

OPERATING INSTRUCTIONS

# IRB-RET

UNIVERSAL SAFETY  
RETROREFLECTIVE PHOTOEYE

UL325-2016 MONITORED DEVICE



Power Door Products

(914) 698-5083

[www.PowerDoorProducts.com](http://www.PowerDoorProducts.com)

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## Cautions and Warnings



1. ***Read and follow all operating and Installation instructions.***
2. ***Always follow gate operator manufacturer installation instructions regarding installation of TYPE B1 sensor to the operator.***
3. ***Disable the gate so it is unable to move.***

***Refer servicing to qualified service personnel.***

### **IMPORTANT:**

This product is an accessory or part of a system. Always read and follow the manufacturer's instructions for the equipment before connecting this product. Comply with all applicable codes and safety regulations. Failure to do so may result in damage, injury or death.

## Product Overview

The IRB-RET retroreflective photo eye is an external entrapment protection device type B1, non-contact sensor for use with automatic gates and doors. The light beam is near infrared and pulses at a rate of 300/second (300Hz). Since the reflector directs the beam back to the photo eye, wiring to the other side of the roadway is not required. The IRB-RET provides a signal to the gate or door operator that the beam is not obstructed. The operating range is up to 60ft. The IRB-RET operates over a wide range of 6-40VDC and 12-24VAC (dependent on configuration selection).

A red alignment indicator on the receiver provides status information at a glance, making set-up and alignment easy. A green LED indicates power.

The IRB-RET includes 3 selectable operating configurations and provides 5 monitoring options for compatibility with most operators that accommodate monitored external entrapment protection devices. The IRB-RET complies with UL325 requirements effective Jan.12, 2016. Refer to operator manufacturer's instructions to assure compatibility.

### **REFER to operator installation instructions for proper configuration selection**

- **CONFIGURATION 0 - RELAY OUTPUT, NON-MONITORED and MONITORED**

Intended for use with operators that require simple relay contact activation to indicate beam obstruction. Reference Light ON/Dark ON setting. Jumper available for compatibility with Normally Open 10K termination operators.

- **CONFIGURATION 1 - MONITORED, HEARTBEAT 300Hz / 0Hz**

Intended for use with operators designed to accept a "heartbeat" form of monitoring, 300Hz when aligned, no obstruction, 0Hz when beam is obstructed.

- **CONFIGURATION 2 – MONITORED, HEARTBEAT 300Hz / 2Hz / 0Hz**

Intended for use with operators designed to accept a “heartbeat” form of monitoring, 300Hz when aligned, no obstruction, 2Hz when beam is obstructed, and 0Hz for a failure.

**Five monitoring interfaces:**

1. **Normally closed:** Cycle power to the transmitter while monitoring the receiver contacts for proper operation
2. **Two-wire pulsed (2 freq):** Provides 300Hz “heartbeat” unobstructed, 0Hz obstructed over power supply lines
3. **Two-wire pulsed (3 freq):** Provides 300Hz “heartbeat” unobstructed, 2Hz obstructed and 0Hz failure over power supply lines
4. **Four-wire pulsed:** Provides 300Hz “heartbeat” unobstructed, 0Hz obstructed over separate connection
5. **Resistive termination:** Provides a measurable resistance when unobstructed

## Specifications

Specifications	
Operating range	5ft. (1.5m) to 60 ft. (18.3m)
Sensitivity adjustment	Potentiometer
Power indicator	Green LED
Detect indicator	Flashing green LED
Mode selection switch	3 modes: relay output, pulsed (3 frequency), pulsed (2 frequency)
Relay output operation	Light ON/dark ON
Relay output	Form C contacts (NO, COM, NC)
Resistive termination	10K ohm across NO contact (jumper selectable)
Power protection	Thermal fuse
Transmitter power cycle	>300mS (for use in configuration 0 Monitored)
Power (see Cautions and Warnings)	6...40VDC, 12...24VAC @ 60 Hz (Configuration 0 RELAY only)
Current (Config. 0)	60mA (relay activated)
Current (Config. 1 & 2)	15mA (12VDC, includes TX and RX wired in parallel)
Operating temperature	-40°...140°F (-40°...60°C)
Environmental	NEMA 4X
Dimensions (L x W x H)	3.1" (79mm) x 2.7" (69mm) x 6.6" (168mm)
Weight	0.7 lbs (320g),
Connections	7 terminals

## Configuration Settings and Wiring Diagrams

ABBREVIATIONS	DESCRIPTION
VTX	Transmitter power input
VTX	Transmitter power input
VRX	Receiver power input
VRX	Receiver power input
PULSE OUT E	Isolated output emitter (Note 1)
PULSE OUT C	Isolated output collector (Note 1)
NO	Normally Open contact, relay output shown in energized state (power on, no obstruction)
COM	Relay common
NC	Normally Closed contact, relay output shown in energized state (power on, no obstruction)

- (1) 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.

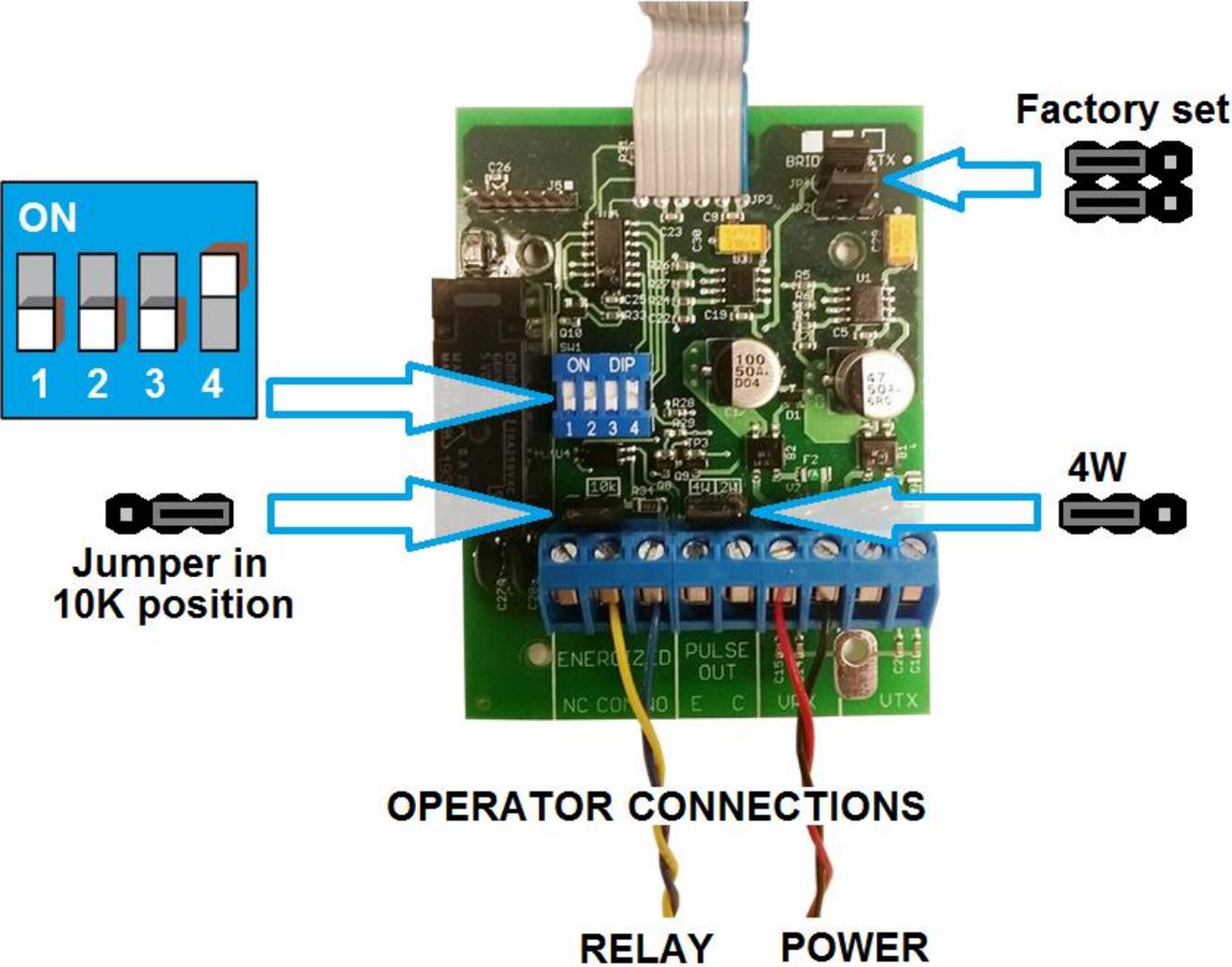
## RESISTIVE

NOTE: Remove power when changing Configuration settings

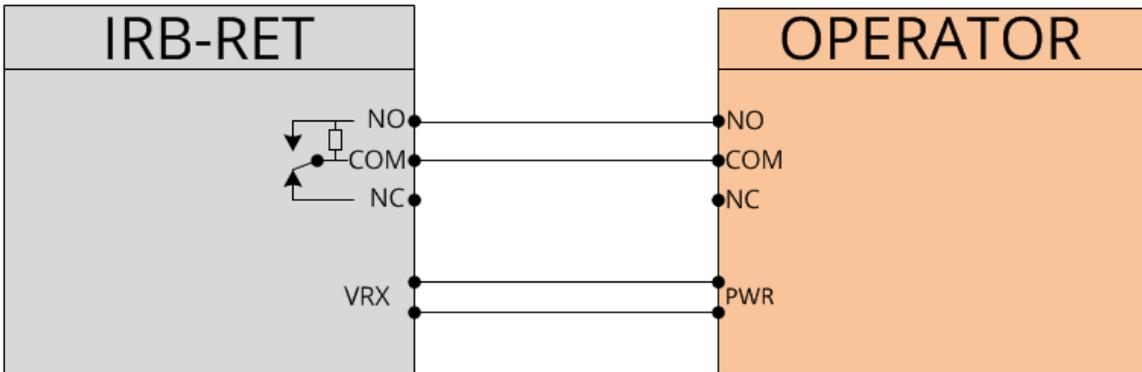
MONITORING METHOD	SWITCH SETTINGS				OUTPUT CONNECTIONS	POWER CONNECTION		JUMPERS INSTALLED				REFERENCE WIRING DIAGRAM
	SW1	SW2	SW3	SW4		VRX	VTX	JP2	JP4	JP5	JP6	
RESISTIVE TERMINATION	OFF	OFF	OFF	ON	NO, COM	VRX		IN	IN	IN	W4	A

NOTE: The relay contacts on the board and the references to them in these Instructions are shown in the energized state, no obstruction, Dark ON setting.

# IRB-RET set-up for relay operation, 10K resistive termination



## WIRING DIAGRAM A



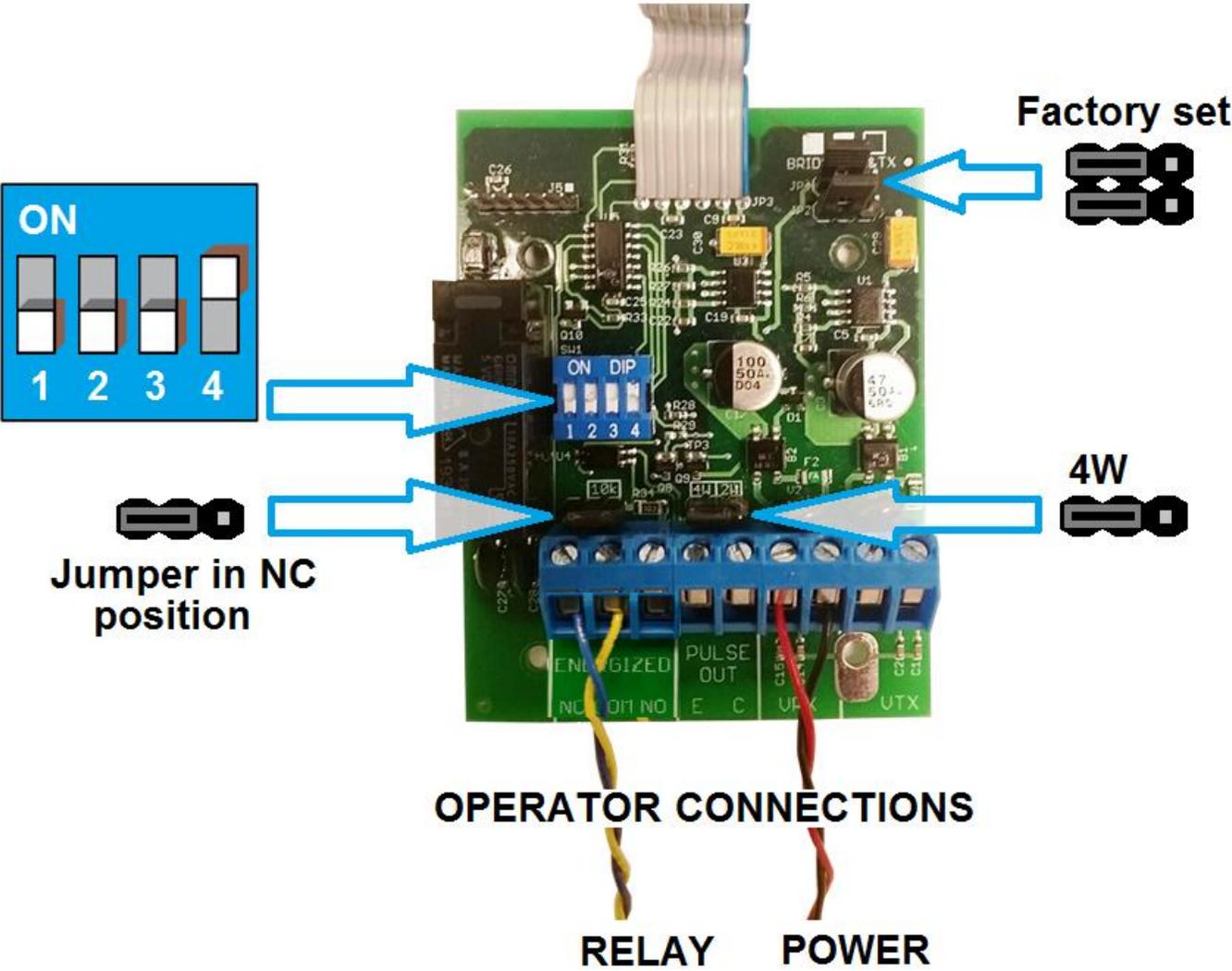
NOTE: Remove power when changing Configuration settings

MONITORING METHOD	SWITCH SETTINGS				OUTPUT CONNECTIONS	POWER CONNECTION		JUMPERS INSTALLED				REFERENCE WIRING DIAGRAM
	SW1	SW2	SW3	SW4		VRX	VTX	JP2	JP4	JP5	JP6	
NORMALLY CLOSED: DARK ON (CONTACT CLOSED WHEN NOT OBSTRUCTED)	OFF	OFF	OFF	ON	NC, COM	VRX	NOT USED	IN	IN	X	4W	B

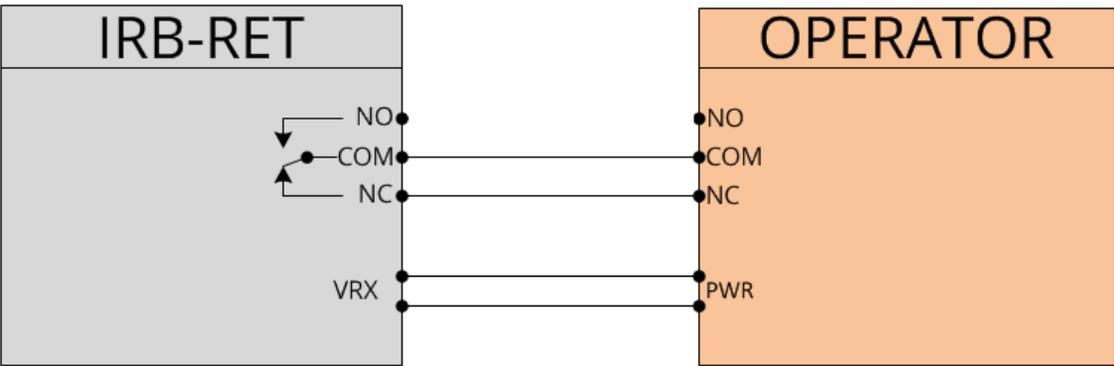
NOTE: The relay contacts on the board and the references to them in these Instructions are shown in the energized state, no obstruction, Dark ON setting.

X indicates jumper not in 10K position, it is in the storage position, or removed

# IRB-RET set-up for relay operation, NC



WIRING DIAGRAM B



## PULSE AND POWER CYCLE

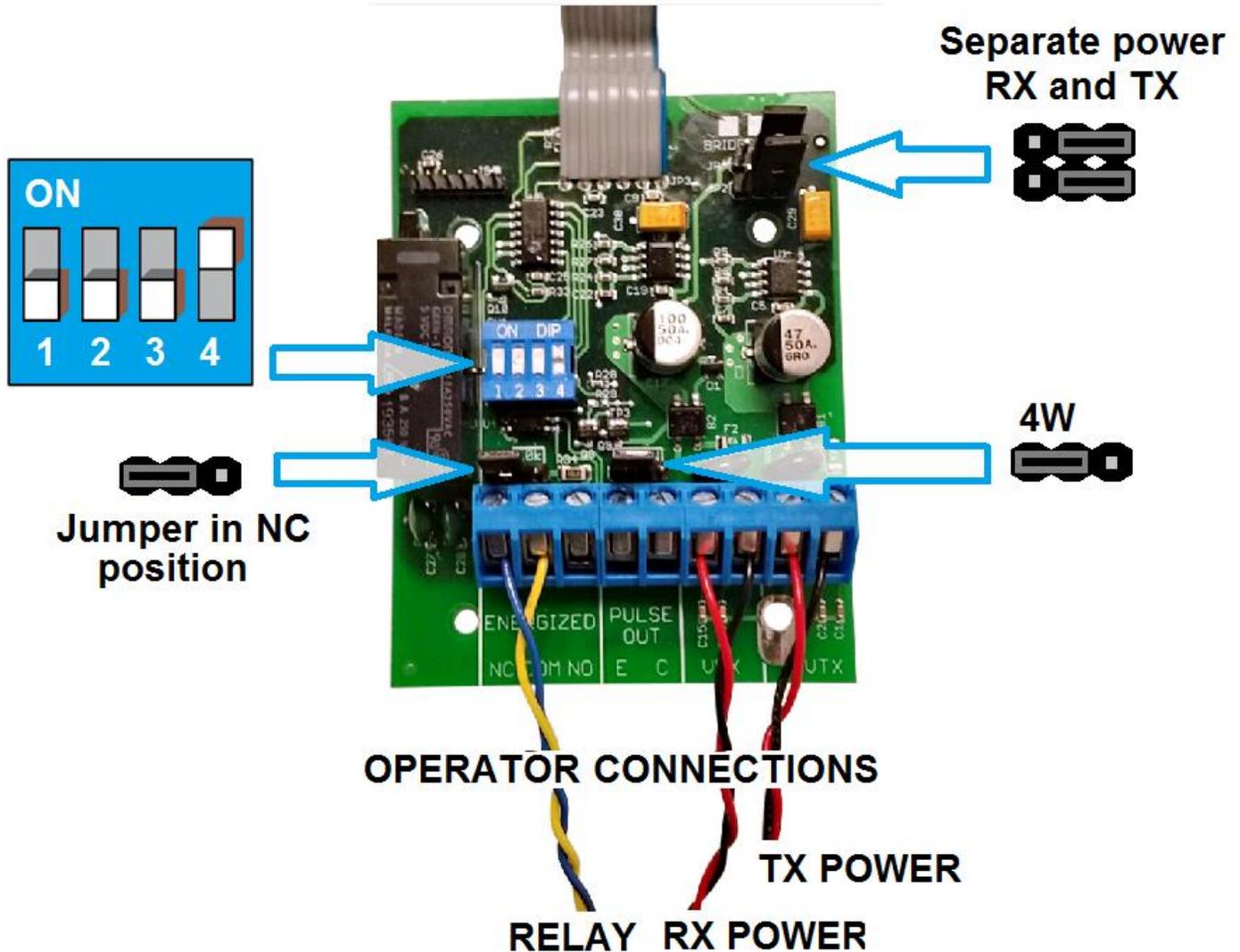
NOTE: Remove power when changing Configuration settings

MONITORING METHOD	SWITCH SETTINGS				OUTPUT CONNECTIONS	POWER CONNECTION		JUMPERS INSTALLED				REFERENCE WIRING DIAGRAM
	SW1	SW2	SW3	SW4		VRX	VTX	JP2	JP4	JP5	JP6	
NORMALLY CLOSED: DARK ON - POWER CYCLE TRANSMITTER ONLY (CONTACT CLOSED WHEN NOT OBSTRUCTED)	OFF	OFF	OFF	ON	NC, COM	VRX	VTX				4W	C
TWO-WIRE PULSED (2 FREQUENCY)	ON	OFF	OFF	OFF	VRX (1)	VRX		IN	IN		2W	D
TWO-WIRE PULSED (3 FREQUENCY)	OFF	ON	OFF	OFF	VRX (1)	VRX		IN	IN		2W	D
FOUR-WIRE PULSED (2 FREQUENCY)	ON	OFF	OFF	OFF	E,C (2)	VRX		IN	IN		4W	E
FOUR-WIRE PULSED (3 FREQUENCY)	OFF	ON	OFF	OFF	E,C (2)	VRX		IN	IN		4W	E

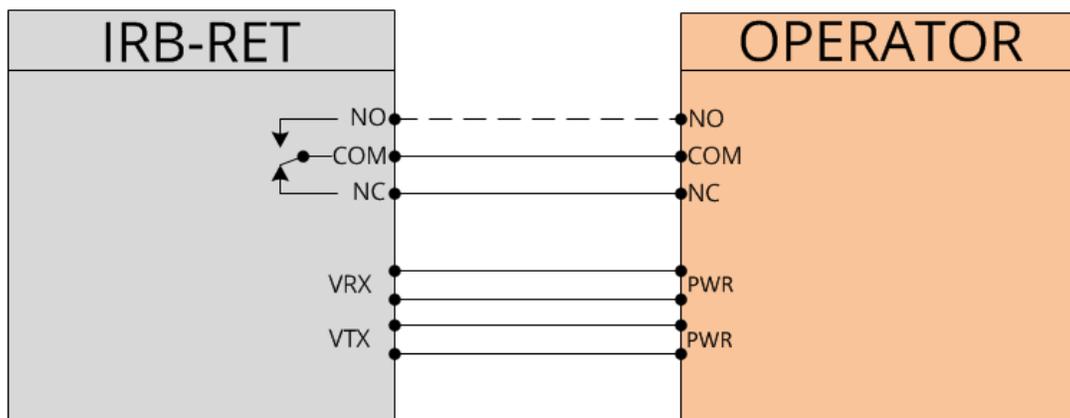
- (2) Pulsed configurations require current limiting in the operator. The IRB-RET will pulse the power lines when no obstruction is present.
- (3) Four-wire output provides an emitter and collector connection to the operator. The emitter is generally connected to the circuit common (ground) and the collector is typically an open-collector output using a pull-up resistor to low-voltage DC power.

# IRB-RET set-up for relay operation

## Power cycle transmitter, NC

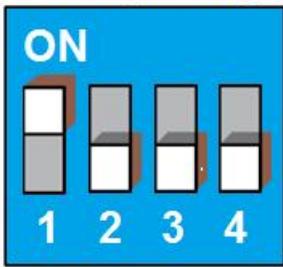


### WIRING DIAGRAM C

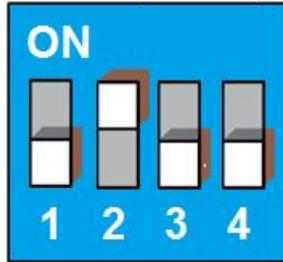


# IRB-RET set-up for 2-wire pulsed operation

2 frequency



3 frequency



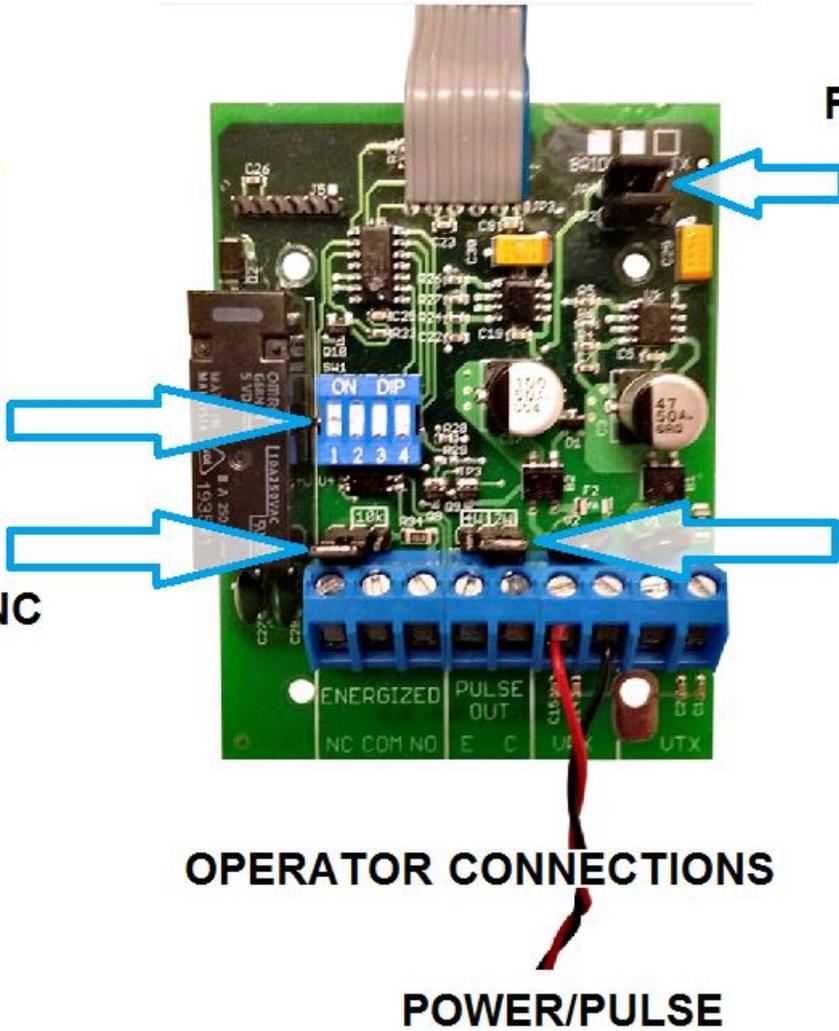
Jumper in NC position



Factory set



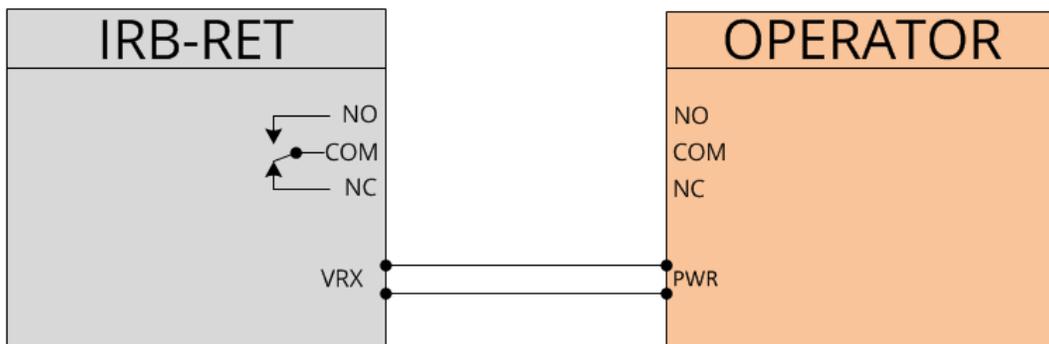
2W



OPERATOR CONNECTIONS

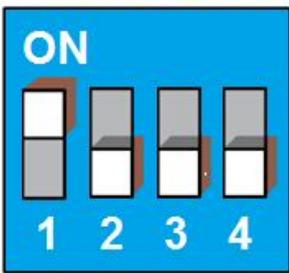
POWER/PULSE

## WIRING DIAGRAM D

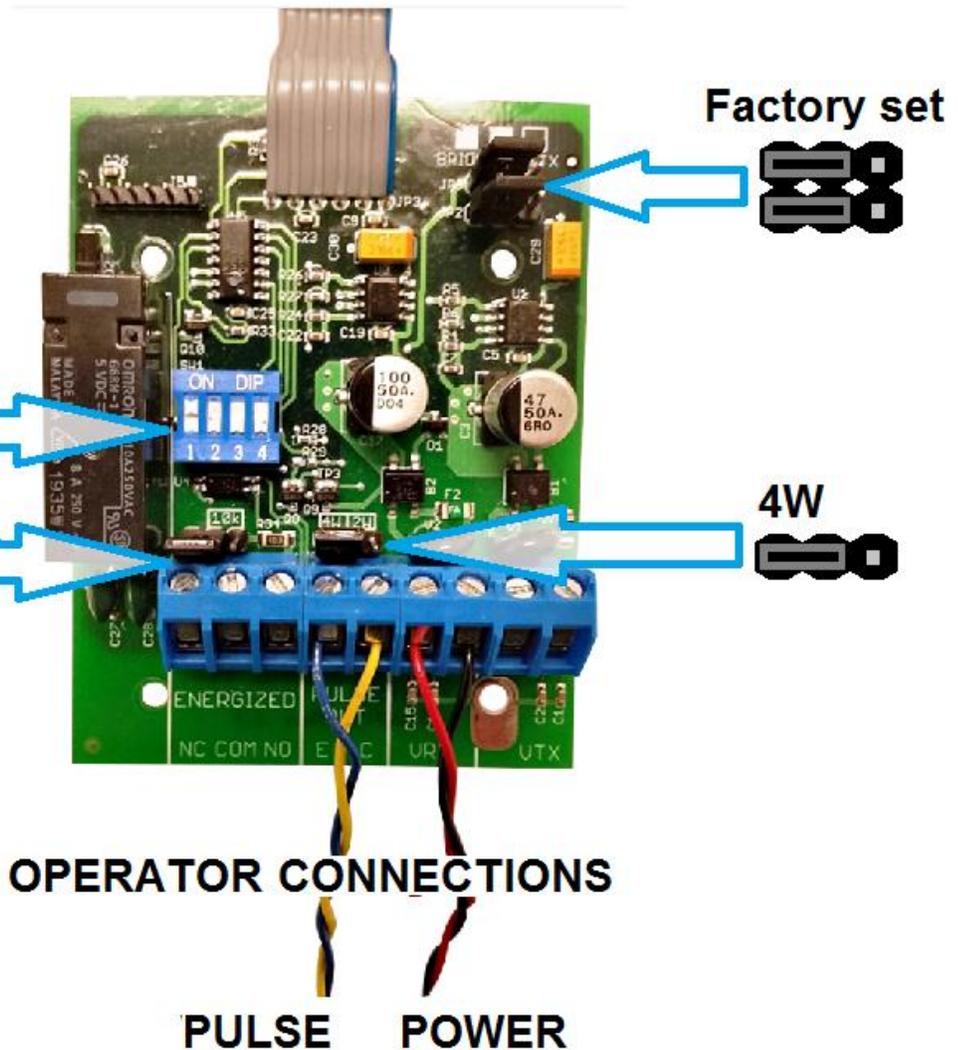
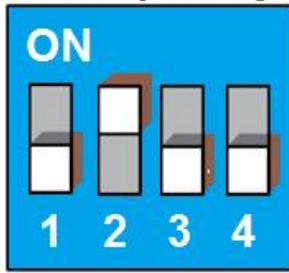


# IRB-RET set-up for 4-wire pulsed operation

2 frequency



3 frequency



Jumper in NC position

Factory set



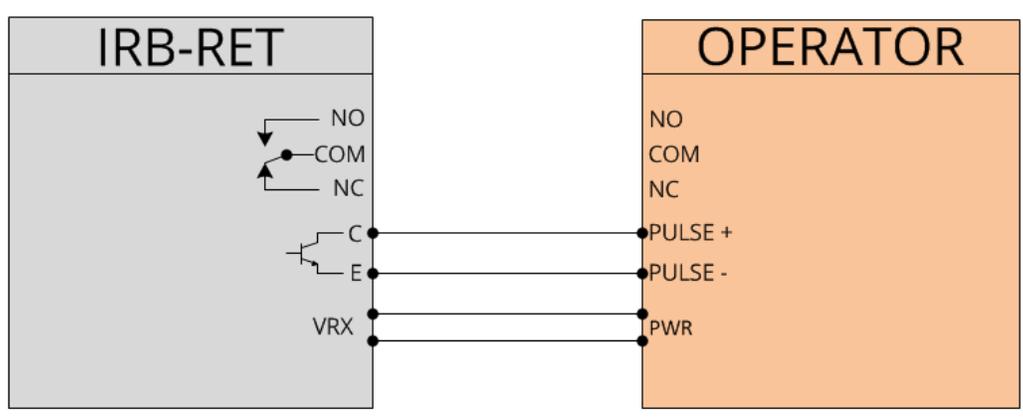
4W



OPERATOR CONNECTIONS

PULSE POWER

## WIRING DIAGRAM E



## Indicators

INDICATORS		
GREEN	ON	Aligned with reflector, no obstruction
GREEN	Flashing	Beam obstructed or not aligned
GREEN	OFF	No power
RED	ON	Aligned
RED	OFF	Beam obstructed or not aligned

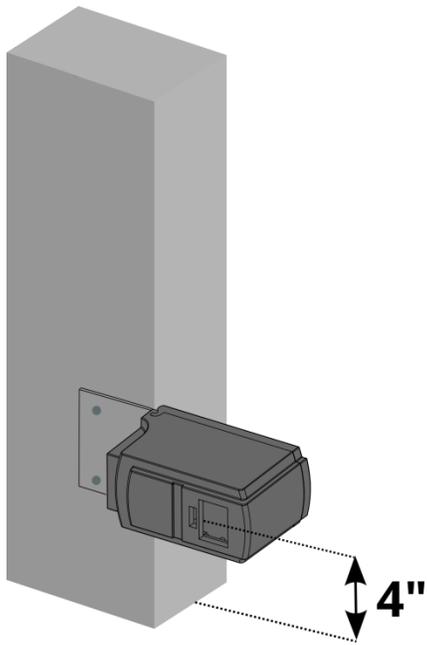
## Installation



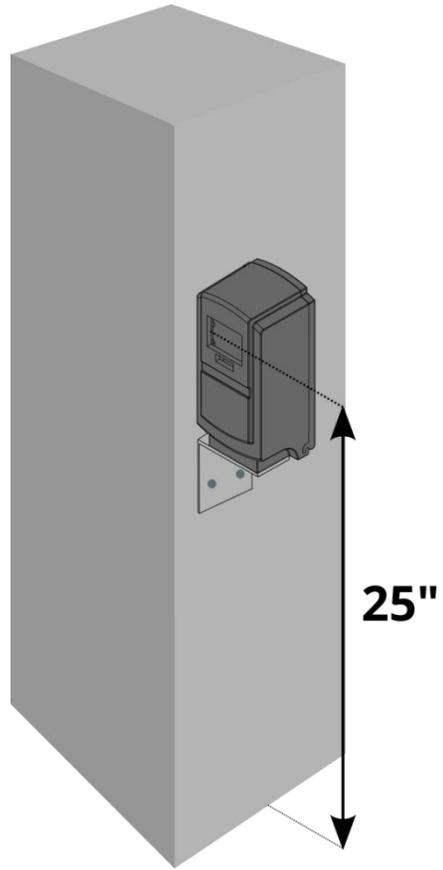
**Install the IRB-RET according to instructions from the gate operator manufacturer. The intent of External Entrapment Protection Device Type B1 non-contact sensor is to protect a person from being accidentally injured by the moving gate or door.**

**DO NOT USE 12-24VAC IN PULSE CONFIGURATIONS.**

1. NOTE: If the terminal screw is backed out all the way it may be necessary to apply slight downward pressure while tightening to re-engage the internal mechanism.
2. Disconnect the IRB-RET from power before installing or servicing the device.
3. Always follow the instructions of the gate operator manufacturer regarding installation of type B1 sensors on the gate operator. The instructions of the gate operator manufacturer always supersede any instructions given in this or any other instructions by EMX Industries Inc.
4. Refer to the Configuration settings table for connections based on Configuration and monitoring method.
5. When using the relay outputs, do not exceed the voltage/current ratings indicated in the specification table.
6. Install the IRB-RET according to instructions from the gate or door operator manufacturer. The intent of External Entrapment Protection Device Type B1 non-contact sensor is to protect a person from being accidentally injured by the moving gate or door.
7. The IRB-RET is housed in a NEMA 4X enclosure. To insure 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 UL Listed watertight fitting such as a strain relief or watertight conduit connector.
8. The IRB-RET must be powered by Class 2 circuits only, wiring must be segregated from other circuits or insulation must be provided that is suitable for the highest voltage for those circuits.



Mounting position for door



Mounting position for gate



LOCATION OF SENSITIVITY ADJUSTMENT

**Alignment instructions:**

1. Set sensitivity adjustment to 1/3 of the setting.
2. Hold the reflector and start at 4 to 6 feet away and move the reflector left, right, up and down in a 2 foot pattern while slowly retreating to the area where the reflector will be mounted.  
Mount the reflector as close to the center of the pattern as possible to assure the strongest signal. If it is necessary to reposition the photo eye, repeat these steps to properly position the reflector.
3. If the signal drops out before getting to the desired distance, increase the sensitivity to 1/2 or 3/4 of the range and repeat step 2.
4. Increase sensitivity adjustment to MAX.

## Verification and operation



**Verify proper operation of the IRB-RET according to instructions from the gate operator manufacturer. The intent of External Entrapment Protection Device Type B1 non-contact sensor is to protect a person from being accidentally injured by the moving gate or door.**

1. Verify that the IRB-RET and reflector are in line of sight and apply power.
2. Place an obstruction (ex. hand) between the IRB-RET and the reflector. The green LED on the receiver is flashing and the red LED turns off. Check the operator control board and verify that the safety input is actuated.
3. Remove the obstruction and green LED and red LED will turn on.
4. If the IRB-RET indicates an obstruction when there is no obstruction, increase the sensitivity by adjusting the SENSITIVITY pot clockwise and carefully verify alignment with the reflector.
5. Follow gate/door manufacturer's installation instructions and safety checks to verify that the IRB-RET is operating properly.

## Troubleshooting

Symptom	Possible cause	Solution
Does not detect obstruction of beam	Signal is reflecting off another surface	Check area for highly reflective surfaces
Green LED flashes continuously (indicating an obstruction when an obstruction is not present)	Sensitivity too low  Photoeye is not aligned with the reflector	Adjust SENSITIVITY pot clockwise  Check alignment, verify operation with reflector at 10ft
Photoeye activates but does not transmit signal to operator	Faulty connection between photoeye and operator control input	Verify all wires and terminal connections

## Ordering Information

**IRB-RET**

**Retroreflective photoeye, Includes REFLECTOR-O-EX and mounting bracket with hardware**

## Accessories

**REFLECTOR-O-HD**

**Plastic protective hood for reflector**

**IRB-RET-HD**

**Steel protective hood for photoeye**

## Warranty

EMX Industries Incorporated warrants all products to be free of defects in materials and workmanship for a period of two years under normal use and service from the date of sale to our customer. This warranty does not cover normal wear and tear, abuse, misuse, overloading, altered products, damage caused by incorrect connections, lightning damage, or use other than intended design.

There is no warranty of merchantability. There are no warranties expressed or implied or any affirmation of fact or representation except as set forth herein.

EMX Industries Inc. sole responsibility and liability, and the purchaser's exclusive remedy shall be limited to the repair or replacement at EMX Industries option of a part or parts found not conforming to the warranty. In no event shall EMX Industries Inc. be liable for damages, including but not limited to damages resulting from non-conformity, defect in material or workmanship.

Effective date: January 1<sup>st</sup>. 2002



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Revision 1.7  
6.14.17