



## Instruction Manual

The IRB-RET retroreflective infrared photoeye is an external entrapment protection device type B1, non-contact sensor for use with automatic gates and doors. Since the reflector directs the beam back to the photoeye, wiring to the other side of the roadway is not needed. The IRB-RET 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 status information at a glance making set-up and alignment easy. The IRB-RET provides compatibility with most operators that accommodate monitored external entrapment devices per UL325.

### Cautions and Warnings



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

Retroreflective photoeyes rely on a reflective surface (a reflector) for proper operation. In some cases, a vehicle with a reflective surface at a given distance can act as a reflector and allow the gate to close on a vehicle.

### 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)	60 mA (relay activated)
Current (Pulse Monitoring Methods)	15 mA
Resistive Termination	10K ohm across NO contact (jumper selectable)
Surge Protection	Thermal fuse
Relay Output Operation	Light ON/Dark ON
Relay Output Configuration	Form C contacts (NO, COM, NC)
Transmitter Power Cycle	<300 mS (for use in NC and 10K monitoring)
Operating Temperature	-40° to 140°F (-40° to 60°C)
Dimensions (L x W x H)	3.1" (79 mm) x 2.7" (69 mm) x 6.6" (168 mm)
Environmental Rating	NEMA 4X

## Ordering Information

- IRB-RET KIT                      Retroreflective photoeye kit, includes photoeye with hood, reflector with hood and mounting bracket with hardware

## Monitoring Methods

**UL325 requires continuous monitoring of all safety devices connected to gate and door operators. Consult the gate or door operator manufacturer's instruction manual for the necessary monitoring method.**

- **Normally Closed:** Cycles power to the transmitter while monitoring the receiver contacts for proper operation
- **10K Resistive Termination:** Provides a measurable 10K ohm resistance across the normally open (NO) contact when unobstructed
- **Two-wire Pulse (2 Frequency):** Provides 300Hz "heartbeat" unobstructed, 0Hz obstructed over power supply lines
- **Two-wire Pulse (3 Frequency):** Provides 300Hz "heartbeat" unobstructed, 2Hz obstructed, and 0Hz failure over power supply lines
- **Four-wire Pulse (2 Frequency):** Provides 300Hz "heartbeat" unobstructed, 0Hz obstructed over separate connection
- **Four-wire Pulse (3 Frequency):** Provides 300Hz "heartbeat" unobstructed, 2Hz obstructed, and 0Hz failure over separate connection

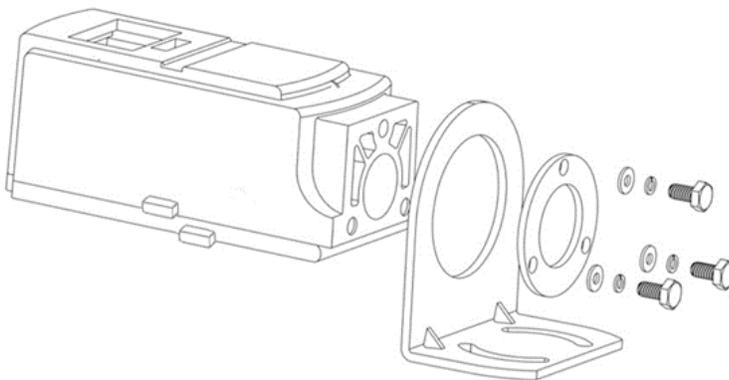
## Installation

- Determine the mounting location of the IRB-RET photoeye according to UL325 guidelines.
- Deactivate the gate or door during photoeye installation.
- **The IRB-RET cannot be used for a detection range of less than 5 feet.**

1. Check the instruction manual of the gate or door operator to determine which monitoring method is necessary for that specific operator.

2. Thread all wiring through the mounting brackets and into IRB-RET as shown.

3. Wire the IRB-RET according to the configuration table and wiring diagram that corresponds with the monitoring method required by the gate or door operator. **MUST USE 6-40 VDC FOR PULSE MONITORING.**



### LED Indicators

Green LED & Red LED On	Aligned with reflector, no obstruction
Green LED Flashing & Red LED Off	Beam obstructed or not aligned
Green LED Off	No power

4. Set the sensitivity adjustment to 1/3 of the maximum by adjusting the potentiometer as shown.

5. Hold the reflector and stand 4 to 6 feet away from the IRB-RET. Align the reflector with the photoeye and slowly back up to the opposite end of the detection zone where the reflector will be mounted. Move the reflector left, right, up, and down to find the detection pattern. (The typical installation will have a 2 foot diameter pattern.) Mount the reflector as close to the center of the pattern as possible to ensure the strongest signal. If it is necessary to reposition the photoeye, repeat these steps to properly position the reflector.

6. If the signal drops out before getting to the desired distance, increase the sensitivity to 1/2 or 3/4 of the maximum and repeat step 5.

7. Once the reflector is aligned and mounted, increase the sensitivity to maximum setting.



**Potentiometer Sensitivity Adjustment**

- |     |   |
|-----|---|
| 8.  | The IRB-RET is housed in a NEMA 4X enclosure. To ensure the integrity of the enclosure, make sure the gasket is present, the cover is properly seated, and the cover screws are tight. The wiring to the enclosure must enter via a UL listed watertight fitting such as a strain relief or watertight conduit connector. |
| 9.  | Tighten the mounting screws on the bracket.   |
| 10. | Verify that the photoeye and reflector are aligned and apply power.   |
| 11. | Place an obstruction (ex. hand) between the photoeye and reflector. The green LED on the receiver will flash and the red LED will turn off. Remove the obstruction and the green LED and red LED will turn on.  |
| 12. | To install the metal hood (an optional accessory), hold it over the top of the IRB-RET. Keep the two hood legs aligned with the locking lugs on the plastic housing and push down until the locking lugs are engaged.   |
| 13. | Check the operator control board and verify that the safety input is recognized by the operator. Test the beam with an obstruction between transmitter and reflector at multiple distances to confirm proper operation.   |
| 14. | Follow the gate or door operator manufacturer's installation instructions and safety checks to verify that the photoeye is operating properly.  |

## Configuration Settings and Wiring Diagrams

Terminals	Description
VTX	Transmitter power input (non-polarized)
VRX	Receiver power input (non-polarized)
Pulse Out C	Isolated pulse output collector
Pulse Out E	Isolated pulse output emitter
Energized NO	Normally open contact, relay output shown in energized state (power on, 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, no obstruction) when properly aligned to the reflector.

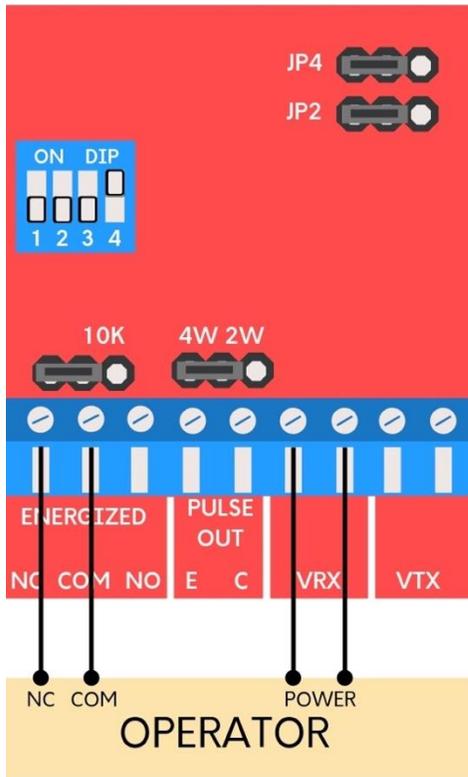
## Configuration Table

Monitoring Method	Wiring Diagram	DIP Switch Settings				Output Connections	Power Connection		Jumpers Installed			
		SW1	SW2	SW3	SW4		VRX	VTX	JP2	JP4	JP5	JP6
Normally Closed	A	OFF	OFF	OFF	ON	NC, COM	VRX		Factory Set	10K disabled	4W	
10K Resistive Termination	B	OFF	OFF	OFF	ON	NO, COM	VRX		Factory Set	10K enabled	4W	
Normally Closed: Power Cycle Transmitter Only	C	OFF	OFF	OFF	ON	NC, COM	VRX	VTX	Separate Power RX and TX	10K disabled	4W	
Two-Wire Pulse (2 Frequency: 300Hz, 0Hz)	D	ON	OFF	OFF	ON	VRX	DC Power only to VRX		Factory Set	10K disabled	2W	
Two-Wire Pulse (3 Frequency: 300Hz, 2Hz, 0Hz)	D	OFF	ON	OFF	ON	VRX	DC Power only to VRX		Factory Set	10K disabled	2W	
Four-Wire Pulse (2 Frequency: 300Hz, 0Hz)	E	ON	OFF	OFF	ON	E, C	DC Power only to VRX		Factory Set	10K disabled	4W	
Four-Wire Pulse (3 Frequency: 300Hz, 2Hz, 0Hz)	E	OFF	ON	OFF	ON	E, C	DC Power only to VRX		Factory Set	10K disabled	4W	

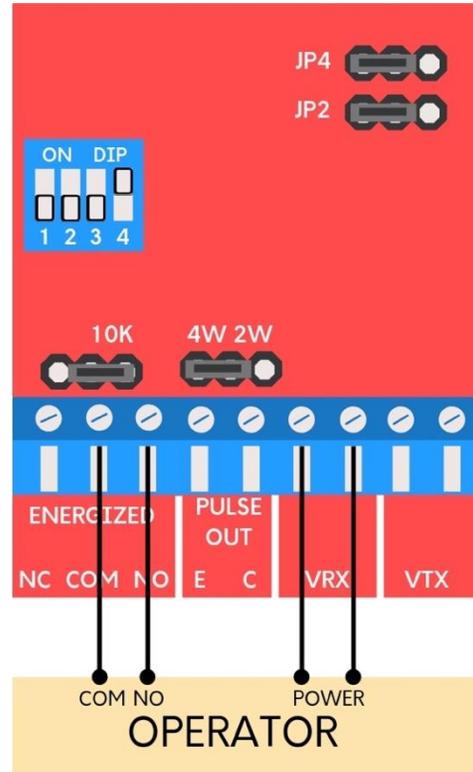
- **Must use 6-40VDC for pulse monitoring.**

- The relay contacts labeled on the terminals and the references to them in these instructions are shown in the energized state, no obstruction. (Dark ON setting – normally open (NO) contact closes when the beam is unobstructed.)
- Pulse configurations require current limiting in the operator. The IRB-RET will pulse 300Hz when not obstructed and 0Hz when obstructed.
- Four-wire output provides an emitter and collector connection to the operator. The emitter is generally connected to the circuit common (ground) and the collector is typically an open-collector output using a pull-up resistor to low-voltage DC power.

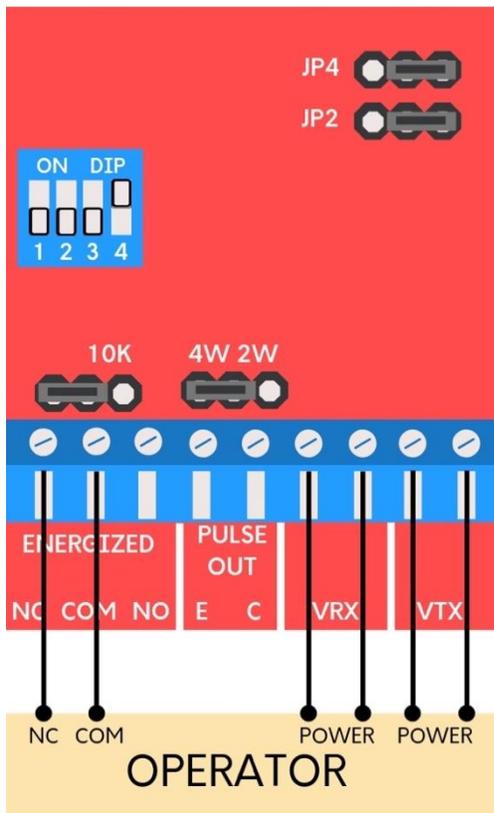
**Wiring Diagram A: Normally Closed**



**Wiring Diagram B: 10K Resistive Termination\***

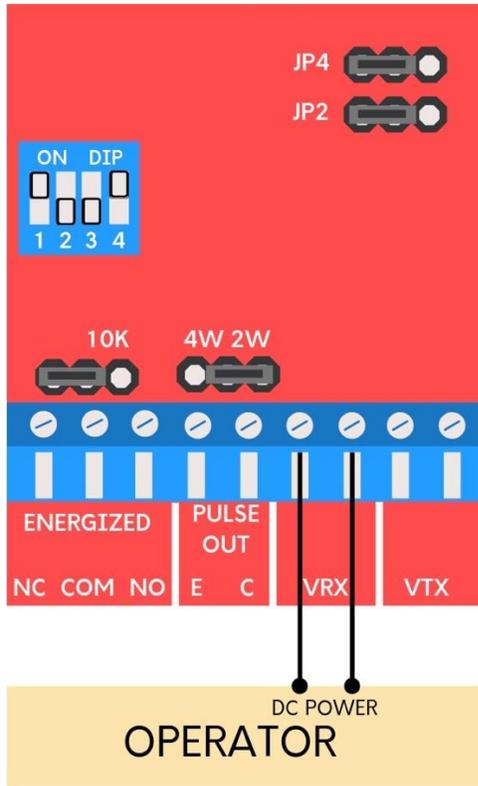


**Wiring Diagram C: Normally Closed  
Power Cycle Transmitter Only**

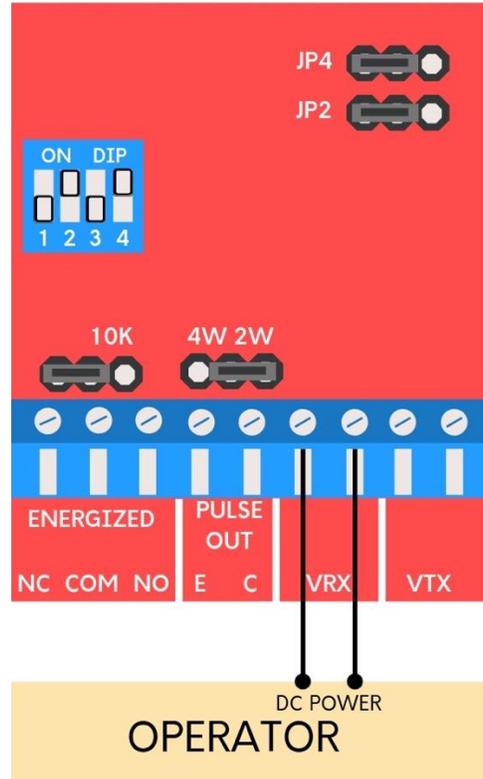


\*If using the IRB-RET in an application that does not require UL325 monitoring across the normally open contact, it is possible to disable the 10K resistor by moving the 10K jumper to pins 1 and 2.

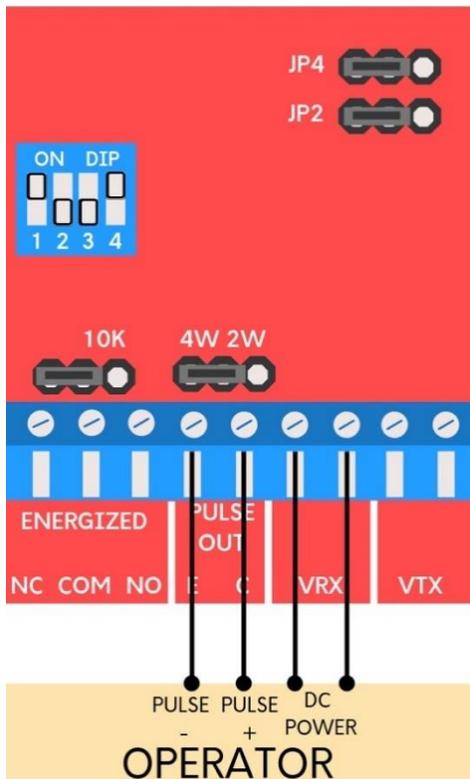
**Wiring Diagram D: Two-Wire Pulse  
(2 Frequency)**



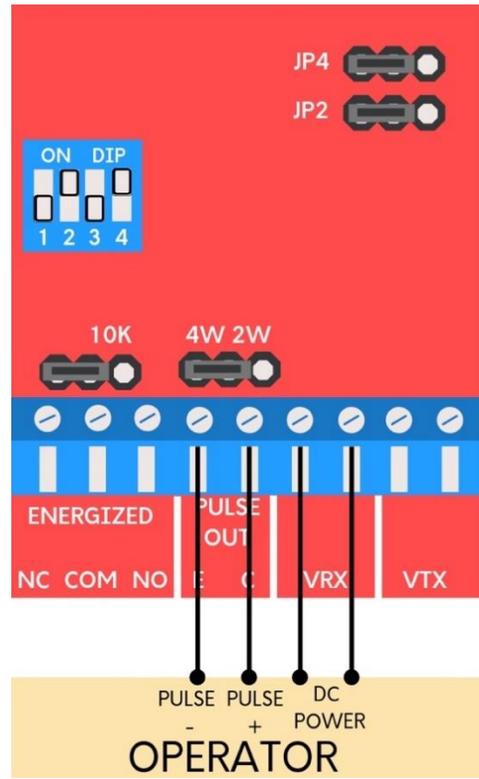
**Wiring Diagram D: Two-Wire Pulse  
(3 Frequency)**



**Wiring Diagram E: Four-Wire Pulse  
(2 Frequency)**



**Wiring Diagram E: Four-Wire Pulse  
(3 Frequency)**



## Troubleshooting

Symptom	Possible Cause	Solution
Does not detect obstruction	Signal is reflecting off another surface	Check area for highly reflective surfaces such as a shiny vehicle. Possible solutions are to move the photoeye farther away from the roadway or adjust the sensitivity counter-clockwise.
Green LED flashes continuously, indicating an obstruction when one is not present	Sensitivity is too low Photoeye is not aligned with reflector	Adjust the sensitivity clockwise. Realign the reflector according to STEP 5 under installation.
Photoeye activates but does not transmit signal to operator	Faulty connection between photoeye and operator control input	Verify all wires and terminal connections to operator.
Green LED not on when powered	Jumper 2 and 4 not in the correct position	Move jumper 2 and 4 into the bridged position (pins 1 and 2).  Verify input power is between 6-40 VDC / 12-24 VAC and wire per the wiring diagram.

## 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.