Panasonic

Amplifier Built-in Type Threaded Miniature Photoelectric Sensor

EX-30 Series USER'S MANUAL



WUME-EX30-3

2013.03 panasonic.net/id/pidsx/global

Panasonic Industrial Devices SUNX

SENTRONICAG 056 222 38 18 mailbox@sentronic.com www.sentronic.c

Contents

1. Cautions ·······3
2. Part Description4
3. Mounting 5 3-1 Mounting the sensor 5 3-2 Installation interval 6
4. I/O Circuit Diagram ······8
5. Adjustment ······9 9 5-1 Beam alignment (Thru-beam type EX-31□ / EX-33□)····9 9 5-2 Sensitivity adjustment (Thru-beam type EX-33□, Diffuse reflective type EX-32□)···10
6. Stability Indicator
7. Option 13 7-1 Beam Slit Mask (Thru-beam type EX-31□ / EX-33□) 13
8. Specifications 14
9. Dimensions 15

1. Cautions

- Never use this product as a sensing device for personnel protection.
- In case of using 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.
- This product has been developed / produced for industrial use only.
- The thin cable 0.1mm² is used for this product. Thus, take care that if the cable is pulled with excessive force, it may cause cable break.
- Extension up to total 50m (emitter and receiver each of thru-beam type) is possible with a 0.3mm², or more of conductor cross-section area cable. However, in order to reduce noise, make the wiring as short as possible.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable joint.
- Make sure to carry out wiring in the power supply OFF condition.
- Take care that wrong wiring will damage the sensor.
- 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.
- 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 use during the initial transient time (50ms) after the power supply is switched ON.
- Make sure to use an isolation transformer for the DC power supply. If an auto-transformer (single winding transformer) is used, this product or the power supply may get damaged.
- In case a surge is generated from power supply, take countermeasures such as connecting a surge absorber to the origin of the surge.
- Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp, a high frequency lighting device or sunlight etc., as it may affect the sensing performance.
- This sensor is suitable for indoor use only.
- Do not use this sensor in places having excessive vapor, dust, etc., or where it may come in contact with corrosive gas, etc.
- Take care that the product does not come in contact with oil, grease, organic solvents such as thinner, etc., strong acid or alkaline.
- In case of using the sensor at a place where static electricity is generated, use a metal mounting plate. Also, ensure to ground the mounting plate.

2. Part Description



4

3. Mounting

3-1 Mounting the sensor

- Mount the sensor on a mounting plate 3mm or less thick and use the enclosed nut and toothed lock washer for mounting.
- When the nut is tightened, hold the the sensor with hand or a spanner etc. and the tightening torque should be 0.6N·m or less. (diffuse reflective type **EX-32**□: 1N·m or less) Do not tighten the sensor itself.



SENTRONICAG 056 222 38 18 mailbox@sentronic.com www.sentronic.com

3-2 Installation interval

- This product does not incorporate auto interference prevention function. In case aligning 2 of this sensors closely, follow diagrams below. (typical)
- Find out the operating point l1 on the parallel deviation diagram for the setting distance L. Separate sensors by 2 × l or more.

Parallel deviation diagram (typical) of Thru-beam type EX-31



Left ← Center → Right Operating point ℓ (mm)

<Installation interval for EX-31□>

In case using at sensing distance (L1) 500mm, the operation point (l1) is approx. 50.3mm according to left diagram.

The installation interval is

Approx. 50.3mm × 2 = approx. 100.6mm

Thus, install EX-31 to approx. 100.6mm or more away.

Parallel deviation diagram (typical) of Thru-beam type EX-33



<Installation interval for EX-33

In case using at sensing distance (L2) 800mm, the operation point (ℓ 2) is approx. 60.2mm according to left diagram.

The installation interval is

Approx. 60.2mm × 2 = approx. 120.4mm

Thus, install **EX-33** to approx. 120.4mm or more away.

Sensing field diagram (typical) Diffuse reflective type EX-32



<Installation interval for EX-32 >

In case using at sensing distance (L3) 50mm, the operation point (l3) is approx. 9.1mm according to left diagram.

The installation interval is

Approx. 9.1mm × 2 = approx. 18.2mm

Thus, install **EX-32** to approx. 18.2mm or more away.



4. I/O Circuit Diagram

NPN output type and PNP output type: Emitter of thru-beam type EX-31 / EX-33



NPN output type: Receiver of Thru-beam type EX-31 / EX-33, Diffuse reflective type EX-32



PNP output type: Receiver of Thru-beam type EX-31 - PN / EX-33 - PN, Diffuse reflective type EX-32 - PN



5. Adjustment

5-1 Beam alignment (Thru-beam type EX-31 / EX-33)

Thru-beam type EX-31

- Place the emitter and the receiver face to face along a straight line, move the emitter in the up, down, left and right directions, in order to determine the range of the light received condition with the help of the operation indicator (orange). Then, set the emitter at the center of this range.
- **2.** Similarly, adjust for up, down, left and right angular movement of the emitter.
- **3.** Further, perform the angular adjustment for the receiver also.
- 4. Check that the stability indicator (green) lights up.



Thru-beam type EX-33

- **1.** Set the operation mode switch to the L side (Light-ON mode position).
- 2. Place the emitter and the receiver face to face along a straight line, move the emitter in the up, down, left and right directions, in order to determine the range of the light received condition with the help of the operation indicator (orange). Then, set the emitter at the center of this range.
- **3.** Similarly, adjust for up, down, left and right angular movement of the emitter.
- Further, perform the angular adjustment for the receiver also.
- 5. Check that the stability indicator (green) lights up.
- **6.** Choose the operation mode, as per your requirement, with the operation mode switch.



5-2 Sensitivity adjustment (Thru-beam type EX-33, Diffuse reflective type EX-32)

Thru-beam type EX-33

• When using **EX-33**, turn the sensitivity adjuster fully clockwise to the MAX. position. However, if the beam penetrates a sensing object, adjust the sensitivity as follows.

Step

- 1. Turn the sensitivity adjuster fully counterclockwise to the minimum sensitivity position.
- In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point A where the sensor enters the "Light" state operation.

- In the dark condition, turn the sensitivity adjuster further clockwise until the sensor enters the "Light" state operation and then bring it back to confirm point B where the sensor just returns to the "Dark" state operation.
- **4.** The position at the middle of points **A** and **B** is the optimum sensing position.

Note: Use the flathead screwdriver (purchase separately) to turn the adjuster slowly. Turning with excessive strength will cause damage to the adjuster.



Diffuse reflective type EX-32

Step

- 1. Turn the sensitivity adjuster fully counterclockwise to the minimum sensitivity position
- In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point A where the sensor enters the "Light" state operation.

3. In the dark condition, turn the sensitivity adjuster further clockwise until the sensor enters the "Light" state operation and then bring it back to confirm point **B** where the sensor just returns to the "Dark" state operation.

(If the sensor does not enter the "Light" state operation even when the sensitivity adjuster is turned fully clockwise, the position is point **B**.

4. The position at the middle of points **A** and **B** is the optimum sensing position.

TRONIC AG



Note: Use the flathead screwdriver (purchase separately) to turn the adjuster slowly. Turning with excessive strength will cause damage to the adjuster.

6. Stability Indicator

• The stability indicator (green) lights up when the incident light intensity has sufficient margin with respect to the operation level. Incident light intensity level is such that the stability indicator light up, stable sensing can

be done without the light received operation and the light interrupted operation being affected by a change in ambient temperature or supply voltage.



7. Option

7-1 Beam Slit Mask (Thru-beam type EX-31 / EX-33)

 Apply the optional slit mask (OS-EX30-1) when detecting small objects or for increasing the accuracy of sensing position.

However, the sensing range is reduced when the slit mask is mounted.

Туре	Model No.			Sensing distance		Minimal sensing object	
	Slit	Sensor	Slit size	Applying on one side	Applying on both side	Applying on one side	Applying on both side
Slit	OS-EX30-1	EX-31□	ø1mm	200mm	150mm	ø2mm	ø1mm
		EX-33□		320mm	240mm		

Mounting method

1. Insert the sensor into the mounting plate.

SENTRONIC AG

- 2. Fit the washer and spacers enclosed with the slit mask. Note that the number of spacers to be fitted differs with the mounting plate thickness, as given in the table on the right.
- **3.** Mount the slit mask. Make sure that the tightening torque is 0.6N·m or less.

Mounting plate thickness	No. of spacers		
3mm	0 pc.		
2mm	1 pc.		
1mm	2 pcs.		



8. Specifications

Туре			Thru-beam type						
		Operation mode switch			Diffuse reflective type				
Model No. (Note 1)	NPN output	EX-31A	EX-31B	EX-33	EX-32A	EX-32B			
	PNP output	EX-31A-PN	EX-31B-PN	EX-33-PN	EX-32A-PN	EX-32B-PN			
Sensing ra	ange	500	mm	800mm	50mm (Note 2)				
Sensing object		ø2mm opaque obj	ect (Completely beam	Opaque, Translucent or transparent object (Note 3)					
Hysteresis	S		-	15% or less of operation distance (Note 2)					
Repeatability (Perpendicular to (sensing axis			0.05mm or less	0.5mm or less					
Supply voltage		12 to 24V DC ±10% Ripple P-P 10% or less							
Current consumption		Emitter: 10m	A or less, Receiver:	13mA or less					
Output		<npn output="" typ<br="">NPN open-collect • Maximum sink • Applied voltage • Residual voltage</npn>	e> or transistor current: 50mA e: 30V DC or less (between output an ge: 2V or less (at 50mA sink curr 0.4V or less (at 16mA sink curr	Sutput type> ben-collector transistor imum source current: 50mA lied voltage: 30V DC or less (between output and +V) idual voltage: 2V or less (at 50mA source current) 0.4V or less (at 16mA source current)					
Output operation		Light-ON	Dark-ON	Switchblade either Light-ON or Dark ON	Light-ON	Dark-ON			
Short-circuit protection		Incorporated							
Response	e time	0.5ms or less							
Protection		IP67 (IEC)							
Ambient temperature		-25 to +55°C (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							
Material		Enclosure: Enclosure Lens: Poly	Die-cast zinc (Nickel cover: Polycarbonate carbonate	Enclosure: Die-cast zinc (Nickel plated) Enclosure cover: Polycarbonate Lens: Acrylic					
Cable		0.1mm ² 3-core (thru-beam type sensor emitter: 2-core) cabtyre cable, 2m							
Wight	Net weight	Emitter: Ap	prox. 20g, Receiver: /	Approx. 20g					
	Gross weight		Approx. 65g		Approx. 45g				
Accessory		Nut: 2 pc	s., Toothed lock wash	Nut: 1 pc., Toothed lock washer: 1 pc.					

Notes: 1) The model No. with suffix "P" shown on the label affixed to the thru-beam type sensor is emitter. "D" shown on the label is receiver. (e.g.) Emitter of EX-31A: EX-31P, Receiver of EX-31A: EX-31AD

5m cable length type is also available for NPN output type (excluding EX-33)

When ordering this type, suffix "-C5" to the model No.

(e.g.) 5m cable length type of EX-31A is "EX-31A-C5"

- 2) The sensing range of diffuse reflective type is specified with non-glossy paper (200 × 200mm) as sensing object
- 3) Make sure to confirm detection with an actual sensor before use

9. Dimensions



(Unit: mm)

(Unit: mm)







(MEMO)

SENTRONIC_{AG} 056 222 38 18 mailbox@sentronic.com www.sentronic.com

Please contact

Panasonic Industrial Devices SUNX Co., Ltd.

http://panasonic.net/id/pidsx/global

Overseas Sales Division (Head Office) 2431-1 Ushiyama-cho, Kasugai-shi, Aichi, 486-0901, Japan Phone: +81-568-33-7861 FAX: +81-568-33-8591

About our sale network, please visit our website.

PRINTED IN JAPAN

© Panasonic Industrial Devices SUNX Co., Ltd. 2013

WUME-EX30-3