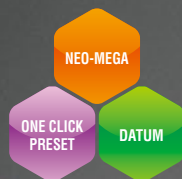


In addition to its MEGA power,
the FS-N Series introduces unprecedented setup ease
with one click operation.

FS-neo



EtherCAT
EtherNet/IP
DeviceNet
CC-Link V2



Certainty and simplicity

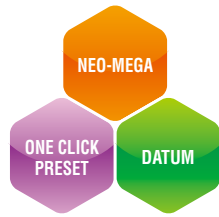
There are two major qualities that are important in fibre sensors.

First, the sensor must have improved basic performance, including ample beam power and accuracy, for greater detection stability.

Second, the sensor must be easy for anyone to setup and operate.



Instant alarm readout!



FS-NEO

NEW CONCEPT

Complete setting in just one click

ONE CLICK PRESET

An entirely new concept in setup ease. Just one click calibrates the sensitivity and resets the display.



NEW CONCEPT

Automatic maintenance

DATUM

The sensor automatically detects reduced light intensity due to debris build-up and automatically re-calibrates to the original display state.

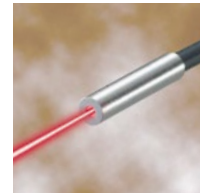


SIMPLE, CONVENIENT

High power reduces labour hours

NEO-MEGA

Increased sensor power greatly reduces maintenance and setup time.



NEO is supported by the world's highest level of performance

World's most powerful beam

Achieves **250** times more light intensity

World's most accurate

Detects wire as small as **ø0.6** μm

World's highest ambient-light resistance

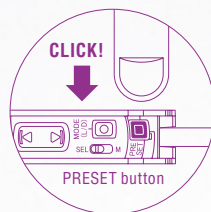
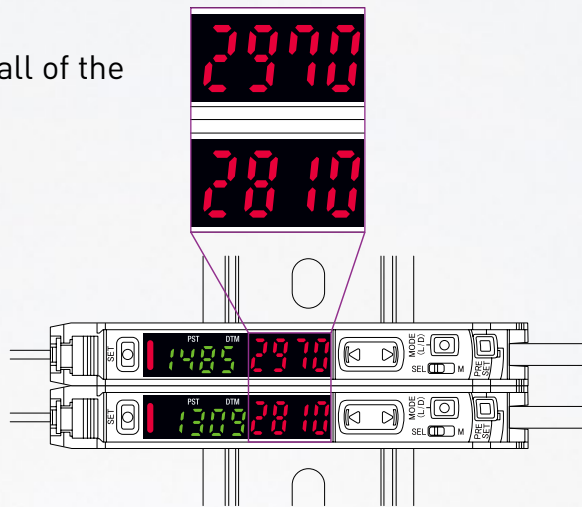
Unaffected up to **30,000** lux

Complete setting in just one click

Click the button once to simultaneously set the sensitivity and reset the display value to 100.

What customers are saying

“ I usually just set the sensitivity.
It would be nice if I could reset all of the
settings and current values,
but I wouldn't use this feature
if it's complicated. ”



“ With the NEO, just one click
sets the sensitivity and
resets the display! ”



Point 1 Easy to detect changes (preventive maintenance)

The NEO provides an easy-to-read indication when the light intensity drops due to dirt or other environment related causes.

Conventional problem

Light intensity reduction is difficult to grasp due to individual differences in numeric values.

FS-NEO

All sensors initially display 100, making it easy to detect changes.

Point 2 The digital value resets to exactly 100

Conventional problem

The value easily shifted and the initial value of 2000 was arbitrary.

Setting the value to an easier to read value of 1000 required a complicated operation. The ability to change the target value made it difficult to keep track of the original value.

FS-NEO

The numbers reset to exactly 100. The set values are reset to 50.

Resetting numeric values with one click offers unprecedented operating ease.

Point 3 Greater convenience when using multiple sensors

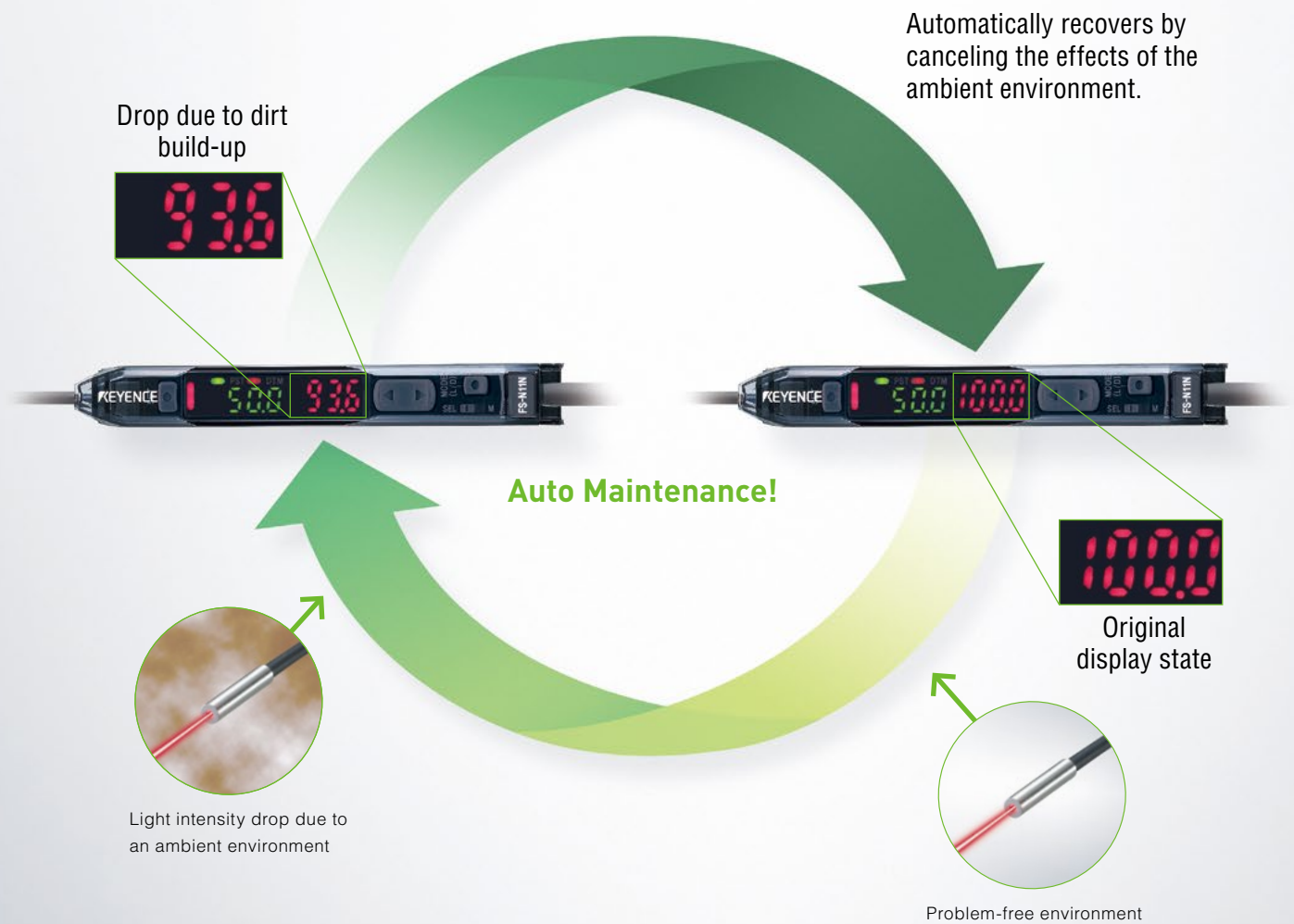
The preset function is even more useful when using multiple sensors. Quickly and easily locate sensors that have become dirty or misaligned. Main and expansion unit sensors can be reset with one click by pressing PRESET on the main unit.

If the light intensity drops significantly it will not return to 100.0, making it easy to detect the problem. The 2-output type can be used to provide a low light intensity signal to a PLC or similar controller.

NEW CONCEPT

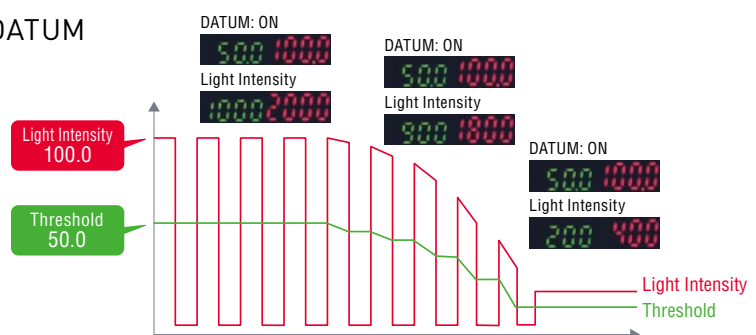
Automatic maintenance

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 the sensor to continue to perform highly accurate detections.



Automatic maintenance function: DATUM

The setting value changes according to the intensity as shown in the figure to the right. This function corrects the setting value based on a running average of the received light intensity value. The correction cycle is the same as the sampling cycle and can be selected from three levels.



SIMPLE, CONVENIENT

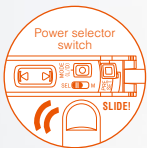
World's highest power reduces maintenance time

"High power" = "large excess gain" that not only reduces the need for maintenance but also expands sensor head capabilities, which reduces setup time.

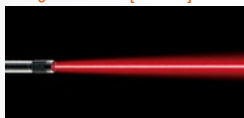
1

Switch selectable MEGA power

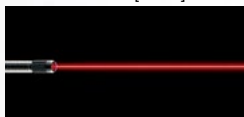
Hassle-free operation allows easy changeover between standard and high power.



Long distance [MEGA]



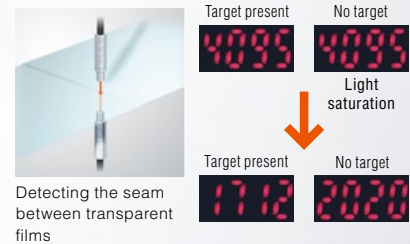
Short distance [FINE]



3

Prevent light saturation with a simple operation

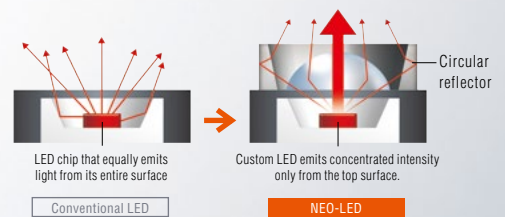
Strong light may result in reduced contrast. In this case, simply press the "MODE" + "SET" buttons to automatically adjust the NEO to the proper light intensity.



2

Reduced light intensity variations

With conventional models, amplifying the projected beam of condensed light causes the focus of the beam to be sensitive to minute positioning errors in the light-emitting device. The NEO-LED solves this positioning problem by using a reflector around the light emitting source. The reflector reduces light intensity variations.

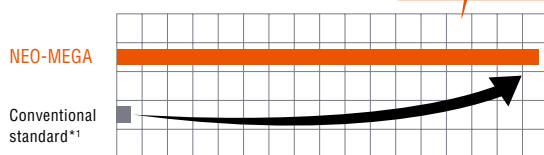


The circular reflector helps compensate for light positioning errors by redirecting any stray light back into the fibre.

World's most powerful beam: NEO-MEGA

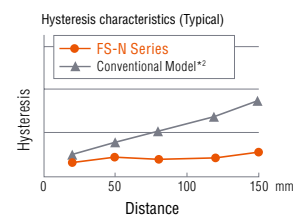
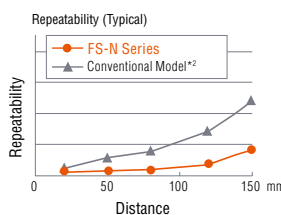
Guideline for received light intensity

250 times greater than conventional models



The emitted light intensity is about 4 times stronger than conventional models.
*1. FS-V30 Series in FINE mode

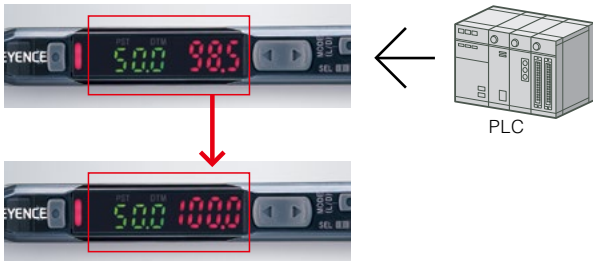
NEO-MEGA, the world's most powerful beam, allows for significant improvement of repeatability and hysteresis.



*2. FS-V30 Series

Convenient functionality designed for ease of use in the field

Using the external calibration input*



The sensor can be calibrated from a PLC or other external device. Regularly executing the Preset function from an external input ensures uninterrupted, stable detection, even in harsh environments. The 2-output type can be used to provide a low light intensity signal if the sensor becomes extremely dirty.

* Available on models with external input support.

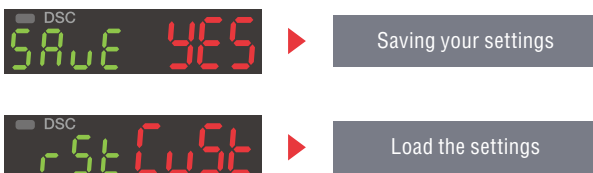
Easy sensitivity setting (two-point tuning)



Set by simply pressing the SET button once with the target present, and once without it.

Program memory

Operators or users may accidentally change the settings on the FS. In this case, conventional models require resetting. The FS-N saves your application settings into memory for fast recovery.



Wire saving when adding sensors



When adding sensors, the power is supplied from the connector on the side. This reduces wiring by two cables per sensor, allowing for a neater, quicker installation.

Note: Only supports FS-N Series amplifiers.

Reliable even when using multiple sensors

All models equipped with a standard heat sink. The heat sink reduces the temperature of the amplifier, and reduces the stress on the LED light source as well as other internal parts.



Zero Shift

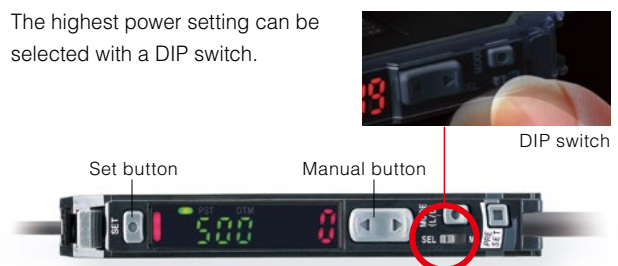
Setting the current value to "0" just got easier. Simply press the PRESET and RIGHT button at the same time.



Using a NEO amplifier with an external input, the Zero Shift adjustment can be performed on a regular basis using a PLC or other external device.

World's first power booster switch

The highest power setting can be selected with a DIP switch.



Complete lineup

Cable Type



Type	Model	Model		Control outputs	External input	Analog output
		NPN output	PNP output			
Standard	Main unit	FS-N11N	FS-N11P	1	0	0
	Expansion unit	FS-N12N	FS-N12P			
2-output	Main unit	FS-N13N	FS-N13P	2	1	0
	Expansion unit	FS-N14N	FS-N14P			
Analog	Main unit	FS-N11MN	—	1	0	1

Connector Type (M8)



Type	Model	Model		Control outputs	External input	Analog output
		NPN output	PNP output			
Standard	Main unit	FS-N11CN	FS-N11CP	1	1	0
	Expansion unit	FS-N12CN	FS-N12CP			
2-output	Main unit	—	FS-N13CP	2	0	0
	Expansion unit	—	FS-N14CP			

O-line Type



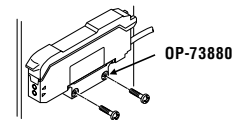
Type	Model	Control outputs	External input	Analog output
Expansion unit (No output cable)	FS-N10	1	0	0

Optional (sold separately)

Amplifier securing bracket
(for main unit)



Can be installed without a DIN-rail.
Can be installed from above or from the side.

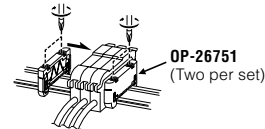


OP-73880

End unit
(when using expansion units)



Used to secure the main and expansion units.
(Two per set)



OP-26751
(Two per set)

M8 connector cable
(2 m/10 m)



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 type
OP-73864

10 m type
OP-73865

Expansion converter unit



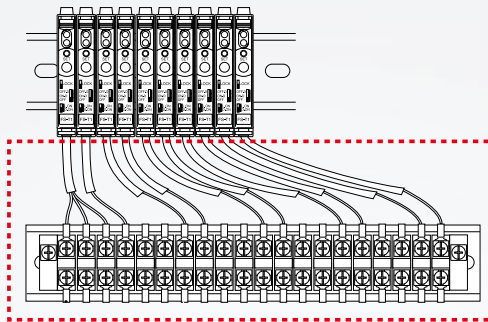
The FS-N Series has different amplifier connection connectors than the FS-V30, LV, and CZ series. This is an adapter to connect these models. It supplies power from the main unit to the expansion unit and prevents interference.
*Communication is not supported.

OP-87199

Dramatic reduction in wiring and installation time

Conventional Method

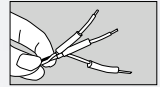
Multiple preparation and wiring steps increased the installation time.



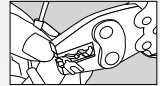
Wires for each sensor

Conventional Wiring

Trim each cable for wiring to the terminal block. Identify and mark each cable.



Apply terminal connectors.



Tighten the screws on the terminal block to connect each sensor.



With the NU Series

Reduced Wiring

Only a single communication cable is required between the PC/PLC and the NU Series for wiring.


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

When using 10 amplifiers that are connected in series.

Conventional wiring (Series connection)

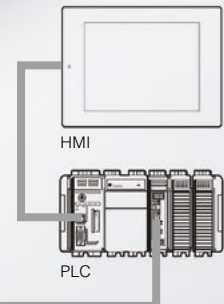
 50 min.

NU Series

 5 min. 90% less time than the conventional installation process



No wires



Lineup



CC-Link Compatible Network Unit
NU-CL1



DeviceNet™ Compatible Network Unit
NU-DN1



EtherNet/IP™ Compatible Network Unit
NU-EP1



EtherCAT® Compatible Network Unit
NU-EC1



Digital Fibreoptic Sensor
FS-N10



e-CON Network Input Unit
NU-EN8N

Improved functionality through remote access

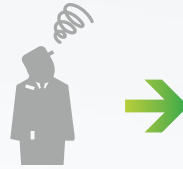
Status monitoring, settings changes, and setup backup/recovery can be done via HMI, PLC, or PC.

Conventional Method

With the NU Series

Monitoring

It is desired to prevent false detection by the sensor before it stops production. However, there is no way to monitor it without looking at each sensor.



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

Tooling change (setting value change)

If multiple products are manufactured on the same line, settings need to be adjusted for each sensor during changeover.



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.

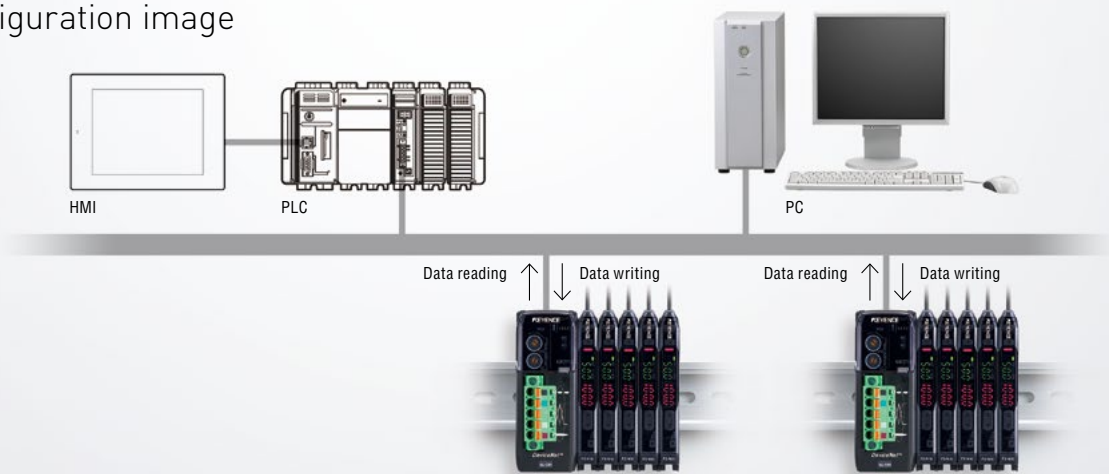
Settings backup/recovery

When shipping a machine, it is necessary to provide setting procedure details for the sensors. Assembling this information can be quite time consuming.



When shipping a machine, backup settings can be quickly saved on an HMI, PLC or PC. Recovering these settings is quick and easy.

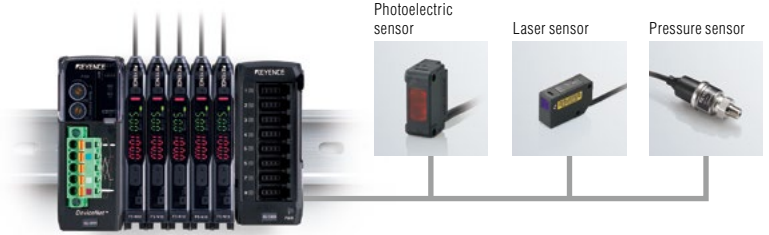
System configuration image



Also available: Sensor input unit

Network Sensor Input Unit **NU-EN8N**

Sensor and switch outputs can be connected with an e-CON (wire-press) connector (**OP-84338** set of 2), making it possible to monitor their ON/OFF status on an HMI, PLC, or PC.



Fibre Unit FU Series

Fibre Unit [FU Series]

Choose from our selection of more than 100 types of fibre units.



Standard Type



▶ P.15

Integrated Bracket

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

Standard Type



▶ P.15

Flat

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

Standard Type

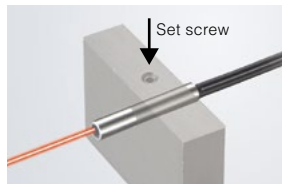


▶ P.16

Threaded and Hex-shaped Fibres

Threaded for easy mounting onto brackets and machine equipment.

Standard Type



▶ P.18

Cylinder

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

Standard Type



▶ P.19

Sleeve

The fibre tip is a thin sleeve. Eliminate problems caused by limited mounting space. Lineup includes side-view and bendable sleeve types.

Focused Beam Type



▶ P.20

Small Spot Reflective

Ideal for detecting small objects. Spot size and focal distance are adjustable, so there is no need to change the distance between the sensor and the target.

High-power Beam Type

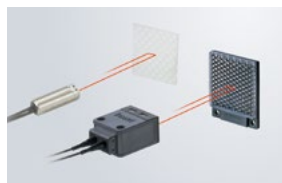


▶ P.21

Area

This sensor forms a wide-area beam, making it ideal for moving-target applications, such as detection of falling objects.

High-power Beam Type



▶ P.21

Retro-reflective

The use of a reflector in place of the receiver used with thru-beam sensors simplifies installation and optical axis alignment. This sensor is suitable for detecting transparent objects.



High-power Beam Type



▶ P.22

Narrow Beam/High-power

Narrow field of view based on focused aperture angle. This sensor reduces stray light for stable target detection. The high-power reflective type with an 8° aperture angle is suitable for detecting objects at longer distances.

Fixed Range Type

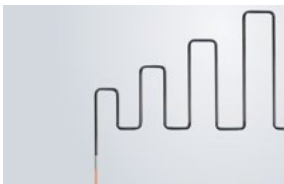


▶ P.22

Definite-reflective

Detects within a fixed distance. Reduces the effect of background, and features a space-saving thin-profile design.

High-flex



▶ P.23

High-flex*

The R2 ToughFlex fibre achieves excellent flexing characteristics with the same bend radius. * 10 million bends

Oil/Chemical Resistant

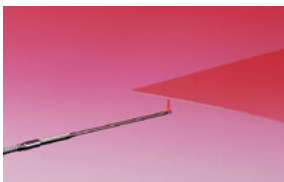


▶ P.23

Oil/Chemical Resistant

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

Heat Resistant



▶ P.24

Heat Resistant

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

Application-specific Type

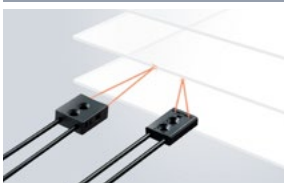


▶ P.25

Liquid-level

Detects liquid levels when immersed or attached to a transparent tube.

Application-specific Type



▶ P.25

**Liquid Crystal/
Semiconductors**

Perfect for glass substrate detection. Lineup offers distance alignment, edge detection, and water mapping types.

Model search

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Integrated Bracket

Integrated bracket and sensor simplifies installation.

Thrubeam/reflective types

Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm) (Standard target to be detected)	Model Weight	
	Beam emitting direction	Optical axis height (mm)				MEGA FINE	Other power modes			
Thrubeam	Top	10	2 m Free-cut (ø2.2) -40 to +50°C		R2 ToughFlex	MEGA: 2200 FINE: 450	ULTRA: 1700 SUPER: 1000 TURBO: 760 HSP: 290	ø1.13	FU-L51Z Approx. 30 g	
		15								FU-L52Z Approx. 30 g
		20								
	Top (lens)	10	2 m Free-cut (ø2.2) -40 to +50°C			MEGA: 3600 FINE: 3100	ULTRA: 3600 SUPER: 3600 TURBO: 3600 HSP: 2100	ø3.5	FU-L50Z Approx. 30 g	
	Side	10	2 m Free-cut (ø2.2) -40 to +50°C			MEGA: 1900 FINE: 410	ULTRA: 1500 SUPER: 900 TURBO: 700 HSP: 270	ø1.13	FU-L54Z Approx. 30 g	
Reflective	Top	10	2 m Free-cut (ø2.2) -40 to +50°C		MEGA: 760 FINE: 170	ULTRA: 580 SUPER: 430 TURBO: 320 HSP: 90	-	FU-L41Z Approx. 25 g		

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Flat

Mount directly in locations where space is limited.

Thrubeam/reflective types

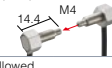
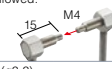
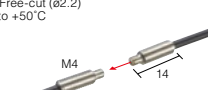

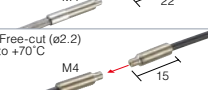
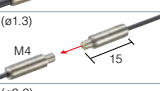
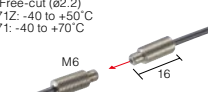
Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm) (Standard target to be detected)	Model Weight
	Beam emitting direction	Optical axis height (mm)				MEGA FINE	Other power modes		
Thrubeam	Top	10	1 m Free-cut (ø1.0) -40 to +50°C		R2 ToughFlex	MEGA: 810 FINE: 170	ULTRA: 520 SUPER: 340 TURBO: 260 HSP: 90	ø0.5	FU-51TZ Approx. 5 g
		14	2 m Free-cut (ø1.3) -40 to +50°C						
	Side	10.5	1 m Free-cut (ø1.0) -40 to +50°C			MEGA: 740 FINE: 140	ULTRA: 480 SUPER: 280 TURBO: 200 HSP: 70	ø0.5	FU-57TZ Approx. 5 g
		13	1 m Free-cut (ø1.0) -40 to +50°C						
	Flat	15	2 m Free-cut (ø2.2) -40 to +50°C			MEGA: 2900 FINE: 610	ULTRA: 1900 SUPER: 1200 TURBO: 850 HSP: 260	FU-54TZ Approx. 25 g	
		8	1 m Free-cut (ø1.0 x 2) -40 to +50°C			MEGA: 1 to 160 FINE: 1 to 36	ULTRA: 1 to 120 SUPER: 1 to 81 TURBO: 1 to 60 HSP: 1 to 13		FU-44TZ Approx. 3 g
Reflective	Top	10.5	1 m Free-cut (ø1.0 x 2) -40 to +50°C		R2 ToughFlex	MEGA: 1 to 160 FINE: 1 to 36	ULTRA: 1 to 120 SUPER: 1 to 81 TURBO: 1 to 60 HSP: 1 to 18	-	
		13	1 m Free-cut (ø1.0) -40 to +50°C						MEGA: 2 to 120 FINE: 2 to 24
	Flat	13	1 m Free-cut (ø1.0) -40 to +50°C			MEGA: 1 to 500 FINE: 1 to 70	ULTRA: 1 to 320 SUPER: 1 to 190 TURBO: 1 to 130 HSP: 1 to 50	FU-42TZ Approx. 24 g	
		20	2 m Free-cut (ø2.2 x 2) -40 to +50°C						

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Threaded and Hex-shaped Fibres

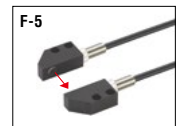
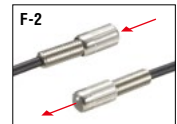
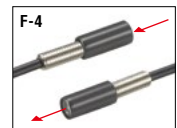
Most common fibre sensor. Easily mounts onto brackets or machine equipment.

Thrubeam

Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)		Optical axis diameter (mm) (Standard target to be detected)	Model Weight
	Size/Shape					MEGA FINE	Other power modes		
Thrubeam	M4	Hex-shaped	2 m Free-cut (ø2.2) -40 to +50°C		R2 ToughFlex	MEGA: 3100 FINE: 640	ULTRA: 2100 SUPER: 1300 TURBO: 880 HSP: 320	ø1.13	FU-77TZ Approx. 43 g
			1 m cut not allowed. -40 to +50°C		R10 Stainless Steel	MEGA: 1800 FINE: 640	ULTRA: 1800 SUPER: 1300 TURBO: 880 HSP: 320		FU-77TG Approx. 43 g
		Threaded	2 m Free-cut (ø2.2) -40 to +50°C		R0.5 ToughFlex	MEGA: 3600 FINE: 880	ULTRA: 3000 SUPER: 1800 TURBO: 1300 HSP: 430		FU-77V Approx. 25 g
			1 m cut not allowed. -40 to +50°C		R2 ToughFlex				FU-77 Approx. 21 g
			2 m Free-cut (ø2.2) -40 to +70°C		R25	MEGA: 3600 FINE: 1100	ULTRA: 3200 SUPER: 2200 TURBO: 1500 HSP: 540		FU-7F Approx. 21 g
	M6	Threaded	2 m Free-cut (ø1.3) -40 to +70°C		R4	MEGA: 2200 FINE: 440	ULTRA: 1400 SUPER: 860 TURBO: 600 HSP: 220	ø1	FU-78 Approx. 9 g
			2 m Free-cut (ø2.2) FU-71Z: -40 to +50°C FU-71: -40 to +70°C		R2 ToughFlex	MEGA: 3600 FINE: 1100	ULTRA: 3600 SUPER: 2300 TURBO: 1600 HSP: 590	ø1.5	FU-71Z Approx. 25 g
				R25	MEGA: 3600 FINE: 1300	ULTRA: 3600 SUPER: 2600 TURBO: 1800 HSP: 650	FU-71 Approx. 25 g		

Thrubeam Lenses




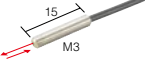

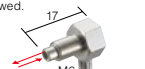




Type	Ambient temperature Appearance (mm)	Model Weight	Applicable fibre units	Detecting distance (mm)*1					
				MEGA	ULTRA	SUPER	TURBO	FINE	HSP
Ultra-long detecting distance Narrow field of view Aperture Angle: Approx. 8°	Heat Resistance: 70°C 	F-4 Approx. 1 g	FU-77TZ/77V/77	2700					
			FU-7F	3200					
			FU-78	2200					
			FU-77G/77TG	1800					
Long-detecting distance Aperture Angle: Approx. 15°	Heat Resistance: 300°C 	F-2 Approx. 2 g	FU-77TZ/77V/77/84C/88K	2100					
			FU-7F/86A	2500					
			FU-86Z	1900					
			FU-78	3600				3300	1600
			FU-77G/77TG	1800					
Side-view with mounting holes	Heat Resistance: 105°C 	F-5 Approx. 10 g	FU-77V/77	2600					
			FU-7F/86A	3100					
			FU-86Z	2900					
			FU-78	2300					
			FU-77G	1800					
Side-view	Heat Resistance: 70°C*2 	F-1 Approx. 2 g	FU-77V/77	3600	3100	1900	1300	900	530
			FU-77G	1800			1300	900	530
			FU-7F/86A	3600		3100	2100	1300	630
			FU-86Z	3600	3300	2300	1500	1100	500
			FU-78/84C/88K	3200	2500	1600	1100	800	360



*1 The maximum sensing distance of 3600 mm (1800 mm) is possible because the fibre length on each side is 2 m (1 m).

*2 When using the F-1 at 70°C or more, specify the "Heat-resistant F-1". Be sure to use the "Heat-resistant F-1" at a constant temperature.

Reflective

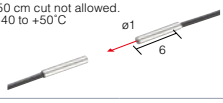
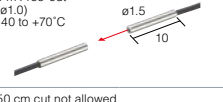
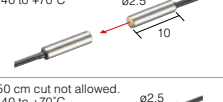
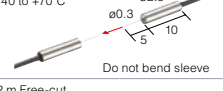
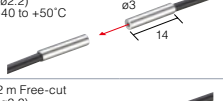
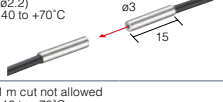
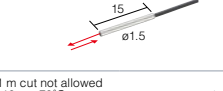
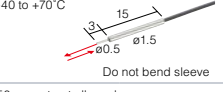
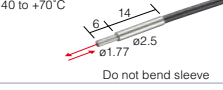
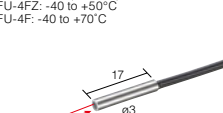

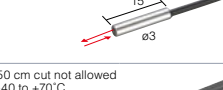
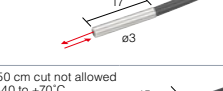
Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Model Weight	
	Size/Shape	Detecting arrangement				MEGA FINE	Other power modes		
Reflective	M3	Hex-shaped	1 m Free-cut (ø1.3 x 2) -40 to +50°C		R2 ToughFlex	MEGA: 400 FINE: 70 Lens attachment: P.18	ULTRA: 270 SUPER: 170 TURBO: 110 HSP: 32	FU-35TZ Approx. 7 g	
									MEGA: 450 FINE: 72 Lens attachment: P.18
		Threaded	Coaxial	1 m Free-cut (ø1.3 x 2) Spiral 30 cm -40 to +50°C		R10 Stainless Steel	MEGA: 550 FINE: 110 Lens attachment: P.18	ULTRA: 400 SUPER: 250 TURBO: 160 HSP: 45	FU-35FG Approx. 15 g
		Threaded	Coaxial	1 m Free-cut (ø1.3 x 2) -40 to +70°C		R25	MEGA: 550 FINE: 110 Lens attachment: P.18	ULTRA: 400 SUPER: 250 TURBO: 160 HSP: 45	FU-35FA Approx. 6 g
		Threaded	Parallel	50 cm cut not allowed. FU-21X: -40 to +70°C FU-24X: -40 to +50°C		R10	MEGA: 100 FINE: 13 Lens attachment: P.18	ULTRA: 72 SUPER: 32 TURBO: 23 HSP: 8	FU-24X Approx. 4 g
		Threaded	Parallel	2 m Free-cut (ø1.3 x 2) FU-66Z: -40 to +50°C FU-66: -40 to +70°C		R25	MEGA: 770 FINE: 190	ULTRA: 560 SUPER: 380 TURBO: 260 HSP: 80	FU-66Z Approx. 10 g
	Threaded	Parallel	1 m cut not allowed. -40 to +50°C		R10 Stainless Steel	MEGA: 710 FINE: 210	ULTRA: 550 SUPER: 470 TURBO: 310 HSP: 90	FU-67TZ Approx. 32 g	
									Threaded
	Threaded	Parallel	2 m Free-cut (ø2.2 x 2) -40 to +50°C		R2 ToughFlex	MEGA: 900 FINE: 210	ULTRA: 740 SUPER: 490 TURBO: 320 HSP: 110	FU-35TG Approx. 32 g	
									Threaded
	Threaded	Parallel	2 m Free-cut (ø2.2 x 2) -40 to +50°C		R2 ToughFlex	MEGA: 900 FINE: 210	ULTRA: 740 SUPER: 490 TURBO: 320 HSP: 110	FU-61Z Approx. 22 g	
									Threaded
	Threaded	Parallel	2 m Free-cut (ø2.2 x 2) -40 to +70°C		R25	MEGA: 1100 FINE: 300	ULTRA: 860 SUPER: 570 TURBO: 410 HSP: 140	FU-61 Approx. 21 g	
									Threaded
	Threaded	Coaxial	2 m Free-cut (ø2.2 x 2) -40 to +70°C		R25	MEGA: 720 FINE: 160	ULTRA: 630 SUPER: 410 TURBO: 270 HSP: 130	FU-25 Approx. 18 g	
									Threaded

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Cylinder

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

Thrubeam/reflective types

Detecting method	Type	Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm) (Standard target to be detected)	Model Weight
					MEGA FINE	Other power modes		
Thrubeam	ø1.0	50 cm cut not allowed. -40 to +50°C		R10	MEGA: 380 FINE: 85	ULTRA: 270 SUPER: 180 TURBO: 120 HSP: 40	ø0.265	FU-58 Approx. 8 g
	ø1.5	1 m Free-cut (ø1.0) -40 to +70°C		R4 High-flex	MEGA: 1200 FINE: 230	ULTRA: 810 SUPER: 590 TURBO: 410 HSP: 130	ø0.7	FU-59 Approx. 3 g
	ø2.5	50 cm cut not allowed. -40 to +70°C		R10	MEGA: 45 FINE: 13	ULTRA: 32 SUPER: 23 TURBO: 18 HSP: -	ø0.125	FU-55 Approx. 3 g
		50 cm cut not allowed. -40 to +70°C						
	ø3	2 m Free-cut (ø2.2) -40 to +50°C		R2 ToughFlex	MEGA: 3600 FINE: 880	ULTRA: 3000 SUPER: 1800 TURBO: 1300 HSP: 430	ø1.13	FU-5FZ Approx. 19 g
		2 m Free-cut (ø2.2) -40 to +70°C		R25	MEGA: 3600 FINE: 1100	ULTRA: 3200 SUPER: 2200 TURBO: 1500 HSP: 540	ø1	FU-5F Approx. 19 g
Reflective	ø1.5	1 m cut not allowed -40 to +70°C		R4 High-flex	MEGA: 150 FINE: 32	ULTRA: 100 SUPER: 80 TURBO: 54 HSP: 22	-	FU-49X Approx. 3 g
		1 m cut not allowed -40 to +70°C		R10	MEGA: 27 FINE: 4.8	ULTRA: 18 SUPER: 13 TURBO: 10 HSP: 2.4		FU-46 Approx. 2 g
	ø2.5	50 cm cut not allowed -40 to +70°C		R25	MEGA: 72 FINE: 23	ULTRA: 59 SUPER: 45 TURBO: 32 HSP: 12	FU-22X Approx. 4 g	
	ø3	2 m Free-cut (ø1.3 x 2) FU-4FZ: -40 to +50°C FU-4F: -40 to +70°C		R2 ToughFlex	MEGA: 770 FINE: 190	ULTRA: 560 SUPER: 380 TURBO: 260 HSP: 80	FU-4FZ Approx. 8 g	
				R25	MEGA: 1100 FINE: 300	ULTRA: 860 SUPER: 570 TURBO: 410 HSP: 140	FU-4F Approx. 8 g	
	ø3	2 m Free-cut (ø1.0 x 2) -40 to +70°C		R4 High-flex	MEGA: 290 FINE: 63	ULTRA: 200 SUPER: 130 TURBO: 80 HSP: 32	FU-48 Approx. 7 g	
		50 cm cut not allowed -40 to +70°C		R25	MEGA: 830 FINE: 180	ULTRA: 680 SUPER: 470 TURBO: 320 HSP: 130	FU-23X Approx. 4 g	
		50 cm cut not allowed -40 to +70°C		R4	MEGA: 68 FINE: 18	ULTRA: 54 SUPER: 40 TURBO: 27 HSP: 8	FU-45X Approx. 4 g	

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Thrubeam/reflective types

Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm) (Standard target to be detected)	Model Weight	
Detecting method	Beam emitting direction				MEGA FINE	Other power modes			
Thrubeam	Side-view	1 m Free-cut (ø1.3) -40 to +70°C		R25	MEGA: 520 FINE: 100	ULTRA: 380 SUPER: 230 TURBO: 160 HSP: 55	ø0.6	FU-32 Approx. 5 g	
		2 m Free-cut (ø2.2) -40 to +70°C			MEGA: 1600 FINE: 330	ULTRA: 1100 SUPER: 660 TURBO: 470 HSP: 140	ø1	FU-34 Approx. 17 g	
	Top view	2 m Free-cut (ø2.2) -40 to +70°C		R10	MEGA: 3600 FINE: 1100	ULTRA: 3200 SUPER: 2200 TURBO: 1500 HSP: 540		ø0.5	FU-73 Approx. 24 g
		1 m Free-cut (ø1.0) -40 to +70°C			MEGA: 690 FINE: 170	ULTRA: 500 SUPER: 340 TURBO: 240 HSP: 72	ø0.265		FU-75F Approx. 10 g
		1 m Free-Free-cut (ø1.0) -40 to +70°C			MEGA: 370 FINE: 85	ULTRA: 260 SUPER: 180 TURBO: 120 HSP: 40			ø0.125
		50 cm cut not allowed -40 to +70°C			MEGA: 45 FINE: 13	ULTRA: 32 SUPER: 23 TURBO: 18 HSP: -	FU-56 Approx. 3 g		
Reflective	Side	2 m Free-cut (ø1.0 x 2) -40 to +70°C		R10	MEGA: 180 FINE: 32	ULTRA: 130 SUPER: 81 TURBO: 50 HSP: 18	-	FU-31 Approx. 5 g	
		1 m Free-cut (ø2.2 x 2) -40 to +70°C		R25	MEGA: 320 FINE: 45	ULTRA: 250 SUPER: 140 TURBO: 90 HSP: 32		FU-33 Approx. 10 g	
	Top	50 cm cut not allowed -40 to +70°C		R4	MEGA: 68 FINE: 18	ULTRA: 54 SUPER: 40 TURBO: 27 HSP: 8	FU-65X Approx. 5 g		
		2 m Free-cut (ø1.3 x 2) -40 to +50°C		R2 ToughFlex	MEGA: 290 FINE: 54	ULTRA: 190 SUPER: 120 TURBO: 80 HSP: 23	FU-63Z Approx. 10 g		
		2 m Free-cut (ø1.3 x 2) -40 to +70°C		R25	MEGA: 330 FINE: 72	ULTRA: 230 SUPER: 150 TURBO: 100 HSP: 36	FU-63 Approx. 10 g		
		2 m Free-cut (ø1.3 x 2) -40 to +70°C					FU-63T Approx. 10 g		
		50 cm cut not allowed -40 to +70°C		R4	MEGA: 68 FINE: 18	ULTRA: 54 SUPER: 40 TURBO: 27 HSP: 8	FU-45X Approx. 4 g		
		2 m Free-cut (ø1.3 x 2) -40 to +70°C		R25	MEGA: 330 FINE: 72	ULTRA: 230 SUPER: 150 TURBO: 100 HSP: 36	FU-43 Approx. 8 g		
		1 m cut not allowed -40 to +70°C		R10	MEGA: 27 FINE: 4.8	ULTRA: 18 SUPER: 13 TURBO: 10 HSP: 2.4	FU-46 Approx. 2 g		
		Coaxial, narrow beam 10°	50 cm cut not allowed -40 to +70°C		R25	MEGA: 72 FINE: 23	ULTRA: 59 SUPER: 45 TURBO: 32 HSP: 12	FU-22X Approx. 4 g	







*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Small Spot Reflective

Ideal for detecting small objects. Select the sensor according to the size of the object.

Parallel Beam Spot

Lens + Fibre Unit













Type	Beam spot diameter (mm)	Lens		Fibre units		Detecting distance (mm)*1		
		Appearance (mm) Weight	Model	Minimum bend radius (mm)	Appearance	Model	MEGA FINE	Other power modes
Parallel beam	Approx. $\varnothing 4$ (within the detecting distance of 0 to 20 mm)		F-3HA	R2 ToughFlex		FU-35FZ	MEGA: 45 FINE: 36	ULTRA: 45 SUPER: 45 TURBO: 40 HSP: 27
				R10 Stainless Steel		FU-35FG		
				R25		FU-35FA	MEGA: 65 FINE: 54	ULTRA: 65 SUPER: 65 TURBO: 60 HSP: 45
				R2 ToughFlex		FU-35TZ		
				R10 Stainless Steel		FU-35TG		

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.



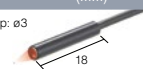
Small Beam Spot

Lens + Fibre Unit

Type	Beam spot diameter (mm)	Focal distance (mm)	Lens		Fibre units		
			Appearance (mm) Weight	Model	Minimum bend radius (mm)	Appearance	Model
Small spot	Approx. $\varnothing 0.1$	7 \pm 2		F-2HA	R10		FU-24X
	Approx. $\varnothing 0.2$				R25		FU-21X
	Approx. $\varnothing 0.4$				R2 ToughFlex		FU-35FZ
					R10 Stainless Steel		FU-35FG
					R25		FU-35FA
					R2 ToughFlex		FU-35TZ
	Approx. $\varnothing 0.5$	15 \pm 2		F-4HA	R2 ToughFlex		FU-35FZ
					R10 Stainless Steel		FU-35FG
					R2 ToughFlex		FU-35TZ
					R10 Stainless Steel		FU-35TG
					R25		FU-35FA
					R25		FU-21X
Approx. $\varnothing 1.0$	35 \pm 3		F-6HA	R2 ToughFlex		FU-35FZ	
				R10 Stainless Steel		FU-35FG	
				R2 ToughFlex		FU-35TZ	
				R25		FU-35FA	




Built-in Lens Fibre Unit

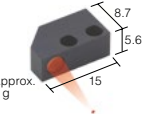



Type	Beam spot diameter (mm)	Focal distance (mm)	Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Model Weight	Minimum bend radius (mm)
Small spot	Approx. $\varnothing 0.1$	5	50 cm cut not allowed -40 to +70°C		FU-20 Approx. 2 g	R25

Adjustable Beam Spot

Built-in Lens Fibre Unit

Type	Beam spot diameter (mm)	Focal distance (mm)	Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Model Weight	Minimum bend radius (mm)
Adjustable beam spot	$\varnothing 0.9$ to 3.5	10 to 30	2 m Free-cut ($\varnothing 1.3 \times 2$) -40 to +70°C		FU-10 Approx. 5 g	R25

Lens + Fibre Unit

Type	Beam spot diameter (mm)	Focal distance (mm)	Lens		Fibre units		
			Appearance (mm) Weight	Model	Minimum bend radius (mm)	Appearance	Model
Side-view adjustable spot	$\varnothing 0.5$ to 3	8 to 30		F-5HA	R2 ToughFlex		FU-35FZ
					R10 Stainless Steel		FU-35FG
					R25		FU-35FA



Area

Great for applications where target position varies or for detecting targets with complicated shapes or rough surface finish.

Thrubeam/reflective types

Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm)	Model Weight
	Type	Optical axis width (mm)				MEGA FINE	Other power modes		
Thrubeam	Area	10	2 m Free-cut (ø2.2) -40 to +50°C		R2 ToughFlex	MEGA: 3400 FINE: 1400	ULTRA: 2800 SUPER: 2400 TURBO: 1700 HSP: 640	10x3	FU-12 Approx. 23 g
		11	2 m Free-cut (ø2.2) -40 to +50°C			MEGA: 3600 FINE: 2700	ULTRA: 3600 SUPER: 3600 TURBO: 3600 HSP: 1300	11x2	FU-E11 Approx. 20 g
		40	2 m Free-cut (ø2.2) -40 to +50°C			MEGA: 3600 FINE: 3600	ULTRA: 3600 SUPER: 3600 TURBO: 3600 HSP: 2500	40x3	FU-E40 Approx. 30 g
	Array	5	2 m Free-cut (ø2.2) -40 to +70°C		R4	MEGA: 2200 FINE: 440	ULTRA: 1400 SUPER: 840 TURBO: 540 HSP: 200	Approx. 6 x 0.3	FU-A05 Approx. 20 g
		10	2 m Free-cut (ø2.2) -40 to +70°C					Approx. 11 x 0.3	FU-A10 Approx. 20 g
Reflective	Area	15 (at distance 15)	2 m Free-cut (ø2.2 x 2) -40 to +70°C		R25	MEGA: 5 to 200 FINE: 5 to 140	ULTRA: 5 to 200 SUPER: 5 to 200 TURBO: 5 to 160 HSP: 5 to 110	-	FU-11 Approx. 19 g
	Array	10 (at distance 4)	2 m Free-cut (ø2.2 x 2) -40 to +70°C		R4	MEGA: 740 FINE: 140	ULTRA: 460 SUPER: 260 TURBO: 180 HSP: 60	-	FU-A05D Approx. 20 g
		15 (at distance 4)	2 m Free-cut (ø2.2 x 2) -40 to +70°C					-	FU-A10D Approx. 20 g

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Retro-reflective

Useful for detecting transparent objects.

Retro-reflective type

Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Model Weight
	Beam emitting direction					MEGA FINE	Other power modes	
Retro-Reflective	M6		2 m Free-cut (ø1.0 x 2) -40 to +50°C		R2 ToughFlex	MEGA: 30 to 960 FINE: 30 to 120	ULTRA: 30 to 760 SUPER: 30 to 380 TURBO: 30 to 230 HSP: -	FU-13 Approx. 8 g
	Square type		2 m Free-cut (ø1.0 x 2) -40 to +50°C Thickness: 12.6		R10	MEGA: 100 to 6400 FINE: 100 to 1260	ULTRA: 100 to 5000 SUPER: 100 to 2500 TURBO: 100 to 1690 HSP: 100 to 1000	FU-15 Approx. 12 g

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Reflector/Reflective Tape Specifications (Optional Parts)

Model	Power modes	Detecting distance (mm)*1			
		R-2 (OP-95388) 51.2 x 61	R-3 (OP-96436) 35 x 42	R-5 14 x 36	Reflective tape (OP-96629) 40 x 30
FU-13	MEGA	10 to 1880	10 to 1540	10 to 1060	30 to 960
	ULTRA	10 to 1500	10 to 1240	10 to 860	30 to 760
	SUPER	10 to 760	10 to 640	10 to 440	30 to 380
	TURBO	10 to 450	10 to 360	10 to 230	30 to 230
	FINE	10 to 250	10 to 200	10 to 130	30 to 120
	HSP	-	-	-	-
FU-15*2	MEGA	100 to 6400	100 to 4400	100 to 2600	-
	ULTRA	100 to 5000	100 to 3600	100 to 2200	-
	SUPER	100 to 2500	100 to 2000	100 to 1500	-
	TURBO	100 to 1690	100 to 1350	100 to 1200	-
	FINE	100 to 1260	100 to 1000	100 to 1000	-
	HSP	100 to 1000	100 to 860	100 to 860	-

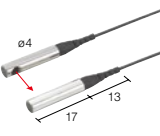
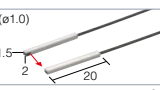
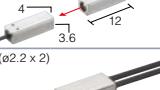
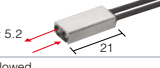
*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

*2 Reflective tape cannot be used.

Narrow Beam/High-power

Built-in lens reduces beam width and helps reduce stray light.

Thrubeam/reflective types


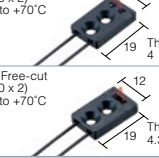
Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm) (Standard target to be detected)	Model Weight
	Beam emitting direction	Aperture angle				MEGA FINE	Other power modes		
Thrubeam	Side	Approx. 6°	2 m Free-cut (ø1.0) FU-16Z: -40 to +50°C FU-16/18: -40 to +70°C		R2 ToughFlex	MEGA: 3600 FINE: 1260	ULTRA: 3600 SUPER: 2600 TURBO: 1800 HSP: 760	ø2.5	FU-16Z Approx. 8 g
		Approx. 2°				MEGA: 3600 FINE: 1900	ULTRA: 3600 SUPER: 3600 TURBO: 2700 HSP: 1000		FU-16 Approx. 8 g
	Top	Approx. 3°			R10	MEGA: 3600 FINE: 1600	ULTRA: 3600 SUPER: 3000 TURBO: 2100 HSP: 960	ø1	FU-18 Approx. 8 g
		Approx. 6°			R2 ToughFlex	MEGA: 1300 FINE: 330	ULTRA: 900 SUPER: 680 TURBO: 530 HSP: 210		FU-18M Approx. 6 g
Reflective	Top	Approx. 8°	2 m Free-cut (ø2.2 x 2) -40 to +50°C Thickness: 5.2		R2 ToughFlex	MEGA: 30 to 2300 FINE: 30 to 290	ULTRA: 30 to 1600 SUPER: 30 to 760 TURBO: 30 to 410 HSP: 30 to 160	-	FU-40 Approx. 23 g
		1 m cut not allowed -40 to +50°C Thickness: 5.2			R10 Stainless Steel				FU-40G Approx. 50 g

*1 3600 mm is assumed as maximum because the fibre cable has a length of 2 m.
 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Definite-reflective

Helps reduce the effect of target background. The thin, small design requires less space.

Definite-reflective types


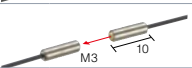

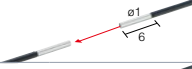
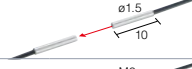


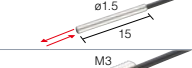
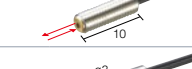
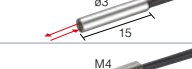
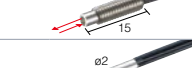
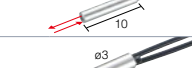


Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Beam spot diameter (mm)	Model Weight
	Beam emitting direction	Aperture angle				MEGA FINE	Other power modes		
Definite-reflective	Side	Approx. 6°	2 m Free-cut (ø1.0 x 2) -40 to +70°C Thickness: 5		R10	MEGA: 3 center of detecting distance FINE: 3 center of detecting distance	ULTRA: 3 center of detecting distance SUPER: 3 center of detecting distance TURBO: 3 center of detecting distance HSP: 3 center of detecting distance	Approx. ø4.5 Approx. ø3.5 (at distance of 3)	FU-37 Approx. 6 g
		Approx. 2°				MEGA: 6 center of detecting distance FINE: 6 center of detecting distance	ULTRA: 6 center of detecting distance SUPER: 6 center of detecting distance TURBO: 6 center of detecting distance HSP: 6 center of detecting distance		FU-38 Approx. 5 g
	Top	Approx. 3°			R10	MEGA: 0 to 4 FINE: 0 to 4	ULTRA: 0 to 4 SUPER: 0 to 4 TURBO: 0 to 4 HSP: 2±1.4	-	FU-38V Approx. 5 g

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

High-flex

Provides higher flexibility than electric wire. R2 types are resistant to repeated bends up to 10 million bends.

Thrubeam/reflective types



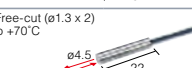
Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm) (Standard target to be detected)	Model Weight	
	Size (mm)					MEGA FINE	Other power modes			
Thrubeam	∅1.5		1 m Free-cut (∅1.0) -40 to +70°C		R4 High-flex	MEGA: 1200 FINE: 230	ULTRA: 810 SUPER: 590 TURBO: 410 HSP: 130	∅0.7	FU-59 Approx. 3 g	
	M3		1 m Free-cut (∅1.0) -40 to +70°C						FU-79 Approx. 6 g	
	6x10.5x2.5		1 m Free-cut (∅1.0) -40 to +70°C						FU-57TE Approx. 5 g	
	Thrubeam	∅1.0		1 m Free-cut (∅1.0) -40 to +50°C		R2 ToughFlex High-flex	MEGA: 590 FINE: 140	ULTRA: 430 SUPER: 300 TURBO: 180 HSP: 55	∅0.5	FU-58U Approx. 4 g
		∅1.5		1 m Free-cut (∅1.0) -40 to +50°C						FU-59U Approx. 4 g
		M3		1 m Free-cut (∅1.0) -40 to +50°C						FU-79U Approx. 4 g
		M4 Built-in lens		1 m Free-cut (∅1.0) -40 to +50°C						FU-70U Approx. 5 g
Reflective	∅1.5		1 m cut not allowed -40 to +70°C		R4 High-flex	MEGA: 150 FINE: 32	ULTRA: 100 SUPER: 80 TURBO: 54 HSP: 22	-	FU-49X Approx. 3 g	
	M3		1 m cut not allowed -40 to +70°C						FU-69X Approx. 3 g	
	∅3		2 m Free-cut (∅1.0 x 2) -40 to +70°C						FU-48 Approx. 7 g	
	Reflective	M4		2 m Free-cut (∅1.0 x 2) -40 to +70°C		R2 ToughFlex High-flex	MEGA: 290 FINE: 63	ULTRA: 200 SUPER: 130 TURBO: 80 HSP: 32	-	FU-68 Approx. 8 g
		∅2		1 m Free-cut (∅1.0 x 2) -40 to +50°C						FU-49U Approx. 4 g
		∅3		1 m Free-cut (∅1.0 x 2) -40 to +50°C						FU-48U Approx. 4 g
		M3		1 m Free-cut (∅1.0 x 2) -40 to +50°C						FU-69U Approx. 4 g

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper.

Oil/Chemical Resistant

PTFE coating allows for use in almost any environment.

Thrubeam/Reflective types

Detecting method	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm) (Standard target to be detected)	Model Weight
	Beam emitting direction	Size (mm)				MEGA FINE	Other power modes		
Thrubeam	Top	∅5	2 m Free-cut (∅2.2) -40 to +70°C		R40	MEGA: 3600 FINE: 2800	ULTRA: 3600 SUPER: 3600 TURBO: 3600 HSP: 1400	∅3.7	FU-92 Approx. 71 g
	Side	∅5	2 m Free-cut (∅2.2) -40 to +70°C		R40	MEGA: 3600 FINE: 1100	ULTRA: 3600 SUPER: 3000 TURBO: 2200 HSP: 510	∅2.8	FU-96 Approx. 71 g
Reflective	Top	∅4.5	2 m Free-cut (∅1.3 x 2) -40 to +70°C		R40	MEGA: 310 FINE: 140	ULTRA: 290 SUPER: 250 TURBO: 200 HSP: 80	-	FU-91 Approx. 32 g

*1 3600 mm is assumed as maximum because the fibre cable has a length of 2 m. Detecting distance for reflective fibres is based on a standard target: White matte paper.

Heat Resistant

Resists temperatures up to 350°C.

A wide variety of heat-resistant types are available, including the easy-to-install R5 type and the high-temperature type, resistant to temperatures up to 350°C. Fibres used in sensors resistant to temperatures of 200°C or more are made from multi-component glass.

Thrubeam/reflective types

Detecting method	Type	Heat resistant temperatures ^{*2}	Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm) ^{*1}		Optical axis diameter (mm) (Standard target to be detected)	Model Weight									
						MEGA FINE	Other power modes											
Thrubeam	100°C ^{*3}	-40 to +100°C	2 m Free-cut (ø2.2)		R5 ToughFlex	MEGA: 3600 FINE: 680 Lens attachment: P14	ULTRA: 2200 SUPER: 1600 TURBO: 900 HSP: 390	ø1	FU-86Z Approx. 25 g									
										105°C ^{*3}	-40 to +105°C	2 m Free-cut (ø2.2)	R25	MEGA: 3600 FINE: 1100 Lens attachment: P14	ULTRA: 3200 SUPER: 2200 TURBO: 1500 HSP: 540	FU-86A Approx. 22 g		
										150°C ^{*4}	-40 to +150°C	2 m Free-cut (ø2.2)	R20	MEGA: 2700 FINE: 520	ULTRA: 1800 SUPER: 1100 TURBO: 720 HSP: 340	FU-86H Approx. 35 g		
										180°C ^{*5}	-60 to +180°C	2 m Free-cut (ø2.2)	R35	MEGA: 2700 FINE: 570	ULTRA: 1900 SUPER: 1200 TURBO: 790 HSP: 380	FU-88 Approx. 36 g		
										200°C	-40 to +200°C	2 m cut not allowed.	R8	MEGA: 1800 FINE: 390	ULTRA: 1300 SUPER: 900 TURBO: 680 HSP: 250	FU-88K Approx. 30 g		
										300°C	-40 to +300°C	2 m cut not allowed.	R25	Lens attachment: P14		FU-84C Approx. 66 g		
Reflective	100°C ^{*3}	-40 to +100°C	2 m Free-cut (ø2.2 x 2)		R5 ToughFlex	MEGA: 740 FINE: 160	ULTRA: 580 SUPER: 410 TURBO: 320 HSP: 90	-	FU-85Z Approx. 25 g									
										105°C ^{*3}	-40 to +105°C	2 m Free-cut (ø2.2 x 2)	R25	MEGA: 1100 FINE: 230	ULTRA: 860 SUPER: 590 TURBO: 410 HSP: 140	FU-85A Approx. 21 g		
										150°C ^{*4}	-40 to +150°C	2 m Free-cut (ø2.2 x 2)	R20	MEGA: 720 FINE: 160	ULTRA: 560 SUPER: 410 TURBO: 320 HSP: 90	FU-85H Approx. 35 g		
										180°C ^{*5}	-60 to +180°C	2 m Free-cut (ø2.2 x 2)	R35	MEGA: 860 FINE: 200	ULTRA: 710 SUPER: 470 TURBO: 350 HSP: 100	FU-87 Approx. 33 g		
										200°C	-40 to +200°C	1 m cut not allowed.	R8			FU-87K Approx. 15 g		
										300°C	-40 to +300°C	1 m cut not allowed.		R25	MEGA: 770 FINE: 190	ULTRA: 650 SUPER: 450 TURBO: 340 HSP: 100	-	FU-82C Approx. 29 g
										350°C	-30 to +350°C	1 m cut not allowed.		R25	MEGA: 650 FINE: 140	ULTRA: 560 SUPER: 390 TURBO: 290 HSP: 86	FU-81C Approx. 24 g	
										250°C	-40 to +250°C	2 m cut not allowed.		R25	MEGA: 8 to 37 FINE: 8 to 30	ULTRA: 8 to 34 SUPER: 8 to 32 TURBO: 8 to 30 HSP: 10 to 18	-	FU-38LK Approx. 70 g
180°C	-60 to +180°C	2 m Free-cut (ø2.2 x 2)		R35	MEGA: 2.5 to 65 FINE: 2.5 to 16	ULTRA: 2.5 to 55 SUPER: 2.5 to 27 TURBO: 2.5 to 22 HSP: 2.5 to 10	FU-38H Approx. 45 g											

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper. (For the FU-38LK, the distances are based on a glass substrate (t = 0.7 mm) detected in the planar direction.)


*2 Use the fibre sensor under dry conditions. Allow some margin for the temperature upper limit when selecting a heat-resistant fibre unit.

*3 The recommended maximum ambient temperature during operation is 90°C when constantly using a fibre unit in a high-temperature environment.

*4 The recommended maximum ambient temperature during operation is 130°C when constantly using a fibre unit in a high-temperature environment.

*5 The recommended maximum ambient temperature during operation is 150°C when constantly using a fibre unit in a high-temperature environment.

Reflective

Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Accessory	Model Weight
Detecting method	Transparent tube diameter (mm)					
Tube-mountable type	ø4 to 26	16	2 m Free-cut (ø2.2 x 2) -40 to +70°C 	R5	Binding band x 2 Nonslip rubber x 2	FU-95S Approx. 23 g
		1		R2 ToughFlex	Binding band x 2 Nonslip rubber x 2 Spacer x 2 Screw x 2 Nut x 2	FU-95Z Approx. 7 g
				R25		FU-95HA Approx. 7 g
	R10	FU-95 Approx. 7 g				
	ø26 or more recommended	16	2 m Free-cut (ø2.2 x 2) -40 to +70°C 	R5	None (Optionally available)	FU-95W Approx. 20 g

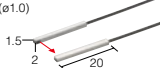
Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)		Model Weight
Detecting method	Beam axis			PFA-sheathed section	Fibre	
Immersion		2 m Free-cut (ø1.3 x 2) FU-93Z: -40 to +50°C FU-93: -40 to +70°C		R40*	R0.5 ToughFlex	FU-93Z Approx. 78 g
					R25	FU-93 Approx. 78 g

* Not bendable up to 80 mm from the tip.

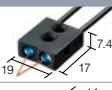
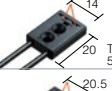
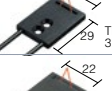

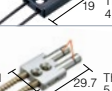
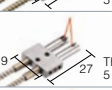
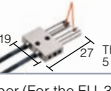
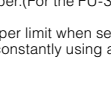
Liquid Crystal/Semiconductors

Perfect for detecting glass substrates. Lineup offers distance alignment, edge detection, and wafer mapping types.

Thrubeam

Application	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Optical axis diameter (mm) (Standard target to be detected)	Model Weight
	Beam emitting direction	Aperture angle				MEGA FINE	Other power modes		
Mapping	Side	Approx. 3°	2 m Free-cut (ø1.0) -40 to +70°C		R10	MEGA: 1300 FINE: 330	ULTRA: 900 SUPER: 680 TURBO: 530 HSP: 210	ø1	FU-18M Approx. 6 g

Reflective

Application	Type		Fibre unit length (Diameter) Ambient temperature	Appearance (mm)	Minimum bend radius (mm)	Detecting distance (mm)*1		Model Weight
	Beam emitting direction	Heat resistant**2 temperatures				MEGA FINE	Other power modes	
Glass substrate mapping	Top		2 m Free-cut (ø2.2 x 2) -40 to +70°C		R25	MEGA: 15 to 70 FINE: 15 to 30	ULTRA: 15 to 60 SUPER: 15 to 46 TURBO: 15 to 38 HSP: -	FU-40S Approx. 25 g
			2 m Free-cut (ø2.2 x 2) -10 to +60°C			MEGA: 8 to 38 FINE: 8 to 32	ULTRA: 8 to 36 SUPER: 8 to 35 TURBO: 8 to 34 HSP: 10 to 26	FU-38L Approx. 20 g
Glass substrate alignment	Flat		2 m Free-cut (ø2.2 x 2) -40 to +70°C		R5	MEGA: 0 to 25 FINE: 0 to 25	ULTRA: 0 to 25 SUPER: 0 to 25 TURBO: 0 to 25 HSP: -	FU-38S Approx. 20 g
			2 m Free-cut (ø2.2 x 2) -40 to +70°C		R25	MEGA: 0 to 14 FINE: 0 to 14	ULTRA: 0 to 14 SUPER: 0 to 14 TURBO: 0 to 14 HSP: 0 to 12	FU-38R Approx. 20 g
Seating check			2 m Free-cut (ø1.0 x 2) -40 to +70°C		R10	MEGA: 0 to 4 FINE: 0 to 4	ULTRA: 0 to 4 SUPER: 0 to 4 TURBO: 0 to 4 HSP: 2±1.4	FU-38V Approx. 5 g
Heat-resistant glass substrate alignment	Flat	250°C	2 m cut not allowed. -40 to +250°C		R25	MEGA: 8 to 37 FINE: 8 to 30	ULTRA: 8 to 34 SUPER: 8 to 32 TURBO: 8 to 30 HSP: 10 to 18	FU-38LK Approx. 70 g
			1 m cut not allowed. -40 to +250°C			MEGA: 2.5 to 65 FINE: 2.5 to 16	ULTRA: 2.5 to 55 SUPER: 2.5 to 27 TURBO: 2.5 to 22 HSP: 2.5 to 10	FU-38K Approx. 45 g
Heat-resistant seating, presence check		180°C*3	2 m Free-cut (ø2.2 x 2) -40 to +180°C		R35			FU-38H Approx. 45 g

*1 Detecting distance for reflective fibres is based on a standard target: White matte paper. (For the FU-38LK, the distances are based on a glass substrate (t = 0.7 mm) detected in the planar direction.)

*2 Use the fibre sensor under dry conditions. Allow some margin for the temperature upper limit when selecting a heat-resistant fibre unit.

*3 The recommended maximum ambient temperature during operation is 150°C when constantly using a fibre unit in a high-temperature environment.

SPECIFICATIONS

Type		Standard 1 output				High functionality 2 output				Monitor output	O-line
		Cable		M8 connector*1		Cable		M8 connector*1		Cable	-
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	-	FS-N10
Main unit/Expansion unit		Main unit	Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit (No output cable)
Control output		1	1	1	1	2	2	2	2	1	N/A*2
Monitor output (1-5 V)		-	-	-	-	-	-	-	-	1	-
External input		-	-	1	1	1	1	-	-	-	-
Response time		50 µs (HIGH SPEED)/250 µs (FINE)/500 µs (TURBO)/1 ms (SUPER)/4 ms (ULTRA)/16 ms (MEGA)									
Control output	NPN output	NPN open collector 24 V; 1 output max: 100 mA or less; 2 output total: 100 mA or less (used stand-alone)/20 mA or less (multiple connections); residual voltage 1 V or less									
	PNP output	PNP open collector 24 V; 1 output max: 100 mA or less; 2 output total: 100 mA or less (used stand-alone)/20 mA or less (multiple connections); residual voltage 1 V or less									
Monitor output*3		1 to 5 V voltage output; load resistance 10 kΩ or more; repeat precision ±0.5% of F.S.; 1 ms response time (HIGH SPEED, FINE, TURBO)*4									
External input		Input time 2 ms (ON)/20 ms (OFF) or more (25 ms or more (ON/OFF) when external calibration is selected.)									
Multiple connections to Expansion units		Up to 16 units can be connected total (two output type is treated as two units)									
Light source		Red, 4-element LED									
APC		ON/OFF switchable (Factory setting: OFF)									
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 - 24 V DC ±10% ripple (P-P) 10% or less									
	NPN Amplifier Current Consumption	Normal: 900 mW or less (36 mA max. at 24 V, 48 mA max. at 12 V)*5 Eco on mode: 800 mW or less (32 mA max. at 24 V, 39 mA max. at 12 V)*5 Eco Full mode: 470 mW or less (19 mA max. at 24 V, 23 mA max. at 12 V)									
	PNP Amplifier Current Consumption	Normal: 950 mW or less (39 mA max. at 24 V, 52 mA max. at 12 V)*5 Eco on mode: 850 mW or less (35 mA max. at 24 V, 44 mA max. at 12 V)*5 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)*5 Eco on mode: 950 mW or less (38 mA max. at 24 V, 47 mA max. at 12 V)*5 Eco Full mode: 600 mW or less (24 mA max. at 24 V, 29 mA max. at 12 V)				-	
Environmental resistance	Operating ambient luminance	Incandescent lamp: 20000 lux or less; Sunlight: 30000 lux or less									
	Operating ambient temperature	-20 to +55 °C (no freezing)*6									
	Operating ambient humidity	35 to 85% RH (no condensation)									
	Vibration resistance	10 to 55 Hz Compound amplitude 1.5 mm, 2 hours for each of X,Y,Z axis									
	Shock resistance	500 m/s ² 3 times for each of X,Y,Z axis									
Case material		Both main unit and expansion unit housing material: Polycarbonate									
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 or less for M8 connector types.

*2 Counted as 1 output when connecting with the network unit NU Series.

*3 FS-N11MN only

*4 SUPER: 1.2 ms, ULTRA: 1.8 ms, MEGA: 4.2 ms

*5 Increases 100 mW (4.0 mA) for High Speed mode

*6 One or two more units connected: -20 to +55°C; 3 to 10 more units connected: -20 to +50°C; 11 to 16 more units connected: -20 to +45°C.

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.

EtherNet/IP™ Compatible Network Unit: NU-EP1

Model		NU-EP1
Ethernet specifications	Compliant standards	IEEE802.3 (10BASE-T)
		IEEE802.3u (100BASE-TX)
		IEEE802.3af (Power over Ethernet, Class 3)
	Transmission rate	10 Mbps (10BASE-T)
		100 Mbps (100BASE-TX)
	Transmission medium	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 (Distance between NU-EP1 and Ethernet switch)	
Maximum number of connectable hubs ²	4 (10BASE-T) 2 (100BASE-TX)	
EtherNet/IP	Compatible functions	Cyclic communication Compatible with UCMM and Class 3 messaging (Explicit messaging)
	Number of connections	64
	RPI (Transmission cycle)	0.5 to 10000 ms (in 0.5 ms)
	Tolerable communication bandwidth for cyclic communication	6000 pps
	Message communication	Compatible with UCMM and Class 3
	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 NU-EP1 via wire-saving connector.
	Allowable passing current ⁵ .	Overall 1200 mA or less
	Power during PoE power receiving ⁶ .	Supply voltage: 24 V ± 10 %, supply current: 360 mA or less ⁷ .
Indicator lamps		Link/activity indicator (LINK/ACT): Green LED
		Module status indicator (MS): 2-colour (green/red) LED
		Network status indicator (NS): 2-colour (green/red) LED
		Sensor communication indicator (D-bus): 2-colour (green/red) LED
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 (at 24 V 60 mA max) ⁸ .
Environmental resistance	Operating ambient temperature	-20 to 55 °C (no freezing)
	Operating ambient humidity	35 to 85% RH (no condensation)
	Vibration resistance	10 to 55 Hz compound amplitude 1.5 mm, 2 hours each in X, Y, Z directions
	Pollution degree	2
Materials		Main unit case: Polycarbonate Power supply connector: Polyamide (plug), PBT (socket)
Weight (including connectors)		Approx. 80 g
Accessories		Instruction manual x 1, power connector x 1, end unit x 2

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. Varies with the sensor amplifiers connected.

5. Current value which, when supplying power from the power supply connector, can be supplied to the NU-EP1 or to a sensor amplifier unit connected to the NU-EP1.

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: 360 mA or less, 45 to 50 °C: 260 mA or less, 50 to 55 °C: 140 mA or less)

8. Does not include power supplied to connected sensor amplifier.

EtherCAT® Compatible Network Unit: NU-EC1

Model		NU-EC1
Ethernet specifications	Compliant standards	IEEE802.3u (100BASE-TX)
	Transmission speed	100 Mbps (100BASE-TX)
	Transmission interface	Category 5e STP
	Distance between nodes	100 m
	Communication port	RJ-45 x2
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	16 units max. ²
	Power supply	Power supplied from the NU-EC1 via wire-saving connector
	Tolerable current ³ .	Total 1200 mA or less
Indicator lamps		Power indicator (PWR): Green LED
		RUN indicator (RUN): Green LED
		ERR indicator (ERR): Red LED
		Sensor communication indicator (N-bus): 2-colour (green/red) LED
Power voltage		24 VDC ± 10%; ripple (p-p) 10 % or less
Power consumption		1700 mW or less (at 24 V, 70 mA max.) ⁴ .
Environmental resistance	Operating ambient temperature	-20 to +55 °C (no freezing)
	Operating ambient humidity	35 to 85 % RH (no condensation)
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours each in X, Y, Z directions
	Pollution degree	2
Materials		Main unit case and dust cover: Polycarbonate Power supply connector: Polyamide (plug), PBT (socket)
Weight (including connectors)		Approx. 80g

1. "N-bus" is the name of KEYENCE's wiring-saving system for sensor amplifiers.

2. Varies with the sensor amplifiers connected.

3. Value of current supplied to this product or sensor amplifier or module connected to this product.

4. Exclusive of the current supplied to the sensor amplifiers connected.

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

DeviceNet™ Compatible Communication Unit: NU-DN1

Model		NU-DN1		
Communication method		DeviceNet compliant		
DeviceNet specifications	Compliant 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 (thick cable) 100 m (thin cable)	250 m (thick cable) 100 m (thin cable)	500 m (thick cable) 100 m (thin cable)
Sensor connection specifications	Connectable sensors	Sensor amplifiers with N-bus support ¹		
	Number of connectable sensor units	Up to 16 units max. ²		
	Power supply	Power is supplied via the DeviceNet communication power supply via NU-DN1.		
	Allowable passing current	Overall 1200 mA or less ³		
Indicator lamps		Network status indicator: 2-colour (green/red) LED, Module status indicator: 2-colour (green/red) LED, N-bus indicator: 2-colour (green/red) LED		
Power voltage		11 to 25 VDC ⁴		
Power consumption		1480 mW or less (60 mA max. at 24 V, 106 mA max. at 12 V) ⁵		
Environmental resistance	Operating ambient temperature	-20 to +55°C (no freezing)		
	Operating ambient humidity	35 to 85% RH (no condensation)		
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours each in X, Y, Z directions		
	Pollution degree	2		
Materials		Main unit case and dust cover: Polycarbonate, DeviceNet connector: Polyamide (plug), PBT (socket)		
Weight (including connectors)		Approx. 65g		

1. "N-bus" is the name of KEYENCE's wiring-saving system for sensor amplifiers.
2. Depends on the sensor amplifiers connected.
3. Indicates the current that can be supplied to this product or to the sensor amplifier units linked to this product.
4. Power to the NU-DN1 is supplied from the DeviceNet communication power supply. The same power is also supplied to all sensor amplifiers connected, via the NU-DN1.
5. Exclusive of the current supplied to the sensor amplifiers connected.

CC-Link Compatible Network Unit: NU-CL1

Model		NU-CL1		
Communication method		CC-Link compliant		
CC-Link specifications	Compatible versions	Ver.2.00/Ver.1.10 (selectable)		
	Number of occupied stations	Ver.2.00: 3 stations; Ver.1.10: 1/2/3/4 stations (selectable)		
	Type of station	Remote device station		
	Transmission rate	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	16 units max. ²		
	Power supply	Power is supplied from the NU-CL1 via wire-saving connector.		
	Allowable passing current	Overall 1200 mA or less ³		
Indicator lamps		Power indicator: Green LED, Communication indicator (L_RUN): Green LED, Communication error indicator (L_ERR): Red LED, Sensor communication indicator: 2-colour (green/red) LED		
Power voltage		24 VDC ± 10%; ripple (p-p) 10% or less		
Power consumption		1400 mW or less (55 mA max. at 24 V) ⁴		
Environmental resistance	Operating ambient temperature	0 to +55°C (no freezing)		
	Operating ambient humidity	35 to 85% RH (no condensation)		
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours each in X, Y, Z directions		
	Pollution degree	2		
Materials		Main unit case and dust cover: Polycarbonate CC-Link connector and power supply connector: Polyamide (plug), PBT (socket)		
Weight (including connectors)		Approx. 80g		

1. "N-bus" is the name of KEYENCE's wiring-saving system for sensor amplifiers.
2. Depends on the sensor amplifiers connected.
3. Indicates the current that can be supplied to this product or to the sensor amplifier units linked to this product.
4. Exclusive of the current supplied to the sensor amplifiers connected.

e-CON Network Input Unit: NU-EN8N

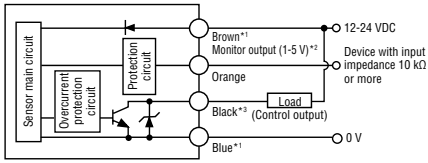
Model		NU-EN8N	
Connectable communication units		Compatible communication units, NU-DN1/NU-CL1/NU-EP1/NU-EC1	
Number of connectable units		2 units max. (occupied ID numbers: 8) ¹	
I/O	Connector	e-CON connector (4-pin)	
	Inputs	8	
	Supply voltage for equipment	Supplied via the NU-EN8N from the connected communication unit	
	Supply current	520 mA or less (total for eight 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)	
	Minimum ON voltage	6 V	
	Maximum OFF current	0.9 mA	
Power voltage	12 to 24 VDC ± 10%; ripple (p-p) 10% or less ²		
Weight (including tag)		Approx. 55g	
Accessories		Instruction manual, Tag, Index seal	

1. The NU-EN8N occupies eight ID numbers of the communication unit regardless of the number of input devices connected.
2. Power to the NU-EN8N is supplied from the connected communication unit.

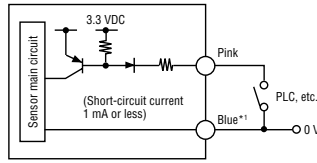
INPUT AND OUTPUT CIRCUIT DIAGRAMS

FS-N11N / N12N / N11MN / N13N / N14N

Output Circuit Diagram



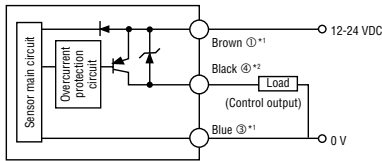
Input Circuit Diagram (FS-N13N/N14N only)



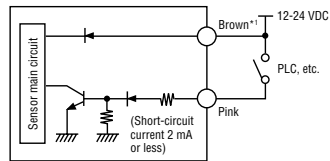
- *1 FS-N11N/N11MN/N13N only
- *2 FS-N11MN only
- *3 The FS-N13N/N14N has a white cable as separate output 2.

FS-N11P / N12P / N13P / N14P / N13CP / N14CP

Output Circuit Diagram



Input Circuit Diagram (FS-N13P/N14P only)



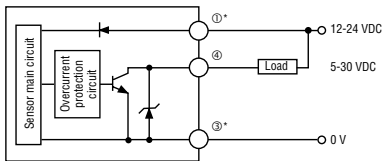
M8 connector pin layout



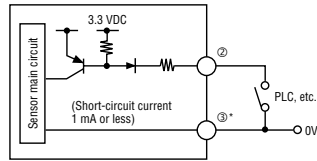
- *1 FS-N11P/N13P/N13CP only
- *2 The FS-N13P/N14P has a white cable as separate output. The FS-N13CP/N14CP has pin ② as separate output 2.

FS-N11CN / N12CN

Output Circuit Diagram



Input Circuit Diagram



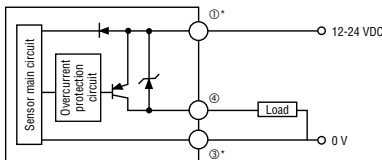
M8 connector pin layout



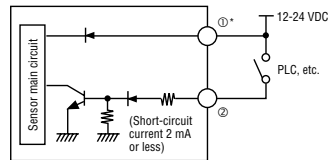
- * FS-N11CN only

FS-N11CP / N12CP

Output Circuit Diagram



Input Circuit Diagram



M8 connector pin layout

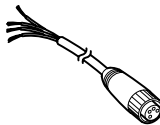


- * FS-N11CP only

Socket Cable (sold separately)

For FS-N11CN / N11CP / N12CN / N12CP / N13CP / N14CP

- OP-73864**
(Cable length: 2 m)
- OP-73865**
(Cable length: 10 m)



Pin – wire colour

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

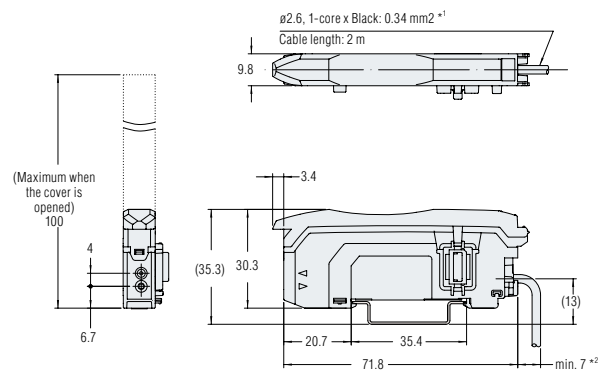
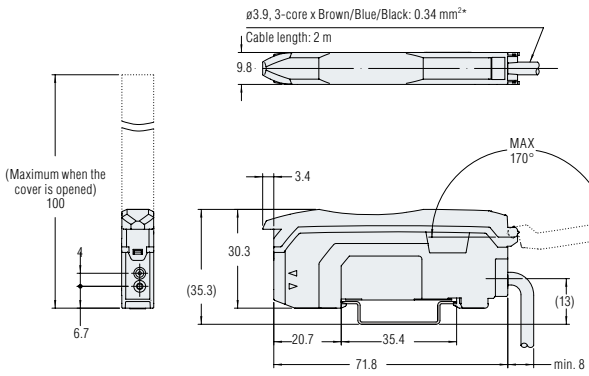
DIMENSIONS



FS-N11N / N11P / N13N / N13P / N11MN
Main unit (lead wire type)



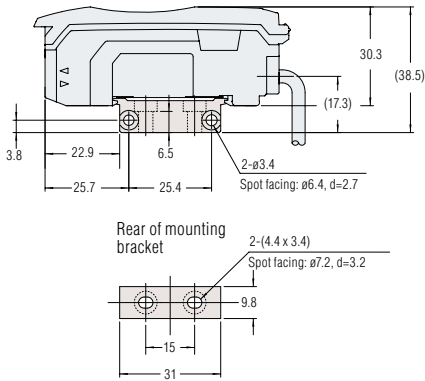
FS-N12N / N12P / N14N / N14P
Expansion unit (lead wire type)



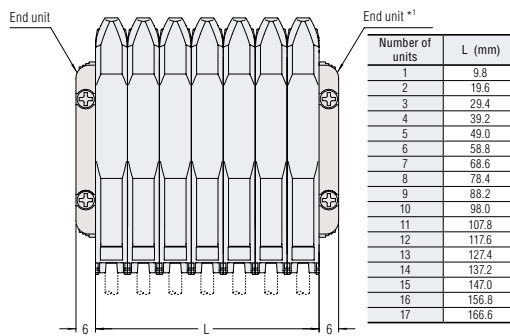
*FS-N11MN: $\phi 3.9$, 4-core x Brown/Blue: 0.34 mm² Black/Orange: 0.18 mm²
 FS-N13N/N13P: $\phi 3.9$, 5-core x Brown/Blue: 0.34 mm² Black/White/Pink: 0.18 mm²

*¹ FS-N14N/N14P: $\phi 3.9$, 3-core x Black/White/Pink: 0.18 mm²
 *² FS-N14N/N14P: min. 8

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

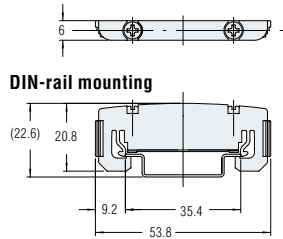


When several units are connected



*¹ When using expansion units, be sure to use the end unit. (Optional)

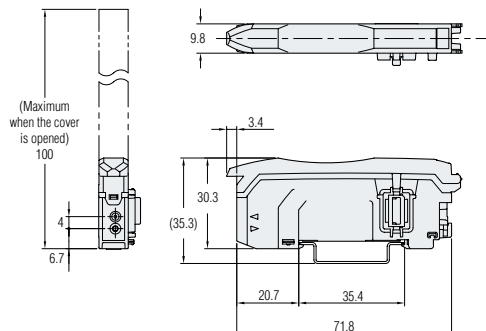
End unit (OP-26751 sold separately)



Material: Polycarbonate, SUS



FS-N10

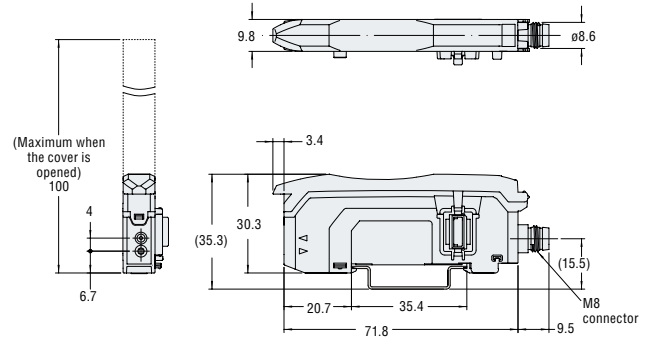
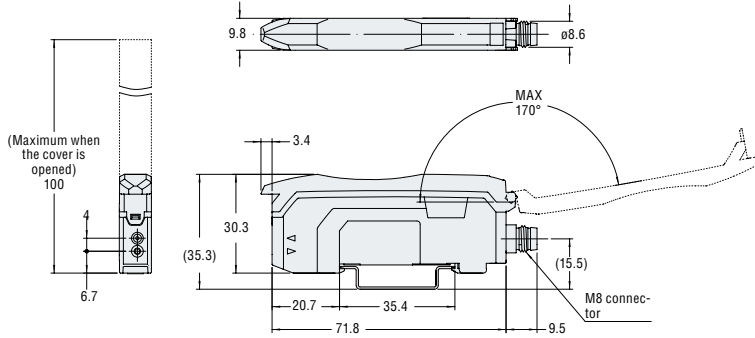




FS-N11CN / N11CP / N13CP
Main unit (M8 connector type)

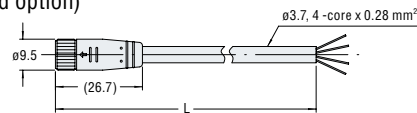


FS-N12CN / N12CP / N14CP
Expansion unit (M8 connector type)

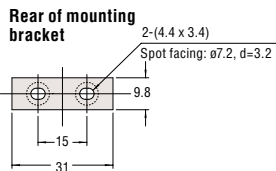
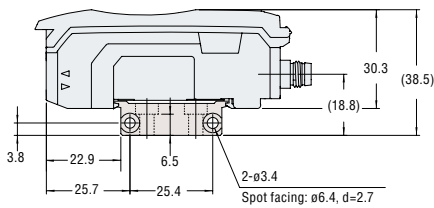


M8 socket cable (separately sold option)

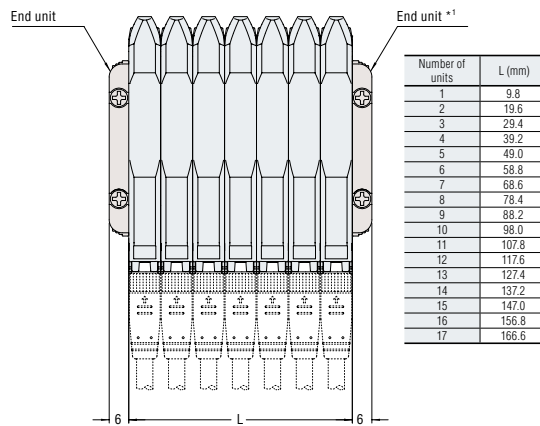
Cable length	L (m)
OP-73864	2
OP-73865	10



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



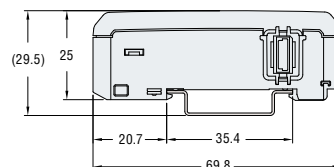
When several units are connected



*1 When using expansion units, be sure to use the end unit. (Optional)



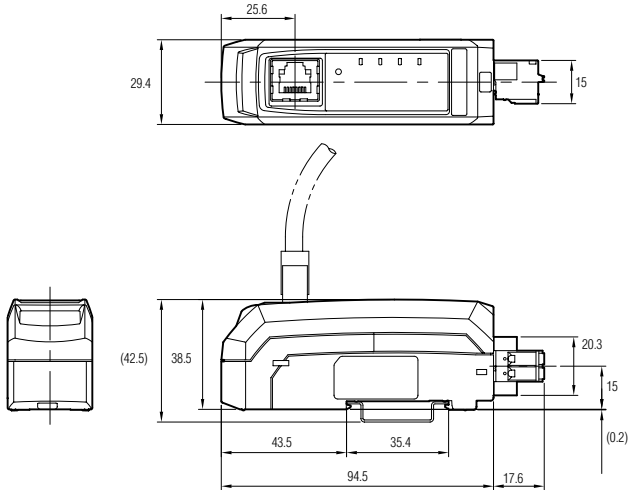
OP-87199
Expansion converter unit



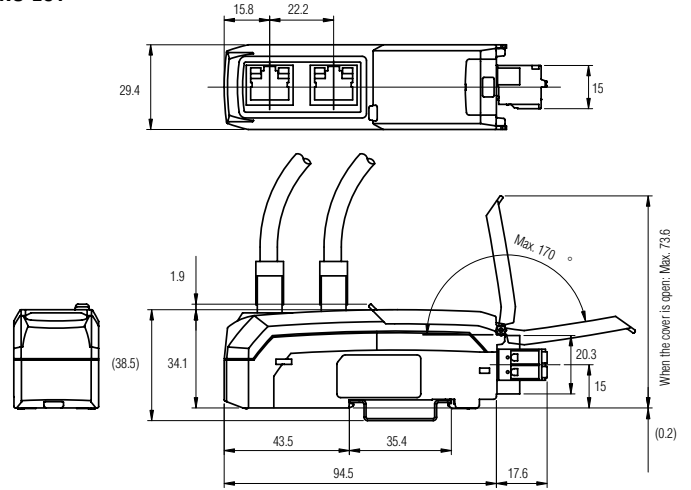
DIMENSIONS

Unit: mm

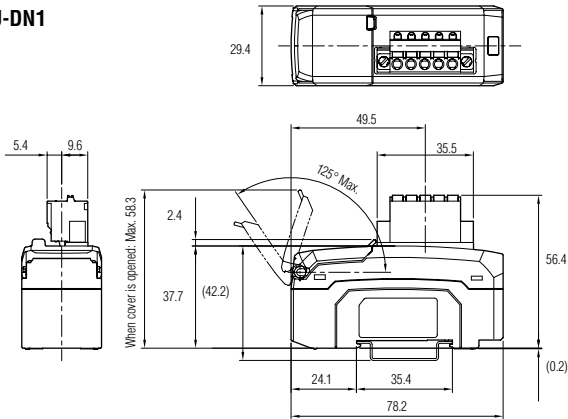
NU-EP1



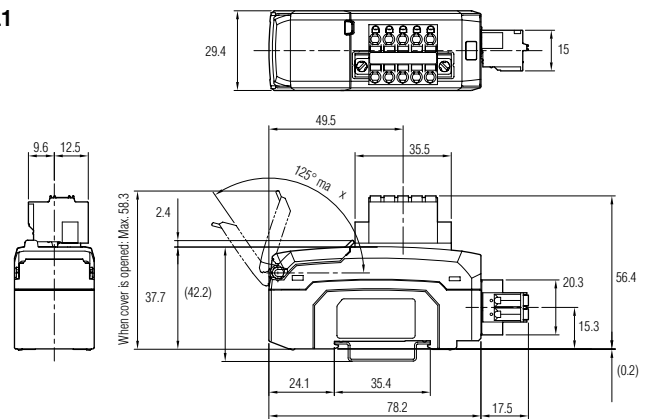
NU-EC1



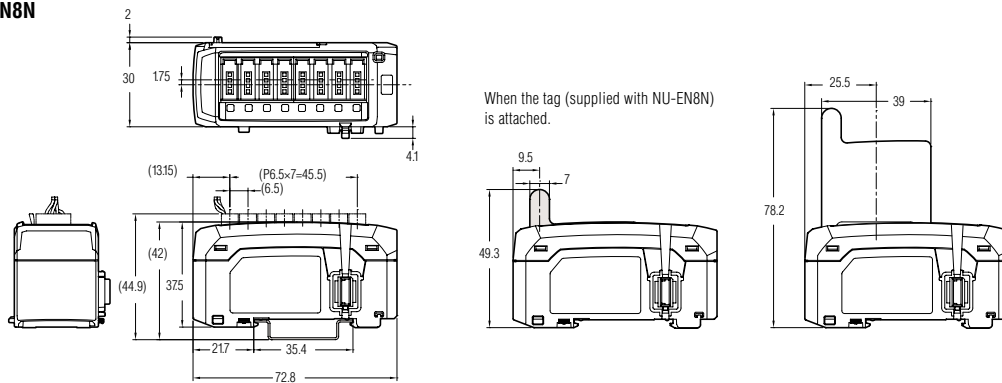
NU-DN1




NU-CL1



NU-EN8N



Please visit: www.keyence.com

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

GLOBAL NETWORK

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