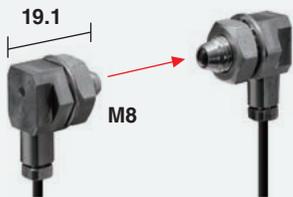


## Oil and Heat Resistant Fiber-Optic Cables

### Through-beam type

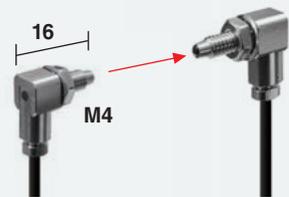
**NF-TR8CF**

Oil resistance IP68G Built-in lens



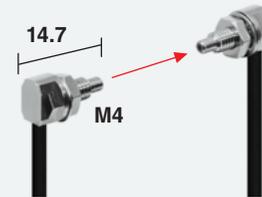
**NF-TR4CF**

Oil resistance IP68G Built-in lens



**NF-TR4F**

IP67



### Diffuse type

**NF-DM6-H10**

Heat resistant 100°C



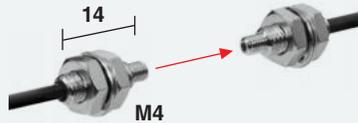
**NF-DM6-H15**

Heat resistant 150°C IP67



**NF-TM4-H10**

Heat resistant 100°C



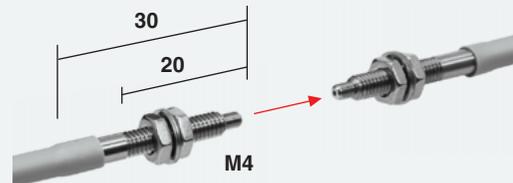
**NF-TM4-H15**

Heat resistant 150°C IP67



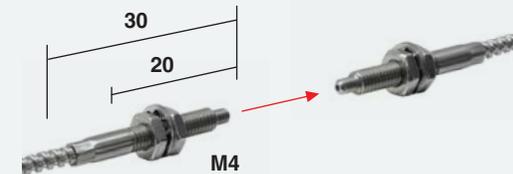
**NF-TM4-H20**

Heat resistant 200°C IP67



**NF-TM4-H35**

Heat resistant 350°C IP67



(Unit: mm)

### Attachment lens

**NF-TA33**  
Long range



Applicable models

NF-TR4F  
NF-TM4-H10  
NF-TM4-H20  
NF-TM4-H35

**NF-TA34**  
Ultra-long range  
Heat resistant



Applicable models

NF-TR4F  
NF-TM4-H10  
NF-TM4-H15  
NF-TM4-H20  
NF-TM4-H35

**NF-TA35**  
Side-view  
Heat resistant



Applicable models

NF-TM4-H10  
NF-TM4-H20  
NF-TM4-H35

**NF-TA36**  
Long range  
Heat resistant



Applicable models

NF-TM4-H15

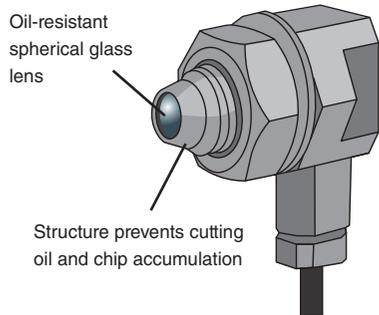
# Lineup

## Fiber-Optic Cables

Type	Model	Thread Size	Product image	Features	Ambient temperature	Min. bending radius (mm)	D4RF sensing distance (mm)								D12R sensing distance (mm)			
							16/22 μs	70 μs	250 μs	500 μs	1 ms	2 ms	8 ms	50 μs	250 μs	1 ms	4 ms	
Through-beam type	NF-TR8CF	M8		Thread type, Side view, Flexible, Free cut, IP68G, Oil resistance	-25 ... +70°C	R1	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
	NF-TR4CF	M4		Thread type, Side view, Flexible, Free cut, IP68G, Oil resistance	-25 ... +70°C	R1	900	3,000	3,500	3,500	3,500	3,500	3,500	1,015	2,925	3,500	3,500	
	NF-TR4F	M4		Thread type, Side view, Flexible, Free cut, IP67, Lens attachable	-40 ... +70°C	R1	350	1,000	1,700	2,100	3,000	3,500	3,500	435	1,275	1,875	2,900	
	NF-TM4-H10	M4		Thread type, Flexible, Free cut, Heat resistant, M2.6, Lens attachable	-40 ... +100°C When used continuously: -40 ... +90°C	R2	450	1,200	2,000	2,500	3,000	3,500	3,500	470	1,365	1,935	3,250	
	NF-TM4-H15	M4		Thread type, Free cut, Heat resistance, IP67, Lens attachable	-40 ... +150°C When used continuously: -40 ... +130°C	R35	500	1,600	2,000	2,500	3,500	3,500	3,500	630	1,630	2,285	3,500	
	NF-TM4-H20*	M4		Thread type, Heat resistance, IP67, M2.6, Lens attachable	-40 ... +200°C	R10	200	550	900	1,100	1,300	1,700	3,000	275	780	1,105	1,780	
	NF-TM4-H35*	M4		Thread type, Heat resistance, IP67, M2.6, Lens attachable	-60 ... +350°C	R25	350	900	1,400	1,900	2,500	3,000	3,500	410	1,205	1,730	2,740	
Diffuse type	NF-DM6-H10	M6		Thread type, Flexible, Heat resistant	-40 ... +100°C When used continuously: -40 ... +90°C	R2	130	350	450	550	650	800	1,500	145	435	570	980	
	NF-DM6-H15	M6		Thread type, Heat resistant, IP67	-40 ... +150°C When used continuously: -40 ... +130°C	R35	300	600	800	1,000	1,200	1,600	2,200	260	660	885	1,410	

● The sensing distances for diffuse reflective Fiber-Optic Cables are reference values measured using a 500 × 500 mm white paper.

\* Due to fiber cable length, the fiber insertion indicators of the D4RF Series Fiber-Optic Sensors cannot be used.



### Oil-resistant structure

The fiber cables of NF-TR8CF and NF-TR4CF are coated with fluoropolymer to prevent cutting oil from seeping inside. The detection area features a structure that prevents the accumulation of cutting oil and chips, as well as an oil-resistant spherical glass lens.

160 different types of Fiber-Optic Cables are available. Find more details on the “Fiber-Optic Sensors” webpage.



## ■ Attachment lens

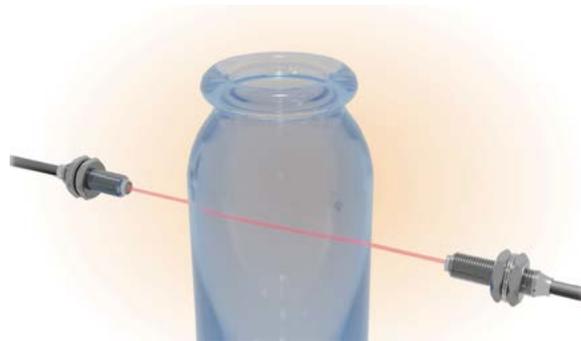
Type	Model	Product image	Applicable Fiber-Optic Cables	D4RF sensing distance (mm)							D12R sensing distance (mm)				Ambient temperature
				16/22 $\mu$ s	70 $\mu$ s	250 $\mu$ s	500 $\mu$ s	1 ms	2 ms	8 ms	50 $\mu$ s	250 $\mu$ s	1 ms	4 ms	
Long range	NF-TA33		NF-TR4F	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	-40 ... +200°C
			NF-TM4-H10	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	
			NF-TM4-H20	1,800	3,500	3,500	3,500	3,500	3,500	3,500	2,600	3,500	3,500	3,500	
			NF-TM4-H35	1,500	3,500	3,500	3,500	3,500	3,500	3,500	2,600	3,500	3,500	3,500	
Ultra-long range	NF-TA34		NF-TR4F	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	-40 ... +350°C
			NF-TM4-H10	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	
			NF-TM4-H15	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	
			NF-TM4-H20	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	
			NF-TM4-H35	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	
Side-view	NF-TA35		NF-TM4-H10	500	1,300	2,000	2,500	3,000	3,500	3,500	585	1,690	2,200	3,500	-40 ... +200°C
			NF-TM4-H20	250	600	900	1,200	1,500	1,800	2,500	285	830	1,230	2,230	
			NF-TM4-H35	250	800	1,200	1,500	1,900	2,300	3,000	320	890	1,220	2,260	
Long range	NF-TA36		NF-TM4-H15	2,500	3,500	3,500	3,500	3,500	3,500	3,500	2,500	3,500	3,500	3,500	-40 ... +200°C

## Applications

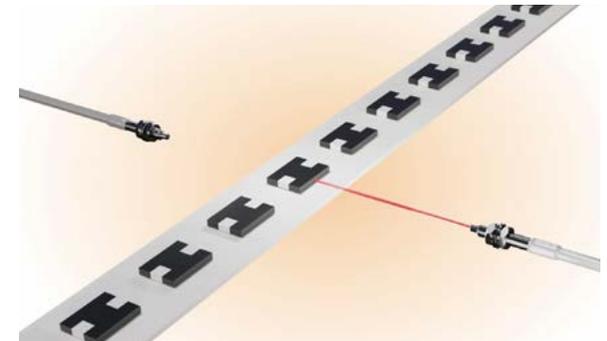
Detection of engine blocks in oil mist environments



Detection of bottles in high temperature environment



Detecting chip parts in high temperature environment



# Easy-to-Read, Easy-to-Use, Fiber-Optic Sensors

## Simple, stand-alone Fiber-Optic Sensors D12R Series

### ■ Response time

50  $\mu$ s/250  $\mu$ s/1 ms/4 ms

### ■ Cross-talk prevention

Up to 4 units

### ■ External input

Teach input, Emitter off, Zero reset, Trigger

NEW



## Fiber-Optic Sensors for various applications D4RF/D4IF Series

### ■ Ultra-fast response time

16  $\mu$ s\*

\* When using stand-alone type or main unit of interconnection type independently.

### ■ Interconnection type

Expandable up to 16 units

### ■ Various communication

IO-Link, Analog output, Digital I/O

### ■ Water detection by D4IF Series



IO-Link

### ■ Sensing distance (Response time: 250 $\mu$ s)



●Specifications are subject to change without prior notice.

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**FA**

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