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You can read the recommendations in the user guide, the technical guide or the installation guide for OMRON E3ZM-V. You'll find the answers to all your questions on the OMRON E3ZM-V in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual OMRON E3ZM-V
User guide OMRON E3ZM-V
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Instruction manual OMRON E3ZM-V

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Print mark detection photoelectric sensor in compact stainless steel housing
E3ZM-V

The detergent resistant photoelectric sensor in a robust stainless steel housing provides reliable detection of all common print marks in packaging applications.

- White LED for stable detection of differently colored print marks
- SUS 316L stainless steel housing
- Easy-to-use teach-in button or remote dynamic teach
- Fast response time of 50 µs

Features

Reliable print mark detection within OMRON's most popular E3Z sensor family
The E3ZM-V provides reliable print mark detection in the compact sized E3Z housing. For packaging machine makers the E3Z family offers a complete sensor platform with one mounting concept simplifying installation and machine design.

- **Space-saving design with an SUS316L housing**
The compact design reduces volume by 90% compared to conventional mark sensors.
- **Coaxial optical system**
The coaxial optical system ensures stable detection of print marks on uneven surfaces.

Straight Sensing Object

Inclined Sensing Object

E3ZM Standard Size

Conventional mark sensor size

Only 10% the volume!

E3ZM-V

E3ZM-V 1



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Manual abstract:

· White LED for stable detection of differently colored print marks · SUS 316L stainless steel housing · Easy-to-use teach-in button or remote dynamic teach · Fast response time of 50 μs Features Reliable print mark detection within OMRON's most popular E3Z sensor family The E3ZM-V provides reliable print mark detection in the compact sized E3Z housing. For packaging machine makers the E3Z family offers a complete sensor platform with one mounting concept simplifying installation and machine design. · Space-saving design with an SUS316L housing The compact design reduces volume by 90% compared to conventional mark sensors. · Coaxial optical system The coaxial optical system ensures stable detection of print marks on uneven surfaces. Straight Sensing Object RGB light-receiving element Half mirror E3ZM Standard Size Only 10% the volume! Conventional mark sensor size E3ZM-V Lens White LED Sensing object (with regular reflection) Inclined Sensing Object RGB light-receiving element Half mirror Lens White LED Sensing object (with regular reflection) E3ZM-V 1 Water and detergent resistance The housing is constructed of corrosion-resistant SUS316L, and the display cover is PES (polyethersulfone). Both materials are highly resistant to the corrosive effects of detergents and disinfectants. The IP69k tight housing construction ensures long sensor lifetime in often cleaned environments. Same Durability as the E3ZM Reliable detection of differently colored print marks due to RGB signal processing · RGB signal processing The white LED and RGB signal processing ensure the stable detection of differently colored print marks. The processing algorithm provides a fast response time of 50 μs. RGB light-receiving element Patent pending White LED · Easy setting with 2-point or automatic teaching 2-point Teaching (Manual) Simply aim the beam spot at the mark portion and background portion, and press the teaching button.

Automatic Teaching (Remote) Send a pulse to the remote control input and have the mark pass by six times for automatic teaching. 2 Photoelectric Sensor Ordering Information Sensor Sensing method Appearance Connection method Pre-wired (2 m) Mark Sensor (Diffuse reflective) Connector (M8, 4 pins) Sensing distance Model NPN output E3ZM-V61 2M PNP output E3ZM-V81 2M E3ZM-V86 White light 12±2 mm *1 E3ZM-V66 *1. A deviation of ±2 mm (typical value) can be handled for combinations of white, yellow, and black. Refer to page 5 for the detection capability for other color combinations. Accessories Sensor I/O Connectors Size Cable Straight 5m M8 (4 pins) Standard 2m L-shaped 5m XS3F-E422-405-A Note 1: The outer cover of the cable is made of PVC (polyvinyl chloride), the nut is SUS316L, and the degree of protection is IP67.

When high-pressure washing will be used, select an I/O Connector that has IP69K degree of protection. Note 2: For detergent resistant cable connectors with stainless steel nuts see accessory datasheet E26E or contact your OMRON representative Appearance Cable type 2m 4-wire Model XS3F-E421-402-A XS3F-E421-405-A XS3F-E422-402-A Mounting Brackets Appearance Model (Material) E39-L153 (SUS304) Quantity Remarks Appearance Model Quantity (Metal material) E39-L98 (SUS304) Mounting Brackets E39-L104 (SUS304) 1 E39-L150 (SUS304) 1 set (Sensor adjuster) Easily mounted to the aluminum frame rails of conveyors and easily adjusted. @@@@Refer to Engineering Data on page 5 for details. 2-mm dia. max.

@@@ (Residual voltage: 2 V max.) Open-collector output (NPN/PNP output depending on model) NPN output ON: Short-circuit to 0 V, or 1.5 V max. (source current: 1 mA max.) NPN output OFF: Open or Vcc 1.5 V to Vcc (leakage current: 0.1 mA max.) PNP output ON: Vcc 1.5 V to Vcc (sink current: 1 mA max.) PNP output OFF: Open or 1.

5 V max. (leakage current: 0.1 mA max.) Set in the order of the teaching operation. *2 Reversed power supply polarity, Load short-circuit protection, and Reversed output polarity protection Operate or reset: 50 s max. Teaching method (Receiver side) Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max. Operating: - to 60°C *3, Storage: - to 70°C (with no icing or condensation) 40 40 Operating: 35% to 85%, Storage: 35% to 95% (with no condensation) 20 M min. (at 500 VDC) 1,000 VAC at 50/60 Hz for 1 min 10 to 55 Hz, 1.5-mm double amplitude for 2 h each in X, Y, and Z directions 500 m/s² for 3 times each in X, Y, and Z directions IEC 60529: IP67, DIN 40050-9: IP69K *4 Pre-wired cable (standard length: 2 m) or M8 4-pin connector Operating indicator (yellow), Stability indicator (green), and Teaching indicator (red) Pre-wired models (2-m cable): Approx.

85 g Connector models: Approx. 35 g SUS316L PMMA (polymethylmethacrylate) PES (polyethersulfone) Fluoro rubber PVC (polyvinyl chloride) Instruction sheet Sensing distance Sensing range Spot diameter Light source (wavelength) Power supply voltage Power consumption Control output Remote control input Operating modes Protection circuits Response time Sensitivity adjustment Ambient illumination Ambient temperature range Ambient humidity range Insulation resistance Dielectric strength Vibration resistance (destruction) Shock resistance (destruction) Degree of protection Connection method Indicator Weight (packed state) Materials Housing Lens Indication Buttons Cable Accessories *1. *2. *3. *4.

A deviation of ±2 mm (typical value) can be handled for combinations of white, yellow, and black. Refer to page 5 for the detection capabilities for other colors. Mark Sensor output switching: When teaching, specify the ON color first and the OFF color second. Do not bend the cable in temperatures of -25°C or lower. For connector models IP69k rating is with connector attached.

Standard Sensing Object for the Mark Sensor Color White Red Yellow-red Yellow Yellow-green Green Blue-green Blue (Black) Munsell color notation N9.5 4R 4.5/12.0 4YR 6.0/11.5 5Y 8.5/11.0 3GY 6.5/10.0 3G 6.

5/9.0 5BG 4.5/10.0 3PB 5.0/10.0 (N2.0) 4 Photoelectric Sensor Engineering Data (Typical) Color vs. Detection Capability E3ZM-V@@ Teaching Capabilities White Red White Red Yellowred Yellow Yellowgreen Green Bluegreen Blue Black YellowYellowBluered Yellow green Green green Blue Black Note: The above chart shows the combinations of colors for which teaching is possible at a sensing distance of 12 mm. Detectable Ranges E3ZM-V@@

Background color: White Teaching distance: 12 mm 14.0 13. 5 13.0 12.5 12.0 11.5 11. 0 10.5 10.0 Detectable range (mm) Detectable range (mm) Background color: Red Teaching distance: 12 mm 14.0 13.5 13. 0 12.5 12.0 11.5 11.0 10.5 10.0 Background color: Yellow-red Teaching distance: 12 mm 14.0 13.5 13.0 12.

5 12.0 11.5 11.0 10.5 10.0 Detectable range (mm) Red Yellow- Yellow Yellow- Green Blue- Blue Black red green green White Yellow- Yellow Yellow- Green Blue- Blue Black red green green White Red Yellow Yellow- Green Blue- Blue Black green green Detectable range (mm) Detectable range (mm) Detectable range (mm) Background color: Yellow Teaching distance: 12 mm 14.



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0 13.5 13.0 12.5 12.

0 11.5 11.0 10.5 10.0 White Red Yellow- Yellow- Green Blue- Blue Black green red green Background color: Yellow-green Teaching distance: 12 mm 14.
0 13.5 13.0 12.5 12.0 11.

5 11.0 10.5 10.0 White Red Yellow- Yellow Green Blue- Blue Black green red Background color: Green Teaching distance: 12 mm 14.0 13.5 13.0 12.5 12.0
11.5 11.

0 10.5 10.0 White Red Yellow- Yellow Yellow- Blue- Blue Black red green green Detectable range (mm) 14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.
5 10.0 White Red Yellow- Yellow Yellow- Green Blue Black red green Detectable range (mm) 14.0 13.5 13.0 12.

5 12.0 11.5 11.0 10.5 10.

0 White Red Yellow- Yellow Yellow- Green Blue- Black red green green Detectable range (mm) Background color: Blue-green Teaching distance: 12 mm
Background color: Blue Teaching distance: 12 mm Background color: Black Teaching distance: 12 mm 14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 White
Red Yellow- Yellow Yellow- Green Blue- Blue red green green E3ZM-V 5 Excess Gain vs.

Distance E3ZM-V@@ Incident light (%) 120 Angle vs. Incident Characteristics E3ZM-V@@ Incident light (%) Teaching ON for white and OFF for black at
12 mm 100 E3ZM-V@@ Incident light (%) Teaching ON for white and OFF for black at 12 mm 100 100 80 80 80 60 60 40 60 40 40 20 20 20 0 10 11 12 13
14 0 -20 12 mm -15 -10 -5 0 5 10 15 20 0 -20 12 mm -15 -10 -5 0 5 10 15 20 Distance (mm) Angle (°) Angle (°) I/O Circuit Diagrams NPN Output Model
E3ZM-V61 E3ZM-V66 Timing charts Sensing object Color taught 1st ON OFF ON OFF Color taught 2nd Color taught 1st Color taught 2nd Output circuit
Operation indicator (yellow) Teaching indicator (red) Stability indicator (green) Photoelectric Sensor Main Circuit 1 Brown Load Operation indicator
(yellow) Output transistor 2 Pink Remote control input 10 to 30 VDC 4 Black Control output Operate Load (e.g., relay) Reset Between brown (1) and black
(4) leads 3 Blue M8 Connector Pin Arrangement 24 1 3 PNP Output Model E3ZM-V81 E3ZM-V86 Timing charts Sensing object Color taught 1st ON OFF
ON OFF Color taught 2nd Color taught 1st Color taught 2nd Output circuit Operation indicator (yellow) Teaching indicator (red) Stability indicator (green)
1 Brown Control Black output Remote Pink control input Operation indicator (yellow) Output transistor Photoelectric Sensor Main Circuit 4 10 to 30 VDC 2
Load 3 Operate Load (e.g., relay) Reset Between blue (3) and black (4) leads Blue M8 Connector Pin Arrangement 24 1 3 Plugs (Sensor I/O Connectors) M8
4-pin Connectors Wire color 4 3 2 1 1 2 3 4 Brown White Blue Black XS3F-E421-402-A XS3F-E421-405-A XS3F-E422-402-A XS3F-E422-405-A
Classification Wire color Connector Application pin No. DC Brown White Blue Black 1 2 3 4 Power supply (+v) Remote control input Power supply (0 V)
Output Note: The above M8 Connectors made by OMRON are IP67. Do not use them in an environment where IP69K is required. 6 Photoelectric Sensor
Nomenclature Teaching Models Stability indicator (green) Operation indicator (yellow) Teaching indicator (red) Teaching button Safety Precautions Refer to
Warranty and Limitations of Liability on page 12. WARNING This product is not designed or rated for directly or indirectly ensuring safety of persons.
Do not use it for such a purpose. Low-temperature Environments Do not touch the metal surface with your bare hands when the temperature is low. Touching
the surface may result in a cold burn. Oily Environments Do not use the Sensor in oily environments. They may damage parts and reduce the degree of
protection.

Modifications Do not attempt to disassemble, repair, or modify the Sensor. Outdoor Use Do not use the Sensor in locations subject to direct sunlight. Cleaning
Do not use thinner, alcohol, or other organic solvents. Otherwise, the optical properties and degree of protection may be degraded. Cleaning Do not use
highly concentrated cleaning agents.

Otherwise, malfunction may result. Also, do not use high-pressure water with a level of pressure that exceeds the stipulated level. Otherwise, the degree of
protection may be reduced. Surface Temperature Burn injury may occur. The Sensor surface temperature rises depending on application conditions, such as
the ambient temperature and the power supply voltage. Use caution when operating or performing maintenance on the Sensor. Cable Bending Do not bend
the cable in temperatures of - C or below. Oth25° erwiseinfectants, but performance may suffer in some types of detergents, disinfectants, and chemicals.
Refer to the following table prior to use. ·The E3ZM has passed detergent and disinfectant resistance testing for the substances listed in the following table.

Use this table as a guide when considering detergents and disinfectants. Type Chemicals Product name Sodium hydroxide, NaOH Potassium hydroxide, KOH
Phosphoric acid, H3PO4 Hydrogen peroxide, H2O2 Alkaline foaming cleansers Acidic foaming cleansers Disinfectants Topax 66s (Ecolab) Concentration
1.5% 1.5% 2.5% 6.5% 3.0% Temperature 70°C 70°C 70°C 25°C 25°C 70°C Time 240 h 240 h 240 h 240 h 240 h 240 h Sodium hypochlorite, NaClO 0.3%
Topax 56 (Ecolab) Oxonia Active 90 (Ecolab) TEK121 (ABC Compounding) 5.0% 1.0% 1.

1% 70°C 25°C 25°C 240 h 240 h 240 h Note: The Sensor was immersed in the above chemicals, detergents, and disinfectants for 240 h at the temperatures
given, and then passed an insulation resistance test at 100 MW min. Restrictions on Sensing Objects Do not use this Sensor if the color and pattern of the
background are similar to those of the mark. Detection of Glossy Objects Mount the Sensor at an angle of 5° to 15°, as shown in the following diagram.

@@@ Press the teaching button for approximately 0.5 second.

@@@ Press the teaching button for approximately 0.5 second. @@@@ (Flashes in cycles of approx. @@Send a pulse with a duration of at least
2 s but less than 10 s min. to the remote control input (pink).

2. @@Make sure the mark passes through the beam spot for at least 1.5 ms. @@3. @@@@ In cases such as these, use 2-point teaching.

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