

# Operating Instructions

# IRB-X60™

**Retro-reflective  
Photoelectric Sensor**



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## INSTRUCTION MANUAL

The IRB-X60 retroreflective, infrared photoeye is a photoelectric sensor that is intended to be used with industrial control systems. A reflector directs the IR beam back to the photoeye, therefore wiring two different pieces of equipment isn't necessary. The IRB-X60 offers a set of dry NO/NC relay contacts so it's compatible with most control systems. The IRB-X60 operates up to 60 feet over a wide range of voltages (6-40 VDC and 12-24 VAC). A red alignment indicator on the receiver provides easy set-up and alignment feedback.

## Cautions and Warnings



This product is an accessory or part of a system. Install the IRB-X60 according to instructions from control system manufacturer. Comply with all applicable codes and safety regulations.

## Specifications

Specifications	
Operating Range	5 ft (1.5 m) to 60 ft (18.3 m)
Power	6-40 VDC, 12-24 VAC
Current (NC and 10K Monitoring Methods)	50 mA DC (Aligned State, Relay Activated)
Relay Contacts	Dry Contacts
Surge Protection	Thermal fuse, MOV
Relay Output Operation	Light ON Only
Response Time (Aligned to Unaligned)	10ms
Response Time (Unaligned to Aligned)	250ms
Operating Temperature	-30° to 140°F (-34° to 60°C)
Dimensions (L x W x H)	5.1" (130 mm) x 3.15" (80 mm) x 5.5" (140 mm)
Ball Joint Mount Conduit Thread	½ Inch NPT

## Ordering Information

- IRB-X60 KIT      Retro-reflective photoelectric sensor kit, includes photo eye, reflector with hood and mounting bracket.

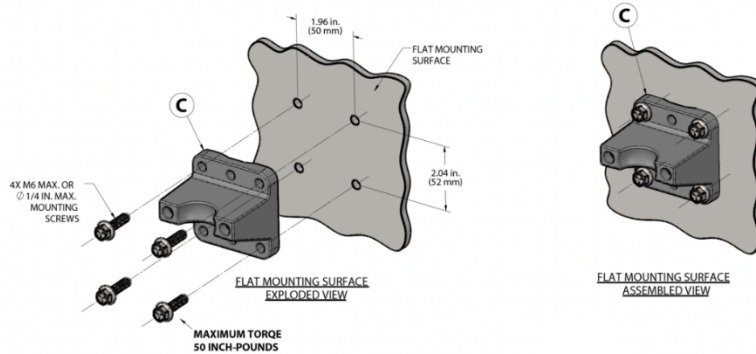
## Installation

- The IRB-X60 cannot be used for an operating range of less than 5 feet.

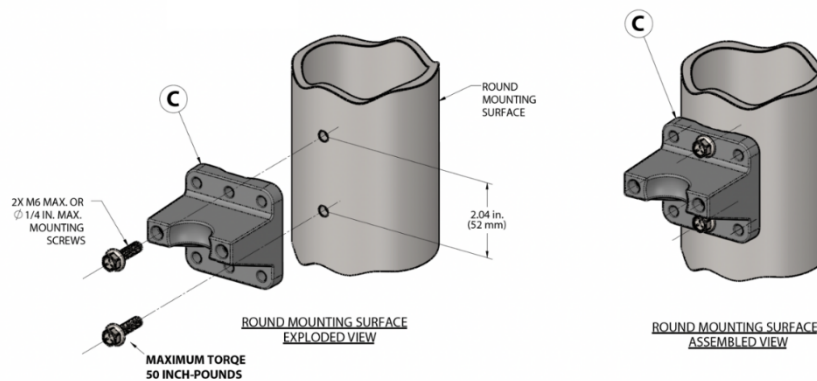
<p>1. Unscrew the four back cover screws, then remove the back cover. Wiring is to be fed through ball joint opening.</p>	
<p>2. If a watertight enclosure is required, the wiring must enter via a UL listed watertight fitting such as a strain relief or ½ inch NPT thread watertight conduit connector.</p>	
<p>3. Wire 12 to 40VDC or AC to terminals V- and V+. There is no polarity to the inputs.</p> <p>Wire the control system's input to either the <b>NO</b> or <b>NC</b> terminal depending on your application. These contacts are labeled for the aligned state. Connect the control system GND to the <b>COM</b> terminal.</p>	
<p>The IRB-X60 has detachable screw terminals for easier wiring. Remove them while connecting wires, then plug them back in properly and secure them.</p> <p>Be careful not to install the connectors upside down as this will reverse the connections.</p>	

4. To mount the photo eye, first secure the bracket clamp base (ITEM C) to the mounting surface.

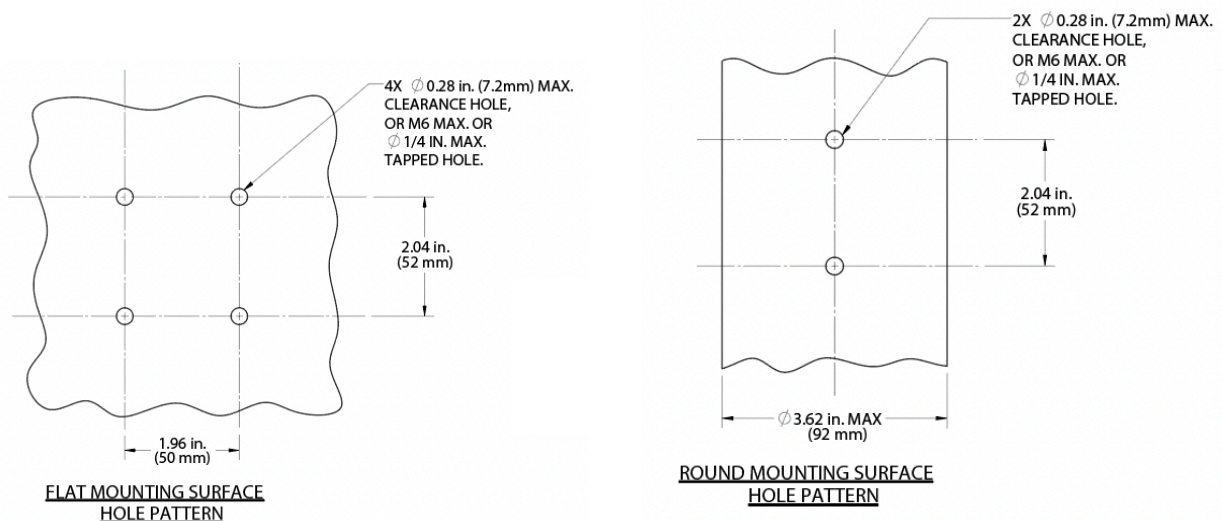
The mounting for a flat surface, such as a square tube or wall is shown below.



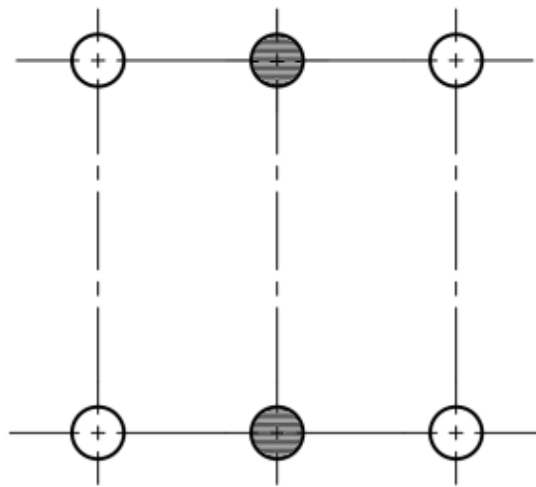
The mounting for a curved surface, such as a pole, is shown below:



Note the different screw locations for a flat vs. curved surface. The mounting patterns for flat and curved surface are shown below.



# Bracket Mounting Template



Use this line for levelling

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Use shaded holes for a curved mounting surface.

Use other holes for a flat mounting surface.

Clearance hole size: 0.283" (7.2mm) max

Tapped hole size: 1/4" or M6 max

5. After mounting the bracket base, attach the photo eye and bracket clamp. Tighten the two bracket clamp screws (ITEM B) to secure the photo eye but leave them loose enough for the photo eye to swivel using the ball joint during the alignment process.

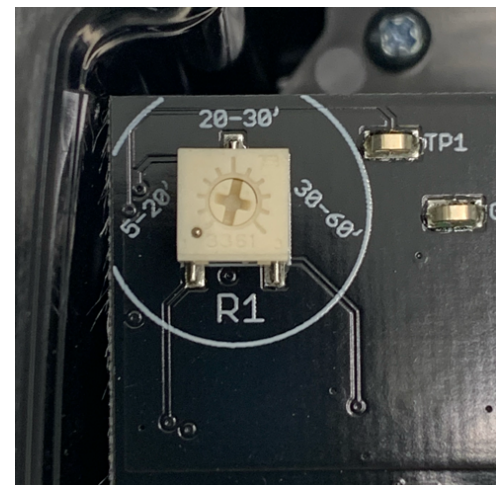
### LED Indicators

Indication	State	Relay State
Green LED & Red LED On	Aligned with reflector, no obstruction	Aligned
Green LED On & Red LED Flashing	Partial Alignment	Aligned
Green LED On & Red LED Off	Beam obstructed or not aligned	Un-aligned
Green LED Off	No power	Un-aligned

6. **Sensitivity Adjustment** - Adjust sensitivity using potentiometer R1 (shown to the right) at the top left of the circuit board. Use the markings as a guide based on the distance between the sensor and reflector:

- 5-20 ft: Point the dial at the 5-20 ft marking
- 20-30 ft: Point the dial at the 20-30 ft marking
- 30-60 ft: Point the dial at the 30-60 ft marking

If you have trouble aligning the sensor or if you are concerned about possible interference obstructing the IR beam, you can further increase the sensitivity by adjusting the potentiometer clockwise while ignoring the distance recommendations.



7. **Alignment:** Apply Power to the photo eye and aim it at the reflector's planned location. Go to the reflector's mounting spot. Move the reflector left, right, up, and down to find the center of the detection pattern (a typical installation will have a 1 to 2-foot diameter). The reflector should be placed in the center of the detection pattern for best performance.

*During this, **watch the Red LED on the photo eye during alignment. A solid RED LED means the best alignment.** If the alignment isn't optimal, the Red LED will flash. Slow flashing means poor alignment, while fast flashing indicates better alignment.*

If you cannot get the photo eye to align near your intended mounting location, adjust the aim of the photo eye and repeat this Alignment process.



8. To ensure the integrity of the enclosure, make sure the gasket is present in the cover and is properly seated, then tighten the cover screws. The wiring to the enclosure must enter via a UL listed watertight fitting such as a strain relief or ½ inch NPT thread watertight conduit connector.
9. Tighten the two bracket clamp screws (ITEM B) and the set screw (ITEM A). (3/32" allen wrench is required)
10. Verify that the photoeye and reflector remained aligned.
11. Place an obstruction (ex. hand) between the photoeye and reflector. The red LED will turn off. Remove the obstruction and the red LED will turn on.
12. Check the control system and verify that the input is recognized when the photo eye is blocked. Test the beam with an obstruction between transmitter and reflector at multiple distances to confirm proper operation.

## Wiring

Terminals	Description
V-	Transmitter power input
V+	Receiver power input
Energized NO	Normally open contact, relay output shown in energized state (power on, and no obstruction) when properly aligned to the reflector
Energized COM	Relay common
Energized NC	Normally closed contact, relay output shown in energized state (power on, and no obstruction) when properly aligned to the reflector.



## Troubleshooting

Symptom	Possible Cause	Solution
Does not detect obstruction	Signal is reflecting off another surface	Check area for highly reflective surfaces such as shiny metal. Possible solutions are to move the photo eye farther away or adjust the sensitivity counterclockwise (lower sensitivity).
Red LED flashes continuously.	Sensitivity is too low  Photo eye is not aligned with reflector  Operating at short range (near 5ft distance photo eye to reflector)	Adjust the sensitivity clockwise according to STEP 6.  Realign the reflector according to STEP 7 under installation.  Ignore the flashing and operation will still perform as expected
Photo eye activates but does not transmit signal to control system	Faulty connection between photo eye and control input	Verify all wires and terminal connections to operator.
Green LED not on when powered	No Power  Faulted Photo eye	Verify input power is between 6-40 VDC / 12-24 VAC.  The photo eye electronics have been damaged and need replaced.
Device will not align,  No Red LED	Close Range Operation  Faulted Photo eye	If operating near 5ft, try moving the photo eye or reflector further back.  The photo eye electronics have been damaged and need replaced.

## Warranty

EMX Industries, Inc. products have a warranty against defects in materials and workmanship for a period of two years from date of sale to our customer.