Distance-settable Photoelectric Sensors

E3AS Series

E3AS Series changes the “way of using” reflective photoelectric sensors

- Complete lineup of photoelectric sensors for various applications
- Teaching method allows anyone to set optimal threshold values
- Antifouling coating prevents contamination on the sensing surface
- Ecolab certified in addition to IP67/69K/67G protection
- All models with IO-Link connectivity (NPN type excluded)

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

⚠ Refer to *Safety Precautions* on page 38.

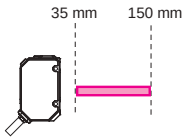
Table of Contents

Ordering Information

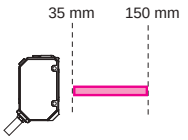
E3AS-HL models [Refer to *Dimensions* on page 40]

Red light

Line beam type

Connection method	Sensing distance (white paper)	Output	Model	
			NPN output	PNP output
		IO-Link baud rate	---	COM3 (230.4 kbps) *3
Pre-wired (2 m) *1			**E3AS-HL500LMN 2M**	**E3AS-HL500LMT 2M**
M8 Connector			**E3AS-HL500LMN M3**	**E3AS-HL500LMT M3**
M12 Pre-wired Smartclick Connector (0.3m) *2			**E3AS-HL500LMN-M1TJ 0.3M**	**E3AS-HL500LMT-M1TJ 0.3M**
Pre-wired (2 m) *1			**E3AS-HL150LMN 2M**	**E3AS-HL150LMT 2M**
M8 Connector			**E3AS-HL150LMN M3**	**E3AS-HL150LMT M3**
M12 Pre-wired Smartclick Connector (0.3m) *2			**E3AS-HL150LMN-M1TJ 0.3M**	**E3AS-HL150LMT-M1TJ 0.3M**

Spot type

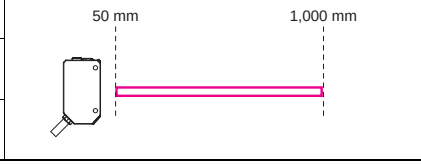
Connection method	Sensing distance (white paper)	Output	Model	
			NPN output	PNP output
		IO-Link baud rate	---	COM3 (230.4 kbps) *3
Pre-wired (2 m) *1			**E3AS-HL500MN 2M**	**E3AS-HL500MT 2M**
M8 Connector			**E3AS-HL500MN M3**	**E3AS-HL500MT M3**
M12 Pre-wired Smartclick Connector (0.3m) *2			**E3AS-HL500MN-M1TJ 0.3M**	**E3AS-HL500MT-M1TJ 0.3M**
Pre-wired (2 m) *1			**E3AS-HL150MN 2M**	**E3AS-HL150MT 2M**
M8 Connector			**E3AS-HL150MN M3**	**E3AS-HL150MT M3**
M12 Pre-wired Smartclick Connector (0.3m) *2			**E3AS-HL150MN-M1TJ 0.3M**	**E3AS-HL150MT-M1TJ 0.3M**

∗1. Models with 5-m cable length are also available with “5M” suffix. (Example: E3AS-HL500MN 5M/E3AS-HL500LMN 5M)
∗2. M8 Pre-wired Connector Models are also availavble. When ordering, add "-M3J 0.3M" to the end of the model number (e.g., E3AS-HL500MN-M3J 0.3M/E3AS-HL500LMN-M3J 0.3M).
∗3. COM2 (38.4kbps) Models are also availavble.

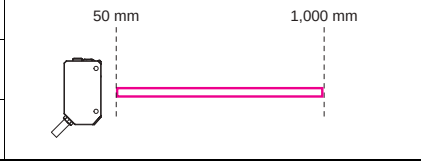
E3AS-F models [Refer to *Dimensions* on page 41]

Infrared light

Metal case type

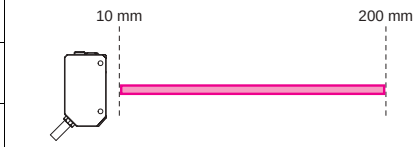
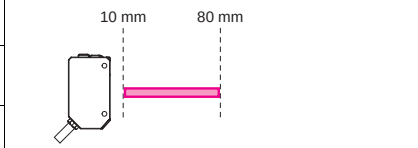
Connection method	Sensing distance (white paper)	Output	Model	
			NPN output	PNP output
		IO-Link baud rate	---	COM3 (230.4 kbps) *3
Pre-wired (2 m) *1			E3AS-F1500IMN 2M	E3AS-F1500IMT 2M
M8 Connector			E3AS-F1500IMN M3	E3AS-F1500IMT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-F1500IMN-M1TJ 0.3M	E3AS-F1500IMT-M1TJ 0.3M
Pre-wired (2 m) *1			E3AS-F1000IMN 2M	E3AS-F1000IMT 2M
M8 Connector			E3AS-F1000IMN M3	E3AS-F1000IMT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-F1000IMN-M1TJ 0.3M	E3AS-F1000IMT-M1TJ 0.3M

Plastic case type

Connection method	Sensing distance (white paper)	Output	Model	
			NPN output	PNP output
		IO-Link baud rate	---	COM3 (230.4 kbps) *3
Pre-wired (2 m) *1			E3AS-F1500IPN 2M	E3AS-F1500IPT 2M
M8 Connector			E3AS-F1500IPN M3	E3AS-F1500IPT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-F1500IPN-M1TJ 0.3M	E3AS-F1500IPT-M1TJ 0.3M
Pre-wired (2 m) *1			E3AS-F1000IPN 2M	E3AS-F1000IPT 2M
M8 Connector			E3AS-F1000IPN M3	E3AS-F1000IPT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-F1000IPN-M1TJ 0.3M	E3AS-F1000IPT-M1TJ 0.3M

E3AS-L models [Refer to *Dimensions* on page 42]

Red light

Connection method	Sensing distance (white paper)	Output	Model	
			NPN output	PNP output
		IO-Link baud rate	---	COM3 (230.4 kbps) *3
Pre-wired (2 m) *1			E3AS-L200MN 2M	E3AS-L200MT 2M
M8 Connector			E3AS-L200MN M3	E3AS-L200MT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-L200MN-M1TJ 0.3M	E3AS-L200MT-M1TJ 0.3M
Pre-wired (2 m) *1			E3AS-L80MN 2M	E3AS-L80MT 2M
M8 Connector			E3AS-L80MN M3	E3AS-L80MT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-L80MN-M1TJ 0.3M	E3AS-L80MT-M1TJ 0.3M

✻1. Models with 5-m cable length are also available with “5M” suffix. (Example: E3AS-F1500IMN 5M/E3AS-F1500IPN 5M/E3AS-L200MN 5M)
✻2. M8 Pre-wired Connector Models are also availavble. When ordering, add "-M3J 0.3M" to the end of the model number (e.g., E3AS-F1500IMN-M3J 0.3M/E3AS-F1500IPN-M3J 0.3M/E3AS-L200MN-M3J 0.3M).
✻3. COM2 (38.4kbps) Models are also availavble.

Ratings and Specifications

E3AS-HL models

Item	Model					
	Sensing method		Triangulation			
		NPN Output	E3AS-HL500MN	E3AS-HL500LMN	E3AS-HL150MN	E3AS-HL150LMN
		PNP Output/COM3	E3AS-HL500MT	E3AS-HL500LMT	E3AS-HL150MT	E3AS-HL150LMT
Sensing distance *1			35 mm to the set distance		35 mm to the set distance	
Setting range *1			35 to 500 mm		35 to 150 mm	
Standard detectable difference *1			35 to 180 mm: 9 mm 180 to 300 mm: 18 mm 300 to 400 mm: 30 mm 400 to 500 mm: 45 mm at 10 m sec		35 to 50 mm: 1 mm 50 to 100 mm: 2 mm 100 to 150 mm: 4 mm at 10 m sec	
Display minimum unit value			1 mm		0.1 mm	
Spot size (reference value) *2			2.5 mm × 1.5 mm at distance of 500 mm	18 mm × 1.5 mm at distance of 500 mm	2.5 mm × 1.3 mm at distance of 150 mm	8 mm × 1.3 mm at distance of 150 mm
Light source (wavelength)			Red laser (660 nm), Class1 (IEC/EN60825-1:2014)			
Power supply voltage			10 to 30 VDC (including 10% ripple (p-p)), Class2			
Current consumption			100 mA max.			
Input/ output	Control output		Load power supply voltage 30 VDC max. (Class2), the total load current of the two outputs is 100 mA max. Residual voltage (Load current 10 mA max.: 1 VDC max., Load current 10 to 100 mA: 2 VDC max.) Open-collector output (NPN/PNP output depending on model) N.O. (Normally Open) / N.C. (Normally Close) selectable			
		NPN	OUTPUT 1: NO (Normally open), OUTPUT 2: NC (Normally closed)			
		PNP/COM3	OUTPUT 1: NO (Normally open)/COM□, OUTPUT 2: NC (Normally closed)			
	External input		Laser OFF / Teaching / Zero reset selectable NPN ON time: 0 V short-circuit or 1.5 V or less, OFF time: Power supply voltage short-circuit or open PNP ON time: Power supply voltage short-circuit or within power supply voltage - 1.5 V, OFF time: 0 V short-circuit or open			
Response time			1.5 ms / 10 ms / 50 ms selectable			
Threshold setting method			Teaching method / Manual Operations / IO-Link communications			
Mutual interference prevention			4 units max. (when using the mutual interference prevention function)			
Ambient illumination			Receiver surface illuminance: Incandescent lamp: 20,000 lx max., Sunlight: 25,000 lx max. at distance of 250 mm Incandescent lamp: 5,000 lx max., Sunlight: 10,000 lx max. at distance of 500 mm		Receiver surface illuminance: Incandescent lamp: 8,000 lx max., Sunlight: 16,000 lx max.	

*1. Measured with OMRON's standard workpiece (White ceramic).
*2. Defined by D4σ method at the maximum sensing distance. Detection 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 spot size, a correct value may not be obtained.

E3AS-F models

Item	Model			
	Sensing method		TOF (Time of flight)	
	Type		Metal case (□: M), Plastic case (□: P)	
		NPN output	E3AS-F1500I□N	E3AS-F1000I□N
		PNP output/ COM3	E3AS-F1500I□T	E3AS-F1000I□T
Sensing distance			50 mm to the set distance (White paper or black paper 200 × 200 mm)	50 mm to the set distance (White paper or black paper 200 × 200 mm)
Setting range			100 to 1,500 mm (White paper 200 × 200 mm) 100 to 1,000 mm (Black paper 200 × 200 mm)	100 to 1,000 mm (White paper 200 × 200 mm) 100 to 500 mm (Black paper 200 × 200 mm)
Spot diameter (reference value)			95 mm dia. (at distance of 1,000 mm)	
Differential travel			15% max. of set distance (Set distance 200 mm min.)	
Reflectivity characteristic (black/white error)			10% max. of set distance (Set distance 200 mm min.)	
Light source (wavelength)			Infrared laser (940 nm) Class1 (IEC/EN60825-1:2014)	
Power supply voltage			10 to 30 VDC (including 10% ripple (p-p)), Class2	
Current consumption			30 mA max.	
Input/ output	Control output		Load power supply voltage: 30 VDC max., Class2, Load current: 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.) Open-collector output (NPN/PNP output depending on model)	
		NPN	OUTPUT 1: NO (Normally open), OUTPUT 2: NC (Normally closed)	
		PNP/COM3	OUTPUT 1: NO (Normally open)/COM□, OUTPUT 2: NC (Normally closed)	
Response time			Operate or reset: 150 ms max.	Operate or reset: 90 ms max.
Threshold setting method			Teaching method/IO-Link communications	
Ambient illumination			Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.	

E3AS-L models

Item \ Model			
Sensing method		Triangulation	
Model	NPN Output	E3AS-L200MN	E3AS-L80MN
Item	PNP Output/COM3	E3AS-L200MT	E3AS-L80MT
Sensing distance		10 mm to the set distance (White paper or black paper 100 × 100 mm)	
Setting range		40 to 200 mm (White paper or black paper 100 × 100 mm)	20 to 80 mm (White paper or black paper 100 × 100 mm)
Spot diameter (reference value)		25 × 25 mm at distance of 200 mm	4 mm dia. (at distance of 80 mm)
Differential travel		10% max. of set distance	White paper: 2% max. of set distance Black paper: 5% max. of set distance
Reflectivity characteristic (black/white error)		10% max. of set distance	5% max. of set distance
Light source (wavelength)		Red LED (624 nm)	Red LED (650 nm)
Power supply voltage		10 to 30 VDC (including 10% ripple (p-p)), Class2	
Current consumption		35 mA max.	
Input/ output	Control output	Load power supply voltage: 30 VDC max., Class2, Load current: 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.) Open-collector output (NPN/PNP output depending on model)	
	NPN	OUTPUT 1: NO (Normally open), OUTPUT 2: NC (Normally closed)	
	PNP/COM3	OUTPUT 1: NO (Normally open)/COM□, OUTPUT 2: NC (Normally closed)	
Response time		Operate or reset: 1 ms max.	
Threshold setting method		Teaching method/IO-Link communications	
Ambient illumination		Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.	

Common to E3AS series

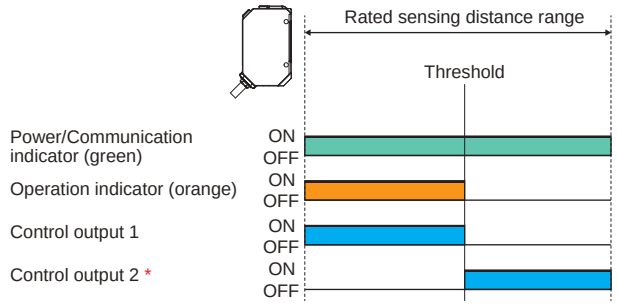
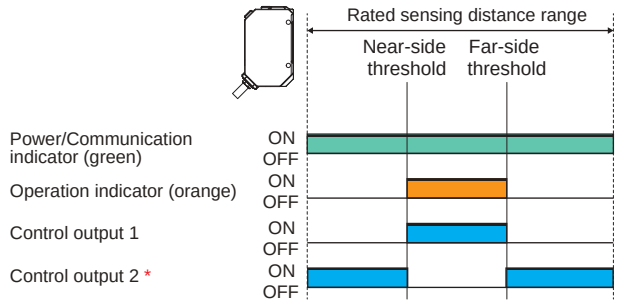
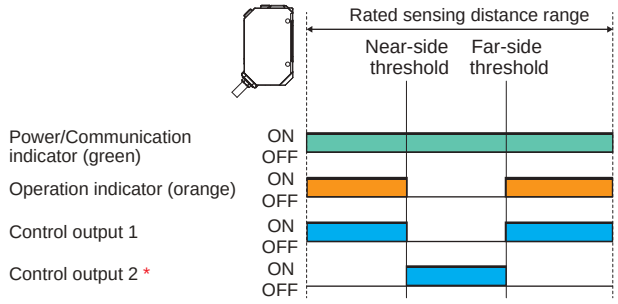
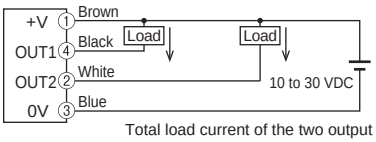
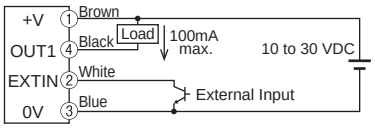
Series		E3AS-HL	E3AS-F	E3AS-L
Protection circuits		Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection		
Ambient temperature range		Operating: -10 to 50°C, Storage: -25 to 70°C (with no icing or condensation)	Operating: -20 to 55°C, Storage: -40 to 70°C (with no icing or condensation)	Operating: -25 to 55°C, Storage: -40 to 70°C (with no icing or condensation)
Ambient humidity range		Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)		
Insulation resistance		20 MΩ min. at 500 VDC		
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min		
Vibration resistance		10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance		500 m/s² for 3 times each in X, Y, and Z directions		
Degree of protection		IP67 (IEC60529) and IP67G *1 (JIS C 0920 Annex 1), IP69K (ISO20653)		
Indicators		OLED Display (White), Power/ Communication indicator (Green*), Operation indicator (Orange) * IO-Link Communication mode: blinking	Operation indicator (orange), Stability & Communication indicator (green*) * IO-Link Communication mode: blinking	
Connection method		Pre-wired (standard cable length: 2 m), M8 Connector, M12 Pre-wired Smartclick Connector (standard cable length: 0.3m)		
Weight (packed state/ Sensor only)	Pre-wired (2 m)	Approx. 180 g/approx. 110 g	Metal case type: Approx. 135 g/approx. 90 g Plastic case type: Approx. 115 g/approx. 70 g	Approx. 135 g/approx. 90 g
	M8 Connector	Approx. 120 g/approx. 50 g	Metal case type: Approx. 75 g/approx. 30 g Plastic case type: Approx. 60 g/approx. 15 g	Approx. 75 g/approx. 30 g
	M12 Pre-wired Smartclick Connector (0.3m)	Approx. 150 g/approx. 80 g	Metal case type: Approx. 95 g/approx. 50 g Plastic case type: Approx. 75 g/approx. 30 g	Approx. 95 g/approx. 50 g
Materials	Case	Stainless steel (SUS316L)	Metal case type: Main unit/mounting part/connector part Stainless steel (SUS316L) Plastic case type: Main unit Polybutylene terephthalate (PBT) / polycarbonate (PC), Mounting part/connector part Nickel-plated brass	Stainless steel (SUS316L)
	Lens cover and Display	Methacrylic resin (PMMA) (Lens cover: Antifouling coating)		
	Indicator	Polyamide 11 (PA11)	Metal case type: Polyamide 11 (PA11) Plastic case type: Polyethersulfone (PES)	Polyamide 11 (PA11)
Main IO-Link functions		Operation mode switching between NO and NC, execution of teaching (2-point teaching, Background teaching), setup of the threshold, timer function of the control output and timer time selecting, Restore Factory Settings, Key Lock (Unlock, Lock, Lock (No Button)), monitor output* (Detection level, Incident light level) * Only for E3AS-HL and E3AS-F		
IO-Link Communication specifications	IO-Link specification	Ver. 1.1		
	Baud rate	COM3 (230.4 kbps)		
	Data length	PD size: 4 bytes, OD size: 1 byte (M-sequence type: TYPE_2_V)		PD size: 1 byte, OD size: 1 byte (M-sequence type: TYPE_2_1)
	Minimum cycle time	COM3: 1.2 ms		
Accessories		Instruction manual, compliance sheet, index list (attached for IO-Link type only) E3AS-HL: FDA certification label and Warning label E3AS-F: FDA certification label Note: Mounting Brackets must be ordered separately.		

✻1. The IP67G is the degree of protection which is defined according to the JIS (Japanese Industrial Standards).
The IP67 indicates the same level of protection as defined by the IEC, and the G indicates that a device has resistance to oil.

I/O Circuit Diagrams/ Timing Charts

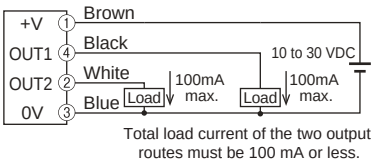
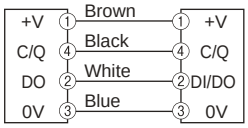
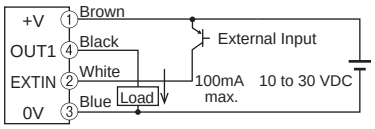
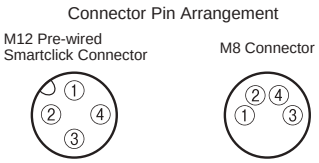
E3AS-HL models

NPN Output

Model	Timing chart	Output circuit
E3AS-HL500□N□ E3AS-HL150□N□	**Single Point Mode [Single]**  **Window BGS mode [Window BGS]**  **Window FGS mode [Window FGS]** 	**Using Pin2 (white wire) as output**  Total load current of the two output routes must be 100 mA or less. **Using Pin2 (white wire) as external input**  **External Input** / **NPN** **ON time** / 0V short-circuit or 1.5V or less **OFF time** / Power supply voltage short-circuit or open Connector Pin Arrangement M12 Pre-wired Smartclick Connector M8 Connector 

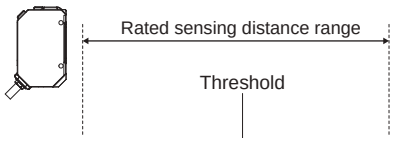
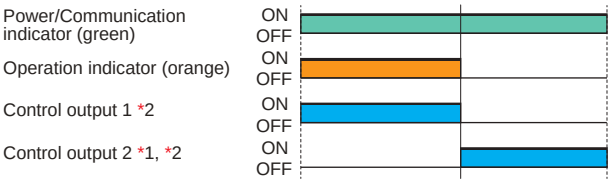
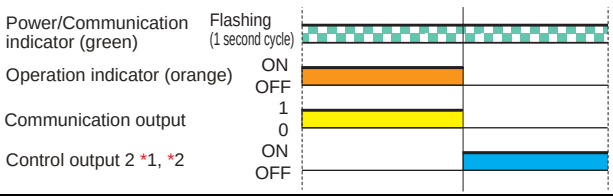
✻The initial value of control output 2 is reverse of control output 1.

PNP Output

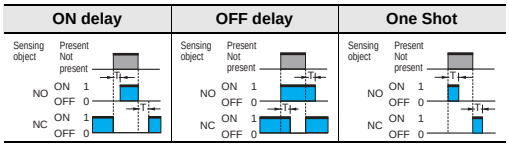
Model	Output circuit	
	Standard I/O mode (SIO mode) *1	IO-Link Communication mode (COM mode) *2
E3AS-HL500□T□ E3AS-HL150□T□	**Using Pin2 (white wire) as output**  Total load current of the two output routes must be 100 mA or less.	**Using Pin2 (white wire) as output** 
	Using Pin2 (white wire) as external input  **External Input** / **PNP** **ON time**: Power supply voltage short-circuit or within power supply voltage - 1.5V **OFF time**: 0V short-circuit or open	---
	Connector Pin Arrangement  	

*1. Standard I/O mode is used as PNP ON/OFF output.
*2. IO-Link Communication mode is used for communications with the IO-Link Master. C/Q performs IO-Link communications. Sensor output DO performs ON/OFF output.

Single Point Mode [Single]

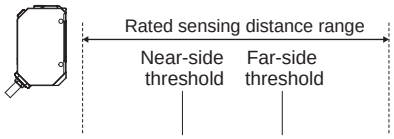
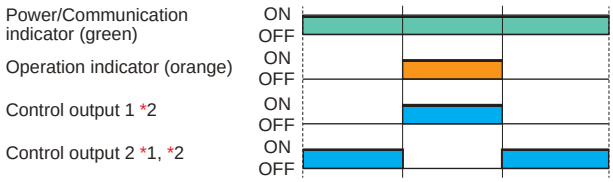
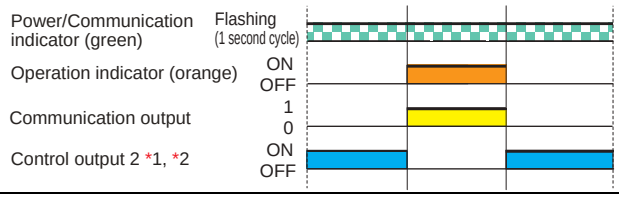
	Timing charts
Output mode	
Standard I/O mode (SIO mode)	
IO-Link Communication mode (COM mode)	

*1. The initial value of control output 2 is reverse of control output 1.
*2. The timer function of the control output can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

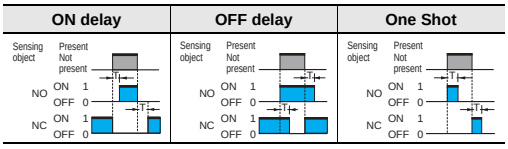


Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).

Window BGS mode [Window BGS]

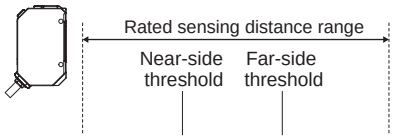
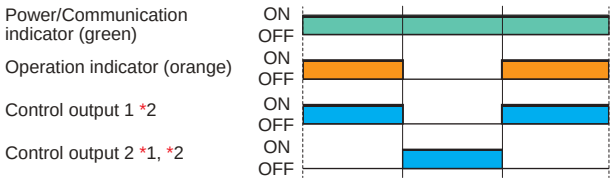
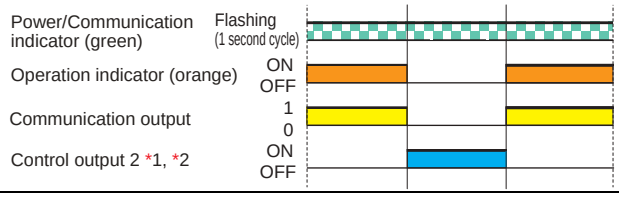
	Timing charts
Output mode	
Standard I/O mode (SIO mode)	
IO-Link Communication mode (COM mode)	

✻1. The initial value of control output 2 is reverse of control output 1.
✻2. The timer function of the control output can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

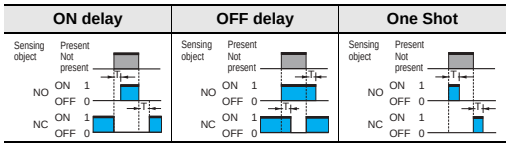


Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).

Window FGS mode [Window FGS]

	Timing charts
Output mode	
Standard I/O mode (SIO mode)	
IO-Link Communication mode (COM mode)	

✻1. The initial value of control output 2 is reverse of control output 1.
✻2. The timer function of the control output can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

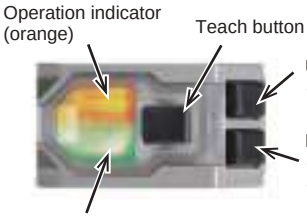


Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).

Note: Shown above are the factory settings. Refer to the index list for the default settings at time of shipment from factory.
PNP/COM output logic can be reversed by IO-Link communication.
The operation indicator (orange) lights up when control output 1 is ON or communication output is 1.

Nomenclature

E3AS-HL500☐
E3AS-HL150☐



UP button
· Changes the threshold value or set value.

DOWN button
· Changes the threshold value or set value.
· To switch between the main screen and menu setting screen, press and hold this button for over 3s.

Threshold value indicator
Displays the set value of the threshold value in [mm] *.

OUT indicator
Displays output state of Control output 1 (Pin4, black wire).

OUT indicator
Displays input/output state of Control output 2 (Pin2, white wire).

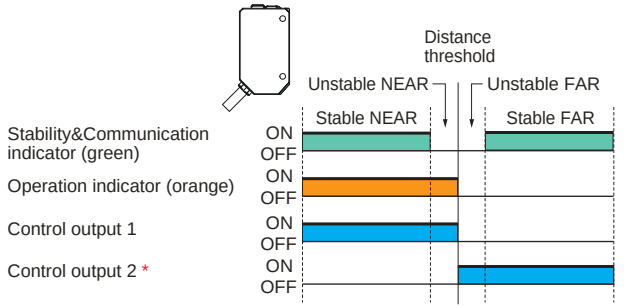
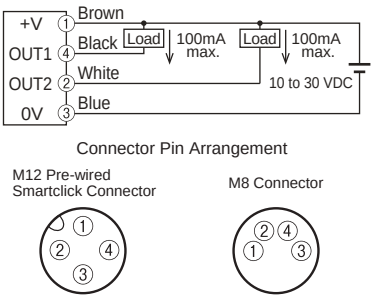
Detected value
Displays the current detected value in [mm] *.

* Reference value

✻ The indicators work differently depending on sensor status.

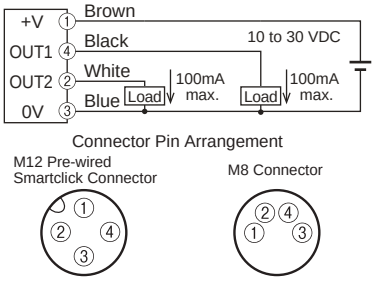
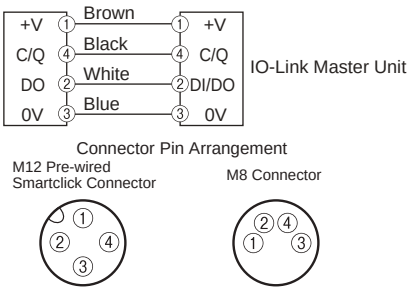
E3AS-F models

NPN Output

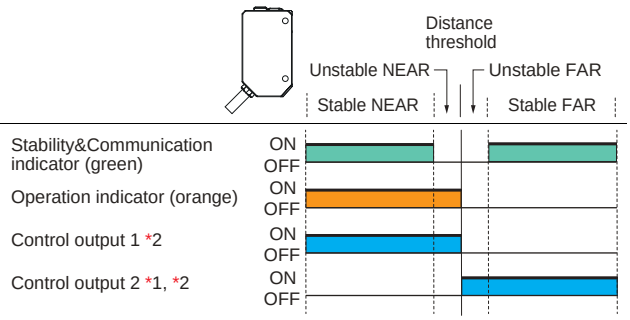
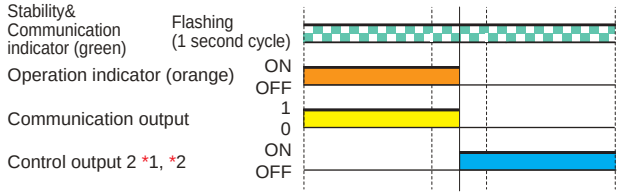
Model	Timing chart	Output circuit
E3AS-F1500I□N□ E3AS-F1000I□N□		

✻ The initial value of control output 2 is reverse of control output 1.

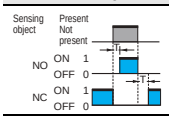
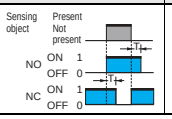
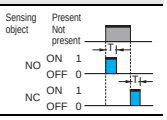
PNP Output

Model	Output circuit	
	Standard I/O mode (SIO mode) *1	IO-Link Communication mode (COM mode) *2
E3AS-F1500I□T□ E3AS-F1000I□T□		

✻**1.** Standard I/O mode is used as PNP ON/OFF output.
✻**2.** IO-Link Communication mode is used for communications with the IO-Link Master. C/Q performs IO-Link communications. Sensor output DO performs ON/OFF output.

Output mode	Timing charts
Standard I/O mode (SIO mode)	
IO-Link Communication mode (COM mode)	

✻**1.** The initial value of control output 2 is reverse of control output 1.
✻**2.** The timer function of the control output can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

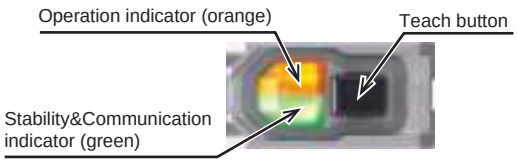
ON delay	OFF delay	One Shot
		

Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).

Note: Shown above are the factory settings. Refer to the index list for the default settings at time of shipment from factory.
PNP/COM output logic can be reversed by IO-Link communication.
The operation indicator (orange) lights up when control output 1 is ON or communication output is 1.

Nomenclature

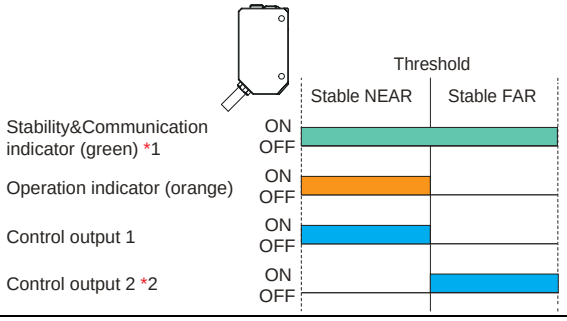
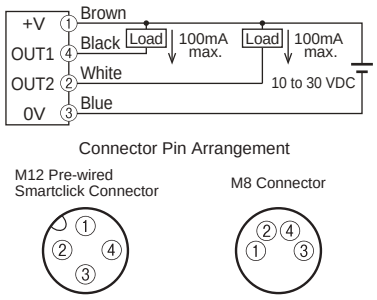
E3AS-F1500□
E3AS-F1000□



Note: The indicators work differently depending on sensor status.

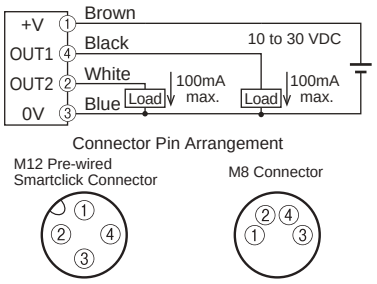
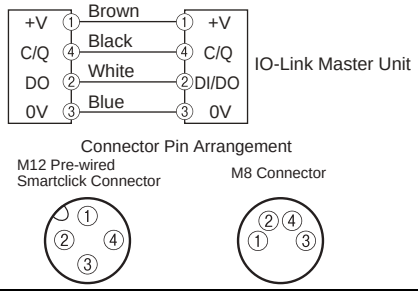
E3AS-L models

NPN Output

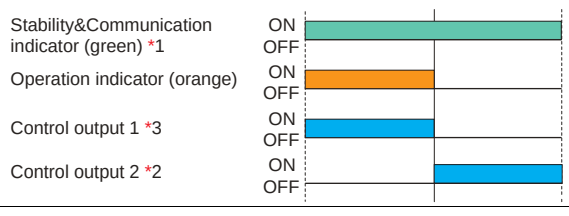
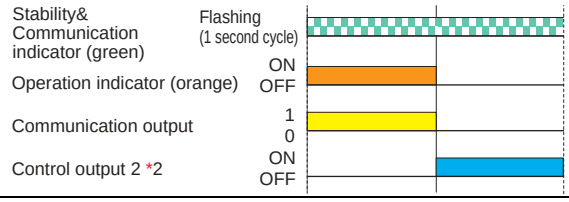
Model	Timing chart	Output circuit
E3AS-L□N		

✻1. Turns off when there is insufficient margin for incident light. In that case, place the workpiece closer to ensure sufficient receiving light intensity.
✻2. The initial value of control output 2 is reverse of control output 1.

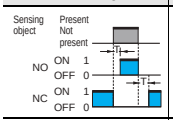
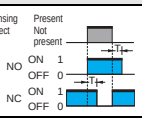
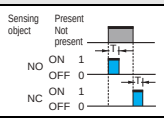
PNP Output

Model	Output circuit	
	Standard I/O mode (SIO mode) *1	IO-Link Communication mode (COM mode) *2
E3AS-L□T		

✻1. Standard I/O mode is used as PNP ON/OFF output.
✻2. IO-Link Communication mode is used for communications with the IO-Link Master. C/Q performs IO-Link communications. Sensor output DO performs ON/OFF output.

Output mode	Timing charts
Standard I/O mode (SIO mode)	
IO-Link Communication mode (COM mode)	

✻1. Turns off when there is insufficient margin for incident light. In that case, place the workpiece closer to ensure sufficient receiving light intensity.
✻2. The initial value of control output 2 is reverse of control output 1.
✻3. The timer function of the control output 2 can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

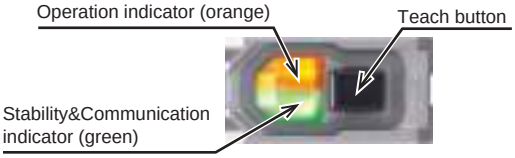
ON delay	OFF delay	One Shot
		

Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).

Note: Shown above are the factory settings. Refer to the index list for the default settings at time of shipment from factory.
PNP/COM output logic can be reversed by IO-Link communication.
The operation indicator (orange) lights up when control output 1 is ON or communication output is 1.

Nomenclature

E3AS-L200□
E3AS-L80□



Note: The indicators work differently depending on sensor status.