

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.



Refer to the **Safety Precautions** on page 14.

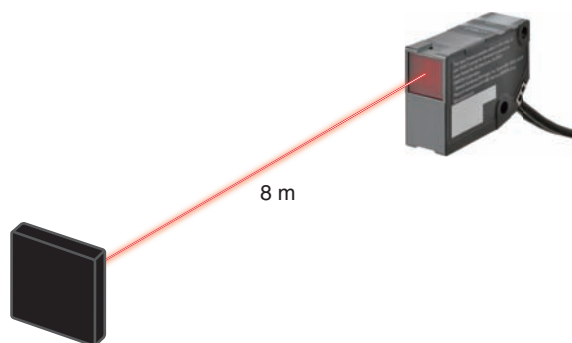


For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Features

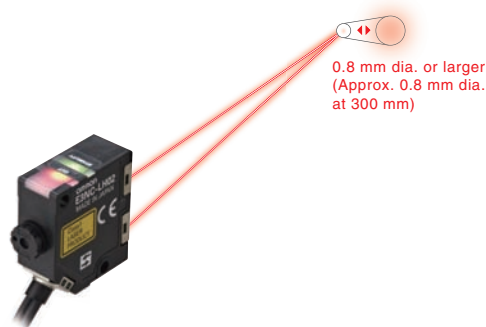
Retro-reflective Models: E3NC-LH03

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



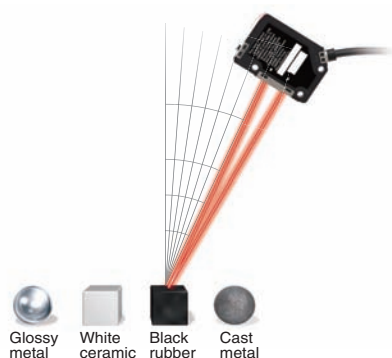
Diffuse-reflective Models: E3NC-LH02 **PAT.P**

- 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.



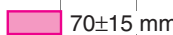
Amplifier Units

- 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
					2 m	E3NC-SH250 2M
			 35 to 100 mm	Class 1	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)

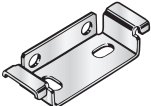
Connectors are not provided with the Amplifier Unit and must be ordered separately.

Size	Cable	Appearance	Cable type	Model
M8	Standard cable	Straight 	2 m	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)

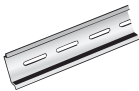
A Mounting Bracket is not provided with the Amplifier Unit. It must be ordered separately as required.

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)

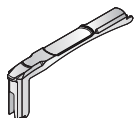
Two End Plates are provided with the Sensor Communications Unit. End Plates are not provided with the Amplifier Unit. They must be ordered separately as required.

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
Item	Model		E3NC-LH03	E3NC-LH03+ E39-P51	E3NC-LH02	E3NC-LH02+ E39-P52	E3NC-LH01
Light source (wavelength)*1			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/s² for 2 hours each in X, Y, and Z directions				
Shock resistance (destruction)			500 m/s² 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/e² (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

		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	
Item		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. 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), 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
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)			
Altitude		2,000 m max.			
Installation environment		Pollution degree 3 (as per IEC 60947-1)			
Insulation resistance		20 MΩ (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 ² for 3 times each in X, Y, and Z directions			150m/s ² for 3 times each in X, Y, and Z directions
Weight (packed state/Amplifier Unit only)		Approx. 115 g/approx. 75 g	Approx. 60 g/approx. 20 g	Approx. 65 g/approx. 25 g	
Materials	Case	Polycarbonate (PC)			
	Cover	Polycarbonate (PC)			
	Cable	Vinyl chloride (PVC)			
Accessories		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
Ambient temperature		Operating: -10 to 55°C; Storage: -25 to 70°C (with no icing or condensation)			
Ambient humidity		Operating/storage: 35% to 85% (with no condensation)			
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude or 100 m/s ² for 2 hours each in X, Y, and Z directions			
Shock resistance (destruction)		500 m/s ² 3 times each in X, Y, and Z directions			
Degree of protection		IEC IP67 (E39-R21 and E39-R22 only)			
Materials		Reflective surface: Methacrylic resin (PMMA) Back surface: Polybutylene terephthalate (PBT)		Methacrylic resin (PMMA)	
Weight (packed state/Reflector only)		Approx. 30 g/approx. 5 g	Approx. 35 g/approx. 10 g	Approx. 26 g/approx. 1 g	Approx. 30 g/approx. 5 g
Accessories		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 μ W) (JIS Class 2, IEC/EN Class 2, and FDA Class 2)	Visible semiconductor laser diode (660 nm), 0.5 mW (average output: 100 μ W) (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 M Ω 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 ² 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/e² (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
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)			
Insulation resistance		20 MΩ (at 500 VDC)			
Altitude		2,000 m max.			
Installation environment		Pollution degree 3 (as per IEC 60947-1)			
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/s² for 3 times each in X, Y, and Z directions			150 m/s² for 3 times each in X, Y, and Z directions
Weight (packed state/Amplifier Unit only)		Approx. 115 g/approx. 75 g	Approx. 60 g/approx. 20 g	Approx. 65 g/approx. 25 g	
Materials	Case	Polycarbonate (PC)			
	Cover	Polycarbonate (PC)			
	Cable	Vinyl chloride (PVC)			
Accessories		Instruction Manual			

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