

OMRON

Model **E3AS-HL150** ☐ / **HL500** ☐

CMOS Laser Sensor

INSTRUCTION SHEET

Thank you for selecting OMRON product. This sheet primarily describes precautions required in installing and operating the product.
Before operating the product, read the sheet thoroughly to acquire sufficient knowledge of the product. For your convenience, keep the sheet at your disposal.

TRACEABILITY INFORMATION:

Importer in EU:
Omron Europe B.V.
Wegalaan 67-69
NL-2132 JD Hoofddorp,
The Netherlands

Manufacturer:
Omron Corporation,
Shiokoji Horikawa, Shimogyo-ku,
Kyoto 600-8530 JAPAN

The following notice applies only to products that carry the CE mark.
Notice:

This is a Class A product. In residential areas it may cause radio interface, in which case the user may be required to take adequate measures to reduce interference.

© OMRON Corporation 2020 All Rights Reserved.



* 5 6 0 3 2 5 2 - 0 A *

PRECAUTIONS ON SAFETY

● Meaning of Signal Words



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.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.



This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purpose.



Do not use the product with voltage in excess of the rated voltage. Excess voltage may result in malfunction or fire.



Its component may be damaged and/or degree of protection may be degraded. Please do not apply high pressure water intensively at one place during cleaning.



To safely use laser products



Looking into the Outgoing light continuously may cause visual impairment. Do not look directly into the Outgoing light.
Caution-Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure
Attention-L'utilisation des commandes ou réglages ou l'exécution des procédures autres que celles spécifiées dans les présentes exigences peuvent être la cause d'une exposition à un rayonnement dangereux



Do not disassemble this product. Doing so may cause exposure to the built-in light source which can damage eyes and skin. Never disassemble it.



Laser safety measures for laser equipment are stipulated in Japan and other countries. For usage in Japan and for export to other countries combined with other products, follow the instructions described below categorized in four cases respectively.

1. Usage in Japan

The JIS C6802:2014 standard stipulates the safety precautions that users must take according to the class of the laser product. This product is classified into class 1 defined by this standard.

2. Usage in U.S.

When this product is installed in a device and exported to the U.S., it is subjected to the U.S. FDA (Food and Drug Administration) laser regulations. This product is classified into Class 1 by the IEC 60825-1:2014 standard according to the provisions of Laser Notice No. 56 of the FDA standard. This product is already reported to CDRH (Center for Devices and Radiological Health).

Accession Number: 1920014-001

Because the product is small, we can not attach an FDA certification label on the main body, so we enclose it in the packing box. When exporting a device equipped with the product to the U.S., attach an FDA certification label near the sensor mounted on customer equipment.

This laser product complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2018.
OMRON Corporation
Shiokoji Horikawa, Shimogyo-ku,
Kyoto 600-8530 JAPAN
Place of manufacture:
Shanghai Factory, OMRON Corp.
Manufactured in

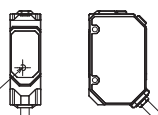
FDA certification label

3. Usage in China

This product is classified into Class 2 by the GB7247.1:2012(IEC60825-1:2007) standard. When exporting a device equipped with the product to the China, attach a Warning label near the sensor mounted on customer equipment.



Center of laser projection



4. Usage in countries other than U.S. and China.

This product is classified into Class 1 by the IEC/EN 60825-1:2014 standard.

Precautions for Safe Use

Please observe the following precautions for safe use of the products.

- Do not reverse connection of DC power supply polarity. Do not connect to AC power supply.
- Do not short-circuit the load.
- Never use this product with AC power supply. Otherwise it may explode.
- The maximum power supply voltage is 30 VDC. Before turning on the product's power, make sure that the supply voltage does not exceed the maximum power supply voltage.
- Do not use the product in environments where flammable or explosive gases are present.
- Please assess the safety beforehand when using the product in chemicals and/or oil environments.
- Do not remodel the product.

Precautions for Correct Use

- Do not hit the product using a hammer for installation.
- The product must be installed with the specified torque or less. For M8 connector and Pre-wired M8 connector the proper tightening torque is from 0.3 to 0.4 N×m. In case of M12 smartclick connector, manually tighten the connector.
- Tightening torque for the mounting hole is 0.6 N×m or less (M3 screw).
- Do not use the product in ambient atmosphere or environment exceeding the rating.
- Output pulses may be generated when the power is turned off. It is recommended to turn off the power of the load or load line first.
- The extension of the cord under the standard I/O mode should be 100m or less. Under the IO-Link mode, the length should be 20m or less.
- Do not pull the cord too strongly.
- Please wait for at least 1000 ms after turning on the product's power until it is available for use.
- The product is rated as IP67 but please avoid using the product underwater, under rain, and outdoors.
- If wiring product's cables and/or cords in the same piping or duct of high voltage cables or power lines may cause malfunction or breakdown due to induced noise. In principle the cables and cords of the product must be separately wired from the power lines, or otherwise shielded.
- Do not use the product in direct sunlight.
- Do not use the product where humidity is high and dew condensation may occur.
- Do not use the product where corrosive gases may exist.
- If high-pressure washing water and so on hits the button, it might lead to malfunctioning. So, consider use of the key lock function.
- Do not apply high-pressure washing water directly to the sensor's light emitting / receiving surface from a short distance. As the antifouling feature may be impaired, keep a sufficient distance from the light emitting / receiving surface.
- Do not use the product at a location subject to shock or vibration.
- To use a commercially available switching regulator, FG (frame ground) must be grounded.
- This product cannot be used as a detection device for human body protection.
- Do not use organic solvents (e.g. paint thinner and alcohol) for cleaning. Otherwise optical properties and protective structure may deteriorate.
- Be sure to check the influence caused by surrounding environments such as background objects and/or LED lighting before using the product.
- Measurement is not possible or the object cannot be measured correctly depending on the material/shape of the object (for example, transparent member, too little reflective material, an object with a diameter smaller than the spot diameter, an object with a large curvature, or a much inclined object).

- Dispose in accordance with applicable regulations.

Package contents

Instruction sheet (this sheet), compliance sheet, index list (attached for IO-Link type only), FDA certification label, Warning label

1 Specification

1-1 Ratings and Specifications

Sensing method		Triangulation			
Model	NPN output	E3AS-HL500MN□ series	E3AS-HL500LMN□ series	E3AS-HL150MN□ series	E3AS-HL150LMN□ series
	PNP output/COM2	E3AS-HL500MD□ series	E3AS-HL500LMD□ series	E3AS-HL150MD□ series	E3AS-HL150LMD□ series
	PNP output/COM3	E3AS-HL500MT□ series	E3AS-HL500LMT□ series	E3AS-HL150MT□ series	E3AS-HL150LMT□ series
Sensing distance		35 to 500mm		35 to 150mm	
Standard detectable level difference*1		35 to 180mm: 9mm 180 to 300mm: 20mm 300 to 400mm: 30mm 400 to 500mm: 45mm at 10msec		35.0 to 50.0mm: 1mm 50.0 to 100.0mm: 2mm 100.0 to 150.0mm: 3mm at 10msec	
Display resolution		1mm		0.1mm	
Spot diameter (reference value)*2		4.5mm×2mm at distance of 500mm	18mm×2mm at distance of 500mm	3.5×1.5mm at distance of 150mm	6mm×1.5mm at distance of 150mm
Light source		Red laser (660nm) (IEC/EN60825-1:2014)			
Power supply voltage		10 to 30 VDC, (including ripple (p-p) 10%), Class2			
Consumption current		100mA max.			
Control Output		Load power supply voltage: 30VDC max., Class2, Load current: 100mA max. (Residual voltage: Load current less than 10mA: 1V max. Load current 10mA to 100mA: 2V max.) NO(Normally Open) / NC(Normally Close) selectable			
External Input		Laser off / Teaching / Zero reset selectable			
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection, and Reversed output polarity protection			
Indicator		OLED Display(White), Power/Communication indicator (Green), Operation indicator (Orange)			
Response time		1.5ms / 10ms / 50ms selectable			
Mutual interference prevention		4 units (when using the interference prevention function)			
Ambient illumination		Illumination on received light surface: Incandescent lamp: 20,000 lx max., Sunlight: 25000 lx max. at distance of 250mm Incandescent lamp: 8,000 lx max., Sunlight: 16000 lx max. at distance of 500mm		Illumination on received light surface: Incandescent lamp: 8,000 lx max., Sunlight: 16,000 lx max.	
Ambient temperature range		Operating: -10 to +50°C (with no icing or condensation) Storage: -25 to +70°C (with no icing or condensation)			
Ambient humidity range		Operating: 35 to 85%RH, Storage: 35~95%RH (with no condensation)			
Insulation resistance		20 MΩ min. at 500 VDC			
Dielectric strength		1,000 VAC at 50 / 60 Hz for 1 minute			
Vibration resistance		Destruction: 10 to 55 Hz, 1.5mm 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			
Enclosure ratings		IP67 (IEC60529), IP69K (ISO20653)			
Size		Pre-wired Type:48.6×30.4×15.5, Connector Type:47.1×28.9×15.5			
Material	Case	SUS316L			
	Indicator	Polyamide 11 (PA11)			
	Lens Cover	Methacrylic resin (PMMA)			
Communication specifications	IO-Link specification	Ver1.1			
	Baud rate	COM3:230.4kbps, COM2:38.4kbps			
	Data length	PD size: 4byte, OD size: 1byte (M-sequence type: TYPE_2_V)			
	Minimum cycle time	COM3: 1.2ms, COM2: 3.5ms			

*1 Measured with OMRON's standard workpiece (White ceramic).

*2 Defined at the 4σ of the central intensity at the maximum sensing 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 spot size, a correct value may not be obtained.

*3 Altitude: Up to 2000m, Pollution degree: 3, Enclosure type: Type1.

1-2 Model standard

E3AS-HL□□□M□□□
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

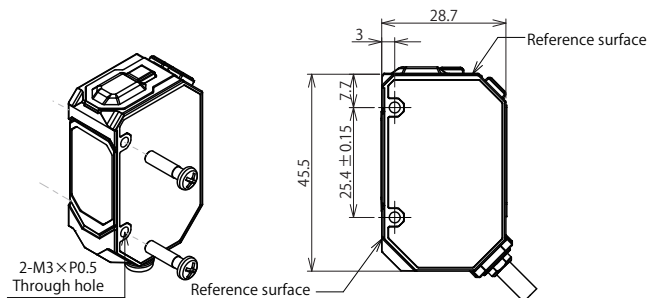
Mark	Specification	Mark	Specification
①	HL	⑦	Blank
②	500	- M1TJ	Pre-wired
③	150	- M3J	Pre-wired M12 Smartclick Connector
④	Blank	M3	Pre-wired M8 Connector
⑤	L	⑧	—
⑥	Blank	Blank	M8 Connector
⑦	M	2M	2m
⑧	N	5M	5m
⑨	D	0.3M	0.3m
	T		

2 Installation

2-1 Installation of the sensor

<Size of installation holes (Unit: mm)>

←Direction toward emitter/receiver



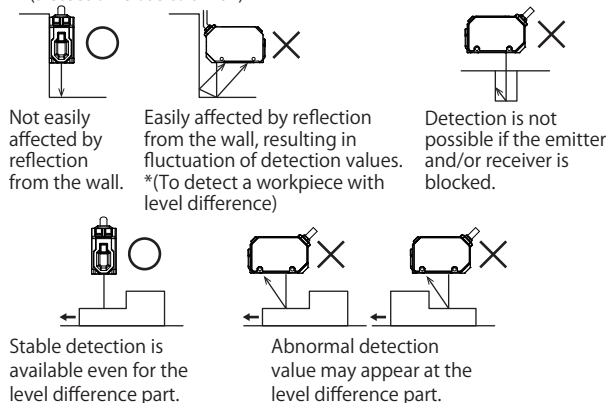
Mounting brackets are sold separately.
Tightening torque for the mounting hole is 0.6 N·m or less (M3 screw).

- CHECK!**
- Do not touch the emitter and/or receiver block of the sensor. Fingerprint deposits may result in improper measurement. If accidentally touched, please wipe gently with a dry cloth. Do not use organic solvent (e.g. paint thinner and alcohol).
 - If the object to be detected has a mirror surface, please install the product so that specular reflection light does not directly enter the light receiving block.

2-2 Constraints on sensor installation

■ Mounting Location

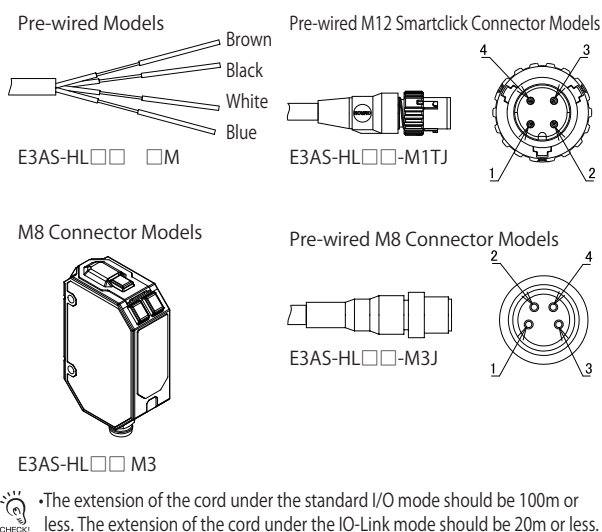
(Detection close to a wall)



Model	Output	Output circuit
E3AS-□□N□	NPN	
E3AS-□□D□ or E3AS-□□T□	PNP/COM□ Standard I/O Mode	
	PNP/COM□ IO-Link Mode	

- Standard I/O mode is used as PNP ON/OFF output.
- IO-Link mode is used for communications with the IO-Link master.
- C/Q performs IO-Link communications. sensor output DO performs ON/OFF output.
- Detailed information of model and specification are described in 1. Specification.

3-2 Connection method

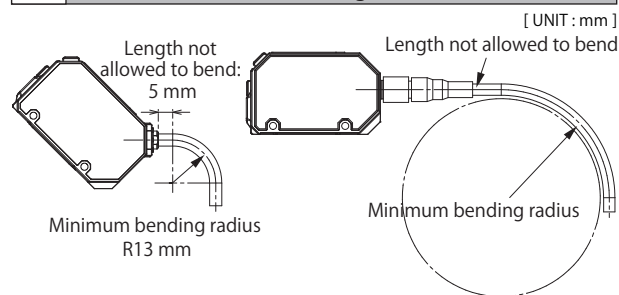


3 Connection

3-1 I/O stage circuit diagram

Model	Output	Output circuit
E3AS-□□N□	NPN	
E3AS-□□D□ or E3AS-□□T□	PNP/COM□ Standard I/O Mode	
	PNP/COM□ IO-Link Mode	

3-3 About allowable bending radius of cord

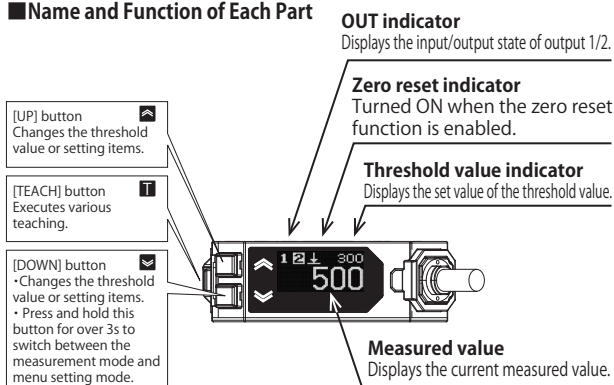


Bending for Pre-wired and Pre-wired Connector Models				
Material	External diameter	Minimum bending radius: mm	Length not allowed to bend: mm	
PVC	Φ4	13	5	
Bending of sensor I/O connector cord				
Model	Material	External diameter	Minimum bending radius: mm	Length not allowed to bend: mm
XS3F-M8PVC	PVC	Φ5	36	0
XS2F/W-D4-F	Incombustible robot	Φ6	40	0
XS5F/W-D4-F	Incombustible robot	Φ6	40	0
XS5F/W-D4-X	Highly oil-resistant PVC	Φ6	40	0
XS5F/W-D4-XR	Highly oil-resistant robot PVC	Φ6	40	0

4 Setting

4-1 Operation/Display Lookup Table

■Name and Function of Each Part



Operation indicator (orange)

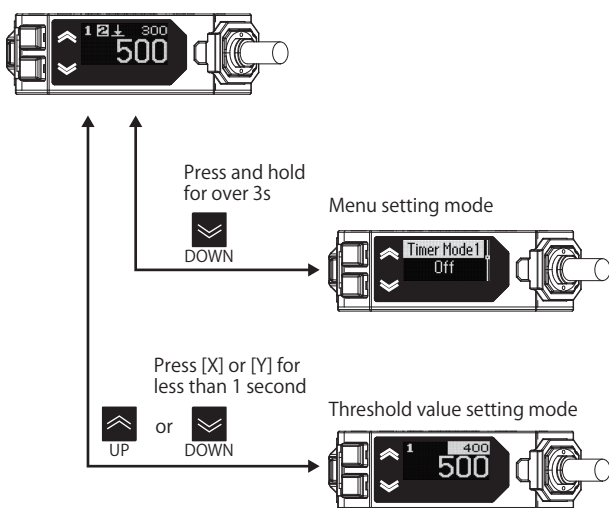
Power supply & communication indicator (green)

Indicator's role is different depending on the sensor state.

■Other button operations

Item	Operation	Reference
Teaching execution	T button TEACH	4-6. Teaching
Zero reset setting	DOWN button + T buttons simultaneously for over 3s.	5-3. Zero reset
Zero reset cancelling	UP button + T buttons simultaneously for over 3s.	
Key lock setting/cancelling	T button+ DOWN button+ UP buttons simultaneously for over 3s.	5-1. Key lock

■How to switch to each mode



4-2 Input/Output Function Selection

The function assigned to output 2 (DI/DO, white) can be selected.
The function selection of output 2 can be changed by selecting [Setting Menu] -> [Output 2 Function (Out2 Func.)].

Output 2 function	Output 1	Output 2
Output1 Invert	Output 1 fixed *1	Output 1 invert
Output2 Single		Output 2 (single point)
Input		External input
Error		Error output

*1 Output 1 is IO-Link communication output in the IO-Link mode.

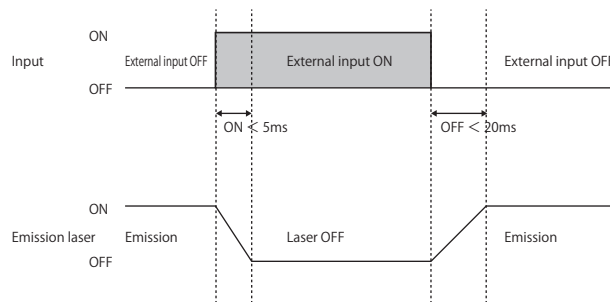
4-3 External Input

The function assigned to the external input can be selected.

External input	Description
Laser OFF	Turns ON/OFF the emitting laser.
Teach	Executes various teaching.
Zero Reset	Zeroes the measured value when zero reset is executed.

The external input setting of output 2 can be changed from the detailed setting menu.

■Emission laser termination (Laser OFF)

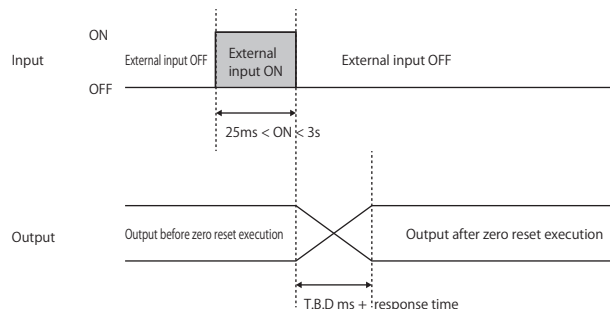


■Teach

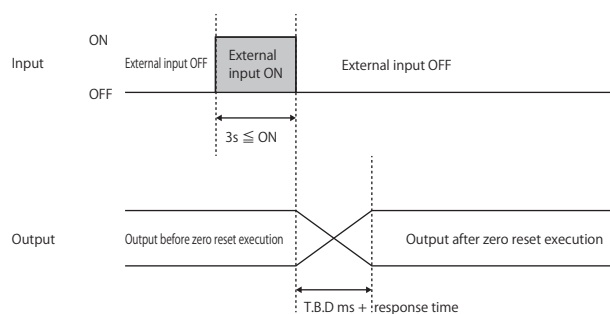
Various teaching can be executed within as much time as spent for button operations.

■Zero Reset

[Zero reset execution]



[Zero reset cancellation]



The function assigned to output 1 (Pin4/black) can be selected. The detection mode of output 1 can be changed from the setting menu

Output 1 mode	Description	BGS/FGS *1	Relations with teaching*2	Reference
Single Point	Output varies when the current measured value reaches the threshold value (SP1) or higher.	BGS	2-point/background teaching	■ Single Point Mode
Window BGS	Output varies when the current measured value reaches between the far-side threshold value (SP1) and the near-side threshold value (SP2).	BGS	Work teaching	■ Window FGS Mode
Window FGS	Output varies when the current measured value reaches between the far-side threshold value (SP1) and the near-side threshold value (SP2).	FGS	Background reference teaching (normal)	■ Window FGS mode
Distance and Intensity	Judgment is based on the conformity of distance and received light intensity, so very minute level difference or a translucent object can be detected.	FGS	Background reference teaching (high sensitivity)	-

*1 BGS operation: When a measurement error occurs, if N.O. or N.C. is set, output is OFF or ON, respectively. FGS operation: When a measurement error occurs, if N.O. or N.C. is set, output is ON or OFF, respectively

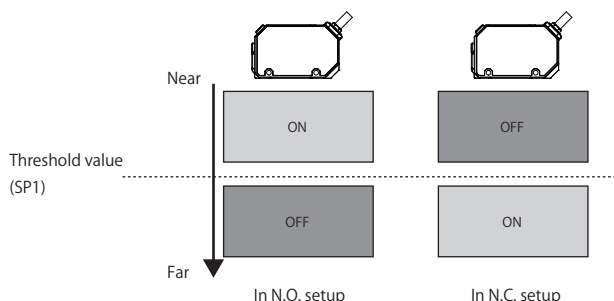
*2 The sensor transits to the corresponding detection mode automatically by executing each teaching. ● Difference between BGS and FGS

● Difference between BGS and FGS

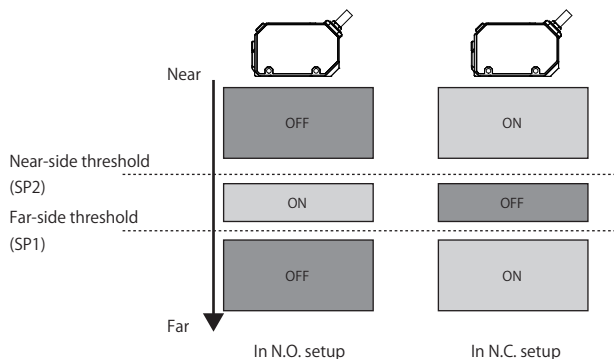
BGS: Influence from the background is controlled. BGS is suitable for detection when there is no background or when the object is far from the background. BGS is usable irrespective of the presence of background.

FGS: Influence from the close-range view is controlled. FGS is suitable for detection when the background is close to the object or when the object has a mirror-surface, level difference, or lowly reflective object. FGS is not usable without a background because the background is always detected.

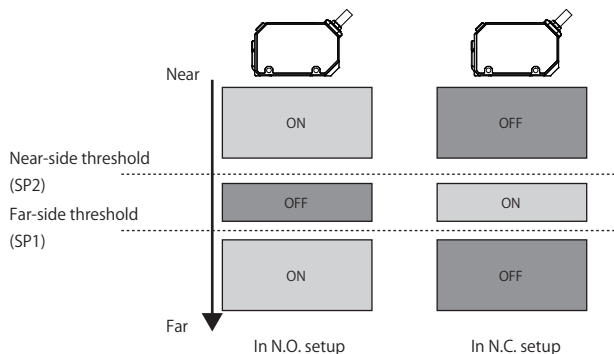
■ Single Point Mode



■ Window BGS mode



■ Window FGS mode



4-5 Display specification (measurement status)

■ Single Point Mode

		Rated sensing distance range	
		Stable NEAR	Stable FAR
Standard I/O Mode	Stability&Communication Indicator (green)	ON	OFF
	Operation Indicator (orange)	ON	OFF
	Output 1	ON	OFF
	Output 2	ON	OFF
	Output 2	ON	OFF
IO-Link Mode	Stability&Communication Indicator (green)	Flashing (1second cycle)	ON
	Operation Indicator (orange)	ON	OFF
	Communication Output	1	0
	Output 2	ON	OFF
	Output 2	ON	OFF

■ Window BGS mode

		Rated sensing distance range	
		NEAR-side threshold	FAR-side threshold
Standard I/O Mode	Stability&Communication Indicator (green)	ON	OFF
	Operation Indicator (orange)	ON	OFF
	Output 1	ON	OFF
	Output 2	ON	OFF
	Output 2	ON	OFF
IO-Link Mode	Stability&Communication Indicator (green)	Flashing (1second cycle)	ON
	Operation Indicator (orange)	ON	OFF
	Communication Output	1	0
	Output 2	ON	OFF
	Output 2	ON	OFF

■ Window FGS mode

		Rated sensing distance range	
		NEAR-side threshold	FAR-side threshold
Standard I/O Mode	Stability&Communication Indicator (green)	ON	OFF
	Operation Indicator (orange)	ON	OFF
	Output 1	ON	OFF
	Output 2	ON	OFF
	Output 2	ON	OFF
IO-Link Mode	Stability&Communication Indicator (green)	Flashing (1second cycle)	ON
	Operation Indicator (orange)	ON	OFF
	Communication Output	1	0
	Output 2	ON	OFF
	Output 2	ON	OFF

*1 Shown above are the factory settings. Refer to the index list for the default settings at time of shipment from factory.

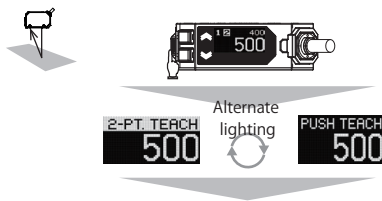
① Basic setting (high-precision detection)

■ 2-point teaching

Single(BGS)

- Specify a threshold as a distance in the middle between the presence and non-presence of an object.
- The setting is available regardless of the order of presence and non-presence of an object.
- If teaching either the first point or the second point without any object and background, the threshold value is calculated by setting the maximum sensing distance (L150: 150 mm, L500: 500 mm) as the teaching point.
- Make sure to press the button for at least 25 ms less than 1s.

- Press the **T** button with no object.

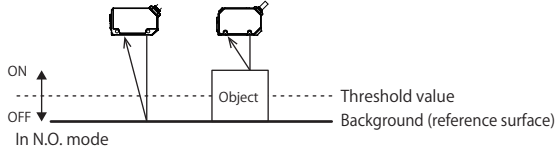


- Press the **T** button with an object



■ Concept of threshold value setting

- Specify a threshold as a distance in the middle between the presence and non-presence of an object.



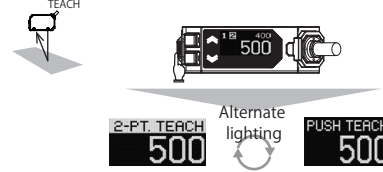
③ Detecting an object with a complex shape

■ Background reference teaching (normal)

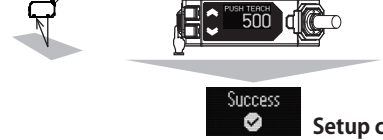
WindowFGS

- Specify two threshold values of the upper and lower limits on the distance to the reference surface.
- The sensor judges that there is an object even if received light intensity is not enough or an out-of-measurement-range error occurs, even a poor reflective object with a complex shape can be detected.
- Execute if the background reference teaching is set to Normal (default: Normal)

- Press the **T** button with no object.

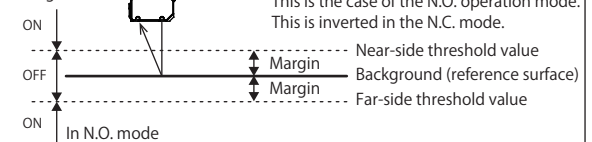


- Without an object, press and hold the **T** button (at least 1s less than 3s). Release the button when [Reference (Normal)] is displayed on the display.



■ Concept of threshold value setting

- Specify a threshold value as a +/- tolerance to the background.
- The range of margin is automatically set to the optimal value according to the sensing distance.



② Detecting an object nearer than the background

■ Background teaching

シングル(BGS)

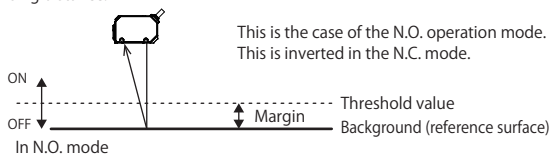
- Specify a threshold based on the state of no object.
- If teaching with no background, the maximum sensing distance (L150: 150 mm, L500: 500 mm) is defined as the threshold value.
- Background teaching can be executed when the teaching type is set to Background (default: Background).

- Without any object, press and hold the **T** button (at least 1s less than 3s). Release the button when [Background Teach] is displayed on the display



■ Concept of threshold value setting

- Threshold value is set on the Near side of the background.
- The range of margin is automatically set to the optimal value according to the sensing distance.



④ Teaching with an object

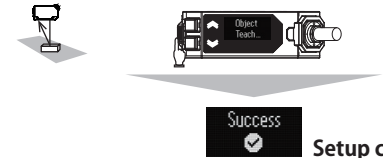
■ Work teaching (normal)

WindowBGS

- Specify two threshold values of the upper and lower limits on the distance to the reference surface.
- This teaching can be executed if the teaching type is set to Object (default: Background).

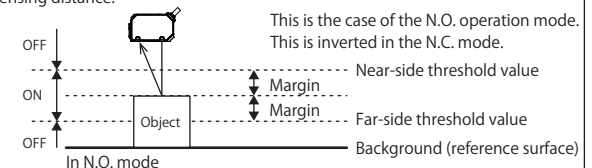
- Select [Setting Menu] -> [Teaching Types (Press and Hold for 3s)] -> [Object]. (Refer to the detailed setting.)

- With an object, press and hold the **T** button (at least 1s less than 3s). Release the button when [Object Teach] is displayed on the display.



■ Concept of threshold value setting

- Specify a threshold value as a +/- tolerance to the background.
- The range of margin is automatically set to the optimal value according to the sensing distance.



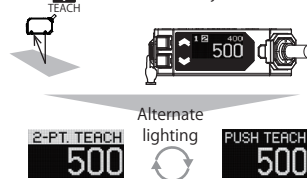
⑤ Detecting a minute level difference or a transparent object

■ Background teaching

- Use this teaching for a minute level difference or a translucent object.
- By the background reference teaching (high sensitivity), the sensor detects the object by memorizing background information (distance + received light intensity) and determining difference from this information.
- The display value indicates the conformity with the background information.
- The display value is 100 on the background in teaching. This value becomes lower as conformity with the background becomes lower.
- The background reference teaching (high sensitivity) detects difference of distance and received light intensity, so more minute level difference can be detected.
- The ABT function which corrects the memorized background information according to the moderate variation of the background is enabled automatically. Correction can be turned OFF or correction time can be changed (three stages). (Refer to the ABT function.)
- This teaching can be executed when background reference teaching is set to Sensitive (default: Normal)

- Select [Setting Menu] -> [Teaching Types (Press and Hold for 3s)] -> [Object]. (Refer to the detailed setting.)

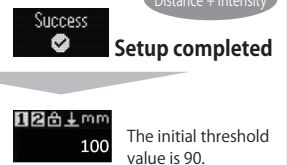
- Press the **T** button with an object



- Without any object, press and hold the **T** button (at least 1s less than 3s). Release the button when [Reference (Sensitive)] is displayed on the display.



Distance + Intensity



Measurement display in background reference

teaching (high sensitivity

- Conformity with the background information is displayed as 0-100(%).



Detection might be difficult even using this mode depending on the reflectance of the transparent object. So, be sure to confirm system operation before using the background reference teaching (high sensitivity).

■Teaching error display

Errors shown on the display and actions are as follows.

OLED display	Indicator		Errors	Cause	Actions
	Orange	Green			
	Quick flashing	OFF	Teaching execution error	Teaching has failed.	Change the setting of response time slower and execute teaching again.Confirm if the distance between the sensor and object is within the measurement range and execute teaching again.
			Teaching NEAR error	The difference of the measured values between the first and second points is too small in 2-point teaching.	Increase the difference of the measured values between the first and second points and execute teaching again.

* Quick flashing cycle is 0.2 seconds.

4-7 Threshold Value Manual Operations

■Threshold value setting

The threshold value can be adjusted minutely using the and buttons.

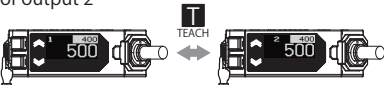
- The threshold value increases.
- The threshold value decreases.
- Quick adjustment is usable by pressing and holding the button.

■When output mode is Single Point:

Press the or button for 1s or less.



The screen moves to the threshold value setting screen of output 1 and the threshold value can be changed by the or button
By pressing the button on the threshold value setting screen of output 1, the screen can be moved to the threshold value setting screen of output 2



The sensor moves back to the measurement mode after a certain period of time has elapsed.



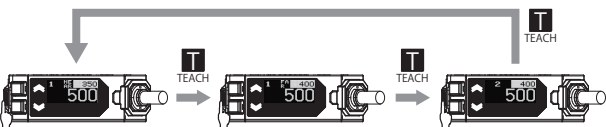
Setup completed

■When output mode is Window:

Press the or button for 1s or less.



The screen moves to the threshold value setting screen of output 1 and the threshold value can be changed by the or button



The sensor moves back to the measurement mode after a certain period of time has elapsed.



Setup completed

4-8 Hysteresis

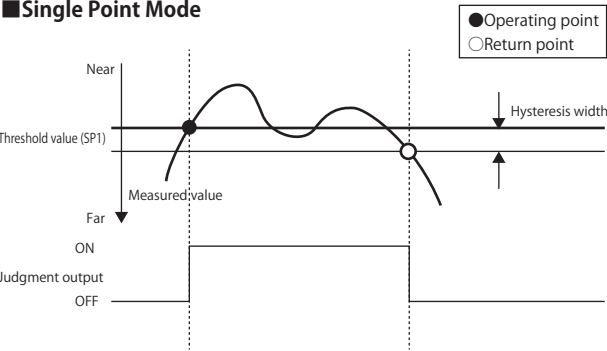
■Setting of hysteresis width

Minute level difference can be judged by controlling the hysteresis width minutely according to the object. However, note that when displacement value is fluctuating due to the movement of the object or the small intensity of the reflected light, if hysteresis width is reduced, the judged output might fluctuate.

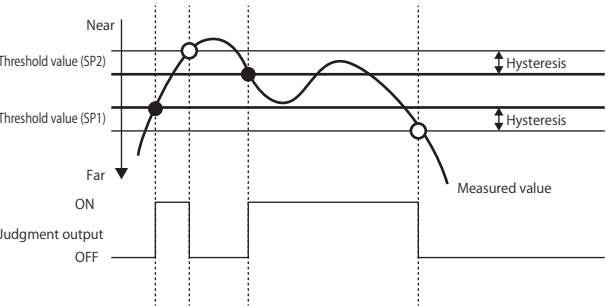
■What's hysteresis width

The point at which the judged output changes from OFF to ON is called the operating point and the point at which the judged output changes from ON to OFF is called the return point
The distance between the operating and return points is called hysteresis width.
For this sensor, threshold value is equal to operating point, so the distance to the return point can be set by hysteresis width.

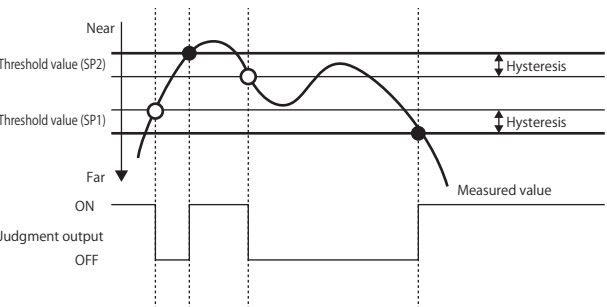
■Single Point Mode



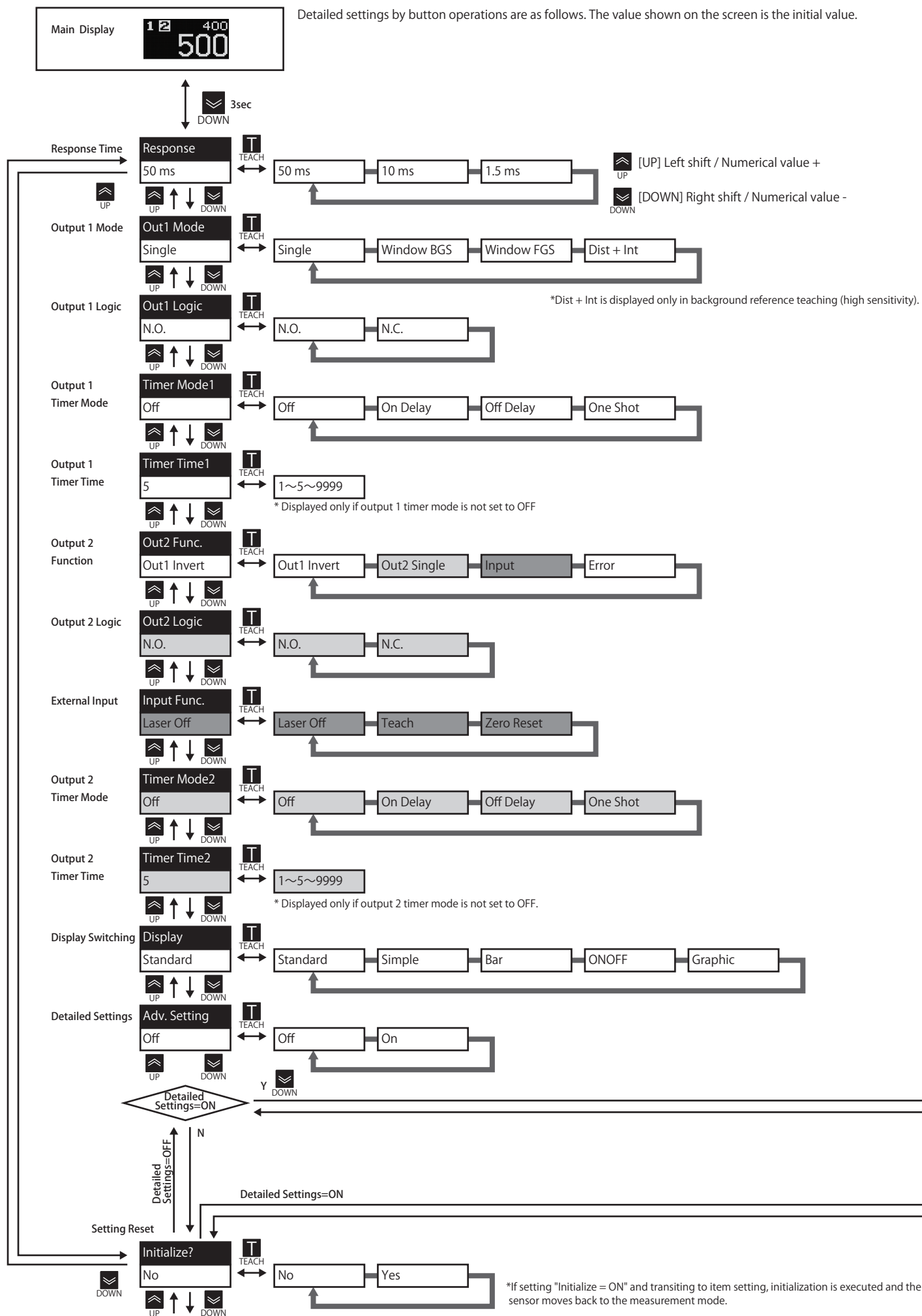
■Window BGS mode



■Window FGS mode



Detailed settings by button operations are as follows. The value shown on the screen is the initial value.



Displayed only when the output 2 function = Out2 Single

Displayed only when the output 2 function = Input

UP [UP] Left shift / Numerical value +
DOWN [DOWN] Right shift / Numerical value -

Display Reverse



Disp. Reverse
Off



Off On

Display on / off



Disp. OnOff
Disp. On



Disp. On Disp. Off

Zero Reset
Memory



Zero Memory
Off



Off On

* Not displayed in the judgment mode of distance + received light intensity

Keep Function



Keep Func.
Off



Off On

* Not displayed in the judgment mode of distance + received light intensity

Mutual
Interference
Prevention



Interference
Channel 1



Channel 1 Channel 2 Channel 3 Channel 4

Teaching type
(pressing and
holding for 3s)
<J1>



Teach 3sec.
Background



Background Object

Background
reference teaching
<J>



Ref. Teach
Normal



Normal Sensitive

ABT Function



ABT Func.
1sec



1sec 0.3sec Off 3 min

* Displayed only when the background reference teaching selection is set to Sensitive.

Hysteresis Mode
<G7>



Hys Mode
Auto



Auto User

Output 1
Hysteresis width



Out1 Hys
10



E3AS-L1 : 0.0~1.0~150.0
E3AS-LS : 0~10~500

* Displayed only when the hysteresis mode is set to User

Output 2
Hysteresis width



Out2 Hys
10



E3AS-L1 : 0.0~1.0~150.0
E3AS-LS : 0~10~500



* Displayed only when the hysteresis mode is set to User

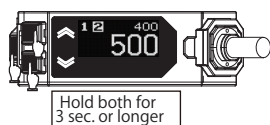
5-1

Key Lock

Button operations can be disabled to prevent misoperations.

■Key Lock Enable

Press the , , and  buttons simultaneously for 3s or more






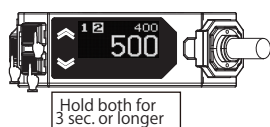
When key lock is effective,  [Key Lock Icon] is displayed on the measurement screen.



Setup completed

■Key Lock Cancel

Press the , , and  buttons simultaneously for 3s or more



On the measurement screen,  [Key Lock Cancellation Icon] is lit up.



Setting is cancelled

5-2

Setting Reset

Initialize all settings to the factory-set defaults.



Setting can be initialized by selecting [Setting Menu] -> [Setting Initialization] -> [Yes].

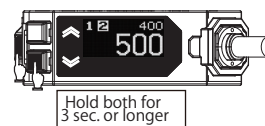
5-3

Zero Reset Function

■Zero Reset Function Enable

- This is the function by which the measured value when zero reset is executed becomes zero
- The measured value is overwritten if zero reset has already been executed.
- * This function cannot be executed if the detection mode is Distance + Intensity mode (when background reference teaching (high sensitivity) is executed)

Press the  and  buttons simultaneously for over 3s



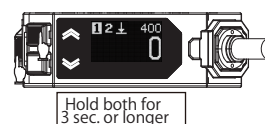
When zero reset is configured,  [Zero Reset Icon] is displayed on the measurement screen




Setup completed

■Zero Reset Function Cancel

Press the  and  buttons simultaneously for over 3s



When  [Zero Reset Icon] is turned OFF on the measurement screen, the setting is cancelled



Setting is cancelled

■Zero reset memory

- By setting the zero reset memory, the zero reset setting data can be memorized even while power supply is OFF.
- Select [Setting Menu] -> [Adv. Settings = ON]. Then select [Setting Menu] -> [Zero Reset Memory] -> [ON (Enabled)].

5-4

Response Time

Response time can be changed.

Detection becomes more stable as increasing response time.

5-5

Output 1 Mode

The detection mode of output 1 can be changed

For details, refer to 4-4 Detection Mode

5-6

Output Logic

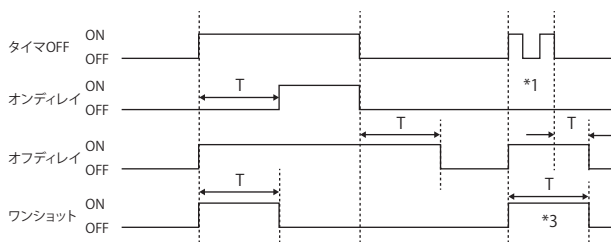
The output logic of output 1/2 (N.O./N.C.) can be switched.

The output 2 logic can be changed only when the output 2 function is set to Out2 Single.

5-7 Timer

The timer time of output can be set.

Timer type	Description
OFF delay	Output ON is retarded after the object is detected
OFF delay	Output ON is held if the detection time is too short for PLC to detect the object
One shot	Output is held for a certain period of time even if the object size varies.



*1: If the OFF time < the timer time, output is not turned OFF.

*2: If the ON time < the timer time, output is not turned ON.

*3: Even if the condition of switching OFF to ON is satisfied while output is effective, it is ignored

5-8 Output 2 Function

The input/output function of output 2 can be set
For details, refer to 4-2 Input/Output Function Selection

5-9 External Output

The external output function can be set.
For details, refer to 4-3 External Input.

5-10 Display Screen Switching

The screen configuration in the measurement mode can be selected from 4 types.

The screen configuration can be selected by selecting [Detailed Settings] -> [Display Indication Switching]

Normal		Default screen configuration. An icon showing the measured value and output/setting state is displayed.
Simple		Only the measured value is displayed.
Bar		The measured value is displayed as a bar.
ONOFF		Only the ON/OFF state is displayed.

5-11 Display Inversion

In order to raise visibility independently on the installation orientation of the sensor, the OLED display can be rotated 180°.

If display inversion is enabled, assignment of the UP and DOWN buttons is also switched

However, for transition to the setting menu, button assignment does not change even during display inversion.

Display inversion: disabled



Display inversion: enabled



5-12 Display ON/OFF

Item	Description
Display On	The luminance of the OLED display is set to XX% after there is no operation for a certain period of time (60s)
Display Off	The OLED display is turned OFF perfectly after there is no operation for a certain period of time (15s).

* Display's luminance decreases as the sensor is used for a long period.

5-13 Zero Reset Memory

Configure if the measured value when zero reset is performed is held even after power supply is turned OFF.

If the zero reset memory is set ON, measured values are written into the EEPROM (non-volatile memory) inside the sensor main unit every time zero reset is performed

The life duration of writing into this EEPROM is 100,000 times

Writing every time measurement is performed might cause a failure, so be careful with the life duration if using the zero reset memory ON

5-14 Keeping Function

The content of the output at the time of measurement error or before the measurement is confirmed can be configured.

Keeping setting	Judgment output
Disabled: Off	The measured value directly before the sensor enters the non-measurement state is held and output.
Enabled: On	Output OFF

* If the detection mode is Distance + Intensity (when background reference teaching (high sensitivity) is executed), keeping is disabled.

5-15 Mutual Interference Prevention Function

By using the mutual interference prevention function, light-emitting frequency can be differentiated, so the influence of mutual interference can be minimized.

More than one sensor can be mounted close to each other by setting mutually different channels.

For E3AS-L150/500 model, up to 4 channels can be set

If mutual interference is set, response time is as follows according to the channel configured.

	1.5ms	10ms	50ms
Channel 1	1.5ms	10ms	50ms
Channel 2	2ms	13ms	65ms
Channel 3	1.7ms	11ms	55ms
Channel 4	1.8ms	12ms	60ms

5-16 Teaching Types

Teaching executed when the teaching button is pressed and held (at least 1s less than 3s), the teaching executed can be switched.

To execute work teaching, select [Setting Menu] -> [Teaching Types (Press and Hold for 3s)] -> [Object].

5-17 Background Reference Teaching Setting

The normal and high-sensitivity modes of the background reference teaching can be switched.

To execute background reference teaching (high sensitivity), select [Setting Menu] -> [Background Reference Teaching] -> [Sensitive].

5-18 ABT Function (Automatic Background Tracking Function)

This is the function enabled only when background reference teaching (high sensitivity) is executed (distance + intensity judgment mode)
This function corrects the variation of the detected value (received light intensity and distance) when background is detected

The time corrected can be staged to 3 types (0.3s / 1s / 3 min).

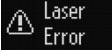


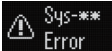
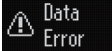


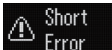


(Precautions)

If the object moves very slowly, correction keeps up with the movement of the object, so the object cannot be detected correctly.

In this case, retard the correction time of the ABT function or set OFF the function



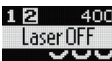
■Error Display

Errors shown on the display and actions are as follows.

OLED display	Indicator		Error details	Possible causes	Action and correction
	Orange	Green			
	Orange and green indicators alternately flash quickly  		Laser failure error	The laser diode might have been deteriorated.	Restart the sensor (turn the power off and on again). If the error remains, replace the sensor.
			System error	The sensor itself may be out of order.	
	OFF 	Quick flashing 	EEPROM error	Sensor's setting memory is abnormal.	Initialize the settings by pressing and holding the UP button for 3s. The sensor is out of order if the error is still not fixed. Replace the sensor.
	Quick flashing 	OFF 	Load short-circuit error	The output line is short-circuited.	Check the wiring and connecting.

* Quick flashing cycle is 0.2 seconds.

■State Display

OLED display	Error details	Possible causes	Action and correction
	Insufficient received light intensity	The received light intensity from the object is not sufficient or the object is out of the detection distance range.	Retard the response time or adjust so that the distance between the sensor main unit and the object can be detected by the sensor.
	Key lock on	The key lock function enabled.	Cancel the key lock function. Refer to Convenient Setting Features.
	Laser OFF	Pin2 terminal (white) might have been short-circuited	Check the wiring and external input setting.

Suitability for Use

OMRON Corporation 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.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

OMRON Corporation Industrial Automation Company
Kyoto, JAPAN Contact: www.ia.omron.com

Regional Headquarters

■ **OMRON EUROPE B.V.**
Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

■ **OMRON ELECTRONICS LLC**
2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

■ **OMRON ASIA PACIFIC PTE. LTD.**
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

■ **OMRON (CHINA) CO., LTD.**
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200