

**EX-10 Series**

MEUEN-EX10 V2.0

Thank you for purchasing products from Panasonic Electric Works SUNX Co., Ltd. Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

**⚠ WARNING**

- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

**1 CAUTIONS**

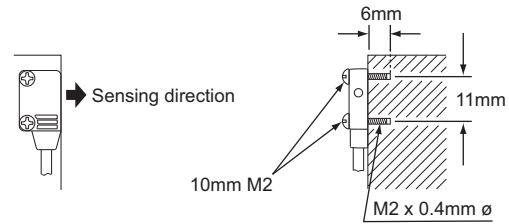
- This product has been developed / produced for industrial use only.
- For the convergent reflective type EX-14□, maintain adequate distance from reflective objects in the background, e.g. conveyors, since they may adversely effect sensing.
- A thin 0.1mm<sup>2</sup> cable is used for this product. Do not use excessive force when pulling on the cable: it may cause cable to break.
- Make sure that the power supply is off while wiring.
- Incorrect wiring will damage the sensor.
- Verify that the supply voltage including the ripple is within the rating. Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- You can extend the cable up to 50m max. with 0.3mm<sup>2</sup> or more cable for both emitter and receiver. However, in order to reduce noise, make the wiring as short as possible.
- Do not use during the initial transient time (0.5s) after the power supply is switched on.
- Ensure that the sensor is not directly exposed to the following light sources as they may adversely effect sensing performance: fluorescent light from a rapid-starter lamp, a high frequency lighting device, sunlight etc.
- This sensor is suitable for indoor use only.
- Avoid dust, dirt and steam. Do not use this sensor in places having excessive vapor, dust, etc., or where it may come in direct contact with corrosive gas.
- Take care that the sensor does not come in contact with oil, grease, organic solvents such as thinner, etc., strong acid, or alkalines.
- Do not apply stress directly to the sensor cable joint by forcibly bending or pulling.
- Since the cable end is not waterproof, do not use the sensor in an application where water could seep in from the cable end.

**2 MOUNTING**

✎ The tightening torque should be 0.2N-m or less.

**Mounting using tapped holes**

- Side sensing

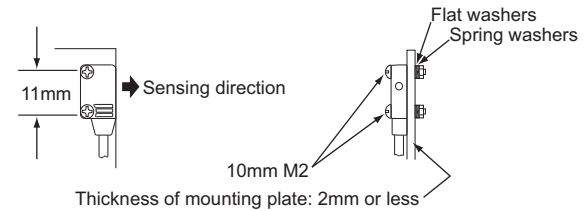


- Front sensing

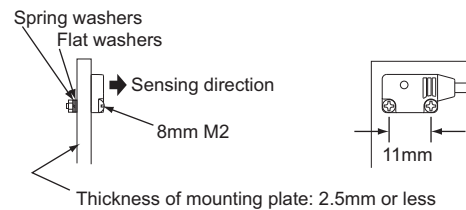


**When using the attached screws and nuts**

- Side sensing



- Front sensing



### 3 MOUNTING BRACKETS

When mounting the sensor with the optional mounting bracket, use the attached M2 screws. The tightening torque should be 0.2N·m or less. Six types of optional sensor mounting brackets are available.

Model no.	Description	Material
MS-EX10-1	Mounting bracket for front sensing type only. Two 4mm M2 pan head screws are attached.	Cold rolled carbon steel (SPCC)
MS-EX10-2	Mounting bracket for side sensing type only. Two 8mm M2 pan head screws are attached.	
MS-EX10-3	L-shaped mounting bracket. Two 4mm and two 8mm M2 pan head screws are attached.	
MS-EX10-11	Mounting bracket for front sensing type only. Two 4mm M2 pan head screws are attached.	Stainless steel (SUS304)
MS-EX10-12	Mounting bracket for side sensing type only. Two 8mm M2 pan head screws are attached.	
MS-EX10-13	L-shaped mounting bracket. Two 4mm and two 8mm M2 pan head screws are attached.	

### 4 SLIT MASKS

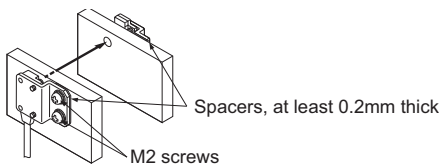
Optional slit masks help the sensor detect small objects. The accuracy of the position being sensed is also increased. However, the sensing range is reduced.

➤ Attach the slit mask to the sensor before mounting the sensor.

Model no.	Description	Material
OS-EX10-12	Slit mask for front sensing type only. Slit diameter: 1.2mm.	Stainless steel (SUS304)
OS-EX10-15	Slit mask for front sensing type only. Slit diameter: 1.5mm.	
OS-EX10E-12*1	Slit mask for side sensing type only. Slit diameter: 1.2mm.	

\*1 Excluding EX-19□

If both the slit mask and the mounting bracket MS-EX10-1 or MS-EX10-11 are attached to the front sensing type sensor, use a spacer that is at least 0.2mm thick, as shown in the figure.

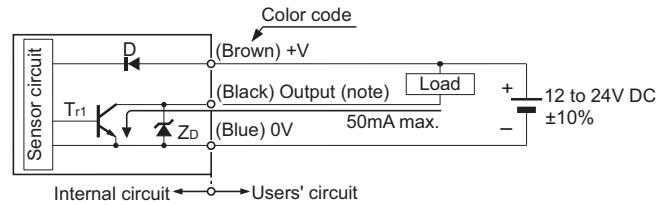


### 5 I/O CIRCUIT DIAGRAMS

The following symbols are used in this section.

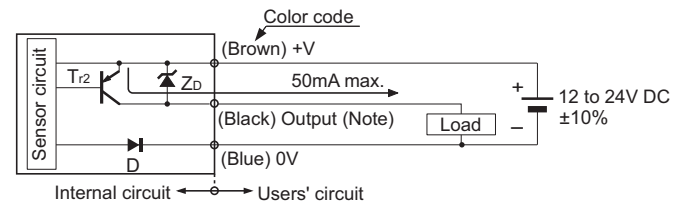
Symbol	Meaning
D	Reverse supply polarity protection diode
ZD	Surge absorption zener diode
Tr1	NPN output transistor
Tr2	PNP output transistor

#### NPN output type



➤ Only the thru-beam receiver incorporates the output.

#### PNP output type



➤ Only the thru-beam receiver incorporates the output.

## 6 SPECIFICATIONS

Type		Thru-beam					Convergent reflective	
		Front sensing	Side sensing	Front sensing	Side sensing	Front sensing	Front sensing	
Model no.*1	Light-ON	EX-11A(-PN/-R)	EX-11EA(-PN/-R)	EX-13A(-PN/-R)	EX-13EA(-PN/-R)	EX-19A(-PN/-R)	EX-14A(-PN/-R)	
	Dark-ON	EX-11B(-PN/-R)	EX-11EB(-PN/-R)	EX-13B(-PN/-R)	EX-13EB(-PN/-R)	EX-19B(-PN/-R)	EX-14B(-PN/-R)	
Sensing range		150mm		500mm		1m	2 to 25mm*2 (Convergent point: 10mm)	
Min. sensing object		ø1mm opaque object (Setting distance between emitter and receiver: 150mm)		ø2mm opaque object (Setting distance between emitter and receiver: 500mm)		ø2mm opaque object (Setting distance between emitter and receiver: 1m)	ø0.1mm copper wire (Setting distance: 10mm)	
Hysteresis		-					15% or less of operation distance	
Repeatability (perpendicular to sensing axis)		0.05mm or less					0.1mm or less	
Supply voltage		12 to 24V DC±10% Ripple P-P 10% or less						
Current consumption		Emitter: 10mA or less, Receiver: 10mA or less					13mA or less	
Output		<b>EX-□A(-R), EX-□B(-R)</b> NPN open-collector transistor <ul style="list-style-type: none"> <li>• Maximum sink current: 50mA</li> <li>• Applied voltage: 30V DC or less (between output and 0V)</li> <li>• Residual voltage: 1V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)</li> </ul>			<b>EX-□A-PN, EX-□B-PN</b> PNP open-collector transistor <ul style="list-style-type: none"> <li>• Maximum source current: 50mA</li> <li>• Applied voltage: 30V DC or less (between output and +V)</li> <li>• Residual voltage: 1V or less (at 50mA source current) 0.4V or less (at 16mA source current)</li> </ul>			
Short-circuit protection		Incorporated						
Response time		0.5ms or less						
Operation indicator		Red LED (lights up when the output is ON), located on the receiver for the thru-beam type sensor						
Stability indicator		Green LED (lights up under stable light received condition or stable dark condition), located on the receiver for the thru-beam type sensor						
Degree of protection		IP67						
Ambient temperature		-25 to +55°C*3 (No dew condensation or icing allowed), Storage: -30 to +70°C						
Ambient humidity		35 to 85% RH, Storage: 35 to 85% RH						
Emitting element		Red LED (modulated)						
Material		Enclosure: Polyethylene terephthalate, Lens: Polyallylate						
Cable		0.1mm <sup>2</sup> 3-core (thru-beam type emitter: 2-core) cabtyre cable, 2m long*4						
Weight		Emitter, receiver: approx. 20g each					Approx. 20g	
Accessories		Mounting screws: 2 sets					Mounting screws: 1 set	

\*1 Model nos. with the suffix -PN are PNP output types. Model nos. with the suffix -R are inflection resistant cable types (NPN output type only). On the label of thru-beam types, the P suffix denotes the emitter, e.g.. EX-□P; D denotes the receiver, e.g. EX-□D.

\*2 The sensing range of the convergent reflective type sensor is specified for white non-glossy paper (50x50mm) as the object.

\*3 -10 to +55°C for the inflection resistant cable type.

\*4 The inflection resistant type has a 0.1mm<sup>2</sup> 3-core (thru-beam type emitter: 2-core) inflection resistant cabtyre cable, 2m long.

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