KEYENCE

neo series

NEO Series
General Catalog

Set to 100 or 0 with just one button!

neo PRESET

Accurate, Stable Operation
meets Simple Setup!

Laser sensor
LV-neo

Fiberoptic sensor
FS-neo

Photoelectric sensor
PS-neo

The technology first introduced by the FS NEO to make easy setup and simple display a reality is now available in the LV and PS Series!

Set to 100 or 0 with just one button!

neo preset

Simple Setup

1 push setting with the PRESET Button

Simple Display

All sensors display “0” or “100”

Simple Operation

Laser, fiberoptic, and photoelectric models all share the same simple functionality

Simple and Precise detection with the “NEO Preset”

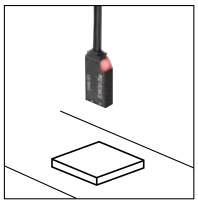
NEW CONCEPT

Complete setting with just one click

When using a thrubeam model, sensitivity adjustments are completed with a single push of the PRESET button. Using a reflective model? Press once with a target present, and once without to calibrate according to the different conditions.

NEW CONCEPT

Simple one click setup for reflective applications



When using diffuse reflective type sensors, variations in the received light intensity can occur due to changing conditions such as mounting position and target configuration, thus resulting in unstable operation when attempting to detect small objects. The NEO Preset function erases these concerns and enables detection to be as simple as a thrubeam.

neo preset

With the “NEO Series”, sensor changes never go undetected!

Conventional

If a sensor error occurs...

It is difficult to know which sensor has the error.

NEO Preset

If a sensor error occurs...

The error is quickly noticed!

By standardizing the received light intensity display of multiple sensors to “100” and “0”, it is easy to tell where an error has occurred because the sensor will not return to the original display value of “100” or “0”.

NEW CONCEPT

Laser, fiberoptic, and photoelectric models all share the same simple operation

Until now, the method of operation to activate new features differed from sensor to sensor. The NEO Series eliminates this problem by integrating the same features, functions, and key layout in all series. This allows you to select the best model for your application without having to learn the operation of a new sensor each time.

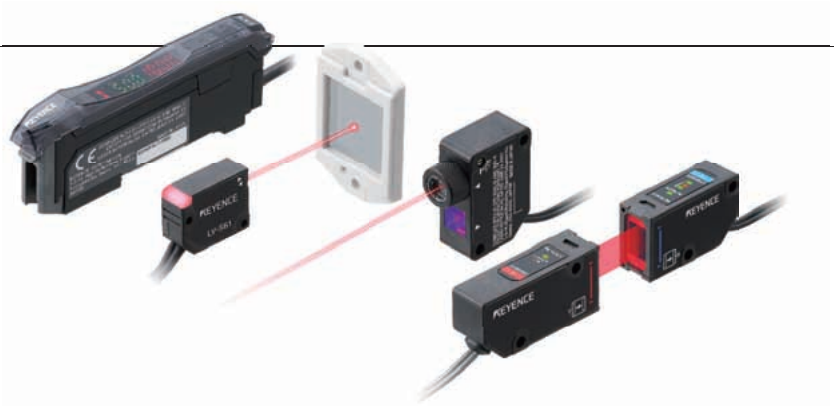
Conventional

neo series

Digital Laser Sensor

LV-neo

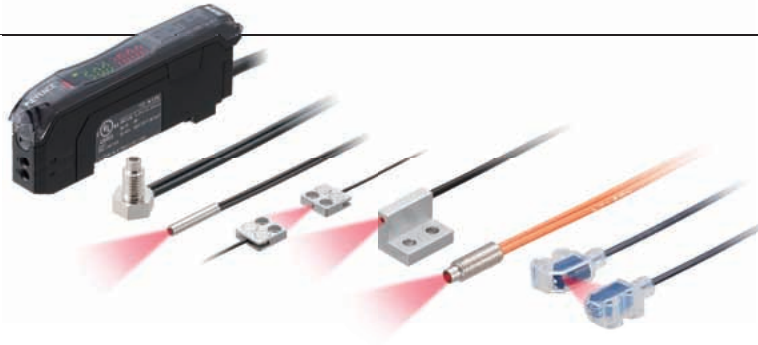
Long distance with a visible beam for the next level of laser detection



Digital Fiberoptic Sensor

FS-neo & FU

More than 100 fiber unit variations to support a wide range of applications



Digital Photoelectric Sensor

PS-neo

High environmental resistance and cable extension capabilities provide increased installation versatility

Network Communication Unit

NU series

Incorporate the NEO Series with an open field network for complete interfacing versatility

CC-Link V2 DeviceNet EtherNet/IP EtherCAT

	Want to see the detection position	Want to prevent detection errors caused by light wraparound	Want to increase the installation distance	Need to use in a harsh environment	Need to detect small targets	Want to adjust the sensor beam spot size	Need to detect fast-moving targets	Need an extended sensor head cable	Limited installation space	
neo PRESET	A Since the spot is a visible red laser, the detection point is easy to see, even at long distances.	A Narrow laser spot remains unchanged over long range.	A Detection spot size remains unchanged as the detection distance is increased.	B	A	A Using the LV-NH32, the beam spot can be adjusted to a focused or wide spot, regardless of the mounting distance.	A 80 µs response time in HIGH SPEED mode.	B Sensor head cable can be extended up to 10 m (3.28').	B Variety of small size sensor heads. In addition, increased detection distance reduces installation limitations.	P.8
LV-neo	C Visible red LED enables the spot to be seen at closer distances		B	A A wide variety of heat resistant and fluorocarbon polymer encased sensor heads provide durable options for harsh environments.	B	C Beam spot adjustment is possible when using the FU-10 or F-5HA. (Mounting distance must remain unchanged.)	A 50 µs response time in HIGH SPEED mode.		A Wide variety of small sensor head shapes and sizes allow for installation in almost any space-limited application.	P.24
FS-neo&FU			C	B Several fluorocarbon polymer encased sensor heads provide durable options for water, oil, and chemical environments.	C PS-49 can detect targets as small as ø1.5 mm (0.06") at a distance of 50 mm (1.97").			B Sensor head cable can be extended up to 10 m (3.28').	C	P.54
PS-neo										
nu series	❙ Want uniform control of multiple sensors ❙ Want to reduce wiring									P.62

A : Excellent
B : Good
C : Acceptable

Digital Laser Sensor

LV-neo

Long distance with a visible beam for the next level of laser detection

* The UL certificate is for LV-NHxx sensor head and LV-Nxx amplifier used in combination.

Using a laser enables long distance detection for difficult applications while maintaining a focused, visible beam spot.

1 Visible red laser beam spot

Precise detection positioning is possible without troublesome installation alignment caused by a weak or invisible beam.

2 Long distance detection with a focused beam

By using a laser light source, the beam spot remains unchanged over long distances, eliminating any concern about the mounting location.

3 Full lineup conforming to Class 1 laser requirements

Class 1 lasers provide completely safe operation and can be used in the same manner as other photoelectric sensors.

LV-neo FUNCTION

NEO Preset

Simply press the PRESET button to change the light intensity display to “100” or “0” to complete the sensitivity settings.

NEO MEGA

MEGA Mode provides Class 2 equivalent light intensity while maintaining Class 1 laser safety.

Built-in application modes

DATUM function

Even if dirt or debris causes the displayed light intensity to decrease, the DATUM function automatically detects the change and restores the display to its original state, thus maintaining stable operation.

Open field network compatibility

Connect an NU Series model for open field network compatibility.

Reduced wiring

No need to wire to a terminal block when using the NU Series.

Interference prevention function

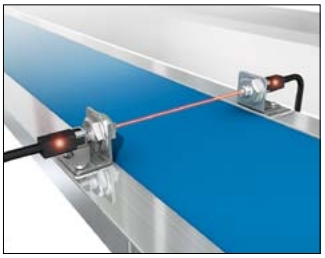
Pause function

Sleep function

Monitor Output Type (LV-N11MN)

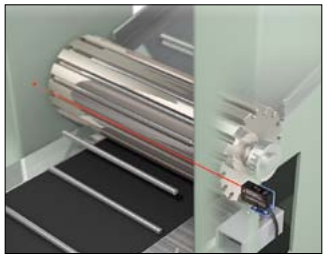
Lasers are Visible, Long Range, and Adjustable

Visible beam ensures simple alignment and installation



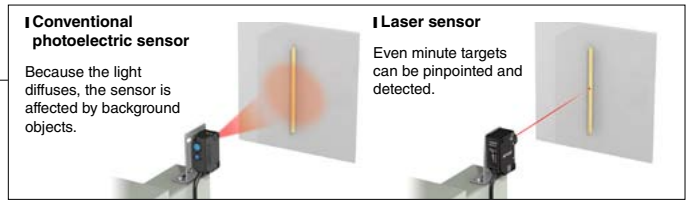
Long range detection is possible, eliminating installation restrictions

Because the beam remains unchanged, lasers can easily detect through small gaps



Stable detection of small targets

Because the beam remains focused, small targets can be pinpointed for detection. Furthermore, because the LV-NEO resists up to 20,000 lux, stable operation is maintained even when exposed to sun and fluorescent lighting.



Built-in application modes enable easy selection of desired functions

Laser sensors are designed for general use, but requirements for target detection often demand more. Therefore, customers often seek additional setting options.
The following modes are built into the NEO Series. Simply select the intended use. There is no need for complicated setting operations.

	Drop detection mode	Targets dropped through the beam are detected by the falling intensity level.
	Percentage tuning mode	The set value is tuned and maintained to -5% of the current value.
	Reflective model background cancellation mode	Sets the background as 0 with no target present when using a reflective model.
	Maximum intensity mode	Sets the sensor to MEGA mode with the extended 5-digit display activated.
	Area detection mode	Set a high and low value for zone detection.
	Zero datum mode	Sets the condition of no target present as 0 to allow simple detection of transparent objects or height changes.

Interference Prevention function supports up to 8 sensors*

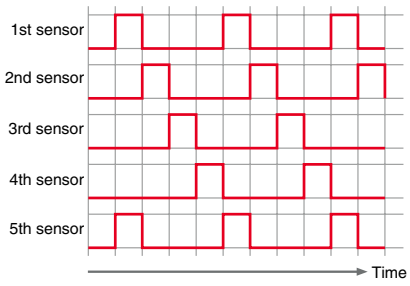
Factory automation equipment is continuously decreasing in size, yet the number of applications that require sensors is steadily rising. When installing multiple sensors in a small area, the problem of interference between nearby sensors can arise. The NEO Series is equipped with a function that prevents interference from up to 4 (or 8*) other sensors.

* When in ULTRA or MEGA mode and set to "double".

Sensor transmission cycle timing

Interference is prevented by automatically shifting the radiation cycle pattern of the laser light.

* Diagram represents LV-N11N / N12N when using FINE mode and set to double.
* Same operation concept as the FS-N and PS-N.



Pause function controls the sensor output

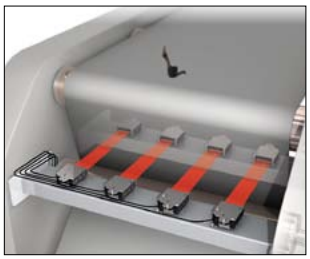
The desired sensor output status can be controlled through an external signal input, regardless of the received light intensity. This will prove useful during a test run because the ON/OFF signal from the sensor can be confirmed on the PLC without requiring the sensor to have a target present/absent.

<Application improvement example using the area laser>

LV-NH300 30 mm (1.18")-wide area type (Thrubeam model)

Less sensors are required to provide the same area detection

8 fiberoptic sensors used



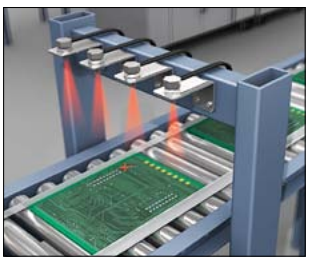
4 LV-NH300 sensors used

Detection of a hole in the target (hole position unspecified)
<Film tear detection>

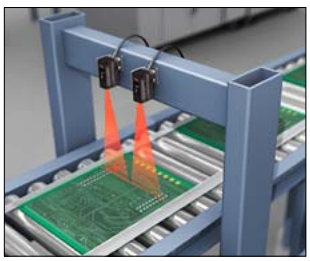
The LV-NH300 is a 30 mm (1.18") wide directional laser sensor. Holes within the 30 mm (1.18") width are reliably detected. Because the detection area is small when using other photoelectric sensors, they may be unable to reliably detect the holes if the position varies. As a result, multiple sensors are required with the conventional method.

LV-NH42 Long distance area type (Reflective model)

Variation in target position is possible



4 fiberoptic sensors used



2 LV-NH42 sensors used

Mark detection with variable target position
<Board BAT mark detection>

With the LV-NH42 area reflective laser sensor, the detection area increases as the detection distance increases. If the target is within the area range, the sensor will detect even if there is position variation. As a result, the number of required sensors can be reduced. In addition, the detection area is easily confirmed due to the visible laser beam.

<Sensor head variations>

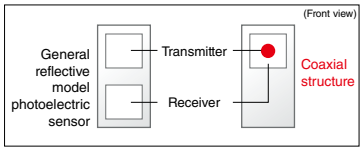
LV-NH32 Adjustable Beam Spot

Spot size can be adjusted as needed

When using the LV-NH32, simply rotate the focus ring to change the spot diameter/width as desired, according to the size of the target. Additionally, the use of a very high-powered sensor head enables detection over long distances of up to 1.2 m (3.94').

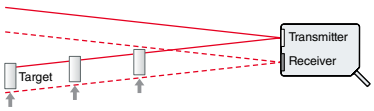
LV-NH35 / NH62 / S61 Coaxial Structure

Coaxial light ensures detection through small spaces

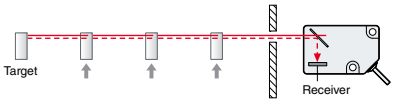


When using general reflective type photoelectric sensors, the position at which the sensor switches ON when the target passes through may vary. Additionally, general sensors cannot always be installed if the installation area is too small. This problem can be solved by using a coaxial structure in which the receiver is positioned in the same axis as the transmitter.

General reflective photoelectric sensor



Coaxial structure



Even in small locations, the target can be detected as long as the beam spot is able to reach the target.
The sensor switches ON at the same position, regardless of the distance to the target.

LV-S71 / S72 Compact, M6 Thrubeam

Compact thrubeam installation is now possible

Featuring an ultra-small M6 size sensor head, installation area is no longer a concern. A variety of installation brackets are also available.

Actual dimensions
LV-S71

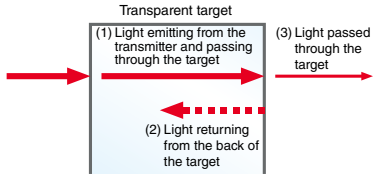
Small ø1.2 mm (0.05") spot diameter at 500 mm (19.69")

LV-S62 / S63 Multi-Wavelength Laser

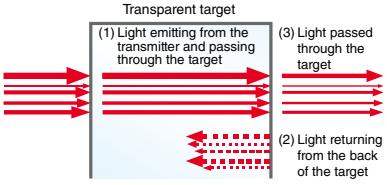
Stable transparent target detection using a multi-wavelength laser

A multi-wavelength laser has been adopted to ensure stable, accurate detection of transparent targets.

Single wavelength



Multiple wavelengths



At a single wavelength, the light is reduced by surfaces (1) and (2), causing the light at (3) to be unstable. By emitting light at different wavelengths, the effects of surface (2) on the light are kept to a minimum, enabling the light intensity at (3) to remain stable.

LV-neo LINEUP Laser head variation to solve difficult conditions

Reflective ▲ P.13

Spot type

LV-S41

Small size

Enables long distance, small spot detection with an ultra-small footprint.

LV-S41L

Small size, Side view

Space-saving, side view sensor head provides a long distance small spot.

LV-NH32

Adjustable beam spot

Up to 1.2 m 3.9' detecting distance. Freely adjust the size and shape of the beam spot for precision and versatility.

LV-NH35

Coaxial structure

Provides effective detection through a small hole or narrow gap.

LV-NH37

Ultra-small beam spot ø50 µm ø1.97 Mil

Enables extremely minute target detection with background cancellation.

LV-S31

Small size, Adjustable range

Dual photodiode allows adjustable distance-based detection while reducing background influence.

Area type

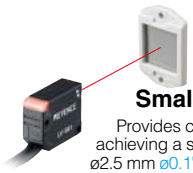
LV-NH42

Long distance

Reliably detects targets with holes or position variation.

Retro-reflective ▲ P.14

Spot type



LV-S61

Small beam spot

Provides compact size while achieving a small beam spot of ø2.5 mm ø0.1" for up to 500 mm 19.69" distance.

LV-NH62

Standard

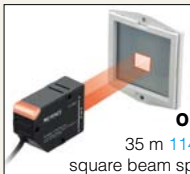
Achieves a small beam spot of ø1.5 mm ø0.06" over a 1 m 3.3' range with the capability to detect up to 8 m 26.2'.

Area type

LV-S62

Area beam

Excellent transparent target detection with the ability to switch between a small spot or area beam.



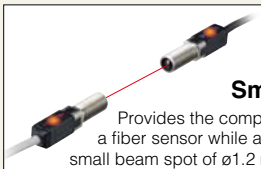
LV-S63

Long-distance transparent object detection

35 m 114.8' detection with a square beam spot to provide stable detection of transparent objects.

Thrubeam ▲ P.15

Spot type



LV-S71

Small: M6

Provides the compact size of a fiber sensor while achieving a small beam spot of ø1.2 mm ø0.05" at a distance of 500 mm 19.69".

LV-S72

Small: M6 (with slit)

Built-in ø6 mm ø0.24" slit filter allows for high accuracy detection.

Area type

LV-NH100

10 mm 0.39" beam width

Effective for height differentiation and applications with position variation.

LV-NH300

30 mm 1.18" beam width

Effective for height differentiation and applications with position variation.

LV-NH110

High power 10 mm 0.39" beam width

High power enables accurate detection of low light transmission targets.

Amplifier part ▲ P.17

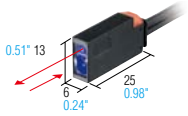
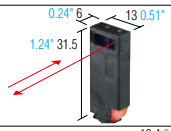
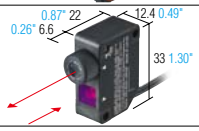
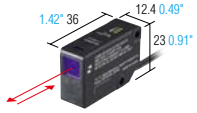
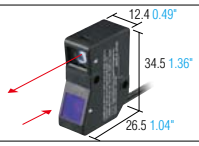
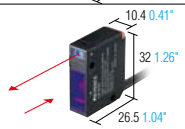
Cable Type

M8 connector Type

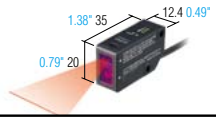
Zero line Type

Monitor output Type

Reflective model Spot type

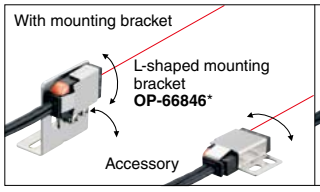
Type	Appearance (mm inch)	Detecting distance (mm inch)	Spot diameter (mm inch)	Model	Dimensions
Small size		MEGA : 600 23.62" ULTRA : 500 19.69" SUPER : 400 15.75" TURBO : 300 11.81" FINE : 200 7.87" HSP : 150 5.91"	Approx. ø1.2 ø0.05" (Up to 500 mm 19.69" distance)	LV-S41	[P.18]
Small size, Side view		MEGA : 480 18.9" ULTRA : 400 15.75" SUPER : 320 12.6" TURBO : 240 9.45" FINE : 160 6.30" HSP : 120 4.72"	Approx. ø1.2 ø0.05" (Up to 400 mm 15.75" distance)	LV-S41L	[P.18]
Adjustable beam spot		MEGA : 1200 47.24" ULTRA : 1000 39.37" SUPER : 750 29.53" TURBO : 500 19.69" FINE : 250 9.84" HSP : 200 7.87"	Approx. ø0.8 ø0.03" max. (Up to 300 mm 11.81" distance)	LV-NH32	[P.20]
Coaxial structure		MEGA : 750 29.53" ULTRA : 600 23.62" SUPER : 450 17.72" TURBO : 300 11.81" FINE : 150 5.91" HSP : 100 3.94"	Approx. ø2 ø0.08" (Up to 600 mm 23.62" distance)	LV-NH35	[P.21]
Ultra-small beam spot		70±15 2.76"±0.59" (Common for all power modes)	Approx. ø50 µm ø1.97 Mil (At 70 mm 2.76" distance)	LV-NH37	[P.21]
Small size, Adjustable range		Adjustment range: 50 to 200 1.97" to 7.87" (Range in which the reference distance can be adjusted)	Approx. ø2 ø0.08" (Up to 200 mm 7.87" distance)	LV-S31	[P.18]

Reflective model Area type

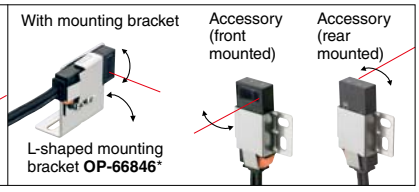
Type	Appearance (mm inch)	Detecting distance (mm inch)	Area width (mm inch)	Model	Dimensions
Long distance		MEGA : 1200 47.24" ULTRA : 1000 39.37" SUPER : 750 29.53" TURBO : 500 19.69" FINE : 250 9.84" HSP : 200 7.87"	Approx. 48×0.4 1.89" × 0.02" (At 200 mm 7.87" distance)	LV-NH42	[P.21]

Accessories/Options

LV-S41

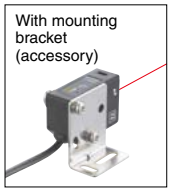


LV-S41L

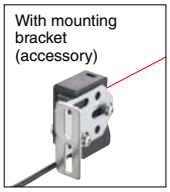


LV-NH32

LV-NH35

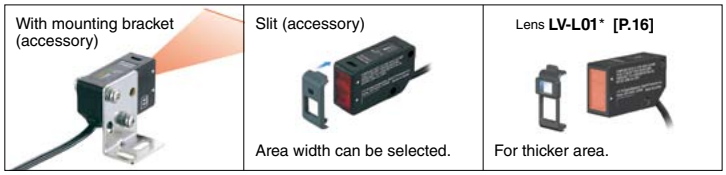


LV-NH37



LV-S31

LV-NH42

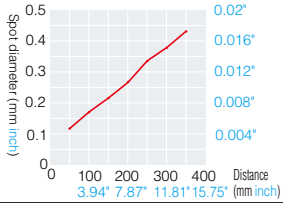


* sold separately

Reflective model characteristics

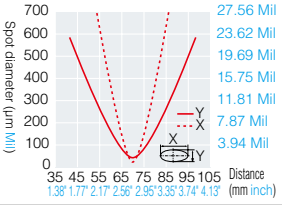
LV-NH32

Characteristics of detecting distance and minimum spot diameter (typical example)



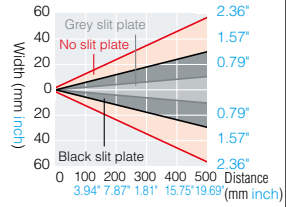
LV-NH37

Characteristics of setting distance and spot diameter (typical example)

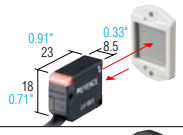
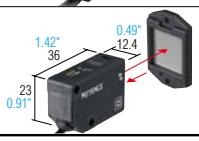


LV-NH42

Characteristics of detecting distance and area width (typical example)

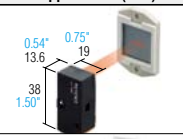
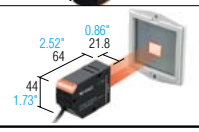


Retro-reflective Type — Spot type

Type	Appearance (mm inch)	Detecting distance (m feet)	Spot diameter (mm inch)	Model	Dimensions
Small beam spot		MEGA : 2.5 8.2' ULTRA : 2 6.6' SUPER : 1.5 4.9' TURBO : 1 3.3' FINE : 0.75 2.5' HSP : 0.5 1.6'	Approx. ø2.5 ø0.10" (Up to 0.5 m 1.6' distance)	LV-S61	[P.18]
Standard		MEGA : 8 26.2' ULTRA : 7 23' SUPER : 6 19.7' TURBO : 5 16.4' FINE : 3.5 11.5' HSP : 2 6.6'	Approx. ø1.5 ø0.06" (Up to 1 m 3.3' distance)	LV-NH62	[P.21]

All models support the P.R.O. function. The polarizing filter reduces direct reflected light from a mirrored-surface workpiece.

Retro-reflective Type — Area type

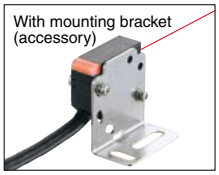
Type	Appearance (mm)	Detecting distance (m feet)	Area width (mm inch)	Model	Dimensions
Wide area		MEGA : 12(6) 39.4'(19.7')*1 ULTRA : 10(5) 32.8'(16.4') SUPER : 8(3.5) 26.2'(11.5') TURBO : 5(2) 16.4'(6.6') FINE : 2.5(0.7) 8.2'(2.3')	Area spot: Approx. 10×2 mm 0.39"×0.08" Small beam spot: Approx. 2×2 mm 0.08"×0.08" (Up to 500 mm 19.69" distance)	LV-S62	[P.18]
Long-distance transparent object detection		MEGA : 35 114.8'*2 ULTRA : 30 98.4' SUPER : 25 82' TURBO : 15 49.2' FINE : 8 26.2'	Approx. 8×12 mm 0.31"×0.47" (Up to 3.5 m 11.5' distance)	LV-S63	[P.19]

All models support the P.R.O. function.The polarizing filter reduces direct reflected light from a mirrored-surface workpiece. *1 Numbers not enclosed in parentheses are the detecting distance for area spot. Numbers enclosed in parentheses are the detecting distance for small beam spot. To be used for glass detection, we recommend that the detecting distance is set to 1 m or less.
*2 To be used for glass detection, we recommend that the detecting distance is set to 3.5 m or less.

Mounting bracket (accessories/options)

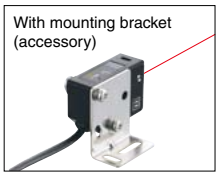
LV-S61

With mounting bracket (accessory)



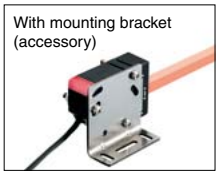
LV-NH62

With mounting bracket (accessory)



LV-S63

With mounting bracket (accessory)



* sold separately

LV-S62 Using the optional mounting brackets allows you to adjust the optical axis right, left, up, or down.

When installing the L-shaped mounting bracket
OP-84350*

Inverse direction mounting

When installing the rear mounting bracket
OP-84349*

Inverse direction mounting

When installing the side mounting bracket
OP-84351*

Inverse direction mounting

Be sure to use the dedicated mounting brackets because optical axis adjustment is required.

Reflectors

OP-51430 (R-6 Gray)
(Included with LV-S61)

[Dimensions P.18]

R-6
(Included with LV-NH62)

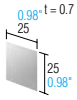
[Dimensions P.21]

R-7
(Included with LV-NH62)

[Dimensions P.21]

Reflective tape (sold separately)

OP-42197*1

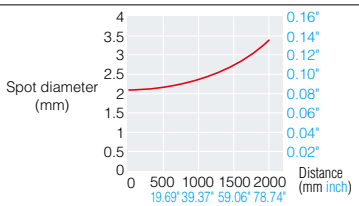


(The detecting distance remains unchanged even if the reflective tape is used.)
*1 Less light intensity variation type (model OP-87123) is also available.

Characteristics

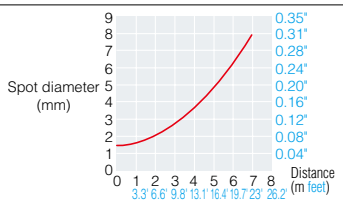
LV-S61

Characteristics of detecting distance and spot diameter (typical example)

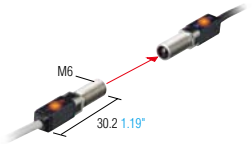
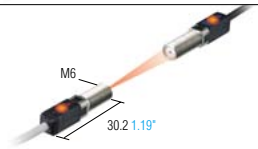


LV-NH62

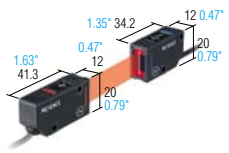
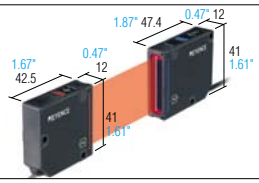
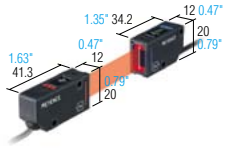
Characteristics of detecting distance and spot diameter (typical example)



Thrubeam type Spot type

Type	Appearance (mm inch)	Detecting distance (mm inch)	Spot diameter (mm inch)	Model	Dimensions
Small beam spot		500 19.69" (Common for all power modes.)	Approx. ø1.2 ø0.05" (Detecting distance: 500 mm 19.69")	LV-S71	[P.20]
Position detection		500 19.69" (Common for all power modes.)	Approx. ø6 ø0.24" (Detecting distance: 500 mm 19.69")	LV-S72	[P.20]

Thrubeam type Area type

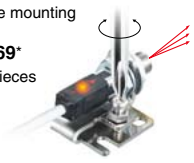
Type	Detecting width (mm)	Appearance (mm inch)	Detecting distance (mm inch)	Area width (mm inch)	Model	Dimensions
Standard	10		2000 78.74" (Common for all power modes.)	Approx. 12 0.47"	LV-NH100	[P.22]
	30			Approx. 32 1.26"	LV-NH300	[P.22]
High power	10			Approx. 12 0.47"	LV-NH110	[P.22]

Mounting bracket (accessories/options)

LV-S71 / S72

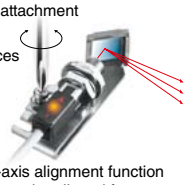
Standard mounting bracket (accessory)

Small type mounting bracket
OP-66869*
Set of 2 pieces



With optical-axis alignment function
Optical-axis can be aligned from the upper direction.

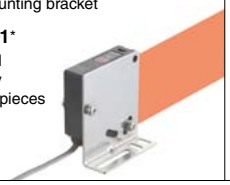
Side viewer attachment
LV-F1*
Set of 2 pieces



With optical-axis alignment function
Optical-axis can be aligned from the upper direction.

LV-NH300

With mounting bracket
LV-B301*
Mounted vertically
Set of 2 pieces



With mounting bracket
LV-B302*
Mounted horizontally
Set of 2 pieces

LV-NH100 / NH110

With mounting bracket
LV-B101*
Mounted vertically
Set of 2 pieces

With mounting bracket
LV-B102*
Mounted horizontally
Set of 2 pieces

* sold separately

Sensor head specifications

LV-Sxx (Spot Reflective)

Type		Small	Small side view	Adjustable distance definite reflective
Model		LV-S41	LV-S41L	LV-S31
FDA (CDRH) Part 1040.10		Class 1 Laser Product		
IEC 60825-1		Class 1 Laser Product		
Light source		Visible red semiconductor laser, Wavelength: 655 nm		
Detecting distance	MEGA	600 mm 23.62"	480 mm 18.9"	50 to 200 mm (1.97" to 7.87") (Adjustment range)
	ULTRA	500 mm 19.69"	400 mm 15.75"	
	SUPER	400 mm 15.75"	320 mm 12.6"	
	TURBO	300 mm 11.81"	240 mm 9.45"	
	FINE	200 mm 7.87"	160 mm 6.3"	
	HSP	150 mm 5.91"	120 mm 4.72"	
Ambient temperature		-10 to +50°C (14 to122°F) (No freezing)		0 to +50°C (32 to 122°F) (No freezing)
Material	Case	Glass reinforced plastic		
	Display	Polycarbonate		
	Lens cover	Norbornene plastic	Acrylic	Norbornene plastic*
Weight		Approx. 70 g		Approx. 75 g
Dimensions		[P.18]	[P.18]	[P.18]

* Transmitter lens: Norbornene plastic/Receiver lens cover: Polyarylate

LV-NHxx (Spot Reflective)

Type		Straight-beam coaxial	Adjustable beam spot	Ultra-small beam spot
Model		LV-NH35	LV-NH32	LV-NH37
FDA (CDRH) Part 1040.10		Class 1 Laser Product		
IEC 60825-1		Class 1 Laser Product		
Light source		Visible red semiconductor laser, Wavelength: 660 nm		
Detecting distance	MEGA	750 mm 29.53"	1200 mm 47.24"	70±15 mm 2.76"±0.59"
	ULTRA	600 mm 23.62"	1000 mm 39.37"	
	SUPER	450 mm 17.72"	750 mm 29.53"	
	TURBO	300 mm 11.81"	500 mm 19.69"	
	FINE	150 mm 5.91"	250 mm 9.84"	
	HSP	100 mm 3.94"	200 mm 7.87"	
Ambient temperature		-10 to +55°C (14 to 131°F) (No freezing)		
Relative humidity		35 to 85% RH (No condensation)		
Material	Case	Glass reinforced plastic		
	Lens cover	Norbornene plastic	Acrylic*1	Glass*1
Weight		Approx. 65 g		
Dimensions		[P.21]	[P.20]	[P.21]

*1 The LV-NH32 and the LV-NH37 receivers are polyarylate.

LV-NHxx (Area Beam Reflective)

Type		Long-distance area
Model		LV-NH42
FDA (CDRH) Part 1040.10		Class 1 Laser Product
IEC 60825-1		Class 1 Laser Product
Light source		Visible red semiconductor laser, Wavelength: 660 nm
Detecting distance	MEGA	1200 mm 47.24"
	ULTRA	1000 mm 39.37"
	SUPER	750 mm 29.53"
	TURBO	500 mm 19.69"
	FINE	250 mm 9.84"
	HSP	200 mm 7.87"
Ambient temperature		-10 to +55 °C (14 to 131°F) (No freezing)
Relative humidity		35 to 85% RH (No condensation)
Material	Case	Glass reinforced plastic
	Lens cover	Polyarylate
Weight		Approx. 65 g
Dimensions		[P.21]

LV-Sxx (Retro-reflective)

Type		Small spot	Parallel light area	Long-distance transparent object
Model		LV-S61	LV-S62	LV-S63
FDA (CDRH) Part 1040.10		Class 1 Laser Product		
IEC 60825-1		Class 1 Laser Product		
Light source		Visible red semiconductor laser*1		
Detecting distance*	MEGA	2.5 m 8.2'	12 m (6 m) 39.4' (19.7')	35 m 114.8'
	ULTRA	2 m 6.6'	10 m (5 m) 32.8' (16.4')	30 m 98.4'
	SUPER	1.5 m 4.9'	8 m (3.5 m) 26.2' (11.5')	25 m 82'
	TURBO	1 m 3.3'	5 m (2 m) 16.4' (6.6')	15 m 49.2'
	FINE	0.75 m 2.5'	2.5 m (0.7 m) 8.2' (2.3')	8 m 26.2'
	HSP	0.5 m 1.6'	–	–
Ambient temperature		-10 to +50°C (14 to 122°F) (No freezing)		
Material	Case	Glass reinforced plastic		
	Lens cover	Acrylic		
	Reflective mirror	Polycarbonate, acrylic		
Weight		Approx. 70 g	Approx. 65 g	Approx. 110 g
Dimensions		[P.18]	[P.18]	[P.19]

* Numbers enclosed in parentheses are the detecting distance for small beam spot.
*1 Wavelength: LV-S61: 655 nm LV-S62/S63: 660 nm

LV-NHxx (Spot Retro-Reflective)

Type		Small spot
Model		LV-NH62
FDA (CDRH) Part 1040.10		Class 1 Laser Product
IEC 60825-1		Class 1 Laser Product
Light source		Visible red semiconductor laser, Wavelength: 660 nm
Detecting distance	MEGA	8 m 26.2'
	ULTRA	7 m 23'
	SUPER	6 m 19.7'
	TURBO	5 m 16.4'
	FINE	3.5 m 11.5'
	HSP	2 m 6.6'
Ambient temperature		-10 to +55°C (14 to 131°F) (No freezing)
Material	Case	Glass reinforced plastic
	Lens cover	Norbornene plastic
	Reflective mirror	Polycarbonate, acrylic
Weight		Approx. 65 g
Dimensions		[P.21]

LV-Sxx (Spot Thrubeam)

Type		Small standard	Small (with slit)
Model		LV-S71	LV-S72
FDA (CDRH) Part 1040.10		Class 1 Laser Product	
IEC 60825-1		Class 1 Laser Product	
Light source		Visible red semiconductor laser, Wavelength: 655 nm	
Detecting distance	MEGA ULTRA SUPER TURBO FINE HSP	500 mm 19.69"	
Ambient temperature		-10 to +50°C (14 to 122°F) (No freezing)	
Material	Case	Metal part: Stainless steel, Plastic part: Polyarylate	
	Lens cover	Transmitter: Norbornene plastic Receiver: Polyarylate	Transmitter: Norbornene plastic Receiver: Glass
Weight		Approx. 70 g	
Dimensions		[→P.20]	[→P.20]

LV-F1

Type		Side-view attachment for thrubeam	
Model		LV-F1	
Applicable head		LV-S71	LV-S72
Detecting distance	MEGA ULTRA SUPER TURBO FINE HSP	250 mm 9.84"	400 mm 15.75"
Ambient temperature		-10 to +50°C (14 to 122°F) (No freezing)	
Material		Metal part: SUS304 Mirror part: Glass	
Vibration resistance		10 to 55 Hz, double amplitude: 1.5 mm 0.06" 2 hours in each of X, Y and Z axis directions	
Weight		Approx. 22 g	
Dimensions		[P.20]	

LV-NHxx (Area Thrubeam)

Type		Area thrubeam		
		High power	High performance	
Model		LV-NH110	LV-NH100	LV-NH300
Detecting area		10 mm 0.39"		30 mm 1.18"
FDA (CDRH) Part 1040.10		Class 1 Laser Product		
IEC 60825-1		Class 1 Laser Product		
Light source		Visible red semiconductor laser, Wavelength: 660 nm		
Detecting distance		2000 mm 78.74"		
Ambient temperature		-10 to +55°C (14 to 131°F) (No freezing)		
Relative humidity		35 to 85% RH (No condensation)		
Material	Case	Glass reinforced plastic		
	Lens cover	Transmitter: Glass, Receiver: Polyarylate		
Weight		Approx. 75 g		Approx. 95 g
Dimensions		[P.22]	[P.22]	[P.22]

LV-L01 Specifications (lens attachment for LV-NH42) (Unit: mm inch)

Name		LV-L01	slit 1 is mounted	slit 2 is mounted	slit 3 is mounted	slit 4 is mounted
Detecting distance	MEGA	960 37.8"	840 33.07"	720 28.35"	600 23.62"	480 18.9"
	ULTRA	800 31.5"	700 27.56"	600 23.62"	500 19.69"	400 15.75"
	SUPER	600 23.62"	525 20.67"	450 17.72"	375 14.76"	300 11.81"
	TURBO	400 15.75"	350 13.78"	300 11.81"	250 9.84"	200 7.87"
	FINE	200 7.87"	175 6.89"	150 5.91"	125 4.92"	100 3.94"
	HSP	160 6.3"	140 5.51"	120 4.72"	100 3.94"	80 3.15"
Area thickness	50 mm 1.97"	2.6 0.1"				
	100 mm 3.94"	4.0 0.16"				
	150 mm 5.91"	5.5 0.22"				
Area width	50 mm 1.97"	15.0 0.59"	11.5 0.45"	9.5 0.37"	7.5 0.3"	5.5 0.22"
	100 mm 3.94"	26.0 1.02"	20.0 0.79"	17.0 0.67"	13.0 0.51"	10.0 0.39"
	150 mm 5.91"	37.0 1.46"	29.0 1.14"	24.0 0.94"	19.0 0.75"	14.0 0.55"
Case material		Polyacetal (main body) Arton (lens)				
Weight		Approx. 1 g				
Dimensions		[P.21]				

Example of "width × thickness" of area in LV-L01 detecting distance (Unit: mm inch)

Distance	LV-NH42	LV-NH42 + black slit	LV-NH42 + gray slit	LV-L01	L01 + slit 1	L01 + slit 2	L01 + slit 3	L01 + slit 4
100 3.94"	26×0.6 1.02"×0.02"	13×0.6 0.51"×0.02"	5×0.6 0.2"×0.02"	27×4 1.06"×0.16"	20×4 0.79"×0.16"	17×4 0.67"×0.16"	13×4 0.51"×0.16"	10×4 0.39"×0.16"
200 7.87"	48×0.4 1.89"×0.02"	25×0.4 0.98"×0.02"	9×0.4 0.35"×0.02"	49×7 1.93"×0.28"	38×7 1.5"×0.28"	32×7 1.26"×0.28"	25×7 0.98"×0.28"	19×7 0.74"×0.28"
300 11.81"	70×0.8 2.76"×0.03"	36×0.8 1.42"×0.03"	13×0.8 0.51"×0.03"	72×10 2.83"×0.39"	56×10 2.2"×0.39"	47×10 1.85"×0.39"	36×10 1.42"×0.39"	27×10 1.06"×0.39"
400 15.75"	92×1.34 3.62"×0.05"	48×1.34 1.89"×0.05"	17×1.34 0.67"×0.05"	94×13 3.7"×0.51"	73×13 2.87"×0.51"	61×13 2.4"×0.51"	48×13 1.89"×0.51"	36×13 1.42"×0.51"

Amplifier

Cable type

Type		Appearance	Model		Control outputs	External input	Monitor output	Dimensions
			NPN output	PNP output				
Standard	Main unit		LV-N11N	LV-N11P	2	1	0	[P.23]
	Expansion unit		LV-N12N	LV-N12P				
Monitor output	Main unit		LV-N11MN	–	1	1	1	

M8 connector type

Type		Appearance	Model		Control outputs	External input	Monitor output	Dimensions
			NPN output	PNP output				
Standard	Main unit		LV-N11CN	LV-N11CP	1	1	0	[P.23]
	Expansion unit		LV-N12CN	LV-N12CP				

Zero line type

Type		Appearance	Model	Control outputs	External input	Monitor output	Dimensions
Standard	Expansion unit		LV-N10	None*1	0	0	[P.23]

*1 Counted as one output when added to an NU Series communication unit.

Specifications

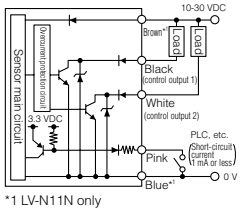
Type		2 output		1 output		Zero line	Monitor output
Cable/connector		Cable		M8 connector		–	Cable
Main/Expansion unit		Main unit	Expansion unit	Main unit	Expansion unit	Expansion unit	Main unit
Model	NPN	LV-N11N	LV-N12N	LV-N11CN	LV-N12CN	LV-N10	LV-N11MN
	PNP	LV-N11P	LV-N12P	LV-N11CP	LV-N12CP		–
I/O	Control outputs	2 output		1 output		None	1 output
	External input	1 input		1 input		None	1 input
	Monitor output	None					1 output
Response time		80 µs (HIGH SPEED)/250 µs (FINE)/500 µs (TURBO)/1 ms (SUPER)/4 ms (ULTRA)/16 ms (MEGA) * 80 µs cannot be selected when the LV-S31/S62/S63 is connected					
Output selection		LIGHT-ON/DARK-ON (switch-selectable)					
Timer function		Timer OFF/OFF-delay timer/ON-delay timer/One-shot timer, Timer duration selectable: 1 ms to 9,999 ms, Maximum error against the setting value: ±10% max.					
Control outputs	NPN output	NPN open collector 30 V, Residual voltage 1 V or less (Output current: 10 mA or less) / 2 V or less (Output current: 10 to 100 mA)(Stand-alone) 1 output max: 100 mA or less, 2 output total: 100 mA or less (Multiple connections) 1 output max: 20 mA or less					
	PNP output	PNP open collector 30 V, Residual voltage 1.2 V or less (Output current: 10 mA or less) / 2.2 V or less (Output current: 10 to 100 mA)(Stand-alone) 1 output max: 100 mA or less, 2 output total: 100 mA or less (Multiple connections) 1 output max: 20 mA or less					
Monitor output (LV-N11MN only)		1 to 5 V voltage output; load resistance 10 kΩ or more; repeat precision ±0.5% of F.S.; response time: 1 ms (HIGH SPEED, FINE, TURBO), 1.2 ms (SUPER), 1.8 ms (ULTRA), 4.2 ms (MEGA)					
External input		Input time 2 ms (ON)/20 ms (OFF) or more*1					
Multiple connections to expansion units		Up to 17 units can be connected in total (two-output type is treated as two units)					
Protection circuit		Reverse polarity protection, Over-current protection, Surge absorber					
Number of interference prevention units*4		Connected to other than LV-S31: 0 for HIGH SPEED; 2 for FINE/TURBO/SUPER; 4 for ULTRA/MEGA, Connected to LV-S31: 2 for FINE; 4 for TURBO/SUPER/ULTRA/MEGA					
Rating	Power voltage*5	24 VDC (operating voltage 10-30 VDC (with ripple)), ripple (P-P) 10% or less, Class 2 or LPS*7					
	Power consumption*6 NPN	Normal: 830 mW or less (at 30 V. 30 mA at 24 V, 56 mA or less at 12 V)*2 Eco on mode: 710 mW or less (at 30 V. 26 mA at 24 V, 48 mA or less at 12 V)*2 Eco Full mode: 550 mW or less (at 30 V. 21 mA at 24 V, 40 mA or less at 12 V)					
	Power consumption*6 PNP	Normal: 950 mW or less (at 30 V. 33 mA at 24 V, 60 mA or less at 12 V)*2 Eco on mode: 815 mW or less (at 30 V. 29 mA at 24 V, 52 mA or less at 12 V)*2 Eco Full mode: 650 mW or less (at 30 V. 24 mA at 24 V, 40 mA or less at 12 V)				–	
Environmental resistance	Ambient temperature	-20 to +55°C (-4 to +131°F) (No freezing)*3					
	Relative humidity	35 to 85% RH (No condensation)					
	Vibration resistance	10 to 55 Hz, double amplitude: 1.5 mm 0.06", 2 hours each in the X, Y and Z axis					
	Shock resistance	500 m/s² 3 times for each of X,Y and Z axis					
Material	Case	Main unit and cover material: Polycarbonate					
	Cable	PVC					
Case size		H 32.6 mm 1.28" × W 9.8 mm 0.39" × L 78.7 mm 3.1"					
Weight		Approx. 75 g	Approx. 65 g	Approx. 20 g	Approx. 20 g	Approx. 20 g	Approx. 75 g

*1 Input time is 25 ms (ON)/25 ms (OFF) when external calibration time is selected. *2 Increases 30 mW (1 mA) for HIGH SPEED mode.
*3 If more than one unit is used together, the ambient temperature varies with the conditions below. Mount the units on the DIN rail with mounting brackets and check that the output current is 20 mA or less for a unit.
One or two more units connected: -20°C to +55°C (-4°F to + 131°F); 3 to 10 more units connected: -20°C to +50°C (-4°F to + 122°F); 11 to 16 more units connected: -20°C to +45°C (-4°F to + 113°F). When using 2-outputs, one unit is counted as two units.
*4 These numbers double when "DOUBLE" is selected.
*5 To connect more than 9 units, the power voltage must be 20 V or more.
*6 It increases by 15% when connected to the LV-NH100/NH110/NH300. It does not include the power consumption of the load.
Power consumption when expansion units are connected is the total power consumption of each amplifier unit. Example: When one main unit (LV-N11N) is connected to 2 expansion units (LV-N12N) and they are used with LV-NH100 heads in HIGH SPEED mode.
(1.15 × 860 mW × 1) + (1.15 × 860 mW x 2) = 2967 mW max.
*7 Use with the over current protection device which is rated 30 V or more and not more than 1 A.

I/O Circuit Diagram

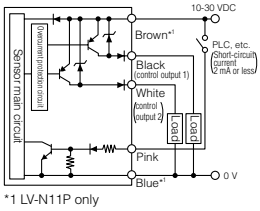
Cable type

LV-N11N / N12N



*1 LV-N11N only

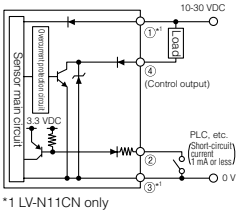
LV-N11P / N12P



*1 LV-N11P only

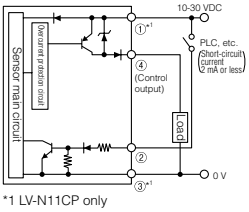
M8 connector type

LV-N11CN / N12CN



*1 LV-N11CN only

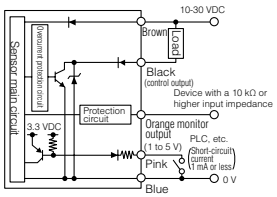
LV-N11CP / N12CP



*1 LV-N11CP only

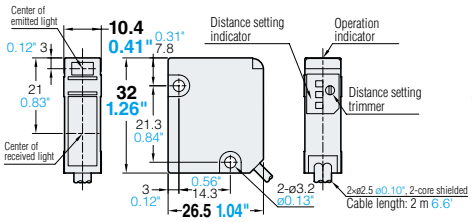
Monitor output type

LV-N11MN

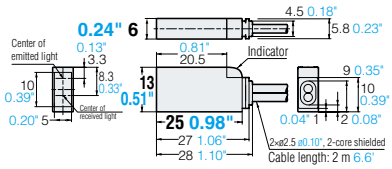


LV-S Series

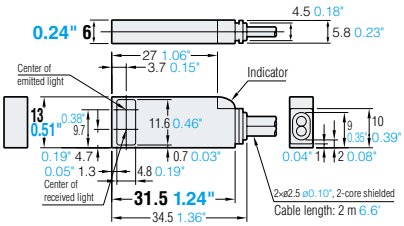
LV-S31



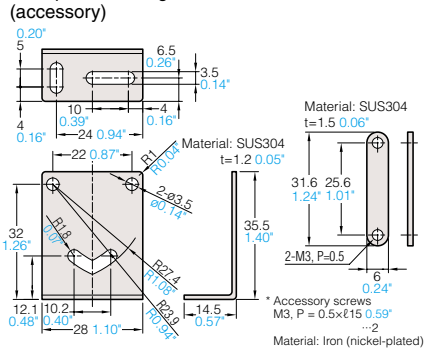
LV-S41



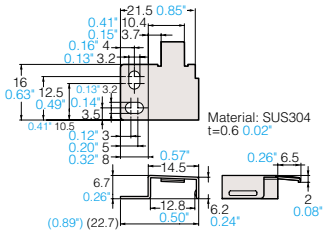
LV-S41L



L-shaped mounting bracket for the LV-S31 (accessory)

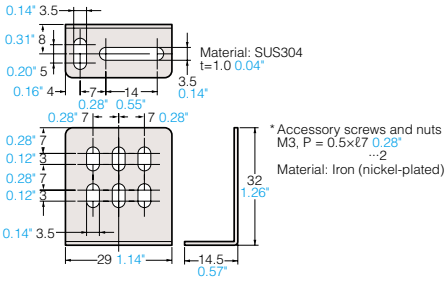


Mounting bracket for the LV-S41 / S41L (accessory)

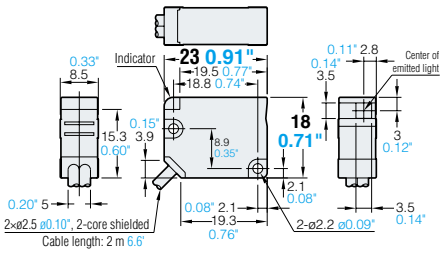


OP-66846

L-shaped mounting bracket for the LV-S41 / S41L (sold separately)

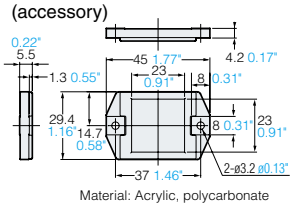


LV-S61



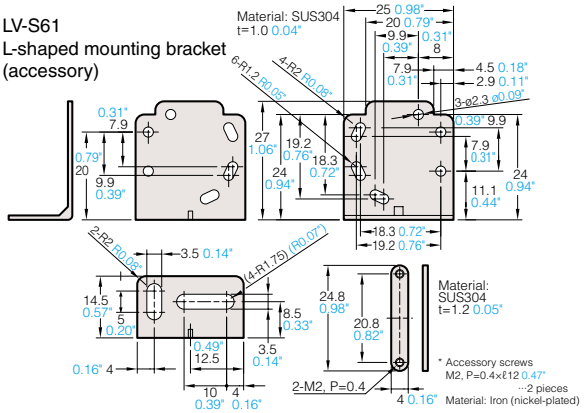
OP-51430

Reflector R-6 (Gray) (accessory)

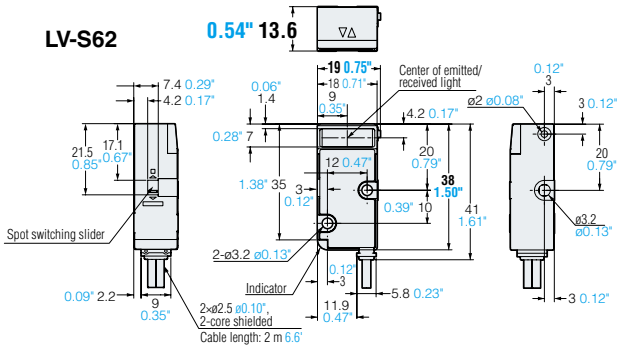


Material: Acrylic, polycarbonate

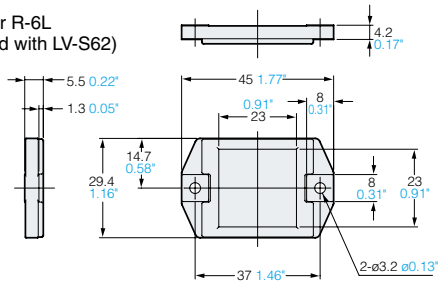
LV-S61 L-shaped mounting bracket (accessory)



LV-S62

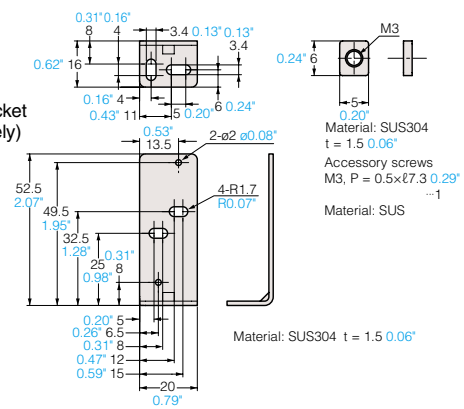


Reflector R-6L (Included with LV-S62)

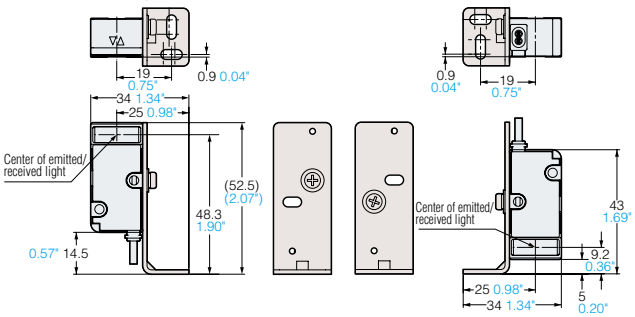


OP-84350

LV-S62 L-shaped mounting bracket (sold separately)

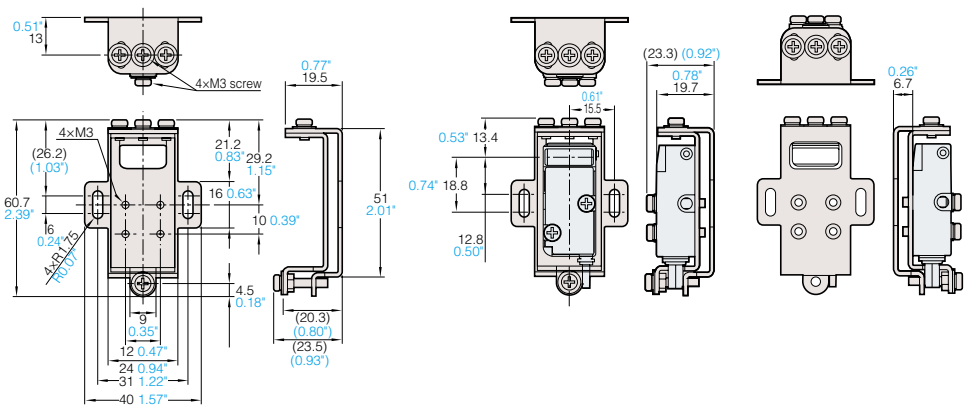


When mounting bracket is attached



OP-84349 L-shaped mounting bracket for the LV-S62 (sold separately)

When mounting bracket is attached



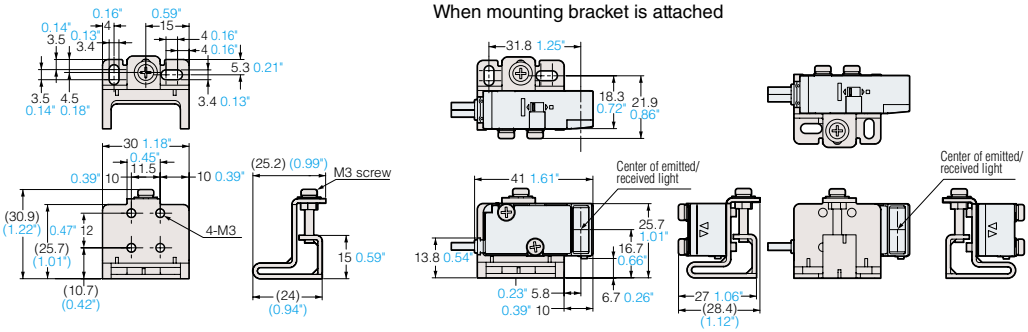
Material: SUS304
t = 1.5 0.06"

Accessory screws
M3, P = 0.5×ℓ5 0.20"···3
Material: SUS
M3, P = 0.5×ℓ16.5 0.65"···1
Material: SUS
M3, P = 0.5×ℓ18 0.71"···2
Material: SUS

Accessory nuts
M3···1
Material: SUS

OP-84351 Side mounting bracket for the LV-S62 (sold separately)

When mounting bracket is attached

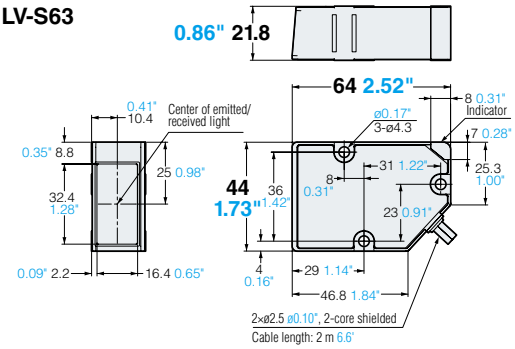


Material: SUS304
t = 1.5 0.06"

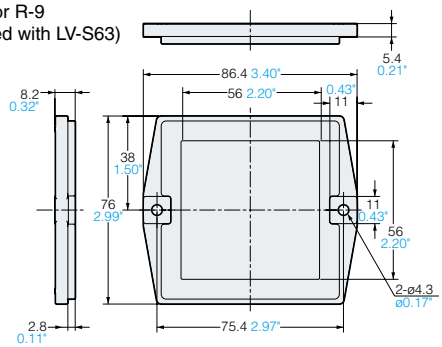
Accessory screws
M3, P = 0.5×ℓ16.5 0.65"···1
Material: SUS
M3, P = 0.5×ℓ18 0.71"···2
Material: SUS

Accessory nuts
M3···1
Material: SUS

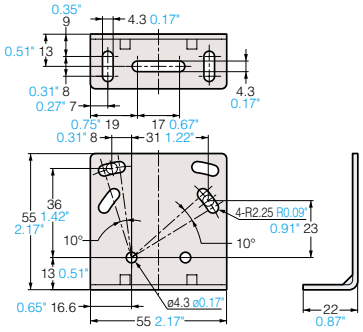
LV-S63



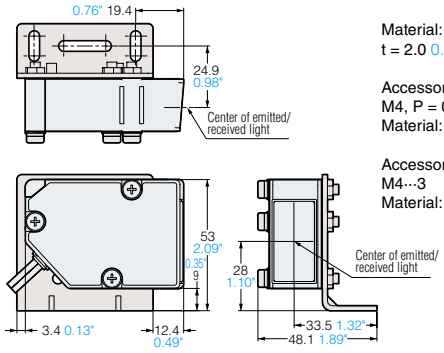
Reflector R-9 (Included with LV-S63)



Rear mounting bracket for the LV-S63 (accessory)



When mounting bracket is attached

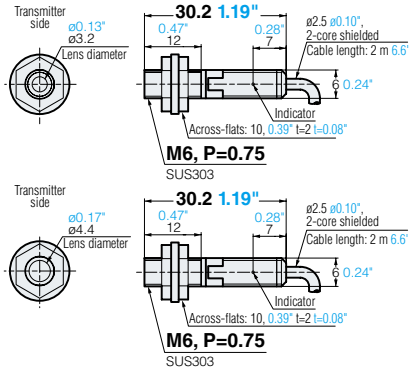


Material: SUS304
t = 2.0 0.08"

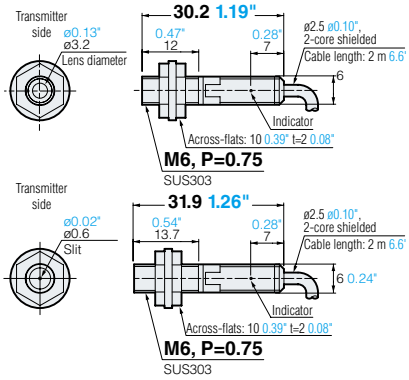
Accessory screws
M4, P = 0.7×ℓ30 1.18"···3
Material: SUS

Accessory nuts
M4···3
Material: SUS

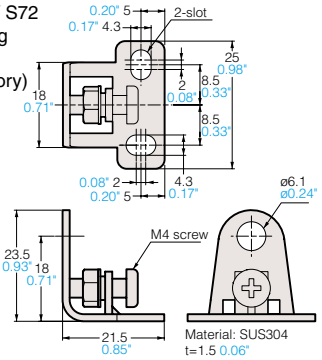
LV-S71



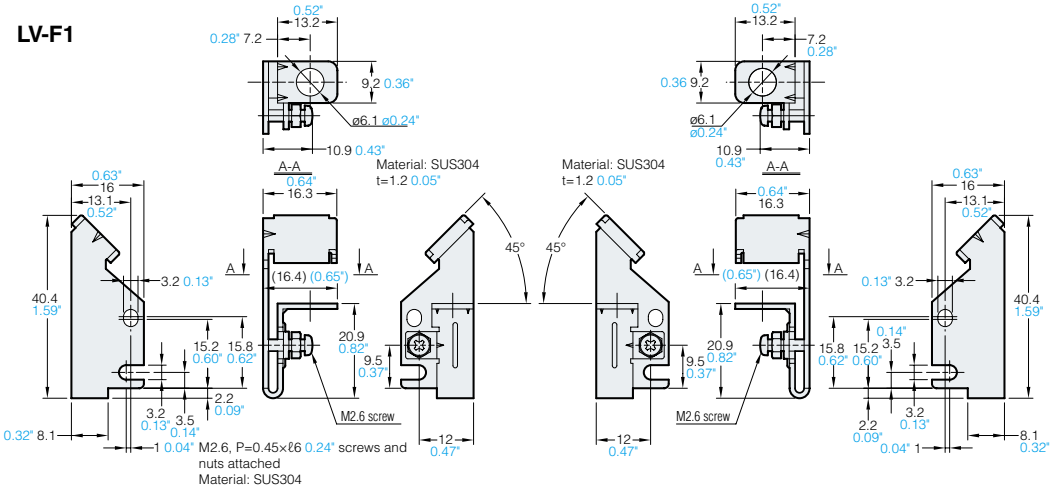
LV-S72



LV-S71 / S72 Mounting bracket (accessory)

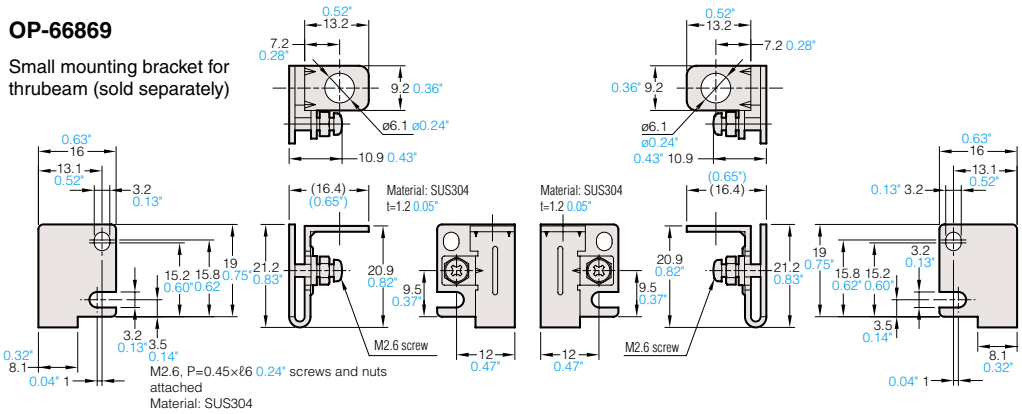


LV-F1



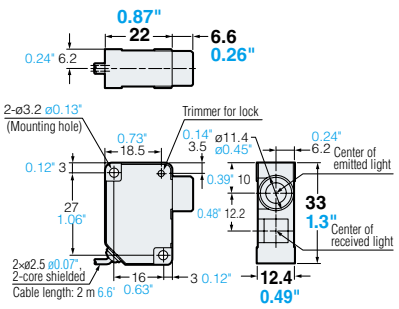
OP-66869

Small mounting bracket for thrubeam (sold separately)

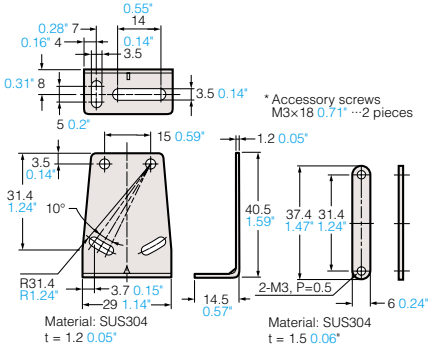


LV-NH Series, Reflective/Retro-Reflective

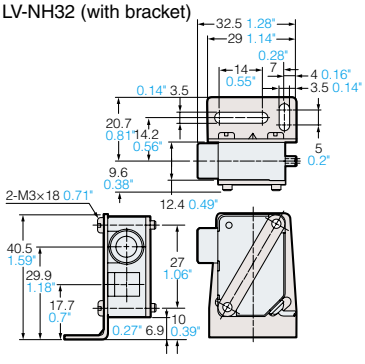
LV-NH32



Mounting bracket for the LV-NH32 (accessory)

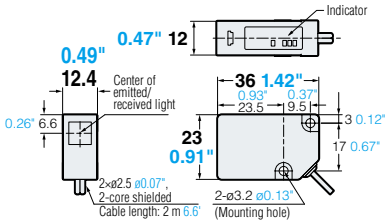


LV-NH32 (with bracket)

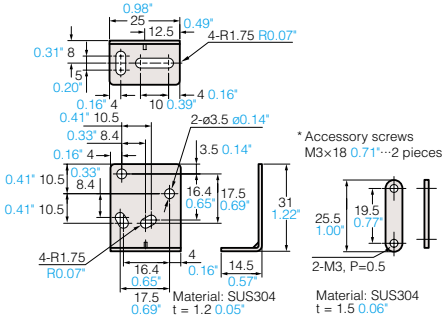


Unit : mm inch

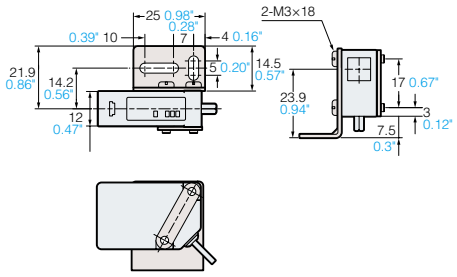
LV-NH35/NH62



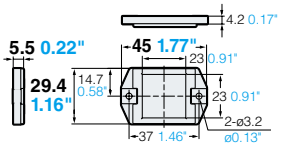
Mounting bracket (accessory)



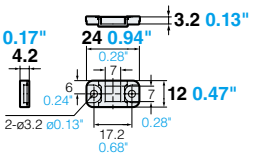
LV-NH35 / NH62 (with bracket)



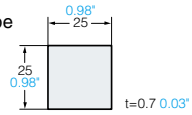
Reflector R-6
(Included with LV-NH62)



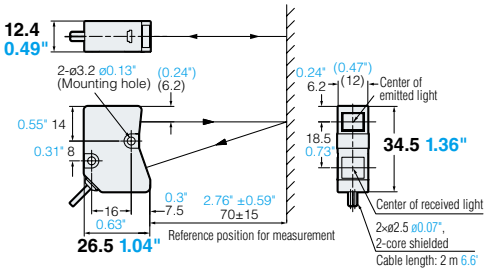
Reflector R-7
(Included with LV-NH62)



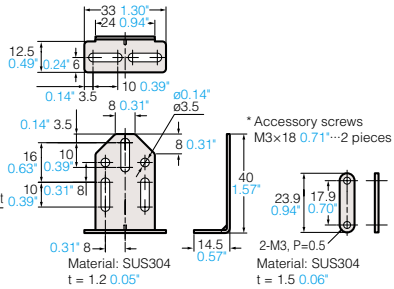
Reflective tape
OP-42197
OP-87123



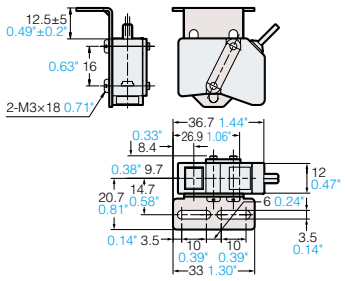
LV-NH37



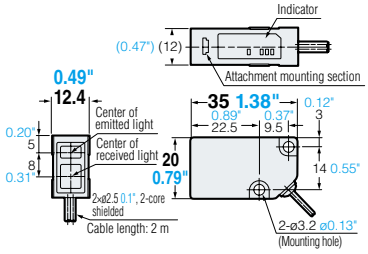
Mounting bracket for the LV-NH37 (accessory)



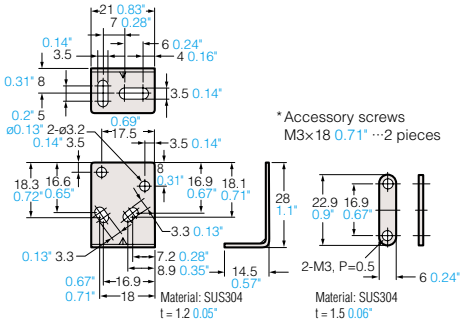
LV-NH37 (with bracket)



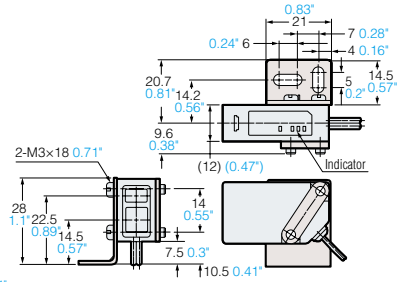
LV-NH42



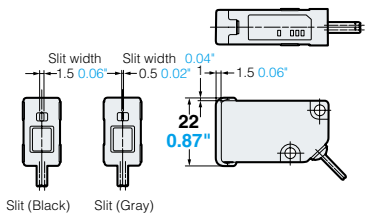
Mounting bracket for the LV-NH42 (accessory)



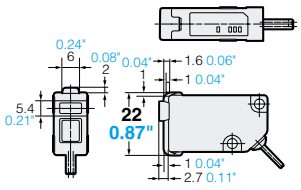
LV-NH42 (with bracket)



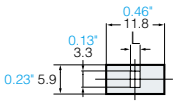
When a slit included with LV-NH42 is attached



When LV-L01 is attached (LV-NH42)



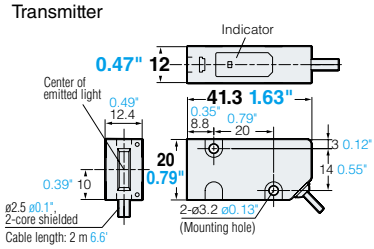
Slit seal (Included with the LV-L01)



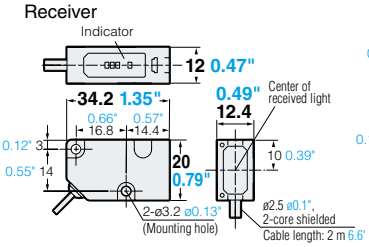
Slit sticker name	L
slit 1	2.6 0.10"
slit 2	2.0 0.08"
slit 3	1.5 0.06"
slit 4	1.1 0.04"

LV-NH100 / NH110

Transmitter



Receiver



LV-B101 (bracket, transmitter, and receiver set for the LV-NH100 / NH110)

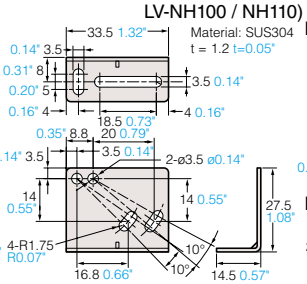


Plate nut for the transmitter

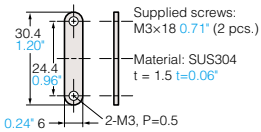
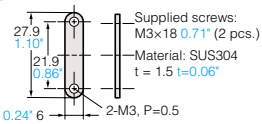
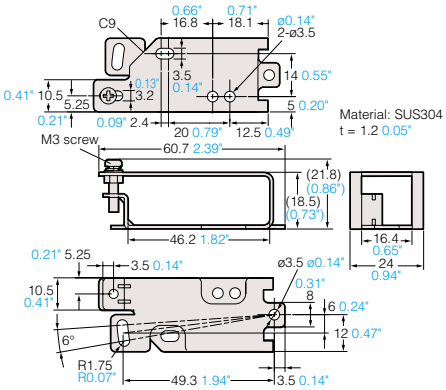


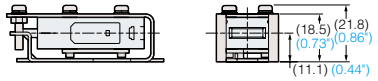
Plate nut for the receiver



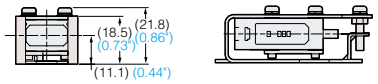
LV-B102 (bracket, transmitter, and receiver set for LV-NH100 / NH110)



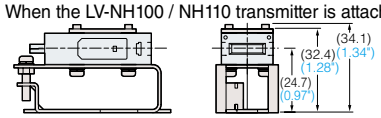
When the LV-NH100 / NH110 transmitter is attached (inside)



When the LV-NH100 / NH110 receiver is attached (inside)



When the LV-NH100 / NH110 transmitter is attached (outside)



When the LV-NH100 / NH110 receiver is attached (outside)

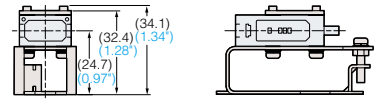


Plate nut for the transmitter

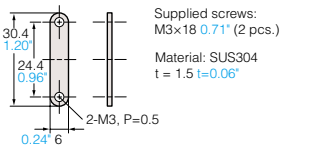
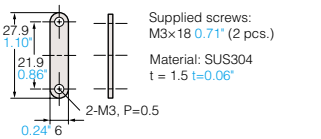
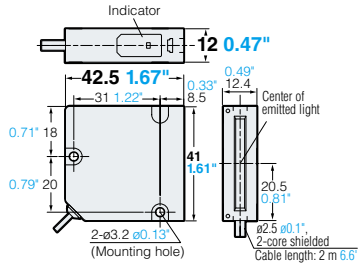


Plate nut for the receiver

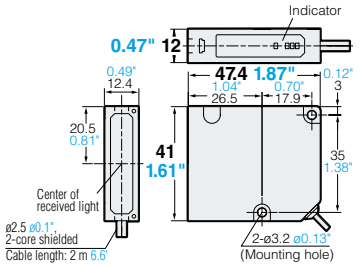


LV-NH300

Transmitter



Receiver



LV-B301 (bracket, transmitter, and receiver set for LV-NH300)

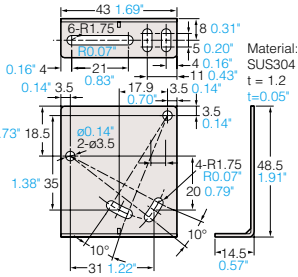


Plate nut for the transmitter

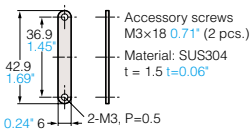
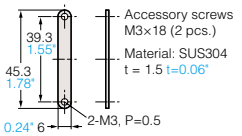
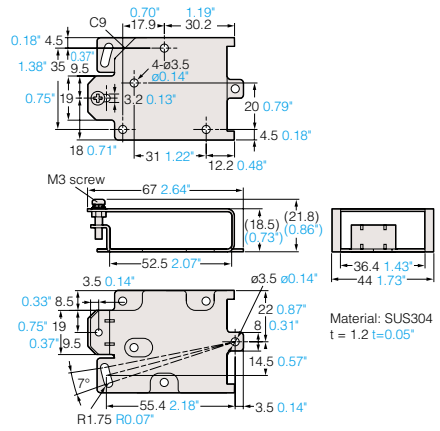


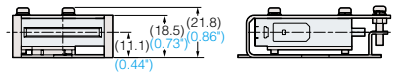
Plate nut for the receiver



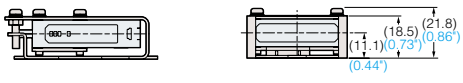
LV-B302 (bracket, transmitter, and receiver set for LV-NH300)



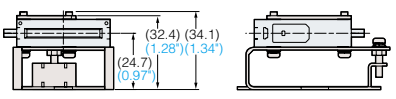
When the LV-NH300 transmitter is attached (inside)



When the LV-NH300 receiver is attached (inside)



When the LV-NH300 transmitter is attached (outside)



When the LV-NH300 receiver is attached (outside)

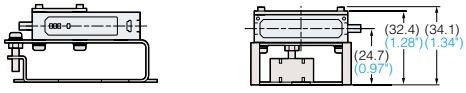


Plate nut for the transmitter

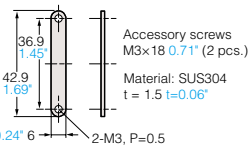
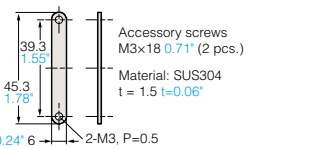


Plate nut for the receiver

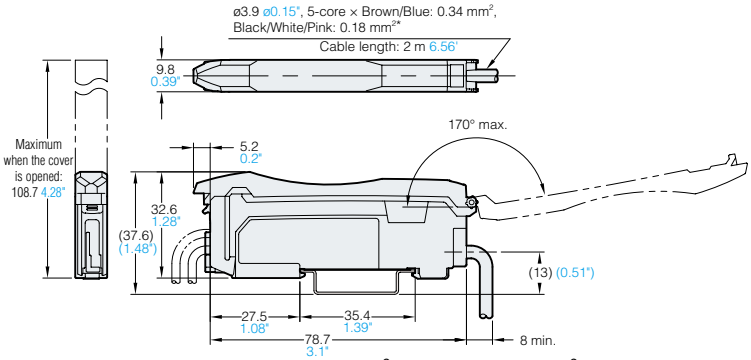


Amplifier Dimensions

CAD Data Download: ▶ www.keyence.com/CADG

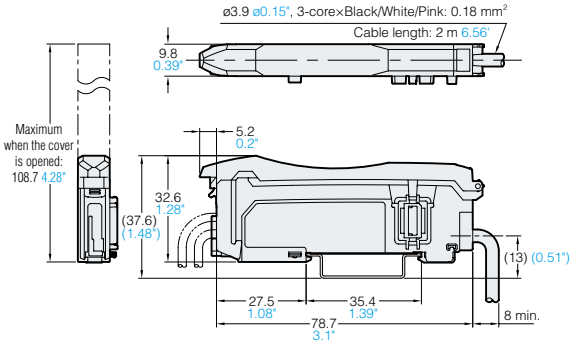
Unit : mm inch

LV-N11N / N11P / N11MN Cable type, Main unit

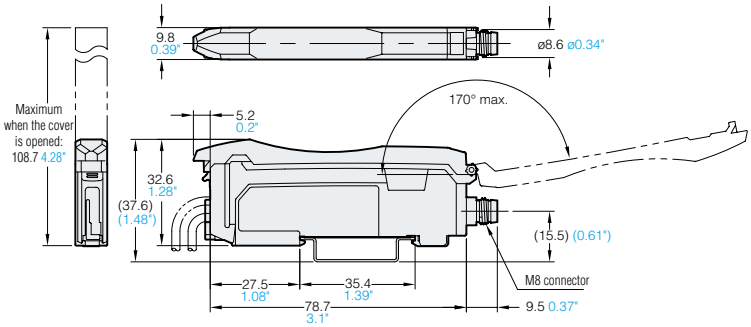


* LV-N11MN: ø3.9 ø0.15", 5-core × Brown/Blue: 0.34 mm², Black/Orange/Pink: 0.18 mm²

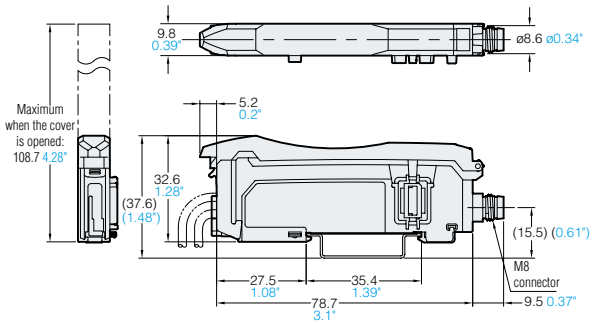
LV-N12N / N12P Cable type, Expansion unit



LV-N11CN / N11CP M8 connector type, Main unit

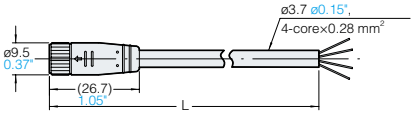


LV-N12CN / N12CP M8 connector type, Expansion unit

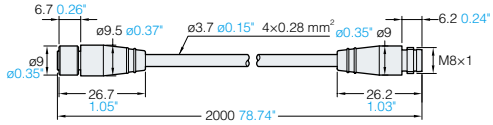


M8 connector cable (**OP-73864 / 73865** sold separately)

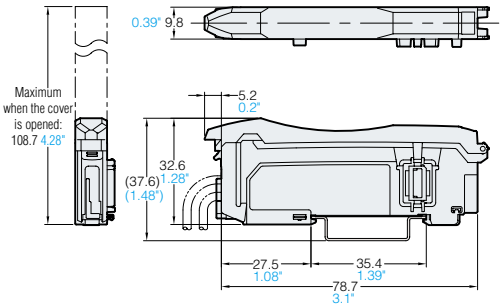
Cable length	L (m foot)
OP-73864	2 6.56'
OP-73865	10 32.8'



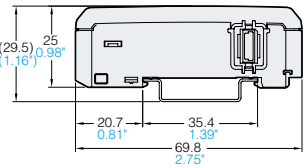
M8 connector junction cable (**OP-85498** sold separately)



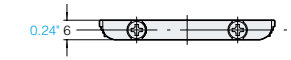
LV-N10 Zero line type, Expansion unit



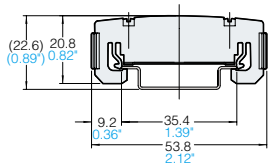
OP-87199 Conversion adaptor



When the end unit is attached (**OP-26751** sold separately)



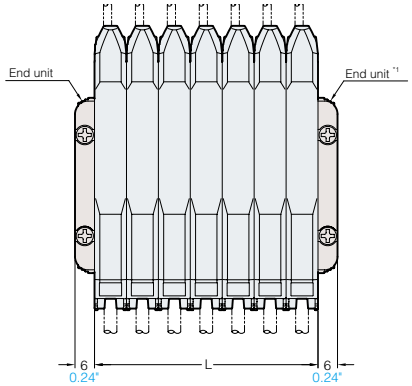
DIN-rail mounting



Material: Polycarbonate

Common for all types

When several units are connected:

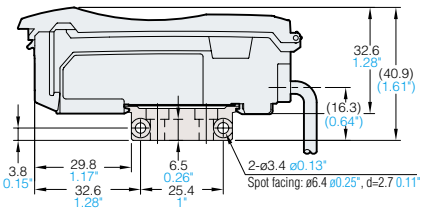


No. of units	L (mm inch)
1	9.8 0.39"
2	19.6 0.77"
3	29.4 1.16"
4	39.2 1.54"
5	49.0 1.93"
6	58.8 2.31"
7	68.6 2.7"
8	78.4 3.09"
9	88.2 3.47"
10	98.0 3.86"
11	107.8 4.24"
12	117.6 4.63"
13	127.4 5.02"
14	137.2 5.4"
15	147.0 5.79"
16	156.8 6.17"
17	166.6 6.56"

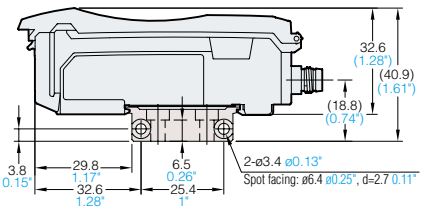
*1 End units must be used when several units are connected.(OP-26751)

When the mounting bracket is attached (**OP-73880** sold separately)

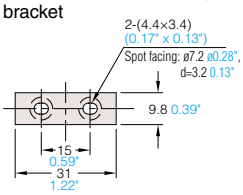
Cable type



M8 connector type



Reverse side of mounting bracket



Material: Polycarbonate

Digital Fiberoptic Sensor

FS-neo&FU

More than 100 fiber unit variations to support a wide range of applications

A high-function amplifier and vast array of sensor head options provide easy solutions for the most challenging detection conditions.

1 Extensive variety of fiberoptic units

The fiberoptic series has the largest selection of sensor head options which provide a vast range of installation methods and detection solutions.

2 High power enables use in a wide range of applications

With the touch of a button, light intensity can easily be switched to 64 times the normal intensity. This high power is often needed for long-distance detection or in adverse environmental conditions where strong light intensity is required.

3 Automatic maintenance

Even if debris build-up causes the light intensity to drop, the sensor automatically detects the drop in intensity, and re-calibrates to the original display state.

FS-neo FUNCTION

NEO Preset

Simply press the PRESET button to change the light intensity display to 100 or 0 to complete the sensitivity settings.

NEO MEGA switch

Simply slide the MEGA switch to immediately obtain 64 times the normal light intensity.

Built-in application modes

Advanced mode settings are pre-programmed into the amplifier. Simply choose a mode according to the application and the optimal settings are automatically selected.

DATUM function

Open field network compatibility

Reduced wiring

Interference prevention function

Pause function

Sleep function

Saturation Avoidance function

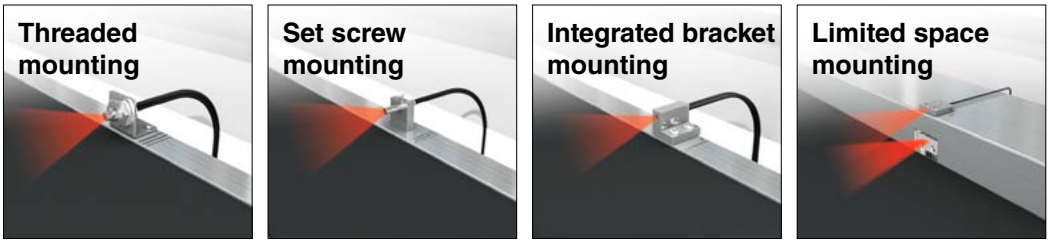
Avoid light interference up to 30,000 lux

Strong resistance to the effects of sunlight and fluorescent lighting enables stable detection.

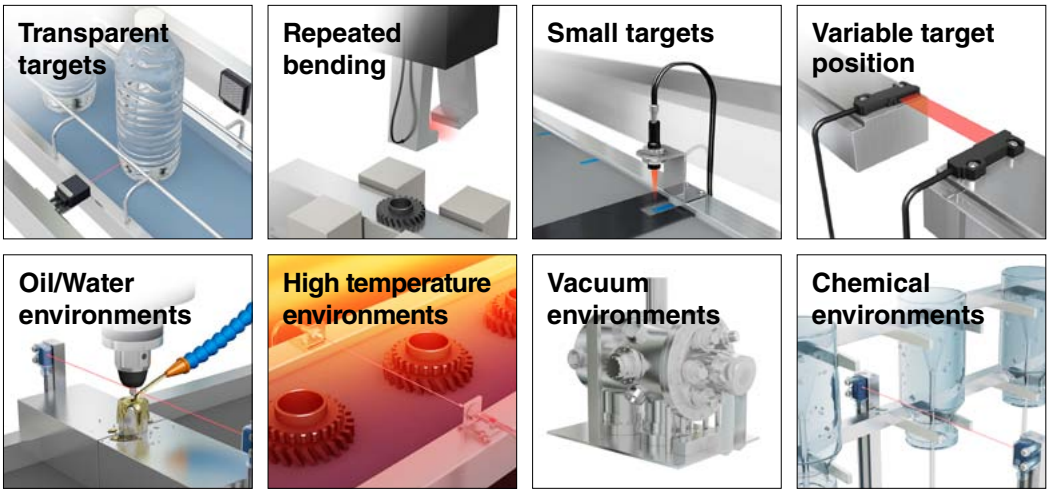
Analog output type (FS-N11MN)

The wide variety of fiber head options provide solutions to a vast range of mounting needs and application conditions.

Mounting options

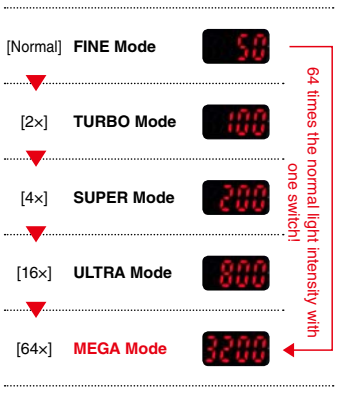


Detection options

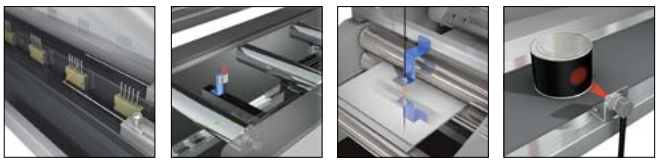


NEO MEGA - 64 times the power with one switch

The amplifiers are equipped with 5 light transmission modes for increasing the light intensity when higher power is required. The most powerful of these modes is “MEGA Mode”. The power can be increased 64-fold from normal power by simply using 1 switch.



* There is also a high-speed response HSP mode.



Ample light intensity can be ensured even when using small diameter fiberoptics.

Sufficient reflection can be ensured even with transparent objects

Sufficient variation can be obtained even when distinguishing between 1 or 2 sheets

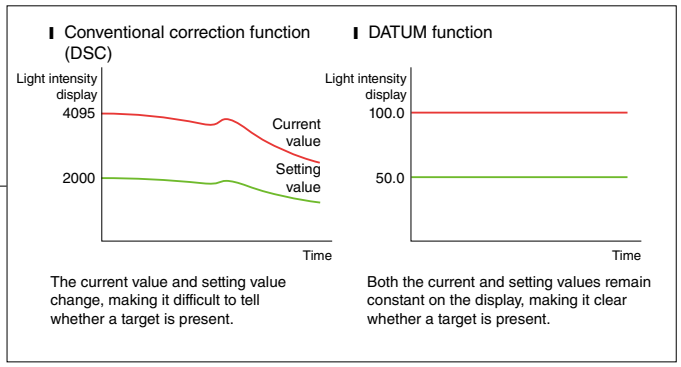
Sufficient reflection can be ensured even from black targets

Simply slide the MEGA switch to the right

Automatic maintenance DATUM function

The automatic maintenance function detects light intensity reduction due to dirt or misalignment, and returns the sensor to its original display state. This feature can cancel the effects of the ambient environment, enabling continuous and highly accurate detection.

As build-up occurs, the setting value changes according to light intensity. Datum corrects the setting value based on a running average of this received light intensity value. Since the display values are scaled, the current value is displayed as an even "100.0" rather than an arbitrary value, making target presence evident.



Saturation Avoidance function adjusts the optimum power to prevent excess light intensity

When a small target is being detected by a thrubeam sensor, or when a reflective sensor experiences background reflections, the ambient light may be too strong and might interfere with accurate target detection.
In this case, simply press two buttons, and this function will automatically adjust the light intensity to the optimum level.

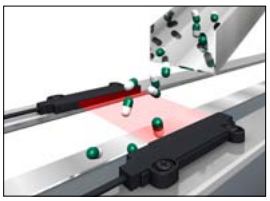
Excess light intensity causes the display value to go off the scale.

Target present　No target

Light transmission level and light intensity gain are automatically calibrated so stable detection can be achieved.

Target present　No target

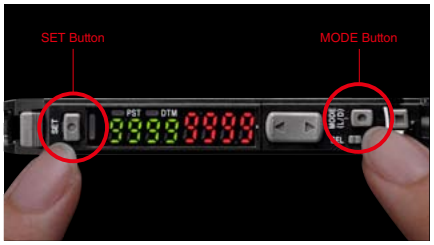
Use the Saturation Avoidance function in the following examples



[Area / Thrubeam model]
Target is small / thin
Light travels around the target.

[Reflective model]
Background reflection is strong
The difference in light intensity may be lost.

Simply press MODE and SET at the same time.



Power-saving Sleep function

This function holds the amplifier in a power save state during external signal input. The normal display is restored after any key is pressed.

Once sleep mode is entered, light transmission is stopped and the display monitor switches off. A single segment on the digital monitor pulses across the display.

KEYENCE Reduced wiring link

Conventional sensors can also be connected for a dramatic reduction in wiring and installation time.

By using the OP-87199 conversion connector 4 on conventional KEYENCE sensors, the NEO Series sensors can easily be connected to significantly reduce wiring and installation time.

<Example connection of NEO Series and conventional sensors>

1 **FS-NEO** Series
2 **LV-NEO** Series
3 **PS-NEO** Series
4 **OP-87199**
5 **CZ-V20** Series
6 **ES** Series
7 **AP-V** Series

Connection method supporting open field networks

Support for open field networks via the sensor input unit

The NEO Series 2 3 4 is able to support open field networks by using the NU Series 1.
Conventional sensors 7 8 9 are supplied with power simply by connecting expansion units.
The sensor output information can be transmitted by connecting e-CON to the NU-EN8N sensor input unit 5.

1 **NU** Series
2 **LV-NEO** Series
3 **FS-NEO** Series
4 **PS-NEO** Series
5 **NU-EN8N**
6 **OP-87199**
7 **ES** Series
8 **AP-V** Series
9 **CZ-V20** Series

FS-neo&FU LINEUP

Fiber unit variation supports a vast range of detecting conditions

Standard/Simple Mounting

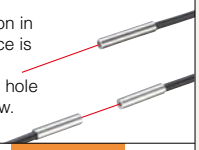
Threaded and Hex-shaped Fibers

Threaded for easy mounting onto brackets and machine equipment.

Thrubeam type ▶ P.29 Reflective model ▶ P.34

Cylindrical (Set Screw Installation)

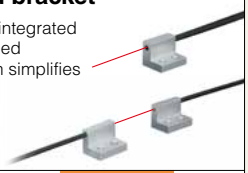
Suitable for installation in locations where space is limited.
Installed by drilling a hole and using a set screw.



Thrubeam type ▶ P.29 Reflective model ▶ P.35

Integrated bracket

The sensor is integrated into an L-shaped bracket, which simplifies installation.



Thrubeam type ▶ P.30 Reflective model ▶ P.35

Small Spot/Focused Beam

Small Spot Reflective

Great for small object detection. Spot size and focal distance are adjustable, so there is no need to change the distance between the sensor and the target.

Reflective model ▶ P.36

Focused Beam/High power

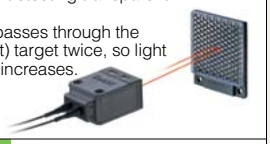
Use of a lens reduces the field of view based on the aperture angle. This narrow beam helps avoid deflection and is suitable for detecting objects at longer distances.

Thrubeam type ▶ P.30 Reflective model ▶ P.37

Transparent object detection

Retro-reflective

Effective for detecting transparent objects.
The beam passes through the (transparent) target twice, so light attenuation increases.



Retro-reflective Type ▶ P.40

Definite-reflective

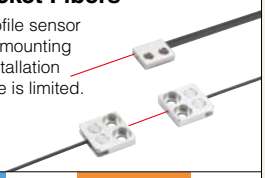
Detects within a fixed range. Reduces background effects and features a space-saving, thin profile design.

Reflective model ▶ P.37

Small space

Flat Bracket Fibers

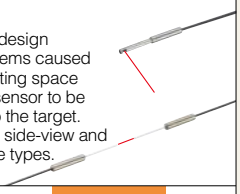
This thin profile sensor comes with mounting holes for installation where space is limited.



Thrubeam type ▶ P.31 Reflective model ▶ P.37

Sleeve

The thin sleeve design eliminates problems caused by limited mounting space and allows the sensor to be placed closer to the target. Lineup includes side-view and bendable sleeve types.

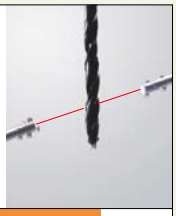


Thrubeam type ▶ P.31 Reflective model ▶ P.38

Environment-proof

Oil/Chemical Resistant

The fluorocarbon resin coating allows these fibers to be used in almost any environment, including oil or chemical-splash conditions.



Thrubeam type ▶ P.32 Reflective model ▶ P.38

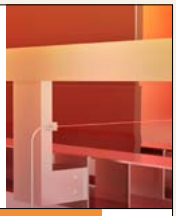
High-flex

Provides higher flexibility than an electric wire. Resistant to 30 million bends!

Thrubeam type ▶ P.32 Reflective model ▶ P.39

Heat Resistant

Ideal for use in high temperature applications. Withstands temperatures up to 350°C 662°F.



Thrubeam type ▶ P.32 Reflective model ▶ P.39

Dedicated application

Area

The wide-area beam is ideal for applications where there is variance in target position and for detecting multiple shapes or moving targets.

Thrubeam type ▶ P.33 Reflective model ▶ P.40

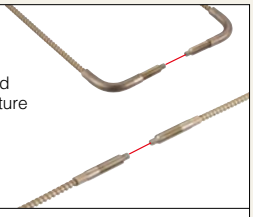
Liquid-level

Accurate liquid level detection sensors are available in transparent tube-mount or immersion type models.

Reflective model ▶ P.40

Vacuums

Can be used in vacuum and high temperature environment.



Thrubeam type ▶ P.41

Amplifiers ▶ P.42

Cable Type

M8 connector Type

Zero line Type

Thrubeam type **Standard/Simple Mounting Type**

Threaded and Hex-shaped Fibers

Threaded fibers must be mounted onto brackets before use.

Benefits!

With the hex-shaped fiber, one end is secured with a nut, making installation easier.

Stainless steel braided cable is recommended in areas where the fiber can be damaged due to machine operator activity.

Size/Shape		Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
M4	Hex-shaped	2 m 6.6' Free-cut (ø2.2 ø0.09") -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 3100 122.05" FINE : 640 25.20"	ULTRA : 2100 82.68" SUPER : 1300 51.18" TURBO: 880 34.65" HSP : 320 12.60"	ø1.13 ø0.04"	ø0.005 ø0.0002"	FU-77TZ Approx. 43 g	[P.48]
		1 m 3.3' cut not allowed -40 to +50°C (-40 to +122°F)	R10 R0.39" Stainless Steel	MEGA : 1800 70.87" FINE : 640 25.20" Lens attachment [P.33]	ULTRA : 1800 70.87" SUPER : 1300 51.18" TURBO: 880 34.65" HSP : 320 12.60"			FU-77TG Approx. 43 g	[P.48]
	Threaded	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F)	R0.5 R0.02" ToughFlex	MEGA : 3600 141.73" FINE : 880 34.65"	ULTRA : 3000 118.11" SUPER : 1800 70.87" TURBO: 1300 51.18" HSP : 430 16.93"			FU-77V Approx. 25 g	[P.47]
			R2 R0.08" ToughFlex					FU-77 Approx. 21 g	[P.47]
		1 m 3.3' cut not allowed -40 to +50°C (-40 to +122°F)	R10 R0.39" Stainless Steel	MEGA : 1800 70.87" FINE : 880 34.65" Lens attachment [P.33]	ULTRA : 1800 70.87" SUPER : 1800 70.87" TURBO: 1300 51.18" HSP : 430 16.93"			FU-77G Approx. 39 g	[P.47]
		2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 3600 141.73" FINE : 1100 43.31" Lens attachment [P.33]	ULTRA : 3200 125.98" SUPER : 2200 86.61" TURBO: 1500 59.06" HSP : 540 21.26"	ø1 ø0.04"		FU-7F Approx. 21 g	[P.47]
		2 m 6.6' Free-cut (ø1.3) (ø0.05") -40 to +70°C (-40 to +158°F)	R4 R0.16"	MEGA : 2200 86.61" FINE : 440 17.32" Lens attachment [P.33]	ULTRA : 1400 55.12" SUPER : 860 33.86" TURBO: 600 23.62" HSP : 220 8.66"			FU-78 Approx. 9 g	[P.48]
M6	Threaded	2 m 6.6' Free-cut (ø2.2) (ø0.09") FU-71Z: -40 to +50°C (-40 to +122°F) FU-71: -40 to +70°C (-40 to +158°F)	R2 R0.08" ToughFlex	MEGA : 3600 141.73" FINE : 1100 43.31"	ULTRA : 3600 141.73" SUPER : 2300 90.55" TURBO: 1600 62.99" HSP : 590 23.23"	ø1.5 ø0.06"		FU-71Z Approx. 25 g	[P.47]
			R25 R0.98"	MEGA : 3600 141.73" FINE : 1300 51.18"	ULTRA : 3600 141.73" SUPER : 2600 102.36" TURBO: 1800 70.87" HSP : 650 25.59"			FU-71 Approx. 25 g	[P.47]

*1 When using the FS-N Series. "3600 mm 141.73"" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

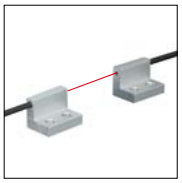
Cylindrical (Set Screw Installation)

Installed by drilling a hole and using a set screw.
Suitable for installation in locations where space is limited.

Size	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
ø1.0 ø0.04"	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex High-flex	MEGA : 590 23.23" FINE : 140 5.51"	ULTRA : 430 16.93" SUPER : 300 11.81" TURBO: 180 7.09" HSP : 55 2.17"	ø0.5 ø0.02"	ø0.005 ø0.0002"	FU-58U Approx. 4 g	[P.46]
	50 cm 19.69" cut not allowed -40 to +50°C (-40 to +122°F)	R10 R0.39"	MEGA : 380 14.96" FINE : 85 3.35"	ULTRA : 270 10.63" SUPER : 180 7.09" TURBO: 120 4.72" HSP : 40 1.57"	ø0.265 ø0.01"		FU-58 Approx. 8 g	[P.46]
ø1.5 ø0.06"	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex High-flex	MEGA : 590 23.23" FINE : 140 5.51"	ULTRA : 430 16.93" SUPER : 300 11.81" TURBO: 180 7.09" HSP : 55 2.17"	ø0.5 ø0.02"		FU-59U Approx. 4 g	[P.47]
	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +70°C (-40 to +158°F)	R4 R0.16" High-flex	MEGA : 1200 47.24" FINE : 230 9.06"	ULTRA : 810 31.89" SUPER : 590 23.23" TURBO: 410 16.14" HSP : 130 5.12"	ø0.7 ø0.03"		FU-59 Approx. 3 g	[P.46]
ø2.5 ø0.10"	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F)	R10 R0.39"	MEGA : 45 1.77" FINE : 13 0.51"	ULTRA : 32 1.26" SUPER : 23 0.91" TURBO: 18 0.71" HSP : –	ø0.125 ø0.005"		FU-55 Approx. 3 g	[P.46]
	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F) Do not bend sleeve						FU-56 Approx. 3 g	
ø3 ø0.12"	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 3600 141.73" FINE : 880 34.65"	ULTRA : 3000 118.11" SUPER : 1800 70.87" TURBO: 1300 51.18" HSP : 430 16.93"	ø1.13 ø0.04"		FU-5FZ Approx. 19 g	[P.46]
	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 3600 141.73" FINE : 1100 43.31"	ULTRA : 3200 125.98" SUPER : 2200 86.61" TURBO: 1500 59.06" HSP : 540 21.26"	ø1 ø0.04"		FU-5F Approx. 19 g	[P.46]

*1 When using the FS-N Series. "3600 mm 141.73"" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

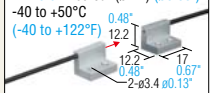
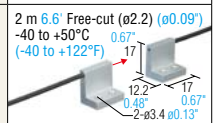
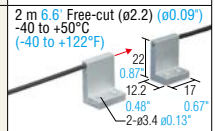
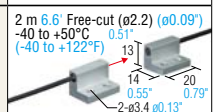
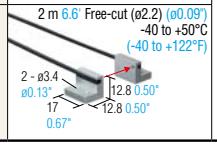
Integrated bracket



The bracket and sensor are integrated.

Benefits!

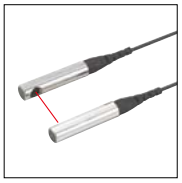
Eliminate concerns about bracket design, bracket and sensor assembly, or loose brackets. Integrated designs reduce space requirements.

Beam emitting direction	Optical axis height	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
Top	10 mm 0.39"	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F) 	R2 R0.08" ToughFlex	MEGA : 2200 86.61" FINE : 450 17.72"	ULTRA : 1700 66.93" SUPER : 1000 39.37" TURBO : 760 29.92" HSP : 290 11.42"	ø1.13 ø0.04"	ø0.005 ø0.0002"	FU-L51Z Approx. 30 g	[P.50]
	15 mm 0.59"	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F) 						FU-L52Z Approx. 30 g	
	20 mm 0.79"	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F) 						FU-L53Z Approx. 30 g	
Top (Built-in lens)	10 mm 0.39"	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F) 		MEGA : 3600 141.73" FINE : 3100 122.05"	ULTRA : 3600 141.73" SUPER : 3600 141.73" TURBO : 3600 141.73" HSP : 2100 82.68"	ø3.5 ø0.14"	ø0.2 ø0.008"	FU-L50Z Approx. 30 g	[P.50]
Side	10 mm 0.39"	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F) 		MEGA : 1900 74.80" FINE : 410 16.14"	ULTRA : 1500 59.06" SUPER : 900 35.43" TURBO : 700 27.56" HSP : 270 10.63"	ø1.13 ø0.04"	ø0.005 ø0.0002"	FU-L54Z Approx. 30 g	[P.50]

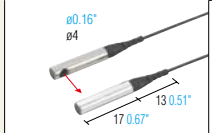
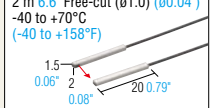
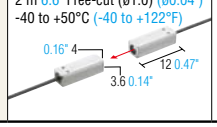
*1 When using the FS-N Series. "3600 mm 141.73'" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Thrubeam type **Small Spot/Focused Beam Type**

Focused Beam / High power



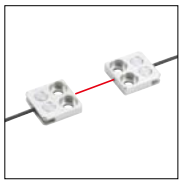
Use of a lens narrows beam width and helps avoid deflection.

Beam emitting direction	Aperture angle	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
Side	Approx. 6°	2 m 6.6' Free-cut (ø1.0) (ø0.04") FU-16Z: -40 to +50°C (-40 to +122°F) FU-16/18: -40 to +70°C (-40 to +158°F) 	R2 R0.08" ToughFlex	MEGA : 3600 141.73" FINE : 1260 49.61"	ULTRA : 3600 141.73" SUPER : 2600 102.36" TURBO : 1800 70.87" HSP : 760 29.92"	ø2.5 ø0.10"	ø0.1 ø0.004"	FU-16Z Approx. 8 g	[P.44]
			R10 R0.39"	MEGA : 3600 141.73" FINE : 1900 74.80"	ULTRA : 3600 141.73" SUPER : 3600 141.73" TURBO : 2700 106.30" HSP : 1000 39.37"			FU-16 Approx. 8 g	[P.44]
	Approx. 2°			MEGA : 3600 141.73" FINE : 1600 62.99"	ULTRA : 3600 141.73" SUPER : 3000 118.11" TURBO : 2100 82.68" HSP : 960 37.80"			FU-18 Approx. 8 g	[P.44]
	Approx. 3°	2 m 6.6' Free-cut (ø1.0) (ø0.04") -40 to +70°C (-40 to +158°F) 		MEGA : 1300 51.18" FINE : 330 12.99"	ULTRA : 900 35.43" SUPER : 680 26.77" TURBO : 530 20.87" HSP : 210 8.27"	ø1 ø0.04"	ø0.02 ø0.0008"	FU-18M Approx. 6 g	[P.44]
Top	Approx. 6°	2 m 6.6' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F) 	R2 R0.08" ToughFlex	MEGA : 3600 141.73" FINE : 3600 141.73"	ULTRA : 3600 141.73" SUPER : 3600 141.73" TURBO : 3600 141.73" HSP : 2400 94.49"	ø2.8 ø0.11"	ø0.1 ø0.004"	FU-50 Approx. 8 g	[P.46]

*1 When using the FS-N Series. "3600 141.73'" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Thrubeam type **Space-Saving Type**

Flat Bracket Fibers



Thin bracket-shaped design for mounting in limited spaces.

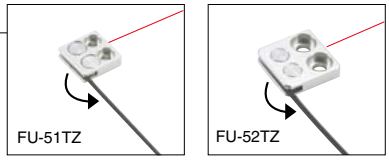
Benefits!

Metal housing eliminates concern about damaged sensors. The sensor and case form a flat surface, so there are no openings where dust and other foreign matter can enter.

Beam emitting direction	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
Top	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 810 31.89" FINE : 170 6.69"	ULTRA : 520 20.47" SUPER : 340 13.39" TURBO : 260 10.24" HSP : 90 3.54"	ø0.5 ø0.02"	ø0.005 ø0.0002"	FU-51TZ Approx. 5 g	[P.46]
	2 m 6.6' Free-cut (ø1.3) (ø0.05") -40 to +50°C (-40 to +122°F)		MEGA : 2900 114.17" FINE : 610 24.02"	ULTRA : 1900 74.80" SUPER : 1200 47.24" TURBO : 850 33.46" HSP : 260 10.24"	ø1 ø0.04"		FU-52TZ Approx. 15 g	[P.46]
Side	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F)		MEGA : 740 29.13" FINE : 140 5.51"	ULTRA : 480 18.90" SUPER : 280 11.02" TURBO : 200 7.87" HSP : 70 2.76"	ø0.5 ø0.02"		FU-57TZ Approx. 5 g	[P.46]
Flat	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F)		MEGA : 500 19.69" FINE : 140 5.51"	ULTRA : 340 13.39" SUPER : 230 9.06" TURBO : 180 7.09" HSP : 80 3.15"			FU-53TZ Approx. 10 g	
	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F)		MEGA : 2900 114.17" FINE : 610 24.02"	ULTRA : 1900 74.80" SUPER : 1200 47.24" TURBO : 850 33.46" HSP : 260 10.24"	ø1 ø0.04"		FU-54TZ Approx. 25 g	

*1 When using the FS-N Series.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

FU-51TZ/52TZ can also be used as side-view fibers.



Sleeve

The fiber tip is incorporated into a thin sleeve.

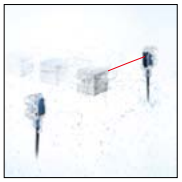
Benefits!

Some long sleeve fibers allow for bending. (See the dimensions diagram for bend radius)

Beam emitting direction	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
Side	1 m 3.3' Free-cut (ø1.3) (ø0.05") -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 520 20.47" FINE : 100 3.94"	ULTRA : 380 14.96" SUPER : 230 9.06" TURBO : 160 6.30" HSP : 55 2.17"	ø0.6 ø0.02"	ø0.005 ø0.0002"	FU-32 Approx. 5 g	[P.44]
	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +70°C (-40 to +158°F)		MEGA : 1600 62.99" FINE : 330 12.99"	ULTRA : 1100 43.31" SUPER : 660 25.98" TURBO : 470 18.50" HSP : 140 5.51"	ø1 ø0.04"		FU-34 Approx. 17 g	[P.45]
Top	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +70°C (-40 to +158°F)		MEGA : 3600 141.73" FINE : 1100 43.31"	ULTRA : 3200 125.98" SUPER : 2200 86.61" TURBO : 1500 59.06" HSP : 540 21.26"			FU-73 Approx. 24 g	[P.47]
	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +70°C (-40 to +158°F)	R10 R0.39"	MEGA : 690 27.17" FINE : 170 6.69"	ULTRA : 500 19.69" SUPER : 340 13.39" TURBO : 240 9.45" HSP : 72 2.83"	ø0.5 ø0.02"		FU-75F Approx. 10 g	[P.47]
	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +70°C (-40 to +158°F)		MEGA : 370 14.57" FINE : 85 3.35"	ULTRA : 260 10.24" SUPER : 180 7.09" TURBO : 120 4.72" HSP : 40 1.57"	ø0.265 ø0.01"		FU-76F Approx. 10 g	[P.47]
	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F)		MEGA : 45 1.77" FINE : 13 0.51"	ULTRA : 32 1.26" SUPER : 23 0.91" TURBO : 18 0.71" HSP : –	ø0.125 ø0.005"		FU-56 Approx. 3 g	[P.46]

*1 When using the FS-N Series. "3600 mm 141.73"" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Oil/Chemical Resistant



Sensor is encased in fluorocarbon resin.

Beam emitting direction	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
Top	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +70°C (-40 to +158°F) ø5 ø0.20" 22 0.87"	R40 R1.57"	MEGA : 3600 141.73" FINE : 2800 110.24"	ULTRA : 3600 141.73" SUPER : 3600 141.73" TURBO : 3600 141.73" HSP : 1400 55.12"	ø3.7 ø0.15"	ø0.2 ø0.01"	FU-92 Approx. 71 g	[P.48]
	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +70°C (-40 to +158°F) ø6.5 0.26" 36.5 1.44"		MEGA : 3600 141.73" FINE : 3600 141.73"	ULTRA : 3600 141.73" SUPER : 3600 141.73" TURBO : 3600 141.73" HSP : 2400 94.49"	ø6 ø0.24"	–	FU-98 Approx. 70 g	[P.49]
Side	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +70°C (-40 to +158°F) ø5 ø0.20" 23 0.91"		MEGA : 3600 141.73" FINE : 1100 43.31"	ULTRA : 3600 141.73" SUPER : 3000 118.11" TURBO : 2200 86.61" HSP : 510 20.08"	ø2.8 ø0.11"	ø0.1 ø0.004"	FU-96 Approx. 71 g	
	2 m 6.6' Free-cut (ø2.2) (ø0.09") 0 to +60°C (0 to +140°F) 13 0.51" Thickness 7 0.28" 14.3 0.56"	R25*3 R0.98"	MEGA : 3600 141.73" FINE : 3600 141.73"	ULTRA : 3600 141.73" SUPER : 3600 141.73" TURBO : 3600 141.73" HSP : 2400 94.49"	ø3.7 ø0.15"	ø0.2 ø0.01"	FU-96T Approx. 35 g	

*1 When using the FS-N Series. "3600 mm 141.73'" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.
*3 25 mm from the end of screw cap of the housing cannot be bent.

High-flex

Suited for use with moving parts.

Size	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
ø1.0 ø0.04"	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F) ø1 ø0.04" 6 0.24"	R2 R0.08" ToughFlex High-flex	MEGA : 590 23.23" FINE : 140 5.51"	ULTRA : 430 16.93" SUPER : 300 11.81" TURBO : 180 7.09" HSP : 55 2.17"	ø0.5 ø0.02"	ø0.005 ø0.0002"	FU-58U Approx. 4 g	[P.46]
ø1.5 ø0.06"	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F) ø1.5 ø0.06" 10 0.39"						FU-59U Approx. 4 g	[P.47]
M3	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F) M3 10 0.39"						FU-79U Approx. 4 g	[P.48]
M4 Built-in lens	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +50°C (-40 to +122°F) M4 13 0.51"		MEGA : 1800 70.87" FINE : 850 33.46"	ULTRA : 1800 70.87" SUPER : 1800 70.87" TURBO : 1200 47.24" HSP : 370 14.57"	ø2.3 ø0.09"	ø0.1 ø0.004"	FU-70U Approx. 5 g	[P.47]
ø1.5 ø0.06"	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +70°C (-40 to +158°F) ø0.06" ø1.5 10 0.39"	R4 R0.16" High-flex	MEGA : 1200 47.24" FINE : 230 9.06"	ULTRA : 810 31.89" SUPER : 590 23.23" TURBO : 410 16.14" HSP : 130 5.12"	ø0.7 ø0.03"	ø0.005 ø0.0002"	FU-59 Approx. 3 g	[P.46]
M3	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +70°C (-40 to +158°F) M3 10 0.39"						FU-79 Approx. 6 g	[P.48]
6×10.5×2.5 0.24" x 0.41" x 0.10"	1 m 3.3' Free-cut (ø1.0) (ø0.04") -40 to +70°C (-40 to +158°F) 0.24" 6 10.5 0.41"		MEGA : 630 24.80" FINE : 110 4.33"	ULTRA : 490 19.29" SUPER : 290 11.42" TURBO : 180 7.09" HSP : 65 2.56"			FU-57TE Approx. 5 g	[P.46]

* 1 When using the FS-N Series. * 2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Heat Resistant

Suited for use at high temperatures of up to 300°C (572°F).

Heat resistant temperature*3	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm) (Standard target to be detected)	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
100°C*4 (212°F)	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +100°C (-40 to +212°F) M4 15 0.59"	R5 R0.20" ToughFlex	MEGA : 3600 141.73" FINE : 680 26.77" Lens attachment [P.33]	ULTRA : 2200 86.61" SUPER : 1600 62.99" TURBO : 900 35.43" HSP : 390 15.35"	ø1 ø0.04"	ø0.005 ø0.0002"	FU-86Z Approx. 25 g	[P.48]
105°C*4 (221°F)	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +105°C (-40 to +221°F) M4 15 0.59"	R25 R0.98"	MEGA : 3600 141.73" FINE : 1100 43.31" Lens attachment [P.33]	ULTRA : 3200 125.98" SUPER : 2200 86.61" TURBO : 1500 59.06" HSP : 540 21.26"			FU-86A Approx. 22 g	[P.48]
150°C*5 (302°F)	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +150°C (-40 to +302°F) M4 17 0.67"	R20 R0.79"	MEGA : 2700 106.30" FINE : 520 20.47"	ULTRA : 1800 70.87" SUPER : 1100 43.31" TURBO : 720 28.35" HSP : 340 13.39"	ø1.5 ø0.06"		FU-86H Approx. 35 g	[P.48]
180°C*6 (356°F)	2 m 6.6' Free-cut (ø2.2) (ø0.09") -60 to +180°C (-76 to +356°F) M4 17 0.67"	R35 R1.38"	MEGA : 2700 106.30" FINE : 570 22.44"	ULTRA : 1900 74.8" SUPER : 1200 47.24" TURBO : 790 31.10" HSP : 380 14.96"			FU-88 Approx. 36 g	[P.48]
200°C (392°F)	2 m 6.6' cut not allowed -40 to +200°C (-40 to +392°F) M4 15 0.59" 10 0.39"	R8 R0.32"	MEGA : 1800 70.87" FINE : 390 15.35" Lens attachment [P.33]	ULTRA : 1300 51.18" SUPER : 900 35.43" TURBO : 680 26.77" HSP : 250 9.84"	ø1 ø0.04"		FU-88K Approx. 30 g	[P.48]
300°C (572°F)	2 m 6.6' cut not allowed -40 to +300°C (-40 to +572°F) M4 15 0.59" 10 0.39"	R25 R0.98"					FU-84C Approx. 66 g	[P.48]

*1 When using the FS-N Series. "3600 mm 141.73'" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.
*3 Use the fiberoptic sensor under dry conditions. Allow some margin for the temperature upper limit when selecting a heat-resistant fiber unit.
*4 The recommended maximum ambient temperature during operation is 90°C (194°F) when constantly using a fiber unit in a high-temperature environment.
*5 The recommended maximum ambient temperature during operation is 130°C (266°F) when constantly using a fiber unit in a high-temperature environment.
*6 The recommended maximum ambient temperature during operation is 150°C (302°F) when constantly using a fiber unit in a high-temperature environment.

Thrubeam type — Dedicated application type

Area

Useful in situations where target position varies.

Type	Detecting width	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Optical axis diameter (mm)	Model / Weight	Dimensions
Array	5 mm 0.20"	Thickness 4 0.16" 0.59" 15 2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +70°C 0.59" 15 (-40 to +158°F)	R4*2 R0.16"	MEGA : 2200 86.61" FINE : 440 17.32"	ULTRA : 1400 55.12" SUPER : 840 33.07" TURBO : 540 21.26" HSP : 200 7.87"	Approx. 6×0.3	FU-A05 Approx. 20 g	[P.49]
	10 mm 0.39"	Thickness 4 0.16" 0.79" 20 2 m 6.6' Free-cut (ø2.2) (ø0.09") 20 -40 to +70°C 0.79" (-40 to +158°F)				Approx. 11×0.3	FU-A10 Approx. 20 g	[P.49]
Area	10 mm 0.39"	Thickness 4.2 0.17" 20 0.79" 2 m 6.6' Free-cut (ø2.2) (ø0.09") 20 -40 to +50°C 0.79" (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 3400 133.86" FINE : 1400 55.12"	ULTRA : 2800 110.24" SUPER : 2400 94.49" TURBO : 1700 66.93" HSP : 640 25.20"	10×3	FU-12 Approx. 23 g	[P.44]
	11 mm 0.43"	Thickness 4 0.16" 29.8 1.17" 2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C 10.5 (-40 to +122°F) 0.41"		MEGA : 3600 141.73" FINE : 2700 106.30"	ULTRA : 3600 141.73" SUPER : 3600 141.73" TURBO : 3600 141.73" HSP : 1300 51.18"	11×2	FU-E11 Approx. 20 g	[P.49]
	40 mm 1.57"	Thickness 5.1 0.20" 69 2.72" 2 m 6.6' Free-cut (ø2.2) (ø0.09") 19.5 -40 to +50°C 0.77" (-40 to +122°F)		MEGA : 3600 141.73" FINE : 3600 141.73"	ULTRA : 3600 141.73" SUPER : 3600 141.73" TURBO : 3600 141.73" HSP : 2500 98.43"	40×3	FU-E40 Approx. 30 g	[P.49]

*1 When using the FS-N Series. "3600 mm 141.73"" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.
*2 R10 for the first 10 mm of cable from the housing.

Slit for FU-E40 (sold separately)

Model		With OP-84365 attached	With OP-84366 attached
Beam size		30×0.5 mm 1.18 × 0.02"	20×0.5 mm 0.79 × 0.02"
Detecting distance by power mode (mm)*1	MEGA	3600 141.73"	3200 125.98"
	ULTRA	2100 82.68"	1400 55.12"
	SUPER	900 35.43"	550 21.65"
	TURBO	450 17.72"	300 11.81"
	FINE	250 9.84"	180 7.09"
	HSP	–	–
Weight (pair)		Approx. 4 g	

*1 When using the FS-N Series. "3600 mm 141.73"" is assumed as maximum because the fiber cable has a length of 2 m 6.6'.

OP-84365

OP-84366

Thrubeam Lens Options

Type	Ambient temperature / Appearance (mm)	Model / Weight	Dimensions	Applicable fiber units	Detecting distance (mm)*1 MEGA	ULTRA	SUPER	TURBO	FINE	HSP
Ultra-long detecting distance Small-field Aperture Angle: Approx. 8°	-40 to +70°C (-40 to +158°F) Tip: ø4.3 ø0.17" 9.5 0.37"	F-4 Approx. 1 g	Set of 2 [P.50]	FU-77TZ/77V/77	3600 mm 141.73"					2700 mm 106.30"
				FU-7F						3200 mm 125.98"
				FU-78						2200 mm 86.61"
				FU-77G/77TG	1800 mm 70.87"					
Long detecting Aperture Angle: Approx. 15°	-40 to +300°C (-40 to +572°F) Tip: ø4 ø0.16" 7.9 0.31"	F-2 Approx. 2 g	Set of 2 [P.50]	FU-77TZ/77V/77/84C/88K	3600 mm 141.73"					2100 mm 82.68"
				FU-7F/86A	3600 mm 141.73"					2500 mm 98.43"
				FU-86Z	3600 mm 141.73"					1900 mm 74.80"
				FU-78	3600 mm 141.73"				3300 mm 129.92"	1600 mm 62.99"
				FU-77G/77TG	1800 mm 70.87"					
With mounting holes Side view	-40 to +105°C (-40 to +221°F) Locking Nut 9.3 0.37" 16.7 0.66" 5.6 0.22"	F-5 Approx. 10 g	Set of 2 [P.50]	FU-77V/77	3600 mm 141.73"					2600 mm 102.36"
				FU-7F/86A						3100 mm 122.05"
				FU-86Z						2900 mm 114.17"
				FU-78						2300 mm 90.55"
				FU-77G	1800 mm 70.87"					
Side view	-40 to +70°C (-40 to +158°F)*2 Tip: ø4 ø0.16" 9.5 0.37"	F-1 Approx. 2 g	Set of 2 [P.50]	FU-77V/77	3600 mm 141.73"	3100 mm 122.05"	1900 mm 74.80"	1300 mm 51.18"	900 mm 35.43"	530 mm 20.87"
				FU-77G	1800 mm 70.87"			1300 mm 51.18"	900 mm 35.43"	530 mm 20.87"
				FU-7F/86A	3600 mm 141.73"		3100 mm 122.05"	2100 mm 82.68"	1300 mm 51.18"	630 mm 24.80"
				FU-86Z	3600 mm 141.73"	3300 mm 129.92"	2300 mm 90.55"	1500 mm 59.06"	1100 mm 43.31"	500 mm 19.69"
				FU-78/84C/88K	3200 mm 125.98"	2500 mm 98.43"	1600 mm 62.99"	1100 mm 43.31"	800 mm 31.50"	360 mm 14.17"

*1 3600 mm (1800 mm) 141.73" (70.87") is assumed as maximum because the fiber cable has a length of 2 m (1 m) 6.6' (3.3').
*2 When using the F-1 at a temperature of 70°C (158°F) or more, specify the "Heat-resistant F-1. "Heat-resistant F-1" must be used in a constant temperature.

Threaded and Hex-shaped Fibers

Threaded fibers must be mounted onto brackets before use.

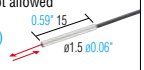
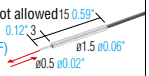
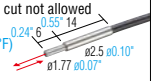
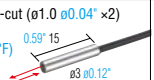
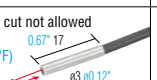
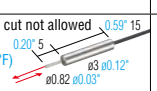
Size/Shape		Detecting Arrangement	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
M3	Hex-shaped	Coaxial	1 m 3.3' Free-cut (ø1.3 ø0.05" ×2) -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 400 15.75" FINE : 70 2.76" Lens attachment **[P.36]**	ULTRA : 270 10.63" SUPER : 170 6.69" TURBO : 110 4.33" HSP : 32 1.26"	ø0.005 ø0.0002" Gold wire	**FU-35TZ** Approx. 7 g	**[P.45]**
M3	Threaded	Coaxial	1 m 3.3' Free-cut (ø1.3 ø0.05" ×2) -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 450 17.72" FINE : 72 2.83" Lens attachment **[P.36]**	ULTRA : 290 11.42" SUPER : 190 7.48" TURBO : 115 4.53" HSP : 36 1.42"		**FU-35FZ** Approx. 6 g	**[P.45]**
M3	Threaded	Coaxial	1 m 3.3' Free-cut (ø1.3 ø0.05" ×2) Spiral 30 cm 11.81" -40 to +50°C (-40 to +122°F)	R10 R0.39" Stainless Steel				**FU-35FG** Approx. 15 g	**[P.45]**
M3	Threaded	Coaxial	1 m 3.3' Free-cut (ø1.3 ø0.05" ×2) -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 550 21.65" FINE : 110 4.33" Lens attachment **[P.36]**	ULTRA : 400 15.75" SUPER : 250 9.84" TURBO : 160 6.30" HSP : 45 1.77"		**FU-35FA** Approx. 6 g	**[P.45]**
M3	Threaded	Coaxial	50 cm 19.69" cut not allowed FU-21X: -40 to +70°C (-40 to +158°F) FU-24X: -40 to +50°C (-40 to +122°F)	R25 R0.98"	MEGA : 130 5.12" FINE : 36 1.42" Lens attachment **[P.36]**	ULTRA : 90 3.54" SUPER : 54 2.13" TURBO : 40 1.57" HSP : 23 0.91"		**FU-21X** Approx. 4 g	**[P.44]**
M3	Threaded	Coaxial	50 cm 19.69" cut not allowed FU-21X: -40 to +70°C (-40 to +158°F) FU-24X: -40 to +50°C (-40 to +122°F)	R10 R0.39"	MEGA : 100 3.94" FINE : 13 0.51" Lens attachment **[P.36]**	ULTRA : 72 2.83" SUPER : 32 1.26" TURBO : 23 0.91" HSP : 8 0.32"		**FU-24X** Approx. 4 g	**[P.44]**
M4	Hex-shaped	Parallel	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 640 25.20" FINE : 140 5.51"	ULTRA : 420 16.54" SUPER : 320 12.60" TURBO : 220 8.66" HSP : 70 2.76"		**FU-66TZ** Approx. 10 g	**[P.47]**
M4	Threaded	Parallel	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) FU-66Z: -40 to +50°C (-40 to +122°F) FU-66: -40 to +70°C (-40 to +158°F)	R2 R0.08" ToughFlex	MEGA : 770 30.32" FINE : 190 7.48"	ULTRA : 560 22.05" SUPER : 380 14.96" TURBO : 260 10.24" HSP : 80 3.15"		**FU-66Z** Approx. 10 g	**[P.47]**
M4	Threaded	Parallel	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) FU-66Z: -40 to +50°C (-40 to +122°F) FU-66: -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 1100 43.31" FINE : 300 11.81"	ULTRA : 860 33.86" SUPER : 570 22.44" TURBO : 410 16.14" HSP : 140 5.51"		**FU-66** Approx. 10 g	**[P.47]**
M6	Hex-shaped	Parallel	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +50°C (-40 to +122°F)	R2 R0.98" ToughFlex	MEGA : 710 27.95" FINE : 210 8.27"	ULTRA : 550 21.65" SUPER : 470 18.50" TURBO : 310 12.20" HSP : 90 3.54"		**FU-67TZ** Approx. 32 g	**[P.47]**
M6	Hex-shaped	Parallel	1 m 3.3' cut not allowed -40 to +50°C (-40 to +122°F)	R10 R0.39" Stainless Steel				**FU-67TG** Approx. 32 g	**[P.47]**
M6	Hex-shaped	Coaxial	1 m 3.3' cut not allowed -40 to +50°C (-40 to +122°F)	R10 R0.39" Stainless Steel	MEGA : 400 15.75" FINE : 70 2.76" Lens attachment **[P.36]**	ULTRA : 270 10.63" SUPER : 170 6.69" TURBO : 110 4.33" HSP : 32 1.26"		**FU-35TG** Approx. 32 g	**[P.45]**
M6	Threaded	Parallel	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +50°C (-40 to +122°F)	R0.5 R0.02" ToughFlex	MEGA : 900 35.43" FINE : 210 8.27"	ULTRA : 740 29.13" SUPER : 490 19.29" TURBO : 320 12.60" HSP : 110 4.33"		**FU-67V** Approx. 25 g	**[P.47]**
M6	Threaded	Parallel	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 1200 47.24" FINE : 300 11.81"	ULTRA : 900 35.43" SUPER : 590 23.23" TURBO : 430 16.93" HSP : 140 5.51"		**FU-61Z** Approx. 22 g	**[P.47]**
M6	Threaded	Parallel	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 900 35.43" FINE : 210 8.27"	ULTRA : 740 29.13" SUPER : 490 19.29" TURBO : 320 12.60" HSP : 110 4.33"		**FU-67** Approx. 21 g	**[P.47]**
M6	Threaded	Parallel	1 m 3.3' cut not allowed -40 to +50°C (-40 to +122°F)	R10 R0.39" Stainless Steel				**FU-67G** Approx. 29 g	**[P.47]**
M6	Threaded	Parallel	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 1300 51.18" FINE : 380 14.96"	ULTRA : 1000 39.37" SUPER : 820 32.28" TURBO : 500 19.69" HSP : 160 6.30"		**FU-61** Approx. 21 g	**[P.47]**
M6	Threaded	Parallel	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 1100 43.31" FINE : 300 11.81"	ULTRA : 860 33.86" SUPER : 570 22.44" TURBO : 410 16.14" HSP : 140 5.51"		**FU-6F** Approx. 21 g	**[P.47]**
M6	Threaded	Coaxial	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 720 28.35" FINE : 160 6.30"	ULTRA : 630 24.80" SUPER : 410 16.14" TURBO : 270 10.63" HSP : 130 5.12"		**FU-25** Approx. 18 g	**[P.44]**

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only.)
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

See P.36 for specifications when a reflective lens is attached.

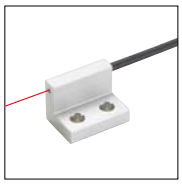
Cylindrical (Set Screw Installation)

Installed by drilling a hole and using a set screw.
Suitable for installation in locations where space is limited.

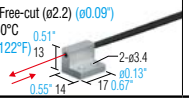
Size	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
ø1.5 ø0.06"	1 m 3.3' cut not allowed -40 to +70°C (-40 to +158°F) 	R4 R0.16" High-flex	MEGA : 150 5.91" FINE : 32 1.26"	ULTRA : 100 3.94" SUPER : 80 3.15" TURBO : 54 2.13" HSP : 22 0.87"	ø0.005 ø0.0002" Gold wire	FU-49X Approx. 3 g	[P.46]
	1 m 3.3' cut not allowed -40 to +70°C (-40 to +158°F)  Do not bend sleeve	R10 R0.39"	MEGA : 27 1.06" FINE : 4.8 0.19"	ULTRA : 18 0.71" SUPER : 13 0.51" TURBO : 10 0.39" HSP : 2.4 0.09"		FU-46 Approx. 2 g	[P.46]
ø2 ø0.08"	1 m 3.3' Free-cut (ø1.0 ø0.04" ×2) -40 to +50°C (-40 to +122°F) 	R2 R0.08" ToughFlex High-flex	MEGA : 140 5.51" FINE : 40 1.57"	ULTRA : 110 4.33" SUPER : 80 3.15" TURBO : 60 2.36" HSP : 13 0.51"		FU-49U Approx. 4 g	[P.46]
ø2.5 ø0.10"	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F)  Do not bend sleeve	R25 R0.98"	MEGA : 72 2.83" FINE : 23 0.91"	ULTRA : 59 2.32" SUPER : 45 1.77" TURBO : 32 1.26" HSP : 12 0.47"		FU-22X Approx. 4 g	[P.44]
ø3 ø0.12"	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) FU-4FZ: -40 to +50°C (-40 to +122°F) FU-4F: -40 to +70°C (-40 to +158°F) 	R2 R0.08" ToughFlex	MEGA : 770 30.32" FINE : 190 7.48"	ULTRA : 560 22.05" SUPER : 380 14.96" TURBO : 260 10.24" HSP : 80 3.15"		FU-4FZ Approx. 8 g	[P.45]
		R25 R0.98"	MEGA : 1100 43.31" FINE : 300 11.81"	ULTRA : 860 33.86" SUPER : 570 22.44" TURBO : 410 16.14" HSP : 140 5.51"		FU-4F Approx. 8 g	[P.45]
	1 m 3.3' Free-cut (ø1.0 ø0.04" ×2) -40 to +50°C (-40 to +122°F) 	R2 R0.08" ToughFlex High-flex	MEGA : 140 5.51" FINE : 40 1.57"	ULTRA : 110 4.33" SUPER : 80 3.15" TURBO : 60 2.36" HSP : 13 0.51"		FU-48U Approx. 4 g	[P.46]
	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +70°C (-40 to +158°F) 	R4 R0.16" High-flex	MEGA : 290 11.42" FINE : 63 2.48"	ULTRA : 200 7.87" SUPER : 130 5.12" TURBO : 80 3.15" HSP : 32 1.26"		FU-48 Approx. 7 g	[P.46]
	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F) 	R25 R0.98"	MEGA : 830 32.68" FINE : 180 7.09"	ULTRA : 680 26.77" SUPER : 470 18.50" TURBO : 320 12.60" HSP : 130 5.12"		FU-23X Approx. 4 g	[P.44]
	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F)  Do not bend sleeve	R4 R0.16"	MEGA : 68 2.68" FINE : 18 0.71"	ULTRA : 54 2.13" SUPER : 40 1.57" TURBO : 27 1.06" HSP : 8 0.32"		FU-45X Approx. 4 g	[P.46]

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only.)
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Integrated Bracket



The bracket and sensor are integrated.

Beam emitting direction	Optical axis height	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
Top	10 mm 0.39"	2 m 6.6' Free-cut (ø2.2) (ø0.09") -40 to +50°C (-40 to +122°F) 	R2 R0.08" ToughFlex	MEGA : 760 29.92" FINE : 170 6.69"	ULTRA : 580 22.83" SUPER : 430 16.93" TURBO : 320 12.60" HSP : 90 3.54"	ø0.005 ø0.0002"	FU-L41Z Approx. 25 g	[P.50]

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only.)
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Benefits!

Eliminate concerns about bracket design, bracket and sensor assembly, or loose brackets.
Integrated designs reduce space requirements.

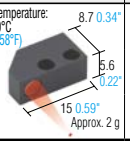
Small Spot Reflective

Great for small object detection.

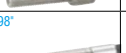
Adjustable Beam Spot/Built-in Lens Fiber Unit

Type	Spot diameter (mm)	Focal distance (mm)	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Model / Weight	Minimum bend radius (mm)	Dimensions
Adjustable beam spot	ø0.9 to 3.5 ø0.04" to ø0.14"	10 to 30 0.39" to 1.18"	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) -40 to +70°C (-40 to +158°F) 	FU-10 Approx. 5 g	R25 R0.98"	[P.44]

Adjustable Beam Spot/Lens + Fiber Unit

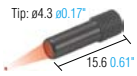
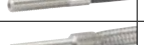
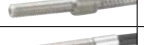
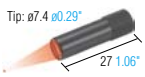
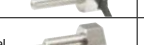
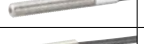
Type	Spot diameter (mm)	Focal distance (mm)	Lens		Dimensions	Fiber Unit		Dimensions
			Appearance (mm) Weight	Model		Minimum bend radius (mm) Appearance	Model	
Side view Adjustable beam spot	ø0.5 to 3 ø0.02" to ø0.12"	8 to 30 0.32" to 1.18"	Ambient temperature: -30 to +70°C (-22 to +158°F) 	F-5HA	[P.50]	R2 R0.08" ToughFlex 	FU-35FZ	[P.51]
						R10 R0.39" Stainless Steel 	FU-35FG	
						R25 R0.98" 	FU-35FA	

Parallel Beam Spot/Lens + Fiber Unit

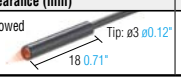
Type	Spot diameter (mm)	Lens		Dimensions	Fiber Unit		Detecting distance (mm)*1		Dimensions
		Appearance (mm) Weight	Model		Minimum bend radius (mm) Appearance	Model	MEGA FINE	Other power modes	
Parallel beam	Approx. ø4 ø0.16" (at 0 to 20 mm 0" to 0.79" distance)	Ambient temperature: -30 to +70°C (-22 to +158°F)  Approx. 2 g	F-3HA	[P.50]	R2 R0.08" ToughFlex 	FU-35FZ	MEGA : 45 1.77" FINE : 36 1.42"	ULTRA : 45 1.77" SUPER : 45 1.77" TURBO : 40 1.57" HSP : 27 1.06"	[P.51]
					R10 R0.39" Stainless steel 	FU-35FG			
					R25 R0.98" 	FU-35FA	MEGA : 65 2.56" FINE : 54 2.13"	ULTRA : 65 2.56" SUPER : 65 2.56" TURBO : 60 2.36" HSP : 45 1.77"	
					R2 R0.08" ToughFlex 	FU-35TZ	MEGA : 40 1.57" FINE : 27 1.06"	ULTRA : 40 1.57" SUPER : 40 1.57" TURBO : 32 1.26" HSP : 23 0.91"	
					R10 R0.39" Stainless Steel 	FU-35TG			

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only.)

Small Beam Spot/Lens + Fiber Unit

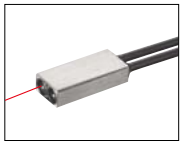
Type	Spot diameter (mm)	Focal distance (mm)	Lens		Dimensions	Fiber Unit		Dimensions
			Appearance (mm) Weight	Model		Minimum bend radius (mm) Appearance	Model	
Small spot	Approx. ø0.1 ø0.004"	7±2 0.28"±0.08"	Ambient temperature: -30 to +70°C (-22 to +158°F)  Approx. 1 g	F-2HA	[P.50]	R10 R0.39" 	FU-24X	[P.51]
	Approx. ø0.2 ø0.008"					R25 R0.98" 	FU-21X	
	Approx. ø0.4 ø0.016"					R2 R0.08" ToughFlex 	FU-35FZ	
						R10 R0.39" Stainless Steel 	FU-35FG	
						R25 R0.98" 	FU-35FA	
						R2 R0.08" ToughFlex 	FU-35TZ	
						R10 R0.39" Stainless Steel 	FU-35TG	
	Approx. ø0.5 ø0.02"	15±2 0.59"±0.08"	Ambient temperature: -30 to +70°C (-22 to +158°F)  Approx. 2 g	F-4HA	[P.50]	R2 R0.08" ToughFlex 	FU-35FZ	
						R10 R0.39" Stainless Steel 	FU-35FG	
						R2 R0.08" ToughFlex 	FU-35TZ	
						R10 R0.39" Stainless Steel 	FU-35TG	
						R25 R0.98" 	FU-35FA	
	Approx. ø1.0 ø0.04"	35±3 1.38"±0.12"	Ambient temperature: -40 to +70°C (-40 to +158°F)  Approx. 5 g	F-6HA	[P.50]	R25 R0.98" 	FU-21X	
	Approx. ø2.0 ø0.08"					R2 R0.08" ToughFlex 	FU-35FZ	
						R10 R0.39" Stainless Steel 	FU-35FG	
						R2 R0.08" ToughFlex 	FU-35TZ	
						R25 R0.98" 	FU-35FA	

Small Beam Spot/Built-in Lens Fiber Unit

Type	Spot diameter (mm)	Focal distance (mm)	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Model / Weight	Minimum bend radius (mm)	Dimensions
Small spot	Approx. ø0.1 ø0.004"	5 0.20"	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F) 	FU-20 Approx. 2 g	R25 R0.98"	[P.44]

* Cannot be used with the FS-N Series HIGH SPEED mode.

Focused Beam/ High power



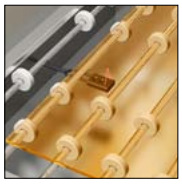
Use of a lens reduces beam width and helps avoid deflection.

Beam emitting direction	Aperture angle	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
Top	Approx. 8°	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +50°C (-40 to +122°F) Thickness 5.2 0.20" 21 0.83"	R2 R0.08" ToughFlex	MEGA : 30 to 2300 1.18" to 90.55" FINE : 30 to 290 1.18" to 11.42"	ULTRA : 30 to 1600 1.18" a 62.99" SUPER : 30 to 760 1.18" to 29.92" TURBO : 30 to 410 1.18" to 16.14" HSP : 30 to 160 1.18" to 6.30"	ø0.3 ø0.01" Copper wire (vertical)	FU-40 Approx. 23 g	[P.45]
		1 m 3.3' cut not allowed -40 to +50°C (-40 to +122°F) Thickness 5.2 0.20" 21 0.83"	R10 R0.39" Stainless Steel				FU-40G Approx. 50 g	[P.45]

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only).
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Reflective model **Transparent object detection type**

Definite-reflective



Features a limited detection range.

Benefits!

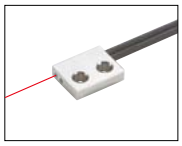
Thin size allows installation where space is limited. Since the effects of the background are minimized, stable detection is possible in complex environments. The FU-38 is a small spot type, which is great for small object detection.

Beam emitting direction	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Spot diameter (mm)	Minimum detectable object (mm)*2	Model / Weight	Dimensions
Top	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F) 19 0.75" 17 0.67" 7.4 0.29"	R25 R0.98"	MEGA : 15 to 70 0.59" to 2.76" FINE : 15 to 30 0.59" to 1.18"	ULTRA : 15 to 60 0.59" to 2.36" SUPER : 15 to 46 0.59" to 1.81" TURBO : 15 to 38 0.59" to 1.50" HSP : -	–	–	FU-40S Approx. 25 g	[P.45]
Side	14.4 0.57" 2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +70°C (-40 to +158°F) 19 0.75" Thickness 5 0.20"	R10 R0.39"	MEGA : 3 0.12" center of detecting distance FINE : 3 0.12" center of detecting distance	ULTRA : 3 0.12" center of detecting distance SUPER : 3 0.12" center of detecting distance TURBO : 3 0.12" center of detecting distance HSP : 3 0.12" center of detecting distance	Approx. 4.5 ø0.18" Approx. 3.5 ø0.14" (At 3 0.12" mm distance)	ø0.005 ø0.0002" Gold wire	FU-37 Approx. 6 g	[P.45]
Flat	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +70°C (-40 to +158°F) Thickness 4 0.16" 19 0.75" 12 0.47"		MEGA : 6 0.24" center of detecting distance FINE : 6 0.24" center of detecting distance	ULTRA : 6 0.24" center of detecting distance SUPER : 6 0.24" center of detecting distance TURBO : 6 0.24" center of detecting distance HSP : 6 0.24" center of detecting distance	Approx. ø1.5 ø0.06" (At 6 0.24" mm distance)		FU-38 Approx. 5 g	[P.45]
	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +70°C (-40 to +158°F) Thickness 4.3 0.17" 19 0.75" 12 0.47"		MEGA : 0 to 4 0" to 0.16" FINE : 0 to 4 0" to 0.16"	ULTRA : 0 to 4 0" to 0.16" SUPER : 0 to 4 0" to 0.16" TURBO : 0 to 4 0" to 0.16" HSP : 2±1.4 0.08" ± 0.06"	–	ø0.08 ø0.003" Copper wire	FU-38V Approx. 5 g	
	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +60°C (-40 to +140°F) Thickness 5.2 0.20" 20 0.79" 14 0.55"	R25 R0.98"	MEGA : 8 to 38 0.32" to 1.50" FINE : 8 to 32 0.32" to 1.26"	ULTRA : 8 to 36 0.32" to 1.42" SUPER : 8 to 35 0.32" to 1.38" TURBO : 8 to 34 0.32" to 1.34" HSP : 10 to 26 0.39" to 1.02"	–	–	FU-38L Approx. 20 g	[P.45]
	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F) Thickness 3.6 0.14" 29 1.14" 20.5 0.81"	R5 R0.20"	MEGA : 0 to 25 0" to 0.98" FINE : 0 to 25 0" to 0.98"	ULTRA : 0 to 25 0" to 0.98" SUPER : 0 to 25 0" to 0.98" TURBO : 0 to 25 0" to 0.98" HSP : –	–	–	FU-38S Approx. 20 g	[P.45]
	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +70°C (-40 to +158°F) Thickness 3.8 0.15" 29 1.14" 22 0.87"	R25 R0.98"	MEGA : 0 to 14 0" to 0.55" FINE : 0 to 14 0" to 0.55"	ULTRA : 0 to 14 0" to 0.55" SUPER : 0 to 14 0" to 0.55" TURBO : 0 to 14 0" to 0.55" HSP : 0 to 12 0" to 0.47"	–	–	FU-38R Approx. 20 g	

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only).
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Reflective model **Space-Saving Type**

Flat Bracket Fibers



Bracket-shaped design is thinner than ever.

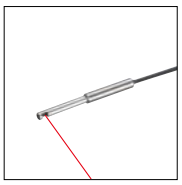
Benefits!

Metal housing eliminates concern about damaged sensors. The sensor and case form a flat surface, so there are no openings where dust and other foreign matter can enter.

Beam emitting direction	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
Top	1 m 3.3' Free-cut (ø1.0 ø0.04" ×2) -40 to +50°C (-40 to +122°F) 2-ø2.1 ø0.08" 6.5 0.26" 8 0.32" Thickness 2 0.08"	R2 R0.08" ToughFlex	MEGA : 1 to 160 0.04" to 6.30" FINE : 1 to 36 0.04" to 1.42"	ULTRA : 1 to 120 0.04" to 4.72" SUPER : 1 to 81 0.04" to 3.19" TURBO : 1 to 60 0.04" to 2.36" HSP : 1 to 13 0.04" to 0.51"	ø0.005 ø0.0002" Gold wire	FU-44TZ Approx. 3 g	[P.46]
Side	1 m 3.3' Free-cut (ø1.0 ø0.04" ×2) -40 to +50°C (-40 to +122°F) 0.41" 10.5 7.2 0.28" 2-ø2.1 ø0.08" Thickness 2.5 0.10"		MEGA : 1 to 160 0.04" to 6.30" FINE : 1 to 36 0.04" to 1.42"	ULTRA : 1 to 120 0.04" to 4.72" SUPER : 1 to 81 0.04" to 3.19" TURBO : 1 to 60 0.04" to 2.36" HSP : 1 to 18 0.04" to 0.71"		FU-47TZ Approx. 4 g	
Flat	1 m 3.3' Free-cut (ø1.0 ø0.04") -40 to +50°C (-40 to +122°F) 13 ø0.51" 7 0.28" 2-ø2.1 ø0.08" Thickness 2 0.08"		MEGA : 2 to 120 0.08" to 4.72" FINE : 2 to 24 0.08" to 0.94"	ULTRA : 2 to 77 0.08" to 3.03" SUPER : 2 to 50 0.08" to 1.97" TURBO : 2 to 32 0.08" to 1.26" HSP : 2 to 8 0.08" to 0.32"		FU-41TZ Approx. 5 g	[P.45]
	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +50°C (-40 to +122°F) 20 0.79" 7 0.28" 2-ø3.2 ø0.13" Thickness 4 0.16"		MEGA : 1 to 500 0.04" to 19.69" FINE : 1 to 70 0.04" to 2.76"	ULTRA : 1 to 320 0.04" to 12.60" SUPER : 1 to 190 0.04" to 7.48" TURBO : 1 to 130 0.04" to 5.12" HSP : 1 to 50 0.04" to 1.97"		FU-42TZ Approx. 24 g	

*1 When using the FS-N Series.Standard target: White mat paper (Reflective type only).
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Sleeve



The fiber tip is incorporated into a thin sleeve.

Benefits!

When determining the smallest detectable object, positioning the sensor too closely to the object causes the object to disappear, making alignment difficult. With the sleeve type, the sensor itself does not become an obstruction and alignment is much easier.

Beam emitting direction	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
Side	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +70°C (-40 to +158°F) Sleeve part Do not bend	R10 R0.39"	MEGA : 180 7.09" FINE : 32 1.26"	ULTRA : 130 5.12" SUPER : 81 3.19" TURBO : 50 1.97" HSP : 18 0.71"	ø0.005 ø0.0002" Gold wire	FU-31 Approx. 5 g	[P.44]
	1 m 3.3' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F) Sleeve part bend R25 R0.98"	R25 R0.98"	MEGA : 320 12.60" FINE : 45 1.77"	ULTRA : 250 9.84" SUPER : 140 5.51" TURBO : 90 3.54" HSP : 32 1.26"		FU-33 Approx. 10 g	[P.44]
Top	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F) Sleeve part Do not bend	R4 R0.16"	MEGA : 68 2.68" FINE : 18 0.71"	ULTRA : 54 2.13" SUPER : 40 1.57" TURBO : 27 1.06" HSP : 8 0.32"		FU-65X Approx. 5 g	[P.47]
	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) -40 to +50°C (-40 to +122°F)	R2 R0.08" ToughFlex	MEGA : 290 11.42" FINE : 54 2.13"	ULTRA : 190 7.48" SUPER : 120 4.72" TURBO : 80 3.15" HSP : 23 0.91"		FU-63Z Approx. 10 g	[P.47]
	2 m 6.6' Free-cut (ø1.3 ø0.05"×2) -40 to +70°C (-40 to +158°F)	R25 R0.98"	MEGA : 330 12.99" FINE : 72 2.83"	ULTRA : 230 9.06" SUPER : 150 5.91" TURBO : 100 3.94" HSP : 36 1.42"		FU-63 Approx. 10 g	[P.47]
	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) -40 to +70°C (-40 to +158°F)					FU-63T Approx. 10 g	[P.47]
	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F) Sleeve part Do not bend	R4 R0.16"	MEGA : 68 2.68" FINE : 18 0.71"	ULTRA : 54 2.13" SUPER : 40 1.57" TURBO : 27 1.06" HSP : 8 0.32"		FU-45X Approx. 4 g	[P.46]
	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) -40 to +70°C (-40 to +158°F) Sleeve part Do not bend	R25 R0.98"	MEGA : 330 12.99" FINE : 72 2.83"	ULTRA : 230 9.06" SUPER : 150 5.91" TURBO : 100 3.94" HSP : 36 1.42"		FU-43 Approx. 8 g	[P.46]
	1 m 3.3' cut not allowed -40 to +70°C (-40 to +158°F) Sleeve part Do not bend	R10 R0.39"	MEGA : 27 1.06" FINE : 4.8 0.19"	ULTRA : 18 0.71" SUPER : 13 0.51" TURBO : 10 0.39" HSP : 2.4 0.09"		FU-46 Approx. 2 g	[P.46]
Coaxial narrow beam 10°	50 cm 19.69" cut not allowed -40 to +70°C (-40 to +158°F) Sleeve part Do not bend	R25 R0.98"	MEGA : 72 2.83" FINE : 23 0.91"	ULTRA : 59 2.32" SUPER : 45 1.77" TURBO : 32 1.26" HSP : 12 0.47"		FU-22X Approx. 4 g	[P.44]

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only).
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Reflective model Environment-proof

Oil-proof, Chemical Proof

Sensor is encased in fluorocarbon resin.

Beam emitting direction	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Standard Detectable object (mm)	Model / Weight	Dimensions
Top	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) -40 to +70°C (-40 to +158°F)	R40 R1.57"	MEGA : 310 12.20" FINE : 140 5.51"	ULTRA : 290 11.42" SUPER : 250 9.84" TURBO : 200 7.87" HSP : 80 3.15"	–	FU-91 Approx. 32 g	[P.48]
	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) -40 to +60°C (-40 to +140°F) Thickness 9.6 0.38" (width of ø4.1 ø0.16" mounting hole seating surface)		MEGA : 8 to 20 0.32" to 0.79" FINE : 8 to 20 0.32" to 0.79"	ULTRA : 8 to 20 0.32" to 0.79" SUPER : 8 to 20 0.32" to 0.79" TURBO : 8 to 20 0.32" to 0.79" HSP : 8 to 16 0.32" to 0.63"	200×200 7.87"×7.87" t = 0.7 0.03" Glass substrate	FU-97P Approx. 75 g	[P.49]
	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) -40 to +85°C (-40 to +185°F)					FU-97S Approx. 90 g	[P.49]

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only.)

Reflective/Environment-proof

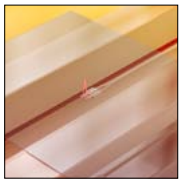
High-flex

Suited for use with moving object detection.

Size (mm)	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
ø2 ø0.08"	1 m 3.3' Free-cut (ø1.0 ø0.04" ×2) -40 to +50°C (-40 to +122°F) ø0.08" ø2 10 0.39"	R2 R0.08" ToughFlex High-flex	MEGA : 140 5.51" FINE : 40 1.57"	ULTRA : 110 4.33" SUPER : 80 3.15" TURBO : 60 2.36" HSP : 13 0.51"	ø0.005 ø0.0002" Gold wire	FU-49U Approx. 4 g	[P.46]
ø3 ø0.12"	1 m 3.3' Free-cut (ø1.0 ø0.04" ×2) -40 to +50°C (-40 to +122°F) ø0.12" ø3 10 0.39"					FU-48U Approx. 4 g	[P.46]
M3	1 m 3.3' Free-cut (ø1.0 ø0.04" ×2) -40 to +50°C (-40 to +122°F) M3 13 0.51"					FU-69U Approx. 4 g	[P.47]
ø1.5 ø0.06"	1 m 3.3' cut not allowed -40 to +70°C (-40 to +158°F) ø1.5 ø0.06" 15 0.59"	R4 R0.16" High-flex	MEGA : 150 5.91" FINE : 32 1.26"	ULTRA : 100 3.94" SUPER : 80 3.15" TURBO : 54 2.13" HSP : 22 0.87"		FU-49X Approx. 3 g	[P.46]
M3	1 m 3.3' cut not allowed -40 to +70°C (-40 to +158°F) M3 10 0.39"					FU-69X Approx. 3 g	[P.47]
ø3 ø0.12"	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +70°C (-40 to +158°F) ø3 15 0.59"		MEGA : 290 11.42" FINE : 63 2.48"	ULTRA : 200 7.87" SUPER : 130 5.12" TURBO : 80 3.15" HSP : 32 1.26"		FU-48 Approx. 7 g	[P.46]
M4	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +70°C (-40 to +158°F) M4 15 0.59"					FU-68 Approx. 8 g	[P.47]

*1 When using the FS-N Series.Standard target: White mat paper (Reflective type only.)
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Heat Resistant



Suited for use at high object detection temperatures of up to 350°C (662°F).

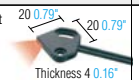
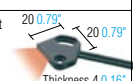
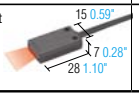
Heat resistant temperature*3	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
100°C*4 (212°F)	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +100°C (-40 to +212°F) M6 17 0.67"	R5 R0.20" ToughFlex	MEGA : 740 29.13" FINE : 160 6.30"	ULTRA : 580 22.83" SUPER : 410 16.14" TURBO : 320 12.60" HSP : 90 3.54"	ø0.005 ø0.0002" Gold wire	FU-85Z Approx. 25 g	[P.48]
105°C*4 (221°F)	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +105°C (-40 to +221°F) M6 17 0.67"	R25 R0.98"	MEGA : 1100 43.31" FINE : 230 9.06"	ULTRA : 860 33.86" SUPER : 590 23.23" TURBO : 410 16.14" HSP : 140 5.51"		FU-85A Approx. 21 g	[P.48]
150°C*5 (302°F)	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +150°C (-40 to +302°F) M6 17 0.67"	R20 R0.79"	MEGA : 720 28.35" FINE : 160 6.30"	ULTRA : 560 22.05" SUPER : 410 16.14" TURBO : 320 12.60" HSP : 90 3.54"		FU-85H Approx. 35 g	[P.48]
180°C*6 (356°F)	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -60 to +180°C (-76 to +356°F) M6 17 0.67"	R35 R1.38"	MEGA : 860 33.86" FINE : 200 7.87"	ULTRA : 710 27.95" SUPER : 470 18.50" TURBO : 350 13.78" HSP : 100 3.94"		FU-87 Approx. 33 g	[P.48]
200°C (392°F)	1 m 3.3' cut not allowed -40 to +200°C (-40 to +392°F) M4 10 0.39" 17 0.67"	R8 R0.32"	MEGA : 770 30.32" FINE : 190 7.48"	ULTRA : 650 25.59" SUPER : 450 17.72" TURBO : 340 13.39" HSP : 100 3.94"		FU-87K Approx. 15 g	[P.48]
300°C (572°F)	1 m 3.3' cut not allowed -40 to +300°C (-40 to +572°F) M4 ø2.1 ø0.08" 35 1.38" 90 3.54" Sleeve part R10 R0.39"	R25 R0.98"				FU-82C Approx. 29 g	[P.48]
	1 m 3.3' cut not allowed -40 to +300°C (-40 to +572°F) M4 ø0.10" ø2.6 10 0.39" 17 0.67"					FU-83C Approx. 23 g	[P.48]
350°C (662°F)	1 m 3.3' cut not allowed -30 to +350°C (-22 to +662°F) M4 ø0.08" ø2.1 40 1.57" 90 3.54" Sleeve part R10 R0.39"		MEGA : 650 25.59" FINE : 140 5.51"	ULTRA : 560 20.05" SUPER : 390 15.35" TURBO : 290 11.42" HSP : 86 3.39"		FU-81C Approx. 24 g	[P.48]
180°C*6 (356°F)	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +180°C (-40 to +356°F) Thickness 5 0.20" 0.75" 19 27 1.06"	R35 R1.38"	MEGA : 2.5 to 65 0.10" to 2.56" FINE : 2.5 to 16 0.10" to 0.63"	ULTRA : 2.5 to 55 0.10" to 2.17" SUPER : 2.5 to 27 0.10" to 1.06" TURBO : 2.5 to 22 0.10" to 0.87" HSP : 2.5 to 10 0.10" to 0.39"	–	FU-38H Approx. 45 g	[P.45]
250°C (482°F)	1 m 3.3' cut not allowed -40 to +250°C (-40 to +482°F) Thickness 5 0.20" 0.75" 19 27 1.06"	R25 R0.98"				FU-38K Approx. 45 g	[P.45]
	2 m 6.6' cut not allowed -40 to +250°C (-40 to +482°F) Thickness 5 0.20" 0.67" 17.1 29.7 1.17"		MEGA : 8 to 37 0.32" to 1.46" FINE : 8 to 30 0.32" to 1.18"	ULTRA : 8 to 34 0.32" to 1.34" SUPER : 8 to 32 0.32" to 1.26" TURBO : 8 to 30 0.32" to 1.18" HSP : 10 to 18 0.39" to 0.71"		FU-38LK Approx. 70 g	[P.45]

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only). (FU-38LK shows values for t=0.7 mm 0.03" glass substrate (horizontal direction).)
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.
*3 Use the fiberoptic sensor under dry conditions. Allow some margin for the temperature upper limit when selecting a heat-resistant fiber unit.
*4 The recommended maximum ambient temperature during operation is 90°C (194°F) when constantly using a fiber unit in a high-temperature environment.
*5 The recommended maximum ambient temperature during operation is 130°C (266°F) when constantly using a fiber unit in a high-temperature environment.
*6 The recommended maximum ambient temperature during operation is 150°C (302°F) when constantly using a fiber unit in a high-temperature environment.

Reflective model — Dedicated application type

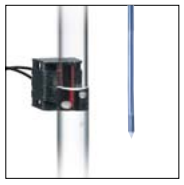
Area

Useful in situations where target position varies.

Type	Detecting width	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum detectable object (mm)*2	Model / Weight	Dimensions
Array	10 mm 0.39" (Detecting distance is 4 mm 0.16")	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F) 	R4*3 R0.16"	MEGA : 740 29.13" FINE : 140 5.51"	ULTRA : 460 18.11" SUPER : 260 10.24" TURBO : 180 7.09" HSP : 60 2.36"	ø0.005 ø0.0002" Gold wire	FU-A05D Approx. 20 g	[P.49]
	15 mm 0.59" (Detecting distance is 4 mm 0.16")	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F) 					FU-A10D Approx. 20 g	[P.49]
Area	15 mm 0.59" (At detecting distance of 15 mm 0.59")	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F) 	R25 R0.98"	MEGA : 5 to 200 0.20" to 7.87" FINE : 5 to 140 0.20" to 5.51"	ULTRA : 5 to 200 0.20" to 7.87" SUPER : 5 to 200 0.20" to 7.87" TURBO : 5 to 160 0.20" to 6.30" HSP : 5 to 110 0.20" to 4.33"	ø0.1 ø0.004" Gold wire	FU-11 Approx. 19 g	[P.44]

*1 When using the FS-N Series. Standard target: White mat paper (Reflective type only).
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.
*3 R10 R0.39" for the first 10 mm 0.39" of cable from the housing.

Liquid-level

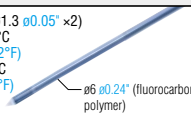


Liquid-level sensors are available in tube-mountable and immersible types.

Benefits!

Though a single beam axis was utilized in the past, this resulted in mis-detection caused by air bubbles, droplets, and other problems. The 16 beam axis is a suitable countermeasure for these types of problems.

Detecting method	Transparent tube diameter (mm)	Beam axis	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Accessory	Model / Weight	Dimensions
Tube mountable	ø4 to 26 ø0.16" to ø1.02"	16	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F) 	R5 R0.20"	Binding band×2 Nonslip rubber×2	FU-95S Approx. 23 g	[P.48]
		1	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) FU-95Z : -40 to +50°C (-40 to +122°F) FU-95HA : -40 to +105°C (-40 to +221°F)* FU-95 : -40 to +70°C (-40 to +158°F)  * The recommended maximum ambient temperature during operation is 90°C (194°F) when constantly using a fiber unit in a high-temperature environment.	R2 R0.08" ToughFlex	Binding band×2 Nonslip rubber×2 Spacer×2 Screw×2 Nut×2	FU-95Z Approx. 7 g	[P.48]
				R10 R0.39"		FU-95HA Approx. 7 g	[P.48]
				R10 R0.39"		FU-95 Approx. 7 g	[P.48]
	More than ø26 ø1.02" is recommended	16	2 m 6.6' Free-cut (ø2.2 ø0.09" ×2) -40 to +70°C (-40 to +158°F) 	R5 R0.20"	None (Optionally available)	FU-95W Approx. 20 g	[P.49]

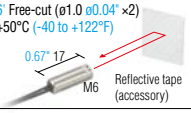
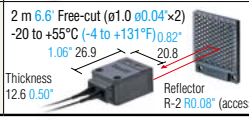
Detecting method	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Minimum bend radius (mm) PFA-sheathed section	Minimum bend radius (mm) Fiber	Model / Weight	Dimensions
Immersion	2 m 6.6' Free-cut (ø1.3 ø0.05" ×2) FU-93Z: -40 to +50°C (-40 to +122°F) FU-93: -40 to + 70°C (-40 to +158°F) 	R40* R1.57"	R0.5 R0.20" ToughFlex	FU-93Z Approx. 78 g	[P.48]
			R25 R0.98"	FU-93 Approx. 78 g	[P.48]

* Not bendable up to 80 mm 3.15" from the tip.

Retro-reflective Type — Transparent object detection type

Retro-reflective

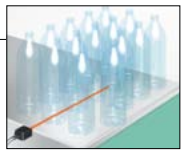
Reflectors enable stable detection with reduced installation time.

Appearance	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)* MEGA FINE	Detecting distance (mm)* Other power modes	Model / Weight	Dimensions
M6	2 m 6.6' Free-cut (ø1.0 ø0.04" ×2) -40 to +50°C (-40 to +122°F) 	R2 R0.08" ToughFlex	MEGA : 10 to 960 0.39" to 37.80" FINE : 10 to 120 0.39" to 4.72"	ULTRA : 10 to 760 0.39" to 29.92" SUPER : 10 to 380 0.39" to 14.96" TURBO : 10 to 230 0.39" to 9.06" HSP : –	FU-13 Approx. 8 g	[P.44]
Square type	2 m 6.6' Free-cut (ø1.0 ø0.04"×2) -20 to +55°C (-4 to +131°F) 	R10 R0.39"	MEGA : 100 to 6400 3.94" to 251.97" FINE : 100 to 1260 3.94" to 49.61"	ULTRA : 100 to 5000 3.94" to 196.85" SUPER : 100 to 2500 3.94" to 98.43" TURBO : 100 to 1690 3.94" to 66.54" HSP : 100 to 1000 3.94" to 39.37"	FU-15 Approx. 12 g	[P.44]

* When using the FS-N Series.

Benefits!

The optics of the FU-15 suppress the effects of refraction and deflection for stable detection of liquid-filled PET bottles and other objects. The FU-15 has an IP67 enclosure rating.



Retro-reflective/Transparent Object Detection

Reflector/Reflective Tape Specifications (Optional Parts)

Model	Power mode	R-2 (OP-95388)  51.2×61 mm 2.02" x 2.40"	R-3 (OP-96436)  35×42 mm 1.38" x 1.65"	R-5  14×36 mm 0.55" x 1.42"	Reflective tape (OP-96629)  40×30 mm 1.57" x 1.18"
FU-13	MEGA (mm)	10 to 1880 0.39" to 74.02"	10 to 1540 0.39" to 60.63"	10 to 1060 0.39" to 41.73"	10 to 960 0.39" to 37.80"
	ULTRA (mm)	10 to 1500 0.39" to 59.06"	10 to 1240 0.39" to 48.82"	10 to 860 0.39" to 33.86"	10 to 760 0.39" to 29.92"
	SUPER (mm)	10 to 760 0.39" to 29.92"	10 to 640 0.39" to 25.20"	10 to 440 0.39" to 17.32"	10 to 380 0.39" to 14.96"
	TURBO (mm)	10 to 450 0.39" to 17.72"	10 to 360 0.39" to 14.17"	10 to 230 0.39" to 9.06"	10 to 230 0.39" to 9.06"
	FINE (mm)	10 to 250 0.39" to 9.84"	10 to 200 0.39" to 7.87"	10 to 130 0.39" to 5.12"	10 to 120 0.39" to 4.72"
	HSP (mm)	–	–	–	–
FU-15*1	MEGA (mm)	100 to 6400 3.94" to 251.97"	100 to 4400 3.94" to 173.23"	100 to 2600 3.94" to 102.36"	–
	ULTRA (mm)	100 to 5000 3.94" to 196.85"	100 to 3600 3.94" to 141.73"	100 to 2200 3.94" to 86.61"	
	SUPER (mm)	100 to 2500 3.94" to 98.43"	100 to 2000 3.94" to 78.74"	100 to 1500 3.94" to 59.06"	
	TURBO (mm)	100 to 1690 3.94" to 66.54"	100 to 1350 3.94" to 53.15"	100 to 1200 3.94" to 47.24"	
	FINE (mm)	100 to 1260 3.94" to 49.61"	100 to 1000 3.94" to 39.37"	100 to 1000 3.94" to 39.37"	
	HSP (mm)	100 to 1000 3.94" to 39.37"	100 to 860 3.94" to 33.86"	100 to 860 3.94" to 33.86"	

*1 Reflective tape cannot be used.

Vacuum environment type (Thrubeam)

Previously requested vacuum type is added to the lineup.

Detecting method	Type	Heat resistant temperature	Fiber unit length (Diameter) Ambient temperature Appearance (mm)	Cable bend radius (mm)	Detecting distance (mm)*1 MEGA FINE	Detecting distance (mm)*1 Other power modes	Minimum Detectable object (mm)*2	Model / Weight	Dimensions
Thrubeam type	Vacuum side	350°C 662°F	1 m 0.04" cut not allowed -40 to +350°C (-40 to + 662°F) 3 0.12" 12 0.47" 25 0.98" M4×P0.7 SUS304	R25 R0.98"	MEGA : 1300 51.18" FINE : 270 10.63"	ULTRA : 500 SUPER : 19.69" TURBO : 360 HSP : 14.17" 720 28.35" 135 5.32"	ø0.005 ø0.0002" Opaque	FU-V84 Approx. 55 g	[P.50]
		350°C 662°F	1 m 0.04" cut not allowed -40 to +350°C (-40 to + 662°F) 3 0.12" 21.1 0.83" 12 0.47" M4×P0.7 SUS304 37 max. 1.46"					FU-V84L Approx. 60 g	[P.50]
	Atmosphere side	70°C 158°F	2 m 0.08" Free-cut (ø2.2 ø0.09") -40 to +70°C (-40 to + 158°C) Across-flats: 8 0.32" 10 0.39"					FU-V7FN Approx. 30 g	[P.50]

*1 Common for APC ON/OFF when the FS-N Series is used.
*2 The smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Detecting method	Heat resistant temperature	Ambient temperature Appearance (mm)	Material	Accessory	Model / Weight	Dimensions
Optical integrator thrubeam 1 set connection type	200°C 392°F	-10 to +200°C (14 to +392°F) 45 1.77"	Unit housing: SUS304 Fiber: Multicomponent glass	·M5 nut, spring washer, washer: 2 each: SUS304 ·2 O-rings: Fluoro-rubber	FU-VJ1 Approx. 25 g	[P.50]

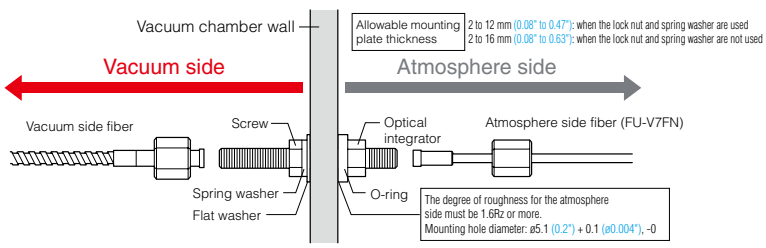
Detecting method	Heat resistant temperature	Ambient temperature Appearance (mm)	Applicable fiber units	Detecting distance (mm)*3 MEGA	ULTRA	SUPER	TURBO	FINE	HSP	Model / Weight	Dimensions
For vacuum long-distance Lens	350°C 662°F	-10 to +350°C (14 to +662°F) Tip: ø4 ø0.16" 7.7 0.3"	FU-V84 FU-V84L	5600 220.47"	4000 157.48"	2600 102.36"	1800 70.87"	1200 47.24"	600 23.62"	F-V2 Approx. 2 g	[P.50]

*3 Common for APC ON/OFF when the FS-N Series is used.

Detecting method	Heat resistant temperature	Ambient temperature Appearance (mm)	Features	Material/Accessory	Model / Weight	Dimensions
2 channel chamber flange	200°C 392°F	-10 to +200°C (14 to +392°F) ø70 ø2.76"	·2 sets of optical integrators are connectable. ·External diameter ø70 ø2.76 and O-ring ø40 ø1.57". Refer to the dimensions for the appearance.	[Material] SUS304 [Accessory] 1×O-ring Material: Fluoro-rubber	FU-VJ2 Approx. 280 g	[P.50]

■ How to mount the optical integrator

The optical integrator seals and isolates the vacuum and atmosphere sides while still transmitting light from the vacuum fiber to the atmosphere fiber. All optical integrators have been leak tested. (Leak amount: 1×10^{-10}Pa·m^3/sec max, at helium leak test)



Amplifier

Cable type

Type		Appearance	Model		Control outputs	External input	Monitor output	Dimensions
			NPN output	PNP output				
Standard	Main unit		FS-N11N	FS-N11P	1	0	0	[P.52]
	Expansion unit		FS-N12N	FS-N12P				
2 output	Main unit		FS-N13N	FS-N13P	2	1	0	
	Expansion unit		FS-N14N	FS-N14P				
Monitor output	Main unit		FS-N11MN	–	1	0	1	

M8 connector type

Type		Appearance	Model		Control outputs	External input	Monitor output	Dimensions
			NPN output	PNP output				
Standard	Main unit		FS-N11CN	FS-N11CP	1	1	0	[P.52]
	Expansion unit		FS-N12CN	FS-N12CP				
2 output	Main unit		–	FS-N13CP	2	0	0	
	Expansion unit		–	FS-N14CP				

Zero line type

Type	Appearance	Model	Control outputs	External input	Monitor output	Dimensions
Expansion unit (No output line)		FS-N10	None*1	0	0	[P.53]

*1 Counted as one output when added to a NU Series communication unit.

Specifications

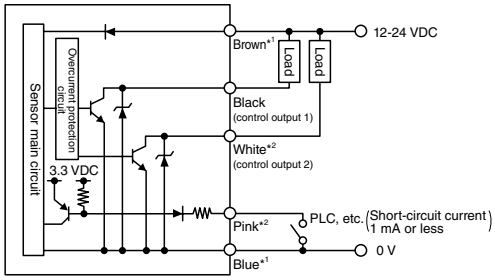
Type		Standard 1 output				High functionality 2 output				Monitor output	Zero line
Cable/M8 connector		Cable		M8 connector *1		Cable		M8 connector *1		Cable	–
Main/Expansion unit		Main unit	Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit (No output wire)
Model	NPN	FS-N11N	FS-N12N	FS-N11CN	FS-N12CN	FS-N13N	FS-N14N	–	–	FS-N11MN	FS-N10
	PNP	FS-N11P	FS-N12P	FS-N11CP	FS-N12CP	FS-N13P	FS-N14P	FS-N13CP	FS-N14CP	–	
I/O	Control outputs	1 output	1 output	1 output	1 output	2 output	2 output	2 output	2 output	1 output	None*2
	Monitor output (1 to 5 V)	–	–	–	–	–	–	–	–	1 output	–
	External input	–	–	1 input	1 input	1 input	1 input	–	–	–	–
Light source LED		Red, 4-element LED (Wavelength: 630 nm)									
Response time		50 µs (HIGH SPEED)/250 µs (FINE)/500 µs (TURBO)/1 ms (SUPER)/4 ms (ULTRA)/16 ms (MEGA)									
Output selection		LIGHT-ON/DARK-ON (switch-selectable)									
Timer function		Timer OFF/OFF-delay timer/ON-delay timer/One-shot timer									
Control outputs	NPN output	NPN open collector 24 V, (without expansion) for one output: 100 mA max., two output total: 100 mA max., (with expansion) 20 mA max for one output, residual voltage 1 V max.									
	PNP output	PNP open collector 24 V, (without expansion) for one output: 100 mA max., two output total: 100 mA max., (with expansion) 20 mA max for one output, residual voltage 1 V max.									
Monitor output*3		1 to 5 V voltage output; load resistance 10 kΩ or more; repeat precision ±0.5% of F.S.; response time: 1 ms (HIGH SPEED, FINE, TURBO)*4									
External input		Input time 2 ms (ON)/20 ms (OFF) or more*5									
Multiple connections to expansion units		Up to 16 units can be connected in total (two-output type is treated as two units)									
Protection circuit		Reverse polarity protection, Over-current protection, Surge absorber									
Number of interference prevention units		0 for HIGH SPEED; 4 for FINE; 8 for TURBO/SUPER/ULTRA/MEGA (When set to DOUBLE, the number of interference-prevention units will be doubled.)									
Rating	Power voltage	12 to 24 VDC ±10% ripple (P-P) 10% or less									
	NPN	Normal: 900 mW or less (36 mA max. at 24 V, 48 mA max. at 12 V)*6 Eco on mode: 800 mW or less (32 mA max. at 24 V, 39 mA max. at 12 V)*6 Eco Full mode: 470 mW or less (19 mA max. at 24 V, 23 mA max. at 12 V)									
	PNP	Normal: 950 mW or less (39 mA max. at 24 V, 52 mA max. at 12 V)*6 Eco on mode (ALL): 850 mW or less (35 mA max. at 24 V, 44 mA max. at 12 V)*6 Eco Full mode: 520 mW or less (21 mA max. at 24 V, 26 mA max. at 12 V)				Normal: 1050 mW or less (42 mA max. at 24 V, 56 mA max. at 12 V)*6 Eco on mode (ALL): 950 mW or less (38 mA max. at 24 V, 47 mA max. at 12 V)*6 Eco Full mode: 600 mW or less (24 mA max. at 24 V, 29 mA max. at 12 V)				–	
Environmental resistance	Ambient light	Incandescent lamp: 20,000 lux max., Sunlight: 30,000 lux max.									
	Ambient temperature	-20°C to +55°C (-4 to +131°F) (No freezing)*7									
	Relative humidity	35 to 85% RH (No condensation)									
	Vibration resistance	10 to 55 Hz, double amplitude 1.5 mm 0.06", 2 hours for each of X,Y,Z axis									
	Shock resistance	500 m/s^2 3 times for each of X,Y and Z axis									
Case material		Main unit and cover material: Polycarbonate									
Case size		H 30.3 mm 1.19" × W 9.8 mm 0.39" × L 71.8 mm 2.83"									
Weight		Approx. 75 g	Approx. 45 g	Approx. 22 g	Approx. 22 g	Approx. 80 g	Approx. 70 g	Approx. 22 g	Approx. 22 g	Approx. 75 g	Approx. 20 g

*1 Use a cable length of 30 m 98.43' or less for M8 connector type. *2 Counted as one output when added to a NU Series communication unit.
*3 FS-N11MN only. *4 SUPER : 1.2 ms, ULTRA : 1.8 ms, MEGA : 4.2 ms. *5 Input time is 25 ms (ON)/25 ms (OFF) when external calibration time is selected.
*6 Increases 100 mW (4.0 mA) for HIGH SPEED mode.
*7 One or two more units connected: -20 to +55°C (-4 to +131°F); 3 to 10 more units connected: -20 to +50°C (-4 to +122°F); 11 to 16 more units connected: -20 to +45°C (-4 to +113°F).
When using 2-outputs, one unit is counted as two units. All temperature regulations are for when the unit is mounted on a DIN rail and installed on metal sheeting.

I/O Circuit Diagram

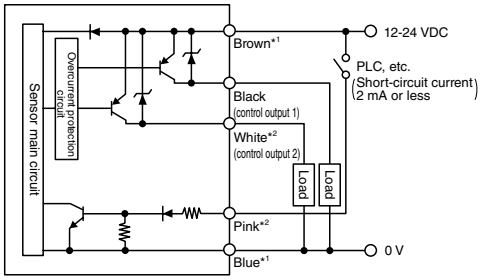
Cable type

FS-N11N / N12N / N13N / N14N



*1 FS-N11N / N13N only
*2 FS-N13N / N14N only

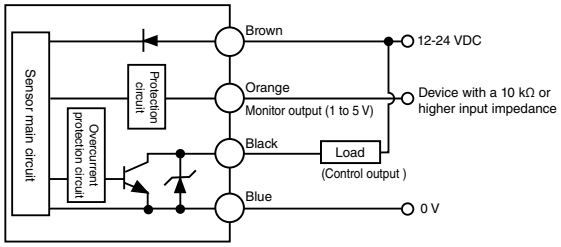
FS-N11P / N12P / N13P / N14P



*1 FS-N11P / N13P only
*2 FS-N13P / N14P only

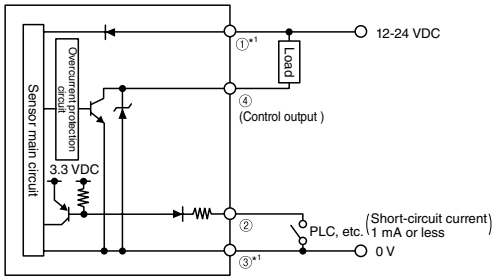
Monitor output type

FS-N11MN



M8 connector type

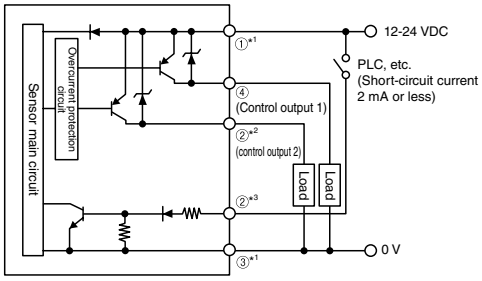
FS-N11CN / N12CN



*1 FS-N11CN only

M8 connector pin layout

FS-N11CP / N12CP / N13CP / N14CP



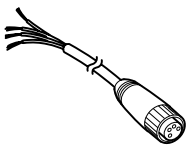
*1 FS-N11CP/N13CP only
*2 FS-N13CP/N14CP only
*3 FS-N11CP/N12CP only

M8 connector pin layout

M8 Connector Cable (sold separately)

FS-N11Cx / N12Cx / N13CP / N14CP

OP-73864 (Cable length: 2 m 6.6')
OP-73865 (Cable length: 10 m 32.8')

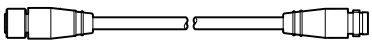


Pin - wire color

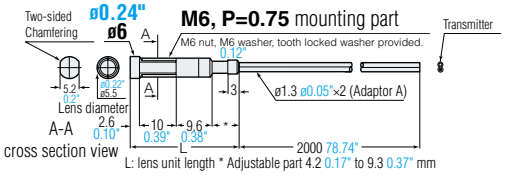
Connected pin number	Core wire cover color
①	Brown
②	White
③	Blue
④	Black

M8 connector junction cable (sold separately)

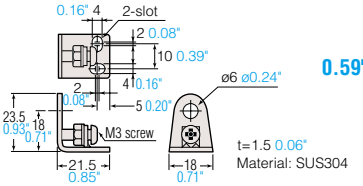
OP-85498



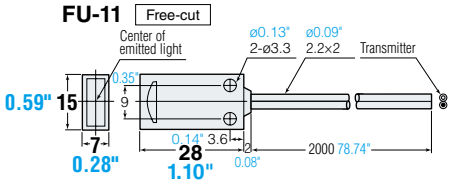
FU-10 Free-cut



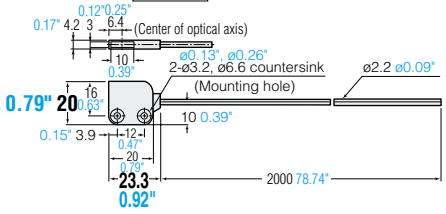
Mounting bracket (Included with FU-10)



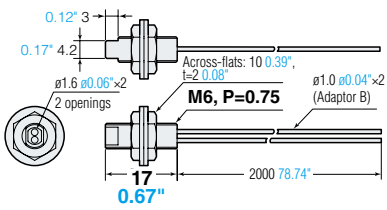
FU-11 Free-cut



FU-12 Free-cut Set of 2

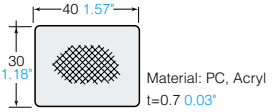


FU-13 Free-cut

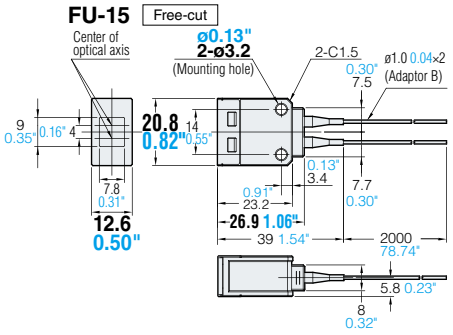


Reflective tape (Included with FU-13)

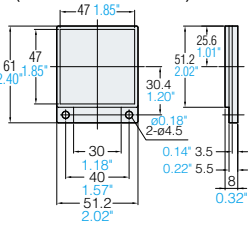
OP-96629



FU-15 Free-cut



R-2 Reflector (Included with FU-15)



Mounting bracket (Included with FU-15)

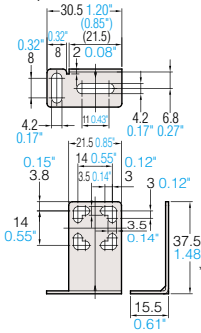
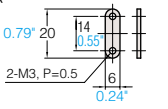
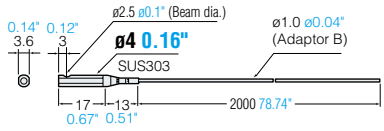


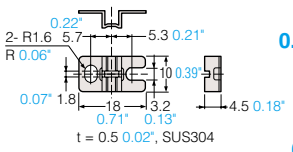
Plate nut (Included with FU-15)



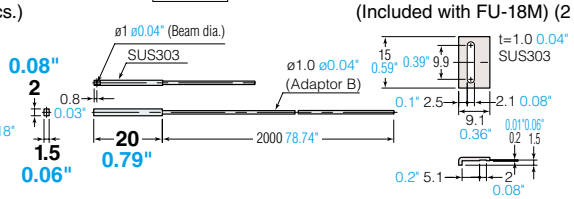
FU-16/16Z/18 Free-cut Set of 2



Mounting bracket (Included with FU-16/16Z/18) (2 pcs.)

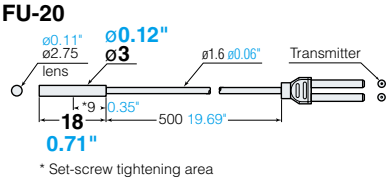


FU-18M Free-cut Set of 2

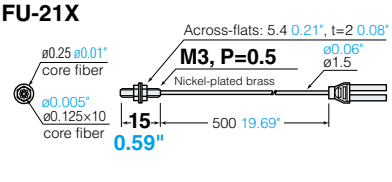


Mounting bracket (Included with FU-18M) (2 pcs.)

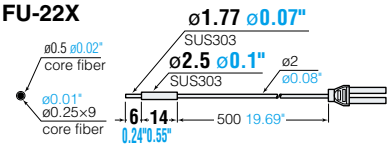
FU-20



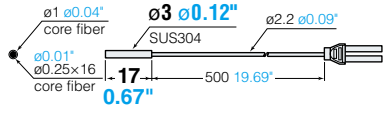
FU-21X



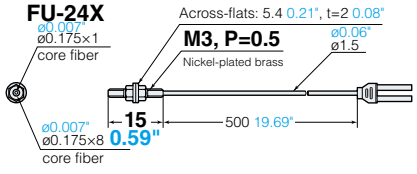
FU-22X



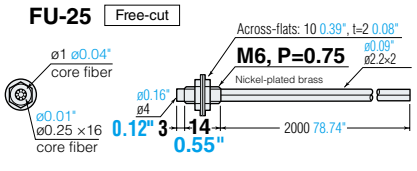
FU-23X



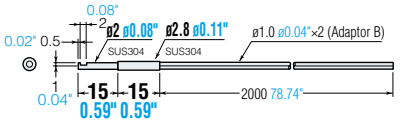
FU-24X



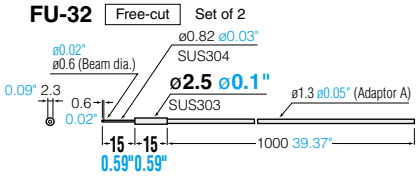
FU-25 Free-cut



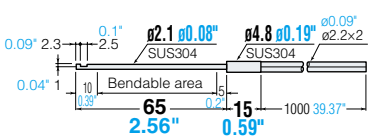
FU-31 Free-cut



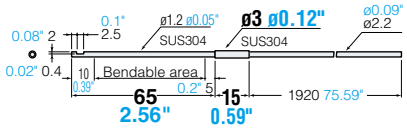
FU-32 Free-cut Set of 2



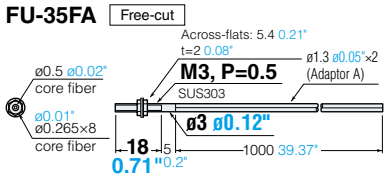
FU-33 Free-cut



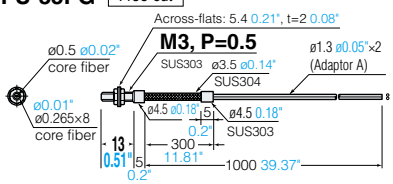
FU-34 Free-cut Set of 2



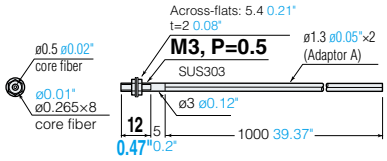
FU-35FA Free-cut



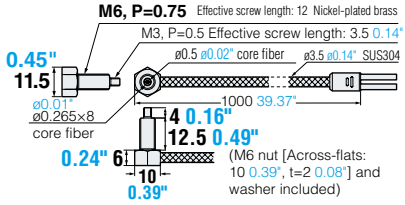
FU-35FG Free-cut



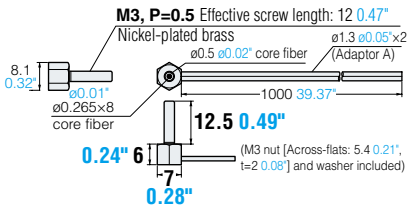
FU-35FZ Free-cut



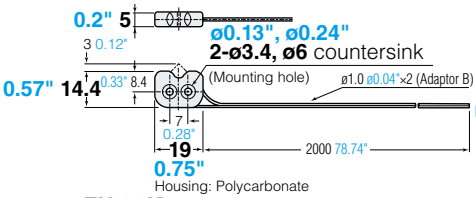
FU-35TG



FU-35TZ Free-cut

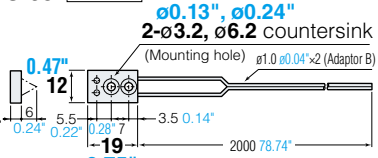


FU-37 Free-cut



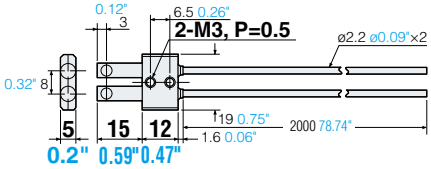
Housing: Polycarbonate

FU-38 Free-cut

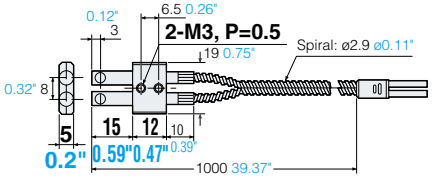


Housing: Polysulfone

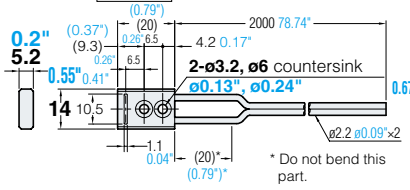
FU-38H Free-cut



FU-38K

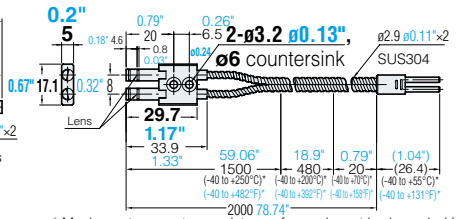


FU-38L Free-cut



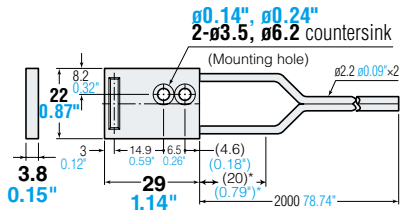
* Do not bend this part.

FU-38LK



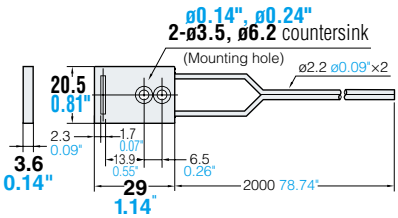
* Maximum temperature resistance for each part is shown in ( ).

FU-38R Free-cut

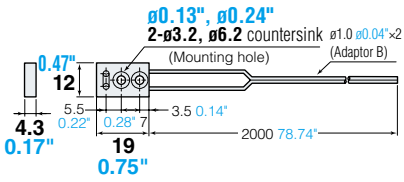


* Do not bend this part.

FU-38S Free-cut

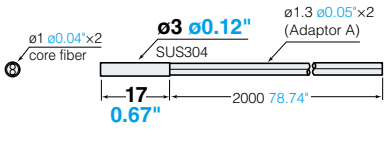


FU-38V Free-cut

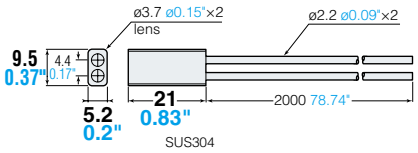


Housing: Polysulfone

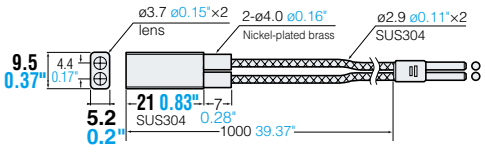
FU-4F/4FZ Free-cut



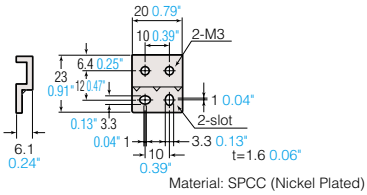
FU-40 Free-cut



FU-40G

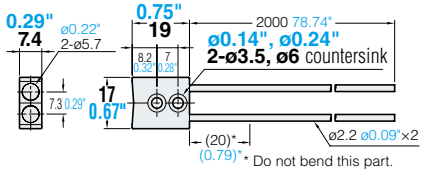


Mounting bracket (Included with FU-40/40G)



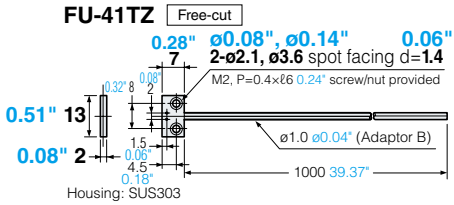
Material: SPCC (Nickel Plated)

FU-40S Free-cut



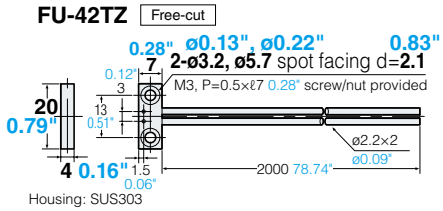
* Do not bend this part.

FU-41TZ Free-cut



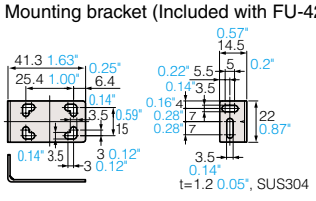
Housing: SUS303

FU-42TZ Free-cut

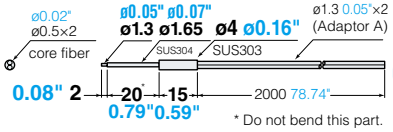


Housing: SUS303

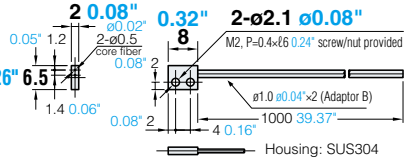
Mounting bracket (Included with FU-42TZ)



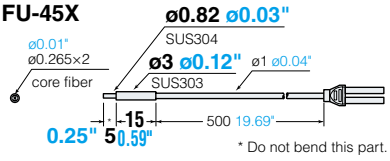
FU-43 Free-cut



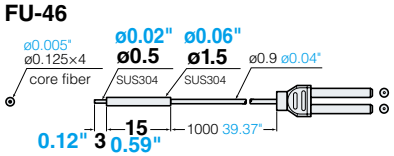
FU-44TZ Free-cut



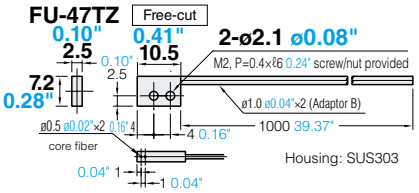
FU-45X



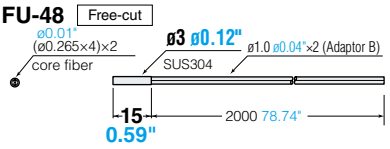
FU-46



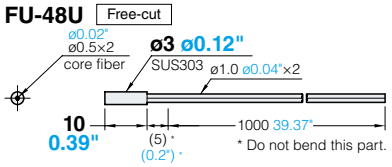
FU-47TZ Free-cut



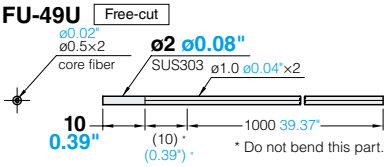
FU-48 Free-cut



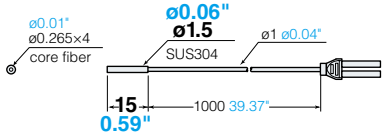
FU-48U Free-cut



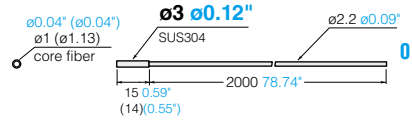
FU-49U Free-cut



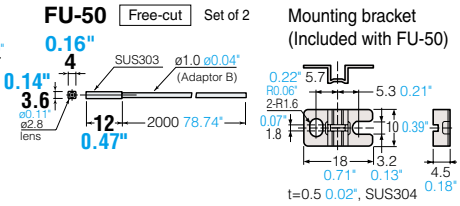
FU-49X



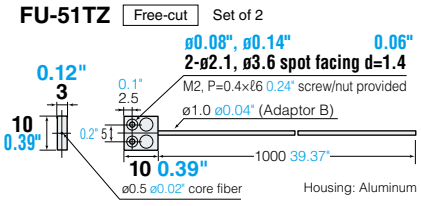
FU-5F/5FZ Free-cut Set of 2



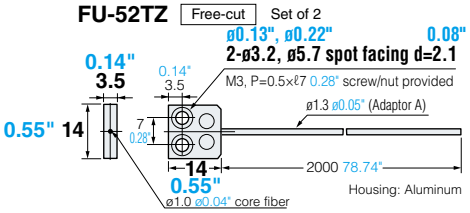
FU-50 Free-cut Set of 2



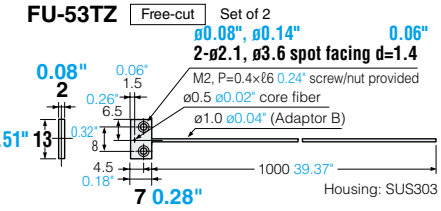
FU-51TZ Free-cut Set of 2



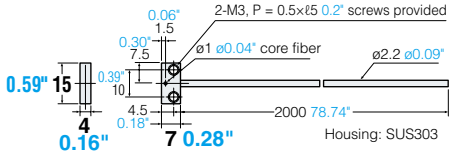
FU-52TZ Free-cut Set of 2



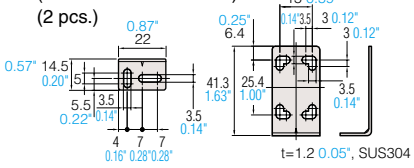
FU-53TZ Free-cut Set of 2



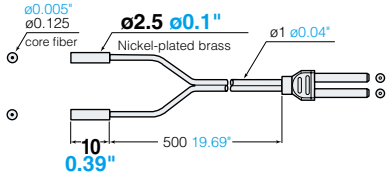
FU-54TZ Free-cut Set of 2



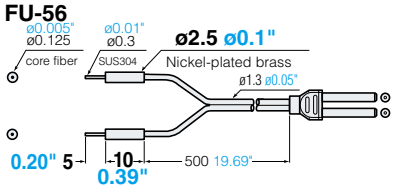
Mounting bracket (Included with FU-54TZ) (2 pcs.)



FU-55

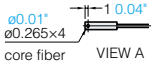


FU-56

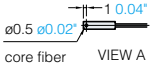


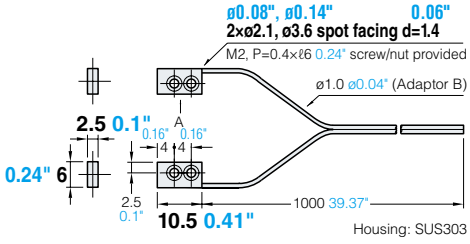
FU-57TE/57TZ Free-cut Set of 2

FU-57TE

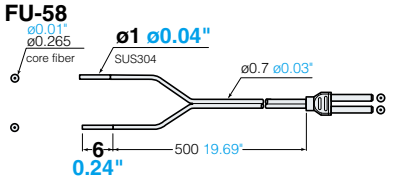


FU-57TZ

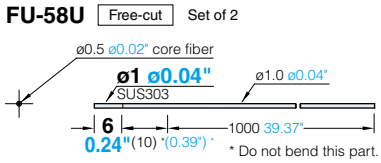




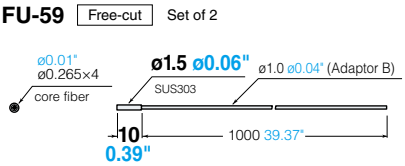
FU-58



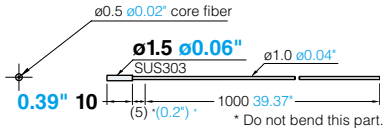
FU-58U Free-cut Set of 2



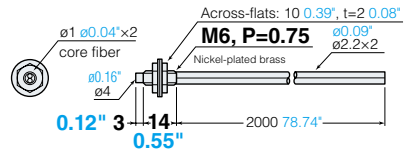
FU-59 Free-cut Set of 2



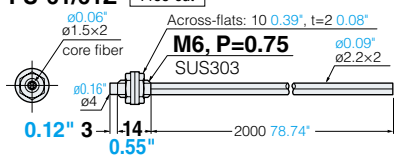
FU-59U
Free-cut | Set of 2



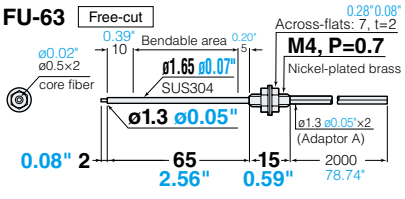
FU-6F
Free-cut



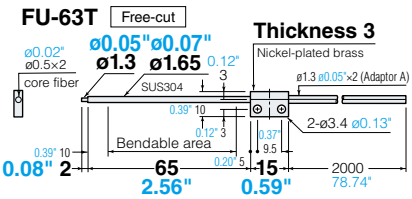
FU-61/61Z
Free-cut



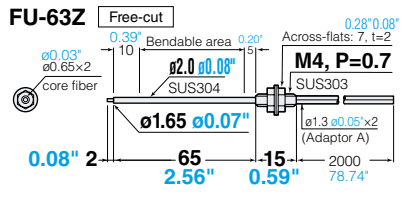
FU-63
Free-cut



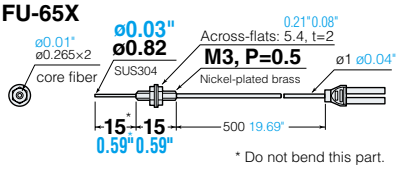
FU-63T
Free-cut



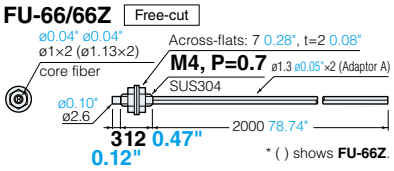
FU-63Z
Free-cut



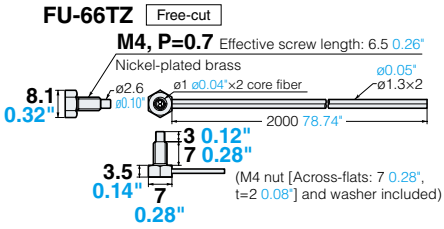
FU-65X



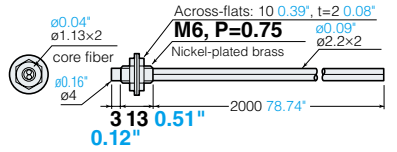
FU-66/66Z
Free-cut



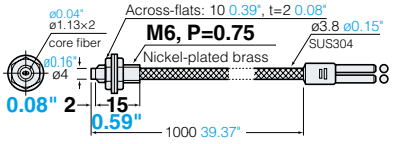
FU-66TZ
Free-cut



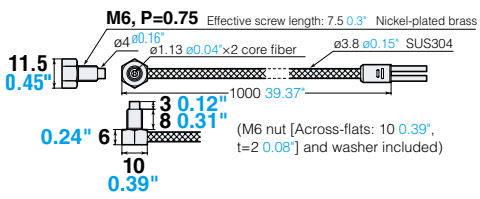
FU-67/67V
Free-cut



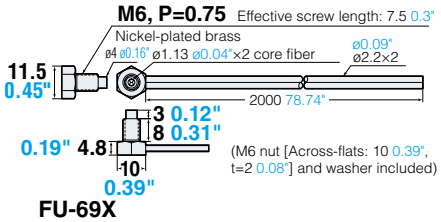
FU-67G



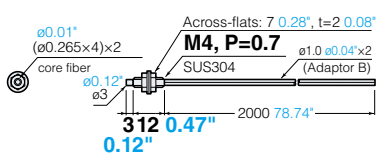
FU-67TG



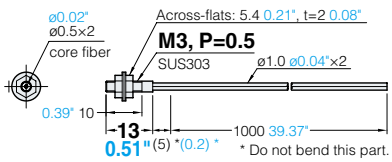
FU-67TZ
Free-cut



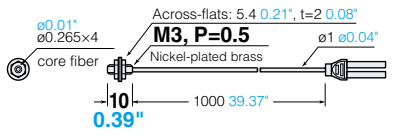
FU-68
Free-cut



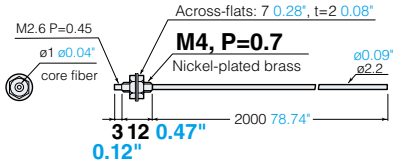
FU-69U
Free-cut



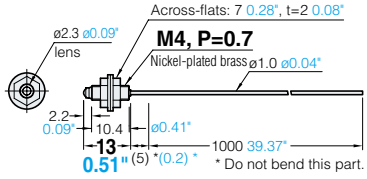
FU-69X



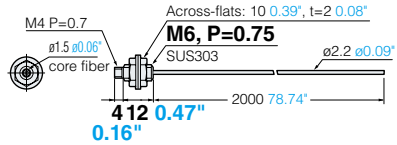
FU-7F
Free-cut | Set of 2



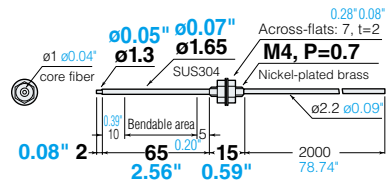
FU-70U
Free-cut | Set of 2



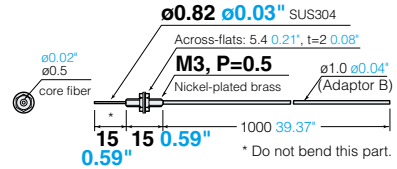
FU-71/71Z
Free-cut | Set of 2



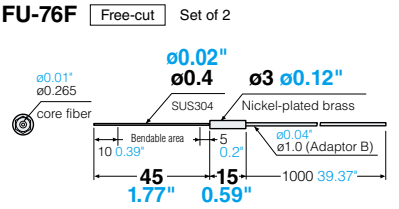
FU-73
Free-cut | Set of 2



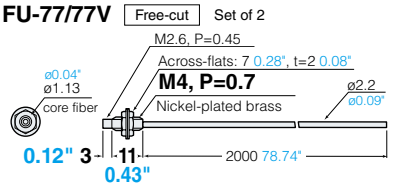
FU-75F
Free-cut | Set of 2



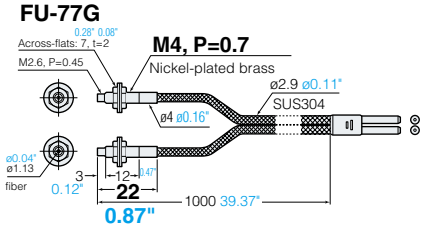
FU-76F
Free-cut | Set of 2



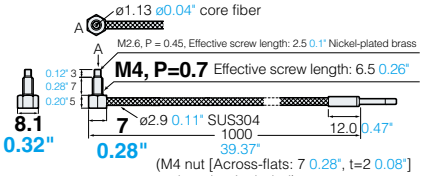
FU-77/77V
Free-cut | Set of 2



FU-77G

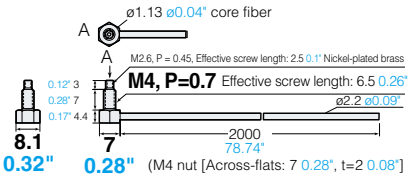


FU-77TG Set of 2



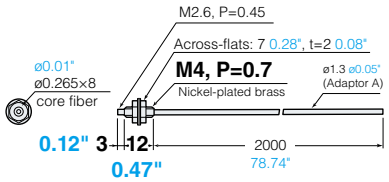
(M4 nut [Across-flats: 7 0.28", t=2 0.08"] and washer included)

FU-77TZ Free-cut Set of 2

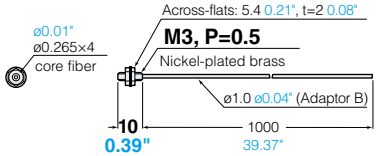


(M4 nut [Across-flats: 7 0.28", t=2 0.08"] and washer included)

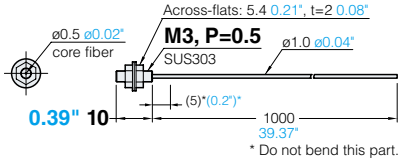
FU-78 Free-cut Set of 2



FU-79 Free-cut Set of 2

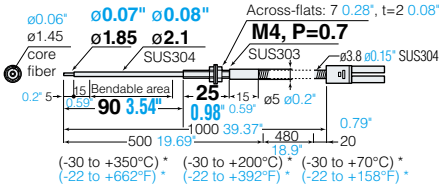


FU-79U Set of 2



* Do not bend this part.

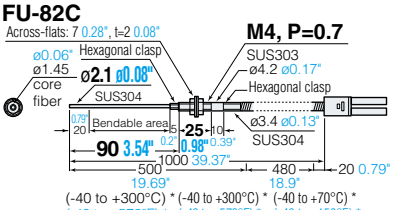
FU-81C



(-30 to +350°C) * (-22 to +662°F) * (-30 to +200°C) * (-22 to +392°F) * (-30 to +70°C) * (-22 to +158°F) *

* Maximum temperature resistance for each part is shown in ( ).

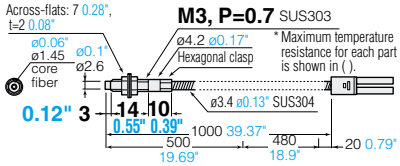
FU-82C



(-40 to +300°C) * (-40 to +572°F) * (-40 to +300°C) * (-40 to +572°F) * (-40 to +70°C) * (-40 to +158°F) *

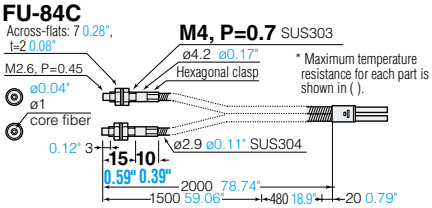
* Maximum temperature resistance for each part is shown in ( ).

FU-83C



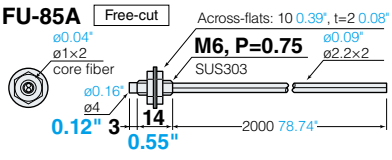
(-40 to +300°C) * (-40 to +572°F) * (-40 to +200°C) * (-40 to +392°F) * (-40 to +70°C) * (-40 to +158°F) *

FU-84C

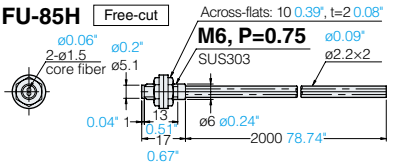


(-40 to +300°C) * (-40 to +572°F) * (-40 to +200°C) * (-40 to +392°F) * (-40 to +70°C) * (-40 to +158°F) *

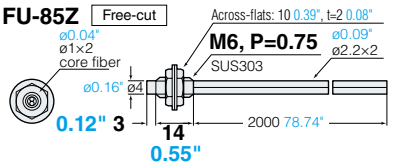
FU-85A Free-cut



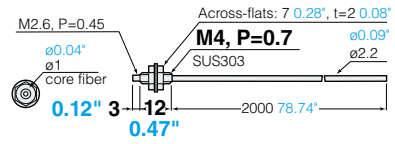
FU-85H Free-cut



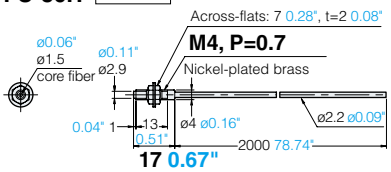
FU-85Z Free-cut



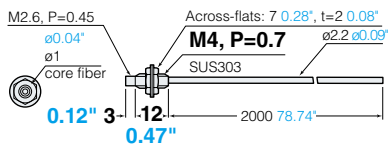
FU-86A Free-cut Set of 2



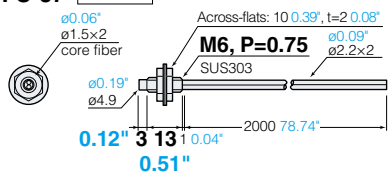
FU-86H Free-cut Set of 2



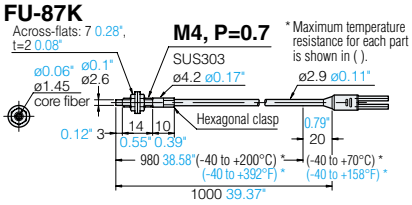
FU-86Z Free-cut Set of 2



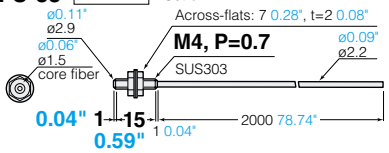
FU-87 Free-cut



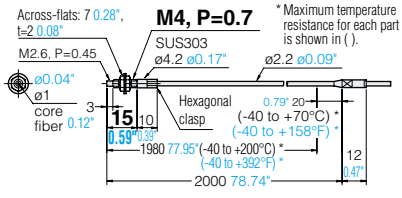
FU-87K



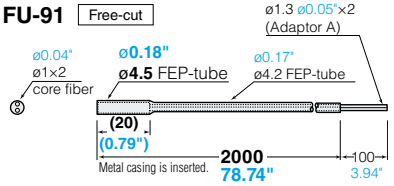
FU-88 Free-cut Set of 2



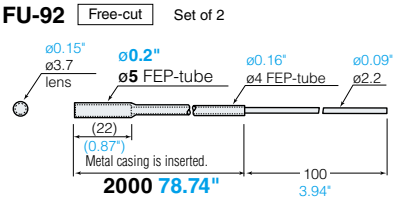
FU-88K



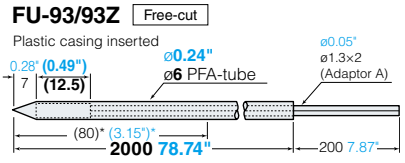
FU-91 Free-cut



FU-92 Free-cut Set of 2

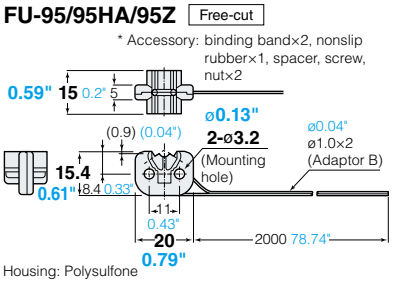


FU-93/93Z Free-cut



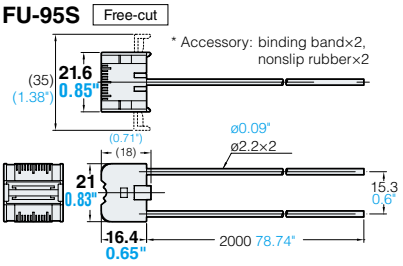
* Do not bend or cut this portion.

FU-95/95HA/95Z Free-cut



Housing: Polysulfone

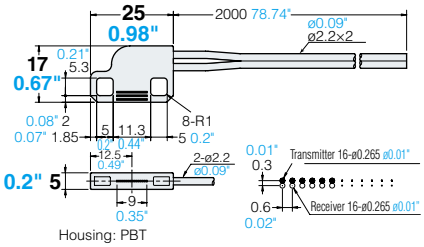
FU-95S Free-cut



Housing: Polyetherimide

FU-95W

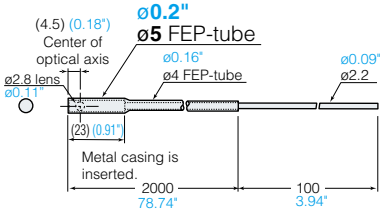
Free-cut



Housing: PBT

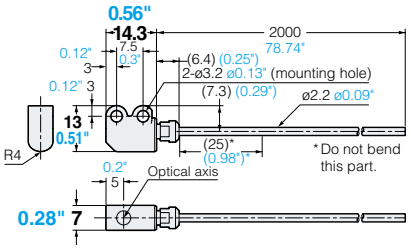
FU-96

Free-cut Set of 2



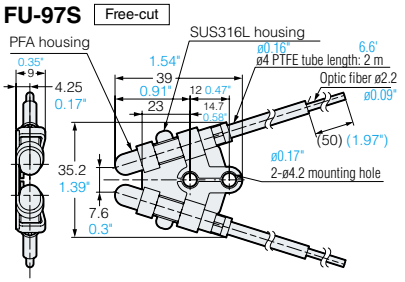
FU-96T

Free-cut Set of 2



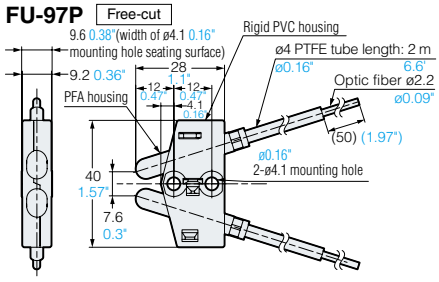
FU-97S

Free-cut



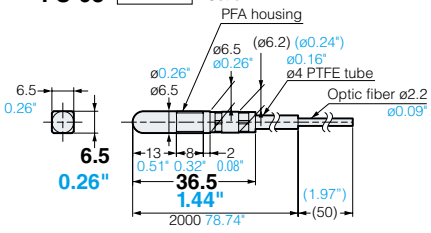
FU-97P

Free-cut

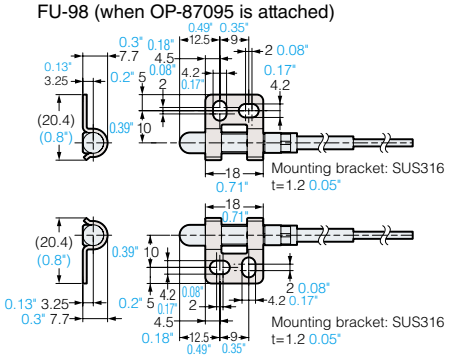


FU-98

Free-cut Set of 2

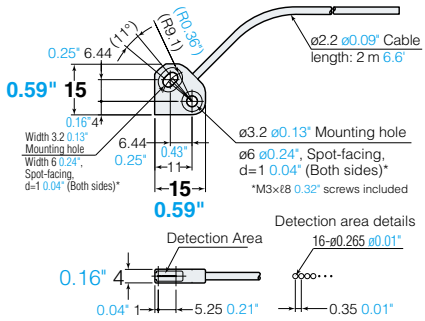


FU-98 (when OP-87095 is attached)



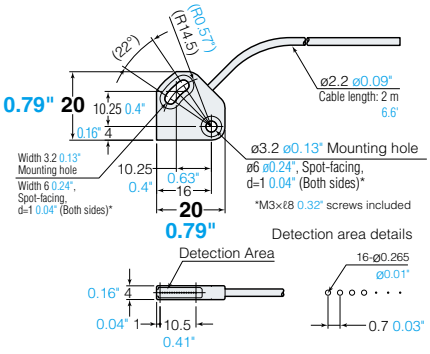
FU-A05

Free-cut Set of 2



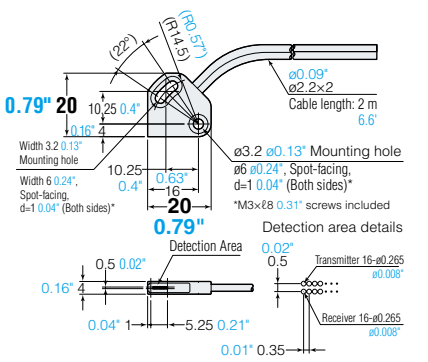
FU-A10

Free-cut Set of 2



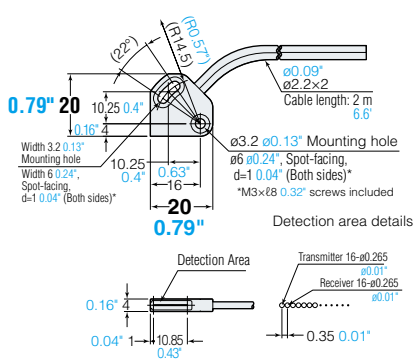
FU-A05D

Free-cut



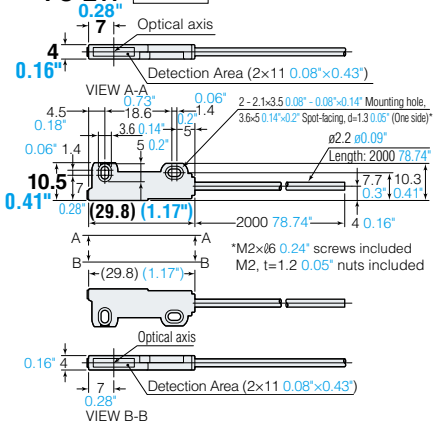
FU-A10D

Free-cut



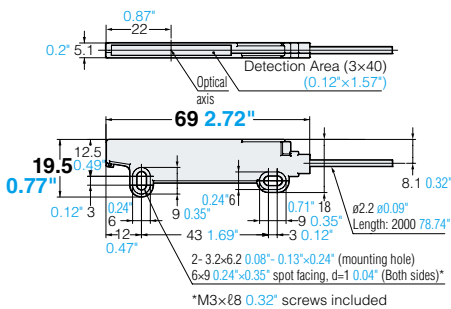
FU-E11

Free-cut Set of 2

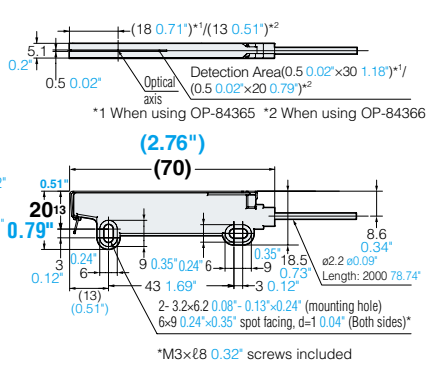


FU-E40

Free-cut Set of 2

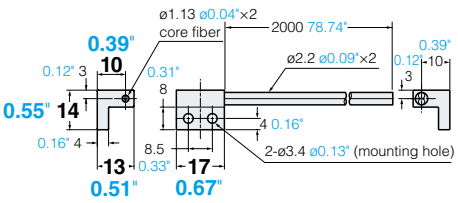


With slit attached



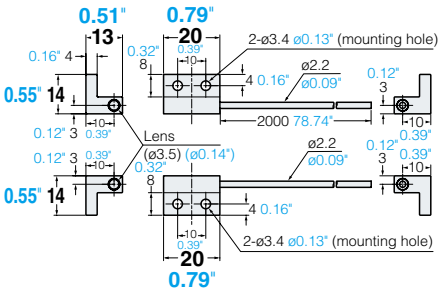
FU-L41Z

Free-cut



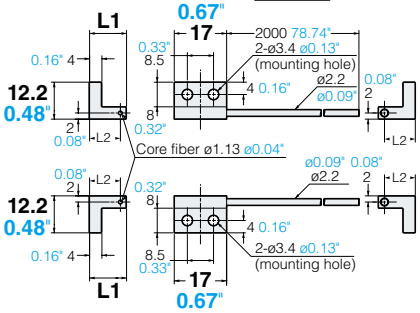
FU-L50Z

Free-cut Set of 2



FU-L51Z/L52Z/L53Z

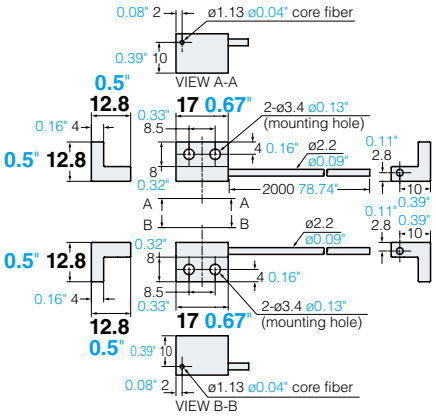
Free-cut Set of 2



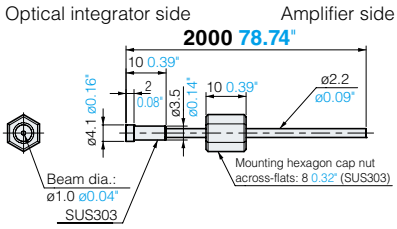
Model	L1	L2
FU-L51Z	12.2 0.48"	10 0.39"
FU-L52Z	17 0.67"	15 0.59"
FU-L53Z	22 0.87"	20 0.79"

FU-L54Z

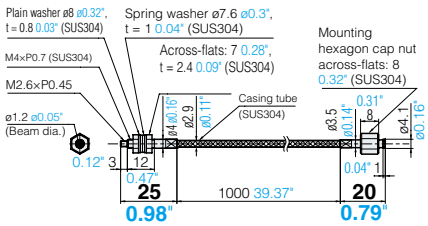
Free-cut Set of 2



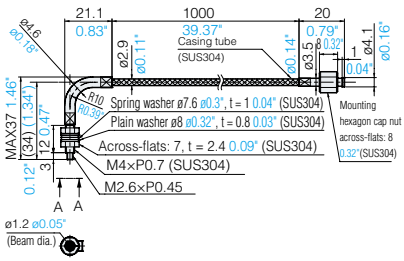
FU-V7FN



FU-V84

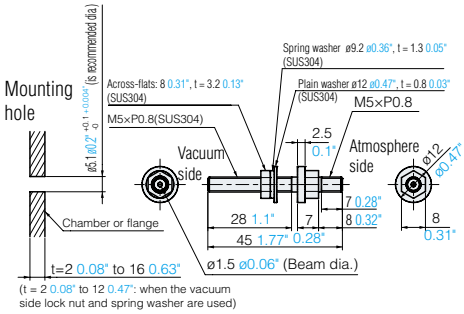


FU-V84L



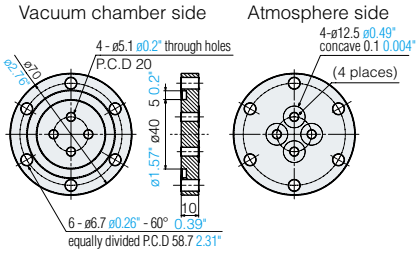
A-A View on arrow

FU-VJ1



(t = 2 0.08" to 12 0.47": when the vacuum side lock nut and spring washer are used)

FU-VJ2

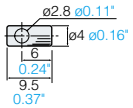


Material: SUS304

F-1

2 per set

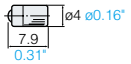
Housing: Nickel-plated brass
Lens: Acrylic



F-2

2 per set

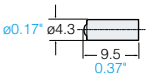
Housing: Nickel-plated brass
Lens: Glass



F-4

2 per set

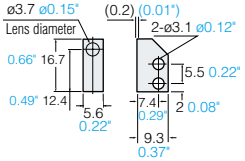
Housing: Aluminum
Lens: Glass



F-5

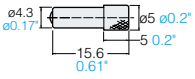
2 per set

Housing: Aluminum
Lens: Glass



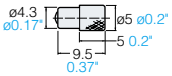
F-2HA

Housing: Aluminum
Lens: Plastic



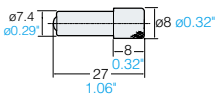
F-3HA

Housing: Aluminum
Lens: Plastic



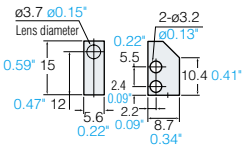
F-4HA

Housing: Aluminum
Lens: Glass



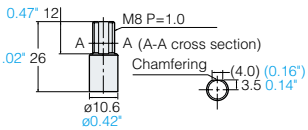
F-5HA

Housing: Aluminum
Lens: Glass



F-6HA

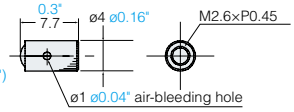
Housing: Aluminum
Lens: Plastic



F-V2

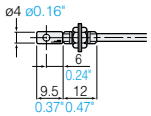
2 per set

Housing: SUS304
Lens: BK-7

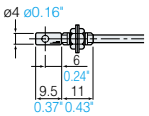


With lenses

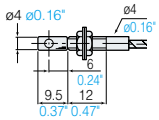
F-1+ FU-7F/86A/86Z



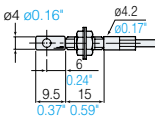
F-1+ FU-77/77V



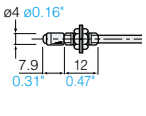
F-1+ FU-77G



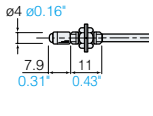
F-1+ FU-84C/88K



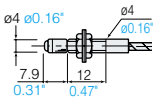
F-2+ FU-7F/86A/86Z



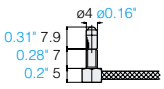
F-2+ FU-77/77V



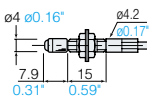
F-2+ FU-77G



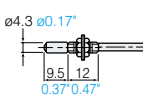
F-2+ FU-77TG



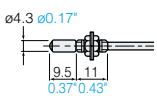
F-2+ FU-84C/88K



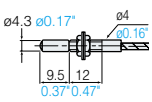
F-4+ FU-7F



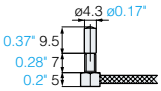
F-4+ FU-77/77V



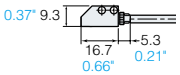
F-4+ FU-77G



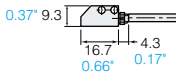
F-4+ FU-77TG



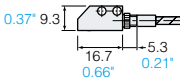
F-5+ FU-7F/86A/86Z



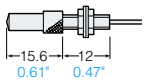
F-5+ FU-77/77V



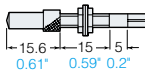
F-5+ FU-77G



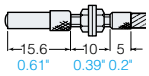
F-2HA+ FU-21X/FU-24X



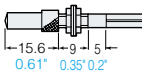
F-2HA+ FU-35FA



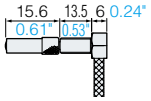
F-2HA+ FU-35FG



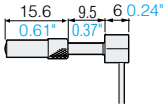
F-2HA+ FU-35FZ



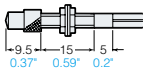
F-2HA+ FU-35TG



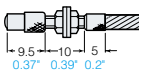
F-2HA+ FU-35TZ



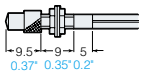
F-3HA+ FU-35FA



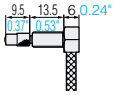
F-3HA+ FU-35FG



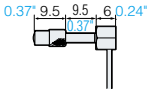
F-3HA+ FU-35FZ



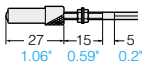
F-3HA+ FU-35TG



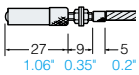
F-3HA+ FU-35TZ



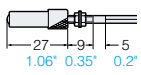
F-4HA+ FU-35FA



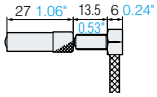
F-4HA+ FU-35FG



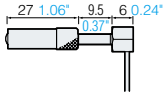
F-4HA+ FU-35FZ



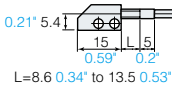
F-4HA+ FU-35TG



F-4HA+ FU-35TZ

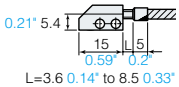


F-5HA+ FU-35FA



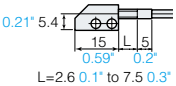
L=8.6 0.34" to 13.5 0.53"

F-5HA+ FU-35FG



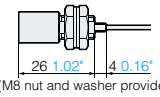
L=3.6 0.14" to 8.5 0.33"

F-5HA+ FU-35FZ



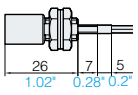
L=2.6 0.1" to 7.5 0.3"

F-6HA+ FU-21X



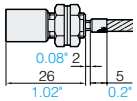
(M8 nut and washer provided)

F-6HA+ FU-35FA



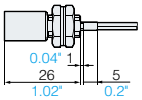
(M8 nut and washer provided)

F-6HA+ FU-35FG



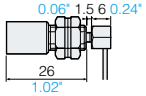
(M8 nut and washer provided)

F-6HA+ FU-35FZ



(M8 nut and washer provided)

F-6HA+ FU-35TZ



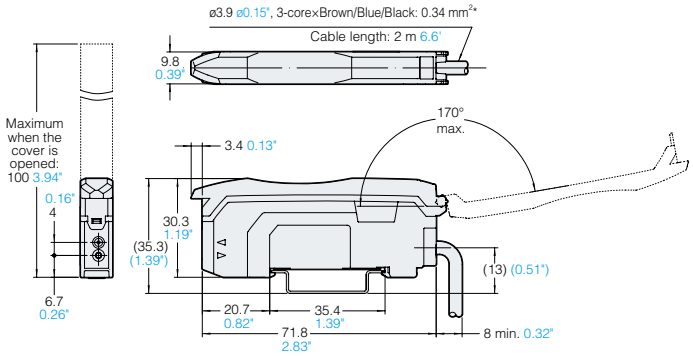
(M8 nut and washer provided)

F-V2+ FU-V84

F-V2+ FU-V84L

FS-N11N / N11P / N13N / N13P / N11MN

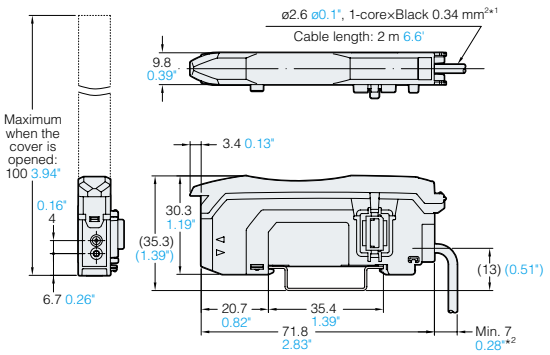
Cable type, Main unit



*FS-N11MN: ø3.9 ø0.15", 4-core × Brown/Blue: 0.34 mm², Black/Orange 0.18 mm²
FS-N13N/N13P: ø3.9 ø0.15", 5-core × Brown/Blue: 0.34 mm², Black/White/Pink 0.18 mm²

FS-N12N / N12P / N14N / N14P

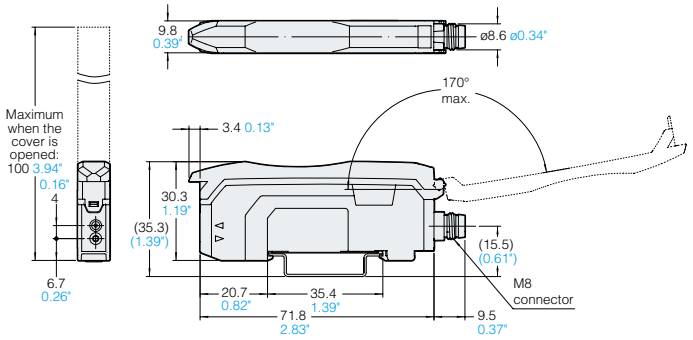
Cable type, Expansion unit



*1 FS-N14N/N14P: ø3.9 ø0.15", 3-core × Black/White/Pink: 0.18 mm²
*2 FS-N14N/N14P: min. 8 0.32"

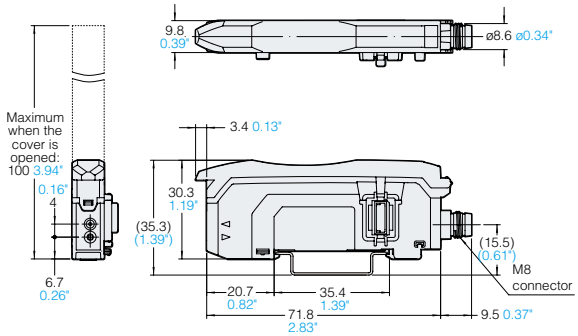
FS-N11CN / N11CP / N13CP

M8 connector type, Main unit



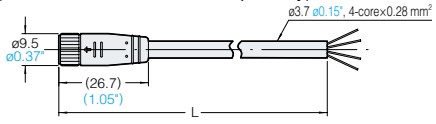
FS-N12CN / N12CP / N14CP

M8 connector type, Expansion unit

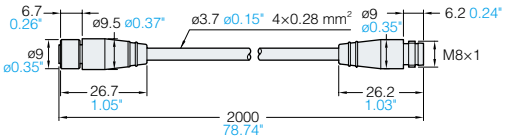


M8 connector cable (**OP-73864/73865** sold separately)

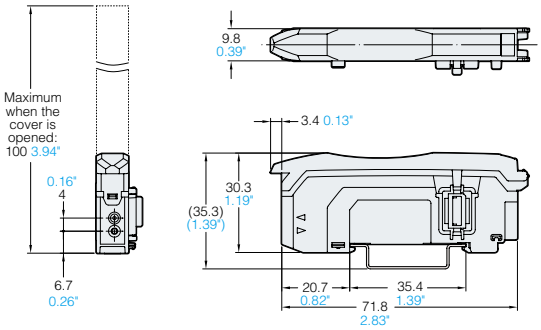
Cable length	L(m feet)
OP-73864	2 6.6'
OP-73865	10 32.8'



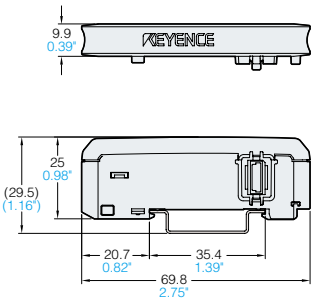
M8 connector junction cable (**OP-85498** sold separately)



FS-N10
Zero line type, Expansion unit

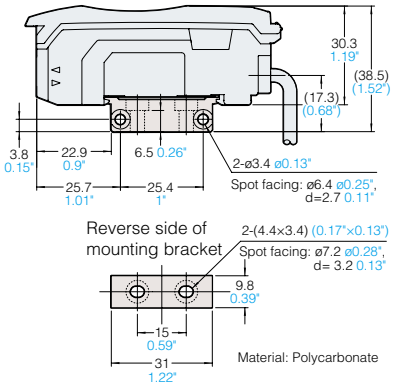


OP-87199
Conversion adaptor

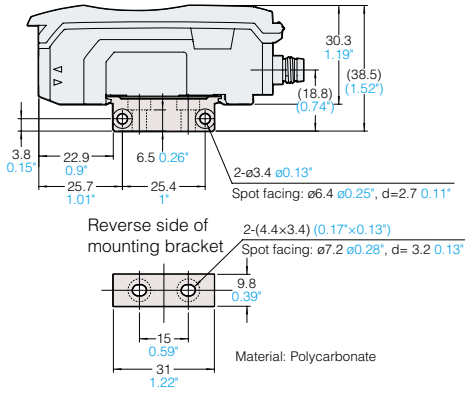


When the mounting bracket is attached (**OP-73880** sold separately)

Cable type

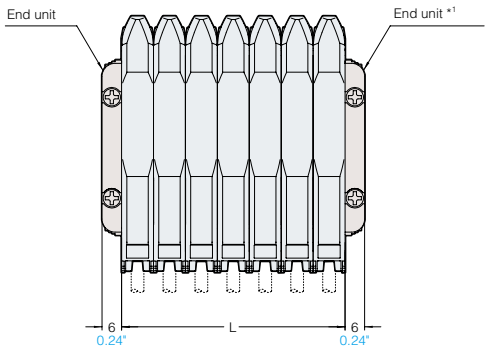


M8 connector type



Common for all types

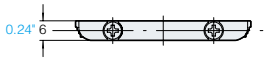
When several units are connected:



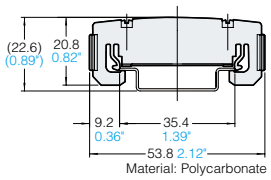
*1 End units must be used when several units are connected. (OP-26751)

No. of units	L (mm inch)
1	9.8 0.39"
2	19.6 0.77"
3	29.4 1.16"
4	39.2 1.54"
5	49.0 1.93"
6	58.8 2.32"
7	68.6 2.7"
8	78.4 3.09"
9	88.2 3.47"
10	98.0 3.86"
11	107.8 4.24"
12	117.6 4.63"
13	127.4 5.02"
14	137.2 5.4"
15	147.0 5.79"
16	156.8 6.17"
17	166.8 6.56"

End unit
(**OP-26751** sold separately)



DIN-rail mounting



Digital Photoelectric Sensor

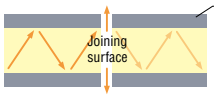
PS-neo

High environmental resistance & cable extension capabilities provide increased installation versatility

Extendable sensor head cable

Because the sensor head cable is a simple power cable, it can be extended to the desired length. By soldering or using a metal connector, it can be extended to a maximum of 10 m (32.81').

When jointing fiberoptic sensors...



The light intensity at the joining surface is attenuated by approximately 90%.

Small size yet high power

While the conventional PS Series had only "FINE" and "TURBO" modes, it is now equipped with additional power modes including "MEGA" mode, like the FS-N Series. This allows the PS Series to be used in applications where strong light intensity is required.

"MEGA" mode is very effective in environments where water, oil, or dirt may become attached to the sensor.

Wide range of sensor head options

The PS Series lineup includes a broad range of sensor heads that have a wide variety of special characteristics, such as the environmentally resistant models that are encased in PFA for protection, or the limited range reflective models that are able to avoid the effects of background light.

PS-neo FUNCTION

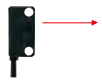
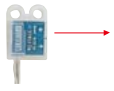
- NEO Preset
- NEO MEGA
- Built-in application modes
- DATUM function
- Open field network compatibility
- Reduced wiring
- Interference prevention function
- Pause function
- Sleep function

Thrubeam type

Type		Appearance	Detecting distance (mm inch)*1	Features	Model (C means with connector)	Dimensions
Thrubeam type	General purpose		MEGA : 3600 (6000) 141.73" (236.22") ULTRA : 2800 (5000) 110.24" (196.85") SUPER : 2200 (4200) 86.61" (165.35") TURBO : 2000 (4000) 78.74" (157.48")	Compact body and long-detecting distance	PS-55 (PS-55C)	[P.59]
			MEGA : 3600 (6000) 141.73" (236.22") ULTRA : 2800 (5000) 110.24" (196.85") SUPER : 2200 (4200) 86.61" (165.35") TURBO : 2000 (4000) 78.74" (157.48")	Compact body and long-detecting distance easy optical-axis alignment	PS-05	[P.58]
			MEGA : 1000 39.37" ULTRA : 900 35.43" SUPER : 750 29.53" TURBO : 700 27.56"	Cylindrical, embedded type	PS-58	[P.59]
			MEGA : 1200 (1500) 47.24" (59.06") ULTRA : 800 (1000) 31.50" (39.37") SUPER : 400 (650) 15.75" (25.59") TURBO : 300 (600) 11.81" (23.62")	Side-to-side type, 3 mm 0.12" thickness	PS-52 (PS-52C)	[P.59]
			MEGA : 750 (900) 29.53" (35.43") ULTRA : 500 (600) 19.69" (23.62") SUPER : 400 (450) 15.75" (17.72") TURBO : 300 (400) 11.81" (15.75")	Flat-to-flat type 2.8 mm 0.11" thickness	PS-56	[P.59]
	Environment-proof		MEGA : 3600 (6000) 141.73" (236.22") ULTRA : 2800 (5000) 110.24" (196.85") SUPER : 2200 (4200) 86.61" (165.35") TURBO : 2000 (4000) 78.74" (157.48")	PFA-sheath type, oil-proof, chemical proof	PS-201 (PS-201C)	[P.59]
			MEGA : 900 (1000) 35.43" (39.37") ULTRA : 700 (900) 27.56" (35.43") SUPER : 600 (800) 23.62" (31.50") TURBO : 500 (750) 19.69" (29.53")	PFA-sheath type, Slit*2 built-in	PS-202	[P.59]

*1 Depends on the mode, response time may be different even with the same detecting distance. Detecting distance in parentheses is a value when enabling the long distance detection mode with a 5 m sensor head cable.
*2 5×1 mm 0.2"×0.04" slits for both transmitter/receiver.

Reflective model

Type		Appearance	Detecting distance (mm inch)*1	Features	Model (C means with connector)	Dimensions
Diffuse-reflective	General purpose		MEGA : 600 (900) 23.62" (35.43") ULTRA : 400 (600) 15.75" (23.62") SUPER : 250 (450) 9.84" (17.72") TURBO : 200 (400) 7.87" (15.75")	Compact body and long-detecting distance	PS-45	[P.58]
			MEGA : 200 (250) 7.87" (9.84") ULTRA : 150 (200) 5.91" (7.87") SUPER : 120 (160) 4.72" (6.30") TURBO : 100 (140) 3.94" (5.51")	Flat-to-flat type 2.8 mm 0.11" thickness	PS-46	[P.58]
			MEGA : 75 2.95" ULTRA : 45 1.77" SUPER : 30 1.18" TURBO : 25 0.98"	Cylindrical, embedded type	PS-48	[P.58]
	Environment-proof		MEGA : 600 (900) 23.62" (35.43") ULTRA : 400 (600) 15.75" (23.62") SUPER : 250 (450) 9.84" (17.72") TURBO : 200 (400) 7.87" (15.75")	PFA-sheath type, oil-proof, chemical proof	PS-205	[P.59]
			MEGA : 250 9.84" ULTRA : 180 7.09" SUPER : 100 3.94" TURBO : 70 2.76"	PFA-sheath type, Focused beam small spot	PS-206	[P.59]
Definite-reflective	Small spot		10 0.39"±4 0.16" * Common for all power modes	Small Spot ø0.8 mm ø0.03" almost unaffected by target background	PS-47 (PS-47C)	[P.58]
	Long detecting		32 1.26" to 53 2.09" * Common for all power modes	Long distance small spot almost unaffected by target background	PS-49 (PS-49C)	[P.58]

*1 Depends on the mode, response time may be different even with the same detecting distance. Detecting distance in parentheses is a value when enabling the long distance detection mode.

Sensor head specifications

Thrubeam sensor head

Type		Thrubeam type						
		General purpose					Environment-proof	
		Long-detecting distance	Free-positioning	Cylindrical	Thin		Long-detecting distance	Slit built-in
Model		PS-55 (C)	PS-05	PS-58	PS-52 (C)	PS-56	PS-201 (C)	PS-202
Detecting distance*1 (mm inch)	MEGA	3600 (6000) 141.73" (236.22")	3600 (6000) 141.73" (236.22")	1000 39.37"	1200 (1500) 47.24" (59.06")	750 (900) 29.53" (35.43")	3600 (6000) 141.73" (236.22")	900 (1000) 35.43" (39.37")
	ULTRA	2800 (5000) 110.24" (196.85")	2800 (5000) 110.24" (196.85")	900 35.45"	800 (1000) 31.50" (39.37")	500 (600) 19.69" (23.62")	2800 (5000) 110.24" (196.85")	700 (900) 27.56" (35.43")
	SUPER	2200 (4200) 86.61" (165.35")	2200 (4200) 86.61" (165.35")	750 29.53"	400 (650) 15.75" (25.59")	400 (450) 15.75" (17.72")	2200 (4200) 86.61" (165.35")	600 (800) 23.62" (31.50")
	TURBO	2000 (4000) 78.74" (157.48")	2000 (4000) 78.74" (157.48")	700 27.56"	300 (600) 11.81" (23.62")	300 (400) 11.81" (15.75")	2000 (4000) 78.74" (157.48")	500 (750) 19.69" (29.53")
Light source		Infrared LED						
Smallest detectable object*2		ø1.0 mm ø0.04" Opaque	ø1.0 mm ø0.04" Opaque	ø0.5 mm ø0.02" Opaque	ø0.3 mm ø0.01" Opaque	ø0.3 mm ø0.01" Opaque	ø0.8 mm ø0.03" Opaque	ø0.5 mm ø0.02" Opaque
Environmental resistance	Protective structure	IP64	IP64	IP67	–	–	IP67	
	Ambient light	Incandescent lamp: 4000 lux max., Sunlight: 12000 lux max.						
	Ambient temperature/ Relative humidity	-10 to +60°C (14 to +140°F) (No freezing)/35 to 85% RH (No condensation)						
Dimensions		[P.59]	[P.58]	[P.59]	[P.59]	[P.59]	[P.59]	[P.59]

*1 Depends on the mode, response time may be different even with the same detecting distance. Detecting distance in parentheses is a value when enabling the long distance detection mode with a 5 m sensor head cable.
*2 With thrubeam sensors, the smallest detectable object indicates the size of a detectable object from the maximum detecting distance.

Reflective sensor head

Type		Diffuse-reflective					Definite-reflective	
		General purpose			Environment-proof		General purpose	
		Long-detecting distance	Thin	Cylindrical	Long-detecting distance	Narrow-beam	Small spot	Long-detecting distance
Model		PS-45	PS-46	PS-48	PS-205	PS-206	PS-47 (C)	PS-49 (C)
Detecting distance*1 (mm inch)	MEGA	600 (900) 23.62" (35.43")	200 (250) 7.87" (9.84")	75 2.95"	600 (900) 23.62" (35.43")	250 9.84"	10±4 0.39"±0.16"	32 to 53 1.26" to 2.09"
	ULTRA	400 (600) 15.75" (23.62")	150 (200) 5.91" (7.87")	45 1.77"	400 (600) 15.75" (23.62")	180 7.09"		
	SUPER	250 (450) 9.84" (17.72")	120 (160) 4.72" (6.30")	30 1.18"	250 (450) 9.84" (17.72")	100 3.94"		
	TURBO	200 (400) 7.87" (15.75")	100 (140) 3.94" (5.51")	25 0.98"	200 (400) 7.87" (15.75")	70 2.76"		
Light source		Infrared LED				Red LED		
Detectable object		Transparent and opaque						
Smallest detectable object*2		–	–	–	–	–	ø0.03 mm ø0.001" Copper wire	ø0.1 mm ø0.004" Copper wire
Spot diameter		–	–	–	–	ø6 mm ø0.24" At detecting distance of 70 mm 2.76"	ø8 mm ø0.32" At detecting distance of 10 mm 0.39"	ø1.5 mm ø0.06" At detecting distance of 50 mm 1.97"
Hysteresis (of detecting distance)		15% max.	10% max.	20% max.	15% max.		3% max.	6% max.
Environmental resistance	Protective structure	IP64	–	IP67			–	
	Ambient light	Incandescent lamp: 4000 lux max., Sunlight: 12000 lux max.					Incandescent lamp: 4000 lux max., Sunlight: 5000 lux max.	
	Ambient temperature	-10 to +60°C (14 to + 140°F) (No freezing)						–10 to +50°C (14 to +122°F) (No freezing)
	Relative humidity	35 to 85% RH (No condensation)						
Dimensions		[P.58]	[P.58]	[P.58]	[P.59]	[P.59]	[P.58]	[P.58]

*1 Depends on the mode, response time may be different even with the same detecting distance. Detecting distance in parentheses is a value when enabling the long distance detection mode.
*2 With reflective sensors, the smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Options

Model number	Applicable model	Type
OP-2555	PS-55	Slit (detecting distance: 700 mm 27.56") (transmitter/receiver set)
OP-93672	PS-05	
OP-0162	PS-45 (accessory)	PS-45 mounting bracket set
OP-0230	PS-56 , 52 (accessory)	Mounting nut set for PS-56
OP-2812	PS-55	Mounting bracket set for PS-55
OP-6349	PS-48 (accessory)	PS-48 mounting bracket
OP-6350	PS-58 (accessory)	PS-58 mounting bracket
OP-6800	PS2-61 (accessory)	PS2 mounting bracket
OP-7080	PS-201 , 202 (accessory)	PS-201 mounting bracket (one side only)
OP-27934	Amplifier (accessory)	Connector for sensor head (2)
OP-42113	PS-55, 05, 52, 56, 58	Thrubeam transmitter side cable (20 m 65.6')
OP-42114	PS-55, 05, 52, 56, 58	Thrubeam receiver side cable (20 m 65.6')
OP-42115	PS-45, 46, 47, 49	Reflective (except PS-48) cable (20 m 65.6')
OP-42116	PS-201, 202	PFA thrubeam transmitter side cable (20 m 65.6')
OP-42117	PS-201, 202	PFA thrubeam receiver side cable (20 m 65.6')
OP-42118	PS-205, 206	PFA Reflective cable (20 m 65.6')

Amplifier

Cable type

Type		Appearance	Model		Control outputs	External input	Monitor output	Dimensions
			NPN output	PNP output				
Standard	Main unit		PS-N11N	PS-N11P	1	1	0	[P.60]
	Expansion unit		PS-N12N	PS-N12P		0		

M8 connector type

Type		Appearance	Model		Control outputs	External input	Monitor output	Dimensions
			NPN output	PNP output				
Standard	Main unit		PS-N11CN	PS-N11CP	1	1	0	[P.60]
	Expansion unit		PS-N12CN	PS-N12CP				

Zero line type

Type		Appearance	Model	Control outputs	External input	Monitor output	Dimensions
Standard	Expansion unit		PS-N10	None*1	0	0	[P.60]

*1 Counted as one output when added to a NU Series communication unit.

Specifications

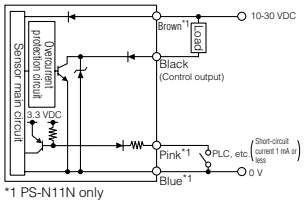
Type		Cable		M8 connector		Zero line
Main/Expansion unit		Main unit	Expansion unit	Main unit	Expansion unit	Expansion unit
Model	NPN	PS-N11N	PS-N12N	PS-N11CN	PS-N12CN	PS-N10
	PNP	PS-N11P	PS-N12P	PS-N11CP	PS-N12CP	
I/O	Control outputs	1 output		1 output		None*1
	External input	1 input	None	1 input	1 input	None
Response time		500 µs (TURBO)/1 ms (SUPER)/4 ms (ULTRA)/16 ms (MEGA)				
Output selection		LIGHT-ON/DARK-ON (switch-selectable)				
Timer function		Timer OFF/OFF-delay timer/ON-delay timer/One-shot timer, Timer duration selectable: 1 ms to 9999 ms, Maximum error against the setting value: ±10% max.				
Control outputs	NPN output	NPN open collector 30 V, (without expansion) 100 mA max., (with expansion) 20 mA max, residual voltage 1 V max. (when the out current is 10 mA or less)/2 V max. (when the output current is 10 to 100 mA)				
	PNP output	PNP open collector 30 V, (without expansion) 100 mA max., (with expansion) 20 mA max, residual voltage 1.2 V max. (when the output current is 10 mA or less)/2.2 V max. (when the output current is 10 to 100 mA)				
External input		Input time 2 ms (ON)/20 ms (OFF) or more*2				
Multiple connections to expansion units		Up to 17 main units can be connected				
Protection circuit		Reverse polarity protection, Over-current protection, Surge absorber				
Number of interference prevention units		4 for TURBO/SUPER/ULTRA/MEGA (When set to DOUBLE, the number of interference-prevention units will be doubled)				
Power voltage		24 VDC (operating voltage 10-30 VDC (with ripple)), ripple (P-P) 10% or less, Class 2 or LPS				
Power consumption	NPN	Normal: 810 mW or less (at 30V. 28 mA max. at 24 V, 34 mA max. at 12 V) Eco on mode: 700 mW or less (at 30V. 24 mA max. at 24 V, 27 mA max. at 12 V) Eco Full mode: 490 mW or less (at 30V. 17 mA max. at 24 V, 20 mA max. at 12 V)				
	PNP	Normal: 860 mW or less (at 30V. 30 mA max. at 24 V, 35 mA max. at 12 V) Eco on mode (ALL): 750 mW or less (at 30V. 26 mA max. at 24 V, 28 mA max. at 12 V) Eco Full mode: 540 mW or less (at 30V. 19 mA max. at 24 V, 21 mA max. at 12 V)				–
Environmental resistance	Ambient temperature	-20°C to +55°C (-4°F to +131°F) (No freezing)*3				
	Relative humidity	35 to 85% RH, (No condensation)				
	Vibration resistance	10 to 55 Hz, double amplitude: 1.5 mm 0.06", 2 hours each in the X, Y and Z axis				
	Shock resistance	500 m/s^2 3 times for each of X,Y and Z axis				
Material	Case	Main unit and cover material: Polycarbonate				
	Cable	PVC				
Case size		H 32.6 mm 1.28"× W 9.8 mm 0.39" × L 78.7 mm 3.1"				
Weight		Approx. 75 g	Approx. 65 g	Approx. 20 g	Approx. 20 g	Approx. 20 g

*1 Counted as one output when added to a NU Series communication unit. *2 Input time is 25 ms (ON)/25 ms (OFF) when the external calibration time is selected.
*3 If more than one unit is used together, the ambient temperature varies with the conditions below. Mount the units on the DIN rail with mounting brackets and check that the output current is 20 mA or less for a unit.
One or two more units connected: -20°C to +55°C (-4°F to +131°F); 3 to 10 more units connected: -20°C to +50°C (-4°F to +122°F); 11 to 16 more units connected: -20°C to +45°C (-4°F to +113°F).

I/O Circuit Diagram

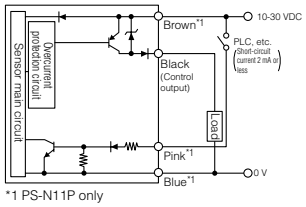
Cable type

PS-N11N/N12N



*1 PS-N11N only

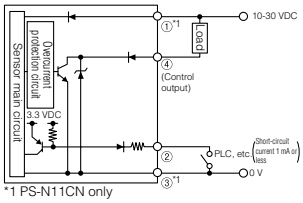
PS-N11P/N12P



*1 PS-N11P only

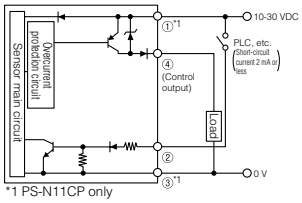
M8 connector type

PS-N11CN/N12CN



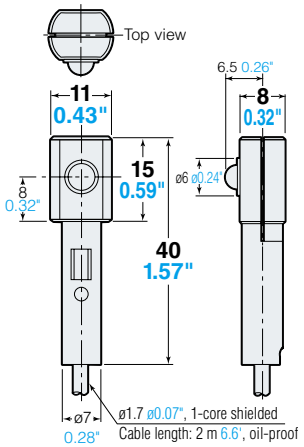
*1 PS-N11CN only

PS-N11CP/N12CP

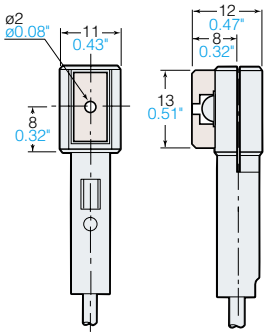


*1 PS-N11CP only

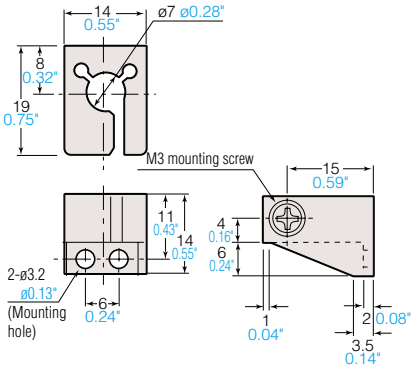
PS-05



With PS-05 slit attached (option **OP-93672**)



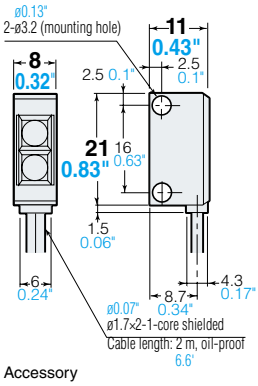
Holder (accessory)
PS-05



Accessory

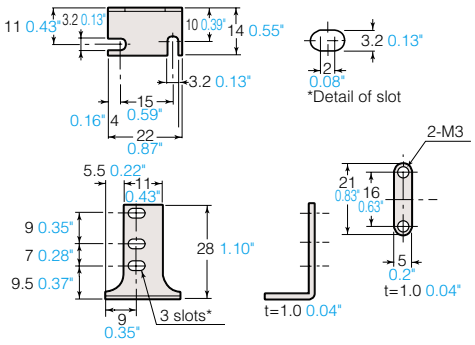
Screw (M3×14) flat washer, spring washer, nut	2 each (to secure head)
Screw (M3×10) spring washer	4 each (to secure holder)

PS-45

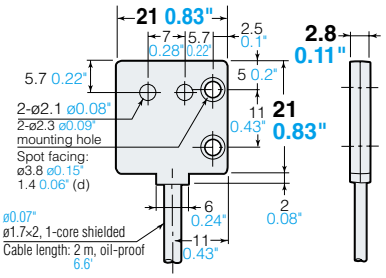


Accessory
Screws (M3×12), 2 pieces

Mounting bracket (accessory) for PS-45 (option **OP-0162**)

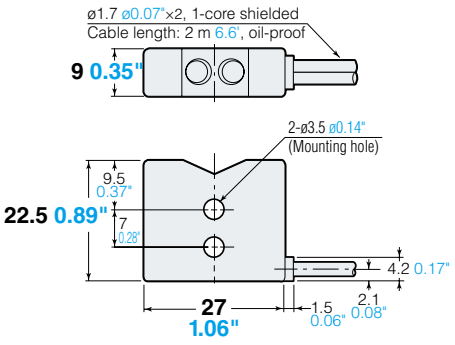


PS-46

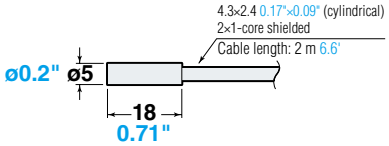


Accessory
Screws (M2×10), 2 pieces
Nut, spring washer, flat washer: 2 each

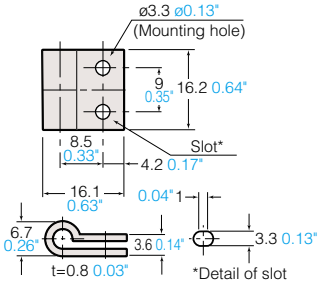
PS-47 (C)



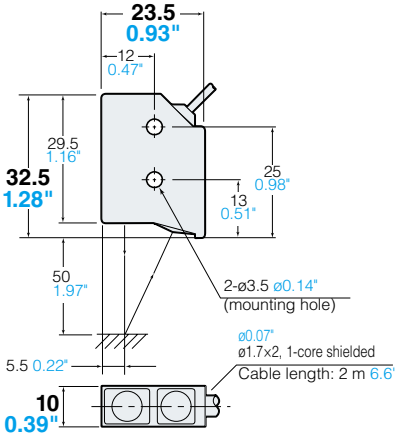
PS-48



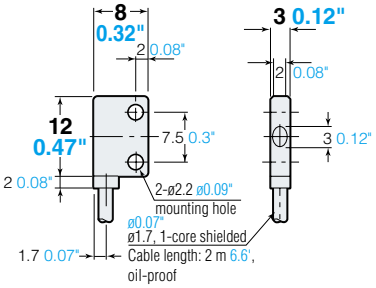
Mounting bracket (accessory) for PS-48 (option **OP-6349**)



PS-49 (C)

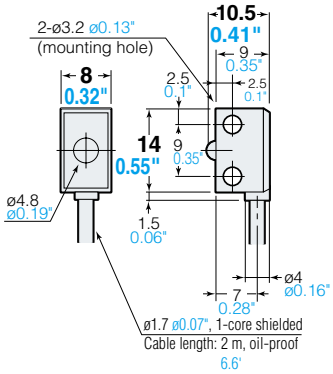


PS-52 (C)

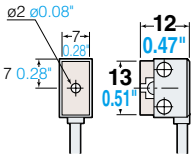


Accessory
Screws (M2×10), 4 pieces
Nut, spring washer, flat washer: 4 each

PS-55 (C)

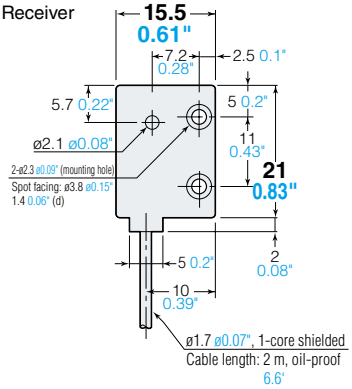


With PS-55 (C) slit attached (option **OP-2555**)

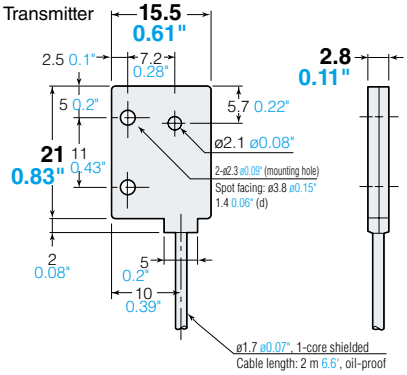


PS-56

Receiver

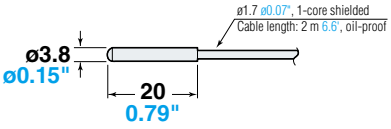


Transmitter

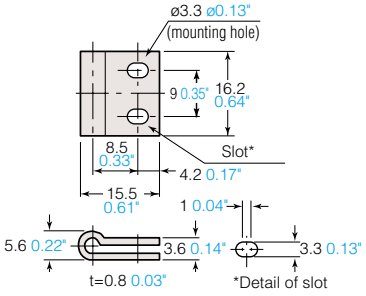


Accessory
Screws (M2×10), 4 pieces
Nut, spring washer, flat washer: 4 each

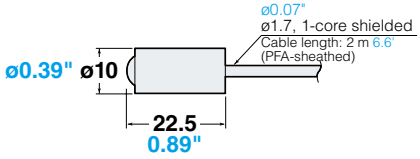
PS-58



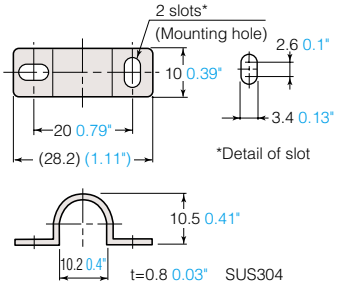
Mounting bracket (accessory) for PS-58
(option for one side only: **OP-6350**)



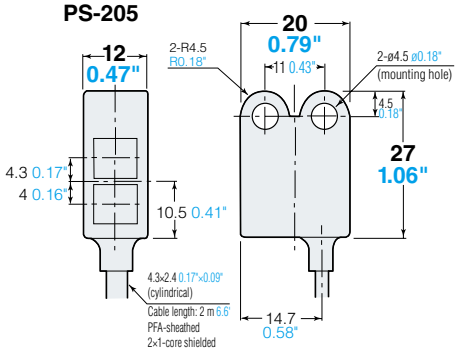
PS-201 (C)/PS-202



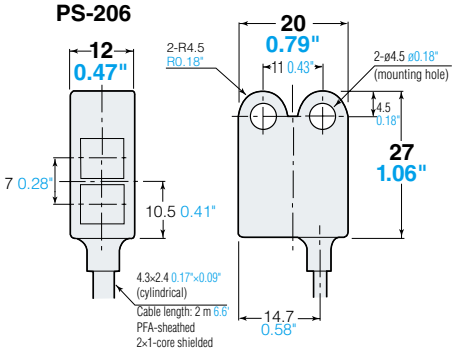
Mounting bracket (accessory)
for PS-201 (C)/PS-202
(option for one side only: **OP-7080**)



PS-205

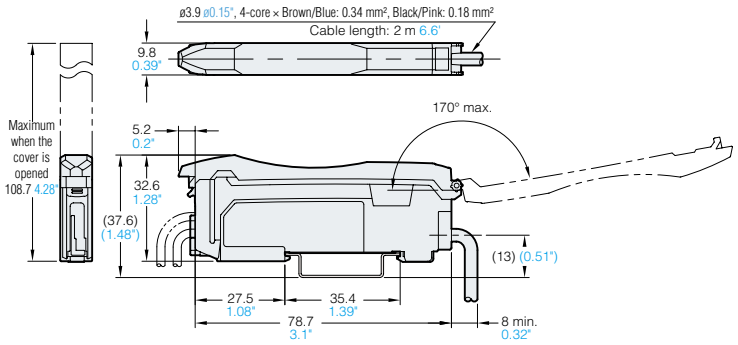


PS-206

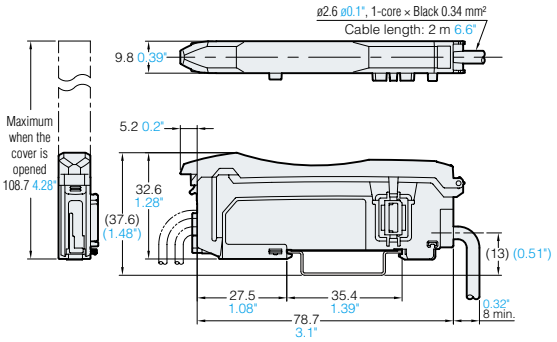


Unit : mm inch

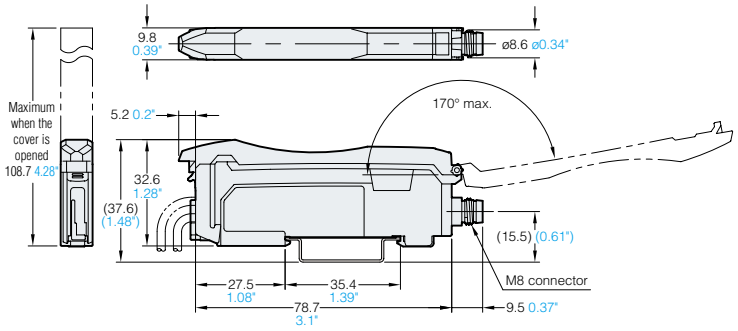
PS-N11N/N11P Cable type, Main unit



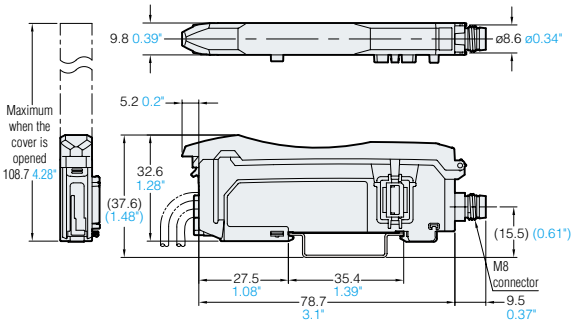
PS-N12N/N12P Cable type, Expansion unit



PS-N11CN/N11CP M8 connector type, Main unit

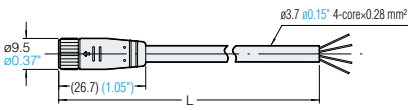


PS-N12CN/N12CP M8 connector type, Expansion unit

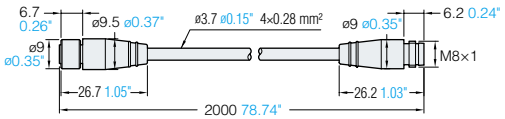


M8 connector cable (OP-73864 / 73865 sold separately)

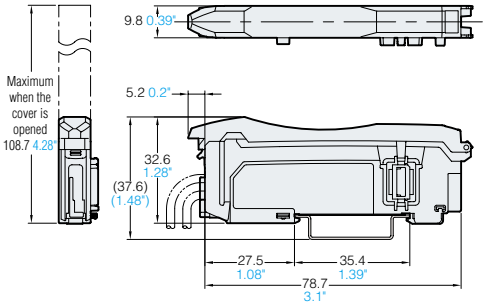
Cable length	L(m)
OP-73864	2 6.6'
OP-73865	10 32.8'



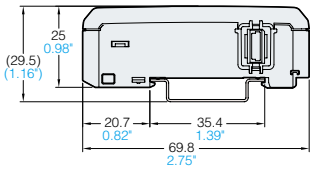
M8 connector junction cable (OP-85498 sold separately)



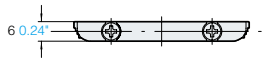
PS-N10 Zero line type, Expansion unit



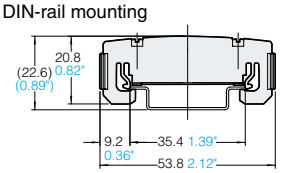
OP-87199 Conversion adaptor



When the end unit is attached (**OP-26751** sold separately)



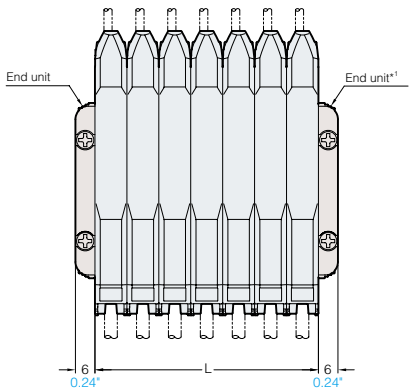
DIN-rail mounting



Material: Polycarbonate

Common for all types

When several units are connected:

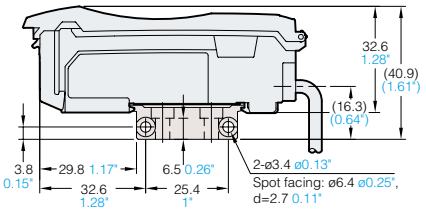


No. of units	L (mm inch)
1	9.8 0.39"
2	19.6 0.77"
3	29.4 1.16"
4	39.2 1.54"
5	49.0 1.93"
6	58.8 2.32"
7	68.6 2.7"
8	78.4 3.09"
9	88.2 3.47"
10	98.0 3.86"
11	107.8 4.24"
12	117.6 4.63"
13	127.4 5.02"
14	137.2 5.4"
15	147.0 5.79"
16	156.8 6.17"
17	166.6 6.56"

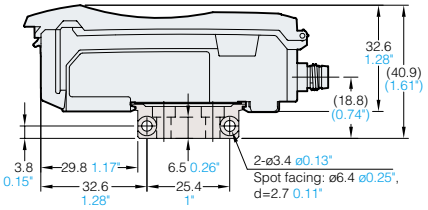
*1 End units must be used when several units are connected.(OP-26751)

When the mounting bracket is attached (**OP-73880** sold separately)

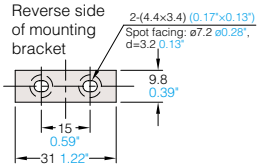
Cable type



M8 connector type

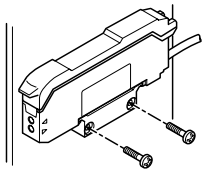
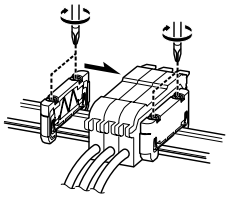


Reverse side of mounting bracket



Material: Polycarbonate

Common options for LV-NEO/FS-NEO/PS-NEO

Type	Appearance	Description	Model	Dimensions
Amplifier securing bracket (for main unit)		Can be installed without a DIN-rail. Can be installed from above or side as shown in right. 	**OP-73880**	**[P.23]**
End unit (when using expansion units)	 2 per set	Used to secure the main and expansion units. 	**OP-26751**	**[P.23]**
M8 connector cable (2 m 6.6'/10 m 32.8')		Used to connect to the M8 connector type amplifier (model numbers end with a "CN" or "CP"). Connector cables are not included with the amplifier. 	2 m 6.6' type **OP-73864** 10 m 32.8' type **OP-73865**	**[P.23]**
M8 connector junction cable (2 m 6.6')		Used to extend the M8 connector cable.	**OP-85498**	**[P.23]**
Expansion Converter Unit		The LV-NEO / FS-NEO / PS-NEO Series has different amplifier connectors than the FS-V30, LV, and CZ series. This is an adapter to connect these models. It supplies power from the main unit to the expansion unit and prevents interference. *Communication is not supported.	**OP-87199**	**[P.23]**

Network Communication Unit

NU series

Incorporate the NEO Series with an open field network for complete interfacing versatility

CC-Link Network Communication unit
NU-CL1

DeviceNet™ Network Communication unit
NU-DN1

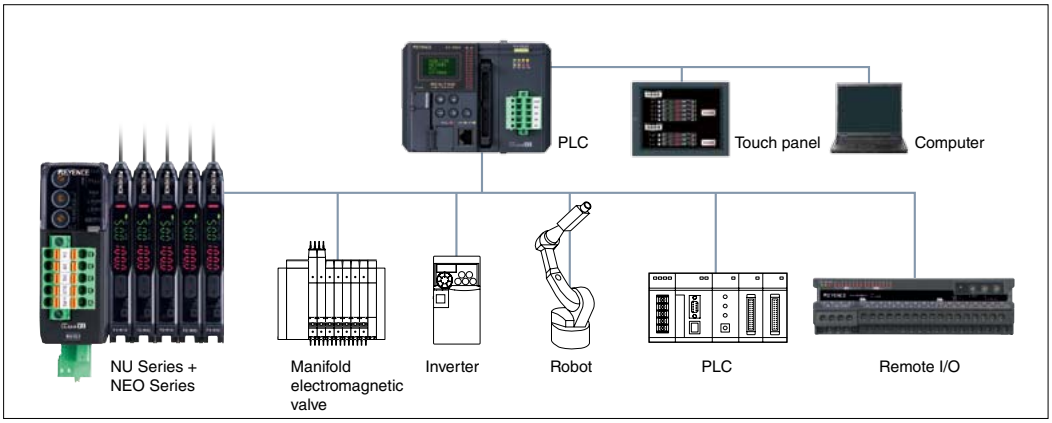
EtherNet/IP™ Network Communication unit
NU-EP1

EtherCAT Network Communication unit
NU-EC1

In addition to saving space and achieving a dramatic reduction in wiring, the remote management of multiple sensors significantly improves convenience and functionality.

Compatible with multiple open field networks

KEYENCE has developed 4 communication units that are compatible with open field networks (CC-Link, DeviceNet™, EtherNet/IP™, EtherCAT). These units enable the NEO Series sensors to be installed and used on the same network as a variety of devices from other manufacturers.



Dramatic reduction in wiring and installation time

Only a single communication cable is required between the PC/PLC ↔ and the NU Series for wiring. This achieves a dramatic reduction in wiring and saves a significant amount of space. In addition, wiring work that conventionally requires a great deal of time and effort has been greatly reduced.

Reduced production costs by introducing the NU Series

- No need for a complicated cable layout
- No additional wiring required when replacing sensors
- No need to trim the cables
- No need for a terminal block

Multiple sensors can be simultaneously managed

By utilizing the network, multiple sensors that exist on the same line can be simultaneously managed, significantly increasing convenience and ease-of-use in the field.
The status of the sensors can be monitored and settings for all of the sensors can modified together from a touch panel or computer.

Monitoring

<Conventional>

I want to check on the sensors before a detection error stops production, but it is too troublesome to go and look at each individual sensor....

<NU Series>

Easy monitoring from the display!

The sensor status can be monitored on an HMI, PLC, or PC, making it easier to detect problems before an error occurs.

Product change

<Conventional>

Because multiple products are manufactured on the same line, settings need to be adjusted frequently, but it is time consuming to have to adjust each individual sensor every time…

<NU Series>

Product change with the push of a button!

The NU allows for settings to be changed externally from an HMI, PLC, or PC. As a result, changeover time can be reduced, even where sensor settings must be changed frequently.

Sensor status log

<Conventional>

A sensor malfunction has occurred and I want to check it, but it doesn't seem to reoccur.... I cannot waste time just watching and waiting.

<NU Series>

Troubleshooting made easy!

If sensor information (light intensity/ setting values/error output) is stored in the log, the cause of minor errors is easily identified.

New lineup of sensor input units

The e-CON connection unit can be used for sensors, electromagnetic valves, and cylinder switches other than the NEO Series models. The ON/OFF status can be displayed and checked on a touch panel or computer.

e-CON Network Communication Input Unit
NU-EN8N

Lineup

Open Field Network Units

Type	Appearance	Network	Model	Dimensions
Communication unit		CC-Link	**NU-CL1**	**[P.66]**
		DeviceNet™	**NU-DN1**	
		EtherNet/IP™	**NU-EP1**	
		EtherCAT	**NU-EC1**	
e-CON Input unit		–	**NU-EN8N**	

Option

Model	Type
OP-79426	Ver.1.10 compatible CC-Link dedicated 20 m 65.6' cable
OP-79427	Ver.1.10 compatible CC-Link dedicated 100 m 328.1' cable
OP-51504	STP (Shielded twisted pair) 0.2 m 0.7' cable
OP-51505	STP (Shielded twisted pair) 0.5 m 1.6' cable
OP-51506	STP (Shielded twisted pair) 1 m 3.3' cable
OP-51507	STP (Shielded twisted pair) 3 m 9.8' cable
OP-51508	STP (Shielded twisted pair) 5 m 16.4' cable
OP-51509	STP (Shielded twisted pair) 10 m 32.8' cable
OP-84338[*1]	e-CON connector (2 per set)

*1 Use shield outer diameter 1.15 to 1.35 mm 0.05" to 0.05", wire range 0.1 to 0.5 mm² cable.
Prepare separate e-CON connectors capable of fitting the necessary cable diameter when the cable diameter is outside the OP-84338 specification listed above.

Specifications

CC-Link compatible communication unit: NU-CL1

Model		NU-CL1
CC-Link Specifications	Compatible version	Ver.2.00/Ver.1.10 (switchable)
	Number of occupied stations	Ver.2.00: 3 stations, Ver.1.10: 1/2/3/4 stations (switchable)
	Type of station	Remote device station
	Transmission speed	156 kbps/625 kbps/2.5 Mbps/5 Mbps/10 Mbps
	Setting of station numbers	1 to 64
Sensor connection specifications	Connectable sensors	Sensor amplifiers with N-bus support*1
	Number of connectable sensor units	Up to 16 units *2
	Power supply	Power is supplied from the unit via a wiring-saving connector.
	Maximum passing current	Total 1200 mA max.*3
Power voltage		24 VDC±10%, ripple (p-p) 10% or less
Power consumption		1400 mW or less (55 mA max. at 24 V)*4
Weight (including connector)		Approx. 80 g
Accessory		Instruction manual, CC-Link connector, power connection connector, termination resistor, end unit × 2

*1 "N-bus" is the name of KEYENCE's wiring-saving system for sensor amplifiers. *2 Depends on the sensor amplifiers connected.
*3 Value for the current which can be supplied to this product or a sensor amplifier unit connected to this product. *4 Current to be supplied to the connected sensor amplifier is not included.

DeviceNet™ compatible communication unit: NU-DN1

Model		NU-DN1		
DeviceNet™ Specifications	Supported functions	I/O Message (polling), Explicit Message		
	Address setting	0 to 63 (PGM compatible)		
	Baud rate (automatically switched)	500 kbps	250 kbps	125 kbps
	Maximum cable length	100 m 328.1' (thick cable)	250 m 820.2' (thick cable)	500 m 1640.4' (thick cable)
		100 m 328.1' (thin cable)	100 m 328.1' (thin cable)	100 m 328.1' (thin cable)
Sensor connection specifications	Connectable sensors	Sensor amplifiers with N-bus support*1		
	Number of connectable sensor units	Up to 16 units *2		
	Power supply	Power is supplied from the DeviceNet™ communication power supply via the unit.		
	Maximum passing current	Total 1200 mA max.*3		
Power voltage		11 to 25 VDC		
Power consumption		1480 mW or less (60 mA max. at 24 V, 106 mA max. at 12 V)*4		
Weight (including connector)		Approx. 65 g		
Accessory		Instruction manual, DeviceNet™ connector, end unit × 2		

*1 "N-bus" is the name of KEYENCE's wiring-saving system for sensor amplifiers. *2 Depends on the sensor amplifiers connected.
*3 Value for the current which can be supplied to this product or a sensor amplifier unit connected to this product. *4 Current to be supplied to the connected sensor amplifier is not included.

EtherNet/IP™ compatible communication unit: NU-EP1

Model		NU-EP1
Ethernet specifications	Compliance	IEEE802.3 (10BASE-T) IEEE802.3u (100BASE-TX) IEEE802.3af (Power over Ethernet, Class3)
	Transmission rate	10 Mbps (10BASE-T) 100 Mbps (100BASE-TX)
	Transmission media	STP cable or category 3 or higher UTP cable (10BASE-T)*1 STP cable or category 5 or higher UTP cable (100BASE-TX)
	Maximum cable length	100 m 328.1' (distance between the unit and Ethernet switch)
	Maximum number of connectable hubs*2	4 (10BASE-T) 2 (100BASE-TX)
EtherNet/IP™ Specifications	Compatible functions	Cyclic communication Compatible with UCMM and Class3 messaging (Explicit messaging)
	Number of connections	64
	RPI (transmission cycle)	0.5 to 10000 ms (in units of 0.5 ms)
	Tolerable communication bandwidth for Cyclic communication	6000 pps
	Conformance test	Compatible with Version A7
Sensor connection specifications	Connectable sensors	Sensor amplifiers with N-bus support*3
	Number of connectable sensor units	Up to 16 units*4
	Power supply	Power is supplied from the unit via a sensor amplifier connection connector.
	Allowable passing current*5	Total 1200 mA max.
	Power during PoE power receiving*6	Supply voltage: 24 V±10%, supply current: 360 mA or less*7
Power voltage		24 VDC±10%, ripple (p-p) 10% or less (with power supply connector) 48 VDC (Max.57 VDC) (During PoE power receiving)
Power consumption		1500 mW or less (60 mA max. at 24 V)*8
Weight (including connector)		Approx. 80 g
Accessory		Instruction manual, power connector, 2 end units

* Cannot connect to the following KEYENCE's PoE power supply devices: [DT-100A], [DT-500], [NE-V08]
*1 When using the power PoE power receiving function, use the STP cable or Category 5 or higher UTP cable. *2 The number of connectable units is not limited when using a switch.
*3 "N-bus" is the name of KEYENCE's wiring-saving system for sensor amplifiers. *4 Depends on the sensor amplifiers connected. *5 Value for the current which can be supplied to this unit or to a sensor amplifier unit connected to this unit. *6 Power which can be supplied to the sensor amplifier when using the PoE power receiving function. *7 Varies according to the working ambient temperature. (-20 to 45°C (-4 to 113°F): 360 mA or less, 45 to 50°C(113 to 122°F): 260 mA or less, 50 to 55°C(122 to 131°F): 140 mA or less) *8 Current to be supplied to the connected sensor amplifier is not included.

EtherCAT compatible communication unit: NU-EC1

Model		NU-EC1
Ethernet specifications	Compliance	IEEE802.3u (100BASE-TX)
	Transmission rate	100 Mbps (100BASE-TX)
	Transmission media	Category 5e or higher STP cable
	Distance between nodes	100 m 328.1'
	Communication port	RJ-45 × 2
EtherCAT communication specifications	Compatible functions	Process data object communication (cyclic communication) Mailbox communication (message communication) CoE compatible
Sensor connection specifications	Connectable sensors	Sensor amplifiers with N-bus support*1
	Number of connectable sensor units	Up to 16 units*2
	Power supply	Power is supplied from the unit via a wiring-saving connector
	Allowable passing current*3	Total 1200 mA max.
Power voltage		24 VDC±10%, ripple (p-p) 10% or less
Power consumption		1700 mW or less (70 mA max. at 24 V)*4
Weight (including connector)		Approx. 80 g
Accessory		Instruction manual, power connector, 2 end units

* EtherCAT is a registered trade name of BECKHOFF.
*1 "N-bus" is the name of KEYENCE's wiring-saving system for sensor amplifiers. *2 Depends on the sensor amplifiers connected.
*3 Value for the current which can be supplied to this product or a sensor amplifier unit connected to this product. *4 Current to be supplied to the connected sensor amplifier is not included.

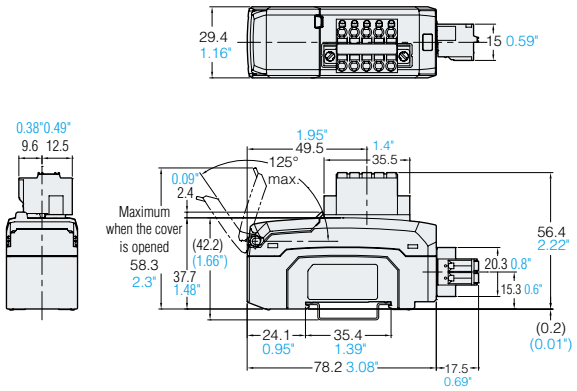
Communication unit compatible e-CON network input unit: NU-EN8N

Model		NU-EN8N
Connectable communication unit		NU-CL1, NU-DN1, NU-EP1, NU-EC1
Number of connectable sensor units		Up to 2 units (occupied ID number: 8)*1
I/O	Connector	e-CON connector (4 pin)
	Inputs	8
	Supply voltage for equipment	Supplied from the communication unit
	Supply current	520 mA or less (total for 8 ports)
	Input signal	NPN open collector output, contact output
	Input response time	20 µs or less
	Internal input voltage	8 VDC (Reference value of input current: 3.1 mA)
	Input resistance	2.4 kΩ
Power voltage		12 to 24 VDC, ripple (p-p) 10% or less*2
Weight (including tag)		Approx. 55 g
Accessory		Instruction manual, tag, index seal

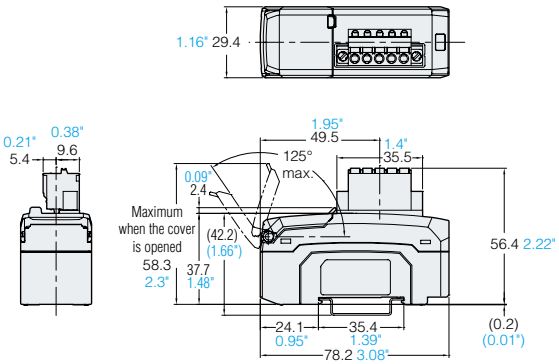
*1 To connect the NU-EN8N to a communication unit, connect it after the sensor amplifier. Sensor amplifier connected after this unit will not be recognized by the communication unit.
*2 Power to the NU-EN8N is supplied from the connected communication unit.

Unit : mm inch

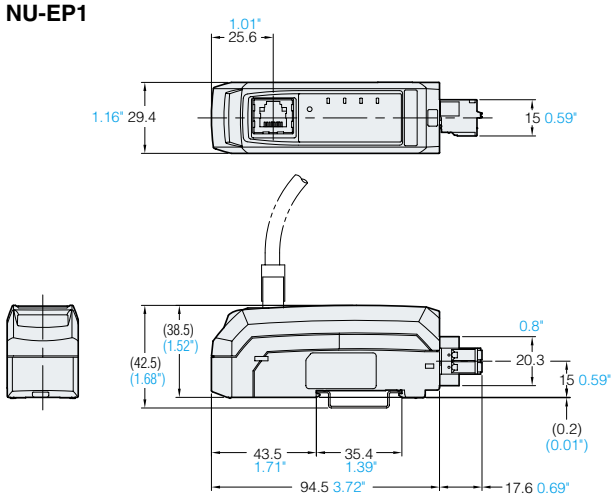
NU-CL1



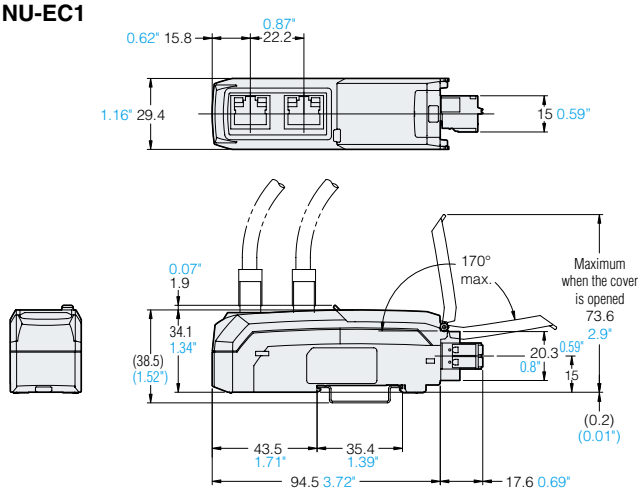
NU-DN1



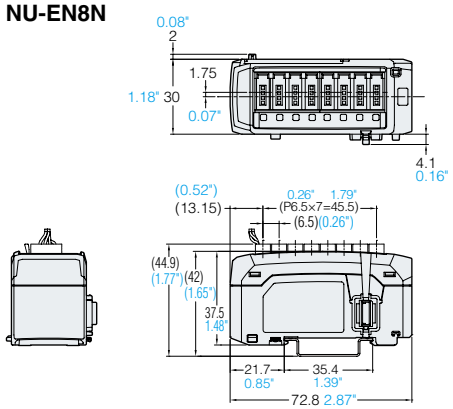
NU-EP1



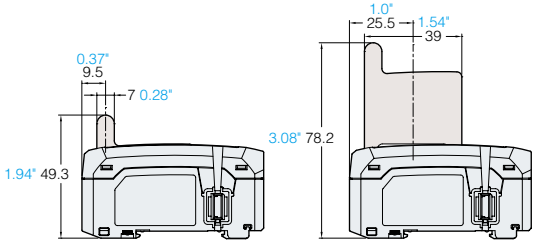
NU-EC1



NU-EN8N



When the tag (supplied with NU-EN8N) is attached.



< Considerations when using the NEO Series>

To replace the LV Series with the LV-N Series

When you replace your LV-Hxx sensor head with the LV-N Series, be aware of the following:

(1) The LV-N Series sensor heads must be used with the LV-N Series amplifiers.

(2) If the desired LV sensor head is not available with the LV-N Series, you must use the LV-H Series amplifier.

Type	LV Series sensor head	LV-N Series sensor head	Remarks
Diffuse-reflective	LV-H32	LV-NH32	–
	LV-H35	LV-NH35	
	LV-H35F	–	Use **LV-21A(P) / 22A(P)** for an amplifier.
	LV-H37	LV-NH37	–
	LV-H41	–	Use **LV-11A** for an amplifier.
	LV-H42	LV-NH42	–
	LV-H47	–	Use **LV-21A(P) / 22A(P)** for an amplifier.
Retro-reflective Type	LV-H62	LV-NH62	–
	LV-H62F	–	Use **LV-21A(P) / 22A(P)** for an amplifier.
	LV-H64		
	LV-H65		
	LV-H67		
Thrubeam type	LV-H100	LV-NH100	–
	LV-H110	LV-NH110	
	LV-H300	LV-NH300	

* All sensor head LV-Sxx can be used with the LV-N Series amplifiers.

Amplifiers for the LV-H Series

Type		Appearance	Model		Control outputs	Calibration external input	Laser transmission stop input	Monitor output
			NPN output	PNP output				
For reflective/ retro-reflective	Main unit		LV-21A	LV-21AP	2	1	1	0
	Expansion unit		LV-22A	LV-22AP	2	0	0	0
For infrared LV-H41	Main unit		LV-11A	–	2	1	1	0
Thrubeam type	Main unit		LV-51M	LV-51MP	2	0	1	1
	Expansion unit		LV-52	LV-52P	2	0	0	0

Number of connectable amplifiers

To expand the LV-N, FS-N, or PS-N Series, up to 16 expansion units and 1 main unit can be connected. Therefore up to 17 total units can be connected. However, be aware that the number of connectable units is dependent upon the number of control outputs for each amplifier.

Series	Model	Number of control outputs
LV-N	LV-N11N (P) / N12N (P)	2
	Others	1
FS-N	FS-N13x/N14x	2
	Others	1
PS-N	All models	1

Number of mutual interference prevention units

When the NEO Series main and expansion units are connected, the mutual interference prevention function enables the following number of units to closely operate without interference with respect to each power mode.

Power mode		HSP	FINE	TURBO	SUPER	ULTRA	MEGA
LV-N10	Normal	×	2	2*2	2*2	4	4
	DOUBLE*1	×	4	4*2	4*2	8	8
FS-N10	Normal	×	4	8	8	8	8
	DOUBLE*1	×	8	16	16	16	16
PS-N10	Normal	–		4	4	4	4
	DOUBLE*1			8	8	8	8

(This depends on the Series with the smallest number of units, when LV-N, FS-N, and PS-N are mixed in a system.)

*1 Can be switched to DOUBLE mode by the amplifier mode setting. When DOUBLE mode is used, all connected amplifiers must be in DOUBLE mode.

*2 The number of units is 4 in normal mode and 8 in DOUBLE mode when connected to the LV-S31.

neo series

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SAFETY INFORMATION
Please read the instruction manual carefully in order to safely operate any KEYENCE product.

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