New Product

OMRON

Built-in Power Supply Photoelectric Sensor
E3JK <NEW>

Long-distance Photoelectric Sensor That Supports AC/DC Power Supplies

- **Long sensing distance that is approximately 8 times that of our conventional model (for the Through-beam and Diffuse-reflective models). (Through-beam: 40 m, Retro-reflective: 7 m, and Diffuse-reflective: 2.5 m.)**
- **Improved visibility:**
  - A red LED that makes the spot visible.
  - Large indicators that can be seen even from a distance.
- **Improved operability. (Enlarged sensitivity adjuster and operation selector)**
- **Freely selectable power supply input (24 to 240 VDC, 24 to 240 VAC). (Additional types added to the DC type lineup.)**

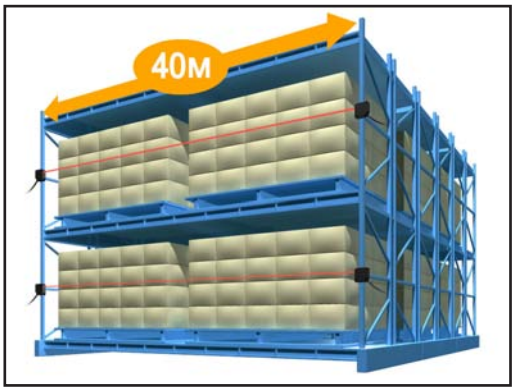
Refer to the *Safety Precautions* on page 12.

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

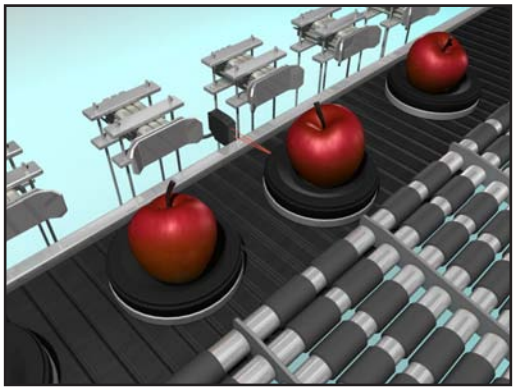
Applications

Elevator cage detection

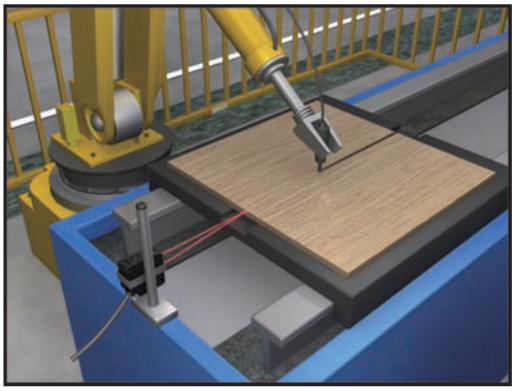
Detection of packages jutting out from their storage location



Pallet detection for agricultural produce conveyors



Workpiece detection for woodworking machines

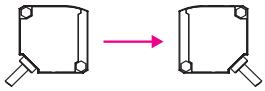
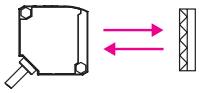
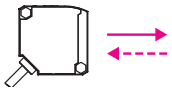
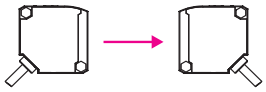
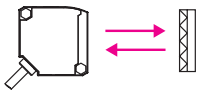
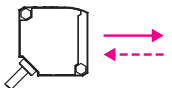


Ordering Information

Sensors

Red light

Sensors without Brackets or Reflectors

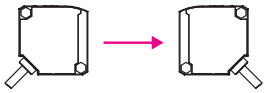
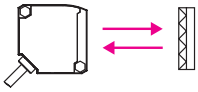
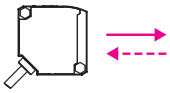
Power supply voltage	Sensing method	Appearance	Sensing distance	Output configu-ration	Model
AC/DC power supply selectable type	Through-beam *1 (Emitter + Receiver)		40 m	Relay	**E3JK-TR11 2M**
			5 m		**E3JK-TR12 2M**
	Retro-reflective without MSR function	 *3	7 m [100 mm] (When using E39-R1) *3 11 m [100 mm] (When using E39-R2)		**E3JK-RR11 2M**
	Retro-reflective with MSR function		6 m [100 mm] (When using E39-R1) *3 10 m [100 mm] (When using E39-R2)		**E3JK-RR12 2M**
	Diffuse-reflective		2.5 m		**E3JK-DR11 2M**
			300 mm		**E3JK-DR12 2M**
DC	Through-beam *1 (Emitter + Receiver)		40 m	NPN	**E3JK-TN11 2M**
				PNP	**E3JK-TP11 2M**
			5 m	NPN	**E3JK-TN12 2M**
				PNP	**E3JK-TP12 2M**
	Retro-reflective without MSR function	 *2	7 m [100 mm] (When using E39-R1) *3 11 m [100 mm] (When using E39-R2)	NPN	**E3JK-RN11 2M**
				PNP	**E3JK-RP11 2M**
	Retro-reflective with MSR function		6 m [100 mm] (When using E39-R1) *3 10 m [100 mm] (When using E39-R2)	NPN	**E3JK-RN12 2M**
				PNP	**E3JK-RP12 2M**
	Diffuse-reflective		2.5 m	NPN	**E3JK-DN11 2M**
				PNP	**E3JK-DP11 2M**
			300 mm	NPN	**E3JK-DN12 2M**
				PNP	**E3JK-DP12 2M**

*1. Through-beam Sensors are sold in sets that include both the Emitter and Receiver.
*2. A Reflector is not included. Purchase a Reflector separately to match the intended use of the Sensor.
*3. Values in parentheses indicate the minimum required distances between the Sensors and Reflectors.

Sensors

Red light

Sensors with Brackets and Reflectors (The model numbers contain (“-C.”)

Power supply voltage	Sensing method	Appearance	Sensing distance	Output configu-ration	Model
AC/DC power supply select-able	Through-beam *1 (Emitter + Receiv-er)		40m	Relay	**E3JK-TR11-C 2M**
			5m		**E3JK-TR12-C 2M**
	Retro-reflective without MSR func-tion		7m *2 [100mm] (When using E39-R1) 11m [100mm] (When using E39-R2)		**E3JK-RR11-C 2M**
	Retro-reflective with MSR function		6m *2 [100mm] (When using E39-R1) 10m [100mm] (When using E39-R2)		**E3JK-RR12-C 2M**
	Diffuse-reflective		2.5m		**E3JK-DR11-C 2M**
			300mm		**E3JK-DR12-C 2M**

*1. Through-beam Sensors are sold in sets that include both the Emitter and Receiver.
*2. Values in parentheses indicate the minimum required distances between the Sensors and Reflectors.

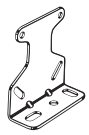
Accessories (Order Separately)

Reflectors (A Reflector is required for Retro-reflective Sensors.) **[Refer to *Dimensions* on page 14.]**
The E39-R1 is enclosed with Sensors with model numbers that contain “-C.”

Name	Sensing distance (rated value)		Model	Quantity
Reflectors	E3JK-**R□11**	7 m [100 mm] *	**E39-R1**	1
	E3JK-**R□12**	6 m [100 mm] *		
	E3JK-**R□11**	9 m [100 mm] *	**E39-R1S**	1
	E3JK-**R□12**	7 m [100 mm] *		
	E3JK-**R□11**	11 m [100 mm] *	**E39-R2**	1
	E3JK-**R□12**	10 m [100 mm] *		

Note: Refer to *Engineering Data* on page 9 for details.
*Values in parentheses indicate the minimum required distances between the Sensors and Reflectors.

Mounting Bracket **[Refer to *Dimensions* on page 14.]**
A Mounting Bracket is enclosed with Sensors with model numbers that contain “-C.”

Appearance	Model	Quantity
	**E39-L40**	1

Note: 1. When using a Through-beam Sensor, order one Mounting Bracket for the Receiver and one for the Emitter.
2. For details, refer to *Mounting Brackets* on E39-L/E39-S/E39-R which can be accessed from your OMRON website.

E3JK

Ratings and Specifications

Item / Sensing method		Through-beam		
Model		E3JK-TR11-□	E3JK-TN11	E3JK-TP11
Sensing distance		40 m		
Standard sensing object		Opaque: 17-mm dia. min.		
Differential travel		–		
Directional angle		Both Emitter and Receiver 3° min.		
Light source (wavelength)		Red LED (624 nm)		
Power supply voltage		24 to 240 VDC ±10%, ripple (p-p): 10% max. 24 to 240 VAC ±10%, 50/60 Hz	10 to 30 VDC, including ripple (p-p): 10%	
Power consumption	DC	3 W max. (Emitter 1.5 W max. Receiver 1.5 W max.)	40 mA max. (Emitter 25 mA max. Receiver 15 mA max.)	
	AC	3 W max. (Emitter 1.5 W max. Receiver 1.5 W max.)	–	
Control output		Relay output SPDT, 250 VAC, 3 A max. (cosφ= 1), 5 VDC, 10 mA min., Light-ON/Dark-ON selectable	Load power supply voltage: 30 V max., Load current: 100 mA max., Residual voltage: 3 V max., open-collector output (NPN/PNP output depending on model), Light-ON/Dark-ON selectable	
Life expectancy (relay output)	Mechanical	50,000,000 times min. (switching frequency: 18,000 times/h)		
	Electrical	100,000 times min. (switching frequency: 1,800 times/h)		
Response time		20 ms max.	1 ms max.	
Sensitivity adjustment		One-turn adjuster Receiver (E3JK-T□□□-D) only		
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lx max., Sunlight: 11,000 lx max.		
Ambient temperature range		Operating: –25°C to 55°C, Storage: –40°C 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		1,500 VAC, 50/60 Hz for 1 min		
Vibration resistance	Destruction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
	Malfunction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance	Destruction	500 m/s^2 for 3 times each in X, Y, and Z directions		
	Malfunction	100 m/s^2 for 3 times each in X, Y, and Z directions	500 m/s^2 for 3 times each in X, Y, and Z directions	
Degree of protection		IEC 60529 IP64		
Connection method		Pre-wired (standard length: 2 m)		
Weight (packed state)		Approx. 350 g	Approx. 300 g	
Material	Case	ABS (Acrylonitril Butadiene Styrene)		
	Lens/Display window	Methacrylic resin		
	Adjuster	POM		
	Cable	PVC		
Bending radius of cable		R18		
Accessories		Instruction manual and Mounting Bracket (E3JK-TR11-C only)		

Item / Sensing method		Through-beam		
Model		E3JK-TR12-□	E3JK-TN12	E3JK-TP12
Sensing distance		5 m		
Standard sensing object		Opaque: 17-mm dia. min.		
Differential travel		–		
Directional angle		Both Emitter and Receiver 3° min.		
Light source (wavelength)		Red LED (624 nm)		
Power supply voltage		24 to 240 VDC ±10%, ripple (p-p): 10% max. 24 to 240 VAC ±10%, 50/60 Hz	10 to 30 VDC, including ripple (p-p): 10%	
Power consumption	DC	3 W max. (Emitter 1.5 W max. Receiver 1.5 W max.)	40 mA max. (Emitter 25 mA max. Receiver 15 mA max.)	
	AC	3 W max. (Emitter 1.5 W max. Receiver 1.5 W max.)	–	
Control output		Relay output SPDT, 250 VAC, 3 A max. (cosφ= 1), 5 VDC, 10 mA min., Light-ON/Dark-ON selectable	Load power supply voltage: 30 V max., Load current: 100 mA max., Residual voltage: 3 V max., open-collector output (NPN/PNP output depending on model), Light-ON/Dark-ON selectable	
Life expectancy (relay output)	Mechanical	50,000,000 times min. (switching frequency: 18,000 times/h)		
	Electrical	100,000 times min. (switching frequency: 1,800 times/h)		
Response time		20 ms max.	1 ms max.	
Sensitivity adjustment		One-turn adjuster Receiver (E3JK-T□□□-D) only		
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lx max., Sunlight: 11,000 lx max.		
Ambient temperature range		Operating: –25°C to 55°C, Storage: –40°C 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		1,500 VAC, 50/60 Hz for 1 min		
Vibration resistance	Destruction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
	Malfunction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance	Destruction	500 m/s^2 for 3 times each in X, Y, and Z directions		
	Malfunction	100 m/s^2 for 3 times each in X, Y, and Z directions	500 m/s^2 for 3 times each in X, Y, and Z directions	
Degree of protection		IEC 60529 IP64		
Connection method		Pre-wired (standard length: 2 m)		
Weight (packed state)		Approx. 350 g	Approx. 300 g	
Material	Case	ABS (Acrylonitril Butadiene Styrene)		
	Lens/Display window	Methacrylic resin		
	Adjuster	POM		
	Cable	PVC		
Bending radius of cable		R18		
Accessories		Instruction manual and Mounting Bracket (E3JK-TR12-C only)		

Item / Sensing method		Retro-reflective (without MSR function)		
Model		E3JK-RR11-□	E3JK-RN11	E3JK-RP11
Sensing distance		7 m [100 mm]* (When using E39-R1), 11 m [100 mm]* (When using E39-R2)		
Standard sensing object		Opaque: 75-mm dia. min.		
Differential travel		–		
Directional angle		1.5° min.		
Light source (wavelength)		Red LED (624 nm)		
Power supply voltage		24 to 240 VDC ±10%, ripple (p-p): 10% max. 24 to 240 VAC ±10%, 50/60 Hz	10 to 30 VDC, including ripple (p-p): 10%	
Power consumption	DC	2 W max.	30 mA max.	
	AC	2 W max.	–	
Control output		Relay output SPDT, 250 VAC, 3 A max. (cosφ= 1), 5 VDC, 10 mA min., Light-ON/Dark-ON selectable	Load power supply voltage: 30 V max., Load current: 100 mA max., Residual voltage: 3 V max., open-collector output (NPN/PNP output depending on model), Light-ON/Dark-ON selectable	
Life expectancy (relay output)	Mechanical	50,000,000 times min. (switching frequency: 18,000 times/h)		
	Electrical	100,000 times min. (switching frequency: 1,800 times/h)		
Response time		20 ms max.	1 ms max.	
Sensitivity adjustment		One-turn adjuster		
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lx max., Sunlight: 11,000 lx max.		
Ambient temperature range		Operating: –25°C to 55°C, Storage: –40°C 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		1,500 VAC, 50/60 Hz for 1 min		
Vibration resistance	Destruction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
	Malfunction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance	Destruction	500 m/s^2 for 3 times each in X, Y, and Z directions		
	Malfunction	100 m/s^2 for 3 times each in X, Y, and Z directions	500 m/s^2 for 3 times each in X, Y, and Z directions	
Degree of protection		IEC 60529 IP64		
Connection method		Pre-wired (standard length: 2 m)		
Weight (packed state)		Approx. 180 g	Approx. 160 g	
Material	Case	ABS (Acrylonitril Butadiene Styrene)		
	Lens/Display window	Methacrylic resin		
	Adjuster	POM		
	Cable	PVC		
Bending radius of cable		R18		
Accessories		Instruction manual, Mounting Bracket (E3JK-RR11-C only), and Reflector (E3JK-RR11-C only)		

*Values in parentheses indicate the minimum required distances between the Sensors and Reflectors.

Item / Sensing method		Retro-reflective (with MSR function)		
	Model	E3JK-RR12-□	E3JK-RN12	E3JK-RP12
Sensing distance		6 m [100 mm]* (When using E39-R1), 10 m [100 mm]* (When using E39-R2)		
Standard sensing object		Opaque: 75-mm dia. min.		
Differential travel		–		
Directional angle		1.5° min.		
Light source (wavelength)		Red LED (624 nm)		
Power supply voltage		24 to 240 VDC ±10%, ripple (p-p): 10% max. 24 to 240 VAC ±10%, 50/60 Hz	10 to 30 VDC, including ripple (p-p): 10%	
Power consumption	DC	2 W max.	30 mA max.	
	AC	2 W max.	–	
Control output		Relay output SPDT, 250 VAC, 3 A max. (cosφ= 1), 5 VDC, 10 mA min., Light-ON/Dark-ON selectable	Load power supply voltage: 30 V max., Load current: 100 mA max., Residual voltage: 3 V max., open-collector output (NPN/PNP output depending on model), Light-ON/Dark-ON selectable	
Life expectancy (relay output)	Mechanical	50,000,000 times min. (switching frequency: 18,000 times/h)		
	Electrical	100,000 times min. (switching frequency: 1,800 times/h)		
Response time		20 ms max.	1 ms max.	
Sensitivity adjustment		One-turn adjuster		
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lx max., Sunlight: 11,000 lx max.		
Ambient temperature range		Operating: –25°C to 55°C, Storage: –40°C 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		1,500 VAC, 50/60 Hz for 1 min		
Vibration resistance	Destruction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
	Malfunction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance	Destruction	500 m/s^2 for 3 times each in X, Y, and Z directions		
	Malfunction	100 m/s^2 for 3 times each in X, Y, and Z directions	500 m/s^2 for 3 times each in X, Y, and Z directions	
Degree of protection		IEC 60529 IP64		
Connection method		Pre-wired (standard length: 2 m)		
Weight (packed state)		Approx. 180 g	Approx. 160 g	
Material	Case	ABS (Acrylonitril Butadiene Styrene)		
	Lens/Display window	Methacrylic resin		
	Adjuster	POM		
	Cable	PVC		
Bending radius of cable		R18		
Accessories		Instruction manual, Mounting Bracket (E3JK-RR12-C only), and Reflector (E3JK-RR12-C only)		

*Values in parentheses indicate the minimum required distances between the Sensors and Reflectors.

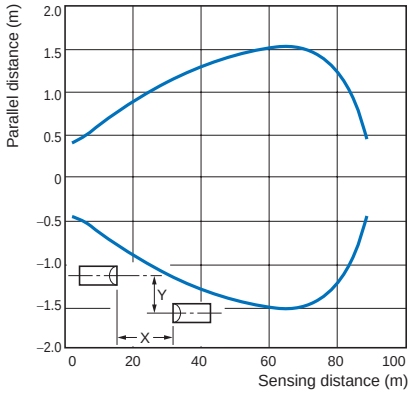
Item / Sensing method		Diffuse-reflective					
Item	Model	E3JK-DR11-□	E3JK-DR12-□	E3JK-DN11	E3JK-DP11	E3JK-DN12	E3JK-DP12
Sensing distance		White paper (300 × 300 mm): 2.5 m	White paper (100 × 100 mm): 300 mm	White paper (300 × 300 mm): 2.5 m		White paper (100 × 100 mm): 300 mm	
Standard sensing object		–					
Differential travel		20% max. of sensing distance					
Directional angle		–					
Light source (wavelength)		Red LED (624 nm)					
Power supply voltage		24 to 240 VDC ±10%, ripple (p-p): 10% max. 24 to 240 VAC ±10%, 50/60 Hz		10 to 30 VDC, including ripple (p-p): 10%			
Power consumption	DC	2 W max.		30 mA max.			
	AC	2 W max.		–			
Control output		Relay output SPDT, 250 VAC, 3 A max. (cosφ= 1), 5 VDC, 10 mA min., Light-ON/Dark-ON selectable		Load power supply voltage: 30 V max., Load current: 100 mA max., Residual voltage: 3 V max., open-collector output (NPN/PNP output depending on model), Light-ON/Dark-ON selectable			
Life expectancy (relay output)	Mechanical	50,000,000 times min. (switching frequency: 18,000 times/h)					
	Electrical	100,000 times min. (switching frequency: 1,800 times/h)					
Response time		20 ms max.		1 ms max.			
Sensitivity adjustment		One-turn adjuster					
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lx max., Sunlight: 11,000 lx max.					
Ambient temperature range		Operating: –25°C to 55°C, Storage: –40°C 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		1,500 VAC, 50/60 Hz for 1 min					
Vibration resistance	Destruction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions					
	Malfunction	10 to 55 Hz with a 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions					
Shock resistance	Destruction	500 m/s^2 for 3 times each in X, Y, and Z directions					
	Malfunction	100 m/s^2 for 3 times each in X, Y, and Z directions		500 m/s^2 for 3 times each in X, Y, and Z directions			
Degree of protection		IEC 60529 IP64					
Connection method		Pre-wired (standard length: 2 m)					
Weight (packed state)		Approx. 180 g		Approx. 160 g			
Material	Case	ABS (Acrylonitril Butadiene Styrene)					
	Lens/Display window	Methacrylic resin					
	Adjuster	POM					
	Cable	PVC					
Bending radius of cable		R18					
Accessories		Instruction manual and Mounting Bracket (E3JK-DR1□-C only)					

Engineering Data (Reference Value)

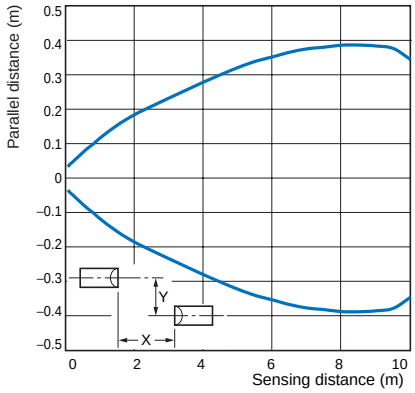
Parallel Operating Range

Through-beam

E3JK-T□11

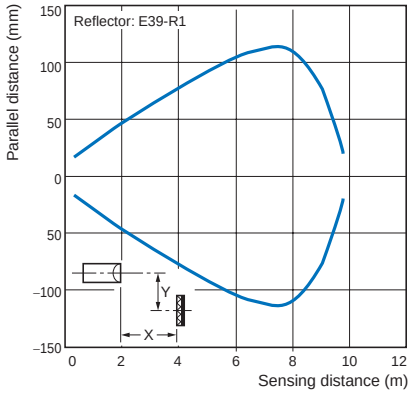


E3JK-T□12

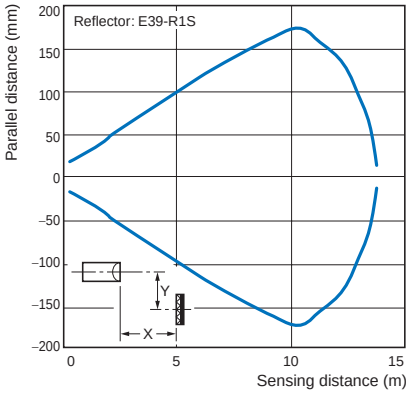


Retro-reflective

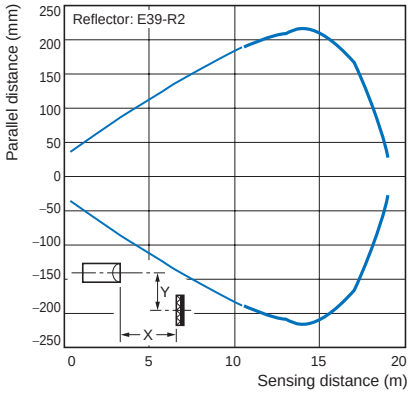
E3JK-R□□1+E39-R1



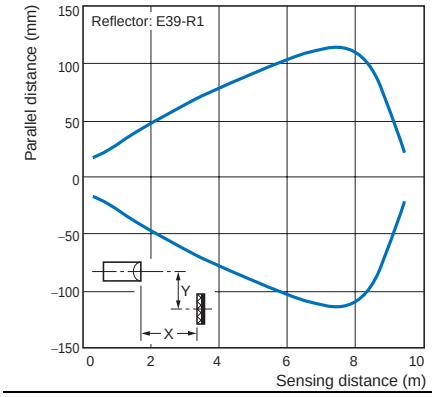
E3JK-R□□1+E39-R1S



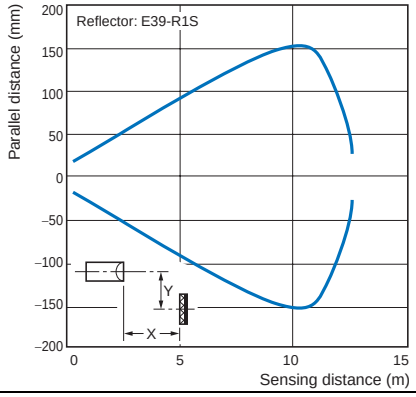
E3JK-R□□1+E39-R2



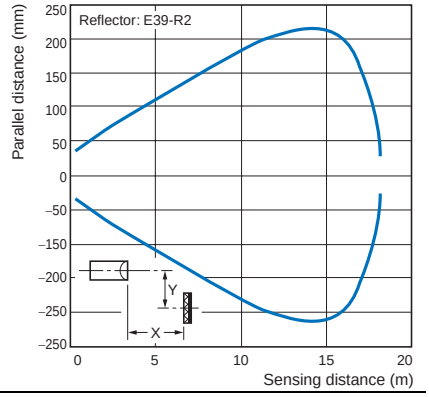
E3JK-R□□2+E39-R1



E3JK-R□□2+E39-R1S



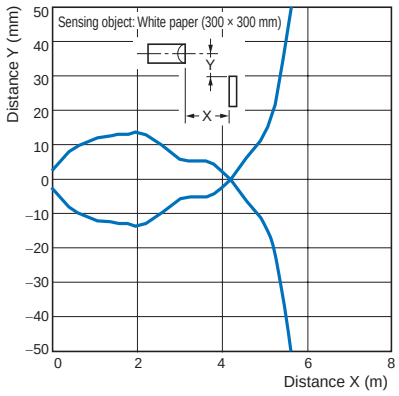
E3JK-R□□2+E39-R2



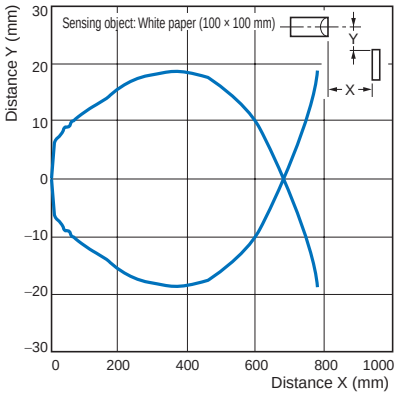
Operating Range

Diffuse-reflective

E3JK-D□□1



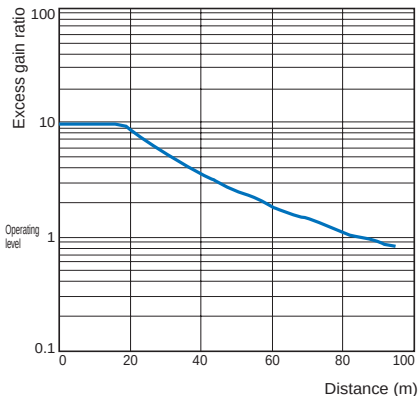
E3JK-D□□2



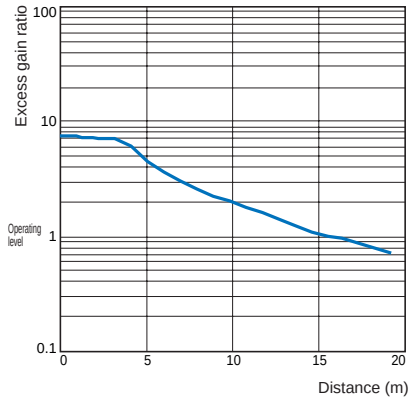
Excess Gain Ratio vs. Set Distance

Through-beam

E3JK-T□11

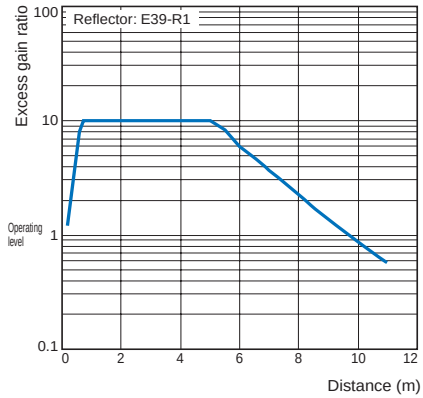


E3JK-T□12

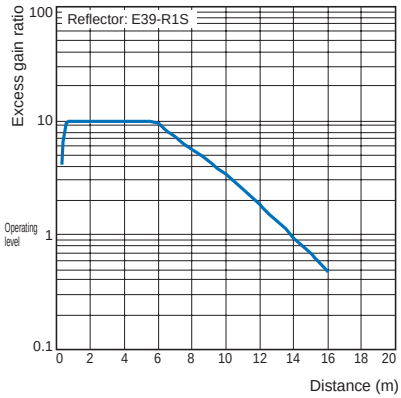


Retro-reflective

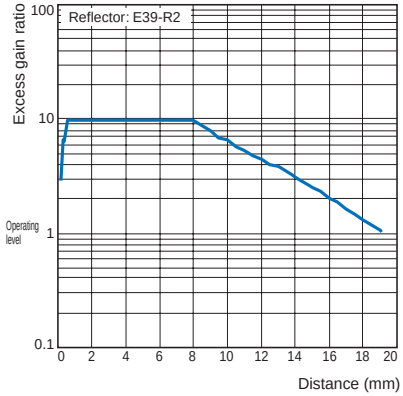
E3JK-R□□1+E39-R1



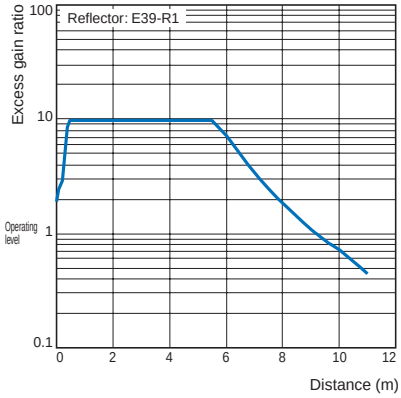
E3JK-R□□1+E39-R1S



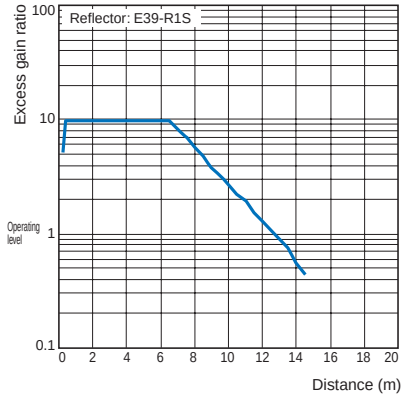
E3JK-R□□1+E39-R2



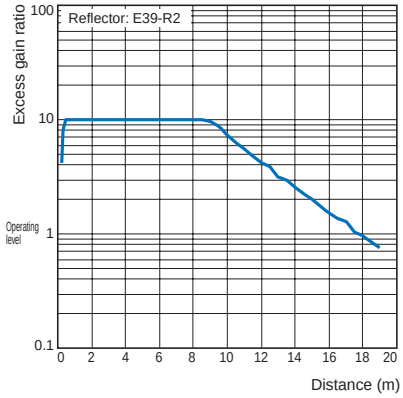
E3JK-R□□2+E39-R1



E3JK-R□□2+E39-R1S

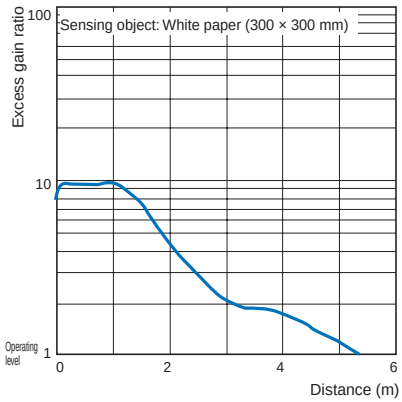


E3JK-R□□2+E39-R2

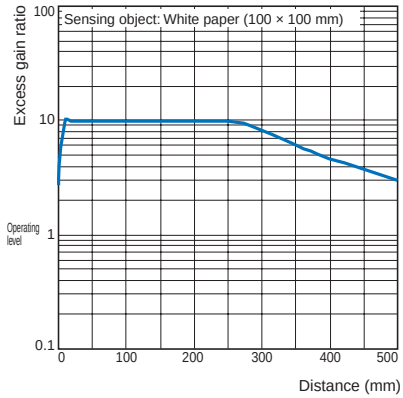


Diffuse-reflective

E3JK-D□□1

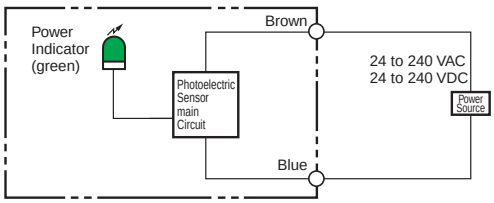
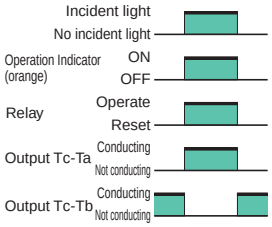
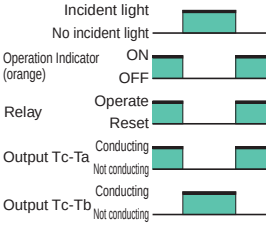
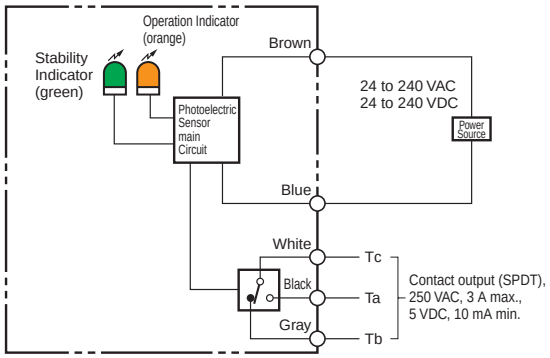


E3JK-D□□2

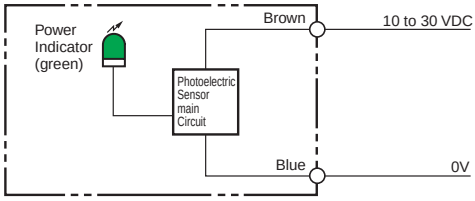
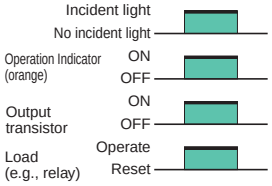
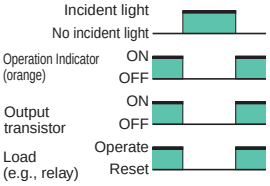
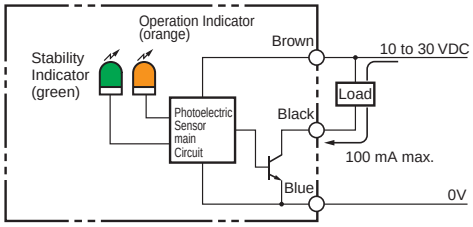
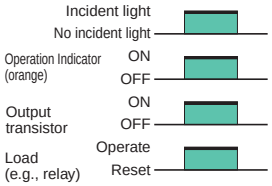
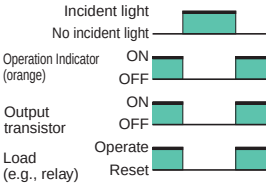
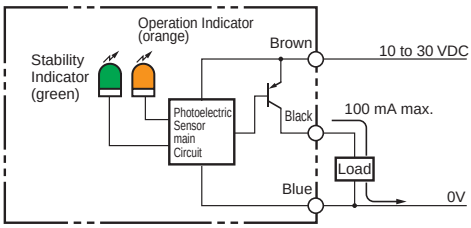


I/O Circuit Diagrams

Relay Output Models

Model	Timing chart		Output circuit
	Light-ON	Dark-ON	
E3JK-TR11-L * E3JK-TR12-L *			
E3JK-TR11-D * E3JK-TR12-D * E3JK-RR11 E3JK-RR12 E3JK-DR11 E3JK-DR12			

DC SSR Output Models

Model	Timing chart		Output circuit
	Light-ON	Dark-ON	
E3JK-TN11-L * E3JK-TP11-L * E3JK-TN12-L * E3JK-TP12-L *			
E3JK-TN11-D * E3JK-TN12-D * E3JK-RN11 E3JK-RN12 E3JK-DN11 E3JK-DN12			
E3JK-TP11-D * E3JK-TP12-D * E3JK-RP11 E3JK-RP12 E3JK-DP11 E3JK-DP12			

Note: Connect the brown cable to any polarity and the blue cable to the power supply because there is no polarity on the Emitter side.
*For the Through-beam Sensor, the Emitter is listed as E3JK-T□11-L, E3JK-T□12-L and the Receiver is listed as E3JK-T□11-D, E3JK-T□12-D in the table. Confirm the models to order in "Ordering Information."

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

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

⚠ Caution

Do not wire the product incorrectly.
Do not use this product with a damaged case or cable.

Do not disassemble, repair, or modify this product.
Doing so may lead to explosion, fire, or product failure.

Precautions for Safe Use

The following precautions must be observed to ensure safe operation of the Sensor.

1. Do not use the Sensor in environments subject to flammable, explosive or corrosive gases.
2. Do not use this product in an environment in which oil or chemicals are present.
3. Do not use this product under water, in the rain, or outdoors.
4. Do not use this product under conditions that exceed or in an environment that exceeds the ratings.
5. When using an AC power supply, do not use a power supply that includes high frequencies (such as an inverter).
6. Do not use this product in a location subject to direct sunlight.
7. Do not use this product in a location in which the product will be subject to direct vibrations or impacts.
8. Do not use thinner, alcohol, or other organic solvents with this product.
9. When disposing of the Sensor, treat it as industrial waste.

Precautions for Correct Use

- If the product is wired to high-voltage power lines and power lines in the same pipe or the same duct, the product may malfunction or be damaged due to induction. Therefore, in principle, perform these two types of wiring separately or use shielded cords.
- Do not apply excessive force to the cables.
- When using a commercially available switching regulator, be sure to install an FG (frame ground terminal).
- The time between the product being turned ON and sensing being possible is 100 ms, so wait at least 100 ms after turning the product ON before using it. If the load and the product are connected to different power supplies, be sure to turn the product ON first.
- An output pulse may be generated when the product is turned OFF, so we recommend turning the load or the load line OFF first.

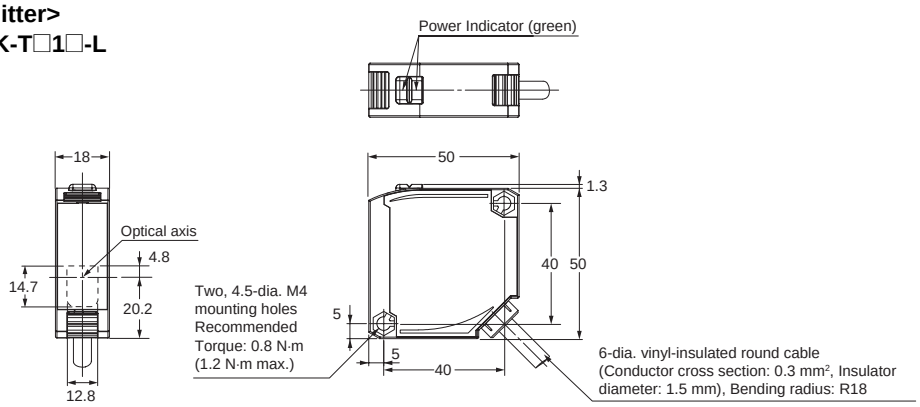
Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

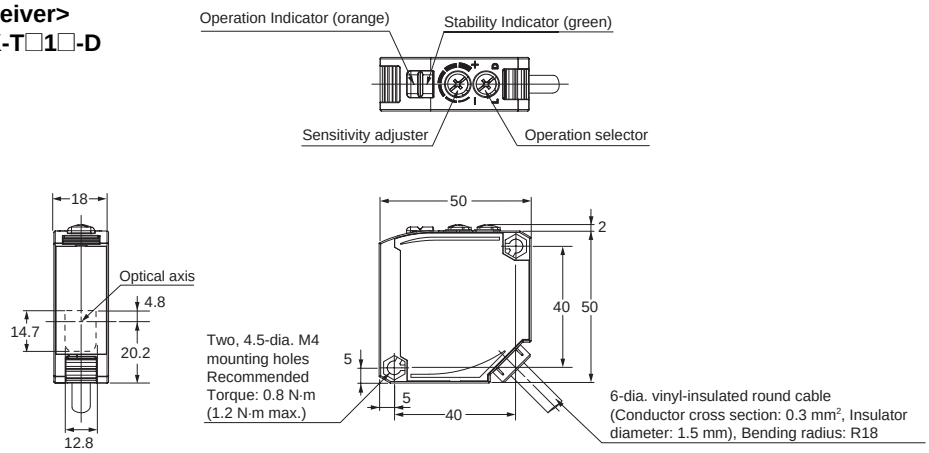
Sensors

Through-beam
E3JK-T□1□

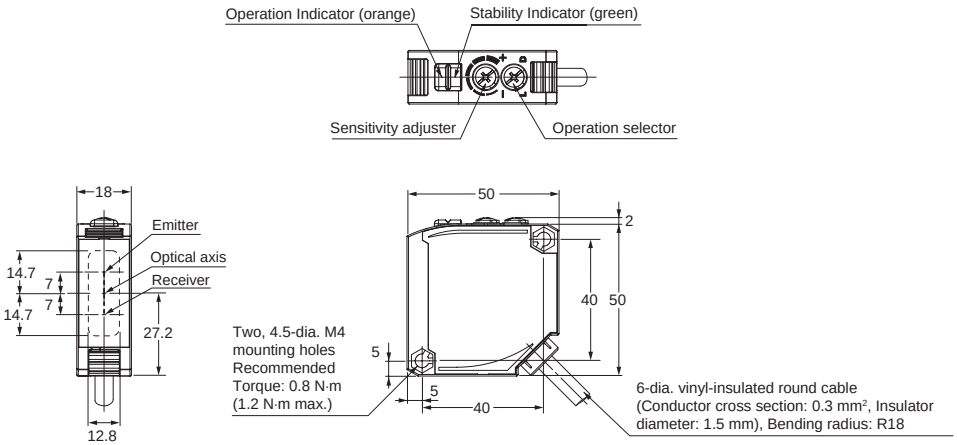
<Emitter>
E3JK-T□1□-L



<Receiver>
E3JK-T□1□-D



Diffuse-reflective/ Retro-reflective
E3JK-R□1□
E3JK-D□1□

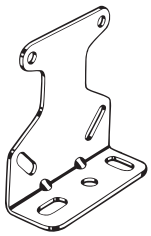


Accessories

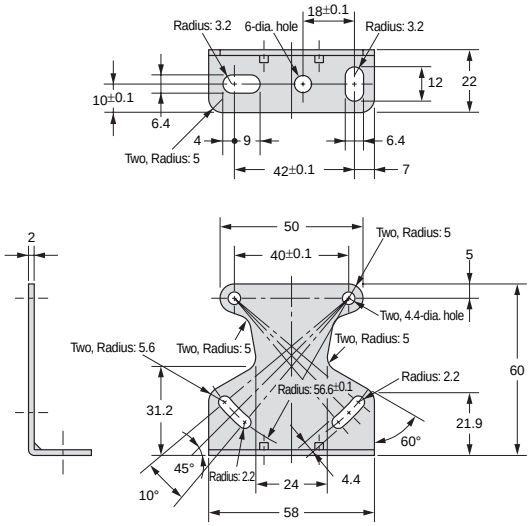
Mounting Bracket (Order separately)

Mounting Bracket

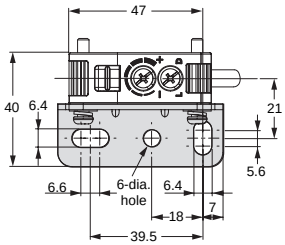
E39-L40



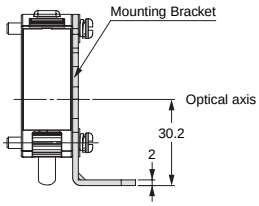
Material: Iron



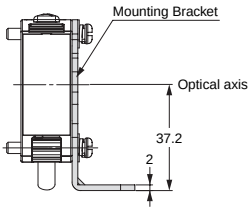
With Mounting Bracket Attached

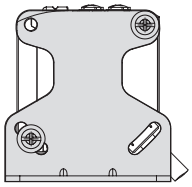


Through-beam

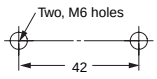


Diffuse-reflective/
Retro-reflective





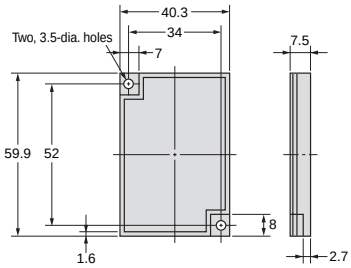
Mounting Holes



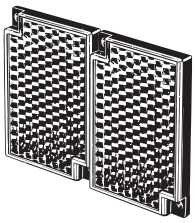
Reflector (Order separately)

E39-R1
E39-R1S

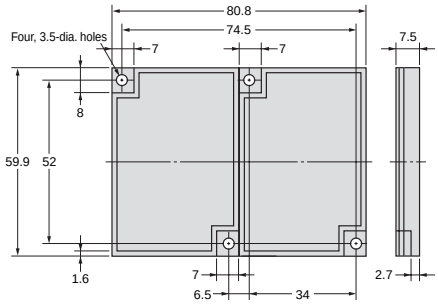
Material:
Reflective surface: acrylic
Rear surface: ABS



E39-R2



Material:
Reflective surface: acrylic
Rear surface: ABS



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Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

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

Regional Headquarters
OMRON EUROPE B.V.
Sensor Business Unit
Carl-Benz-Str. 4, D-71154 Nufringen,
Germany
Tel: (49) 7032-811-0/Fax: (49) 7032-811-199

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 ELECTRONICS LLC
One Commerce Drive Schaumburg,
IL 60173-5302 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

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

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