

# Smart Proximity Sensor E2NC Series

## Smart Proximity Sensor with Separate Amplifier Enables Easily Making Highprecision Sensitivity Settings.

- Wide variety of Sensor Heads to select according to the application. Flexible cables are used between Preamplifiers and Amplifier Units of the Sensor Heads.
- High resistance to changes in ambient temperature.  
Temperature characteristics of 0.08%/°C \*
- Make simple and reliable detection settings with micronlevel precision using the teaching function.
- Check the sensing excess gain level on the digital display.
- Support for high-precision positioning and screening with fine positioning to maximize variations.
- The Model for Sensor Communications Units support an EtherCAT Sensor Communications Unit or CC-Link Sensor Communications Unit.

\* Refer to the *Ratings and Specifications* on page 4.



Refer to the *Safety Precautions* on page 13.















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

## Ordering Information

### Sensors (Dimensions → page 16)

#### Sensor Heads

Type	Appearance	Sensing Distances	Repeat accuracy	Cable specification	Model
Shielded	Cylindrical 	3 dia. × 18 mm 	0.6 mm	1 μm	Free cutting *2 E2NC-EDR6-F
		5.4 dia. × 18 mm 	1 mm	1 μm	Standard *2 E2NC-ED01
		8 dia. × 22 mm 	2 mm	2 μm	Free cutting *2 E2NC-ED01-F
	Screw 	M10 × 22 mm 	2 mm	2 μm	With Protective Spiral Tube *1*2 E2NC-ED01-S
				Standard *2	E2NC-ED02
				Free cutting *2	E2NC-ED02-F
	Flat 	30 × 14 × 4.8 mm 	5 mm	2 μm	With Protective Spiral Tube *1*2 E2NC-ED02-S
				Standard *2	E2NC-EM02
				Free cutting *2	E2NC-EM02-F
Unshielded	Screw 	M18 × 46.3 mm 	7 mm	5 μm	With Protective Spiral Tube *1*2 E2NC-EM02-S
				Standard *2	E2NC-EM07M
				Free cutting *2	E2NC-EM07M-F
Heat-resistant	Screw 	M12 × 22 mm 	2 mm	2 μm	With Protective Spiral Tube *1*2 E2NC-EM07M-S
				Standard *2	E2NC-EM02H

\*1. Ask your OMRON representative for information on the Protective Spiral Tube.

\*2. Standard models and models with Protective Spiral Tube: The standard cable length is 2.6 m, Free-cut models: The standard cable length is 3.6 m. (Standard cable length is the length containing the preamplifier and connector.)

## E2NC Series

### Amplifier Units (Dimensions → page 19)



Type	Appearance	Connection method	Input/output	Model	
				NPN output	PNP output
Advanced models		Pre-wired (2 m)	2 outputs + 1 input	<b>E2NC-EA21 2M</b>	<b>E2NC-EA51 2M</b>
		Wire-saving Connectors	2 outputs	<b>E2NC-EA7TW</b>	<b>E2NC-EA9TW</b>
		Wire-saving Connectors	1 output + 1 input	<b>E2NC-EA7</b>	<b>E2NC-EA9</b>
Model for Sensor Communications Unit *		Connector for Sensor Communications Unit	---	<b>E2NC-EA0</b>	
		Connector for Sensor Communications Unit Pre-wired (2 m)	1 output	<b>E2NC-EA10 2M</b>	<b>E2NC-EA40 2M</b>

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

## Accessories (Sold Separately)

**Wire-saving Connectors (Required for models for Wire-saving Connectors.) (Dimensions → page 21)**



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

Type	Appearance	Cable length	No. of conductors	Model	Applicable Amplifier Units
Master Connector		2 m	4	E3X-CN21	E2NC-EA7TW E2NC-EA9TW E2NC-EA7 E2NC-EA9
Slave Connector			2	E3X-CN22	

**End Plate (Dimensions → page 21)**




Two End Plates (PFP-M) are provided with the Sensor Communications Unit.

End Plates (PFP-M and E39-EP1) are not provided with the Amplifier Unit. They must be ordered separately as required.

Appearance	Model	Quantity	Applicable Amplifier Units
	PFP-M	1	E2NC-EA21 E2NC-EA51 E2NC-EA7□□ E2NC-EA9□□ E2NC-EA0
	E39-EP1	1	E2NC-EA10 E2NC-EA40

## Related Products

### Sensor Communications Units

Type	Appearance	Model
Sensor Communications Unit for EtherCAT		E3NW-ECT
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.

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

# E2NC Series

## Ratings and Specifications

### Sensor Heads

Model		E2NC-EDR6-F	E2NC-ED01(-□)	E2NC-ED02(-□)	E2NC-EM02(-□)	E2NC-EV05(-□)	E2NC-EM07M(-□)	E2NC-EM02H	
Item		3 dia. × 18 mm	5.4 dia. × 18 mm	8 dia. × 22 mm	M10 × 22 mm	30 × 14 × 4.8 mm	M18 × 46.3 mm	M12 × 22 mm	
Sensing Distances		0.6 mm	1 mm	2 mm	2 mm	5 mm	7 mm	2 mm	
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to <i>Engineering Data</i> on page 7.)							
Standard sensing object		5 × 5 mm	5 × 5 mm	10 × 10 mm	10 × 10 mm	15 × 15 mm	22 × 22 mm	20 × 20 mm	
		Material: iron (t = 3, S50C)							
Repeatability *1		1 μm	1 μm	2 μm	2 μm	2 μm	5 μm	2 μm	
Hysteresis distance		Variable							
Temperature characteristics *2	Sensor Head	0.3%/°C	0.08%/°C	0.08%/°C	0.08%/°C	0.04%/°C	0.08%/°C	0.2%/°C	
	Preamplifier and Amplifier	0.08%/°C							
Ambient temperature range *3	Operating	-10°C to 60°C (with no icing or condensation)							-10°C to 200°C (with no icing or condensation) *4
	Storage	-10°C to 60°C (with no icing or condensation)	-20°C to 70°C (with no icing or condensation)						
Ambient humidity		Operating/storage: 35% to 85% (with no condensation)							
Insulation resistance		50 MΩ min. (at 500 VDC)							
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry parts and case							
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> for 3 times each in X, Y, and Z directions							
Degree of protection (Sensor Head)		IEC60529 IP67							IEC60529 IP60 *5
Weight (packed state) *6		Approx. 120 g							
Materials	Sensor Head	Brass	SUS	Brass	Brass	Zinc	Brass	Brass	
	Sensing surface	Heat-resistant ABS							PEEK
	Clamping nut	---				Nickel-plated brass	---	Nickel-plated brass	
	Toothed washer	---				Zinc-plated iron	---	Zinc-plated iron	
	Preamplifier	PES							
Connection method *7		Connector (Standard models and models with Protective Spiral Tube: The standard cable length is 2.6 m, Free-cut models: The standard cable length is 3.6 m.)							
Accessories		Instruction Manual, Mounting Brackets							

\*1. Repeatability: The standard reference object at 1/2 of the measurement range.

\*2. Temperature characteristic: The standard reference object at 1/2 of the measurement range.

\*3. Do not expose the product to rapid temperature changes, otherwise the characteristics may be deteriorated.

\*4. Sensor Head only (The ambient temperature of other parts is -10 to 60°C)

\*5. Do not expose the product to steam. This product does not have any protection mean against water.

\*6. The protective spiral tube adds another 90 g to the weight.

\*7. Standard length is the length containing the preamplifier and connector.

## Amplifier Unit

Types		Advanced models			Model for Sensor Communications Unit *1	
Item	NPN output	E2NC-EA21	E2NC-EA7TW	E2NC-EA7	E2NC-EA10	E2NC-EA0
	PNP output	E2NC-EA51	E2NC-EA9TW	E2NC-EA9	E2NC-EA40	
	Connecting method	Pre-wired (2 m)	Wire-saving Connectors		Connector for Sensor Communications Unit Pre-wired (2 m)	Connector for Sensor Communications Unit
Input/output	Output	2 outputs		1 output	1 output *2	2 outputs *3
	External inputs *4	1 input	---	1 input	---	---
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)			Refer to the communication unit specifications.	
Power consumption *5		At Power Supply Voltage of 24 VDC Normal mode: 1,080 mW max. (Current consumption at 45 mA max.), Eco function ON: 840 mW max. (Current consumption at 35 mA max.), Eco function LO: 960 mW max. (Current consumption at 40 mA max.)				
Control output		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.				Refer to the communication unit specifications.
Indicators		7-segment displays (Sub digital display: green, Main digital display: white) Display direction: Switchable between normal and reversed. OUT indicator (orange), NO/NC indicator (orange), ST indicator (blue) 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, output short-circuit protection
Response time	Super-high-speed mode (SHS)	Operate or reset: 150 μs				
	High-speed mode (HS)	Operate or reset: 300 μs (default setting)				
	Standard mode (Std)	Operate or reset: 1 ms				
	GIGA power mode (GIGA)	Operate or reset: 4 ms				
Sensitivity adjustment		Smart Tuning (Fine Positioning, 2-point Tuning, Position Tuning, Percentage Tuning (-99% to 99%), Full Auto Tuning, or manual adjustment				
Maximum connectable Units		30 units			16 units	With E3NW-ECT: 30 units *6 With E3NW-CCL: 16 units
No. of Units for mutual interference prevention		Up to five units, intermittent oscillation method (response time = (No. of connected units + 1) x 15 ms) <b>Note:</b> The mutual interference prevention function is disabled if Super High Speed mode (SHS) is selected for detection function.				
Functions	Operation mode	NO (Normally Open)/NC (Normally closed)				
	Timer	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms				
	Differential detection	Single edge: Can be set to 250 μs, 500 μs, 1 ms, 10 ms, or 100 ms.				
	Zero reset	Provided Zero-reset is accompanied by a change of detection distance. After zero-reset, some threshold level may also cause a change of the indication by influence of other settings.				
	Resetting settings *7	Select from initial reset (factory defaults) or user reset (saved settings).				
	Eco mode	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 differential detection mode.				
	Output 2	Select from normal detection mode, alarm output mode, error output mode or disconnection detection output mode.		---	---	Select from normal detection mode, alarm output mode, error output mode or disconnection detection output mode.
	External input	Select from input OFF, 2-point Tuning, Percentage Tuning, Full Auto Tuning, Fine Positioning, zero reset, synchronization detection, or bank switching.	---	Select from input OFF, 2-point Tuning, Percentage Tuning, Full Auto Tuning, Fine Positioning, zero reset, synchronization detection, or bank switching.	---	---
	Hysteresis width	Select from standard setting or user setting. For a user setting, the hysteresis width can be set from 0 to 9,999.				
	Changing the displays	Threshold/ Detected intensity ratio, Peak receiving Detected amount/ Bottom Detected amount, Threshold bar display, Peak Detected amount/ Receiving Detected and CH number/ Detected amount			Threshold/ Detected intensity ratio, Peak receiving Detected amount/ Bottom Detected amount, Threshold bar display, Peak Detected amount/ Receiving Detected and CH number/ Detected amount	

# E2NC Series

Types		Advanced models			Model for Sensor Communications Unit *1	
Item	NPN output	E2NC-EA21	E2NC-EA7TW	E2NC-EA7	E2NC-EA10	E2NC-EA0
	PNP output	E2NC-EA51	E2NC-EA9TW	E2NC-EA9	E2NC-EA40	
	Connecting method	Pre-wired (2 m)	Wire-saving Connectors		Connector for Sensor Communications Unit Pre-wired (2 m)	Connector for Sensor Communications Unit
Ambient temperature range		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)	
Ambient humidity range		Operating and storage: 35 to 85% (with no condensation) within the surrounding air temperature range shown above				
Altitude		2,000 m max.				
Installation environment		Pollution degree 3				
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> 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	
Weight (packed state/Sensor only)		Approx. 115 g/Approx. 75 g	Approx. 60 g/Approx. 20 g	Approx. 60 g/Approx. 20 g	Approx. 95 g/Approx. 45 g	Approx. 65 g/Approx. 25 g
Materials	Case	Polycarbonate (PC)				
	Cover	Polycarbonate (PC)				
	Cable	PVC				
Accessories		Instruction Manual				

\*1. The communication unit is compatible with EtherCAT type E3NW-ECT and E3NW-CCL of CC-Link. This unit is not usable with E3NW-CRT.

\*2. Channel 1 of each amplifier unit is output as the output drawn by the cord.

\*3. Output signals from two sensors are assigned to the PLC via the network.

Various settings can be changed and detected values can be read by operating the PLC via the network.

\*4. The following details apply to the input.

	Contact input (relay or switch)	Non-contact input (transistor)	Input time *4-1
NPN output E2NC-EA21 E2NC-EA7	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 output E2NC-EA51 E2NC-EA9	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: 3mA max.) OFF: 1.5 V max. (Leakage current: 0.1 mA max.)	

\*4-1. Input time is 25 ms (ON)/(OFF) only when (in tUnE) or (in PtUn) input is selected.

\*5. At Power supply voltage of 10 to 30 VDC

Normal mode: 1,110 mW max. (Current consumption: 37 mA max. at 30 VDC, 76 mA max. at 10 VDC)

Eco function ON: 900 mW max. (Current consumption: 30 mA max. at 30 VDC, 48 mA max. at 10 VDC)

Eco function LO: 1,020 mW max. (Current consumption: 34 mA max. at 30 VDC, 58 mA max. at 10 VDC)

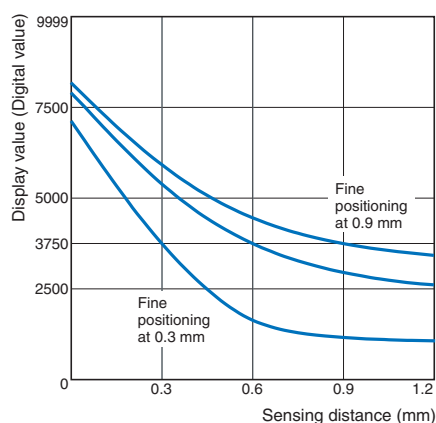
\*6. When connected to an OMRON NJ-series Controller. For details, refer to the communication unit manual.

\*7. The bank is not reset by the user reset function or saved by the user save function.

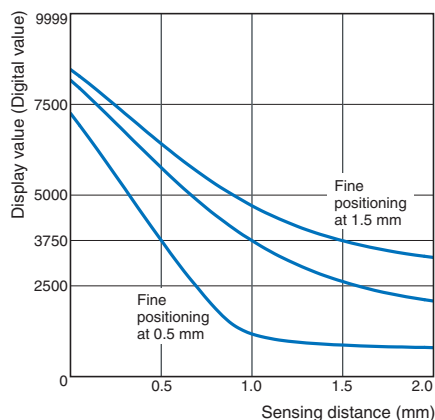
# Engineering Data (Reference Value)

## Sensing Distance vs. Display Values

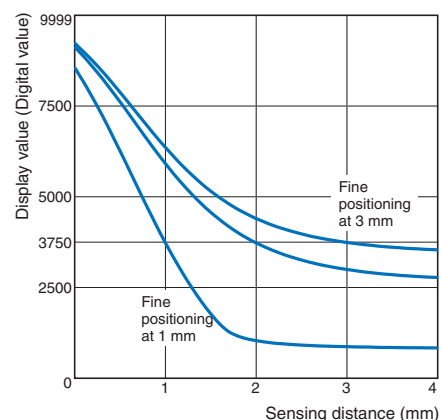
E2NC-EDR6-F



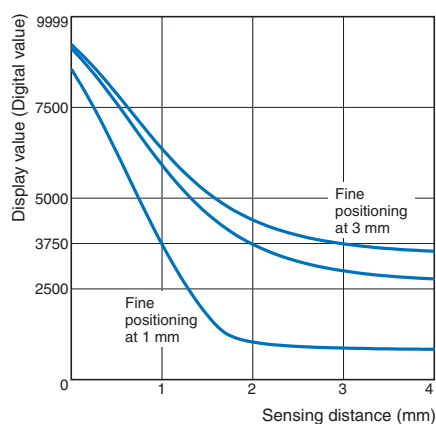
E2NC-ED01(-□)



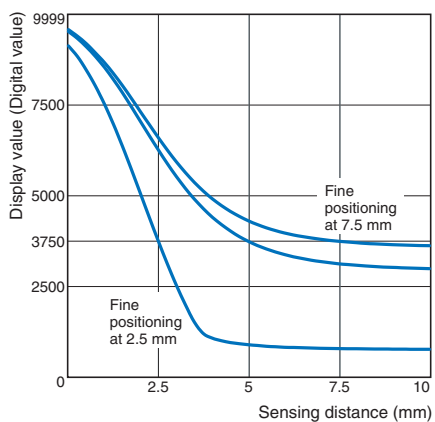
E2NC-ED02(-□)



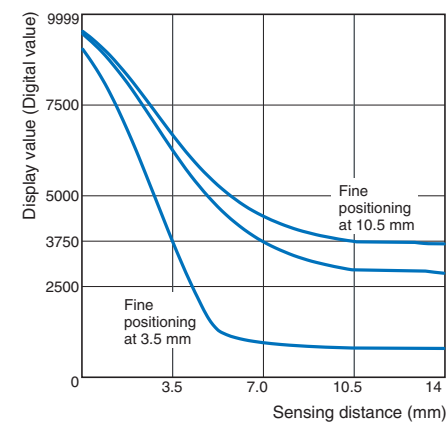
E2NC-EM02(-□)



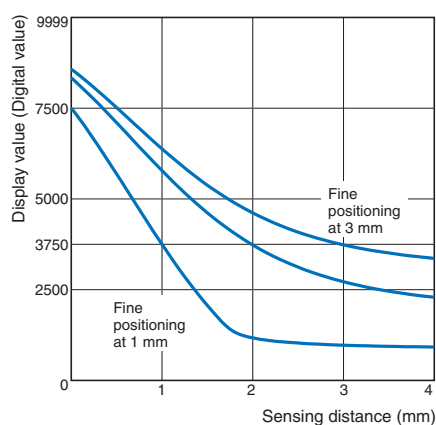
E2NC-EV05(-□)



E2NC-EM07M(-□)

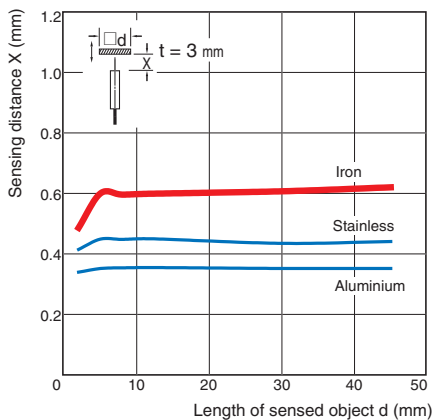


E2NC-EM02H

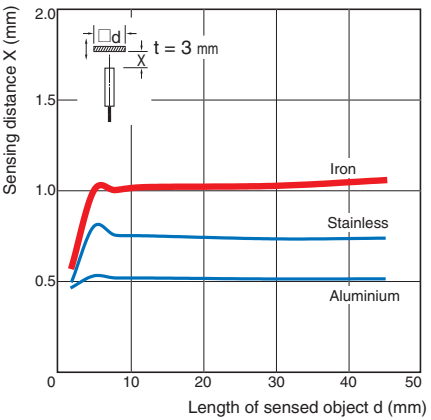


Influence of Sensing Object Size and Material

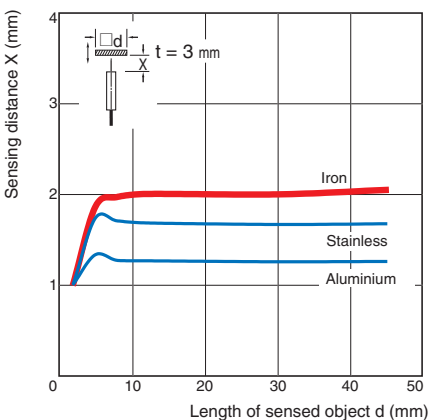
E2NC-EDR6-F



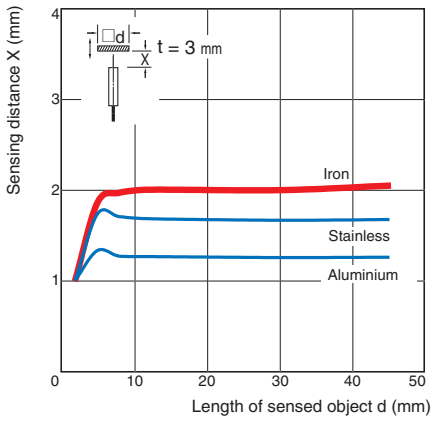
E2NC-ED01(-□)



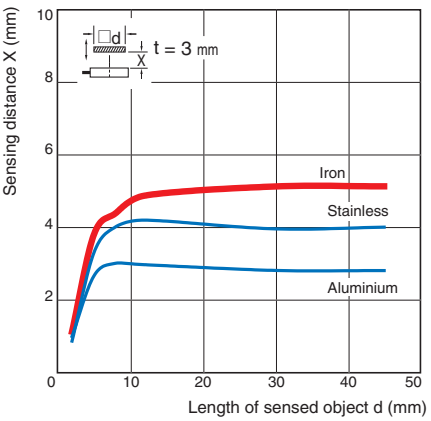
E2NC-EM02(-□)



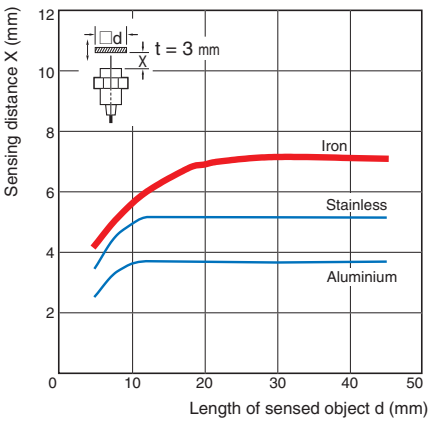
E2NC-ED02(-□)



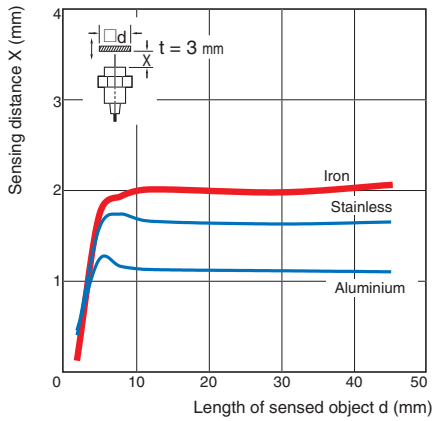
E2NC-EV05(-□)



E2NC-EM07M(-□)



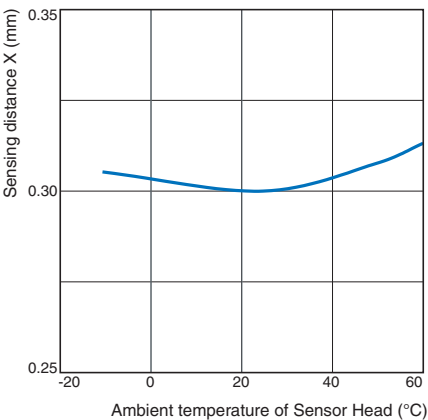
E2NC-EM02H



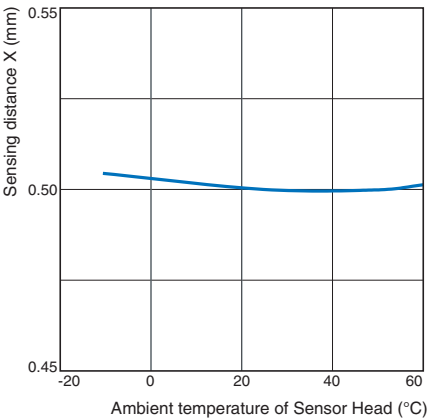


Influence of Sensor Head Temperature

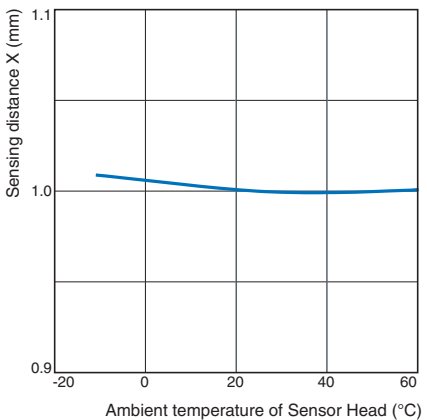
E2NC-EDR6-F



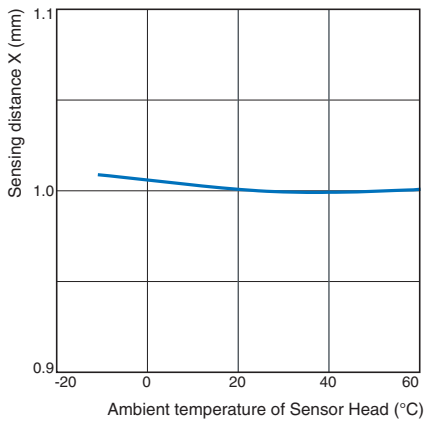
E2NC-ED01(-□)



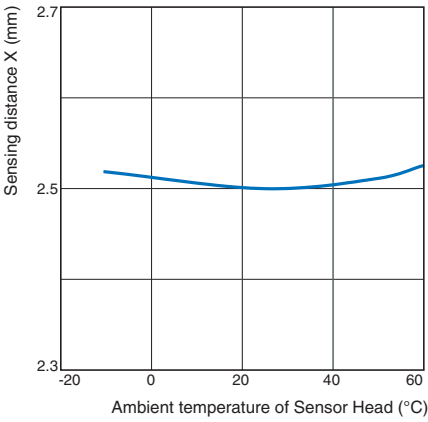
E2NC-ED02(-□)



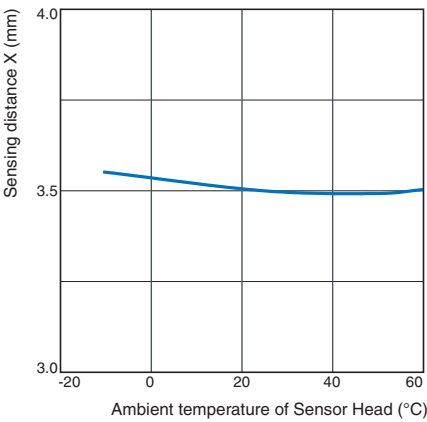
E2NC-EM02(-□)



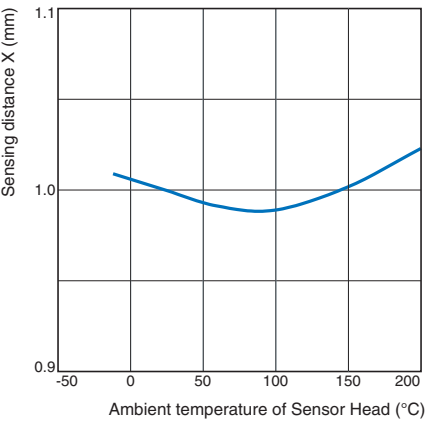
E2NC-EV05(-□)



E2NC-EM07M(-□)



E2NC-EM02H



E2NC Series

I/O Circuit Diagrams

NPN output

Model	Operation mode	Timing charts	NO/NC indicator	Output circuit
E2NC-EA21	NO (Normally open)	<div>ch1/ Incident light</div> <div>ch2 No incident light</div> <div>OUT indicator Lit</div> <div>(orange) Not lit</div> <div>Output transistor ON</div> <div>OFF</div> <div>Load Operate</div> <div>(e.g., relay) Reset</div> <div>(Between brown and black (orange) leads)</div>	NO lit.	
	NC (Normally closed)	<div>ch1/ Incident light</div> <div>ch2 No incident light</div> <div>OUT indicator Lit</div> <div>(orange) Not lit</div> <div>Output transistor ON</div> <div>OFF</div> <div>Load Operate</div> <div>(e.g., relay) Reset</div> <div>(Between brown and black (orange) leads)</div>	NC lit.	
E2NC-EA7TW	NO (Normally open)	<div>ch1/ Incident light</div> <div>ch2 No incident light</div> <div>OUT indicator Lit</div> <div>(orange) Not lit</div> <div>Output transistor ON</div> <div>OFF</div> <div>Load Operate</div> <div>(e.g., relay) Reset</div> <div>(Between brown and black (orange) leads)</div>	NO lit.	
	NC (Normally closed)	<div>ch1/ Incident light</div> <div>ch2 No incident light</div> <div>OUT indicator Lit</div> <div>(orange) Not lit</div> <div>Output transistor ON</div> <div>OFF</div> <div>Load Operate</div> <div>(e.g., relay) Reset</div> <div>(Between brown and black (orange) leads)</div>	NC lit.	
E2NC-EA7	NO (Normally open)	<div>Incident light</div> <div>No incident light</div> <div>OUT indicator Lit</div> <div>(orange) Not lit</div> <div>Output transistor ON</div> <div>OFF</div> <div>Load Operate</div> <div>(e.g., relay) Reset</div> <div>(Between brown and black leads)</div>	NO lit.	
	NC (Normally closed)	<div>Incident light</div> <div>No incident light</div> <div>OUT indicator Lit</div> <div>(orange) Not lit</div> <div>Output transistor ON</div> <div>OFF</div> <div>Load Operate</div> <div>(e.g., relay) Reset</div> <div>(Between brown and black leads)</div>	NC lit.	
E2NC-EA10	NO (Normally open)	<div>Incident light</div> <div>No incident light</div> <div>OUT indicator Lit</div> <div>(orange) Not lit</div> <div>Output transistor ON</div> <div>OFF</div> <div>Load Operate</div> <div>(e.g., relay) Reset</div> <div>(Between brown and black leads)</div>	NO lit.	
	NC (Normally closed)	<div>Incident light</div> <div>No incident light</div> <div>OUT indicator Lit</div> <div>(orange) Not lit</div> <div>Output transistor ON</div> <div>OFF</div> <div>Load Operate</div> <div>(e.g., relay) Reset</div> <div>(Between brown and black leads)</div>	NC lit.	

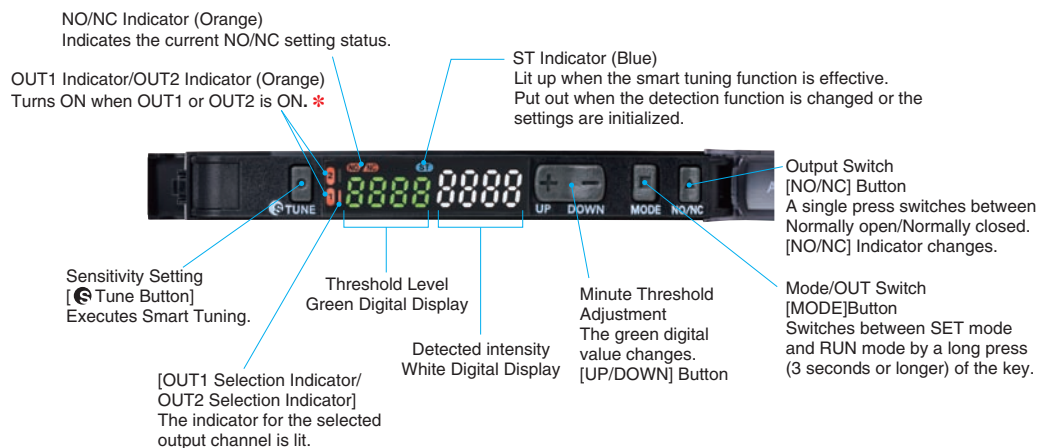
## PNP output

Model	Operation mode	Timing charts	NO/NC indicator	Output circuit
E2NC-EA51	NO (Normally open)	ch1/ Incident light ch2 No incident light OUT indicator (orange) Lit Not lit Output transistor ON OFF Load Operate (e.g., relay) Reset (Between blue and black (orange) leads)	NO lit.	
	NC (Normally closed)	ch1/ Incident light ch2 No incident light OUT indicator (orange) Lit Not lit Output transistor ON OFF Load Operate (e.g., relay) Reset (Between blue and black (orange) leads)	NC lit.	
E2NC-EA9TW	NO (Normally open)	ch1/ Incident light ch2 No incident light OUT indicator (orange) Lit Not lit Output transistor ON OFF Load Operate (e.g., relay) Reset (Between blue and black (orange) leads)	NO lit.	
	NC (Normally closed)	ch1/ Incident light ch2 No incident light OUT indicator (orange) Lit Not lit Output transistor ON OFF Load Operate (e.g., relay) Reset (Between blue and black (orange) leads)	NC lit.	
E2NC-EA9	NO (Normally open)	Incident light No incident light OUT indicator (orange) Lit Not lit Output transistor ON OFF Load Operate (e.g., relay) Reset (Between blue and black leads)	NO lit.	
	NC (Normally closed)	Incident light No incident light OUT indicator (orange) Lit Not lit Output transistor ON OFF Load Operate (e.g., relay) Reset (Between blue and black leads)	NC lit.	
E2NC-EA40	NO (Normally open)	Incident light No incident light OUT indicator (orange) Lit Not lit Output transistor ON OFF Load Operate (e.g., relay) Reset (Between blue and black leads)	NO lit.	
	NC (Normally closed)	Incident light No incident light OUT indicator (orange) Lit Not lit Output transistor ON OFF Load Operate (e.g., relay) Reset (Between blue and black leads)	NC lit.	

# E2NC Series

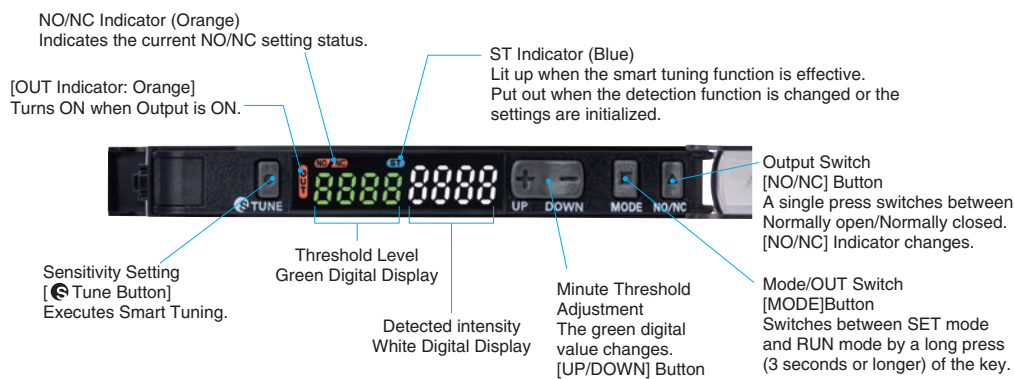
## Nomenclature

### E2NC-EA21/EA51/EA7TW/EA9TW/EA0/EA10/EA40



\* Only OUT1 turns ON for output.


### E2NC-EA7/EA9






## Safety Precautions

Be sure to read the precautions for all models in the website at: <http://www.ia.omron.com/>.

### Warning Indications

 <b>WARNING</b>	<b>Warning level</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.

### Meaning of Product Safety Symbols

	<b>General prohibition</b> Indicates the instructions of unspecified prohibited action.
	<b>Caution, explosion</b> Indicates the possibility of explosion under specific conditions.
	<b>Caution, fire</b> Indicates the possibility of fire under specific conditions.

### WARNING

This product 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 product with voltage in excess of the rated voltage.  
Excess voltage may result in malfunction or fire.



Never use the product with an AC power supply.  
Otherwise, explosion may result.



### Precautions for Safe Use

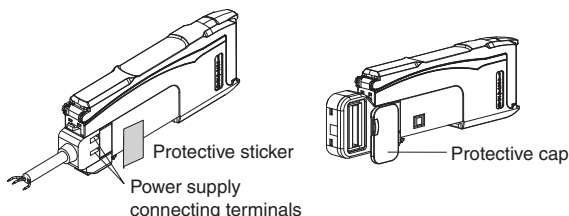
The following precautions must be observed to ensure safe operation of the product. Doing so may cause damage or fire.

- Do not install the product in the following locations.
  - (1) Locations subject to direct sunlight
  - (2) Locations subject to condensation due to high humidity
  - (3) Locations subject to corrosive gas
  - (4) Locations subject to vibration or mechanical shocks exceeding the rated values
  - (5) Locations subject to exposure to water, oil, chemicals
  - (6) Locations subject to steam
  - (7) Locations subject to strong magnetic field or electric field
- Do not use the product in environments subject to flammable or explosive gases.
- Do not use the product in any atmosphere or environment that exceeds the ratings.
- To secure the safety of operation and maintenance, do not install the product close to high-voltage devices and power devices.
- High-voltage lines and power lines must be wired separately from the product. 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. Doing so may cause damage or fire.
- Do not short the load. Doing so may cause damage or fire.
- 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 product if the case is damaged.
- Burn injury may occur. The product 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 product in any way.
- When disposing of the product, treat it as industrial waste.
- Do not use the Sensor in water, rain, or outdoors.
- Process the unwired terminals so as not to contact other wiring or devices.
- Connect the Sensor Head correctly. Otherwise, it might be broken or catch fire.
- If power is supplied from an external power source to the sensor, excessive current flows to this product or sensor, so that the device might be broken or catch fire. Use this product as supplying power from it to the sensor.
- When connecting this device with a sensor, confirm product performance well before using the product.
- When connecting or disconnecting the connector, be sure to turn OFF the power supply first.

## Precautions for Correct Use

### Amplifier Units

- 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).



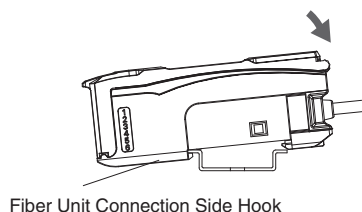
- The length for the cable extension must be 30 m or less. Be sure to use a cable of at least 0.3 mm<sup>2</sup> for extension.
- Do not apply the forces on the cord exceeding the following limits: Pull: 29.4N; torque: 0.1N-m; pressure: 20N; bending: 29.4N
- Always keep the protective cover in place when using the product. Not doing so may cause malfunction.
- It may take time until the measurement value become stable immediately after the power is turned on depending on use environment.
- The Mobile Console E3X-MC11, E3X-MC11-SV2 and E3XMC11-S cannot be connected.
- The Communication Unit E3X-DRT21-S, E3X-CRT and 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, benzine, acetone, and lamp oil for cleaning.
- When using Sensor Heads with free-cut cables, be sure to check the performance and resistance to electronic noise before use for the cable length between Preamplifiers and Amplifier Units.
- The amplifier unit uses EEPROM to save the configuration information. If memory rewrite count exceeds the limit (1,000,000 times), the memory error appears, in which case you must replace the amplifier unit. Memory data rewrite occurs when you perform zero reset, threshold change, tuning and so on.

### Mounting the Amplifier Units

#### Mounting on DIN Track

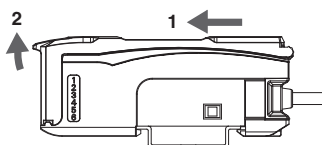
1. Let the hook on the Amplifier Unit's Fiber Unit connection side catch the track.
2. Push the unit until the hook clicks into place.

**Note:** DIN track (PFP-□N) is sold separately.



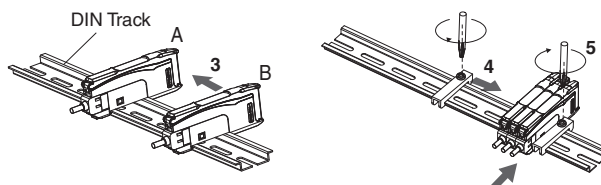
#### Removing from DIN Track

1. Push the unit in the direction 1.
2. Lift the unit in the direction of arrow 2 while performing step (1).



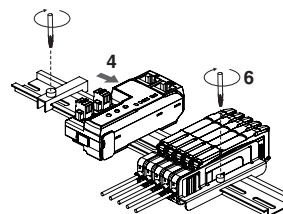
### Joining Amplifier Units

1. Mount the Amplifier Units one at a time onto the DIN track.
2. When using a wire-saving connector, mount the master connector to A and slave connector to B.
3. Slide the Amplifier Unit until the Amplifier Unit is closely attached. (Arrow 3) (For the wire-saving connector type, be sure that a master connector and a slave connector, or a slave connector and a slave connector are connected.)
4. Use End Plates (PFP-M: separately sold) at the both ends of the grouped Amplifier Units to prevent them from separating due to vibration or other cause. (Arrow 4)
5. Tighten the screw on the End Plates using a driver. (Arrow 5)



Tighten the screw while pressing the End Plate.

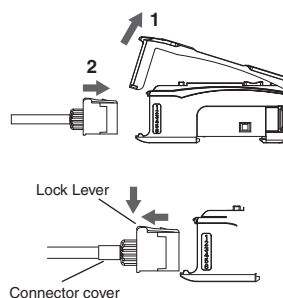
If the Sensor Communications Unit is equipped with a cable, apply the separately sold end plate (E39-EP1) to tighten the screws of it with a screwdriver (Arrow 6).



- Note:** 1. If there is any vibration, use the end plate even for the single body of the Amplifier Unit.
2. To install this device without connecting with the Amplifier Unit, seal the optical communication part on the side with light shielding tape.

### Mounting the Sensor Heads

1. Open the protection cover.
2. Insert the Sensor Head, with the lock lever on its connector area facing upward, all the way into the connector port. To remove it, press and hold the lock lever then pull the Sensor Head out.

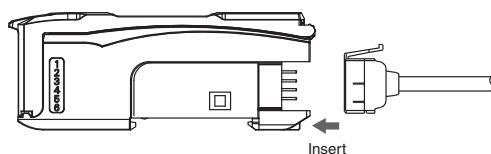


**Note:** Fix the connector part so as not to be exposed to vibration or impact. Be careful with inappropriate connection with another input unit.

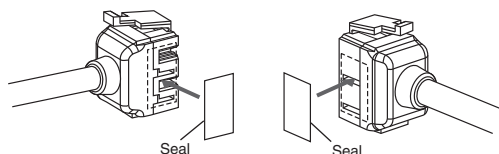
## Amplifier Units with Wire-saving Connectors

### Mounting Connectors

1. Insert the Master or Slave Connector into the Amplifier Unit until it clicks into place.



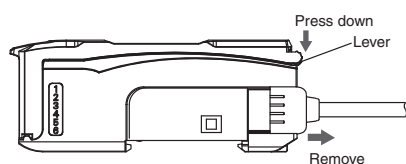
2. Join Amplifier Units together as required after all the Master and Slave Connectors have been inserted.
3. Attach the protector seals (provided as accessories) to the sides of master and slave connectors that are not connected.



**Note:** Attach the stickers to the sides with grooves.

### Removing Connectors

1. Slide the slave Amplifier Unit for which the Connector is to be removed away from the rest of the group.
2. After the Amplifier Unit has been separated, press down on the lever on the Connector and remove it. (Do not attempt to remove Connectors without separating them from other Amplifier Units first.)



## Sensor Heads

- Do not install the Sensor in the following locations.
  - (1) Locations where the ambient temperature exceeds the rated temperature range.
  - (2) Locations subject to rapid changes in temperature (causing condensation).
  - (3) Locations where the relative humidity exceeds the range of 35% to 85%.
  - (4) Locations subject to corrosive or flammable gases.
  - (5) Locations where dust, salt, or metallic powder accumulate on the Sensor.
  - (6) Locations subject to direct vibration or impact.
  - (7) Locations subject to direct sunlight or close to the heating apparatus.
  - (8) Locations subject to exposure to water, oil, chemicals, etc.
  - (9) Locations subject to strong electromagnetic or electrical fields.

### Power Supply and Wiring

- (1) Be sure to connect terminals in correct polarization.
- (2) Separate sensor cord from high voltage or current line.

### Warm-up

The digital display will slowly change until the circuits stabilize after the power is turned ON.

To ensure the product meets the ratings and specifications, leave the device for 30 minutes after the power is turned ON.

### Maintenance and Inspection

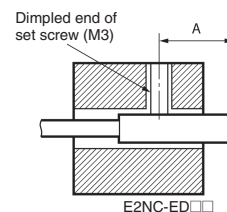
- (1) Be sure to turn OFF the power before adjusting, connecting, or disconnecting the Sensor Head.
- (2) Do not use thinner, benzene, acetone, or lamp oil to clean the Sensor Head or Amplifier Unit.

## Mounting Sensor Heads

### Mounting the Sensor Head

- The mounting dimensions for the cylindrical type(E2NC-ED□□) are shown in the table below.  
Use a tightening torque of 0.2N·m max.

Model	Tightening range A
E2NC-EDR6-F	9 to 18 mm
E2NC-ED01□□	9 to 18 mm
E2NC-ED02□□	11 to 12 mm



- The tightening torque for the threaded type(E2NC-EM□□) are shown in the table below.

Model	Tightening torque
E2NC-EM02□□	15 N·m max.
E2NC-EM07M□□	15 N·m max.
E2NC-EM02H	5.9 N·m max.

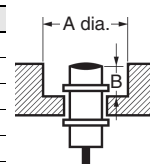
- The tightening torque for the flat type(E2NC-EV□□) is 0.5N·m max.
- The minimum-bending radius of the Sensor Head Cable is R8.

### Influence of Surrounding Metal

- When embedding the Sensor Head within a metal object, allow the following spot facing.

(Units: mm)

Model	Spot facing A	Protrusion B
E2NC-EDR6-F	3	0
E2NC-ED01□□	5.4	0
E2NC-ED02□□	8	0
E2NC-EM02□□	10	0
E2NC-EM07M□□	18	20
E2NC-EV05□□	14 × 30	4.8
E2NC-EM02H	12	0



### Mutual Interference

- When installing two or more Sensor Heads face to face or side by side, ensure that the minimum distances given in the following table are maintained.
- The mutual interference prevention function using optical communications can be used for this sensor by setup of an amplifier unit.  
The installation distance of the Sensor Heads when confirming a mutual interference prevention function is as follows.  
Refer to instruction sheet of an Amplifier Unit for the setting method.



(Units: mm)

Model	Face to face A	Side by side B	When using mutual interference function	
			Face to face A	Side by side B
E2NC-EDR6-F	14	10	3.5	3.1
E2NC-ED01□□	45	20	9	5.4
E2NC-ED02□□	35	30	21	8
E2NC-EM02□□	35	30	21	10
E2NC-EM07M□□	140	120	35	18
E2NC-EV05□□	65	30	21	14
E2NC-EM02H	45	30	21	12

# E2NC Series

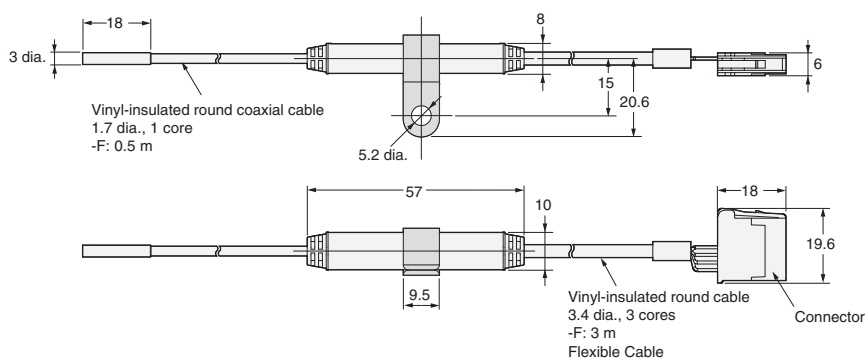
## Dimensions

(Unit: mm)

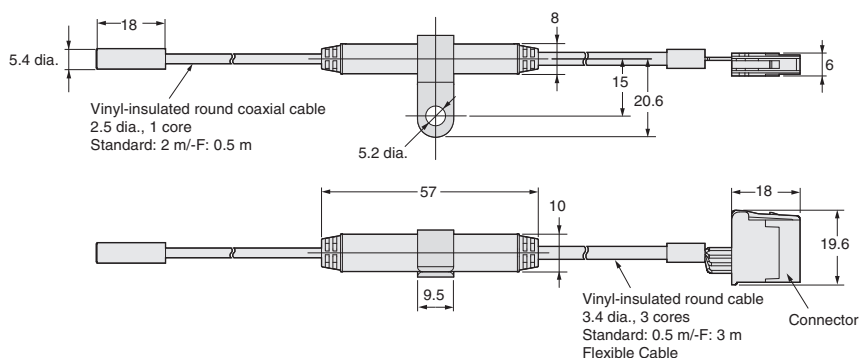
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

## Sensor Heads

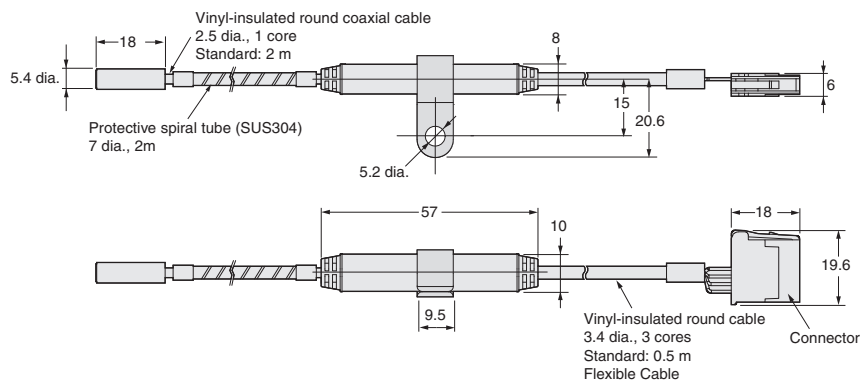
### E2NC-EDR6-F



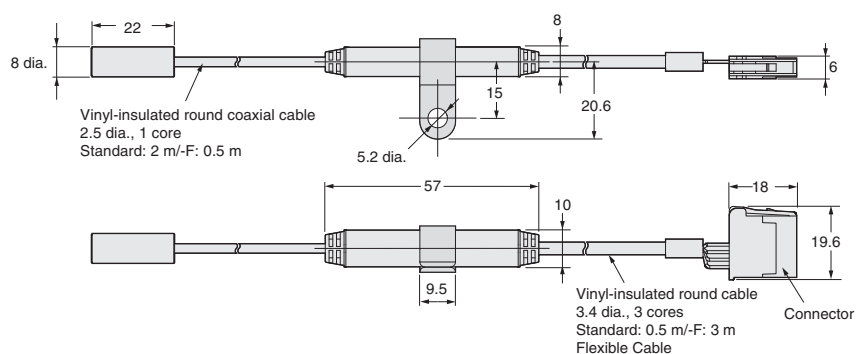
### E2NC-ED01(-F)



### E2NC-ED01-S

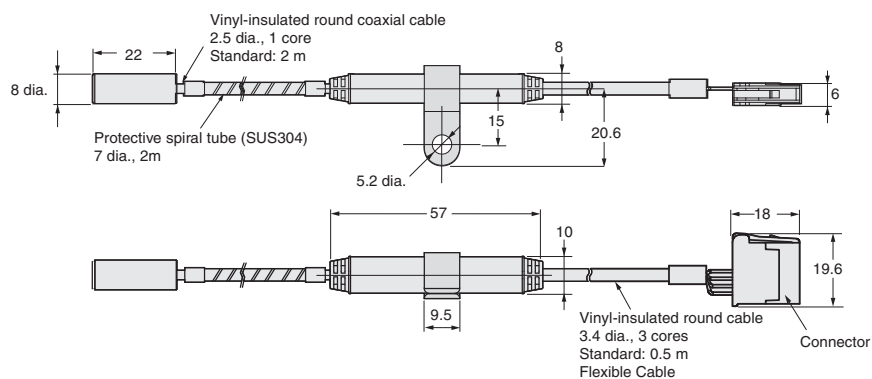


### E2NC-ED02(-F)

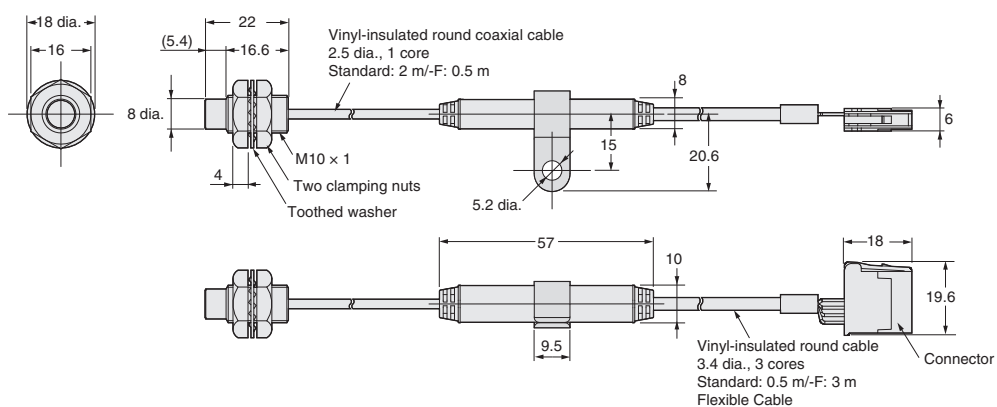




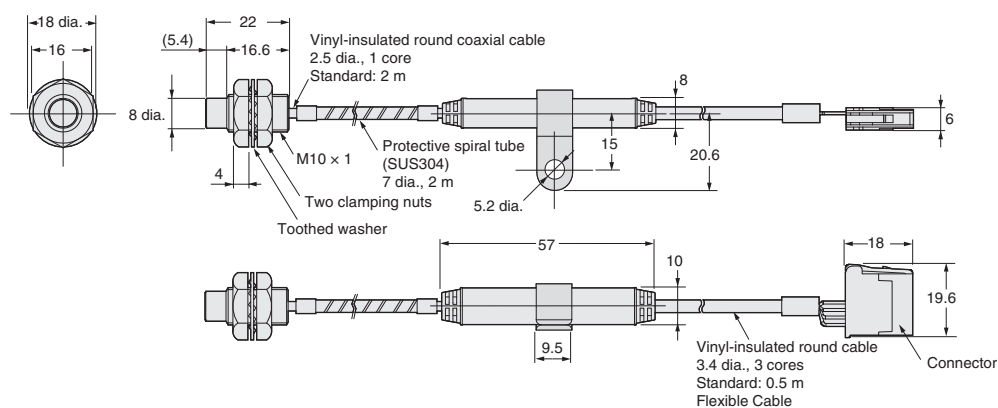
## E2NC-ED02-S



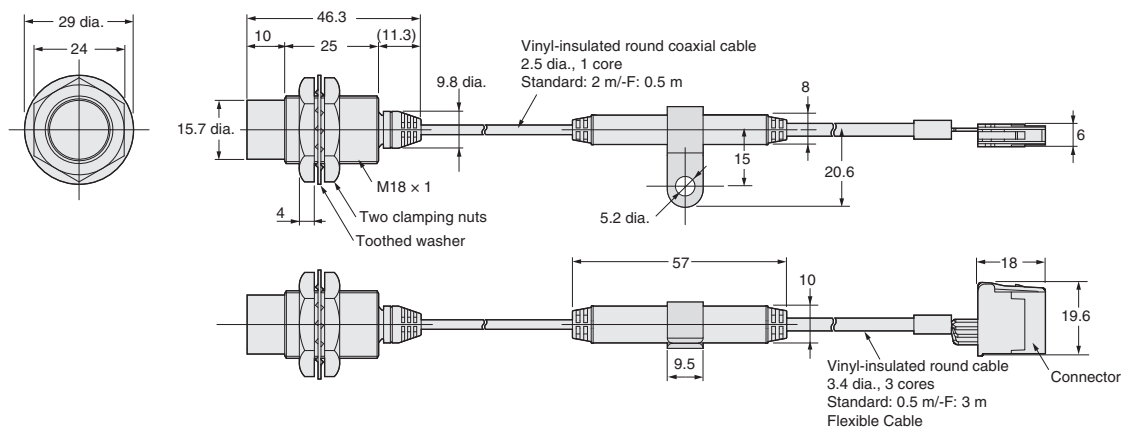
## E2NC-EM02(-F)



## E2NC-EM02-S

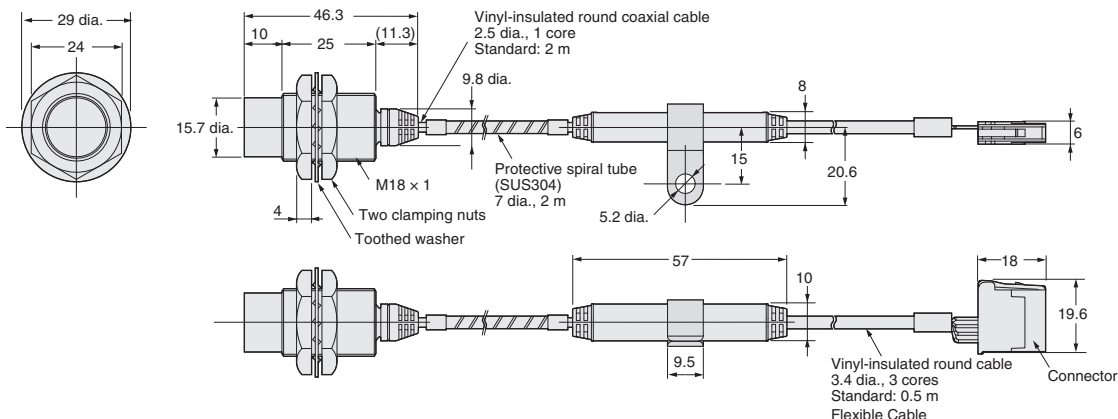


## E2NC-EM07M(-F)

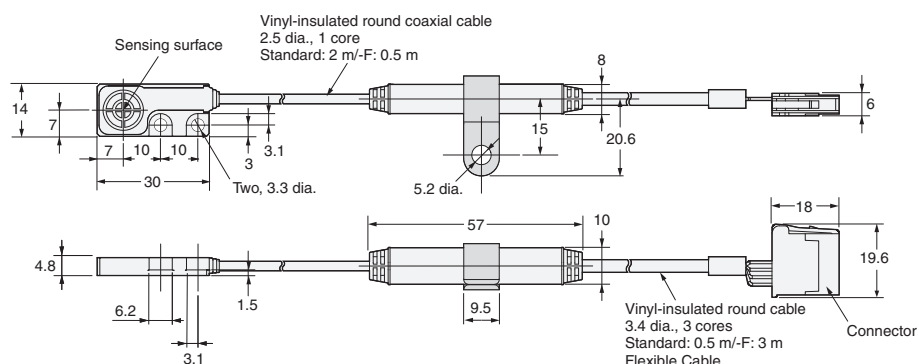
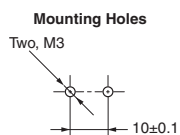


# E2NC Series

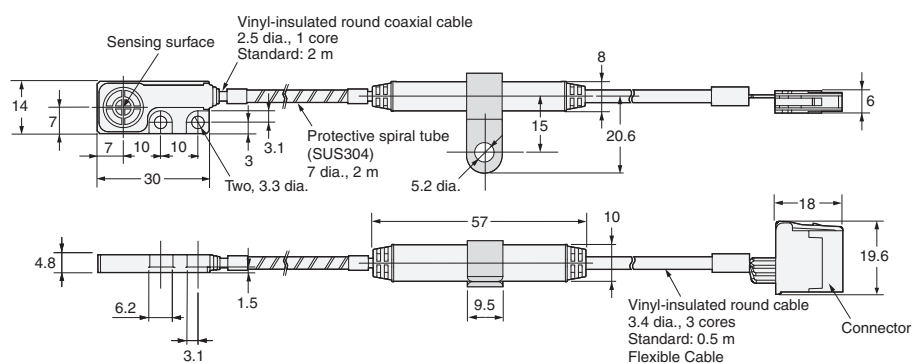
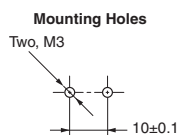
## E2NC-EM07M-S



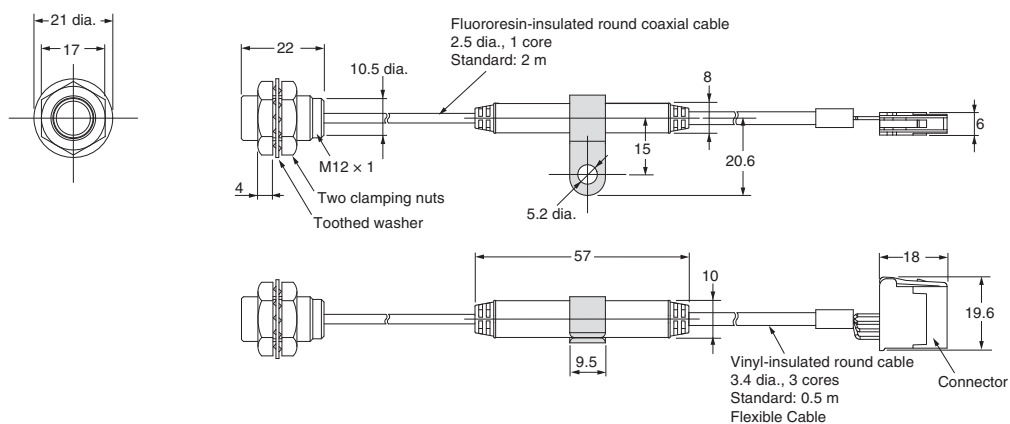
## E2NC-EV05(-F)



## E2NC-EV05-S



## E2NC-EM02H

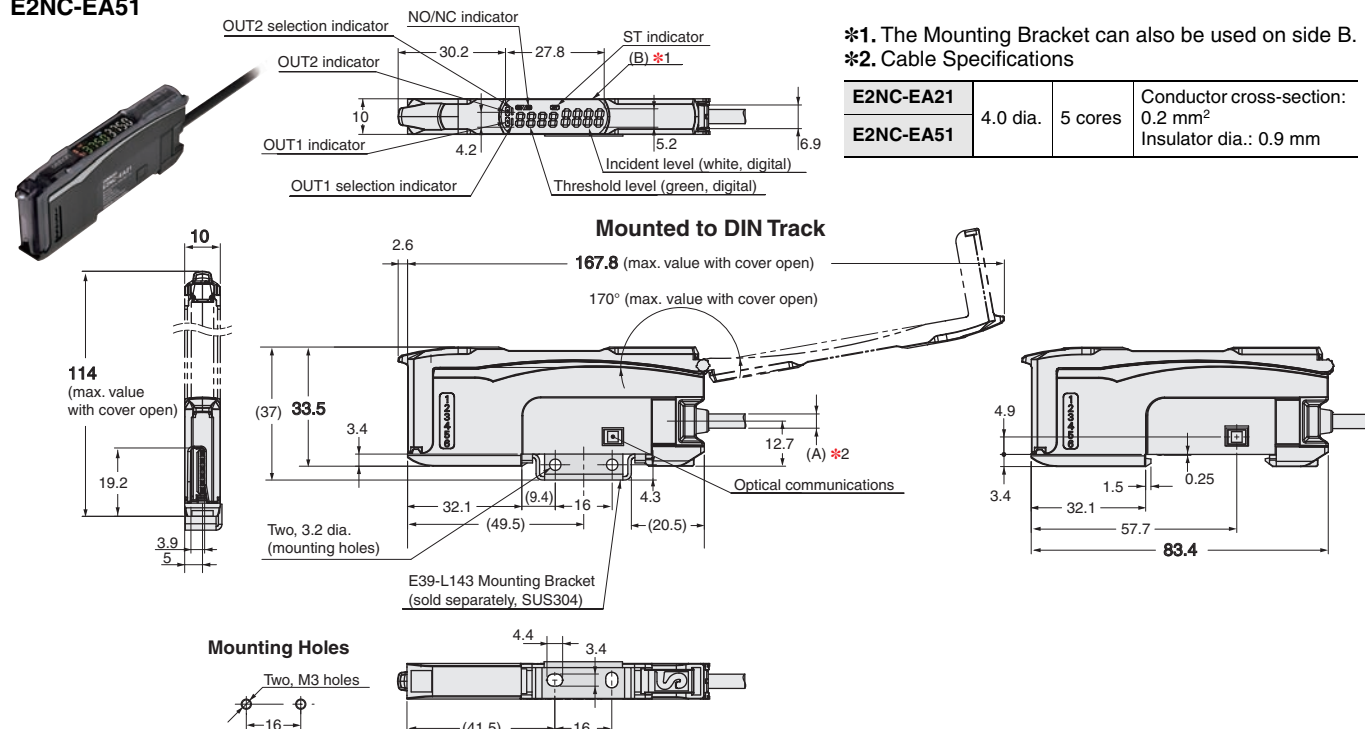


## Amplifier Unit

### Pre-wired Amplifier Units

E2NC-EA21

E2NC-EA51



### Amplifier Units with Wire-saving Connectors

E2NC-EA7TW

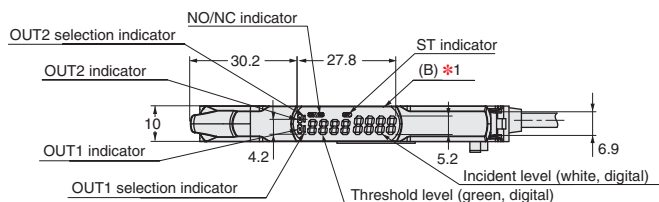
E2NC-EA9TW

E2NC-EA7

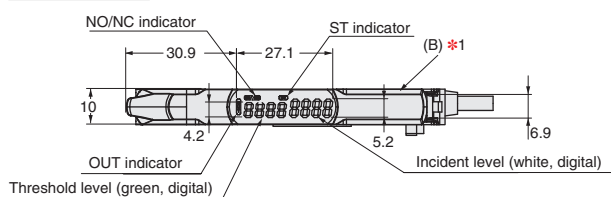
E2NC-EA9



#### E2NC-EA7TW/EA9TW



#### E2NC-EA7/EA9



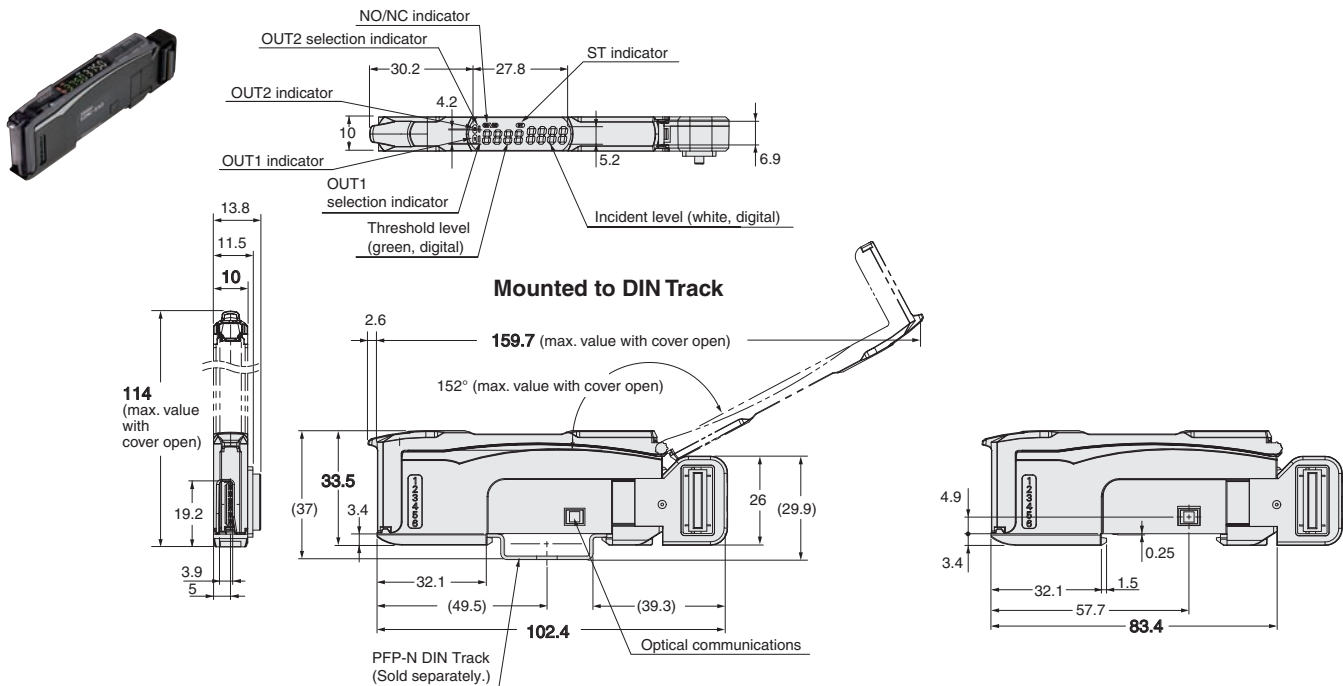
**\*1. The Mounting Bracket can also be used on side B.**

**\*2. Cable Specifications**

E3X-CN12	2.6 dia.	1 core
E3X-CN22		2 cores
E3X-CN11	4.0 dia.	3 cores
E3X-CN21		4 cores

E2NC Series

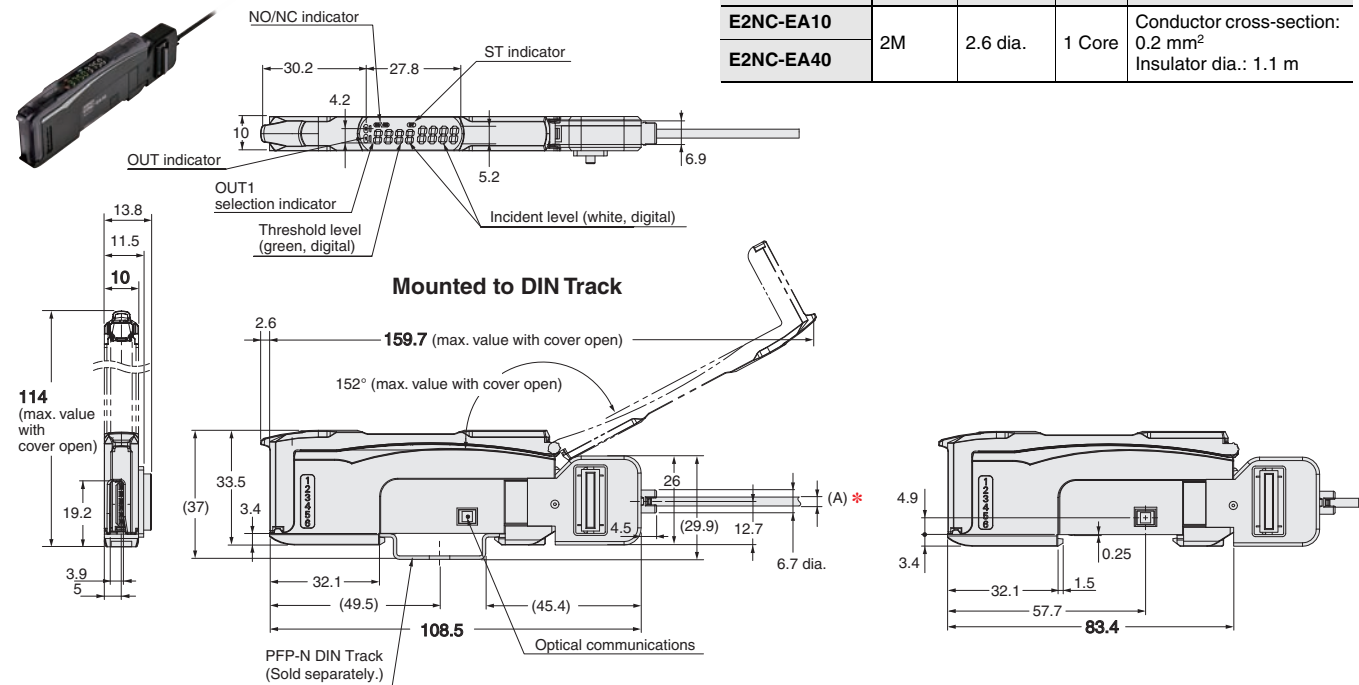
Amplifier Unit with Connector for Sensor Communications Unit  
E2NC-EA0



Amplifier Unit with Connector for Sensor Communications Unit  
(Pre-wired)  
E2NC-EA10  
E2NC-EA40

\* Cable Specifications

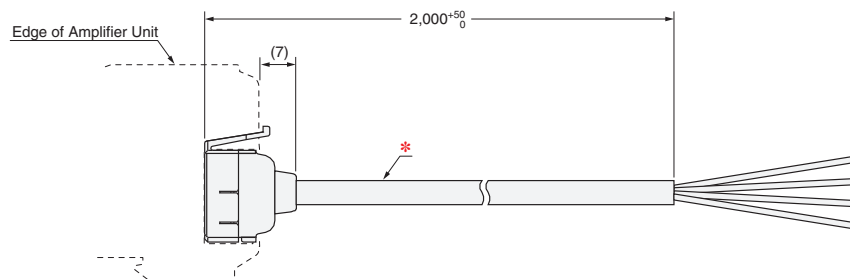
Model	Length	Diameter	Cores	Specifications
E2NC-EA10	2M	2.6 dia.	1 Core	Conductor cross-section: 0.2 mm <sup>2</sup> Insulator dia.: 1.1 m
E2NC-EA40				



## Accessories (Sold Separately)

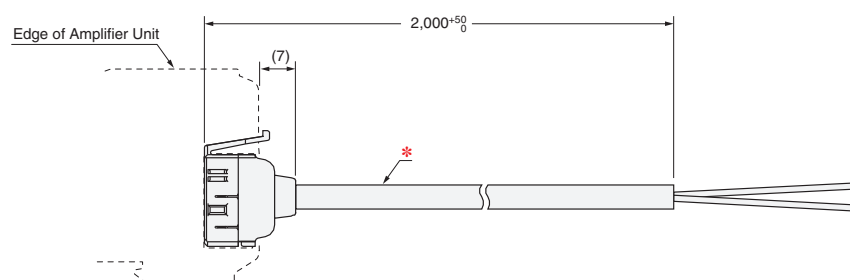
### Wire-saving Connectors

#### Master Connector E3X-CN21



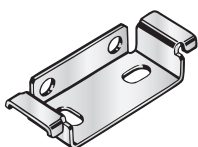
\* E3X-CN21: 4-dia. cable with 4 conductors, Standard cable length: 2 m (Conductor cross-section: 0.2 mm<sup>2</sup> (AWG24), Insulator diameter: 1.1 mm)

#### Slave Connector E3X-CN22

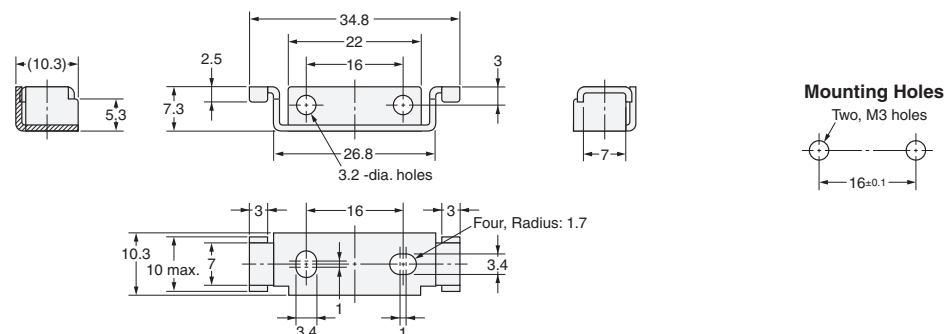


\* E3X-CN22: 4-dia. cable with 2 conductors, Standard cable length: 2 m (Conductor cross-section: 0.2 mm<sup>2</sup> (AWG24), Insulator diameter: 1.1 mm)

#### Mounting Bracket E39-L143



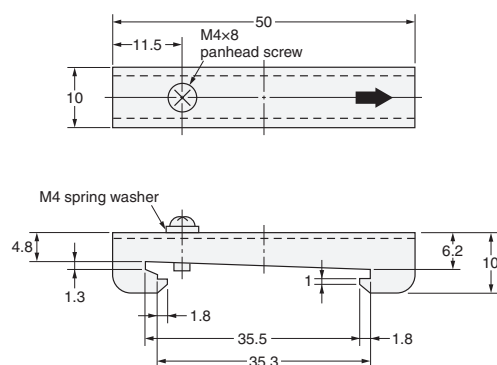
Material: Stainless steel (SUS304)



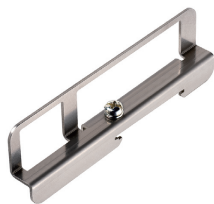
#### End Plate PFP-M



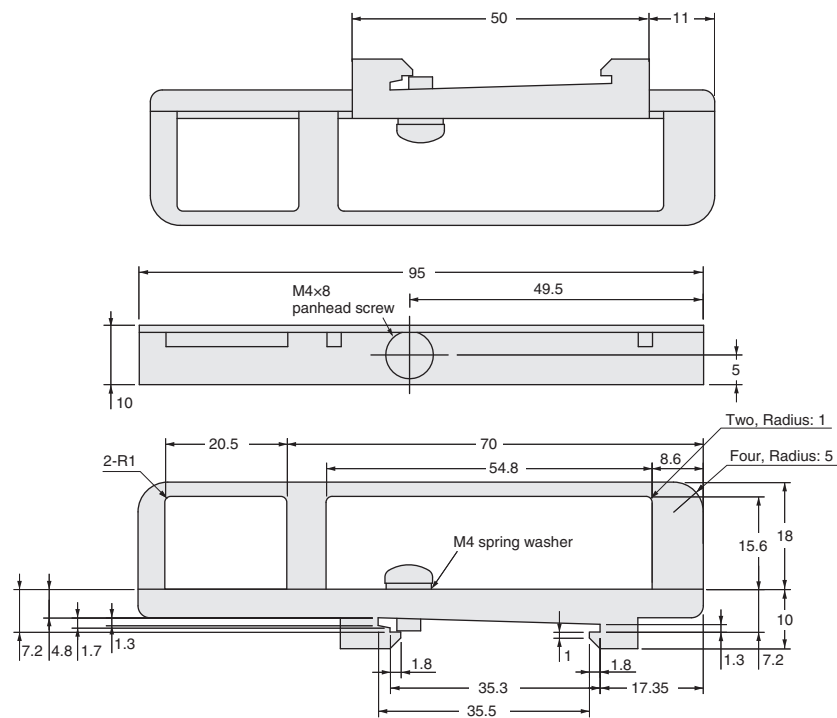
Materials: Iron, zinc plating



End Plate  
E39-EP1



Materials: SUS304 CP



# Terms and Conditions Agreement

## Read and understand this catalog.

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

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- (a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.
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Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

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Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

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