

# Smart Laser Sensors

# E3NC

CSM\_E3NC\_DS\_E\_9\_3

## Ideal for Applications That Cannot Be Handled with Fiber Sensors or Photoelectric Sensors

- The lineup includes E3NC-L Sensors, which are ideal for presence detection, and E3NC-S Sensors, which are ideal for discriminations.
  - E3NC-L Sensors are available in Coaxial Retro-reflective Models, Long-distance Variable-spot Diffuse-reflective Models, and Small-spot Limited-reflective Models.
  - The E3NC-S Sensors include CMOS and provide stable detection of workpieces with different colors and inclined installation.
- Smart Tuning to achieve stable detection with easy setup.
- White on black display characters for high visibility.
- Flexible robot cables are used for the Sensor Heads.



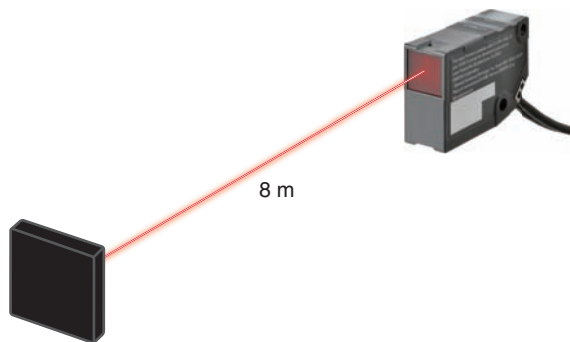
For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

 Refer to the *Safety Precautions* on page 14.

## Features

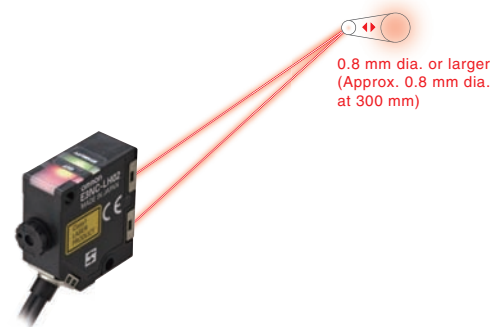
### Retro-reflective Models: E3NC-LH03

- Maximum sensing distance of 8 m.
- Stable detection of many types of workpieces.
- Stable detection of highly transparent films.



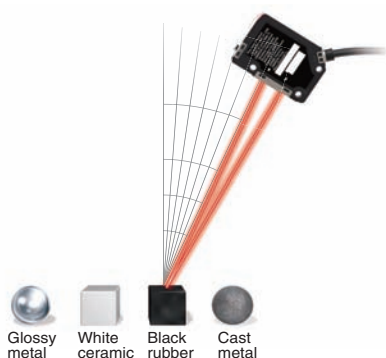
### Diffuse-reflective Models: E3NC-LH02 **PAT.P**

- Long-distance detection at up to 1.2 m.
- Spot can be adjusted to the workpiece or application.



### CMOS Laser, Reflective Models: E3NC-SH250H/SH250/SH100

- Stable detection even for different workpiece colors and materials.
- Stable detection for inclined Head installation and different workpiece shapes.









### Amplifier Units

- Same shape as Fiber Amplifier Units plus easy operation.
- Smart Tuning with one button.



## Ordering Information





### Sensor Heads: E3NC-L Compact Laser Sensor Series (Dimensions → page 17)

Sensing method	Appearance	Beam shape	Sensing distance	Laser class	Cable length	Model
Coaxial Retro-reflective with MSR function		Spot	 8 m *	Class 1	2 m	E3NC-LH03 2M
					5 m	E3NC-LH03 5M
Diffuse-reflective		Variable spot	 1.2 m		2 m	E3NC-LH02 2M
					5 m	E3NC-LH02 5M
Limited-reflective		Spot	 70±15 mm		2 m	E3NC-LH01 2M
					5 m	E3NC-LH01 5M

\* These values apply when an E39-R21, E39-R22, E39-RS10, or E39-RS11 Reflector is used. A Reflector is not included. Purchase a Reflector separately to match the intended use of the Sensor.

**Note:** Only an E3NC-LA□□ Amplifier Unit can be connected.



### Amplifier Units: E3NC-L Compact Laser Sensor Series (Dimensions → page 19)

Connecting method	Appearance	Inputs/outputs	Model	
			NPN output	PNP output
Pre-wired (2 m)		2 outputs + 1 input	E3NC-LA21 2M	E3NC-LA51 2M
Wire-saving Connector		1 output + 1 input	E3NC-LA7	E3NC-LA9
M8 Connector		1 output + 1 input	E3NC-LA24	E3NC-LA54
Connector for Sensor Communications Unit *		---	E3NC-LA0	

\* A Sensor Communications Unit is required if you want to use the Amplifier Unit on a network.





**Note:** Only an E3NC-LH□□ Sensor Head can be connected.

### Sensor Heads: E3NC-S Ultra-compact CMOS Laser Sensor Series (Dimensions → page 18)

Sensing method	Appearance	Beam shape	Measurement range	Laser class	Cable length	Model
Distance-settable		Spot	 35 to 250 mm	Class 2	2 m	E3NC-SH250H 2M
				Class 1	2 m	E3NC-SH250 2M
					2 m	E3NC-SH100 2M

**Note:** Only an E3NC-SA□□ Amplifier Unit can be connected.

## Amplifier Units: E3NC-S Ultra-compact CMOS Laser Sensor Series (Dimensions → page 19)

Connecting method	Appearance	Inputs/outputs	Model	
			NPN output	PNP output
Pre-wired (2 m)		2 outputs + 1 input	E3NC-SA21 2M	E3NC-SA51 2M
Wire-saving Connector		1 output + 1 input	E3NC-SA7	E3NC-SA9
M8 Connector		1 output + 1 input	E3NC-SA24	E3NC-SA54
Connector for Sensor Communications Unit *		---	E3NC-SA0	

\* A Sensor Communications Unit is required if you want to use the Amplifier Unit on a network.





**Note:** Only an E3NC-SH□□ or E3NC-SH□□H Sensor Head can be connected.

## Accessories (Sold Separately)

### Sensor Head Accessories

**Reflectors (Required for Retro-reflective Sensors) (Dimensions → page 21)**






A Reflector is not provided with the Sensor Head. It must be ordered separately.

Applicable Sensor Head	Appearance	Model	Quantity
E3NC-LH03		E39-R21	1
		E39-R22	
		E39-RS10	
		E39-RS11	

**Note:** Refer to the *Safety Precautions* on page 14 for how to attach the reflector.

**Sensor Head Mounting Brackets (Dimensions → page 22)**

A Mounting Bracket is not provided with the Sensor Head. It must be ordered separately as required.

Applicable Sensor Head	Appearance	Model	Quantity	Contents
E3NC-LH03		E39-L190	1	Mounting Bracket: 1 Nut plate: 1 Phillips screws (M3×18): 2
E3NC-LH02		E39-L185		
E3NC-LH01		E39-L186		
E3NC-SH250H E3NC-SH250 E3NC-SH100		E39-L187		
		E39-L188		

**Lens Attachments for Sensor Heads (Dimensions → page 21)**

A Lens Attachment is not provided with the Sensor Head. It must be ordered separately as required.



Applicable Sensor Head	Appearance	Model	Quantity
E3NC-LH03		E39-P51	1
E3NC-LH02		E39-P52	

**Note:** You can combine the Lens Attachment with an applicable Sensor Head to create a line beam.

## Amplifier Unit Accessories



### Wire-saving Connectors (Required for models for Wire-saving Connectors.) (Dimensions → page 26)

Connectors are not provided with the Amplifier Unit and must be ordered separately. \*Protective stickers are provided.

Type	Appearance	Cable length	No. of conductors	Model
Master Connector		2 m	4	E3X-CN21
Slave Connector			2	E3X-CN22

### Sensor I/O Connectors (Required for models for M8 Connectors.) (Dimensions → page 26)

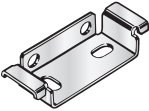
Connectors are not provided with the Amplifier Unit and must be ordered separately.

Size	Cable	Appearance	Cable type	Model	
M8	Standard cable	Straight 	2 m	4-wire	XS3F-M421-402-A
			5 m		XS3F-M421-405-A
		L-shaped 	2 m		XS3F-M422-402-A
			5 m		XS3F-M422-405-A

**Note:** For details, refer to XS3 which can be accessed from your OMRON website.

### Amplifier Unit Mounting Bracket (Dimensions → page 27)

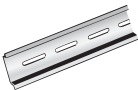
A Mounting Bracket is not provided with the Amplifier Unit. It must be ordered separately as required.

Appearance	Model	Quantity
	E39-L143	1

**Note:** For details, refer to Mounting Brackets on E39-L/E39-S/E39-R which can be accessed from your OMRON website.


### DIN Track (Dimensions → page 27)

A DIN Track is not provided with the Amplifier Unit. It must be ordered separately as required.

Appearance	Type	Model	Quantity
	Shallow type, total length: 1 m	PFP-100N	1
	Shallow type, total length: 0.5m	PFP-50N	
	Deep type, total length: 1 m	PFP-100N2	

### End Plate (Dimensions → page 27)

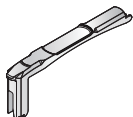
Two End Plates are provided with the Sensor Communications Unit. End Plates are not provided with the Amplifier Unit. They must be ordered separately as required.

Appearance	Model	Quantity
	PFP-M	1

### Cover





Attach these Covers to Amplifier Units.

Order a Cover when required, e.g., if you lose the covers.

Appearance	Model	Quantity
	E39-G24 FOR E3NC-LA	1
	E39-G21 FOR E3NC-SA	

## Related Products

### Sensor Communications Units

Type	Appearance	Model
Sensor Communications Unit for EtherCAT		E3NW-ECT
Sensor Communications Unit for CompoNet		E3NW-CRT
Sensor Communications Unit for CC-Link		E3NW-CCL
Distributed Sensor Unit *		E3NW-DS

Refer to your OMRON website for details.

\* The Distributed Sensor Unit can be connected to any of the Sensor Communications Units.

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

CompoNet is a registered trademark of the ODVA. CC-Link is a registered trademark of Mitsubishi Electric Corporation. The trademark is managed by the CC-Link Partner Association.

## Ratings and Specifications

### Compact Laser Sensors: E3NC-L

#### Sensor Heads

Sensing method		Coaxial Retro-reflective with MSR function		Diffuse-reflective		Limited-reflective
		E3NC-LH03	E3NC-LH03+ E39-P51	E3NC-LH02	E3NC-LH02+ E39-P52	E3NC-LH01
Item	Model	Visible semiconductor laser diode (660 nm), 1.35 mW (average output: 315 μW) (JIS Class 1, IEC/EN Class 1, and FDA Class 1)				
Sensing distance*2	Giga-power mode (GIGA)	8 m	0.5 m	1,200 mm	1,000 mm	70±15 mm
	Standard mode (Std)	6 m		750 mm	600 mm	
	High-speed mode (HS)	3.5 m		250 mm	200 mm	
	Super-high-speed mode (SHS)	2 m		200 mm	150 mm	
Beam shape		Spot	Line	Spot	Line	Spot
Beam size*3		Approx. 2 mm dia. at 1 m	Line length: Approx. 25 mm at 250 mm Line length: Approx. 50 mm at 500 mm	Approx. 0.8 mm dia. at 300 mm	Line length: Approx. 45 mm at 500 mm Line length: Approx. 100 mm at 1,000 mm	Approx. 0.1 mm dia. at 70 mm
Differential distance*4		---		10% of sensing distance max.		
Indicators		OUT indicator (orange) and STABILITY indicator (green)				
Ambient illumination (Receiver side)		Incandescent lamp: 10,000 lx max., Sunlight: 20,000 lx max.				
Ambient temperature range		Operating: -10 to 55°C; Storage: -25 to 70°C (with no icing or condensation)				
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)				
Altitude		2,000 m max.				
Installation environment		Pollution degree 3 (as per IEC 60947-1)				
Insulation resistance		20 MΩ min. (at 500 VDC)				
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min				
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude or 100 m/s <sup>2</sup> for 2 hours each in X, Y, and Z directions				
Shock resistance (destruction)		500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions				
Degree of protection		IEC IP67*5		IEC IP65 (E3NC-LH02: Applies only when adjuster is locked.)*5		
Connecting method		Pre-wired connector (standard length: 2 m)				
Materials	Sensor Head	Case	Polybutylene terephthalate (PBT)			
		Lens	Methacrylic resin (PMMA)			
		Cable	Vinyl chloride (PVC)			
	Lens Attachment	Case	---	ABS	---	ABS
Lens		---	Methacrylic resin (PMMA)	---	Methacrylic resin (PMMA)	---
Weight (packed state/Sensor Head only)	Models with 2-m cable	Approx. 120 g/approx. 70 g		Approx. 115 g/approx. 65 g		
	Models with 5-m cable	Approx. 180 g/approx. 130 g		Approx. 175 g/approx. 125 g		
	Lens Attachment	---	Approx. 25 g/ approx. 2 g	---	Approx. 25 g/ approx. 2 g	---
Accessories		Instruction Manual				

\*1. These Sensors are classified as Class 1 laser devices under IEC 60825-1 and the regulations of Laser Notice No. 50 for FDA certification. CDRH (Center for Devices and Radiological Health) registration has been completed.  
E3NC-LH01, E3NC-LH02 (Accession Number: 1220690)  
E3NC-LH03 (Accession Number: 1320739)

\*2. The values were measured using the OMRON standard sensing object (white paper) for the E3NC-LH01, E3NC-LH02, and E3NC-LH02 + E39-P52.  
The values for the E3NC-LH03, and E3NC-LH03 + E39-P51 apply when an E39-R21, E39-R22, E39-RS10, or E39-RS11 Reflector is used. Other Reflectors are not recommended.

\*3. Defined at the 1/e<sup>2</sup> (13.5%) of the central intensity at the measurement distance.  
Measurement may be influenced if there is light leakage outside the defined region and the surroundings of the target object have a high reflectance in comparison to the target object.

\*4. Measured at the rated sensing distance.

\*5. The E39-P5□ contains a packing to prevent entry of foreign matter. The degree of protection between the E3NC-LH□□ and E39-P5□ is not specified.

## Amplifier Units

Item	Type	Standard models			Model for Sensor Communications Unit	
		NPN output	E3NC-LA21	E3NC-LA7	E3NC-LA24	E3NC-LA0
		PNP output	E3NC-LA51	E3NC-LA9	E3NC-LA54	
Connecting method	Pre-wired	Wire-saving Connector	M8 Connector	Connector for Sensor Communications Unit		
Inputs/outputs	Outputs	2 outputs		1 output	---*1	
	External inputs	1 input				
Power supply voltage *2		10 to 30 VDC, including 10% ripple (p-p)			Supplied from the connector through the Sensor Communications Unit	
Power consumption *3		At Power Supply Voltage of 24 VDC Normal mode: 1,560mW max. (Current consumption: 65mA max.) Eco ON: 1,320 mW max. (Current consumption: 55 mA max.) Eco LO: 1,440 mW max. (Current consumption: 60 mA max.)				
Control outputs *4		Load power supply voltage: 30 VDC max., open-collector output Load current: Groups of 1 to 3 Amplifier Units: 100 mA max., Groups of 4 to 30 Amplifier Units: 20 mA max.  <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">           Residual voltage:            At load current of less than 10 mA: 1 V max.            At load current of 10 to 100 mA: 2 V max.         </div> OFF current: 0.1 mA max.			---	
External inputs		Refer to *5.			---	
Indicators		7-segment displays (Sub digital display: green, Main digital display: white) Display direction: Switchable between normal and reversed. OUT indicator (orange), L/D indicator (orange), ST indicator (blue), DPC indicator (green), and OUT selection indicator (orange, only on models with 2 outputs)				
Protection circuits		Power supply reverse polarity protection, output short-circuit protection, and output reverse polarity protection			Power supply reverse polarity protection and output short-circuit protection	
Response time	Super-high-speed mode (SHS)*6	Operate or reset: 80 μs				
	High-speed mode (HS)	Operate or reset: 250 μs				
	Standard mode (Stdnd)	Operate or reset: 1 ms				
	Giga-power mode (GIGA)	Operate or reset: 16 ms				
Sensitivity adjustment		Smart Tuning (2-point tuning, full auto tuning, position tuning, maximum sensitivity tuning, power tuning, or percentage tuning (-99% to +99%)), or manual adjustment.				
Maximum connectable Units		30			With E3NW-ECT: 30 units *7 With E3NW-CRT: 16 units With E3NW-CCL: 16 units	
No. of Units for mutual interference prevention	Super-high-speed mode (SHS)*6	0				
	High-speed mode (HS)	2				
	Standard mode (Stdnd)	2				
	Giga-power mode (GIGA)	4				
Functions	Dynamic power control (DPC)	Provided				
	Timer	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms				
	Zero reset	Negative values can be displayed. (Threshold value is shifted.)				
	Resetting settings*8	Select from initial reset (factory defaults) or user reset (saved settings).				
	Eco mode*9	Select from OFF (digital display lit), ECO ON (digital display not lit), and ECO LO (digital display dimmed).				
	Bank switching	Select from banks 1 to 4.				
	Power tuning	Select from ON or OFF.				
	Output 1	Select from Normal Detection Mode or Area Detection Mode.				
	Output 2	Select from normal detection mode, alarm output mode, or error output mode.	---		Select from normal detection mode, alarm output mode, or error output mode.	
	External input	Select from input OFF, tuning, power tuning, laser OFF, zero reset, or bank switching.			---	
Hysteresis width	Select from standard setting or user setting.					

\*1. Two sensor outputs are allocated in the programmable logic controller PLC I/O table.

PLC operation via Communications Unit enables reading detected values and changing settings.

\*2. Applicable Sensor Head is the series of E3NC-LH□□ (Input/Output 10-30V DC Class 2)

\*3. At Power Supply Voltage of 10 to 30 VDC.

Normal mode: 1,650 mW max. (Current consumption: 55 mA max. at 30 VDC, 115 mA max. at 10 VDC)

Eco ON: 1,410 mW max. (Current consumption: 47 mA max. at 30 VDC, 95 mA max. at 10 VDC)

Eco LO: 1,530 mW max. (Current consumption: 51 mA max. at 30 VDC, 105 mA max. at 10 VDC)

\*4. The total for both outputs of a model with 2 outputs is 100 mA max. (Residual voltage: Load current of less than 10 mA: 1 V max., Load current of 10 to 100 mA: 2 V max.)

\*5. The following details apply to the input.

	Contact input (relay or switch)	Non-contact input (transistor)	Input time*5-1
NPN	ON: Shorted to 0 V (Sourcing current: 1 mA max.) OFF: Open or shorted to Vcc.	ON: 1.5 V max. (Sourcing current: 1 mA max.) OFF: Vcc - 1.5 V to Vcc (Leakage current: 0.1 mA max.)	ON: 9 ms min. OFF: 20 ms min.
PNP	ON: Shorted to Vcc (Sinking current: 3 mA max.) OFF: Open or shorted to 0 V.	ON: Vcc - 1.5 V to Vcc (Sinking current: 3 mA max.) OFF: 1.5 V max. (Leakage current: 0.1 mA max.)	

\*5-1. Input time is 25 ms (ON)/(OFF) only when (in tUnE) or (in PtUn) input is selected.

\*6. The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.

\*7. When connected to an OMRON NJ-series Controller.

\*8. The bank is not reset by the user reset function or saved by the user save function.

\*9. Eco LO is supported for Amplifier Units manufactured in July 2014 or later.



Item	Type	Standard models			Model for Sensor Communications Unit
	NPN output	E3NC-LA21	E3NC-LA7	E3NC-LA24	E3NC-LA0
	PNP output	E3NC-LA51	E3NC-LA9	E3NC-LA54	
Connecting method	Pre-wired	Wire-saving Connector	M8 Connector	Connector for Sensor Communications Unit	
<b>Ambient temperature range*</b>	Operating: Groups of 1 or 2 Amplifier Units: -25 to 55°C, Groups of 3 to 10 Amplifier Units: -25 to 50°C, Groups of 11 to 16 Amplifier Units: -25 to 45°C, Groups of 17 to 30 Amplifier Units: -25 to 40°C Storage: -30 to 70°C (with no icing or condensation)				Operating: Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units: 0 to 40°C, Storage: -30 to 70°C (with no icing or condensation)
<b>Ambient humidity range</b>	Operating and storage: 35% to 85% (with no condensation)				
<b>Altitude</b>	2,000 m max.				
<b>Installation environment</b>	Pollution degree 3 (as per IEC 60947-1)				
<b>Insulation resistance</b>	20 MΩ (at 500 VDC)				
<b>Dielectric strength</b>	1,000 VAC at 50/60 Hz for 1 min				
<b>Vibration resistance (destruction)</b>	10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions				
<b>Shock resistance (destruction)</b>	500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions				150m/s <sup>2</sup> for 3 times each in X, Y, and Z directions
<b>Weight (packed state/Amplifier Unit only)</b>	Approx. 115 g/approx. 75 g	Approx. 60 g/approx. 20 g	Approx. 65 g/approx. 25 g		
<b>Materials</b>	<b>Case</b>	Polycarbonate (PC)			
	<b>Cover</b>	Polycarbonate (PC)			
	<b>Cable</b>	Vinyl chloride (PVC)			
<b>Accessories</b>	Instruction Manual				

\* When the number of connected units is 11 or more, the ambient temperature is less than 50°C.

## Accessories

### Reflectors

Item	Model	E39-R21	E39-R22	E39-RS10	E39-RS11
<b>Ambient temperature</b>	Operating: -10 to 55°C; Storage: -25 to 70°C (with no icing or condensation)				
<b>Ambient humidity</b>	Operating/storage: 35% to 85% (with no condensation)				
<b>Vibration resistance (destruction)</b>	10 to 55 Hz with a 1.5-mm double amplitude or 100 m/s <sup>2</sup> for 2 hours each in X, Y, and Z directions				
<b>Shock resistance (destruction)</b>	500 m/s <sup>2</sup> 3 times each in X, Y, and Z directions				
<b>Degree of protection</b>	IEC IP67 (E39-R21 and E39-R22 only)				
<b>Materials</b>	Reflective surface: Methacrylic resin (PMMA) Back surface: Polybutylene terephthalate (PBT)			Methacrylic resin (PMMA)	
<b>Weight (packed state/Reflector only)</b>	Approx. 30 g/approx. 5 g	Approx. 35 g/approx. 10 g	Approx. 26 g/approx. 1 g	Approx. 30 g/approx. 5 g	
<b>Accessories</b>	Instruction manual				

## Ultra-compact CMOS Laser Sensor: E3NC-S

### Sensor Heads

Sensing method		Distance-settable		
Item	Model	E3NC-SH250H	E3NC-SH250	E3NC-SH100
Light source (wavelength)*1		Visible semiconductor laser diode (660 nm), 1 mW (average output: 220 μW) (JIS Class 2, IEC/EN Class 2, and FDA Class 2)	Visible semiconductor laser diode (660 nm), 0.5 mW (average output: 100 μW) (JIS Class 1, IEC/EN Class 1, and FDA Class 1)	
Measurement range		35 to 250 mm (display value: 350 to 2,500)		35 to 100 mm (display value: 350 to 1,000)
Standard detected level difference*2		35 to 180mm: 9 mm 180 to 250 mm: 25 mm		35 to 50 mm: 1.5 mm 50 to 100 mm: 3 mm
Beam size*3		Approx. 1 mm dia. at 250 mm		Approx. 0.5 mm dia. at 100 mm
Indicators		OUT indicator (orange), STABILITY indicator (green), and ST indicator (blue)		
Ambient illumination (Receiver side)		Incandescent lamp: 4,000 lx max., Sunlight: 8,000 lx max.	Incandescent lamp: 2,000 lx max., Sunlight: 4,000 lx max.	Incandescent lamp: 4,000 lx max., Sunlight: 8,000 lx max.
Ambient temperature range		Operating: -10 to 50°C; Storage: -25 to 70°C (with no icing or condensation)		
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)		
Altitude		2,000 m max.		
Installation environment		Pollution degree 3 (as per IEC 60947-1)		
Insulation resistance		20 MΩ min. (at 500 VDC)		
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min		
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance (destruction)		500 m/s <sup>2</sup> 3 times each in X, Y, and Z directions		
Degree of protection		IEC IP67		
Connecting method		Pre-wired connector (Standard cable length: 2 m)		
Materials	Case	Polybutylene terephthalate (PBT)		
	Lens	Methacrylic resin (PMMA)		
	Cable	Vinyl chloride (PVC)		
Weight (packed state/Sensor Head only)		Approx. 125 g/approx. 75 g		
Accessories		Instruction Manual, laser warning label (E3NC-SH250H only)		

**Note:** Incorrect detection may occur outside the measurement range if the object has a high reflection factor.

\*1. These Sensors are classified as Class 1 laser devices under IEC 60825-1 and the regulations of Laser Notice No. 50 for FDA certification. CDRH (Center for Devices and Radiological Health) registration has been completed. (Accession Number: 1220691)

\*2. The values were measured at the center of the sensing distance using OMRON's standard sensing object (white ceramic).

\*3. Beam size: Defined at the 1/e<sup>2</sup> (13.5 %) of the central intensity at the measurement center distance.

Measurement may be influenced if there is light leakage outside the defined region and the surroundings of the target object have a high reflectance in comparison to the target object.

Also, when detecting a workpiece that is smaller than the beam size, a correct value may not be obtained.



## Amplifier Units

Item	Type	Standard models			Model for Sensor Communications Unit	
		NPN output	E3NC-SA21	E3NC-SA7	E3NC-SA24	E3NC-SA0
		PNP output	E3NC-SA51	E3NC-SA9	E3NC-SA54	
Connecting method	Pre-wired	Wire-saving Connector	M8 Connector	Connector for Sensor Communications Unit		
Inputs/ outputs	Outputs	2 outputs	1 output		-- *1	
	External inputs	1 input				
Power supply voltage *2		10 to 30 VDC, including 10% ripple (p-p)			Supplied from the connector through the Sensor Communications Unit	
Power consumption *3		At Power Supply Voltage of 24 VDC Normal mode: 1,920 mW max. (Current consumption: 80 mA max.) Eco ON: 1,680 mW max. (Current consumption: 70 mA max.) Eco LO: 1,800 mW max. (Current consumption: 75 mA max.)				
Control outputs *4		Load power supply voltage: 30 VDC max., open-collector output Load current: Groups of 1 to 3 Amplifier Units: 100 mA max., Groups of 4 to 30 Amplifier Units: 20 mA max.  (Residual voltage: At load current of less than 10 mA: 1 V max. At load current of 10 to 100 mA: 2 V max.)  OFF current: 0.1 mA max.			--	
External inputs		Refer to *5.				
Indicators		7-segment displays (Sub digital display: green, Main digital display: white) Display direction: Switchable between normal and reversed. OUT indicator (orange), L/D indicator (orange), ST indicator (blue), ZERO indicator (green), and OUT selection indicator (orange, only on models with 2 outputs)				
Protection circuits		Power supply reverse polarity protection, output short-circuit protection, and output reverse polarity protection			Power supply reverse polarity protection and output short-circuit protection	
Response time	Super-high-speed mode (SHS) *6	Operate or reset: 1.5 ms				
	High-speed mode (HS)	Operate or reset: 5 ms				
	Standard mode (Std)	Operate or reset: 10 ms				
	Giga-power mode (GIGA)	Operate or reset: 50 ms				
Sensitivity adjustment		Smart Tuning (2-point tuning, full auto tuning, 1-point tuning, tuning without workpiece, 2-point area tuning, 1-point area tuning, or area tuning without workpiece), or manual adjustment				
Maximum connectable Units		30			With E3NW-ECT: 30 units *7 With E3NW-CRT: 16 units With E3NW-CCL: 16 units	
No. of Units for mutual interference prevention	Super-high-speed mode (SHS) *6	0				
	High-speed mode (HS)	2				
	Standard mode (Std)	2				
	Giga-power mode (GIGA)	2				
Functions	Timer	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms				
	Zero reset	Negative values can be displayed. (Threshold value is shifted.)				
	Resetting settings *8	Select from initial reset (factory defaults) or user reset (saved settings).				
	Eco mode *9	Select from OFF (digital display lit), ECO ON (digital display not lit), and ECO LO (digital display dimmed).				
	Bank switching	Select from banks 1 to 4.				
	Output 1	Select from Normal detection mode, Area detection mode, or hold mode.				
	Output 2	Select from Normal detection mode or Error output mode.	--		Select from Normal detection mode or Error output mode.	
	External input	Select from input OFF, tuning, laser OFF, zero reset, or bank switching.			--	
	Keep function *10	Select from ON or OFF.				
	Background suppression *11	Select from ON or OFF.				
Hysteresis width		Select from standard setting or user setting.				

\*1. Two sensor outputs are allocated in the programmable logic controller PLC I/O table.

PLC operation via Communications Unit enables reading detected values and changing settings.

\*2. Applicable Sensor Head is the series of E3NC-SH□□ (Input/Output 10-30V DC Class 2).

\*3. At Power Supply Voltage of 10 to 30 VDC.

Normal mode: 2,250 mW max. (Current consumption: 75 mA max. at 30 VDC, 145 mA max. at 10 VDC)

Eco ON: 2,010 mW max. (Current consumption: 67 mA max. at 30 VDC, 125 mA max. at 10 VDC)

Eco LO: 2,130 mW max. (Current consumption: 71 mA max. at 30 VDC, 135 mA max. at 10 VDC)

\*4. The total for both outputs of a model with 2 outputs is 100 mA max. (Residual voltage: Load current of less than 10 mA: 1 V max., Load current of 10 to 100 mA: 2 V max.).

\*5. The following details apply to the input.

	Contact input (relay or switch)	Non-contact input (transistor)	Input time*5-1
NPN	ON: Shorted to 0 V (Sourcing current: 1 mA max.). OFF: Open or shorted to Vcc.	ON: 1.5 V max. (Sourcing current: 1 mA max.) OFF: Vcc - 1.5 V to Vcc (Leakage current: 0.1 mA max.)	ON: 9 ms min. OFF: 20 ms min.
PNP	ON: Shorted to Vcc (Sinking current: 3 mA max.). OFF: Open or shorted to 0 V.	ON: Vcc - 1.5 V to Vcc (Sinking current: 3 mA max.) OFF: 1.5 V max. (Leakage current: 0.1 mA max.)	

\*5-1. Input time is 25 ms (ON)/(OFF) only when (in tUnE) input is selected.

\*6. The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.

\*7. When connected to an OMRON NJ-series Controller.

\*8. The bank is not reset by the user reset function or saved by the user save function.

\*9. Eco LO is supported for Amplifier Units manufactured in August 2014 or later.

\*10. The output for a measurement error is set. ON: The value of the output from before the measurement error is retained. OFF: The output is turned OFF when a measurement error occurs.

\*11. Only the sensing object is detected when tuning.

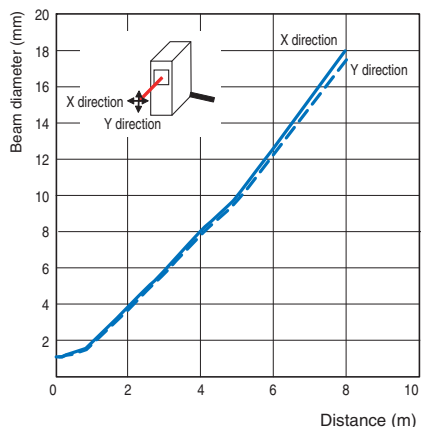
Item	Type	Standard models			Model for Sensor Communications Unit
	NPN output	E3NC-SA21	E3NC-SA7	E3NC-SA24	E3NC-SA0
	PNP output	E3NC-SA51	E3NC-SA9	E3NC-SA54	
Connecting method	Pre-wired	Wire-saving Connector	M8 Connector	Connector for Sensor Communications Unit	
<b>Ambient temperature range*</b>	Operating: Groups of 1 or 2 Amplifier Units: -25 to 55°C, Groups of 3 to 10 Amplifier Units: -25 to 50°C, Groups of 11 to 16 Amplifier Units: -25 to 45°C, Groups of 17 to 30 Amplifier Units: -25 to 40°C Storage: -30 to 70°C (with no icing or condensation)				Operating: Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units: 0 to 40°C Storage: -30 to 70°C (with no icing or condensation)
<b>Ambient humidity range</b>	Operating and storage: 35% to 85% (with no condensation)				
<b>Insulation resistance</b>	20 MΩ (at 500 VDC)				
<b>Altitude</b>	2,000 m max.				
<b>Installation environment</b>	Pollution degree 3 (as per IEC 60947-1)				
<b>Dielectric strength</b>	1,000 VAC at 50/60 Hz for 1 min				
<b>Vibration resistance (destruction)</b>	10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions				
<b>Shock resistance (destruction)</b>	500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions				150 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions
<b>Weight (packed state/Amplifier Unit only)</b>	Approx. 115 g/approx. 75 g	Approx. 60 g/approx. 20 g	Approx. 65 g/approx. 25 g		
<b>Materials</b>	<b>Case</b>	Polycarbonate (PC)			
	<b>Cover</b>	Polycarbonate (PC)			
	<b>Cable</b>	Vinyl chloride (PVC)			
<b>Accessories</b>	Instruction Manual				

\* When the number of connected units is 11 or more, the ambient temperature is less than 50°C.

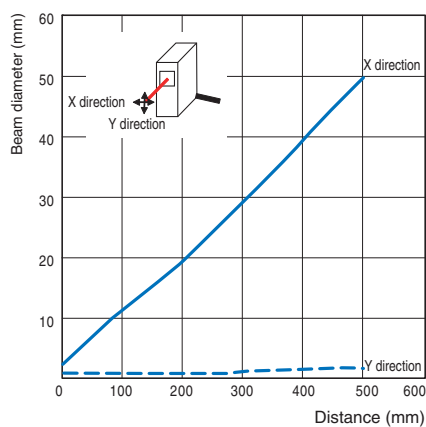
# Engineering Data (Reference Value)

## Beam Diameter Vs. Distance

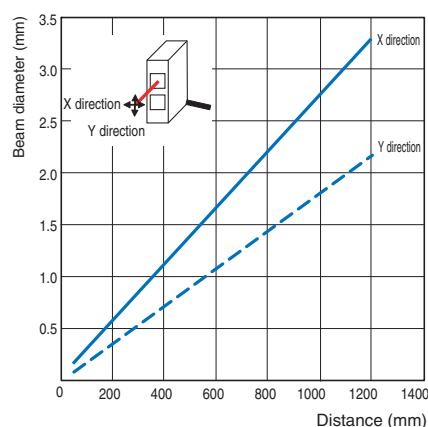
**Retro-reflective Model  
E3NC-LH03**



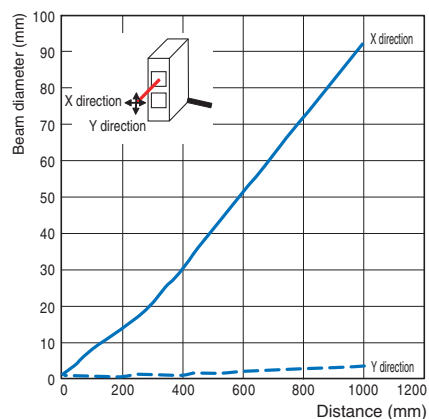
**Retro-reflective Model  
E3NC-LH03 + E39-P51**



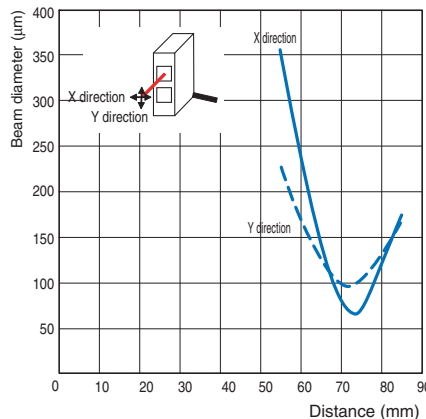
**Diffuse-reflective Model  
E3NC-LH02**



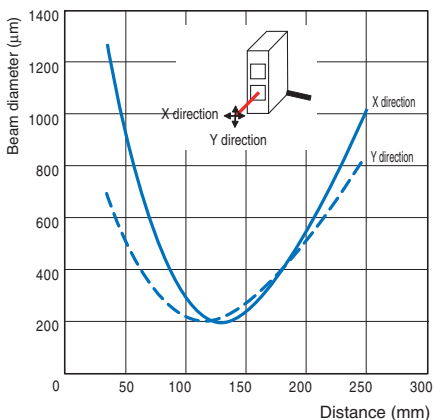
**Diffuse-reflective Model  
E3NC-LH02 + E39-P52**



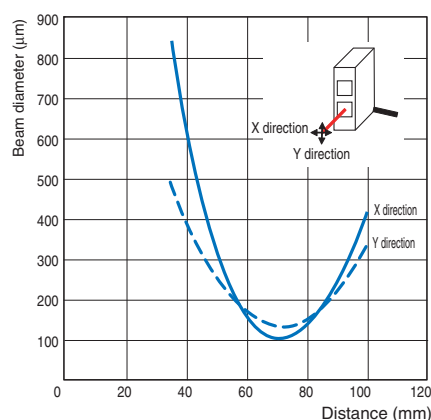
**Limited-reflective Model  
E3NC-LH01**



**Distance-settable Model  
E3NC-SH250/SH250H**



**Distance-settable Model  
E3NC-SH100**



# I/O Circuit Diagrams

## NPN Output

Model	Operation mode	Timing chart	L/D indicator	Output circuit
E3NC-LA21 E3NC-SA21	Light-ON	ch1/ Incident light ch2/ No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Operate Reset (Between brown and black (orange) leads)	lit.	
	Dark-ON	ch1/ Incident light ch2/ No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Operate Reset (Between brown and black (orange) leads)	lit.	
E3NC-LA7 E3NC-LA24 E3NC-SA7 E3NC-SA24	Light-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Operate Reset (Between brown and black leads)	lit.	<p>Note: 1, 2, 3 and 4 are pin terminals of M8 Connector Type.</p>
	Dark-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Operate Reset (Between brown and black leads)	lit.	

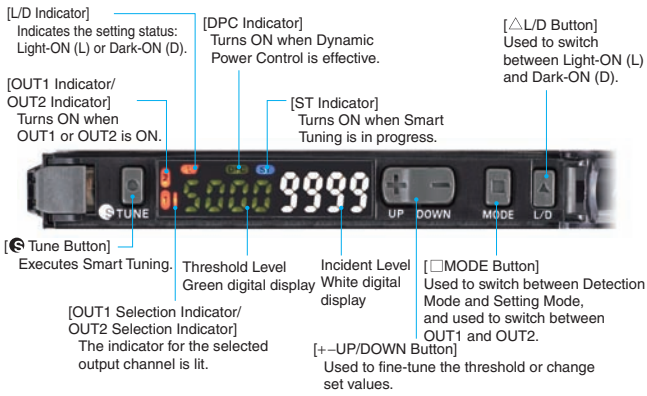
## PNP Output

Model	Operation mode	Timing chart	L/D indicator	Output circuit
E3NC-LA51 E3NC-SA51	Light-ON	ch1/ Incident light ch2/ No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Operate Reset (Between blue and black (orange) leads)	lit.	
	Dark-ON	ch1/ Incident light ch2/ No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Operate Reset (Between blue and black (orange) leads)	lit.	
E3NC-LA9 E3NC-LA54 E3NC-SA9 E3NC-SA54	Light-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Operate Reset (Between blue and black leads)	lit.	<p>Note: 1, 2, 3 and 4 are pin terminals of M8 Connector Type.</p>
	Dark-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Operate Reset (Between blue and black leads)	lit.	

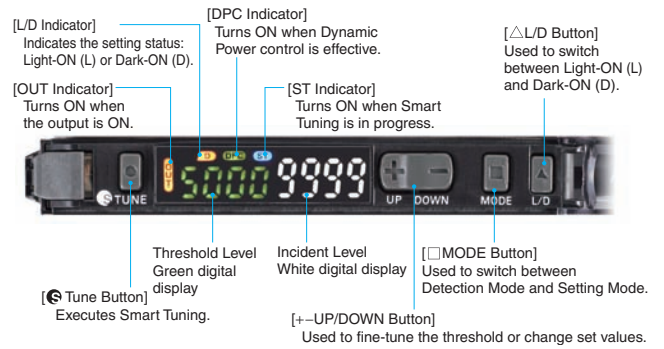
# Nomenclature

## Compact Laser Sensors

### E3NC-LA21/LA51/LA0

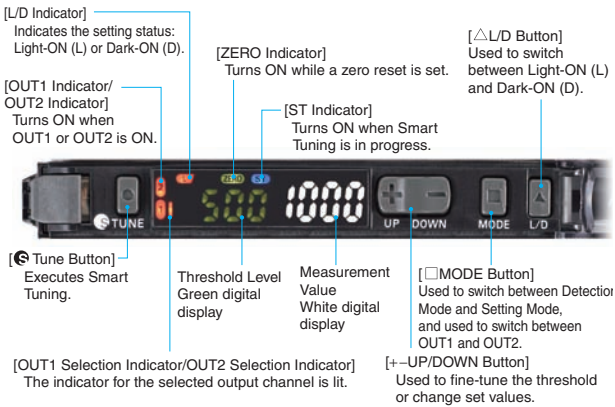


### E3NC-LA7/LA9/LA24/LA54

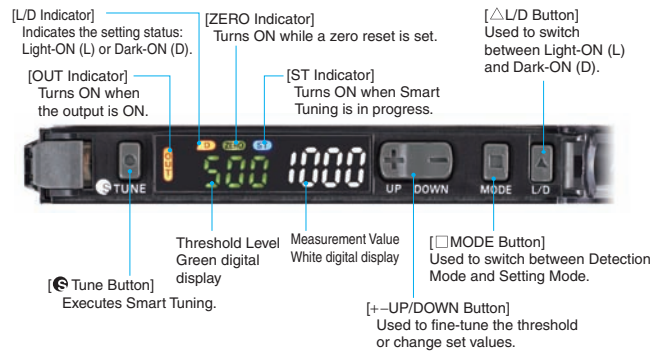


## Ultra-compact CMOS Laser Sensors

### E3NC-SA21/SA51/SA0




### E3NC-SA7/SA9/SA24/SA54



# Safety Precautions

To ensure safe operation, be sure to read and follow the Instruction Manual provided with the Sensor.

## Indication and Meaning for Safe Use

 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
<b>Precautions for Safe Use</b>	Supplementary comments on what to do or avoid doing, to use the product safely.
<b>Precautions for Correct Use</b>	Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

## Sensor Heads

### Laser Safety

Various safety standards regarding laser devices are stipulated in Japan and abroad. When this Sensor Head is used in Japan and when it is assembled in Japan but exported to a foreign country, the safety standards are classified into three cases.

#### 1. When Using the Sensor Head in Japan

JIS C6802 stipulates the safety measures that must be observed by the user for each type of laser equipment.

E3NC-LH□□ Sensor Heads: Class 1

E3NC-SH□□ Sensor Heads: Class 1

E3NC-SH□□H Sensor Heads: Class 2

### WARNING

Do not expose your eyes to the laser beam either directly or indirectly (i.e., after reflection from a mirror or shiny surface). The laser beam has a high power density and exposure may result in loss of sight.



#### Attention

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Do not disassemble the Sensor Head. Doing so may cause the laser beam to leak, resulting in a risk of visual impairment.



- The following laser warning label and laser description labels are attached to the sides of the Sensor Heads.

E3NC-LH03

Description Label



Certification Label



E3NC-LH01 /E3NC-LH02

Description Label



Certification Label



E3NC-SH□□

Description Label



Certification Label



E3NC-SH□□H

Laser Warning Label



Certification Label



## 2. Using in the USA

When using devices in which the Sensor Head is installed in the USA, the devices are subject to FDA (Food and Drug Administration) laser regulations of the USA.

E3NC-LH03:

These Sensor Heads are classified as Class 1 laser devices under IEC/EN 60825-1 and the regulations of Laser Notice No. 50 for this certification. CDRH (Center for Devices and Radiological Health) registration has been completed. (Accession Number: 1320739)

E3NC-LH01, E3NC-LH02:

These Sensor Heads are classified as Class 1 laser devices under IEC/EN 60825-1 and the regulations of Laser Notice No. 50 for this certification. CDRH (Center for Devices and Radiological Health) registration has been completed. (Accession Number: 1220690)

E3NC-SH□□, E3NC-SH□□H:

These Sensor Heads are classified as Class 1 or Class 2 laser devices under IEC/EN 60825-1 and the regulations of Laser Notice No. 50 for this certification. CDRH (Center for Devices and Radiological Health) registration has been completed. (Accession Number: 1220691)

- For countries other than Japan

Replace the warning label with the corresponding English label (supplied with SH□□H).



## 3. Using in Europe

E3NC-LH□□, E3NC-SH□□:

These Sensor Heads are classified in Class 1 under EN 60825-1.

E3NC-SH□□H:

These Sensor Heads are classified in Class 2 under EN 60825-1.

## Precautions for Safe Use

The following precautions must be observed to ensure safe operation of the Sensor Head.

- 1. Installation Environment**
  - Do not use the Sensor Head in an environment where explosive or flammable gas is present.
  - To secure the safety of operation and maintenance, do not install the Sensor Head close to high-voltage devices or power devices.
- 2. Power Supply and Wiring**
  - Always use an E3NC-LA□□, E3NC-LA0, E3NC-SA□□ or E3NC-SA0 Amplifier Unit. If a different Amplifier Unit is used, damage or fire may occur.
  - If you short the cable, reconnect it as specified. If the connections are not correct, damage or fire may occur.
  - High-voltage lines and power lines must be wired separately from the Sensor Head. Wiring them together or placing them in the same duct may cause induction, resulting in malfunction or damage.
  - Always turn OFF the power supply before connecting or disconnecting the connectors.
- 3. Installation**
  - Use screws for installation and tighten the screws securely, but do not exceed the specified tightening torque.  
Specified torque (M3): 0.5 N·m
- 4. Others**
  - Never disassemble (including removing labels), repair, modify, deform by pressure, or incinerate the Sensor Head. Do not turn the adjuster on the E3NC-LH02 with a force that is greater than 40 mN·m. Damage or fire may occur.
  - Dispose of the Sensor Head as industrial waste.
  - If you notice any abnormalities, immediately stop using the Sensor Head, turn OFF the power supply, and contact your OMRON representative.
- 5. Conditions of UL**  
(Applicable Models: E3NC-LH01/LH02 Only)
  - The E3NC-LH series sensor head accessories shall be used with the E3NC-LA amplifiers.  
These amplifiers and sensor head accessories shall be installed within a suitable enclosure where all components, including cords and connectors, shall be entirely contained within the same enclosure.  
(Applicable Models: E3NC-SH100/SH250 Only)
  - The E3NC-SH series sensor head accessories shall be used with the E3NC-SA amplifiers.  
These amplifiers and sensor head accessories shall be installed within a suitable enclosure where all components, including cords and connectors, shall be entirely contained within the same enclosure.
- 6. Shortening the connection cable for use**  
(Applicable Models: E3NC-LH01/LH02/SH100/SH250 Only)
  - The shortened cable has not been evaluated by UL.

## Precautions for Correct Use

Observe the following precautions to prevent failure to operate, malfunctions, or undesirable effects on Sensor Head performance.

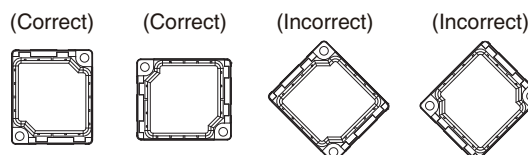
- 1. Installation Environment**  
Do not install the Sensor Head in locations subject to the following conditions:
  - Ambient temperatures outside of the rated range
  - Condensation caused by rapid changes in temperature
  - Relative humidity that is not between 35% and 85%
  - Corrosive or flammable gas
  - Dust, salt, or iron particles
  - Direct vibration or shock
  - Strong external light interference (such as other laser beams or electric arc-welding machines)
  - Direct sunlight or near heaters
  - Water, oil, or chemical fumes or spray
  - Strong magnetic or electric fields

- 2. Warming Up**
  - The circuits will be unstable just after the power supply is turned ON, so measurement values may fluctuate gradually.
  - For accurate measurements, allow the product to stand for at least 10 minutes after turning ON the power supply before use. (E3NC-S Series)
- 3. Maintenance and Inspection**
  - Always turn OFF the power supply before adjusting or connecting/disconnecting the Sensor Head.
  - Do not use thinner, benzene, acetone, or kerosene to clean the Sensor Head.
  - If large dust particles or dirt adheres to the filter on the front of the Sensor Head, use a blower brush (such as one used to clean camera lenses) to blow it off. Do not blow the dust particles or dirt with your mouth. To remove dust particles or dirt, wipe it off gently with a soft cloth (such as one for cleaning lenses) moistened with a small amount of alcohol. Do not wipe it off with excessive force. Scratches on the filter may cause errors.
- 4. Sensing Object**
  - The Sensor Head cannot accurately measure objects with the following materials and shapes: Transparent objects (with the E3NC-LH03, objects that are extremely transparent), objects with an extremely low reflection ratio, objects smaller than the spot diameter, objects with a large curvature, excessively inclined objects, etc. Also, for long-distance detection, the Sensor may falsely operate if a white object approaches near the Sensor Head (E3NC-LH03).
- 5. Do not use the Sensor in water, rainfall, or outdoors.**
- 6. A ferrite core is attached to the Sensor Head end of the cable connected to the E3NC-LH03 5M. Do not remove the ferrite core or change its position. Also, do not bend the cable within 12 mm of each end of the ferrite core. Doing so may damage the cable.**

### Attaching a Reflector

Mount the Reflector as shown in (Correct) below. Errors will be generated if you mount it at the angle shown in (Incorrect). Always install the Reflector at the same angle as the Sensor Head if the head is not mounted vertically or horizontally.

#### Common for all models

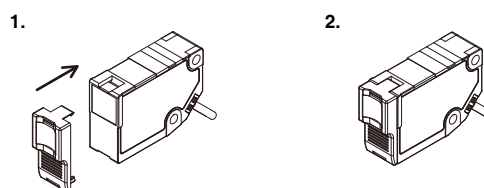


Sheet products (E39-RS10/E39-RS11) are peel-off stickers. Peel off the release paper and apply the sheet to a flat surface for installation. If there are any dirt and dust on the installation surface, a reduction in adhesion and deflection of a sheet may occur, resulting in malfunction.

**Note:** Beam is irradiated on the glossy surface.

### Attaching a Lens Attachment (E39-P51 or E39-P52)

- Check the widths of the slots in the Sensor and the widths of the tabs on the Lens Attachment and attach the Lens Attachment as shown below. (The Lens Attachment must be in the correct orientation, so the widths of the tabs on the Lens Attachment are different on the top and bottom.)
- After you attach the Lens Attachment, make sure that the tabs are completely engaged in the slots in the Sensor.





## Amplifier Units

### WARNING

This Amplifier Unit is not designed or rated for ensuring safety of persons either directly or indirectly.

Do not use it for such purposes.



Do not use the Amplifier Unit with voltage in excess of the rated voltage.

Excess voltage may result in malfunction or fire.



Never use the Amplifier Unit with an AC power supply.

Otherwise, explosion may result.



### Precautions for Safe Use

The following precautions must be observed to ensure safe operation of the Amplifier Unit. Doing so may cause damage or fire.

- Do not install the Amplifier Unit in the following locations.
  - Locations subject to direct sunlight
  - Locations subject to condensation due to high humidity
  - Locations subject to corrosive gas
  - Locations subject to vibration or mechanical shocks exceeding the rated values
  - Locations subject to exposure to water, oil, chemicals
  - Locations subject to steam
  - Locations subjected to strong magnetic field or electric field
- Do not use the Amplifier Unit in environments subject to flammable or explosive gases.
- Do not use the Amplifier Unit in any atmosphere or environment that exceeds the ratings.
- To secure the safety of operation and maintenance, do not install the Amplifier Unit close to high-voltage devices or power devices.
- High-voltage lines and power lines must be wired separately from the Amplifier Unit. Wiring them together or placing them in the same duct may cause induction, resulting in malfunction or damage.
- Do not apply any load exceeding the ratings. Otherwise, damage or fire may result.
- Do not short the load. Otherwise, damage or fire may result.
- Connect the load correctly.
- Do not miswire such as the polarity of the power supply.
- To use this device as connecting with each other, be sure to connect with the same power supply and turn ON the power simultaneously. Using a separate power supply will influence the functions when connecting the devices to use them.
- Do not use the Amplifier Unit if the case is damaged.
- Burn injury may occur. The Amplifier Unit surface temperature rises depending on application conditions, such as the ambient temperature and the power supply voltage. Attention must be paid during operation or cleaning.
- When setting the sensor, be sure to check safety such as by stopping the equipment.
- Be sure to turn off the power supply before connecting or disconnecting wires.
- Do not attempt to disassemble, repair, or modify the Amplifier Unit in any way.
- When disposing of the Amplifier Unit, treat it as industrial waste.
- Do not use the Sensor in water, rainfall, or outdoors.
- UL Standard Certification (Applicable Models: E3NC-LA21/LA51/SA21/SA51 Only)
 

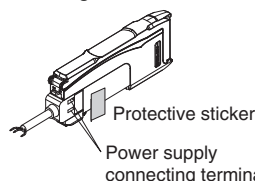
Only the sensors with Enhanced UL Certification Mark are certified by UL. They are intended to be supplied by a "Class 2 circuit". When used in United States and Canada, Please use the same Class 2 source for input and output. The overcurrent protection current rating is 2A max. They were evaluated as Open type and shall be installed within a enclosure.

### Precautions for Correct Use

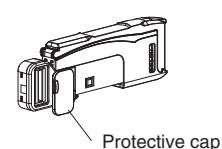
- Be sure to mount the unit to the DIN track until it clicks.
- When using the Amplifier Units with Wire-saving Connectors, attach the protective stickers (provided with E3X-CN-series Connectors) on the unused power pins to prevent electrical shock and short circuiting.

When using the Amplifier Units with Connectors for Communications Units, attach the protective caps (provided with E3NW-series Sensor Communications Unit).

Amplifier Unit with Wire-saving Connector



Amplifier Unit with Connector for Sensor Communications Unit



- Use an extension cable with a minimum thickness of 0.3 mm<sup>2</sup> and less than 10 m long.
- Do not apply the forces on the cord exceeding the following limits: Pull: 40 N; torque: 0.1 N·m; pressure: 20 N; bending: 29.4 N
- Do not apply excessive force (9.8 N max.) such as tension, compression or torsion to the connector of the Sensor Head that is fixed to the Amplifier Unit.
- Always keep the protective cover in place when using the Amplifier Unit. Not doing so may cause malfunction.
- It may take time until the received light intensity and measured value become stable immediately after the power is turned on depending on use environment.
- The product is ready to operate 200 ms after the power supply is turned ON.
- The Mobile Console E3X-MC11, E3X-MC11-SV2 and E3X-MC11-S cannot be connected.
- The mutual interference prevention function does not work when in combination with E3C/E2C/E3X.
- If the unit receives excessive sensor light, the mutual interference prevention function may not work properly, resulting in malfunction of the unit. In such case, increase the threshold.
- Standard models (E3NC-□A21/51/7/9)
 

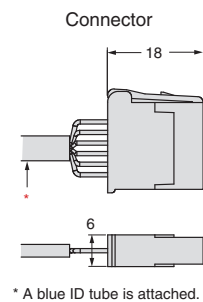
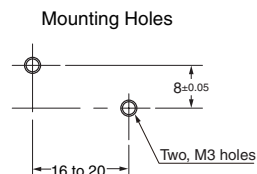
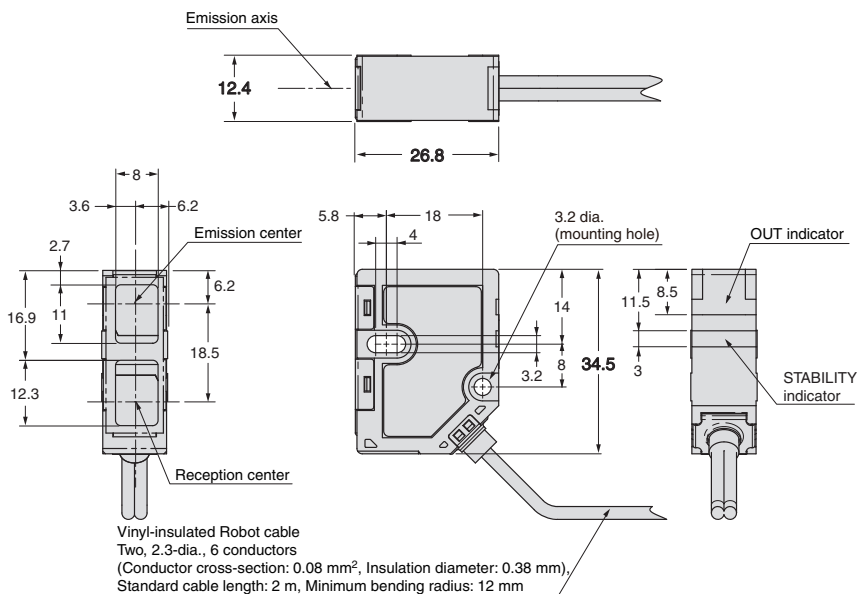
The Sensor Communications Unit E3X-DRT21-S, E3X-CRT, E3X-ECT and E3NW cannot be connected.

Model for Sensor Communications Unit (E3NC-□A0)
 

The Sensor Communications Unit E3NW can be connected. E3X-DRT21-S, E3X-CRT, E3X-ECT cannot be connected.
- If you notice an abnormal condition such as a strange odor, extreme heating of the unit, or smoke immediately stop using the product, turn off the power, and consult your dealer.
- Do not use thinner, benzene, acetone, and lamp oil for cleaning.



**Limited-reflective Model**  
E3NC-LH01

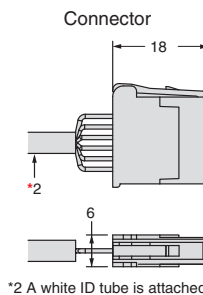
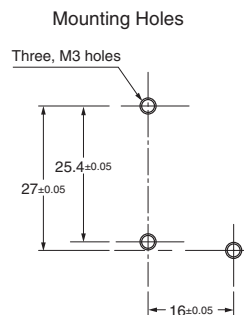
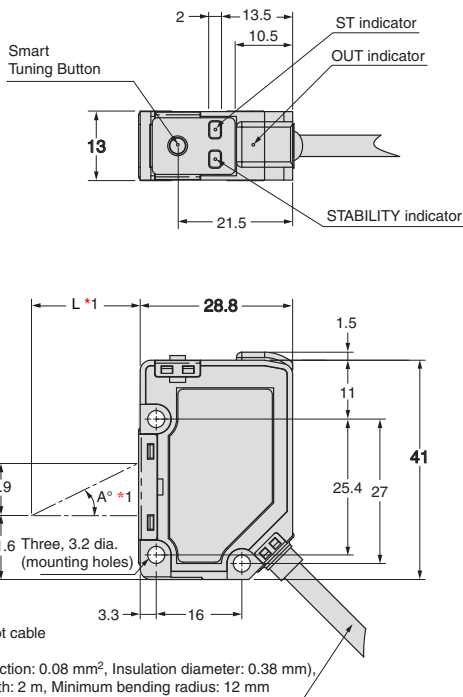


**Distance-settable Models**  
E3NC-SH250H  
E3NC-SH250  
E3NC-SH100



\*1 E3NC-SH100  
L = 35 to 100 mm,  
A = 15.92° to 5.67°

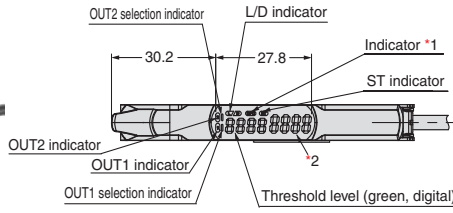
E3NC-SH250H/250  
L = 35 to 250 mm,  
A = 15.92° to 2.27°



# Amplifier Units

## Pre-wired Amplifier Units

- E3NC-LA21
- E3NC-LA51
- E3NC-SA21
- E3NC-SA51



\*1. The indicators are as follows:

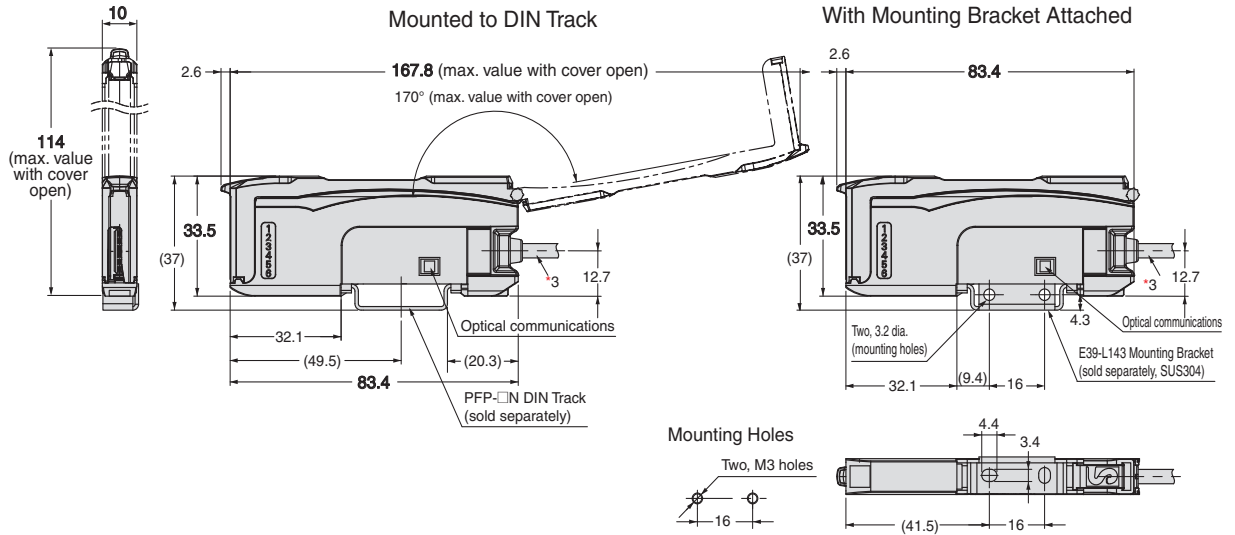
E3NC-LA21	DPC indicator
E3NC-LA51	DPC indicator
E3NC-SA21	ZERO indicator
E3NC-SA51	ZERO indicator

\*2. The display is as follows:

E3NC-LA21	Incident level (white, digital)
E3NC-LA51	Incident level (white, digital)
E3NC-SA21	Measurement value (white, digital)
E3NC-SA51	Measurement value (white, digital)

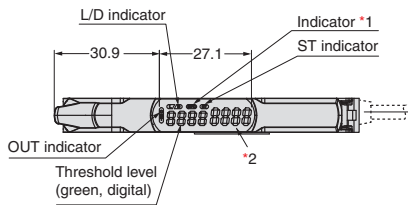
\*3. Cable Specifications

Round vinyl-insulated cable, 4 dia., 5 conductors  
 (Conductor cross-section: 0.2 mm<sup>2</sup>, Insulation diameter: 0.9 mm),  
 Standard cable length: 2 m, Minimum bending radius: 12 mm



## Amplifier Units with Wire-saving Connectors

- E3NC-LA7
- E3NC-LA9
- E3NC-SA7
- E3NC-SA9



\*1. The indicators are as follows:

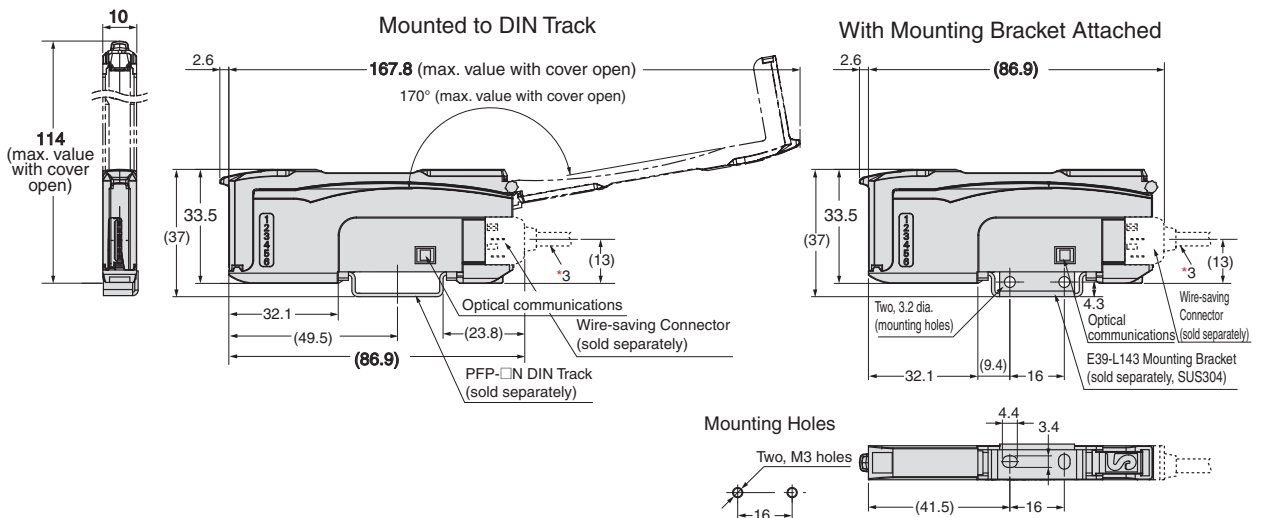
E3NC-LA7	DPC indicator
E3NC-LA9	DPC indicator
E3NC-SA7	ZERO indicator
E3NC-SA9	ZERO indicator

\*2. The display is as follows:

E3NC-LA7	Incident level (white, digital)
E3NC-LA9	Incident level (white, digital)
E3NC-SA7	Measurement value (white, digital)
E3NC-SA9	Measurement value (white, digital)

\*3. Cable Specifications

Model	Outer diameter	No. of conductors
E3X-CN22	4.0	2
E3X-CN21		4



**Amplifier Units with M8 Connectors**

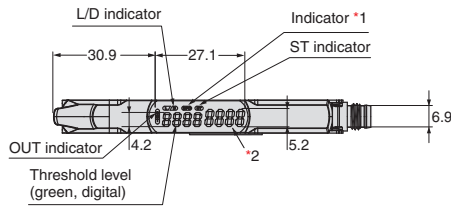
**E3NC-LA24**  
**E3NC-LA54**  
**E3NC-SA24**  
**E3NC-SA54**

\*1. The indicators are as follows:

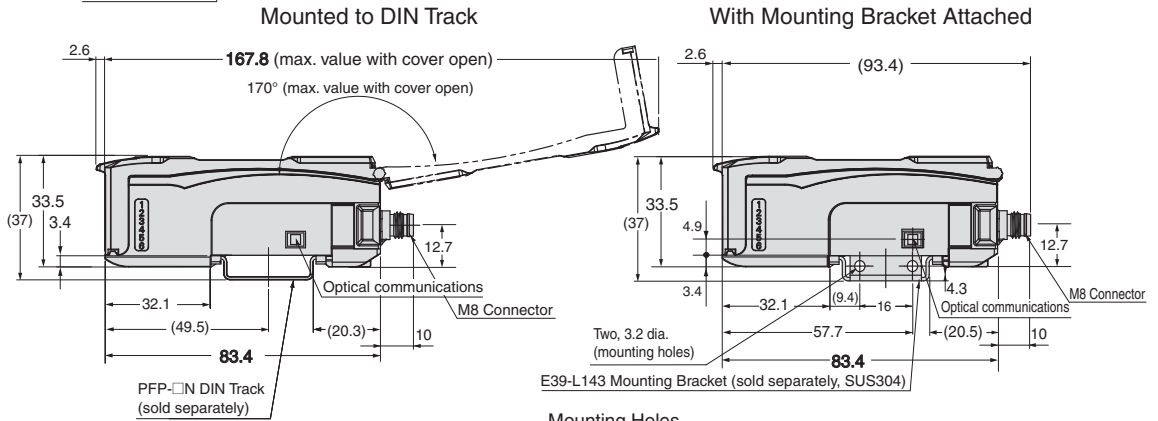
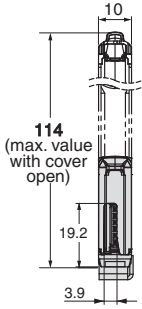
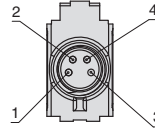
<b>E3NC-LA24</b>	DPC indicator
<b>E3NC-LA54</b>	indicator
<b>E3NC-SA24</b>	ZERO indicator
<b>E3NC-SA54</b>	indicator

\*2. The display is as follows:

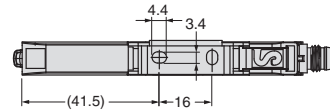
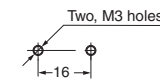
<b>E3NC-LA24</b>	Incident level (white, digital)
<b>E3NC-LA54</b>	
<b>E3NC-SA24</b>	Measurement value (white, digital)
<b>E3NC-SA54</b>	



Connector pin arrangement



Mounting Holes



**Amplifier Units with Connectors for Sensor Communications Unit**

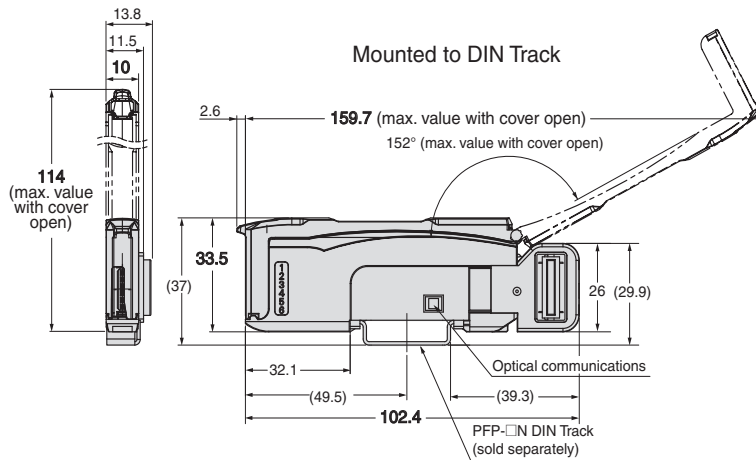
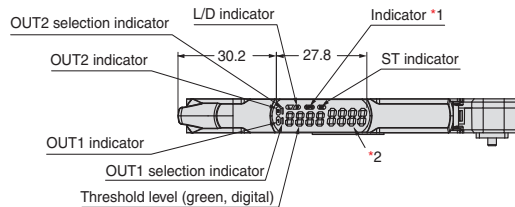
**E3NC-LA0**  
**E3NC-SA0**

\*1. The indicators are as follows:

<b>E3NC-LA0</b>	DPC indicator
<b>E3NC-SA0</b>	ZERO indicator

\*2. The display is as follows:

<b>E3NC-LA0</b>	Incident level (white, digital)
<b>E3NC-SA0</b>	Measurement value (white, digital)

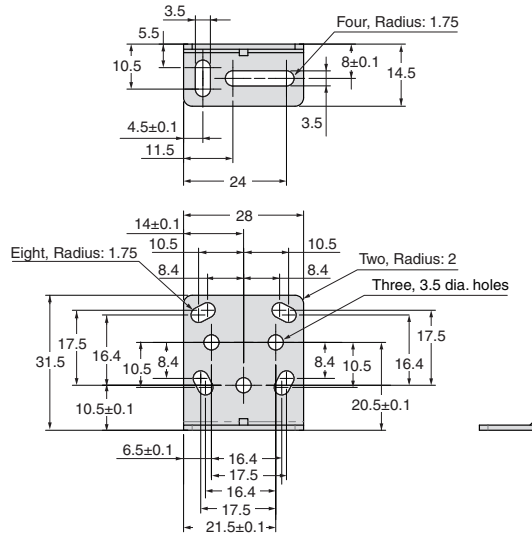




**Sensor Head Mounting Brackets**  
**E39-L190**

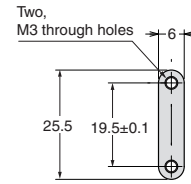
**Mounting Bracket**

Materials: Stainless steel (SUS304)  
 Thickness: 1.2 mm  
 Accessories: Phillips screws (M3x18, P = 0.5, stainless steel): 2, Nut plate: 1

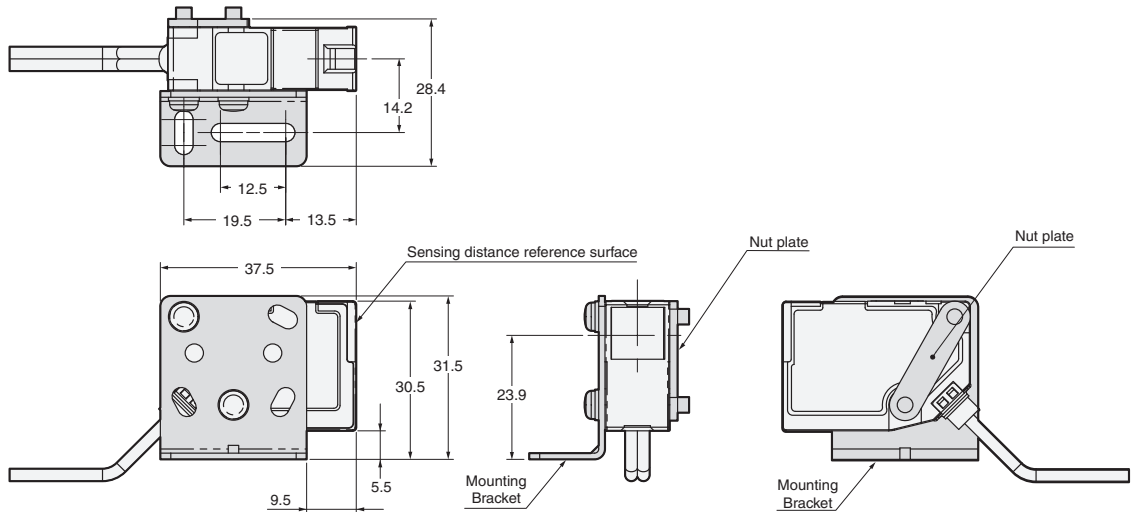


**Nut Plate**

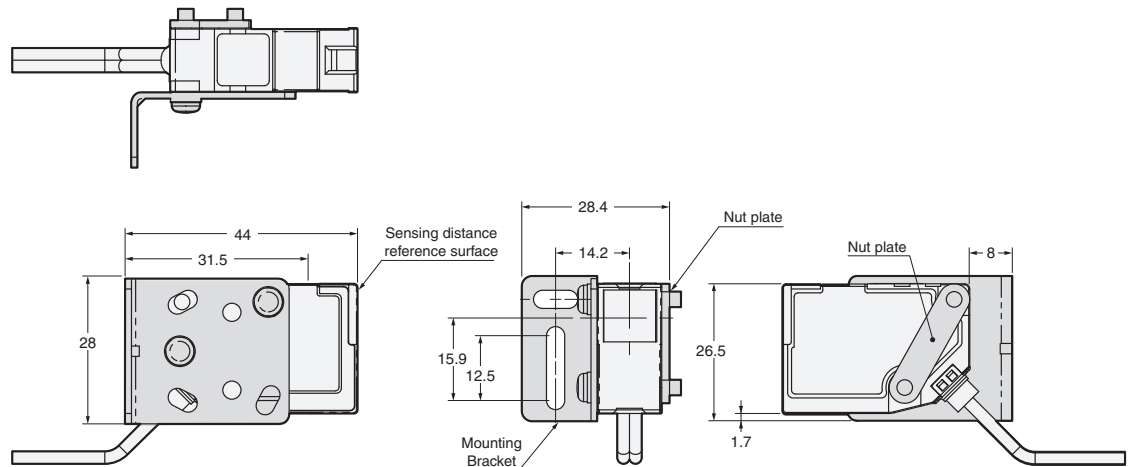
Materials: Stainless steel (SUS304)  
 Thickness: 1.5 mm



**With E39-L190 Mounting Bracket Attached for Bottom Mounting**



**With E39-L190 Mounting Bracket Attached for Back Mounting**

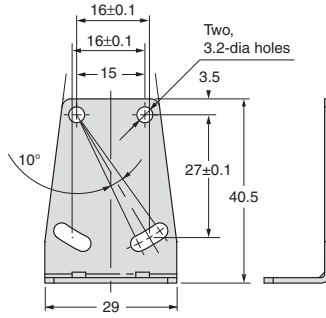
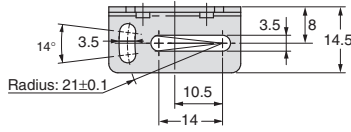




**E39-L185**

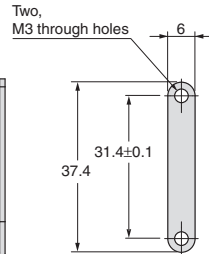
**Mounting Bracket**

Material: Stainless steel (SUS304)  
 Thickness: 1.2 mm  
 Accessories: Phillips screws (M3x18, P = 0.5, stainless steel): 2  
 Nut plate: 1

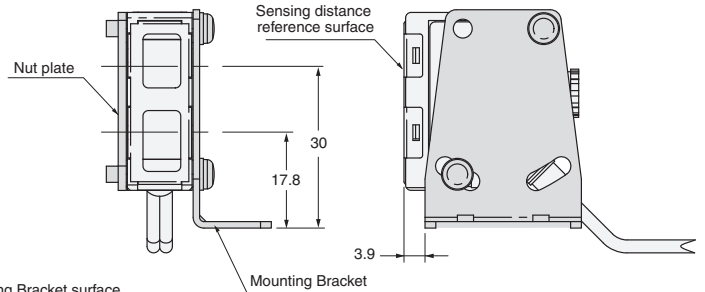
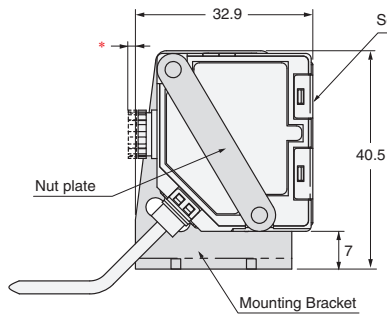
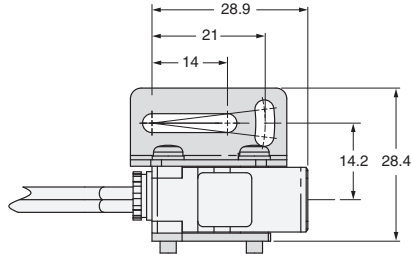


**Nut Plate**

Material: Stainless steel (SUS304)  
 Thickness: 1.5 mm



**With E39-L185 Mounting Bracket Attached**

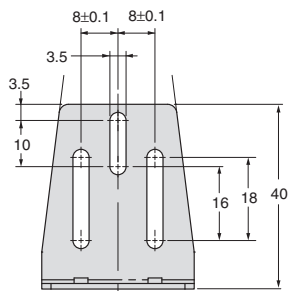
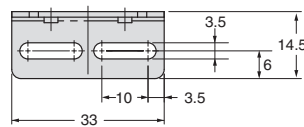


\* When adjusted, the adjuster extends 0.8 mm from the Mounting Bracket surface.

**E39-L186**

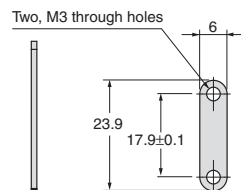
**Mounting Bracket**

Material: Stainless steel (SUS304)  
 Thickness: 1.2 mm  
 Accessories: Phillips screws (M3x18, P = 0.5, stainless steel): 2  
 Nut plate: 1

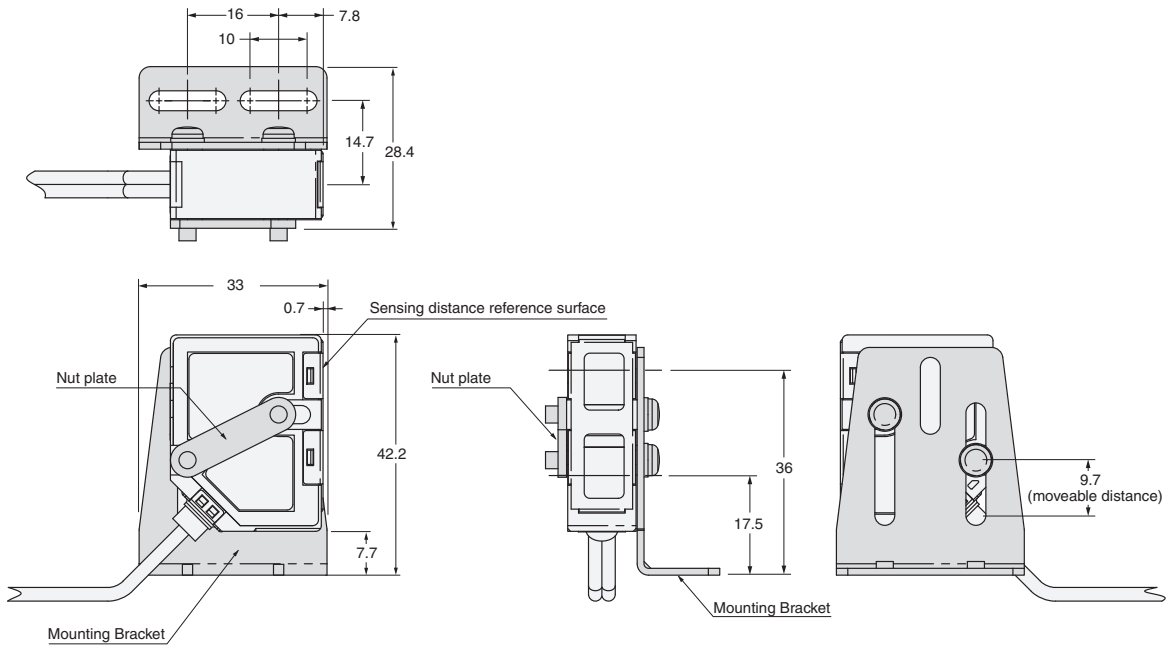


**Nut Plate**

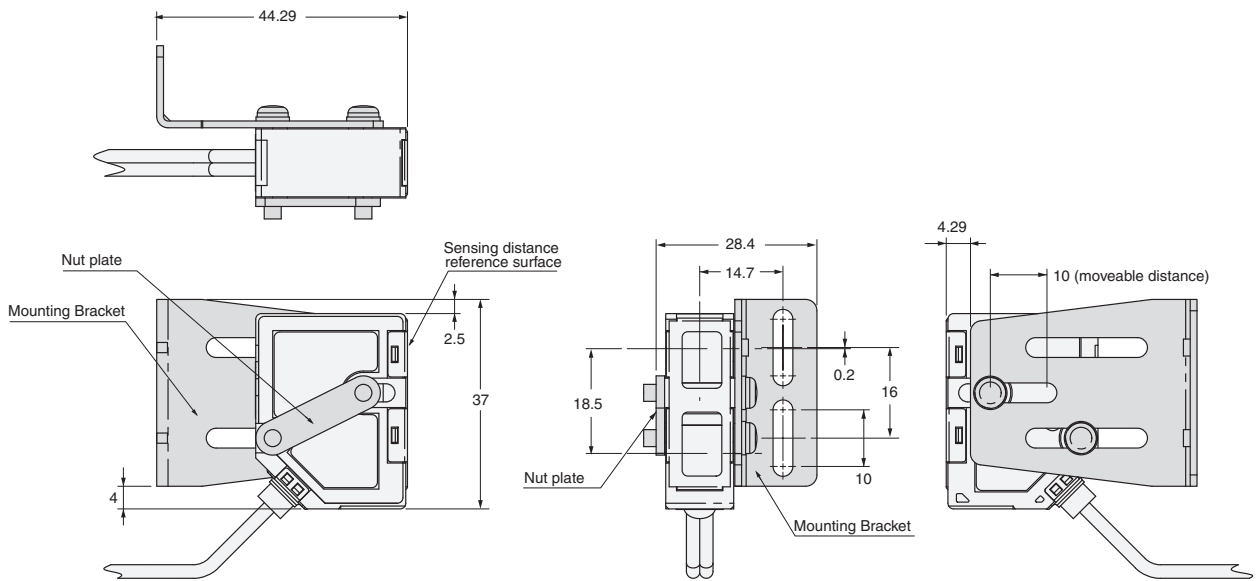
Material: Stainless steel (SUS304)  
 Thickness: 1.5 mm



**With E39-L186 Mounting Bracket Attached for Bottom Mounting**

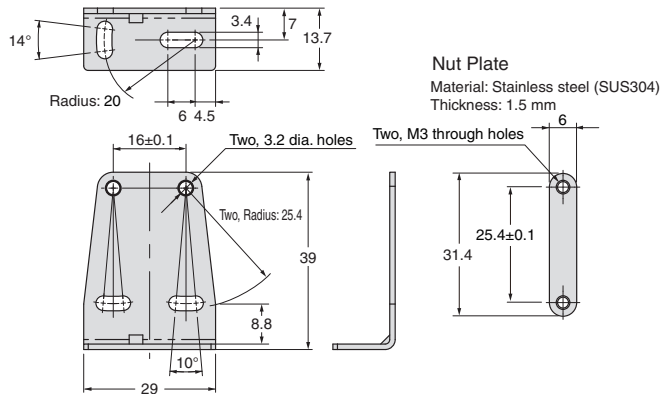


**With E39-L186 Mounting Bracket Attached for Back Mounting**

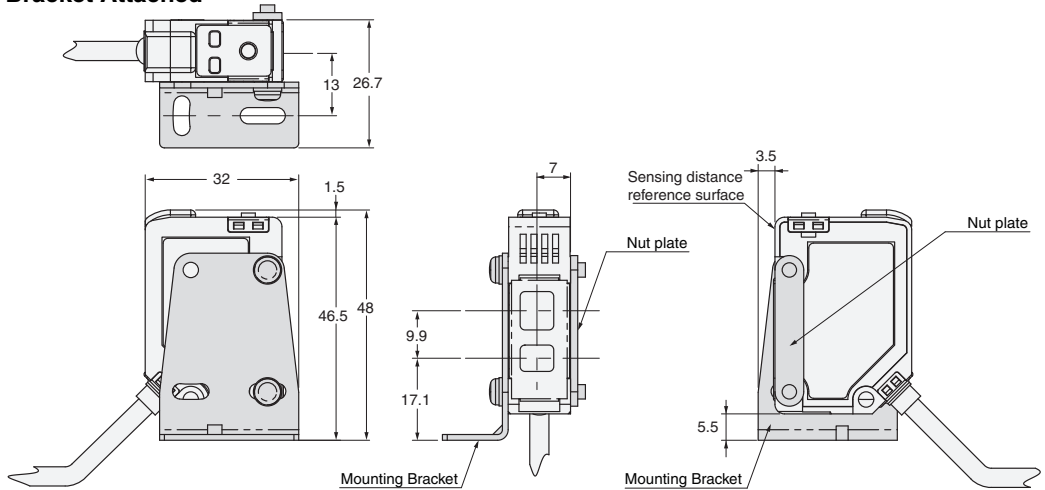


**E39-L187**

**Mounting Bracket**  
 Material: Stainless steel (SUS304)  
 Thickness: 1.2 mm  
 Accessories: Phillips screws (M3×18, P = 0.5, stainless steel): 2  
 Nut plate: 1



With E39-L187 Mounting Bracket Attached



E39-L188

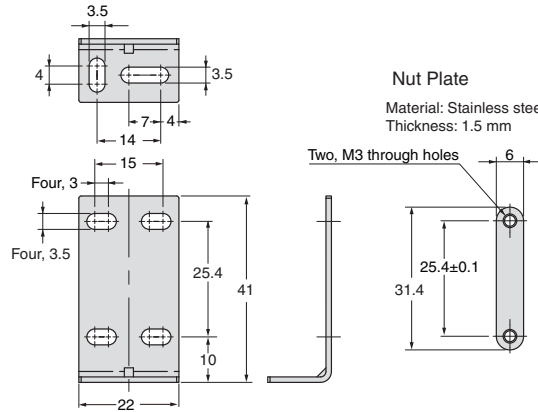
Mounting Bracket

Material: Stainless steel (SUS304)

Thickness: 1.2 mm

Accessories: Phillips screws (M3×18, P = 0.5, stainless steel): 2

Nut plate: 1

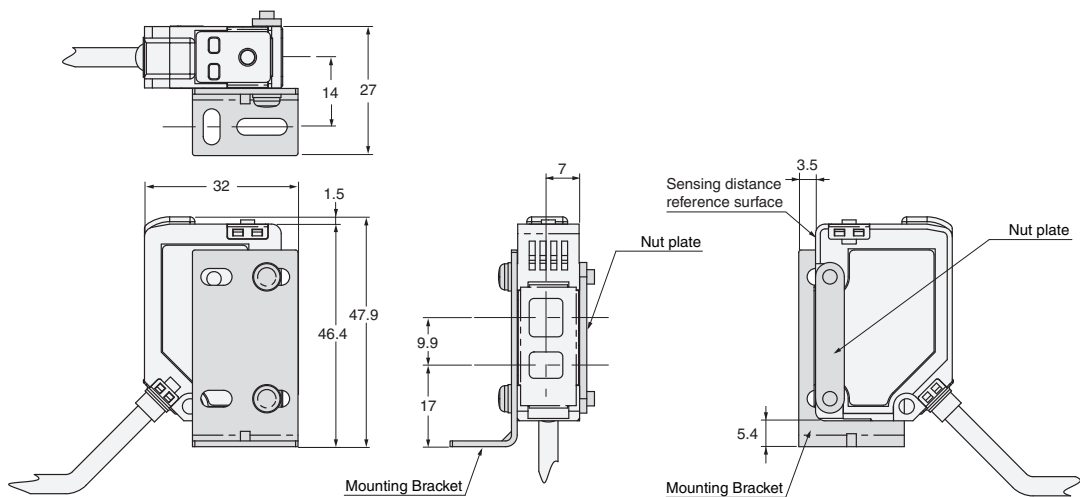


Nut Plate

Material: Stainless steel (SUS304)

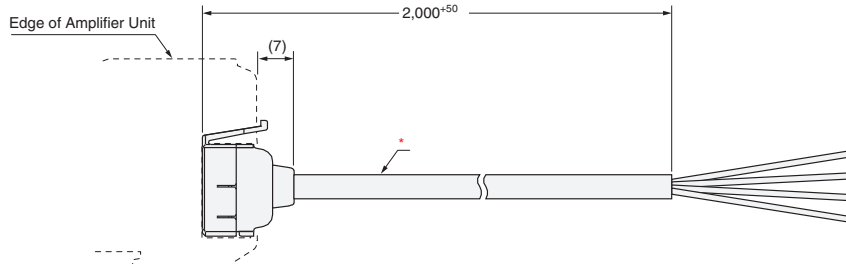
Thickness: 1.5 mm

With E39-L188 Mounting Bracket Attached



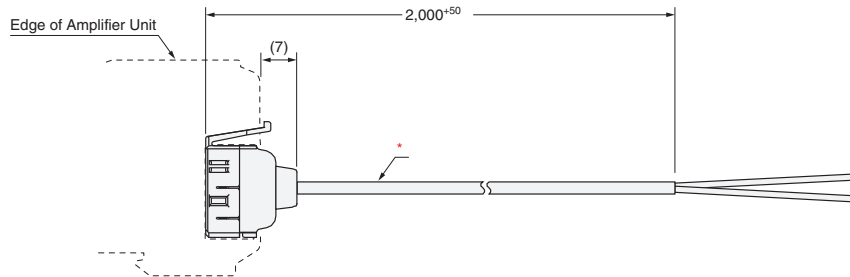
## Wire-saving Connectors

### Master Connector E3X-CN21



\*4-dia. cable with 4 conductors, Standard cable length: 2 m (Conductor cross-section: 0.2 mm<sup>2</sup> (AWG24), Insulation diameter: 1.1 mm)

### Slave Connector E3X-CN22

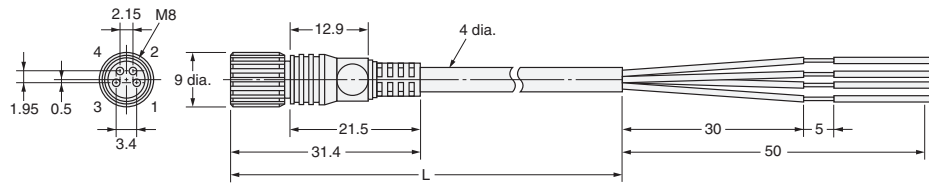


\*4-dia. cable with 2 conductors, Standard cable length: 2 m (Conductor cross-section: 0.2 mm<sup>2</sup> (AWG24), Insulation diameter: 1.1 mm)

## Sensor I/O Connectors

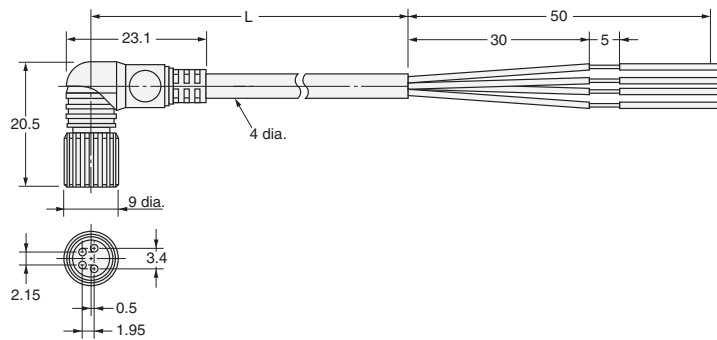
### Straight

#### XS3F-M421-40□-A

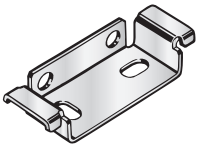


### L-shaped

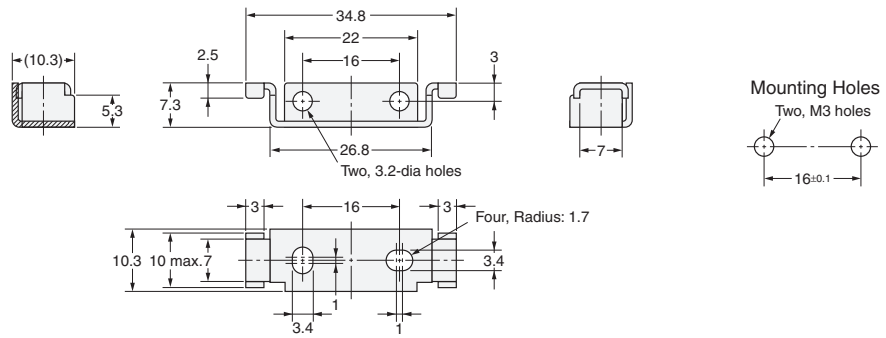
#### XS3F-M422-40□-A



**Amplifier Unit Mounting Bracket**  
E39-L143



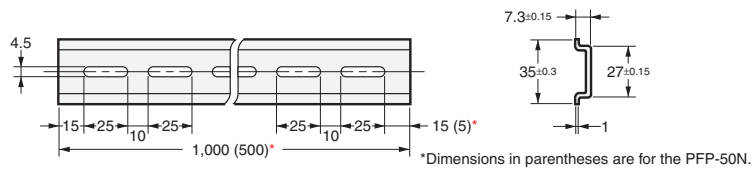
Material: Stainless steel (SUS304)



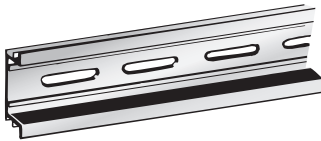
**DIN Track**  
PFP-100N  
PFP-50N



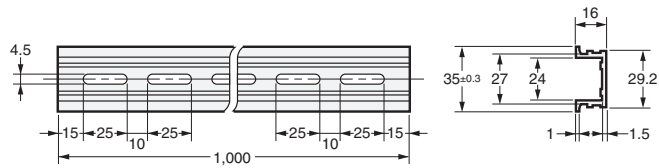
Material: Aluminum



**PFP-100N2**



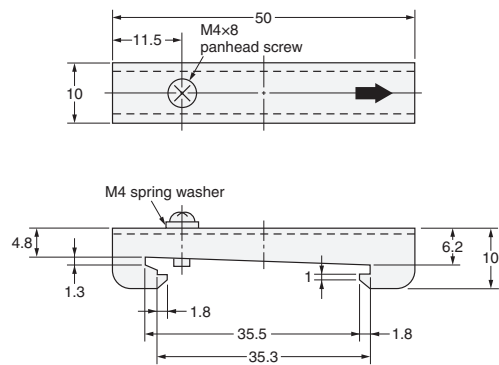
Material: Aluminum



**End Plate**  
PFP-M



Materials: Iron, zinc plating



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