°C	R1	NF-TG02	Vacuum resistant Liquid level/liquid leakage/ water detection Lens for

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Flexible R1 mm fiber units (through-beam type)

-			Sensing	distance (mm)		Ambient	Bending radius	
Ту	ре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
	een	11 mm wide screen, Side ON, Free cut Light axis center Light axis	7-EL 3,700 6-UL 3,000 5-PL 3,000 4-LG 3,000 3-ST 2,500 2-FS 2,500 2-FS 2,000 1-HS 1,000	Long 3,000 Sid 2,500 Fast 1,200	2,000	-40 to +55°C	R1	NF-TZO9 Renewal Collimated light
	Screen	32 mm wide screen, Side ON, Free cut Fiber: o1 × 1 core (PMMA), sheath o1.3 (PE) Window (3.2 × 32), ters (norbornene plastic) 65 4 2000 16 5.2 e1.3 16 2.03.2 66 countersinking (both sides)	7-EL 3,700 6-UL 3,700 5-PL 3,700 4-LG 3,700 3-ST 3,700 2-FS 3,000 1-HS 2,500	Long 3,700 Std 3,000 Fast 2,500	2,500	-40 to +55°C	R1	NF-TZO7 Renewal Collimated light
Through-beam type		Flat ON, Free cut 0.5	7-EL 1,190 6-UL 1,120 5-PL 980 4-L6 850 3-ST 5-50 2-FS 310 1-HS 100	Long 600 Sid 350 Fast 200	220	-40 to +60°C	R1	NF-TEO1
	Square	Head ON/Side ON switchable type, Free cut 1000 0.5 + -2 1.05 1	7-EL 430 6-UL 350 4-L6 300 4-L6 300 2-FS 190 2-FS 120 1-HS 36	Long 250 Sid 120 Fast 55	110	-40 to +60°C	R1	NF-TEO2 (Switchable direction)
		Flat ON, Free cut 7 112 7 112 7 112 7 112 7 112 7 112 7 112 7 112 112	7-EL 1,890 6-UL 1,770 5-PL 1,540 4-LG 1,350 3-ST 880 2-FS 520 1-HS 170	Long 900 Sid 500 Fast 350	450	-40 to +60°C	R1	NF-TEO3

●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.

Photoelectric Sensors

Photoelectric Sensors

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

Fiber units Flexible R1 (R1 mm)

			Sensing di	stance (mm)		Ambient	Bending radius		<u></u>
Тур	be	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	
		Flat ON/Head ON switchable type, Free cut 2000 1 1.05 3.5 11 2.200 1 1.05 3.5 12 2.2000 2.2000 2.2000 2.200	7-EL 1,340 6-UL 1,260 5-PL 1,090 4-L6 960 3-ST 630 2-FS 390 1-H5 130	Long 750 Std 450 Faat 250	280	-40 to +60°C	R1	NF-TEO4 Switchable direction	Photoelectric Sensors
		Flat ON, Free cut	7-EL 2,450 6-UL 2,300 5-PL	Long					Photoelectric Sensors
/pe		Light axis 2-02.2 02.5 (PVC) Housing 1.75 7.5 Detecting part detail 0.5 0.5 0.5	2,010 ^{4-LG} 1,710 ^{3-ST} 1,150 _{2-FS}	1,200 Std 650 Fast 330	1,200 Std 650 Fast	500 -40 to +60°C	R1	NF-TR13	Specialized Photoelectric Sensors
beam ty	Square	Multi core fiber 0.075 × 151 Those for emitting and receiving are symmetrical in shape.	650 ^{1-HS} 220						Laser Displacement Sensors
Through-beam type	Sq	Side ON, Free cut housing (polycarbonate) 12 25 3 11 (20) 13 13 13 14 12 2000 13 13 14 12 2000 13 13 14 14 12 12 12 12 12 12 12 12 12 12	7-EL 3,600 6-UL 3,600 5-PL 3,600	3,600 ^{6-UL} 3,600 5-PL Long		-40 to +60°C	C R1	NF-TR12	Fiber Units
			4-LG 3,150	std 1,500	1,300				Easy mounting
		5.5- 1.75- 1.75- Light axis 02.5 (PVC) Detecting part detail o1 Multi core fiber 0.075 × 151	3-st 2,000 2-Fs 1,200	Fast 1,000					Thread type
			1-HS 540						Cylindrical type
		Head ON, Free cut housing (polycarbonate)	7-EL 3,600						Sleeve type
		Light axis	6-UĹ 3,600	Long					Flexible R4/R2
		2.5 1.3 1.1 3.5 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2	3,580 4-LG	2,700 Std 1,600 Fast	1,600	-40 to +60°C	R1	NF-TR11	Flexible R1/R2
		<u>1.75</u> →17.51→ <u>Light axis</u> <u>Lens</u>	1,980 2-FS	Fast 850					Retro-reflective
			1,350 ^{1-HS} 530						Small object detection
		ø0.075 × 151							uerection

Flexible R1 mm 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.

Chemical resistant Vacuum

Screen/Array

Limited diffuse Narrow view/ wafer mapping Heat resistant

resistant Liquid level/liquid leakage/ water detection

Lens for through-beam type

Flexible R1 mm fiber units (diffuse type)

Photoelectric Sensors	Ту
Photoelectric Sensors	
Specialized Photoelectric Sensors	
Laser Displacement Sensors	
Fiber Units	
Easy mounting	be
Thread type	se tyl
Cylindrical type	Diffu
Sleeve type	
Flexible R4/R2	
Flexible R1/R2	
Retro-reflective	
Small object detection	
Screen/Array	
Screen/Array Limited diffuse	

Heat	resistant
mour	rooiotaint

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

Correct use

 \bullet The sensing distances for the diffuse type fiber units are values on 500 \times 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.

Ту	pe	Features/dimensions (mm)	Sensing dis	1		Ambient	Bending radius	Model
			D3RF	D2RF	BRF	temperature	(mm)	model
	M4	e1.48 sleeve: 40 mm long, Free cut Detecting part detail (0.05 x 151) x 2 (Brass with nickel plating)	7-EL 140 6-UL 135 5-PL 110 4-LG 95 3-ST 65 2-FS 30 1-HS 10	Long 60 Std 35 Fast 17	30	-40 to +60°C	Fiber R1 Sleeve R10	NF-DR10 Bendable sleeve
	ø3	<i>o</i> 2 sleeve: 15 mm long, Side view, Free cut Detecting part detail <i>o</i> 2 (SUS) 1	7-EL 9-ST 53 20 6-UL 2-FS 50 12 5-PL 1-HS 43 4 4-LG 36	Long 25 Std 12 Fast 5	10	-40 to +60°C	R1	NF-DR12
		Long range detection, Free cut Glass lens (BK7) $\frac{1}{9.5}$ 1.4 ± 110.2 1.4 ± 100.2 1.4 ± 100.2 1	7-EL 1,070 6-UL 990 5-PL 880 4-LG 770 3-ST 500 2-FS 310 1-HS 90	Long 600 Std 380 Fast 200	250	-40 to +60°C	R1	NF-DR09
Diffuse type	Square	Flat ON Free cut 0.5 + 2 3.5 + 2 3.5 + 1.2 + 0.5 + 1.2 + 0.5 + 1.2 + 0.5 + 1.2 + 0.5 + 1.2 + 0.5 + 0	7-EL 140 6-UL 135 5-PL 110 4-LG 99 9-3-ST 70 2-FS 34 1-HS 10	Long 60 Std 30 Fast 10 to 16	30	-40 to +60°C	R1	NF-DE01
	Sq	Flat ON, Free cut Detecting part detail Multi core fiber 00.075 x 151 1 1 1 1 2 2000 1 1 1 2 2 0 0 1 2 2 0 0 1 2 2 0 0 1 2 0 0 0 0	7-EL 490 6-UL 450 5-PL 400 4-LG 350 3-ST 225 2-FS 117 1-HS 41	Long 250 Std 100 Fast 60	100	-40 to +60°C	R1	NF-DE03
		Head ON/Side ON switchable type Free cut 0.5 + -2 3.5 + -1.05 10 0 22 hole, a3.6 countersinking depth 1.4 10	7-EL 160 6-UL 150 5-PL 130 4-LG 117 3-ST 77 2-FS 43 1-HS 12	Long 65 Std 35 Fest 20	30	-40 to +60°C	R1	NF-DE02 Switchable direction



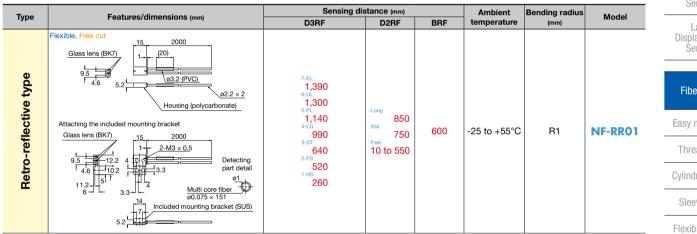
Flexible R1 mm fiber units (diffuse type)

	Туре			Sensing dis	Ambient	Bending radius	Model		
			Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	wodei
	niiuse iype	Square	Head ON/Side ON switchable type Detecting part detail Free cut Multi core fiber a0.075 × 151 1 05 3.5 1 06 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	7-EL 480 6-UL 450 5-PL 390 4-LG 340 3-ST 225 2-FS 117 1-HS 45	Long 250 Std 120 Fast 80	100	-40 to +60°C	R1	NF-DEO4 Switchable direction

•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.

Flexible R1 mm fiber units (retro-reflective 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.

Flexible R1 mm fiber units (limited diffuse reflective type)

Turne	Features/dimensions (mm)	Sensing dis	stance (mm)		Ambient	Bending radius	Model
Туре	reatures/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Woder
Limited diffuse reflective type	Ultra-small, Flexible, Free cut 0.5 + 7 + 2.5 1.2 +	7-EL 0 to 9 6-UL 0 to 8 5-FL 0 to 7 4-L6 0 to 6 3-ST 2 to 5 2-FS 2 to 3 1-HS 1 to 2	Long 1 to 7 Std 1 to 5.5 Fast 1 to 3	3	-20 to +60°C	R1	NF-DC08

●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.

Photoelectric Sensors

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

OPTEX

notoelectric Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement **Sensors**

Fiber Units

Easy mounting Thread type Cylindrical type

New concept Straight view/side view switchable type Switchable direction

Flexible R2 (R2 mm)

The NF-TR14 can be used as a side view type by bending the fiber cable to fit the slit in the side of the nut. This fiber unit is a completely new concept that allows switching between side view and straight view according to mounting conditions.

radius of 2 mm

view and side view also available

40 mm wide screen fiber type is available

Sleeve type Slit 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

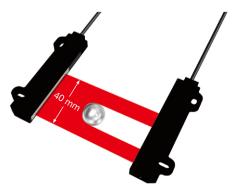
Lens for through-beam type Correct use



40 mm wide screen type

The NF-TS40 is a through-beam type capable of detecting within a 40 mm wide area. It emits collimated light like that of a laser beam even at a 40 mm width thanks to its unique optical design. This fiber unit demonstrates its strength in the detection of workpieces with complex shapes and in detecting falling objects.

Other screen array fibers→P.66



Fiber units

Flexible R1

(R1 mm)

P.52

Related

products

Easy to handle fiber with a bending

Adjustable mounting type that switches between straight

Fiber units

Flexible R4/R2

(R4 mm, R2 mr

O P.49



Flexible R2 mm fiber units (through-beam type/diffuse type)

			Sensing dis	stance (mm)		Ambient	Bending radius		ပ
Ту	/pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	Ξ.
	M4 -	Nut type, Straight view/side view switchable type, Free cut Multi core fiber 0.075×151 (8.1) (8.1) M2.6 \times P0.45 (0.1) M2.6 \times P0.45 (0.1)	7-EL 3-ST 3,800 1,200 6-UL 2-FS 2,700 800 5-PL 1-HS 2,200 300 4-L6 1,800	Long 1,300 Std 600 Fast 300	400	-40 to +60°C	R2	NF-TR14 Switchable direction	Photoelectric Sensors
type	IVP.	Nut type, Free cut 14.4 14.4 14.4 Lens: PC Polyamide (PA6) 3.5	7-EL 3-ST 2,000 550 6-UL 2-FS 1,000 250 5-PL 1-HS 950 80 4-LG 800	Long 600 Std 500 Fast 150	270	-40 to +70°C	R2	NF02-TK Space-saving	Pho
Through-beam type	ø3	Free cut	7-EL 4,000 6-UL 2,000 5-PL 1,600 4-UG 1,400 3-ST 2,550 5-PL 1+HS 180 4-UG 1,400	Long 800 Std 400 Fast 200	360	-40 to +70°C	R2	NF-TK05	Photoelectric Sensors Specialized
Thre	Screen	40 mm wide screen, Side ON, Free cut 20 5.1 3 22.3 Light axis Housing (ABS) 69.3 2000 40 5.1 1.3 22.3 40 5.1 1.3 22.3 40 5.1 1.3 2.3 43 18.5 Model 2.3 43 18.5 Model 2.3 43 18.5 Model 2.3 43 18.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1	7.EL 3,600 6-UL 3,600 5-PL 3,600 4-IG 3,600 2-F8 3,600 2-F8 3,600 1-H5 2,500	Long 3,600 Std 3,600 Fast 3,000	3,600	-40 to +60°C	R2	NF-TS40 Collimated light	Photoelectric Sensors Laser Displacement Sensors Fiber Units Easy mounting
	M4	Free cut <u>e1.0 × 2</u> <u>3</u> <u>41.0 × 2</u> <u>12</u> <u>2000</u> <u>41.3</u> <u>12</u> <u>2000</u>	7-EL 1,200 6-UL 750 5-PL 4-LG 5550 3-ST 4-D 2-FS 250 1-HS 80 4-LG	Long 300 Std 180 Fast 80	110	-40 to +70°C	R2	NF-DK66	Thread type Cylindrical type
		Free cut	7-EL 1,200 6-JL 750 5-PL 650 4-L6 550	Long 300 Std 180 Fast 80	110	-40 to +70°C	R2	NF-DK67	Sleeve type Flexible R4/R2 Flexible R1/R2
Diffuse type	M6	Nut type, Free cut Lens: PC 5 02.2 × 2 10 2.4 12 6.8 2000 M6 P=1.0 Polyamide (PA6) 14.4 4.4	7-EL 550 6-UL 230 4-L6 200 3-ST 150 2-/S 90 1-H6 18	Long 65 Sid 45 Faat 10	15	-40 to +70°C	R2	NF02-DK Space-saving	Retro-reflective Small object detection Screen/Array Limited diffuse Narrow view/ wafer mapping
		Free cut	7-EL 3-ST 850 275 6-UL 2-FS 550 170 5-PL 1-HS 4-LG 375	Long 300 Std 180 Fast 80	110	-40 to +70°C	R2	NF-DK04Z	Heat resistant Chemical resistant Vacuum
	ø3	Coaxial, Free cut Detecting part detail Receiving: 00.285 × 9 2.7 Screwing side Emitting: 00.5 × 151) × 1 Multi core fiber (00.05 × 151) × 1	7-EL 3-ST 270 120 6-UL 2-FS 250 60 5-PL 1-HS 210 20 4-L6 180	Long 120 Std 70 Fast 35	55	-40 to +60°C	R2	NF-DR11	Liquid level/liquid leakage/ water detection Lens for through-beam type
Tho		ng distances for the diffuse type fiber units are values on 500 >	1	0 × 1000 mm	white paper f	or NE02-DK)	L	<u> </u>	

The sensing distances for the diffuse type fiber units are values on 500 × 500 mm white paper (1000 × 1000 mm white paper for NF02-DK).
 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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OPTEX F R

hotoelectric Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement **Sensors**

Fiber Units

Easy mounting

Thread type Cylindrical type

Sleeve type Flexible R4/R2

Stable detection of transparent workpieces

Ultra-thin fiber units and reflectors Ultra-thin

Built-in polarizing filter type and narrow view type

Retro-reflective type

NF-RR01 with a built-in polarizing filter is minimally affected by reflected light from the surface of glass or film. NF-RB02 (Side ON) with narrow view design is also available. Please select based on the application.

Ultra-thin design with a thickness of just 2 mm. Wafer mapping that was only possible on through-beam types which require

much cable installation made possible on retro-reflective types. Of course since this is a space-saving side view type, the

NF-RR01 (built-in polarizing filter type)

NF-RB02 (narrow view, Side ON)



fiber cable can be easily handled.

*Reflector thickness is 2.2 mm.

Reflector (included)



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



Mounting on robot arm



Wafer mapping with the NF-RG01 retro-reflective type.

This type allows for a reduction in the required work hours for cable installation and processing work hours compared to a through-beam type.



Stable detection of transparent workpieces

Related

products

Built-in polarizing filter type and narrow view type available

Fiber amplifier

D3RF

• P.110

Fiber amplifier

BRF

• P.130

Extremely thin design with a thickness of just 2 mm. Wafer mapping with retro-reflective type. (NF-RG01)

DPTEX

Retro-reflective type fiber units (built-in polarizing filter/narrow view/wafer mapping)

		Sensing distance (mm)			Ambient	Bending radius		C
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	
Built-in polarizing filter	Flexible, Free cut Glass lens (BK7) $\frac{15}{14.6}$ $\frac{9.5}{14.6}$ $\frac{16}{10.2}$ $\frac{15}{14.6}$ $\frac{12}{12.2}$ $\frac{15}{14.6}$ $\frac{12}{12.2}$ $\frac{15}{14.6}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{200}{14.6}$ $\frac{15}{12.2}$ $\frac{2000}{14.6}$ $\frac{15}{12.2}$ $\frac{2000}{14.6}$ $\frac{15}{12.2}$ $\frac{2000}{14.6}$ $\frac{15}{12.2}$ $\frac{15}{14.6}$ $\frac{15}{10.2}$ $\frac{15}{14.6}$ $\frac{15}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6}$ $\frac{16}{10.2}$ $\frac{16}{14.6$	7-EL 1,390 6-UL 1,300 5-PL 1,140 4-LG 990 3-ST 640 2-FS 520 1-HS 260	Long 850 Std 750 Fast 10 to 550	600	-25 to +55°C	R1	NF-RR01	Considered to the sensors
view	Side ON, Free cut 25 2000 2-R1.25 1.2.8 9.5	7-EL 410 6-UL 380 5-FL 340	Long 250					Specialized Photoelectric Sensors Laser Displacement Sensors
Narrow view	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4-LG 290 3-ST 180 2-FS 150 1-HS 90	Std 200 Fast 200	200	-40 to +60°C	R10	NF-RB02	Fiber Units
	Ultra-small type, Free cut Detecting part detail							Easy mounting
	15.8 14.7-02 00.5 × 1							Thread type
_	0.7 - 1.45 ±0.15 ±0.05 - 1 +-1.95 ±0.05 ±0.05 - 2-M1.4 × 0.3 threaded	7-EL 590						Cylindrical type
pinç	2000 11 9 7.5 2000 Base (ABS)	6-UL 550 5-PL	Long 350					Sleeve type
Wafer mapping	2.2-0.1	480 4-LG 420	Std 230	Unusable	-40 to +60°C	R10	NF-RG01 Ultra-thin	Flexible R4/R2
lafer		3-ST 270 2-FS	Fast 230					Flexible R1/R2
3	2 -8.1 - 1.9 - 1.91.5	180 ^{1-HS} 70						Retro-reflective
	1 2 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							Small object detection
●Install with	h an ambient humidity between 35 and 85%. In the case of 85			e between 0 a	I 40°C	<u> </u>		Screen/Array

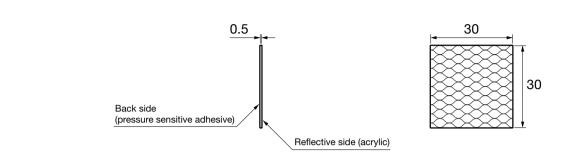
Limited diffuse Narrow view/ wafer mapping Heat resistant Chemical resistant Vacuum resistant Liquid level/liquid leakage/ water detection Lens for through-beam type Correct use

Reflector dimensions

P31 (NF-RB02 included reflector)

NF-RG01 included reflector

DG3030 (NF-RR01 included reflective sheet)



10.1

-15

1.1

19

3.2

(2-R)

 1.45 ± 0.15

Specialized Photoelectric Sensors

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

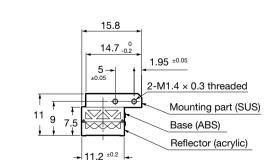
Heat resistant

Chemical resistant Vacuum resistant

Liquid level/liquid leakage/ water detection

through-beam type Correct use 0.7 ±0.05 2.2 -0.1

Cover (SUS304)



10.6

10 (effective reflector width)

Reflector

(Norbornene plastic)

 \oplus

4.3 -

10 (effective reflector width)

19 28



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Small object detection





Small object detection with spot lens and fine core



A small spot focus lens with adjustable spot size is available Suitable for handling small objects with a Ø0.125 mm fine core (NF-TP01, NF-DP01)

Photoelectric ensors

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Photoelectric Sensors

Photoelectric Sensors

Laser Displacement **Sensors**

Stable detection of small objects with spot lens

Fine spot lens NF-DA03 and coaxial diffuse fiber unit NF-DK21 enables ø0.2 mm spot.



Adjustable spot size

The NF-DA06 comes with a small spot lens where sensing distance and spot size can be adjusted through the amount of fiber inserted. It is possible to change the spot size between Ø0.9 and 1.9 mm with a distance of between 20 and 40 mm. The NF-DA07, with its space-saving side view, is also available.

Adjustable spot size



Detects small objects with a core diameter of Ø0.125 mm

The NF-TP01 through-beam type and the NF-DP01 diffuse type use a Ø0.125 mm fine core. Suitable for small object detection. The position of the fiber can be easily adjusted by attaching a sleeve.



NF-DP01 Fine core diameter: ø0.125 mm (4 cores)



Specialized

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

Fiber units Small object detection

Small object detection lens (for diffuse type fibers)

ric	Туре	Features/dimensions (unit: mm)	Spot size and supported fiber Parentheses indicate dia. of the smallest detectable object	Center sensing distance	Ambient temperature	Model
Photoelectric Sensors	Small object spot lens	Housing: aluminum (black alumite) Lens : acrylic Lens e^4 e^4 e^5 16	Approx. ø0.2 mm: NF-DK21 Approx. ø0.4 mm: NF-DT01 (ø0.005 mm metal wire)	7 mm	-20 to +60°C	NF-DA03 Small
Photoelectric Sensors Specialized	Small obje	Housing: aluminum (black alumite) Lens : glass	Approx. ø0.3 mm: NF-DK21 Approx. ø0.5 mm: NF-DT01 (ø0.005 mm metal wire)	7.5 mm	-40 to +70°C	NF-DA04
Photoelectric Sensors Laser Displacement Sensors		Lens diameter: $o3.3$ o4 o6 $mathbf{t}$ o6 $mathbf{t}$ $mathbf{t}$ o6 $mathbf{t}$ $mathbf{t$	Approx. ø0.5 mm: NF-DM02 (ø0.005 mm metal wire)	6 mm	-40 to +70°C	NF-DA05
Fiber Units Easy mounting Thread type Cylindrical type	Small spot lens	Lens diameter: ø3.0 M3 × 0.5 depth 3.4 Ø e4.3 Aluminum (black alumite) Alumite	Approx. ø0.2 mm: NF-DK21 (ø0.005 mm metal wire) Approx. ø0.4 mm: NF-DT01 (ø0.01 mm metal wire)	6 mm	-40 to +70°C	NF-DA01
Sleeve type Flexible R4/R2 Flexible R1/R2 Retro-reflective		Lens diameter: ø3.0 M3 × P0.5 depth 3.4 o4.3 0 o4.3 0 o5.0 Aluminum (black alumite) 10.9 0 of 10.9	Approx. ø1.2 mm: NF-DK21 (ø0.005 mm metal wire) Approx. ø1.4 mm: NF-DT01 (ø0.01 mm metal wire)	15 mm	-40 to +70°C	NF-DA02
Small object detection Screen/Array Limited diffuse Narrow view/ wafer mapping	Spot size Adjustable lens	e7.1 Inner thread M4 × 0.7 depth 6 Housing: aluminum (black alumite) Lens : glass	Approx. ø0.9 to 1.9 mm: NF-DM02-G4 (ø0.2 mm metal wire)	Approx. 20 to 40 mm	-40 to +70°C	NF-DA06
Heat resistant Chemical resistant Vacuum resistant Liquid level/liquid leakage/ water detection Lens for through-beam type	Side view Lens with adjustable spot size	Housing: PBT (black) Lens : glass Special nut included	Approx. ø0.8 to 3.2 mm: NF-DM02-G4 (ø0.1 mm metal wire)	Approx. 9 to 17 mm	-40 to +70°C	NF-DA07

●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. •The values for the smallest detectable object are typical values when set for the best to detect small objects on the fiber amplifier side.



Correct use

Small object detection fiber units (through-beam type)

Туре			Sensing distance Parentheses indicate dia. of the smallest detectable object Unit: mm			Ambient	Bending radius		C)
		Features/dimensions (mm)	D3RF D2RF BRF		temperature	(mm)	Model		
	ø1	Flexible 500 6 500 6 500 18.3 6 500 18.3 18.3 02.2 01.5 01.4 (PVC) 04.33 02.2 00.265 x 1	7-EL 54 6-UL 50 5-PL 44 4-LG 38 3-ST 25 2-FS 15 1-HS 5 (00.02 metal wire)	Long 30 Std Fast 8 (e0.02 metal wire)	10 (ø0.02 metal wire)	-40 to +60°C	R4	NF-TRO4	Photoelectric Sensors
ype	-15	Flexible, Free cut <u>o0.25 fiber (4)</u> <u>o1.5 SUS</u> <u>o1</u> <u>10</u> <u>1000</u>	7-EL 3-ST 850 275 6-UL 2-FS 550 150 6-PL 1-HS 4-50 50 4-LS (00.1 metal wire) 400	Long 350 Std 200 Fast 90 (ø0.1 metal wire)	110 (ø0.1 metal wire)	-40 to +70°C	R4	NF-TR03	Photoelectric Sensors Specialized
Through-beam type	ø1.5	ø0.5 fiber (1) ø1.5 SUS ø1 10 2000	7-EL 3-ST 900 250 6-UL 2-FS 550 140 6-PL 1-HS 4-UG 45 4-IG (00.1 metal wire) 350	Long 350 Std 200 Fast 90 (ø0.1 metal wire)	120 (ø0.1 metal wire)	-40 to +70°C	R15	NF-TM03	Photoelectric Sensors Laser Displacement Sensors
Thro		00.5 sleeve: 5 mm long, Free cut 00.25 fiber (1) 00.25 fiber (2) 00.5 SUS 00.5 SUS	7-EL 3-ST 170 50 6-UL 2-FS 110 25 5-PL 1-HS 80 8 4-LG (60.1 metal wire)	Long 80 Std 40 Fast 20 (ø0.1 metal wire)	30 (ø0.1 metal wire)	-40 to +70°C	R15	NF-TT01	Fiber Units Easy mounting
	ø3	ø0.25 fine sleeve: 5 mm long	7-EL 27 6-UL 25						Thread type
00	0.25 (SUS)	25 5-PL 21 4-LG 18	Long 6 Std 3.5	1	40 to 170°O	DE	NF-TP01	Cylindrical type	
		0.125 Fiber x 1 03 04.33 (PA)	3-ST 12 2-FS	Fast 2 (ø0.02 metal wire)	(ø0.02 metal wire)	-40 to +70°C	R5	Fine core	Sleeve type
		(Brass with nickel plating) 03.2 (PVC)	7 1-HS 2 (=0.02 metal v						Flexible R4/R2
			(ø0.02 metal wire)						Flexible R1/R2

●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. •The values for the smallest detectable object are typical values when set for the best to detect small objects on the fiber amplifier side.

Small object detection fiber units (diffuse type)

Туре	Features/dimensions (mm)	Sensing distance Parentheses indicate dia. of the smallest detectable object Unit: mm			Ambient	Bending radius	Madal
Type	reatures/uniterisions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
Diffuse type	00.5 sleeve: 3 mm long 00.5 sleeve: 3 mm long 00.5 +3 +15 + 1000 (SUS) (SUS) (Brass with nickel planing) Detecting @ part detail (00.125 × 4) 01.5 × 4	7-EL 28 6-UL 26 5-FL 23 4-LG 20 3-ST 13 2-FS 3 1-HS 1 (00.02 metal wire)	Long 18 Std 5 Fast Unusable (o0.02 metal wire)	3 (ø0.02 metal wire)	-40 to +60°C	R10	NF-DP01 Fine core

●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.

•The values for the smallest detectable object are typical values when set for the best to detect small objects on the fiber amplifier side.

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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

Photoelectric Sensors

Specialized Photoelectric Sensors Laser Displacement

Sensors

Fiber Units

Easy mounting

Thread type

Sleeve type

Small object detection Screen/Array

Limited diffuse

66

Screen/Array



• P.110

Fiber amplifier BRF • P.130



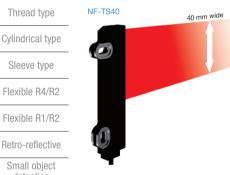
Fiber units for detecting with light screen

Optimal for detection of complex shapes and when workpiece passage locations are not fixed.

Screen fiber

New through-beam type

New models for 32 mm wide and 11 mm wide types in addition to new 40 mm wide type. Five models are available as optimal solutions for the detection of workpieces with complex shapes, as well as for the detection of workpiece passage locations and shapes that are not fixed.



NF-TZ07 NF-TZ08 32 mm wide NF-TZ09 NF-TZ10

Upgrades from the previous model

NF-TZ08	Bending radius changed from R10 mm		
NF-TZ10	to a flexible R2 mm.		
*Small changes only in sensing distance for NF-TZ09.			

Slit masks for small object detection and short-distance light saturation are included for NF-TZ07, -TZ08, -TZ09, and -TZ10

Head ON diffuse type

The NF-DZ01 diffuse type enables a detection area with a spot size of 2 × 15 mm (at a distance of 15 mm). Optimal for the detection of workpieces with complex shapes and drilled workpieces such as lead frames.

Lead frame detection

Collimated light like laser beam

Collimated light like laser beam achieved through unique optical design. Because there is little light leakage even for mounting in complex areas, superior detection stability is achieved.

Narrow view/ wafer mapping Heat resistant Chemical resistant Vacuum resistant Liquid level/liquid leakage/ water detection

Lens for through-beam type



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Difference between screen fiber and array fiber

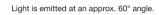
Screen fiber Collimated light

This screen fiber collimates light into a band through the lens. Able to detect finer light differences than array fibers as a through-beam type due to collimated light.

Light path: almost parallel.

Array fiber

This array fiber aligns the fiber cores and emits light in a band. Easy to perform light axis adjustment as a through-beam type because the light expands. Because there is more light received when detecting small objects at a short-distance when using diffuse types as compared to screen fibers, stable detection is possible.



Photoelectric Sensors

Photoelectric

ensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Fiber Units

Screen / Array fiber units (through-beam type)

								Easy mounting
Туре	Features/dimensions (mm)	Sensing dis	stance (mm) D2RF	BRF	Ambient temperature	Min. bending radius (mm)	Model	Thread type
	11 mm wide screen, Flexible, Side ON, Free cut Light axis center Light axis center Lig	7-EL 3,700 6-UL 3,000 5-PL 3,000 4-LG 3,000 3-81 2,500 2+FS 2,500 1-HS 1,500	Long 3,500 Std 2,500 Fast 1,800	2,500	-40 to +70°C	R10	NF-TZ10 Renewal Collimated light	Cylindrical type Sleeve type Flexible R4/R2 Flexible R1/R2 Retro-reflective
Through-beam type	11 mm wide screen, Flexible, Side ON, Free cut Lens (norbornene plastic), Lens (norbornene plastic), undow (2.2 × 11) (13.5) 9.5 (8) <u>Light axis</u> (9) <u>Light axis</u> (9) <u>Light axis</u> (13.5) 9.5 <u>2-R4</u> <u>4</u> <u>4</u> <u>5</u> <u>2-R4</u> <u>4</u> <u>19</u> Housing (PC)	7-EL 3,700 6-UL 3,000 5-PL 3,000 4-LG 4-LG	Long 3,000 Std 2,500 Fast 1,200	2,000	-40 to +55°C	R1	NF-TZO9 Renewal Collimated light	Small object detection Screen/Array Limited diffuse Narrow view/ wafer mapping Heat resistant
	32 mm wide screen, Flexible, Side ON, Free cut Light axis 19 center Sheath ol.3 (PE) (norbornene plastic) (20) 16 2 PA 12 45 2 -032 of countersinking (both sides)	7-EL 3,700 6-UL 3,700 5-PL 3,700 4-G 3,700 3.5T 3,700 2-FS 3,000 1-HS 2,500	Long 3,700 Std 3,000 Fast 2,500	2,500	-40 to +60°C	R10	NF-TZO8 Renewal Collimated light	Chemical resistant Vacuum resistant Liquid level/liquid leakage/ water detection Lens for through-beam type Correct use

●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.



Fiber units Screen/Array

Screen / Array fiber units (through-beam type)

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Photoelectric
Sensors

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

Туре	Features/dimensions (mm)	Sensing dis		1	Ambient	Min. bending	Model
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		D3RF	D2RF	BRF	temperature	radius (mm)	
	32 mm wide screen, Flexible, Side ON, Free cut Light axis 19 center Fiber: e1 × 1 core (PMMA), sheath e1.3 (PE) Window (3.2 × 32), lens (norbornene plastic) (19) Light Housing PO 16 2-63.2 e6 countersinking (both sides)	7-EL 3,700 6-UL 3,700 5-PL 3,700 4-L6 3,700 3,700 2-FS 3,000 1-H8 2,500	Long 3,700 Std 3,000 Fast 2,500	2,500	-40 to +55°C	R1	NF-TZO7 Renewal Collimated light
Through-beam type	40 mm wide screen, Flexible, Side ON, Free cut 5.1 40 5.1 5.1 40 5.1 5.1 40 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1	7-EL 3,600 6-UL 3,600 5-PL 3,600 4-L6 3,600 2-FS 3,600 1-HS 2,500	Long 3,600 8id 3,600 Fast 3,000	3,600	-40 to +60°C	R2	NF-TS40 Collimated light
	5.25 mm wide array, Head ON, Free cut Housing (Brass with nickel plating) 15 2000 (a3.2) Protective tube (polyolefin) 5.25 15 (a3.2) Protective tube (polyolefin) 4. rray fiber part (o0.265 x 16) 3 -M3 x 0.5 threaded (b) Constant of the second	7-EL 1,350 6-UL 1,260 5-PL 1,170 4-L3 990 3-ST 660 2-FS 400 1-HS 130	Long 650 Std 400 Faat 250	300	-40 to +70°C	R25	NF-TZ05
	5.25 mm wide array, Side ON, Free cut Array fiber part ($a0.265 \times 16$) Housing (Brass with nickel plating) 15 15 3 -M3 \times 0.5 threaded 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10	7-EL 1,440 6-UL 1,350 5-FL 1,170 4-L6 1,080 3-ST 710 2-FS 430 1-HS 130	Long 650 Std 400 Fast 250	300	-40 to +70°C	R25	NF-TZ06
	5.25 mm wide array, Head ON, Free cut 10 5.25 S S S S S S S S S S S S S S S S S S S	7-EL 3-ST 4-,000 6-50 2-FS 2-FS 1,600 330 5-FL 1-HS 1,000 100 4-LG 100	Long 800 Std 500 Fast 250	330	-40 to +70°C	R25	NF-TS10
	10.5 mm wide array, Head ON, Free cut 10.5 mm wide array, Head ON, Free cut BSBM brass M3 × P0.5 2-02.2 19 10.5 Array fiber part 41 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7-EL 3-ST 4,000 650 6-UL 2-FS 1,600 330 5-PL 1-HS 1,000 100 4-LG 900	Long 800 Std 500 Fast 250	330	-40 to +70°C	R25	NF-TS14

Sensing distance (mm)

●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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Screen / Array fiber units (through-beam type/diffuse type)

Туре	Features/dimensions (mm)	Sensing dis	stance (mm)		Ambient	Min. bending Model		<u>ں</u>
Type		D3RF	D2RF	BRF	temperature	radius (mm)	Woder	s itr
Through-beam type	13 mm wide array, Head ON, Detecting part detail e0.265 fiber (16) 0.7 0.35 0.35 1 2 1 1 1 1 2 1 3 12 Head material BSBM 4 0.5 (13) 0.5 1 1.13 19 4 2.5 2000	7-EL 4,000 6-UL 1,500 5-PL 1,400 4-L3 1,200 3-ST 800 2-FS 400 1-HS 100	Long 850 Std 500 Fast 250	350	-40 to +70°C	R25	NF-TS28	Photoelectric Sensors
	30 mm wide array, Head ON, Free cut 0.265 fiber (16) 2.5 Head material BSBM 30 2.5 1.5 1.5 2.5 1.5 2.5 1.5 1.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 2.5 1.5 0.22 1.5 2.5 1.5 0.22 1.5 0.200	7-EL 4,000 6-UL 1,400 5-PL 1,200 4-L6 1,000 3-ST 700 2-FS 300 1-HS 100	Long 650 Std 500 Fast 250	200	-40 to +70°C	R25	NF-TS19	Photoelectric Sensors Specialized Photoelectric Sensors Laser Displacement Sensors
	Screen Head ON, Free cut Lens 15 15 Housing (polycarbonate) 7 15	$\begin{array}{c c c c c c c c c c c c c c c c c c c $		-40 to +60°C	R25	NF-DZ01 (Collimated light)	Fiber Units Easy mounting Thread type	
be	$\begin{array}{c c c c c c c c c c c c c c c c c c c $		R25	NF-DZ02	Cylindrical type Sleeve type Flexible R4/R2 Flexible R1/R2			
Diffuse type	Array, Side ON, Free cut Array fiber part (0.265 \times 32) Housing (Brass with nickel plating) $\overline{5}$ $3-M3 \times 0.5$ threaded 15 20 (0.26) 10 10 (0.26) 10 (0.26) (0.26) 10 (0.26)	7-EL 3-ST 5300 2-FS 6-UI 2-FS 500 140 5-PL 1+HS 440 45 4-LG 3770	Long 320 Std 170 Fast 85	100	-40 to +70°C	R25	NF-DZ03	Retro-reflective Small object detection Screen/Array Limited diffuse Narrow view/ wafer mapping
	Array, Head ON, Free cut Detecting part detail 1.125 31 × P0.35 10.85) 31 × P0.35 10.85) 2-M3P0.5 through 10.422 25.435 2000 13 ¹⁰⁰	7.EL 3-ST 950 250 6-UL 258 500 100 5-PL 1-HS 450 40 4-UG	Long 300 Std 180 Fast 80	35	-40 to +70°C	R25	FD-ML02	Heat resistant Chemical resistant Vacuum resistant Liquid leek/liquid leakage/ water detection Lens for through-beam type

 $\bullet The sensing distances for the diffuse type fiber units are values on 500 <math display="inline">\times$ 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.

Correct use

Photoelectric Sensors

Photoelectric Sensors

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

ортех



Limited diffuse reflective type



Detection at a limited distance for mapping and alignment

Related

products

Fiber amplifier

D3RF

• P.110

Fiber amplifier

BRF

• P.130

Most number of models in the industry with 14 total models

Detects glass substrate

Five types for detecting existence, five types for alignment, and one for mapping are available, making for a total of 11. Selection is possible between flexible types, heat resistant types, and vacuum resistant types.

Existence detection	NF-DC38	NF-DC07	NF-DH08	NF-DH06
	Low cost	Standard	Heat resistant to 180°C	Heat resistant to 300°C
	20°	000	and a	Galler a maint

	Alignment	NF-DC05	NF-DC06	NF-DC04	NF-DH10	NF-DH11
-		Standard	Flexible	Flexible	Heat resistant to 250°C	Long range, heat resistant to 250°C
		Also supports PCB deflection	Also supports PCB deflection	For long range alignment	Also supports PCB deflection	Also supports PCB deflection

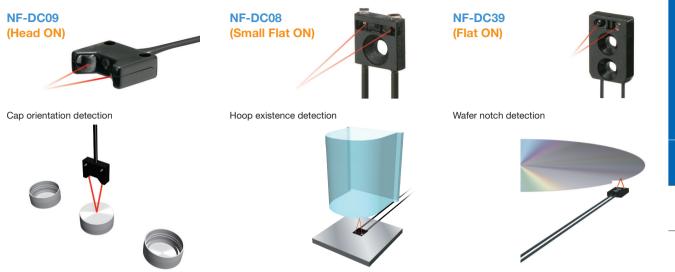
Wafer mapping	NF-DC03
	Standard
	Con
14	Also detects glass substrate of 0.5 mm in thickness

For mapping with through-beam type and retro-reflective type fibers \rightarrow P.74

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General-purpose use

Three general-purpose models are available



Limited diffuse reflective type fiber units (glass substrate detection)

_			Sensing di	stance (mm)		Ambient	Min. bending		Easy mounting
Ту	/pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	radius (mm)	Model	Thread type
		Alignment, Free cut 29 3000 18 6.5 2 -M3 flush screw hole 23.5 23.5 23.5	7-EL 3 to 44 6-UL 4 to 39 5-PL 4 to 38	Long 7 to 32					Cylindrical type Sleeve type
		L L L L L L L L L L L L L L L L L L L	^{4-LG} 4-LG 4-LG 4-LO 3-ST 4 to 35	Std 10 to 25 Fast 10 to 18	15	0 to +70°C	R25	NF-DC05	Flexible R4/R2
		Housing (heat resistant Emitting fiber 01 × 1 Receiving fiber 00.265 × 16	4 to 35 2-FS 6 to 29 1-HS 9 to 18	10 10 18					Flexible R1/R2
_		ABS) Ó (91018						Retro-reflective
detection		Alignment, Flexible, Free cut Detecting part detail 2 -M3 flush screw hole Emitting/receiving fiber	7-EL 0 to 23 6-UL		15	0 to +70°C	R4	NF-DC06	Small object detection
	z	$\begin{array}{c} \text{Emitting} \\ \text{Emitting} \\ \text{part} \\ \text$	0 to 23 5-PL 0 to 22	o 23 o 22 o 22 o 22 o 22 o to 23 Std o 20 o to 17 Fest o 20 o to 12					Screen/Array
itrat	Flat ON	T T T T T T T T T T T T T T T T T T T	4-LG 0 to 22 3-ST						Limited diffuse
Glass substrate		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 to 21 2-FS 0 to 20 1-HS						Narrow view/ wafer mapping
lass		Housing (heat resistant ABS)	5 to 13						Heat resistant
G		Alignment, Flexible, Free cut Detecting part detail Emitting/receiving fiber g0.25 x 9	^{7-EL} 0 to 38			o to +70°C	R4	NF-DC04	Chemical resistant
		$29 \qquad 3000$ $18 \qquad 6.5 \qquad 2 - M3 \text{ flush screw hole} \qquad \sigma 1.3 \times 2$ $10 \qquad 10 \qquad$	6-UL 0 to 38 5-PL 0 to 38	Long 0 to 36					Vacuum resistant
			0 to 38 4-LG 0 to 38 3-ST	0 to 30 Std 0 to 30 Fast	Unusable				Liquid level/liquid leakage/ water detection
		Imiting/receiving part Imiting/recei	0 to 34 2-FS 0 to 31	0 to 15					Lens for through-beam type
		(heat resistant ABS)	1-HS 4 to 22						Correct use

●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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Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Fiber Units

Fasy mounting)e 2

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OPTEX

Limited diffuse reflective type fiber units (glass substrate detection)

<u>.</u>	т	ne		Sensing dis	stance (mm)		Ambient	Min. bending	Model
	fy	ре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	radius (mm)	Model
Photoelectr Sensors			Alignment, Heat resistant to 250°C	7-EL 2 to 28 6-UL 2 to 24 5-PL 2 to 23 4-LG 3 to 23 3-ST 3 to 20 2-FS 3 to 18 1-HS 4 to 11	Long 4 to 20 Std 4 to 20 Fast 4 to 15	4 to 17	-20 to +250°C (Normal temperature side: -20 to +70°C)	R25	NF-DH10
Photoelectric Sensors Specialized Photoelectric Sensors Laser Displacement Sensors			Alignment, Heat resistant to 250°C 300 102-W3 Hotes 102-W3 Hotes 102	7-EL 2 to 45 6-UL 3 to 40 5-PL 3 to 39 4-LG 3 to 38 3-ST 4 to 35 2-FS 6 to 28 1-HS 8 to 19	Long 6 to 38 Std 7 to 30 Fast 8 to 25	8 to 25	-20 to +250°C (Normal temperature side: -20 to +70°C)	R25	NF-DH11
Fiber Units Easy mounting	stection		Existence detection, Free cut Housing (polycarbonate) 2-03.2 01 x 2 12 01 x 2 5.5 -	7-EL 0 to 12 B-UL 0.5 to 11 5-PL 1.5 to 10 4-L6 1.5 to 10	Long 2 to 9 Std 4 to 8 Fast 5 to 6	3.5 to 7	-40 to +60°C	R10	NF-DC38 Low cost
Thread type Cylindrical type Sleeve type Flexible R4/R2 Flexible R1/R2	Glass substrate detection	Flat ON	Existence detection, Free cut 2000 9.5 + Housing (heat resistant ABS) 24 16 + (20)	7-EL 3 to 16 6-UL 3 to 14 5-PL 4 to 14 4-LG 5 to 14 3-ST 5 to 13 2-FS 5 to 11 1-HS 7 to 8	Long 4 to 15 Std 5 to 12 Fast 7 to 10	7	-40 to +60°C	R10	NF-DC07
Retro-reflective Small object detection Screen/Array Limited diffuse Narrow view/ wafer mapping			Existence detection, Heat resistant to 180°C, Free cut	7-EL 0 to 35 6-UL 0 to 28 5-PL 0 to 22 3-ST 0 to 22 2-FS 0 to 20 2-FS 0 to 9 1-HS 3 to 4	Long 0 to 20 Std 0 to 10 Fast 0 to 8	10	-60 to +180℃	R25	NF-DH08
Heat resistant Chemical resistant Vacuum resistant Liquid level/liquid leakage/ water detection Lens for through-beam type			Existence detection, Heat resistant to 300°C 7 20 16.7 2000 10.75 402.9 16.7 T8.3 - 19 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7-EL 0 to 40 6-UL 0 to 34 5-PL 0 to 22 4-LG 0 to 18 3-ST 0 to 17 2-FS 0 to 9 1-HS 0 to 4	Long 0 to 15 Std 0 to 10 Fast 0 to 8	6	-30 to +300°C or -60 to +200°C	R25	NF-DH06

Correct use

OPTEX FR ●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.

Limited diffuse reflective type fiber units (glass substrate detection)

	ype		Sensing dis	stance (mm)		Ambient	Min. bending	Model
	ype	Features/dimensions (mm) D3RF D2RF BRF		temperature	radius (mm)	Model		
Glass substrate detection	Head ON	Mapping, Free Cut Detecting part detail Emitting/receiving tiber 01.5 × 1 (ABS) 25 (ABS) 26 (ABS) (B) (C) (C) (C) (C) (C) (C) (C) (C	7-EL 2 to 310 6-UL 3 to 160 5-PL 4 to 130 4-LG 5 to 120 3-ST 5 to 110 2-FS 10 to 95 1-HS 12 to 60	Long 10 to 55 Std 10 to 45 Fast 13 to 35	55	-40 to +60°C	R25	NF-DC03

●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.

L Limited diffuse reflective fiber units (general-purpose)

			Sensing dis	stance (mm)		Austriaut			Displacement	
Ту	/pe	Features/dimensions (mm)	D3RF	D2RF	BRF	Ambient temperature	Min. bending radius (mm)	Model	Sensors	
	Flat ON	Free cut Housing (polycarbonate) of x 2 Model name tube 4.3 5.5 - 3.5 30 12 10 - 3.5 - - 12 12 - - - - - 12 12 - - - - - - 12 13.5 - <	$\begin{array}{c} \begin{array}{c} 7\text{-EL} & 3\text{-ST} \\ 1.5 \text{ to } 4 & 0 \text{ to } 4 \\ \text{\tiny 6-UL} & 2\text{-}Fs \\ 0 \text{ to } 4 & 0 \text{ to } 4 \\ \text{-}5\text{-}PL & 0 \text{ to } 4 \\ 0 \text{ to } 4 & 0 \text{ to } 4 \\ \text{-}4\text{-}LG \\ 0 \text{ to } 4 \end{array}$	Long 0 to 4 Std 0 to 4 Fast 0 to 4	0 to 4	-40 to +60°C	R10	NF-DC39 Low cost	Fiber Units Easy mounting	
			7-EL 0 to 15 6-UL						Thread type	
se	NO	4 14 ≥ 2000 →1 = 2.5	5 to 12 5 ^{PL} 5 to 11 ^{4+G} 6 to 11 3-5T 6 to 10 2-FS 7 to 9 1-HS	5-PL 5 to 11	4.5 to 11		-40 to +70°C	540		Cylindrical type
General-purpose	Head ON	↓ 2-03 (PVC) 01 × 2 Detecting part detail		4.5 to 10 Fast 4.5 to 10	6	-40 10 +70 C	R10	NF-DC09	Sleeve type	
al-p		Housing Emitting/receiving (ABS)							Flexible R4/R2	
enera		©	6 to 7						Flexible R1/R2	
G		Ultra-small, Flexible, Free cut	7-EL 0 to 9 6-UL		.5 3	-20 to +60°C	R1	NF-DC08	Retro-reflective	
	z	1.5 + (polycarbonate) <u>g1 × 2</u> 1.2 + (20) +	0 to 8 5-PL 0 to 7	Long 1 to 7					Small object detection	
	Flat ON		4-LG 0 to 6 3-ST 2 to 5	Std 1 to 5.5 Fast 1 to 3					Screen/Array	
		2 Detecting axis Detecting part detail 0.5 Multi core fiber	^{2-FS} 2 to 3	1 10 3					Limited diffuse	
		0.5 + 3 + 00.05 × 151 + 3 + 1.5	$ \begin{array}{c} \frac{1}{0.5} + 0.6 \\ \frac{1}{3} + 0.5 \\ \frac{1}{3} + 1.5 \\ \end{array} $						Narrow view/ wafer mapping	

•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.

Photoelectric Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser

resistant

Vacuum resistant

Liquid level/liquid leakage

water detection Lens for

through-beam type

Correct use



3

Photoelectric Sensors

Featuring a built-in lens and narrow aperture that minimizes light leakage.

Related

products

 Long range detection together with minimized light leakage
 Retro-reflective type and diffuse type also available for wafer mapping

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Fiber Units

Easy mounting

Thread type Cylindrical type

Sleeve type

Aperture 2° or less Ultra-narrow view

Ultra-narrow view which restricted the spread of light to the limit. Optimal for wafer mapping due to a design that minimizes light leakage.

Ultra-narrow view and ultra-thin type

Straight view: NF-TG01 Side view: NF-TG02, NF-TG03



Ultra-thin type: NF-TG04 Ultra-thin

Ultra-thin design with a thickness of just 1.5 mm. Almost no mounting space needed. Of course, since this is a side view type, the fiber cable can be easily handled.

Fiber amplifier

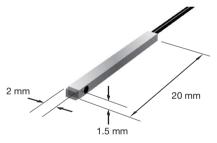
D3RF

• P.110

Fiber amplifier

BRF

• P.130



Retro-reflective types and diffuse types are also available

Narrow view/wafer mapping

Ultra-thin fiber units and reflectors

*Reflector thickness is 2.2 mm.

Ultra-thin design with a thickness of just 2 mm. Wafer mapping that was only possible on through-beam types which require much cable installation is now possible on retro-reflective types. Of course, since this is a space-saving side view type, the fiber cable can be easily handled.



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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Narrow view/wafer mapping fiber units (through-beam type)

L

Turne		Sensing dis	Ambient	Min. bending	Model		
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	radius (mm)	Model
Through-beam type	2° aperture, Free cut Detecting part (a2.2) o3.5 (polycarbonate) 20 (Screw installing range) 2000 2000 2000 04 (PVC) o3.7 (SUS) 02.2	7-EL 3,600 6-UL 3,600 2-F8 3,600 2,000 5-PL 1-HS 3,600 4-LG 3,200	Long 3,000 Std 2,000 Fast 1,300	2,300	-40 to +60°C	R25	NF-TGO1 Ultra-narrow view

●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.

Narrow view/wafer mapping fiber units (through-beam type: side view)

-		-	Sensing di	stance (mm)		Ambient	Min. bending		Dhotoslastvia
Ту	pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	radius (mm)	Model	Photoelectric Sensors
	2 × 1.5	3° aperture, Free cut Prism Light axis Mounting base surface Light axis Mounting base surface 20 2000 1.5 to large to the surface 1.5 to large to the surf	7-EL 1,000 6-UL 900 5-PL 790 4-L3 690 3-ST 450 2-FS 260 1-HS 90	Long 500 Std 300 Fast 150	220	-40 to +60°C	R10	NF-TG04 Ultra-thin	Specialized Photoelectric Sensors Laser Displacement Sensors
		2° aperture, Free cut (Screw installing range) 25 2000 4 25 2000 4 2000 2000 4 2000 200 2000 2	7-EL 3,600 6-UL 3,600 5-PL 3,600 4-L6 3,300 3-ST 2,100 2-FS 1,780 1-HS 510	Long 2,500 Sid 1,600 Fasi 800	900	-40 to +60°C	R25	NF-TG03 Ultra-narrow view	Fiber Units Easy mounting Thread type Cylindrical type Sleeve type
	ø4	2° aperture, Flexible, Free cut 3.7 - 25 2000 ad - 12 Screw installing range Prism Holder Tip bracket (SUS) 04 (PVC)	7-EL 3,600 6-UL 3,600 4-IG 3,600 4-IG 3,300 3-6T 2,100 2-FS 1,500 1-HS 520	Long 2,5000 Std 1,600 Fast 800	1,000	-40 to +60°C	R1	NF-TG02 Ultra-narrow view	Flexible R4/R2 Flexible R1/R2 Retro-reflective Small object detection Screen/Array
		5° aperture, Free Cut 00.75 fiber (1) Mounting bracket Detecting part detail 1.3 $\overrightarrow{1}$ 17.6 $\overrightarrow{0.4}$ $\overrightarrow{0.4}$ $\overrightarrow{0.4}$ $\overrightarrow{0.4}$ $\overrightarrow{0.2.2}$ \overrightarrow	7-EL 4,000 6-UL 4,000 5-PL 4,000 5-PL 1-HS 1,000 4-LG 3,000	Long 4,000 Std 3,000 Fast 2,000	1,700	-40 to +70°C	R25	NF-TS12	Limited diffuse Narrow view/ wafer mapping Heat resistant
		3° aperture, Free cut Detecting part detail 2.8 3 3 3 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5	7-EL 2,000 6-UL 2-FS 4,000 1,000 5-PL 1.HS 4,000 300 4-LG 300	Long 3,000 Std 1,600 Fast 700	750	-40 to +70°C	R25	NF-TS22	Chemical resistant Vacuum resistant Liquid leve(/liquid leakage/ water detection

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Lens for through-beam type Correct use

Fiber units Narrow view/wafer mapping

Narrow view/wafer mapping fiber units (retro-reflective type/diffuse type/limited diffuse reflective type)

с С		_		Sensing dis	stance (mm)		Ambient	Min. bending	
	1	Гуре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	radius (mm)	Model
Photoelectric Sensors	Retro-reflective type	4 2	Wafer mapping, Ultra-small type, Free cut	7-EL 590 6-UL 550 5-PL 480 4-L6 420 3-ST 270 2-FS 180 1-HS 70	Long 350 Std 230 Fast 130	Unusable	-40 to +60°C	R10	NF-RG01 Ultra-thin
Photoelectric Sensors			Long range detection, Flexible, Free cut Detecting part detail						
Laser Displacement Sensors			$\begin{array}{c} \text{Multi core fiber}\\ \underline{\text{o0.075 \times 151}}\\ \hline \\ \hline \\ \underline{\text{Glass lens (BK7)}}\\ \underline{\text{gl}}_{\underline{4.6}} \\ \underline{\text{fl}}_{\underline{4.6}} \\ \underline{\text{bl}}_{\underline{5.2}} \\ \hline \\ \hline \\ \underline{\text{Housing (SUS)}}\\ \underline{\text{o2.2 (PVC)}}\\ \underline{\text{o2.2 \times 2}}\\ \hline \\ \hline \\ \underline{\text{blagram for attaching the included mounting bracket}}\\ \hline \\ \underline{\text{Glass lens (BK7)}}\\ \underline{\text{gl}}_{\underline{1.2}} \\ \underline{\text{fl}}_{\underline{4.6}} \\ \underline{\text{fl}}_{\underline{1.2}} \\ \underline{\text{fl}}_{\underline{4.6}} \\ \underline{\text{fl}}$	7-EL	Long 600 Std 380 Fast 200	250	-40 to +60°C	R1	NF-DR09
Fiber Units	Diffuse type	are		5-UL 990 5-PL 880 4-LG					
Easy mounting	fuse	Squ		770 ^{3-ST} 500 ^{2-FS} 310 ^{1-HS} 90					
Thread type	Dif								
Cylindrical type									
Sleeve type				1.2 - 3.3 - 4 6 - 1.4 + 1.4 Included mounting bracket (SUS)					
Flexible R4/R2			5.2 + 7 +						
Flexible R1/R2	4		Housing (SUS)						
Retro-reflective	/e tvpe	:	Possible to detect object even at a thickness of Emitting/receiving 10.5 mm, Free cut Detecting part detail	^{7-EL} 2 to 310 6-UL					
Small object detection	offectiv	e	Housing 30 4000 02.2×2 (ABS) (20) (20) (20) (20)	3 to 160 ^{5-PL} 4 to 130	Long 10 to 55				
Screen/Array	fuse re	Square	25 (8) (82.2) Model name tube (PVC)	^{4-LG} 5 to 120 ^{3-ST}	Std 10 to 45 Fast	55	-40 to +60°C	R25	NF-DC03
Limited diffuse Narrow view/	Limited diffuse reflective type		2 -03.2 mounting hole, ø5.7 countersinking depth 2.6 15 17.5 17	5 to 110 2-FS 10 to 95 1-HS 12 to 60	13 to 35				
wafer mapping			t	 1 × 500 mm white paper					

wafer mapping Heat resistant

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

DPTEX ΓA •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.

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Heat resistant (130°C or below)







Non-protruding cables Space-saving

Straight type Extra space needed

10 mm

Fiber units for ambient temperatures of 130°C or below

Fiber units

Heat resistant (180 to 200°C)

P.80

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

77

Photoelectric Sensors

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

Low cost nut type→P.35 Flexible R2 mm nut type→P.58 Fiber units with 45° angle light axis and different sleeve lengths An angled light axis is needed when mounting workpieces for detecting transparent glass substrates with through-beam type fibers. The light axis of the NF-TH06 is angled at 45° and the sleeve lengths for the emitting and receiving fibers differ, making it possible to simplify the mounting jig and installation. NF-TH06 NF-TH06 provides stable Angle detection using conventional fiber units 45° light axis and different detection and simple sleeve lengths mounting Vertical mounting Angled mounting The light passes through the glass and Although the detection is stable, Sleeve length detection is unstable when installed mounting bracket with a complex shape Glass 25 mm substrate vertically to a glass substrate. is needed when mounting at an angle. Glass Sleeve length Glass substrate substrate 15 mm

Because the cables of NF25-DH and NF25-TH heat resistant nut type fiber units do not protrude even when mounted to the conveyer side, no extra space is needed. Also, they eliminate worries regarding cable breakage caused by snagging on tools during work.

Nut type Non-protruding cables

Heat resistant <130°C or below> fiber units (through-beam type)

<u></u>	Trees			Sensing o	listance (mm)		Ambient	Min. bending	Mandal
	Тур	e	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	radius (mm)	Model
Photoelectri Sensors			Nut type, Free cut 7 Lens: PC 14.4 4.4 Polyamide (PA6)	7-EL 2,000 6-UL 1,100 5-PL 1,000 4-LG 900 3-ST 600 2-FS 300 1-HS 90	Long 750 Std 500 Fast 170	300	-40 to +105°C	R25	NF25-TH Space-saving
Photoelectric Sensors Specialized	eam type	05°C	Side view, Free cut	7-EL 3,500 6-UL 2,300 5-PL 2,000 4-LG 1,800 3-ST 1,200 2-FS 600 1-HS 170 170	Long 1,300 Std 700 Fast 400	500	-40 to +105°C	R10	NF-TS22M
Photoelectric Sensors Laser Displacement Sensors	Through-beam type		a1 sleeve: 25 mm long and 10 mm long, 45° angle light axis, Heat resistant, Free cut 2.2 25 15 1000 1. SUS304 o2.5 SUS303 PC 0.5 T Light axis angle	7-EL 100 6-UL 55 5-PL 50 4-LG	Long 28 Std 20	16	-40 to +105°C	B10	NF-TH06
Fiber Units			2.2 0.5 1 02.5 SUS303 Light axis angle 2 2.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	40 3-ST 30 2-FS 10 1-HS 4	Fast 15				
Easy mounting Thread type		00°C	Lens attachable (P.98), Free cut <u>of fiber (1)</u> $\sqrt{2}$ <u>M2.6 × P0.45</u> (brass with nickel plating) <u>2.4</u> <u>o2.2</u>	7-EL 3-ST 2,400 700 6-UL 2-FS 1,400 300	Long 700 Std 400	300	-40 to +100°C	R25	NF-TH01
Cylindrical type		00 0	3 12 2000	5-PL 1-HS 1,000 100 4-LG 900	Fast 200	500	(Note)	nzu	Low cost

●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 90% or above after 2000 continuous work hours.

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





Sensing distance (mm) Ambient Min. bending Туре Features/dimensions (mm) Model D3RF D2RF BRF temperature radius (mm) Free cut 2000 650 10 68 350 280 120 NF25-DH 2-ø2.2 15 -40 to +105°C R25 80 240 Space-saving Lens: PC M6 P=1.0 ^{ast} 25 175 Polyamide (PA6) 105°C 100 Diffuse type 14.4 25 4.4 Free cut ø1.0 × 2 2000 18 950 250 300 FD-3SD1(100) 500 130 180 160 -40 to +105°C R25 Standard iter 450 40 C0.5 80 ast 2- ø2.2 M6 × P0.75 (brass with nickel plating) 400 Free cut ø2.5 SUS 275 <u>M6 × P0.75 SUS</u> ø2.2 850 250 NF-DH02 ø1 × 550 170 -40 to +100°C 100°C 110 R25 150 (Note) Low cost 450 55 50 2000 Detecting part detail 375

Heat resistant <130°C or below> fiber units (diffuse type)

The sensing distances for the diffuse type fiber units are values on 500 × 500 mm white paper (1000 × 1000 mm white paper for NF25-DH).
 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

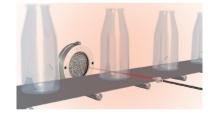
Possible to detect as retro-reflective type if the SW50 heat resistant reflector is used for the heat resistant diffuse type fiber. Demonstrates its strength in transparent object detection under high temperatures.

Reflector heat resistant to 300°C



SW50 ø80 × 20 mm (ø50 mm reflective surface)

Glass bottle detection under high temperatures



Photoelectric Sensors

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Specialized Photoelectric Sensors

Laser Displacement Sensors

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

Lens for through-beam type

Correct use



Photoelectric Sensors

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Laser Displacement Sensors

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

Small object detection

0	Scree	m / A m	011
- 6	SCIEE	H/AH	dV

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 the second			"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 with	al al		
Ordinary temperature fiber section is free cut	Ordinary temperature fiber section is free cu			

Diffuse type

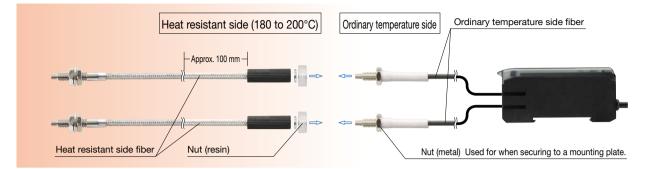
Coaxial	Standard
NF-DH07	NF-DH01
Heat resistant to 200°C	Heat resistant to 200°C
Metal sheath	Free cut

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 x1 M2.6 × 0.45 Screwing side 150 0.6 150 0.8 bundled 150 0.8 bundled 160 0.8 bundled 18.3 18.3 0.8 bundled 18.3 18.5	7-EL 570 6-UL 540 5-PL 460 4-LG 410 3-ST 270 2-FS 160 1-HS 45	Long 350 Std 180 Fast 85	110	-60 to +200°C	R10	NF-TH10	Fiber Units Easy mounting Thread type Cylindrical type
		ens attachable (P98) <u>M2.6 × 0.45</u> 3 20 1000 7-EL Histitezin Ordinary temperature 1,350		Sleeve type					
		3.5	6-ÚL 1,260				: R25	NF-TH11 Standard item	Flexible R4/R2
type			5-PL 1,130 4-LG 990	Long 750 Std 450	280	280 -60 to +200°C			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 // 7 thickness 2.4 Screwing side Mounting plag (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						NF-TH12	Screen/Array
F		23 200 025							Limited diffuse
		2.5 - Heat/freezing Ordinary temperature Heat/freezing Grinary temperature M2.6 × 0.45 - Grinary temperature Heat/freezing Ordinary temperature Heat/freezing Ordinary temperature (brass with nickel plating)	7-EL 1,080 6-UL				Heat resistant side R18 Ordinary temperature side R25		Narrow view/ wafer mapping
			990 5-PL	Long					Heat resistant
		Tip bracket (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			Chemical resistant
			510 ^{2-FS} 290	170					Vacuum resistant
		G G						Liquid level/liquid leakage/ water detection	
		Width across flats 7 thickness 3.2 Ø4.0 (PVC) [polypropylene] 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% BH the ambient tempera	ture should be	e between 0 :	and 40°C		l	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)

U				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-L6 790 3-ST 5-10 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 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	Long			Heat resistant side	
Fiber Units	Through-beam type	200°C	tip braket (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				900 6-UL 870				Heat	
Retro-reflective			<u>o2.7 liner + blade tube (SUS)</u> <u>24</u> <u>485</u> ³⁰⁰ <u>485</u> ³⁰⁰ <u>485</u> ¹⁰⁰ <u>485</u> ¹⁰⁰ <u>48</u>	5-PL 760 4-LG	Long 500 Std	150	-60 to +200°C	resistant side R18 Ordinary	NF-TH15
Small object detection			$\begin{array}{c c} & 12 \\ 2.2 \\ \hline \\ 2.2 \\ \hline \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$	660 3-ST 430 2-FS	300 ^{Fast} 150	150	-00 10 +200 C	temperature side	NF-IFIT3
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 :5 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

Correct use



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

	Tuno		Sensing dis	stance (mm)		Ambient	Bending radius	Madal
	Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
Diffuce time	200'	Coaxial, Metal sheath 1000 Detecting part detal Receiving: e50 µm × 440 Liner + blade tube (SUS) Kenting: e50 µm × 440 Width across flats 7 thickness 2.4 (SUS)	7-EL 1,280 6-UL 1,200 5-PL 1,050 4-L6 920 3-ST 600 2-F8 230 1-H8 59	Long 850 Std 320 Fast 100	200	-60 to +200°C	R25	NF-DH07
	180'	C $e^{04.9}$ M6 × P0.75 SUS $e^{01.5 \text{ fiber (2)}}$ $e^{04.9}$ M6 × P0.75 SUS $e^{04.9}$ M6 × P0.75 SUS	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)

	Tra		Features/dimensions (mm)	Sensing dis	stance (mm)		Ambient	Bending radius	Model
	Тур	pe	reatures/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Woder
-	Limited diffuse reflective type	180°C	Glass substrate detection, Free cut 10.75	7-EL 0 to 35 6-UL 0 to 28 5-PL 0 to 25 4-L6 0 to 22 3-ST 0 to 20 2-FS 0 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.

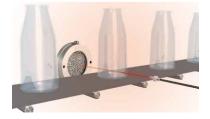
Heat resistant reflector

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

Photoelectric Sensors

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



Fiber units

Heat resistant (180 to 200°C)

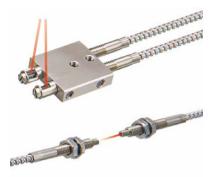
• P.80

Fiber units

Heat resistant

• P.77

6 Heat resistant (250 to 350°C)



Fiber units for ambient temperatures of 250 to 350°C

Limited diffuse reflective types are optimal for glass substrate alignment

Related

products

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

Through-beam type/Diffuse type/Limited diffuse reflective type

Two through-beam types, three diffuse types, and three limited diffuse reflective types are available. We offer a total of 8 variations to suit any high-temperature application.

Through-beam type



Diffuse type

Coaxial	60 mm sleeve	90 mm sleeve
NF-DH03	NF-DH04	NF-DH05
and the second sec	and the second se	

Limited diffuse reflective type

Glass substrate detection	Glass substrate alignment				
NF-DH06	NF-DH10	NF-DH11			
and a communication					

Photoelectric Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

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

Lens for

through-beam type Correct use

Heat resistant <250 to 350°C or below> fiber units (through-beam type)

Tree		Easterna (d'anna i anna i	Sensing di	stance (mm)		Ambient	Bending radius	Mandal
Тур	e	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	re (mm))°C R25	Model
eam type		Lens attachable (P.98) 3 17 Heat/freezing temperature resistant side side 15 15 16 16 16 16 16 16 16 16 16 16	7-EL 1,440 6-UL 1,350 5-PL 1,240 4-L6 1,080 3-ST 710 2-FS 430 1-HS 130	Long 750 Std 450 Fiat 220	300	-30 to +350°C or -60 to +200°C	R25	NF-THC Standard it
Through-beam	350°C	Ø1.2 bundled fiber core × 1 Width across flats 7 thickness 2.4 (SUS) Mounting plug (PA)	7-EL 1,350 6-UL 1,260 5-PL 1,120 4-L6 900 3-ST 630 2-FS 410 1-HS 120	Long 750 Std 450 Fast 220	300	-30 to +350°C or -60 to +200°C	Fiber R25 Sleeve R10	NF-TH(

●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.

Heat resistant <250 to 350°C or below> fiber units (diffuse type)

Туре	De Features/dimensions (mm)	Sensing dis	stance (mm)		Ambient	Bending radius	Model
туре	reatures/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Woder
Diffuse type	Coaxial Heat/freezing Ordinary temperature resistant side Detecting part detail Receiving out dramer of 2, bunded fiber core x1 Joint (brass with nickel plating) Biological States Joint (brass with nickel plating) Biological States Joint (brass with nickel plating) Biological States Joint (brass with nickel plating) States OCO OCO	7-EL 940 6-UL 890 5-EL 770 4-LG 670 3-ST 440 2-FS 190 1-HS 50	Long 650 Std 250 Fiast 80	150	-30 to +350°C or -60 to +200°C	R25	NF-DH0 Standard ite

•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.

Photoelectric Sensors

Photoelectric Sensors

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

		-	Sensing	distance (mm)		Ambient	Bending radius		U
I)	ype	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model	
iype		o2.1 sleeve: 90 mm long 90 - 27 - 1000 Bendable range Detecting part detail Receiving: 050 µm × 380 02.1 (SUS) 03.1 Width across flats 7 Width across flats 7 Width across flats 7 Width across flats 7	7-EL 1,110 6-UL 1,050 5-PL 910 4-LG 800 3-ST 520 2-FS 190 1-HS 50	Long 750 Std 250 Fast 80	200	-30 to +350°C or -60 to +200°C	Fiber R25 Sleeve R10	NF-DH05	Photoelectric Sensors
Diffuse type	350°C	o2.8 sleeve: 60 mm long Ordinary Detecting part detail resistant side of 8 bundled of 8 bundled ordinary temperature side Joint (brass with nickel plating)		7-EL 950 6-U					Specialized Photoelectr Sensors Laser
		$\begin{array}{c c c c c c c c c c c c c c c c c c c $	950						Displaceme Sensors
			5-PL 780 4-LG 680 3-ST 450	Long 650 Std 250 Fast 80	300	-30 to +350°C or -60 to +200°C	Fiber R25 Sleeve R10	NF-DH04	Fiber Units
		<u> </u>	2-FS 200 1-HS						Easy mounti
		Mo × 0.75 (SUS) Mounting bracket ø5 (SUS) (brass with nickel plating)	59						Thread typ
		Toothed washer ø11 Width across flats 10 thickness 2 (SUS) Mounting plug (PA)							Cylindrical ty
		1	1	1	1	1	1		01

Heat resistant <250 to 350°C or below> fiber units (diffuse type)

•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.

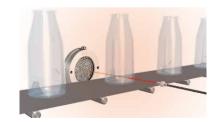
Heat resistant reflector

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



SW50 ø80 × 20 mm (ø50 mm reflective surface) Glass bottle detection under high temperatures



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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



Heat resistant <250 to 350°C or below> fiber units (limited diffuse reflective type)

-		-	Sensing di	stance (mm)		Ambient	Bending radius	
Ту	pe	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
	300°C	Glass substrate detection Flat ON 10.75 1	7-EL 0 to 40 6-UL 0 to 34 5-PL 0 to 22 4-LG 0 to 18 3-ST 0 to 17 2-FS 0 to 9 1-HS 0 to 4	Long 0 to 15 Std 0 to 10 Fast 0 to 8	6	-30 to +300°C or -60 to +200°C	R25	NF-DH0
Limited diffuse reflective type		Glass substrate alignment Flat ON	7.EL 2 to 28 6-UL 2 to 24 5-PL 2 to 23 4-LG 3 to 23 3-ST 3 to 20 2-FS 3 to 18 1-HS 4 to 11	Long 4 to 20 Std 4 to 20 Fast 4 to 15	4 to 17	-20 to +250°C (Ordinary temperature side: -20 to +70°C)	R25	NF-DH1
	250°C	Glass substrate alignment Flat ON	7-EL 2 to 45 6-UL 3 to 40 5-FL 3 to 39 4-L6 3 to 38 3-ST 4 to 35 2-FS 6 to 28 1-HS 8 to 19	Long 6 to 38 Std 7 to 30 Fast 8 to 25	8 to 25	-20 to +250°C (Ordinary temperature side: -20 to +70°C)	R25	NF-DH1

Correct use

OPTEX E E •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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Photoelectric Sensors

Photoelectric Sensors

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

Chemical resistant





Oil resistance

Resistance

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Resistance for fire resistant fluids

Fire resistant fluid mineral oil

Diester oil

Silicone ester oil

Low aniline point oils

High aniline point oils

Water-glycolic phosphoric acid

Ester chlorinated hydrocarbons



Fiber portion is protected from chemicals and oils using a fluoroplastic coating.

Select an optimal model from among 7 through-beam types and 1 diffuse type

Photoelectric Sensors

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

ffuse

iew/ ping

stant

leakage/ n type

lse

For use with various chemicals

The detecting part and fiber portion are protected from chemicals by using a fluoroplastic coating. Selection of an optimal model is possible from among 7 through-beam types and 1 diffuse type.

Chemical resistance

	Chemical resistance	
Chemical type	Typical examples	Resistance
Inorganic acids	Hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, chromic acid	~
Organic acids	Acetic acid, oxalic acid, formic acid, oleic acid, phthalic acid	✓
Alkali	Caustic soda, caustic potash, ammonia water, calcium hydroxide	✓
Salts	Sodium chloride, magnesium sulfate, lead nitrate, potassium chlorate	~
Alcohols		✓
Glycols	Ethanol, butyl alcohol, glycerol	~
Ketones	Acetone, methyl ethyl ketone	~
Esters	Butyl acetate, dibutyl, phthalate	✓
Ethers	Ethyl ether, dibutyl ether	✓
Amines	Dibutyl amine, triethanolamine	~
Aliphatics	Propane, butadiene, cyclohexane, kerosene	✓
Aromatics	Benzene, toluene, xylene, aniline	~
Organic halogen compounds (chlorine)	Carbon tetrachloride, trichlene, ethylene sulfide	✓

Chemical resistant fiber units (through-beam type)

-		Eastern (illusionalisms)		Sensing di	stance (mm)		Ambient	Bending radius	Madal	Screen/Arr
Туре		Features/dimensions (mm)	DS	BRF	D2RF	BRF	temperature	(mm)	Model	Limited diffu
am type	Ð	Side ON, Free cut 15 2000 13 15 2000 13 15 2000 13 15 2000 13 15 2000 15 2000 17 15 4 10 0 0 7.3 Degree of protection on IP67 (excluding cated surfaces that have been cut)	7-EL 3,600 6-UL 3,600 5-PL 3,600 4-LG 3,150	3-ST 2,000 2-FS 2,000 1-HS 760	Long 3,500 Std 2,500 Fast 1,300	2,000	0 to +60°C	R25	NF-TY05	Narrow vie wafer mapp Heat resista Chemical resistant
Through-beam	Square	Side ON, Fiber length: 5 m, Free cut 15 500013 13 12 15 15 500013 13 14 15 15 100	7-EL 3,600 6-UL 3,600 5-PL 3,600 4-LG 3,200	з-sт 2,000 2-Fs 1,600 1-HS 550	Long 3,000 Std 2,000 Fast 1,000	1,500	0 to +60°C	R25	NF-TY05-5	Vacuum resistant Liquid level/liquid lea water detection Lens for through-beam Correct us

●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.



Fiber units Chemical resistant

Chemical resistant fiber units (through-beam type)

Tune		Sensing	distance (mm)		Ambient	Bending radius	Madel
Туре	Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
	Heat resistant, Free cut 2000 $\frac{100}{300}$ 100 $\frac{50}{300}$ (1.0) 20 (1.0) 20 (1.	7-EL 3-ST 4,000 2,800 6-UL 2-FS 4,000 2,900 5-PL 1-HS 4,000 700 4-L6 3,000	Long 3,500 Std 2,500 Fast 1,200	2,000	-40 to +105°C	R60	NF-TYO
	Heat resistant, Fiber length: 3 m, Free cut 2000 ^{1/00} 1100 ^{1/00} 1100 ^{1/00} 1100 ^{1/00} 1100 ^{1/00} 1100 ^{1/00} 05 05 05 05 (lube outer diameter) Degree of protection on IP67 (excluding coated surfaces that have been cut)	7-EL 3-ST 4,000 3,000 6-UL 2-FS 4,000 1,700 5-FL 1,700 4,000 500 4-L6 3,500	Long 2,200 Std 1,300 Fast 550	650	-40 to +105°C	R60	NF-TY01
Through-beam type	Side view, Free cut of fluoroplastic tube of a strategy of the	7-EL 3-ST 4,000 1,500 6-UL 3,550 700 5-PL 2,800 200 4-L6 2,000	Long 1,500 Std 800 Fast 400	500	-40 to +70°C	R60	NF-TYO
Throug	Side view, Free cut 3000 :300 100 :30 100 :30 100 :30 100 :30 100 :30 05 (lens outer diameter) 05 (ube outer diameter) Degree of protection on IP67 (excluding coated surfaces that have been cut)	7-EL 4,000 6-UL 3,500 5-PL 3,000 4-L6 2,000	Long 1,500 Std 800 Faat 400	480	-40 to +70°C	Fiber R25 Tube R60	NF-TY02-1
	Elbow, Free cut of lens outer diameter) (1.0) 20 (R7.5) 03 (tube outer diameter) 03 000 100 100 100 100 100	7-EL 4,000 6-UL 6-UL 3,500 4-LG 3,000 3-ST 2,200 2-FS 1,000 1-HS 300	Long 3,000 Std 1,700 Fast 800	900	-55 to +70°C	Fiber R20 Tube R20	NF-TY03-1

●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.

detection Screen/Array

Limited diffuse

Narrow view/ wafer mapping

Heat resistant

Chemical resistant
Vacuum resistant
iquid level/liquid leakage/ water detection
Lens for

emical istant	iuse typ	ø6	¢
cuum istant	Diff		
/liquid leakage/	●The	sensin	g

through-beam type Correct use

Chemica	l resistant	fiber	units	(diffuse type)
---------	-------------	-------	-------	----------------

	Туре		Factures (dimensions (Sensing distance (mm)			Ambient	Bending radius	Madal
			Features/dimensions (mm)	D3RF	D2RF	BRF	temperature	(mm)	Model
	Diffuse type		Heat resistant, Free cut of fluoroplastic tube o2.2 o2.2 o2.2 o2.2 o2.2 Degree of protection on IP67 (excluding coated surfaces that have been cut)	7-EL 3-5-5T 440 160 2-FS 145 5-FL 145 250 85 4-LG 85 225	Long 100 Std 70 Fast 50	45	-40 to +100°C	R60	NF-DY01 Only in industry

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.

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Photoelectric Sensors

Photoelectric Sensors

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



Photoelectric Sensors

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Heat resistant

Chemical resistant Vacuum

resistant Liquid level/liquid leakage/ water detection

Lens for through-beam type

Correct use



Fiber units for detecting liquid

Related

products

- Select based on applications for liquid level, liquid leakage, and water detection
- Array type NF-DF07 that can be mounted on ø8 to ø80 mm pipes
- A liquid accumulation prevention structure is used for all liquid level contact type models.

Liquid level detection 1: Pipe-mounted type

Liquid level/liquid leakage/water detection

Array type mountable on ø8 to ø80 mm pipes and tolerant to air bubbles: NF-DF07

In order to detect the liquid level without being affected by bubbles or water droplets, the number of cores and the array length of the array type NF-DF07 have been optimized to 18×8.75 mm. As a result of an optical design that can perform detections without malfunctioning, stable liquid level detection becomes possible.

A detection surface slide structure has been adopted that can bring the detection surface into close contact regardless of the pipe diameter. It can be installed on large diameter pipes up to a maximum of ø80 mm.

Fiber amplifier

D3RF

D3IF

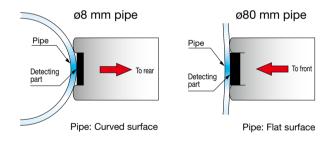
O P.110

Fiber amplifier

BRF

BIF

• P.130



Liquid level detection 2: Liquid level contact type

A liquid accumulation prevention structure is used for all liquid level contact type models.

Multi step tip design prevents accumulation of liquid at the tip of the sensor head. This design is useful for preventing malfunctions.

Without liquid accumulation prevention structure







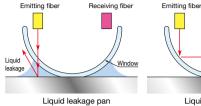
Liquid leakage detection

Detects leakage (liquid leakage) to liquid leakage pan: NF-DW02



Detection theory

When there is liquid leakage, light from the emitting fiber will be diffused in the liquid leakage causing light to not be detected.



not detected by the receiving fiber.

Liquid leakage pan

Light from the emitting fiber is reflected by the liquid leakage and

Light from the emitting fiber is reflected by the window and detected by the receiving fiber.

> Specialized Photoelectric Sensors

Liquid level detection fiber

Ту	pe	Dimensions (unit: mm)	Details	Ambient temperature	Bending radius (mm)	Model	Laser Displacement Sensors
		For detecting upper limit level, Free cut 17 09.4) 28.3 20.3 7.8 28.3 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.3 1 20.5 20.9 1 1 1 1 1 1 1 1 1	For transparent pipes with outer diameter of ø8 mm or more (When used with included zip ties: ø8 to 80 mm) An array type tolerant to air bubbles	-40 to +70°C	R10	NF-DF07	Fiber Units Easy mounting Thread type Cylindrical type
tection	pa	For detecting lower limit level, Free cut $23 \underbrace{\begin{array}{c}20\\12\\1\\1\\3\\5.5\\1\\6\\17\\9\\17\\9\\17\\9\\17\\9\\17\\9\\17\\9\\17\\9\\$	For PFA pipes with outer diameter of ø3 to 10 mm and thickness of 0.3 to 1 mm, or pipes with same level of transparency	-20 to +60°C	Protective tube R20 Fiber R4	R20 Fiber NF-TF01 _	Sleeve type Flexible R4/R2 Flexible R1/R2 Retro-reflective
Liquid level detection	Pipe-mount	For detecting upper limit level, Heat resistant, Free cut	For PFA pipes with outer diameter of ø6 to 26 mm and thickness of 1 mm, or pipes with same level of transparency With mounting position adjusting lever	-40 to +100°C	R10	NF-DF05	Small object detection Screen/Array Limited diffuse Narrow view/ wafer mapping Heat resistant
		For detecting upper limit level, Heat resistant, Free cut	For transparent pipes with outer diameter of ø6 to 26 mm and thickness of 1 to 3 mm With mounting position adjusting lever	-40 to +100°C	R10	NF-DF04	Chemical resistant Vacuum resistant Liquid lexel/liquid lexeage/ water detection Lens for through-beam type Correct use

●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.

Photoelectric Receiving fiber Window

Photoelectric Sensors

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OPTEX

Fiber units Liquid level/liquid leakage/water detection

Liquid level detection fiber

Photoelectri Sensors

Photoelectric Sensors

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	
	Chemical resistant	

Lens for through-beam type

Correct use

ту	vpe	Dimensions (unit: mm)	Details	Ambient temperature	Bending radius (mm)	Model
(Liquid level contact type)	ø4	Heat resistant, Free cut 500 å ³⁶ (50) Rage in which protective tube cutting is not possible (17) Range in which bending part (44) (10) Swaged part (1.5)	Liquid level contact type, liquid accumulation prevention structure Protective tube: Fluoroplastic 500 mm long (can be cut) Heat resistant to +105°C	-40 to +105°C	Protective tube R20 Fiber R10	NF-DF08
Liquid level detection (L	ø6	Free cut 0.9 1.4 1.6 1.7 1.6 1.7 1.6 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	Liquid level contact type, liquid accumulation prevention structure Protective tube: Fluoroplastic 2 m long (can be cut)	-40 to +70°C	R60	NF-DF03 Standard item

●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.

Liquid leakage detection fiber

Туре		Dimensions (unit: mm)	Details	Ambient temperature	Bending radius (mm)	Model
Liquid leakage detection	Square	Free cut Emitting indicator Housing (fluororesin) 20 10 10 20 10 10 20 11 10 10 11 10 10 11 10 10 11 10 11 11 10 11 10 11 11 11 10 11	SEMI S2 supported Through use of capillary phenomenon can also detect minor liquid leakage and viscous liquid Included mounting brackets can be purchased separately. NF-DA52 (SUS mounting bracket) NF-DA53 (PVC mounting bracket)	-20 to +50°C	Protective tube R20 Fiber R4	NF-DW02

●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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Water detection fiber

Fiber unit specialized for D3IF and BIF fiber amplifiers for detecting water. The detection of contents (through-beam type) or adhesives inside transparent bottles, as well as detection of colorless water or chemicals on the production is now possible.

Detection of chemicals in transparent bottles Detection of adhesives



Water detection fiber units (through-beam type/diffuse type)

Туре			Sensing dis	Ambient	Bending radius		Sensors	
		Dimensions (unit: mm)	D3IF-TN BIF		temperature	(mm)	Model	
Through-beam type		Heat resistant	7-EL 650 6-UL 350 6-PL 300 4-L6 250 3-ST 230 2-F5 150 1-HS 60	100	-40 to +200°C		NF-TW01	Laser Displacement Sensors
	M4							Fiber Units
								Easy mounting
								Thread type
	M6	Heat resistant 22 1000 $\frac{100}{100}$ 3 12 SUS303 SUS303 12 12 13 9.5 1304 05 04 010 00 1	7-EL 280 6-UL 125 5-PL 110 4-LG 100 3-ST 85 2-FS 45 1-HS 20	30	-40 to +200°C	R25	NF-DW01	Cylindrical type
/pe								Sleeve type
Diffuse type								Flexible R4/R2
								Flexible R1/R2
								Retro-reflective
Ise D3IE-TN or RIE-WN/-OWN fiber amplifiere for water detection								

●Use D3IF-TN or BIF-WN/-CWN fiber amplifiers for water detection

•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.

Photoelectric Sensors

Photoelectric Sensors

Specialized Photoelectric

Limited diffuse

detection

Screen/Array

Narrow view/ wafer mapping

Heat resistant

Chemical resistant

Vacuum resistant

Liquid level/liquid leakage water detection

Lens for

through-beam type Correct use

> OPTEX

Lens for through-beam type 20

Related products Lens for small object detection NF-DA • P.64

Vacuum resistant Lens for fiber NF-TA EST. O P.92



Lenses for through-beam type fiber units selectable from 6 models

Long distance lens for extending sensing distance

Side-view lens for space saving

Lens for through-beam type fiber units (fiber amplifier: D3RF)

Photoelectric Sensors	_		Applicable D3RF sensing distance (mm)							Ambient		
26112012	Туре	Dimensions (mm)	fiber units	7-EL	6-UL	5-PL	4-LG	3-ST	2-FS	1-HS	temperature	Model
Leser		Standard	NF-TB01	4,000	4,000	4,000	4,000	4,000	2,500	800		
Laser		ø4.4 ø5 (brass with nickel plating)	NF-TB02	4,000	4,000	4,000	4,000	4,000	4,000	1,800		
Displacement Sensors			NF-TB06	4,000	4,000	4,000	4,000	4,000	4,000	1,500		NF-TAO1
06113013			NF-TJ01	2,000	2,000	2,000	2,000	2,000	2,000	750	-40 to +100°C	
		Lens 2.5 7.5	NF-TR01	4,000	4,000	4,000	4,000	4,000	4,000	1,800		(2 pieces)
		diameter:	NF-TK77	4,000	4,000	4,000	4,000	4,000	4,000	2,000		
Fiber Units		Inner thread M2.6 × 0.45 depth 3	NF-TH01	4,000	4,000	3,200	2,700	2,500	1,400	500		
		Heat resistant	NF-TB01	4,000	4,000	4,000	4,000	4,000	2,000	360		
	Long range lens	Knurling	NF-TB02	4,000	4,000	4,000	4,000	4,000	4,000	1,200		
Easy mounting	e	A6061-T6	NF-TB06	4,000	4,000	4,000	4,000	4,000	4,000	1,200		
	- O	04.3	NF-TJ01	2,000	2,000	2,000	2,000	2,000	2,000	600		NF-TA03
Thread type	Jg		NF-TR01	4,000	4,000	4,000	4,000	4,000	2,000	800	-40 to +350°C	
inioda gpo	, ai	04	NF-TK77	4,000	4,000	4,000	4,000	4,000	2,000	600	-40 10 +350 C	(2 pieces)
Culindrical tuna	5		NF-TH01	4,000	4,000	4,000	4,000	4,000	2,000	1,200		Low cost
Cylindrical type	ũ	9.2	NF-TH08	4,000	4,000	4,000	4,000	4,000	2,000	800		
	- 2	Inner thread M2.6 × 0.45 depth 3	NF-TH10	2,000	2,000	2,000	2,000	2,000	2,000	750	1	
Sleeve type			NF-TH11	2,000	2,000	2,000	2,000	2,000	2,000	1,000		
	-	SUS housing Inner thread M2.6 × 0.45 depth 3	NF-TB01	4,000	4,000	4,000	4,000	4,000	2,500	800		
Flexible R4/R2		Lens diameter: ø3.5 ø4.4 ø5 (SUS)	NF-TB02	4,000	4,000	4,000	4,000	4,000	4,000	1,800		
	_		NF-TB06	4,000	4,000	4,000	4,000	4,000	4,000	1,500		NF-TA01S
Flexible R1/R2			NF-TJ01	2,000	2,000	2,000	2,000	2,000	2,000	650	-40 to +100°C	
FIEXIDIE NI/NZ			NF-TR01	4,000	4,000	4,000	4,000	4,000	4,000	1,800		(2 pieces)
	-		NF-TK77	4,000	4,000	4,000	4,000	4,000	4,000	2,000	_	
Retro-reflective			NF-TH01	4,000	4,000	3,200	2,700	2,500	1,400	500		
Our all also at	o	Heat resistant	NF-TB01	4,000	4,000	4,000	4,000	4,000	4,000	4,000	-	
Small object	eu	<u>+ 22.2</u> 17	NF-TB02	4,000	4,000	4,000	4,000	4,000	4,000	4,000		
detection	- <u>-</u>	ø12 8	NF-TB06	4,000	4,000	4,000	4,000	4,000	4,000	4,000		
Screen/Array	bu		NF-TJ01	2,000	2,000	2,000	2,000	2,000	2,000	2,000		
SUICEII/AITay	2		NF-TR01	4,000	4,000	4,000	4,000	4,000	4,000	4,000	-60 to +350°C	NF-TAO4
	Gu		NF-TK77	4,000	4,000	4,000	4,000	4,000	4,000	4,000	-00 10 +000 0	(2 pieces)
Limited diffuse	ē		NF-TH01	4,000	4,000	4,000	4,000	4,000	4,000	4,000		
Nemenieur	- <u>ė</u>	Housing: SUS303 Inner thread	NF-TH08	4,000	4,000	4,000	4,000	4,000	4,000	4,000] !	
Narrow view/	Ultra-long range lens	Lens : glass <u>M4 × 0.7 depth 6</u> /	NF-TH10	2,000	2,000	2,000	2,000	2,000	2,000	2,000		
wafer mapping			NF-TH11	2,000	2,000	2,000	2,000	2,000	2,000	2,000		
Heat resistant		Standard ø3 ø5 (brass with nickel plating)	NF-TB01	3,600	2,500	2,000	1,600	1,200	650	200		
nour resistant			NF-TB02	4,000	3,500	3,000	2,400	1,800	1,000	300		NF-TA02
Chemical		Inner thread	NF-TJ01	2,000	1,900	1,600	1,500	950	600	200	-40 to +70°C	(2 pieces)
resistant	S	2.75 M2.6 × 0.45 depth 3	NF-TR01	4,000	3,300	2,400	2,000	1,500	900	200		(z pieces)
	er	9	NF-TK77	4,000	3,500	3,000	2,400	1,800	950	300		
Vacuum resistant	Side-view lens	Heat resistant	NF-TB01	4,000	2,400	2,300	2,000	1,200	800	250		
1001010111	ev –	Rod prism Brass with nickel	NF-TB02	4,000	2,400	2,300	2,000	1,200	800	250		
Liquid level/liquid leakage/	, S	Knurling plating	NF-TJ01	2,000	1,900	1,700	1,500	950	600	200		
water detection	<u>e</u>		NF-TR01	4,000	1,700	1,600	1,300	850	550	160		NF-TA05
Lens for	bid		NF-TK77	4,000	1,900	1,700	1,500	950	600	200	-60 to +300°C	(2 pieces)
through-beam type	0		NF-TH01	4,000	1,500	1,300	1,200	800	450	160		Low cost
		1 -+ 2.5 -+ Inner thread	NF-TH08	4,000	1,600	1,500	1,200	800	550	170		Low cost
		M26×0.45 denth 3										
Correct use		M2.6 × 0.45 depth 3	NF-TH10 NF-TH11	2,000 4,000	1,100	1,000	850 1,100	600 700	300 400	100 150		

●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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Photoelectric

Fib	er	Uni	ts
Fasv	ma	nın	tin



Lens for through-beam type fiber units (fiber amplifier: D2RF, BRF)

	1		Consistent distances (www)				1		0	
T	Dimensions (mm)	Applicable	Applicable Sensing distance (mm)				Ambient	Mandal		
Туре		fiber units		D2RF		BRF	temperature	Model	Photoelectric Sensors	
			Long	Std	Fast				0 <u>2</u>	
	Standard ø4.4 ø5 (brass with nickel plating)	NF-TB01	3,500	3,500	1,500	3,000	_		O Ū	
		NF-TB02	3,500	3,500	1,500	3,500	_			
	Lens 2.5 7.5 diameter: ø3.5 Inner thread M2.6 × 0.45 depth 3	NF-TB06	3,500	3,500	3,500	3,500	-40 to +100°C	NF-TA01		
		NF-TJ01	1,500	1,500	1,500	1,500		(2 pieces)	6 2	
		NF-TR01	3,500	3,500	3,000	3,000		(2 picoco)	δ. O	
		NF-TK77	3,500	3,500	3,000	3,500		1		
		NF-TH01	3,500	3,500	2,500	3,500				
í	Heat resistant	NF-TB01	3,500	3,500	600	3,500				
Long range lens	A6061-T6	NF-TB02	3,500	3,500	3,000	3,500		NF-TA03 (2 pieces)		
<u>_</u>		NF-TB06	3,500	3,500	2,800	3,500				
ge		NF-TJ01	1,500	1,500	1,500	1,500	-			
ŝ	04	NF-TR01	3,500	3,500	2,000	2,500	-40 to +350°C			
ra		NF-TK77	3,500	3,500	1,700	3,500	_		Photoelectric	
g		NF-TH01	3,500	3,500	2,700	3,500	-	Low cost	Sensors	
5		NF-TH08	3,500	3,500	1,900	2,100	_			
Ľ.	Inner thread M2.6 × 0.45 depth 3	NF-TH10	1,500	1,500	1,500	1,500	_		Crocialized	
		NF-TH11	1,500	1,500	1,500	1,500			Specialized Photoelectric	
	SUS housing Inner thread M2.6 × 0.45 depth 3	NF-TB01	3,500	3,500	1,500	3,000	-40 to +100°C	NF-TA01S	Sensors	
	Lens diameter: 04.4 05 (SUS)	NF-TB02	3,500	3,500	1,500	3,500			0013013	
		NF-TB06	3,500	3,500	3,500	3,500			Locor	
		NF-TJ01	1,500	1,500	1,500	1,500		(2 pieces)	Laser Displacement	
		NF-TR01	3,500	3,500	3,000	3,000		(2 picoco)	Sensors	
		NF-TK77	3,500	3,500	3,000	3,500			0013013	
_		NF-TH01	3,500	3,500	2,500	3,500				
S	Heat resistant 012 17 17 17 15 17 15 16 102 17 17 15 17 15 17 15 17 17 17 17 15 17 15 17 17 17 17 17 17 17 17 17 17	NF-TB01	3,500	3,500	3,500	3,500	-60 to +350°C	NF-TA04 (2 pieces)		
<u>e</u>		NF-TB02	3,500	3,500	3,500	3,500			Fiber Units	
Ultra-long range lens		NF-TB06	3,500	3,500	3,500	3,500				
ũ		NF-TJ01	1,500	1,500	1,500	1,500				
2		NF-TR01	3,500	3,500	3,500	3,500			Easy mounting	
ů		NF-TK77	3,500	3,500	3,500	3,500				
우		NF-TH01	3,500	3,500	3,500	3,500			Thread type	
tra		NF-TH08	3,500	3,500	3,500	3,500			inioda typo	
Ś		NF-TH10	1,500	1,500	1,500	1,500			Outin dui o al dum a	
		NF-TH11	1,500	1,500	1,500	1,500			Cylindrical type	
	Standardø5 (brass with nickel plating)	NF-TB01	1,500	800	400 450	600 600	-40 to +70°C	(2 pieces)		
		NF-TB02	1,500	1,000					Sleeve type	
		NF-TJ01	1,500	800	450	500				
SU		NF-TR01	1,000	700	450	500			Flexible R4/R2	
ē		NF-TK77	1,500	800	450	600				
Side-view lens	Heat resistant	NF-TB01	1,800	900 900	400	500			Flexible R1/R2	
ē	Rod prism	NF-TB02 NF-TJ01	1,800	600	300	500 400			ΓΙΕΧΙΔΙΕ ΠΙ/ΚΖ	
2	Knurling Brass with nickel plating		1,300	600	250	350				
e		NF-TR01	,	600	300	400			Retro-reflective	
Sic	04 + + + + + + + + + + + + + + + + + + +	NF-TK77	1,300	500	250	400		(2 pieces)	0	
•,	Inner thread	NF-TH01						Low cost	Small object	
	1 → 2.5 → M2.6 × 0.45 depth 3	NF-TH08	1,100	600 300	250	350		Low cost	detection	
	8	NF-TH10 NF-TH11	700 900	500	180 250	300 350	-		Coroon/Arrow	
					should be betwe				Screen/Array	

●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.

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

