OMRON

E3JU

PHOTOELECTRIC SENSOR

Instruction Sheet

Thank you for purchasing this OMRON product. Please read this instruction sheet and thoroughly familiarize yourself with the functions and characteristics of the product before use. Please retain this sheet for future reference.

■ SPECIFICATIONS

Part number			E3JU-25□4□-□	E3JU-R5□4□-□	E3JU-D1□4□-□	E3JU-D2□4□-□	E3JU-R5M1-MN1
Method of detection			Through-beam type	Polarized retroreflective	Diffuse reflective	Diffuse reflective	Polarized retroreflective
Supply voltage			24 to 240 VAC ± 10%, 50/60 Hz; 12 to 240 VDC, 10% max peak-to-peak ripple				
Power consumption			Emit: 2 W max, Rec: 3.5 W max	3.5 W max	4.0 W max	4.0 W max	2.5 W max
Sensing distance / Target			25 m (82 ft)	5 m (16.4 ft) / E39-R1 reflector (supplied)	1 m (3.3 ft) / 20 cm² (7.9 in²) (Kodak gray card white side 90% reflective)	2 m (6.6 ft) / 30 cm² (11.8 in²)	5 m (16.4 ft) / E39-R1 reflector (supplied)
Light source			Infrared LED, 950 nm	Polarized red LED, 660 nm	Infrared LED, 950 nm	Infrared LED, 950 nm	Polarized red LED, 660 nm
Detectable object type, size (min)			Opaque, 16 mm (0.63 in)	Opaque, 56 mm (2.2 in)	Opaque and translucent	Opaque and translucent	Opaque, 56 mm (2.2 in)
Operation mode			Light-ON / Dark-ON, switch selectable				Light-ON only
Sensitivity			Adjustable				Not adjustable
Mutual interference protection			Not provided	Provided			
Control output	Contact	Type	SPDT relay				
		Max load	3 A, 250 VAC, 30 VDC rated (p.f. =1)				
		Min load	10 mA, 5 VDC minimum				
		Response	Models w/o timer and timer models set to No Timer: 12 ms On (6 ms typ.), 12 ms Off (5 ms typ.); Models with timer: 0.1 to 10 sec (adjustable)				
	Solid state	Type	Power MOSFET relay				Not provided
		Max load	400 mA AC/DC (600 mA up to 40°C), 240 VAC, 100 VDC rated				
		Response	Models w/o timer and timer models set to No Timer: 8 ms On, 12 ms Off max; Models with timer: 0.1 to 10 sec (adjustable)				
Timer Functions (models w/ timer)			On-delay, off-delay, on/off delay, one-shot retrigger or non-retrigger, delayed one-shot retrigger or non-retrigger; switch selectable				Not provided
Output short-circuit protection			Not provided				
Indicators			Light incident (red LED), output operation (yellow LED), stability (green LED)				
Materials			Lens: PMMA; case: ABS/PC; cover: PC				
Mounting			Two M5 front-mounting through holes. M30 externally threaded base. 1/2-14 NPSM internal threads accessible for cable type; conduit torque not to exceed 100 in-lbs				
Connections		Pre-wired	(-6) 600 V rated, AWG20: 2, 4 wire cables, AWG21: 5 wire cables or (-3) 300 V rated, AWG22: 4, 5 wire cables				Not provided
		Connector	Mini-change type connector: 2, 4,and 5 pins				Mini-change 5 pins
Weight		Emitter	(-6): 260 g, (-3): 180 g, (-MN1): 115 g	(-6): 300 g, (-3): 220 g, (-MN1): 130 g	(-3): 235 g, (-6): 315 g, (-MN1): 145 g		(-MN1): 130 g
		Receiver	(-6): 300 g, (-3): 220 g, (-MN1): 130 g				
Enclosure ratings			UL type 1; NEMA 1, 2, 3, 4X, 5, 12; IEC 144: IP67				
Approvals		UL, CSA, CE	UL listed: E41515; CSA certified: LR45951; CE: IEC947-5-2				
Ambient temperature			Operating: -25° to 55° C (-13° to 131° F); storage: -40° to 70° C (-40° to 158° F)				

■ PROTECTIVE COVER CARE

Cover Screw: The torque of the cover screw must not exceed 3.5 kg-cm (3 in-lb). Over-torquing will cause the plastic parts to crack.

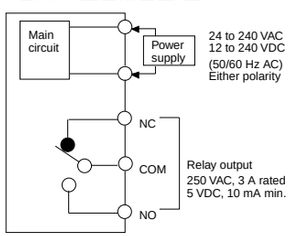
■ WARNING

These photoelectric sensors should not be used in personal safety applications. Using the sensor as a safety device may cause an unsafe condition that could lead to serious injury or death.

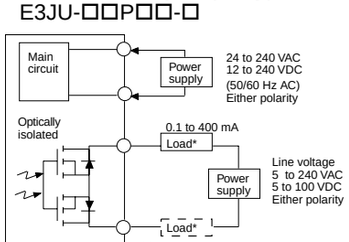
 EMA0008-B

■ CIRCUIT DIAGRAMS

- Relay output types
  E3JU-□□M□□-□



- Solid state relay output types
  E3JU-□□P□□-□

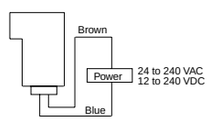


* Load can be hooked up on either side of the power supply.

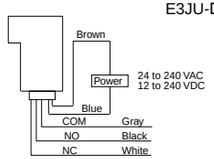
■ CONNECTION

- Pre-wired types:

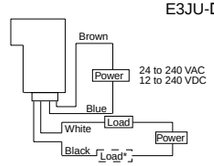
Through-beam emitter types: E3JU-25L-3, E3JU-25L-6



Relay output types: E3JU-□□M□□-3, E3JU-□□M□□-6

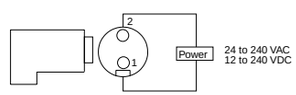


Solid state relay output types: E3JU-□□P□□-3, E3JU-□□P□□-6

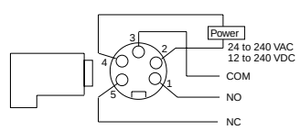


- Connector types:

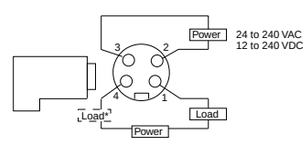
Through-beam emitter type: E3JU-25L-MN1



Relay output type: E3JU-□□M□□-MN1



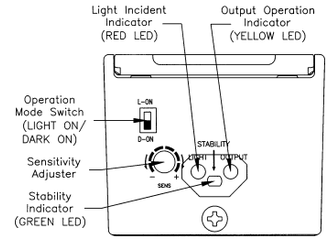
Solid state relay output type: E3JU-□□P□□-MN1



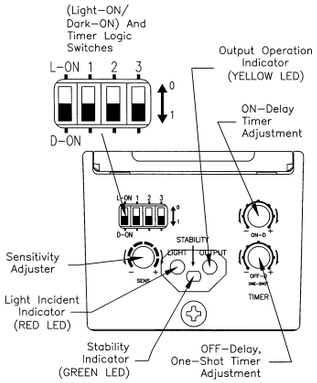
* Load can be hooked up on either side of the power supply

■ OPERATION PANEL LAYOUT

- Sensor without timer
  E3JU-□□□4-□

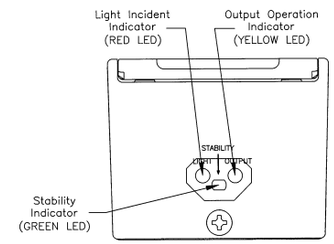


- Sensor with timer
  E3JU-□□□4T-□



TIMER FUNCTION SWITCH SETTINGS	SW 1	2	3
NO TIMER	0	0	0
ON-DELAY (ON-DLY)	0	1	0
OFF-DELAY (OFF-DLY)	1	0	0
ON-DLY + OFF-DLY	1	1	0
ONE-SHOT (O.S.)	1	0	1
O.S. NON-RETRIG	0	1	1
ON-DLY + O.S.	1	1	1
ON-DLY + O.S. NON-RETRIG	0	0	1

- Sensor without timer
  E3JU-R5M1-MN1



■ TIMING CHART

TIMER FUNCTIONS	TIMER SWITCH SETTNGS				t1: ON-DELAY TIME t2: OFF-DELAY AND ONE-SHOT TIME	LIGHT INCIDENT INDICATOR (RED LED)	INCIDENT INTERRUPTED / ON / OFF
	D-ON=1 L-ON=0	1	2	3			
NO TIMER	0	0	0	0	LIGHT-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
	1	0	0	0	DARK-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
ON-DELAY	0	0	1	0	LIGHT-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
	1	0	1	0	DARK-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
OFF-DELAY	0	1	0	0	LIGHT-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
	1	1	0	0	DARK-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
ON-DELAY +OFF-DELAY	0	1	1	0	LIGHT-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
	1	1	1	0	DARK-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
ONE SHOT	0	1	0	1	LIGHT-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
	1	1	0	1	DARK-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
ONE SHOT NON-RETRIG	0	0	1	1	LIGHT-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
	1	0	1	1	DARK-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
ON-DELAY +ONE SHOT	0	1	1	1	LIGHT-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
	1	1	1	1	DARK-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
ON-DELAY +ONE SHOT NON-RETRIG	0	0	0	1	LIGHT-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF
	1	0	0	1	DARK-ON MODE	OUTPUT & OUTPUT INDICATOR (YELLOW LED)	ON / OFF

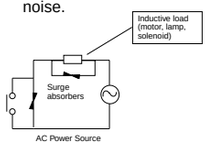
■ SUGGESTED USE

• Wiring

Separating the sensor line from inductive or noisy power lines is recommended.

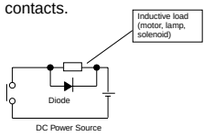
• Output Protection Circuit

The protection circuit below increases reliability by protecting the sensor output from surge or noise.



By utilizing the constant-voltage characteristic of a surge absorber, this circuit prevents high voltages from being applied across the contacts.

This circuit, if connected across the load, is effective when the supply voltage is 24 to 48 V. If the supply voltage is 100 to 240 V, connect the circuit across the contacts.

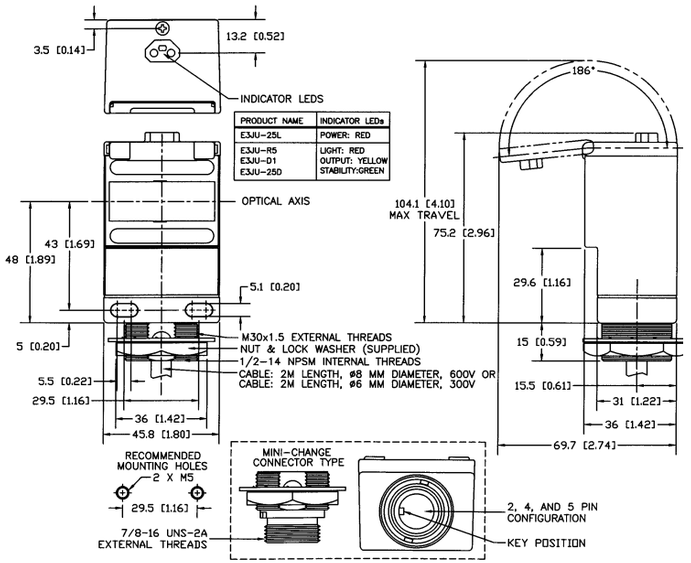


Employ a diode having a reverse breakdown voltage of more than 10 times the circuit voltage and a forward current rating greater than the load current. A diode having a reverse breakdown voltage two to three times that of the supply voltage can be used in an electronic circuit where the circuit voltage is not particularly high.

■ DIMENSIONS

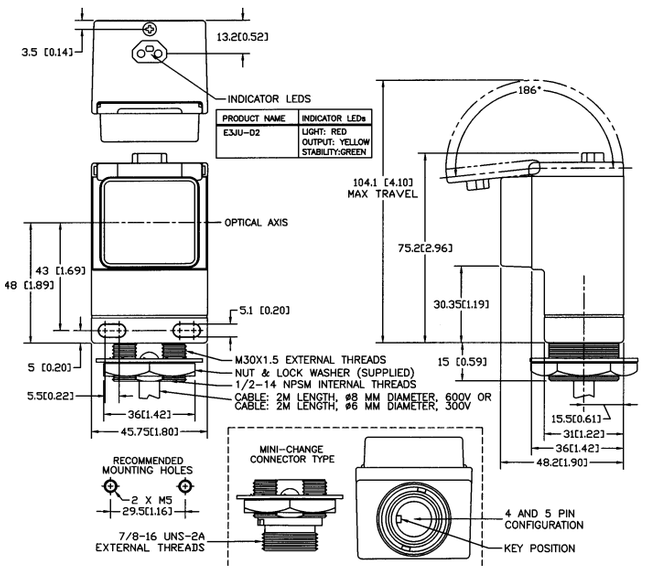
• E3JU-[R5, 25, D1]□□□-□

Unit: mm(in)



• E3JU-D2□□□-□

Unit: mm(in)



■ SENSITIVITY ADJUSTMENT (DIFFUSE REFLECTIVE SENSORS)

Step/Function	Step 1: Determine position A	Step 2: Determine position B	Step 3: Adjust to optimum setting
Sensing condition	Photoelectric sensor Target Background	Photoelectric sensor Target Background	Photoelectric sensor Target Background
Sensitivity adjuster	A Min Max (Position A: designates the point at which the LED has turned ON.)	B Min Max (Position B: designates the point at which the LED has turned OFF.)	A B Min Max (In some cases, positions A and B are opposite of this example.)
Indicators	ON LIGHT Incident Indicator (red)	OFF LIGHT Incident Indicator (red)	OFF LIGHT Incident Indicator (red)
Procedure	Place target at the desired sensing distance. Set sensitivity adjuster to the minimum scale position and gradually increase sensitivity by turning the sensitivity adjuster clockwise until the Light Incident Indicator (red LED) turns ON (see Position A).	Remove the target. Starting from the maximum scale position, gradually decrease sensitivity by turning the sensitivity adjuster counterclockwise until the Light Incident Indicator (red LED) turns OFF (see Position B).	Set the sensitivity indicator to the position between Positions A and B. NOTE: To ensure stable sensor operation, green stability indicator should be fully ON in both the sensing and non-sensing condition.