

Miniature Photo-Electric Sensors



- EASILY FITS MOST ANY MOUNTING SITUATIONS
- EXCEPTIONAL OPTICAL PERFORMANCE
- +10 to +30 VDC OPERATION WITH REVERSE POLARITY PROTECTION
- DISPLAY OPERATING STATUS LEDs ARE VISIBLE FROM 360°
- RUGGED SEALED HOUSING, PROTECTED CIRCUITRY
- LESS THAN 1 MILLISECOND OUTPUT RESPONSE FOR EXCELLENT SENSING REPEATABILITY

GENERAL DESCRIPTION

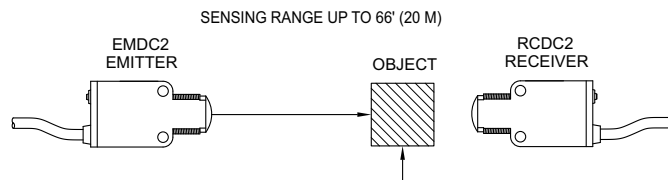
These miniature self-contained and powerful Retroreflective, Proximity (Diffuse) and Opposed Beam Pair Photo-electric sensors provide application flexibility in counting, positioning and object detection. Their small size, in addition to various mounting options, greatly increases alignment ease and application possibilities.

All units can be powered by supplies ranging from +10 to +30 VDC and are reverse polarity protected. Green and amber LED's display operating status from 360 degrees, indicating "power on" and "light sensed". You can tell operating status of your sensors at a glance.

MODELS EMDC2 & RCDC2 - OPPOSED BEAM EMITTER/ RECEIVER SENSOR PAIR

The Models EMDC2 (Emitter) and the RCDC2 (Receiver) are miniature, DC powered, Opposed Beam photo-electric sensor pairs with a 66 foot sensing range. The Emitter contains a high power modulated "infrared" LED. The Receiver contains a sensitive photo-transistor and output transistor.

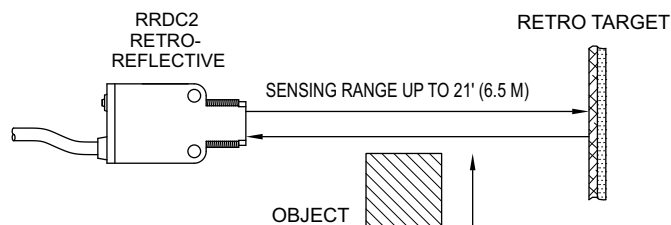
In operation, the output will turn on when the Receiver detects that an object has broken the Emitter beam. Due to their high gain, they are ideally suited for detecting opaque objects in dirty and dusty areas or when condensation or oil film environments are present.



MODEL RRDC2 - RETROREFLECTIVE SENSOR

The Model RRDC2 is a miniature, DC powered, retroreflective photo-electric sensor. The "visible" LED light beam allows for easy alignment and is modulated, to provide immunity to ambient light. The small beam size makes it a good choice for detecting relatively small objects.

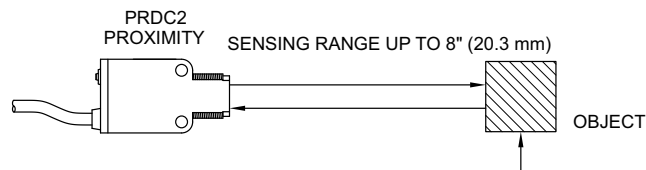
In operation, the visible LED light beam is directed at a retro reflective target. An object breaking this beam will trigger the output.



MODEL PRDC2 - PROXIMITY SENSOR

The Model PRDC2 is a miniature, DC powered, Proximity (Diffuse) photo-electric sensor with a 18" maximum detecting distance. This sensor requires no special reflectors or reflective tapes and the limited sensing range reduces detection of background reflections. It is ideally suited for detection of transparent or translucent objects, parts ejected from presses, and rotating targets such as pulley spokes. A modulated "infrared" LED light beam provides immunity to ambient light.

In operation, the modulated light beam is reflected by the detected object. This reflected light beam is sensed by a photo-transistor, which in turn energizes the output. Actual sensing range is determined by the surface area and the amount of reflectivity of the object.



SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in this literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit. An independent and redundant temperature limit indicator with alarm outputs is strongly recommended.



CAUTION: Risk of Danger.

Read complete instructions prior to installation and operation of the unit.



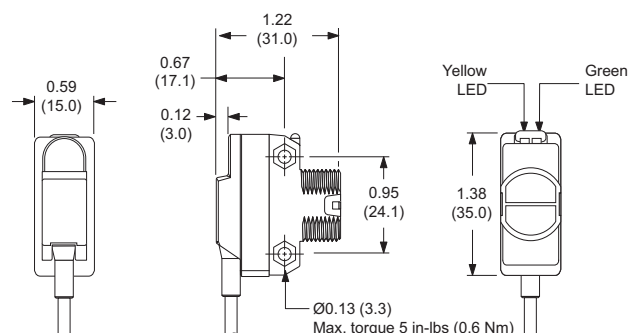
WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to **serious injury or death**.

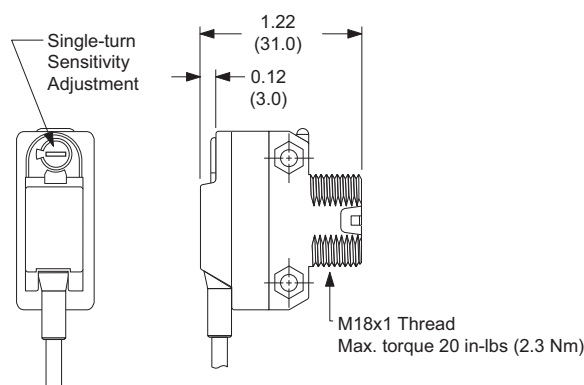
This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

DIMENSIONS In inches (mm)

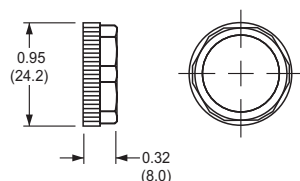
EMDC2 & RCDC2



RRDC2 & PRDC2



MOUNTING NUT (Supplied)



SPECIFICATIONS

- SUPPLY VOLTAGE:** 10 to 30 VDC (10% maximum ripple) at less than 25 mA, exclusive of load
Protected against reverse polarity and transient voltages
- LIGHT SOURCE:**
Opposed and Diffuse mode models: Infrared, 940 nm
Retroreflective mode models: Visible red, 660 nm
- ADJUSTMENTS:**
Diffuse, and Retroreflective mode models: Single-turn sensitivity (Gain) adjustment potentiometer
- INDICATORS:**
2 LED indicators on sensor top:
Green solid: Power on
Amber solid: Light sensed
Green flashing: Output overloaded
Amber flashing: Marginal excess gain (1 to 1.5x excess gain)
- REQUIRED OVERCURRENT PROTECTION:**



WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

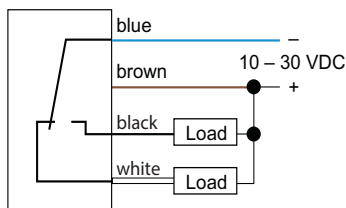
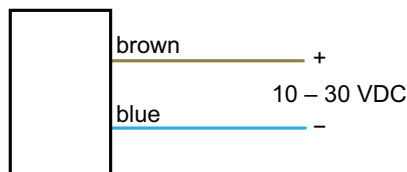
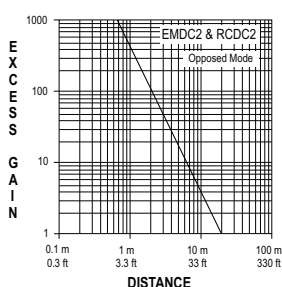
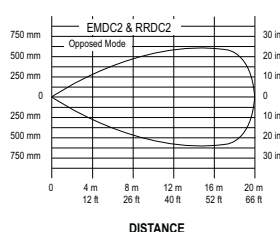
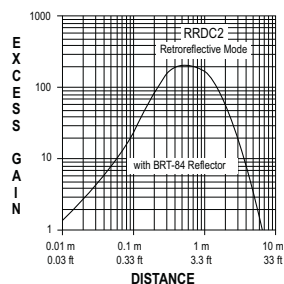
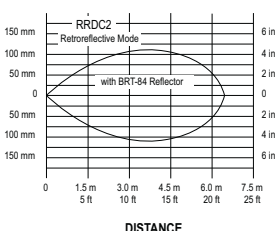
Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

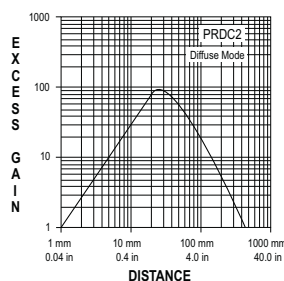
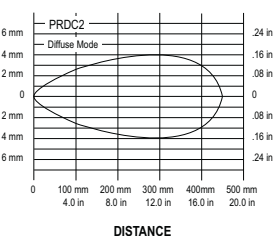
Supply wiring leads < 24 AWG shall not be spliced.

SUPPLY WIRING	REQUIRED OVERCURRENT PROTECTION
20	5.0 A
22	3.0 A
24	2.0 A
26	1.0 A
28	0.8 A
30	0.5 A

- REPEATABILITY:**
Opposed Mode: 100 microseconds
Diffuse and Retroreflective Mode: 150 microseconds
- OUTPUT CONFIGURATION:**
Solid-state NPN (current sinking)
Rating: 100 mA maximum at 25°C
Off-state Leakage Current: less than 50 μ A @ 30 VDC
ON-state Saturation Voltage: less than 1 V @ 10 mA; less than 1.5 V @ 100 mA
Protected against false pulse on power-up and continuous overload or short circuit of output
- OUTPUT RESPONSE:**
Opposed Mode: 750 microseconds ON; 375 microseconds OFF
Diffuse and Retroreflective Mode: 600 microseconds ON/OFF
Note: 100 millisecond delay on power-up; output does not conduct during this time
- CONSTRUCTION:**
ABS housing
3 mm mounting hardware included
- CONNECTIONS:** 2 m (6.5 ft) 4-wire PVC cable.
- ENVIRONMENTAL:**
IEC IP67; NEMA 6
- OPERATING CONDITIONS:**
Temperature: -4°F to 158°F (-20°C to 70°C)
Relative Humidity: 90% @ 50°C (non-condensing)
- CERTIFICATIONS:**
UL Recognized Component: File #E71083
- WEIGHT:** 2.0 oz (62.2 g)

WIRING**RCDC2, RRDC2, & PRDC2****EMDC2****PERFORMANCE CURVES****Opposed Mode****Excess Gain Curve****Beam Pattern****Retroreflective Mode****Excess Gain Curve****Beam Pattern****Diffuse Mode**

(Performance is based on a 90% reflectance white test card.)

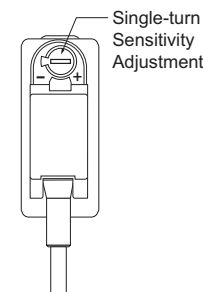
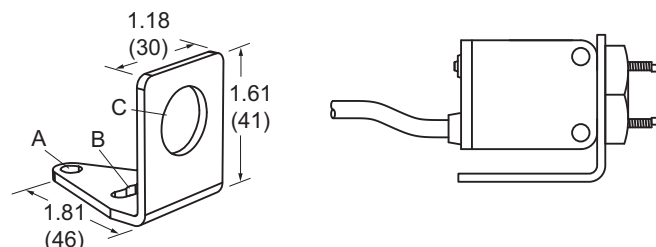
Excess Gain Curve**Beam Pattern****SET-UP AND INSTALLATION****USING THE PHOTOELECTRIC****LED INDICATORS**

The photoelectric has two bright LEDs; both are visible from 360 degrees. They indicate the following:

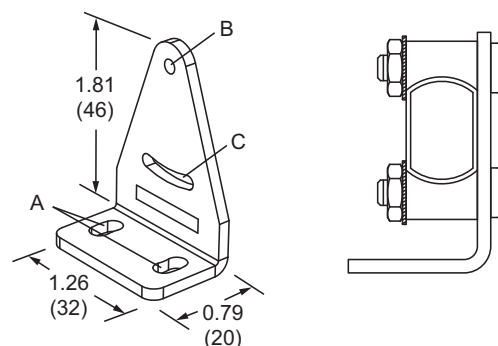
Green solid:	Power on
Amber solid:	Light sensed
Green flashing:	Output overloaded
Amber flashing:	Marginal excess gain (1 to 1.5x excess gain)

SENSITIVITY ADJUSTMENT (RRDC2 & PRDC2 Only)

The unit features an extremely simple method for setting sensitivity (gain). Reduce gain by turning the pot counter-clockwise. If the gain is set too low, turn the pot clockwise to the appropriate level. Gain may be readjusted in this way at any time.

**BRACKET DIMENSIONS In inches (mm)****MBMAB200****Hole center spacing:** A to B = 0.95 (24.2)**Hole size:**

- A = \varnothing 0.18 (\varnothing 4.6)
- B = 0.67 x 0.18 (17.0 x 4.6)
- C = \varnothing 0.73 (\varnothing 18.5)

MBMSB200**Hole size:**

- A = 0.169 x 0.295 (4.3 x 7.5)
- B = \varnothing 0.12 (\varnothing 3)
- C = 0.118 x 0.602 (3 x 15.3)

ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
EMDC2	DC Emitter (Opposed Beam Pair)	EMDC2000
RCDC2	DC Receiver (Opposed Beam Pair)	RCDC2000
RRDC2	Retroreflective DC Photo-Electric Sensor	RRDC2000
PRDC2	Proximity (Diffuse) DC Photo-Electric Sensor	PRDC2000
MBMA	Right-Angle Mounting Bracket	MBMAB200
MBMS	Side-Mount Mounting Bracket	MBMSB200
RT	1.5" Reflective Target	RT100000
	3" Reflective Target	RT200000
RRTAPE	50 mm x 2.5 m Reflective Tape	RRTAPE00