

Compact Photoelectric Sensor

# E3Z Preventive Maintenance Series

- „Machine Stop“ or „Sensor Defect“ alarm output if beam interruption is too long (-J0)
- Detection of dirt cover by power reduction (-G2)
- Active sensor check by test input forcing state change at receiver (-G0)
- Anti-tampering  
-non-adjustable (H)



## Features

Mutual interference in a through-beam sensor causes errors.  
[This is solved by using the light emission stop function to achieve successive light emission.](#)  
 Errors due to mutual interference often happen when multiple through-beam sensors are mounted in-line.

**Here's the solution!**

Mutual interference can be prevented by using a PLC to shift the timing enough to successively light E3Z Sensors using the light emission stop function.

<b>Sensor 1</b>	Light emission stop input	ON	OFF	
	LED	ON	OFF	
<b>Sensor 2</b>	Light emission stop input	ON	OFF	
	LED	ON	OFF	
<b>Sensor 3</b>	Light emission stop input	ON	OFF	
	LED	ON	OFF	

The sensor may be malfunctioning or disconnected.  
[The light emission stop function reveals problems before they happen!](#)  
 Sensor that turn ON/OFF only occasionally, such as error detection sensors, may take some time to discover a malfunction or disconnection caused by external factors like the system being struck by something or a cable being pulled.

**Here's the solution!**

The E3Z with light emission stop function can be used to determine whether a malfunction or disconnection has occurred. You can check this by turning the light emission of the emitter ON/OFF periodically and checking to see if the receiver turns ON/OFF accordingly. This makes it possible to discover problems due to malfunction or disconnection in advance.

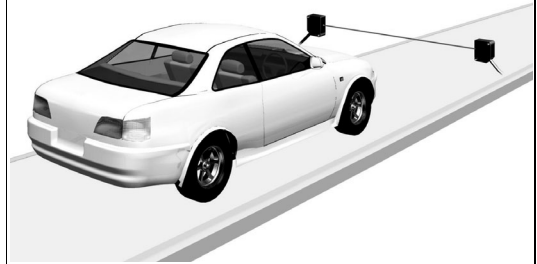
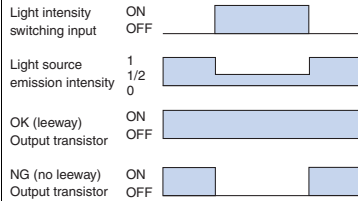
For Dark ON Mode				
<b>Normal</b>	Light emission stop input	ON	OFF	
	LED	ON	OFF	
	Output transistor	ON	OFF	
<b>Malfunction</b>	Output transistor	ON	OFF	

The optical axis adjustment may be incorrect.  
**The light intensity switching function can be used to confirm the amount of leeway.**  
 When through-beam sensors are installed far apart, the sensing distance becomes long, making it difficult to check the optical axis adjustment.

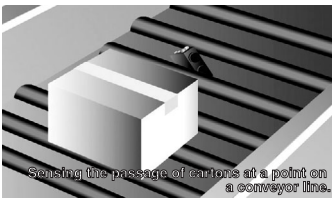
**Here's the solution!**

When installing E3Z Sensors with light intensity switching, the intensity of the light source can be reduced by half to check whether or not light is received. This enables confirming the amount of leeway with respect to light reception before operation.

**For Light ON Mode with No Workpiece**



Errors might be caused by a dusty or dirty lens.  
**Full protection provided by light intensity switching and self-diagnostic output functions.**  
 When using the sensor in dusty, dirty environments, errors may occur due to a lowering in the intensity of the received light due to dust or dirt adhering to the detection surface of the Sensor.

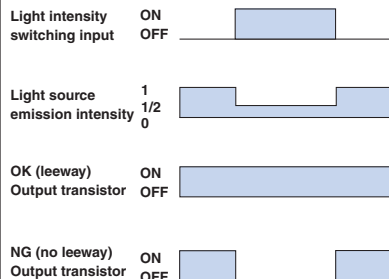


**Here's the solution!**

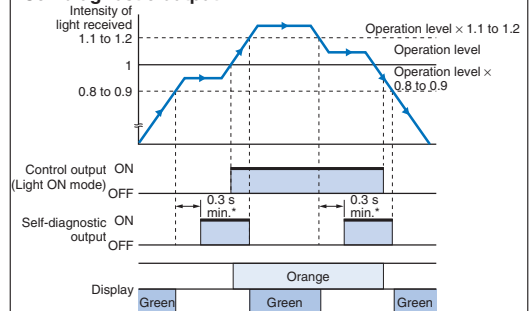
The E3Z with light intensity switching can prevent malfunctions by periodically confirming the amount of leeway at operation start-up. Also, when light reception becomes unstable during operation, the E3Z with self-diagnostic output function outputs an alert to enable early maintenance.

**For Light ON Mode with Workpiece**

**Light intensity switching input**



**Self-diagnostic output**



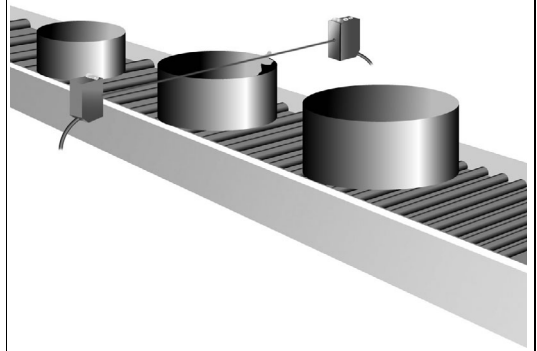
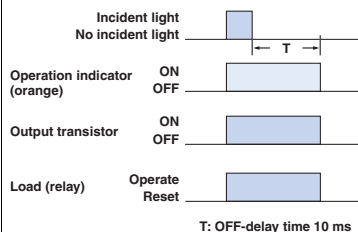
\* The self-diagnostic output may also be generated when workpieces move at a slow speed. To prevent this, include an ON-delay timer circuit or other measure.

The workpiece is too small for the PLC to read the output signal.  
**Stable sensing by use of an OFF-delay timer.**  
 When sensing the passage of small objects, the output signal may be too short for PLC input.

**Here's the solution!**

The OFF-delay time of approximately 10 ms in the E3Z with OFF-delay timer provides an adequate output signal for the PLC to read even without a high-speed counter.

**For Light ON Mode**







## Ordering Information

### Through-beam (Emitter and Receiver Set)

#### Main Model Numbers

 Red light  Infrared light

#### Model Number Suffixes

Output form	Sensing distance	Additional functions	Timer functions	Light source	Main model number (Nos. 1 to 7)	
NPN output	 10 m	Anti-tampering	---	Red light	E3Z-T61-AH	
		Self diagnosis			E3Z-T61-J0SRW	
		Emission STOP			E3Z-T61-G0SRW	
		Light intensity switching			E3Z-T61-G2SRW	
		Emission STOP			E3Z-T61-G0TRW	
		Light intensity switching			E3Z-T61-G2TRW	
		 15 m			Anti-tampering	---
	Self diagnosis		E3Z-T61-J0SHW			
	Emission STOP		E3Z-T61-G0SHW			
	Light intensity switching		E3Z-T61-G2SHW			
	Emission STOP		E3Z-T61-G0THW			
	Light intensity switching		E3Z-T61-G2THW			
	PNP output		 10 m	Anti-tampering	---	
		Self diagnosis		E3Z-T81-J0SRW		
Emission STOP		E3Z-T81-G0SRW				
Light intensity switching		E3Z-T81-G2SRW				
Emission STOP		E3Z-T81-G0TRW				
Light intensity switching		E3Z-T81-G2TRW				
 15 m		Anti-tampering		---		Infrared
		Self diagnosis	E3Z-T81-J0SHW			
		Emission STOP	E3Z-T81-G0SHW			
		Light intensity switching	E3Z-T81-G2SHW			
		Emission STOP	E3Z-T81-G0THW			
		Light intensity switching	E3Z-T81-G2THW			

Connection method	Model number suffix (No. 8)
Pre-wired 0.5 m	-05
Pre-wired 1 m	-P1
Pre-wired 2 m	-P2
Pre-wired 5 m	-P5
M8 connector (4-pin)	-CN
M12 junction connector 0.3 m	-M1
M8 junction connector (4-pin) 0.3m	-M3


Note: 1. Always order using a main model number followed by a model number suffix.  
(Example: E3Z-T61-S0SRW-05)

Retroreflective Type

Main Model Numbers

 Red light  Infrared light

Model Number Suffixes

Output form	Sensing distance	Additional functions	Timer functions	Light source	Main model number (Nos. 1 to 7)
NPN output	 <b>4 m</b> (100 mm) (See note 2.)	Anti-tampering	---	Red light	E3Z-R61H
		Self diagnosis			E3Z-R61-J0SRW
		Emission STOP			E3Z-R61-G0SRW
		Light intensity switching			E3Z-R61-G2SRW
		Emission STOP			E3Z-R61-G0TRW
		Light intensity switching			E3Z-R61-G2TRW
PNP output		Anti-tampering	OFF delay (always 10 ms)		E3Z-R81H
		Self diagnosis			E3Z-R81-J0SRW
		Emission STOP			E3Z-R81-G0SRW
		Light intensity switching			E3Z-R81-G2SRW
		Emission STOP			E3Z-R81-G0TRW
		Light intensity switching			E3Z-R81-G2TRW

Connection method	Model number suffix (No. 8)
Pre-wired 0.5 m	-05
Pre-wired 1 m	-P1
Pre-wired 2 m	-P2
Pre-wired 5 m	-P5
M8 connector	-CN
M12 junction connector 0.3 m	-M1
M8 junction connector 0.3 m	-M3



Note: 1. Always order using a main number followed by a model number suffix. (Example: E3Z-R61-P2)  
 2. Sensing distance specified with reflector E39-R1S. Values in parentheses indicate minimum required sensing distance between sensor and reflector.

Diffuse-reflective Type

Main Model Numbers

 Red light  Infrared light

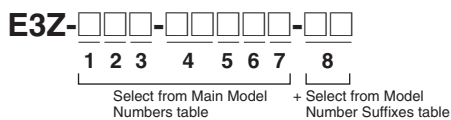
Model Number Suffixes

Output form	Sensing distance	Additional functions	Timer functions	Light source	Main model number (Nos. 1 to 7)	
NPN output	 <b>5 to 100 mm</b>	Anti-tampering	---	Infrared	E3Z-D61H	
		Self diagnosis			E3Z-D61-J0SHW	
		Emission STOP			E3Z-D61-G0SHW	
		Light intensity switching			E3Z-D61-G2SHW	
		Emission STOP			E3Z-D61-G0THW	
		Light intensity switching			E3Z-D61-G2THW	
PNP output			Anti-tampering		OFF delay (always 10 ms)	E3Z-D81H
			Self diagnosis			E3Z-D81-J0SHW
			Emission STOP			E3Z-D81-G0SHW
			Light intensity switching			E3Z-D81-G2SHW
			Emission STOP			E3Z-D81-G0THW
			Light intensity switching			E3Z-D81-G2THW
NPN output	 <b>1 m</b>	Anti-tampering	---	E3Z-D62H		
		Self diagnosis		E3Z-D62-J0SHW		
		Emission STOP		E3Z-D62-G0SHW		
		Light intensity switching		E3Z-D62-G2SHW		
		Emission STOP		E3Z-D62-G0THW		
		Light intensity switching		E3Z-D62-G2THW		
PNP output			Self diagnosis	OFF delay (always 10 ms)	E3Z-D82-J0SHW	
			Anti-tampering		E3Z-D82H	
			Emission STOP		E3Z-D82-G0SHW	
			Light intensity switching		E3Z-D82-G2SHW	
			Emission STOP		E3Z-D82-G0THW	
			Light intensity switching		E3Z-D82-G2THW	

Connection method	Model number suffix (No. 8)
Pre-wired 0.5 m	-05
Pre-wired 1 m	-P1
Pre-wired 2 m	-P2
Pre-wired 5 m	-P5
M8 connector	-CN
M12 junction connector 0.3 m	-M1
M8 junction connector 0.3 m	-M3

Note: 1. Always order using a main number followed by a model number suffix. (Example: E3Z-R61)

## Model Number Structure



### 1:Sensing type

Code	Meaning
T	Through-beam
R	Retroreflective
D	Diffuse-reflective

### 2:Output form

Code	Meaning
6	NPN output
8	PNP output

### 3:Sensing distance

Code	Meaning
1	Standard
2	Long-distance

### 4:Additional functions

Code	Meaning
H	Anti-tampering
J0	Self-diagnostic output
G0	Light emission stop function
G2	Light intensity switching

### 5:Timer functions

Code	Meaning
S	Without timers
T	OFF-delay timer Always 10 ms

### 6:Light source

Code	Meaning
R	Red light
H	Infrared light

### 7:Sensor type

Code	Meaning
L	Emitter (through-beam types)
D	Receiver (through-beam types)
W	Emitter/receiver set (through-beam types) Retroreflective

### 8:Connection method

Code	Meaning
05	Pre-wired 0.5 m
P1	Pre-wired 1 m
P2	Pre-wired 2 m
P5	Pre-wired 5 m
CN	M8 connector (4-pin)
M1	M12 junction connector (M1J) 0.3 m
M3	M8 junction connector (M3J) 0.3 m (4-pin)

Rating/Performance

Item	Model	Sensor type	Through-beam		Retroreflective model (with M.S.R. function)	Diffuse-reflective	
		NPN output	E3Z-T61 (red light)	E3Z-T61 (infrared light)	E3Z-R61	E3Z-D61	E3Z-D62
		PNP output	E3Z-T81 (red light)	E3Z-T81 (infrared light)	E3Z-R81	E3Z-D81	E3Z-D82
Sensing distance			10 m	15 m	4 m (100 mm) (When using the E39-R1S) 3 m (100 mm)(See note.) (When using the E39-R1)	100 mm (White paper 100 × 100 mm)	1 m (White paper 300 × 300 mm)
Standard sensing object			Opaque: 12-mm dia. min.		Opaque: 75-mm dia. min.	---	
Differential distance			---		20% max. of sensing distance		
Directional angle			Both emitter and receiver: 3 to 5°	Both emitter and receiver: 3 to 5°	2 to 10°	---	
Light source (wave length)			Red LED (660 nm)	Infrared LED (870 nm)	Red LED (660 nm)	Infrared LED (860 nm)	
Power supply voltage			12 to 24 VDC ±10%, ripple (p-p) 10% max.				
Current consumption			Emitter: 15 mA, Receiver: 20 mA		30 mA max.		
Control output			Load power supply: 26.4 VDC max., load current: 100 mA max., residual voltage ( NTLPxCALLOUT: Residual voltage Load current less than 10 mA: 1 V max. Load current 10 to 100 mA: 2 V max. )				
			Open collector output type (depends on the NPN/PNP output format) Light-ON/Dark-ON switch selectable				
Self-diagnostic output (models with self-diagnostic output only)			Only Sensors with self-diagnostic output: Load voltage 26.4 VDC max., load current 20 mA max. (residual voltage 1 V max.), open collector output (NPN/PNP output depends on the model)				
Light emission stop function, light intensity switching function (models with light emission stop function/light intensity switching function only)	Input		NPN types: Light OFF: Short-circuited to 0 V or 1.5 V max. (leakage current 1 mA max.), Light ON: Open (leakage current 0.1 mA max.) PNP types: Light OFF: Short-circuited to +DC (positive pole of power supply) or within +DC to 1.5 V (absorption current 3 mA max.), Light ON: Open (leakage current 0.1 mA max.)				
	Response time		Operation or reset: 0.5 ms max.		Operation or reset: 0.5 ms max.		
Protective circuits			Reversed power supply connection protection, output short-circuit protection, reversed output connection protection		Reversed power supply connection protection, output short-circuit protection, mutual interference prevention, reversed output connection protection		
Response time			Operation or reset: Both 1 ms max.				
Sensitivity adjustment			Single-turn adjustment				
Timer functions (For models with timer functions only)			OFF-delay (Always 10 <sup>+4</sup> ms)				
Ambient illuminance			Incandescent lamp: 3,000 lux max., Sunlight: 10,000 lux max.				
Ambient temperature			Operating: -25°C to 55°C, Storage: -40°C to 70°C (with no icing or condensation)				
Ambient humidity			Operating: 35% to 85% RH, Storage: 35% to 95% RH (with no icing or condensation)				
Insulation resistance			20 MΩ min. at 500 VDC				
Dielectric strength			1,000 VAC at 50/60 Hz for 1 minute				
Vibration resistance			10 to 55 Hz, 1.5-mm or 300 m/s <sup>2</sup> double amplitude for 2 hours each in X, Y, and Z directions				
Shock resistance			Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions				
Protective structure			IEC60529 IP67				
Connection method			Pre-wired type, M8 connector type, M12 junction connector, M8 junction connector, e-CON junction connector				
Indicator lamp			Operation indicator (orange), stability indicator (green) Note that the emitter has the power indicator (orange) only.				
Weight (Packedstate)			Pre-wired	0.5 m: Approx. 55 g 1 m: Approx. 75 g 2 m: Approx. 120 g 5 m: Approx. 250 g	Pre-wired	0.5 m: Approx. 30 g 1 m: Approx. 45 g 2 m: Approx. 65 g 5 m: Approx. 130 g	
			M8 connector: M12 junction connector M8 junction connector	Approx. 30 g 0.3 m: Approx. 75 g 0.3 m: Approx. 50 g	M8 connector: M12 junction connector M8 junction connector	Approx. 20 g 0.3 m: Approx. 45 g 0.3 m: Approx. 30 g	
Material	Case		PBT (polybutylene terephthalate)				
	Lens		Methacrylate resin		Methacrylic resin	Methacrylate resin	
Accessories			Instruction manual (The Reflector or Mounting Bracket is not provided with any of the above models.)				

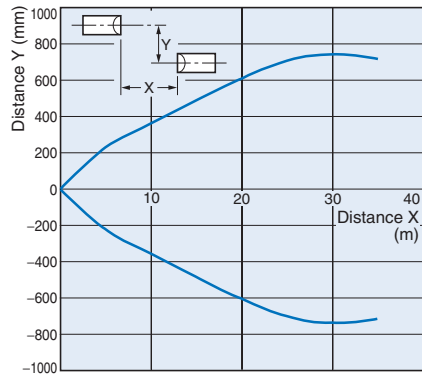
Note: Values in parentheses indicate the minimum required distance between the sensor and reflector.

Characteristic data (typical)

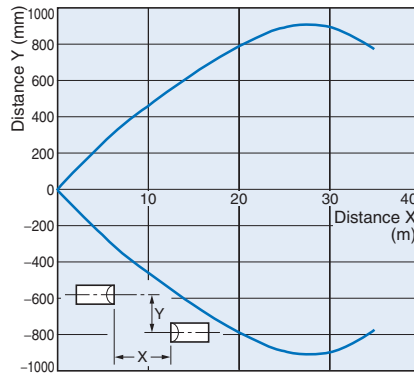
Parallel Movement

Through-beam

E3Z-T61/T81 (Red light)

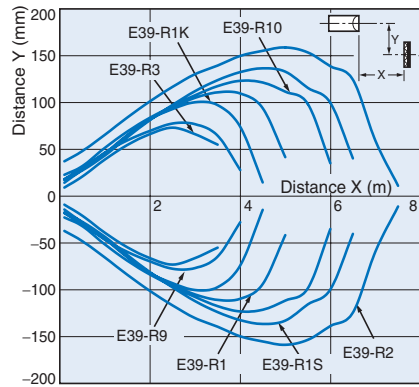


E3Z-T61/T81 (Infrared light)



Retroreflective

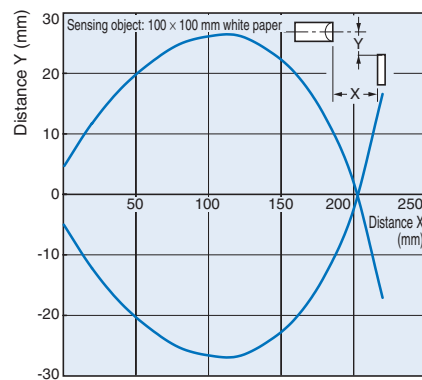
E3Z-R61/R81



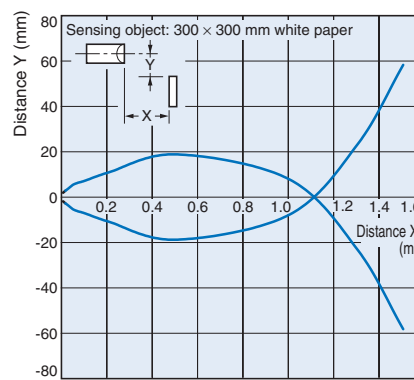
Operating Range

Diffuse-reflective

E3Z-D61/D81



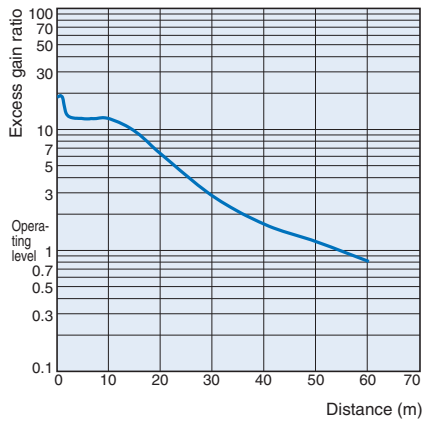
E3Z-D62/D82



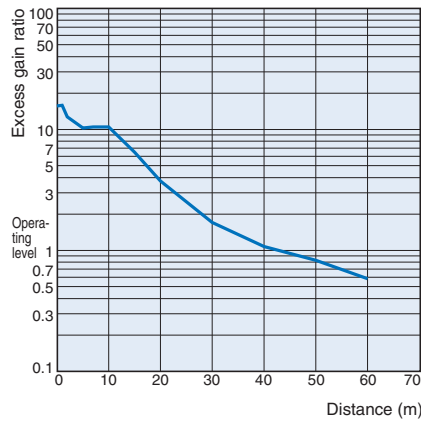
Receiver Output vs. Distance

Through-beam

E3Z-T61/T81 (Red light)

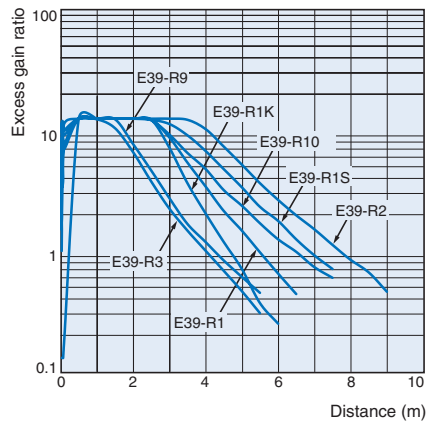


E3Z-T61/T81 (Infrared light)



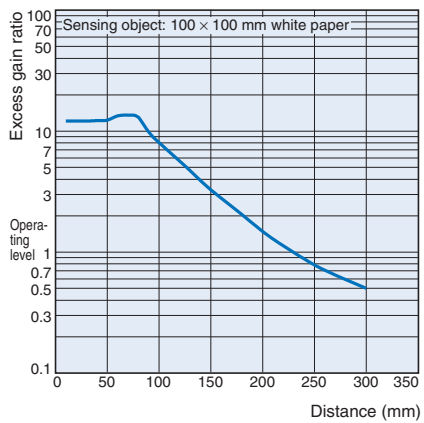
Retroreflective

E3Z-R61/R81

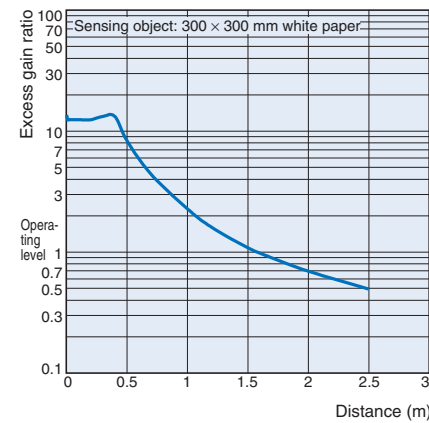


Diffuse-reflective

E3Z-D61/D81



E3Z-D62/D82

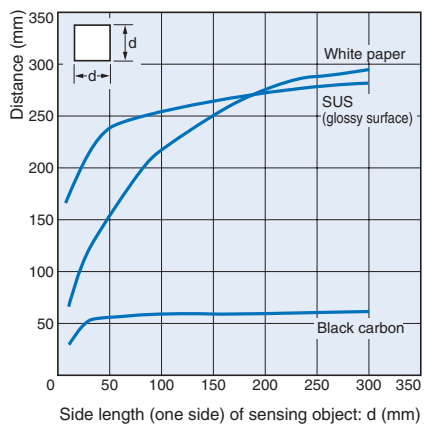




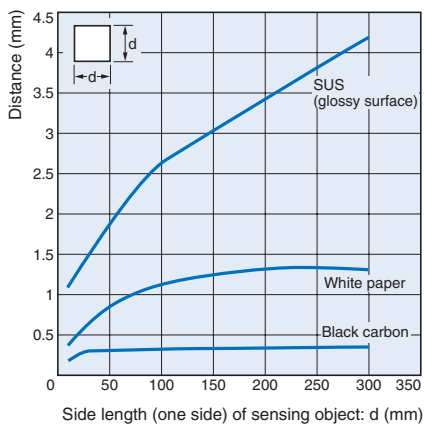
Sensing Object Size vs. Distance

Diffuse-reflective

E3Z-D61/D81



E3Z-D62/D82



## Output Circuit Diagram

### Additional functions: Self-diagnostic Output without Timer

#### NPN output

Model	Output configuration	Timing chart	Mode selection switch	Output circuit
E3Z-T61-J0S□□-□□ E3Z-R61-J0SRW-□□ E3Z-D61-J0SHW-□□ E3Z-D62-J0SHW-□□	Light-ON	<p>Incident Interrupted Operation indicator (orange) ON OFF Output transistor ON OFF Load Operates (Relay) Releases [Between brown (1) to black (4)]</p>	LIGHT ON (L/ON)	<p>Through-beam receivers, Retroreflective models, Diffuse-reflective models</p> <p>Through-beam emitters</p>
	Dark-ON	<p>Incident Interrupted Operation indicator (orange) ON OFF Output transistor ON OFF Load Operates (Relay) Releases [Between brown (1) and black (4)]</p>	DARK ON (D/ON)	

Note: Refer to *Connector Pin Arrangement* on page 17 for details on connector pin arrangement.

#### PNP output

Model	Output configuration	Timing chart	Mode selection switch	Output circuit
E3Z-T81-J0S□□-□□ E3Z-R81-J0SRW-□□ E3Z-D81-J0SHW-□□ E3Z-D82-J0SHW-□□	Light ON	<p>Incident Interrupted Operation indicator (orange) ON OFF Output transistor ON OFF Load Operates (Relay) Releases [Between brown (1) to black (4)]</p>	LIGHT ON (L/ON)	<p>Through-beam receivers, Retroreflective models, Diffuse-reflective models</p> <p>Through-beam emitters</p>
	Dark ON	<p>Incident Interrupted Operation indicator (orange) ON OFF Output transistor ON OFF Load Operates (Relay) Releases [Between blue (3) and black (4)]</p>	DARK ON (D/ON)	

Note: Refer to *Connector Pin Arrangement* on page 17 for details on connector pin arrangement.

Additional functions: Emission Stop without Timer

NPN output

Model	Output configuration	Timing chart	Mode selection switch	Output circuit
E3Z-T61-G0S□□-□□ E3Z-R61-G0SRW-□□ E3Z-D61-G0SHW-□□ E3Z-D62-G0SHW-□□	Light-ON		LIGHT ON (L/ON)	Retroreflective models, Diffuse-reflective models 
	Dark-ON		DARK ON (D/ON)	Through-beam receivers 
	---		---	Through-beam emitters 

Note: Refer to Connector Pin Arrangement on page 17 for details on connector pin arrangement.

PNP output

Model	Output configuration	Timing chart	Mode selection switch	Output circuit
E3Z-T81-G0S□□-□□ E3Z-R81-G0SRW-□□ E3Z-D81-G0SHW-□□ E3Z-D82-G0SHW-□□	Light-ON		LIGHT ON (L/ON)	Retroreflective models, Diffuse-reflective models 
	Dark-ON		DARK ON (D/ON)	Through-beam receivers 
	---		---	Through-beam emitters 

Note: Refer to Connector Pin Arrangement on page 17 for details on connector pin arrangement.

Additional functions: Light intensity Switching without Timer  
NPN output

Model	Output configuration	Margin in light intensity	Timing chart Mode selection switch	Mode selection switch	Output circuit
E3Z-T61-G2S□□-□□ E3Z-R61-G2SRW-□□ E3Z-D61-G2SHW-□□ E3Z-D62-G2SHW-□□	Light-ON	x2 min. (Diffuse-reflective models: x1.4 min.)	<p>Incident Interrupted</p> <p>Operation indicator (orange) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load (Relay) Operates Releases</p> <p>[Between brown (1) and black (4)]</p> <p>Light intensity switching input ON OFF</p>	LIGHT ON (L/ON)	<p>Retroreflective models, Diffuse-reflective models</p>
		x2 max. (Diffuse-reflective models: x1.4 max.)	<p>Incident Interrupted</p> <p>Operation indicator (orange) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load (Relay) Operates Releases</p> <p>[Between brown (1) and black (4)]</p> <p>Light intensity switching input ON OFF</p>		
---	Dark-ON	x2 min. (Diffuse-reflective models: x1.4 min.)	<p>Incident Interrupted</p> <p>Operation indicator (orange) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load (Relay) Operates Releases</p> <p>[Between brown (1) and black (4)]</p> <p>Light intensity switching input ON OFF</p>	DARK ON (D/ON)	<p>Through-beam receivers</p>
		x2 max. (Diffuse-reflective models: x1.4 max.)	<p>Incident Interrupted</p> <p>Operation indicator (orange) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load (Relay) Operates Releases</p> <p>[Between brown (1) and black (4)]</p> <p>Light intensity switching input ON OFF</p>		
---	---	---	<p>Light intensity switching input ON OFF</p> <p>[Between blue (3) and pink (2)]</p> <p>LED for emitter ON OFF</p> <p>Indicator (orange) ON OFF</p>	---	<p>Through-beam emitters</p>

Note: Refer to Connector Pin Arrangement on page 17 for details on connector pin arrangement.

PNP output

Model	Output configuration	Margin in light intensity	Timing chart	Mode selection switch	Output circuit	
E3Z-T81-G2S□□-□□ E3Z-R81-G2SRW-□□ E3Z-D81-G2SHW-□□ E3Z-D82-G2SHW-□□	Light-ON	x2 min. (Diffuse-relective models: x1.4 min.)		LIGHT ON (L/ON)	<p>Retroreflective models, Diffuse-reflective models</p>	
		x2 max. (Diffuse-relective models: x1.4 max.)				
	Dark-ON	x2 min. (Diffuse-relective models: x1.4 min.)			DARK ON (D/ON)	<p>Through-beam receivers</p>
		x2 max. (Diffuse-relective models: x1.4 max.)				
---	---	---		---	<p>Through-beam emitters</p>	

Note: Refer to *Connector Pin Arrangement* on page 17 for details on connector pin arrangement.

Additional functions: Emission Stop with Fixed OFF-delay Timer

NPN output

Model	Output configuration	Timing chart	Mode selection switch	Output circuit
E3Z-T61-G0T□□□□ E3Z-R61-G0TRW-□□ E3Z-D61-G0THW-□□ E3Z-D62-G0THW-□□	Light-ON	<p>Incident Interrupted</p> <p>Operation indicator (orange) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load Operates (Relay) Releases [Between brown (1) and black (4)]</p> <p>Emission stop input ON OFF</p> <p>T: OFF-delay time</p>	LIGHT ON (L/ON)	<p>Retroreflective models, Diffuse-reflective models</p> <p>Operation indicator (orange) Stability indicator (green)</p> <p>Main circuit</p> <p>(Control output)</p> <p>Brown 12 to 24 VDC Pink Black 100 mA max. Blue Emission stop input 0 V</p>
	Dark-ON	<p>Incident Interrupted</p> <p>Operation indicator (orange) ON OFF</p> <p>Output transistor ON OFF</p> <p>Output Operates (Relay) Releases [Between brown (1) and black (4)]</p> <p>Emission stop input ON OFF</p> <p>T: OFF-delay time</p>	DARK ON (D/ON)	<p>Through-beam receivers</p> <p>Operation indicator (orange) Stability indicator (green)</p> <p>Main circuit</p> <p>(Control output)</p> <p>Brown 12 to 24 VDC Pink Black 100 mA max. Blue Emission stop input 0 V</p>
	---	<p>Emission stop input ON OFF [Between blue (3) and pink (2)]</p> <p>LED for emitter ON OFF</p> <p>Indicator (orange) ON OFF</p>	---	<p>Through-beam emitters</p> <p>Power indicator (orange)</p> <p>Main circuit</p> <p>(Emission stop input)</p> <p>Brown 10 to 30 VDC Pink Blue 0 V</p>

Note: Refer to Connector Pin Arrangement on page 17 for details on connector pin arrangement.

PNP output

Model	Output configuration	Timing chart	Mode selection switch	Output circuit
E3Z-T81-G0T□□□□ E3Z-R81-G0TRW-□□ E3Z-D81-G0THW-□□ E3Z-D82-G0THW-□□	Light-ON	<p>Incident Interrupted</p> <p>Operation indicator (orange) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load Operates (Relay) Releases [Between blue (3) and black (4)]</p> <p>Emission stop input ON OFF</p> <p>T: OFF-delay time</p>	LIGHT ON (L/ON)	<p>Retroreflective models, Diffuse-reflective models</p> <p>Operation indicator (orange) Stability indicator (green)</p> <p>Main circuit</p> <p>(Control output)</p> <p>Brown 12 to 24 VDC Pink Black 100 mA max. Blue Emission stop input 0 V</p>
	Dark-ON	<p>Incident Interrupted</p> <p>Operation indicator (orange) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load Operates (Relay) Releases [Between blue (3) and black (4)]</p> <p>Emission stop input ON OFF</p> <p>T: OFF-delay time</p>	DARK ON (D/ON)	<p>Through-beam receivers</p> <p>Operation indicator (orange) Stability indicator (green)</p> <p>Main circuit</p> <p>(Control output)</p> <p>Brown 12 to 24 VDC Pink Black 100 mA max. Blue Emission stop input 0 V</p>
	---	<p>Emission stop input ON OFF [Between brown (1) and pink (2)]</p> <p>LED for emitter ON OFF</p> <p>Indicator (orange) ON OFF</p>	---	<p>Through-beam emitters</p> <p>Power indicator (orange)</p> <p>Main circuit</p> <p>(Emission stop input)</p> <p>Brown 10 to 30VDC Pink Blue 0 V</p>

Note: Refer to Connector Pin Arrangement on page 17 for details on connector pin arrangement.

Additional functions: Light Intensity Switching with Fixed OFF-delay Timer

NPN output

Model	Output configuration	Margin in light intensity	Timing chart	Mode selection switch	Output circuit	
E3Z-T61-G2T□□-□□ E3Z-R61-G2TRW-□□ E3Z-D61-G2THW-□□ E3Z-D62-G2THW-□□	Light-ON	x2 min. (Diffuse-relective models: x1.4 min.)		LIGHT ON (L/ON)	<p>Retroreflective models, Diffuse-reflective models</p>	
		x2 max. (Diffuse-relective models: x1.4 max.)				
	Dark-ON	x2 min. (Diffuse-relective models: x1.4 min.)		DARK ON (D/ON)	<p>Through-beam receivers</p>	
		x2 max. (Diffuse-relective models: x1.4 max.)				
	---	---	---		---	<p>Through-beam emitters</p>

Note: Refer to Connector Pin Arrangement on page 17 for details on connector pin arrangement.

PNP output

Model	Output configuration	Margin in light intensity	Timing chart Mode selection switch	Mode selection switch	Output circuit
E3Z-T81-G2T□□-□□ E3Z-R81-G2TRW-□□ E3Z-D81-G2THW-□□ E3Z-D82-G2THW-□□	Light ON	x2 min. (Diffuse-relective models: x1.4 min.)		LIGHT ON (L/ON)	<p>Retroreflective models, Diffuse-relective models</p>
		x2 max. (Diffuse-relective models: x1.4 max.)			
	Dark ON	x2 min. (Diffuse-relective models: x1.4 min.)			
---	---	x2 max. (Diffuse-relective models: x1.4 max.)			
		---	---		---

Note: Refer to Connector Pin Arrangement on page 17 for details on connector pin arrangement^



## Connection pin arrangement

M12 Junction Connector (-M1)

M8 Connector (-CN)  
M8 Junction Connector (-M3)

M12 connector pin arrangement

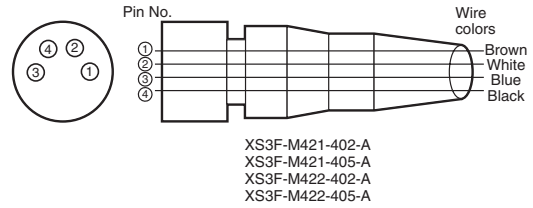


M8 connector pin arrangement



## Connectors (Sensor I/O connectors)

M8 Connector (-CN)  
M8 Junction Connector (-M3)



## Precautions

### Caution

Do not connect an AC power supply to the Sensor. If AC power (100 VAC or more) is supplied to the Sensor, it may explode or burn.

### Precautions for Safe Use

Be sure to abide by the following precautions for the safe operation of the Sensor.

### Wiring

#### Power Supply Voltage and Output Load Power Supply Voltage

Make sure that the power supply to the Sensor is within the rated voltage range. If a voltage exceeding the rated voltage range is supplied to the Sensor, it may be damaged or burn.

#### Load

- Do not exceed the rated load.
- Do not short-circuit the load, otherwise the Sensor may be damaged or explode.
- Do not connect the power supply to the Sensor with no load connected, otherwise the internal elements may explode or burn.

### Operating Environment

Do not use the Sensor in locations with explosive or flammable gas.

### Precautions for Correct Use

#### Design

##### Power Reset Time

The Sensor is ready to operate 100 ms after the Sensor is turned ON. If the load and Sensor are connected to independent power supplies respectively, be sure to turn ON the Sensor before supplying power to the load.

### Wiring

#### Avoiding Malfunctions

If using the Photoelectric Sensor with an inverter or servomotor, always ground the FG (frame ground) and G (ground) terminals. Otherwise, the Sensor may malfunction.

## Mounting

### Mounting the Sensor

- If Sensors are mounted face-to-face, make sure that the optical axes are not in opposition to each other. Otherwise, mutual interference may result.
- Always install the Sensor carefully so that the aperture angle range of the Sensor will not cause it to be directly exposed to intensive light, such as sunlight, fluorescent light, or incandescent light.
- Do not strike the Photoelectric Sensor with a hammer or any other tool during the installation of the Sensor, or the Sensor will lose its water-resistive properties.
- Use M3 screws to mount the Sensor.
- The degree of protection is IEC IP67, but avoid use in water, or outdoors.
- When mounting the case, make sure that the tightening torque applied to each screw does not exceed 0.54 N·m.

## Connectors

- Always turn OFF the power supply to the Sensor before connecting or disconnecting the metal connector.
- Hold the connector cover to connect or disconnect it.
- Secure the connector cover by hand. Do not use pliers, otherwise the connector may be damaged.
- If the connector is not connected securely, it may be disconnected by vibration or the proper degree of protection of the Sensor may not be maintained.

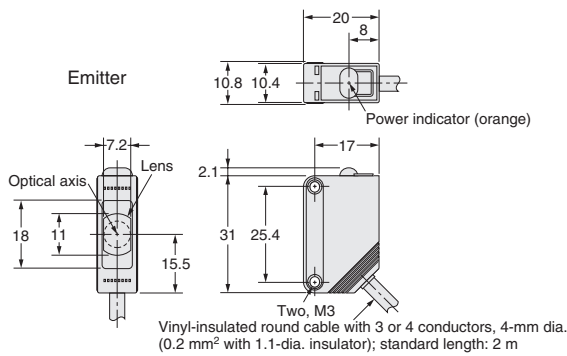
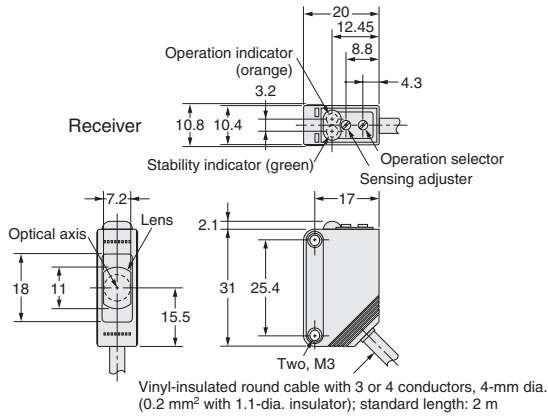
## Cleaning

Never use paint thinners or other organic solvents to clean the surface of the product.

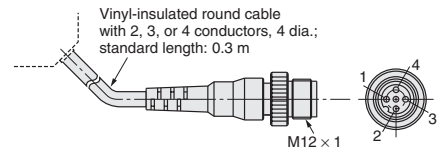
## Dimensions (Unit: mm)

Note: All units are in millimeters unless otherwise indicated.

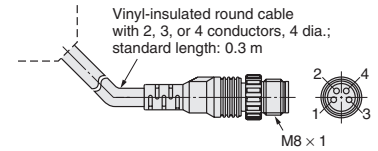
### Through-beam Pre-wired models E3Z-T □ □



### M12 Junction Connector (-M1)



### M8 Junction Connector (-M3)



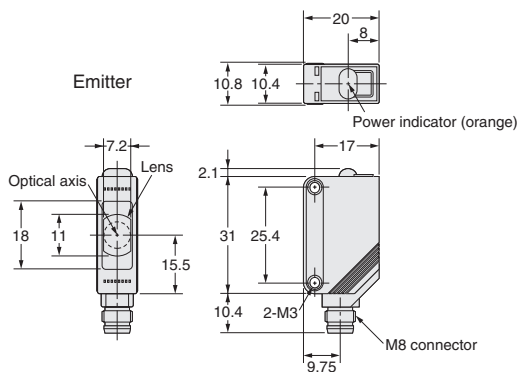
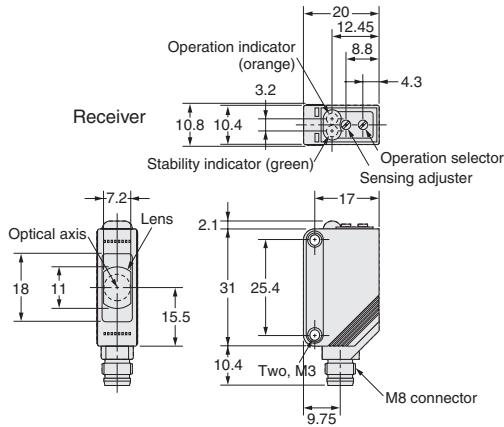
### Receiver Connector Pin Arrangement

Terminal No.	Specifications
1	+ V
2	Unused or self-diagnostic output
3	0 V
4	Output

### Emitter Connector Pin Arrangement

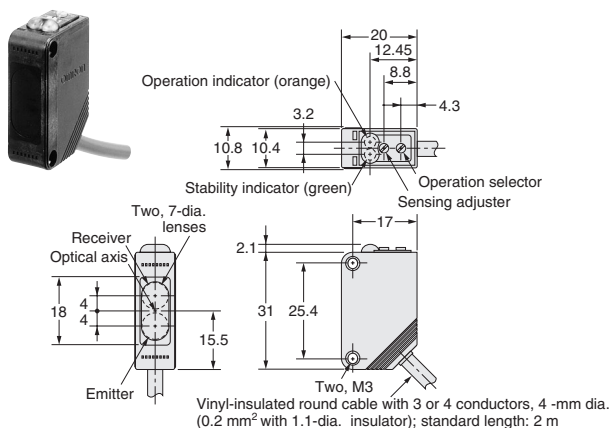
Terminal No.	Specifications
1	+ V
2	Unused, emission stop input, or light intensity switching input
3	0 V
4	Unused

### Through-beam M8 Connector E3Z-T

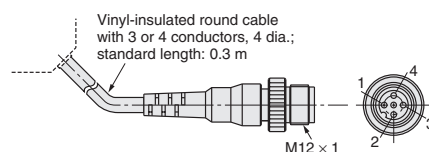


**Retroreflective**  
Pre-wired models  
E3Z-R□ □

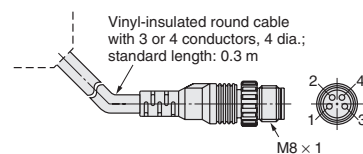
**Diffuse-reflective**  
Pre-wired models  
E3Z-D□ □



M12 Junction Connector (-M1)



M8 Junction Connector (-M3)

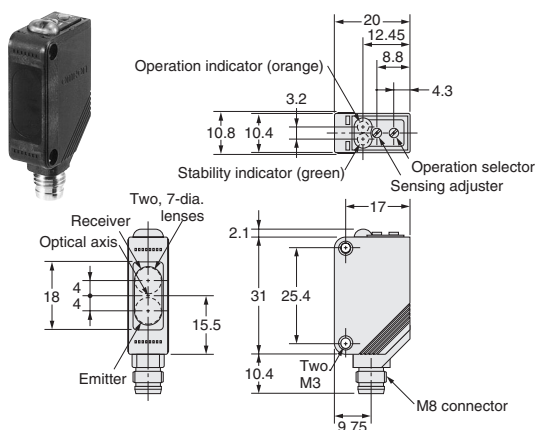


Connector Pin Arrangement

Terminal No.	Specifications
1	+V
2	Unused, self-diagnostic output, emission stop input, or light intensity switching input
3	0V
4	Output

**Retroreflective**  
M8 Connector type  
E3Z-R□ □

**Diffuse-reflective**  
M8 Connector type  
E3Z-D□ □



• The application examples provided in this catalog are for reference only. Check functions and safety of the equipment before use.  
• Never use the products for any application requiring special safety requirements, such as nuclear energy control systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, or other 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 products are properly rated and installed for the intended use within the overall equipment or system.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.  
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E39E-EN-01

**In the interest of product improvement, specifications are subject to change without notice.**

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