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Bulletin No. PRM/RRM-A

Drawing No. LP0522

Released 3/07

## MODELS PRM & RRM – MINIATURE DC POWERED PHOTO-ELECTRIC SENSOR



- RETROREFLECTIVE, PROXIMITY (DIFFUSE) & OPPOSED BEAM PAIRS
- +10 to +30 VDC OPERATION WITH REVERSE POLARITY PROTECTION
- COMPLEMENTARY NPN (CURRENT SINKING) OUTPUTS
- DURABLE BLACK POLYCARBONATE/ABS ALLOY HOUSING MEETS NEMA 6 AND IP65 STANDARDS
- LED's DISPLAY OPERATING STATUS
- PUSH BUTTON DIGITAL GAIN ADJUSTMENT

### 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. All units are interchangeable with conventional 12 mm threaded barrel-type photo-electrics and inductive proximity sensors. Their small size, in addition to various mounting options, greatly increases alignment ease and application possibilities.

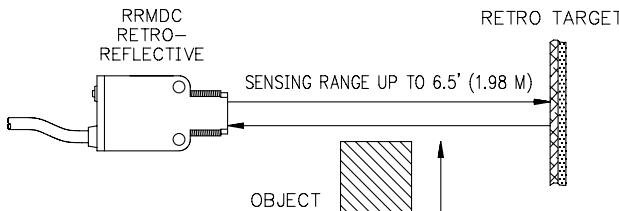
All units can be powered by supplies ranging from +10 to +30 VDC and are reverse polarity protected. The complementary NPN open collector (Current Sinking) outputs are protected from continuous overload and inductive load transients and are rated to 150 mA, with low saturation voltage and less than 10  $\mu$ A off-state leakage current. In addition, no false outputs are generated at power-up. Two versions of the sensor are available, a 6 foot (1.83 M) long 4 conductor PVC jacketed cable or 6 inch long quick disconnect Pico-style connector provides supply input and transistor output.

These miniature sensors offer a digital gain adjustment that uses a single sealed push button to streamline installation and setup. The user simply holds the button in to achieve maximum sensitivity, and then can click the button for seven decremental settings to fine tune for your application. They also feature smart new status indicators. Green and amber LED's display operating status from three directions, indicate "power on" and "light sensed" and flash to signal "maximum gain," "gain reduced one increment" and "minimum gain" conditions. You can tell operating status of your sensors at a glance.

### MODEL RRMDC - RETROREFLECTIVE SENSOR

The Model RRMDC is a miniature, DC powered, retroreflective photo-electric sensor with maximum detection range of 6.5 feet [1.98 M] (with 3" dia. reflector Model RT2). The "visible" LED light beam allows for easy alignment and is modulated, providing immunity to ambient light. The small beam size makes it a good choice for detecting relatively small objects.

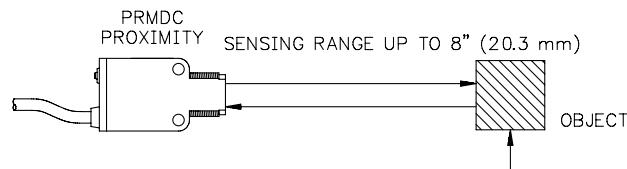
In operation, the visible LED light beam is directed at a photo transistor, amplified and demodulated. An object which then breaks this beam will trigger the output.



### MODEL PRMDC - PROXIMITY SENSOR

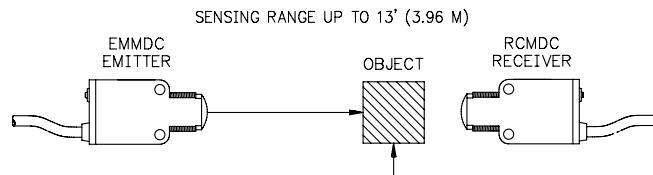
The Model PRMDC is a miniature, DC powered, Proximity (Diffuse) photo-electric sensor with a 8" maximum detecting distance. This sensor requires no special reflectors or reflective tapes and the limited 8" sensing range reduces detection of background reflections. It is ideally suited for detection of 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 object to be detected. Actual sensing range is determined by the surface area and the amount of reflectivity of the object. This reflected light is sensed by a phototransistor, amplified, demodulated and then energizes the outputs.



### MODELS EMMDC & RCMDC - OPPOSED BEAM EMITTER/ RECEIVER SENSOR PAIR

The Models EMMDC (Emitter) and the RCMDC (Receiver) are miniature, DC powered, Opposed Beam photo-electric sensor pairs with a 13 foot sensing range. The Emitter contains a high power modulated "infrared" LED. The Receiver contains a sensitive photo-transistor, amplifier-demodulator and output transistor. In operation, this output will be triggered when the Receiver detects that an object begins to break 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.

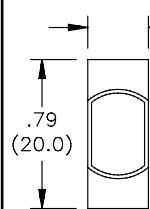


## SPECIFICATIONS

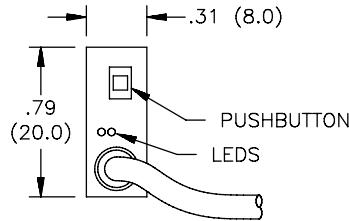
1. **POWER REQUIREMENTS:** +10 to +30 VDC (10% Ripple Max.)  
Current Draw: 25 mA max. (exclusive of load)  
Reverse Polarity Protected
2. **REPEATABILITY:** Opposed Mode: 1 msec, All others: 175  $\mu$ sec.
3. **OUTPUTS:** Current Sinking Complementary NPN Open Collector Transistor; Short Circuit Protected  
 $I_{SNK}$ : 150 mA max. each;  $V_{OH}$  = 30 VDC max.  
 $V_{SAT}$ : 1 V @ 10 mA load  
Offstate Leakage Current : Less than 10  $\mu$ A @ 30 VDC
4. **OUTPUT RESPONSE TIME:** Opposed Mode: 8 msec ON, 4 msec OFF, All others 1.5 msec
5. **OPERATING TEMPERATURE:** -4° to +131°F (-20° to +55°C)
6. **WEIGHT:** 0.4 oz. (1.13 g)

## DIMENSIONS In inches (mm)

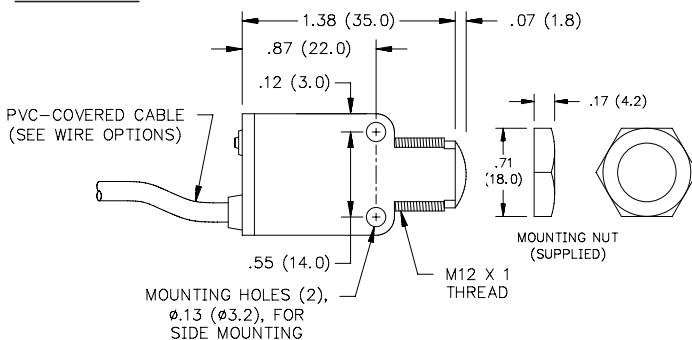
### FRONT VIEW



### REAR VIEW



### SIDE VIEW



## SET-UP AND INSTALLATION

### USING THE PHOTOELECTRIC LED INDICATORS

The photoelectric has two bright LEDs; both are visible from the back, and each is visible from one side of the sensor. They indicate the following:

**Green steady:** Power ON

**Amber steady:** Light sensed

**Green flashing rapidly 5 times:** Maximum gain

**Single green flash:** Push button "click" registered, gain reduced by one increment

**Amber/Green alternating:** Minimum gain (can not reduce further)

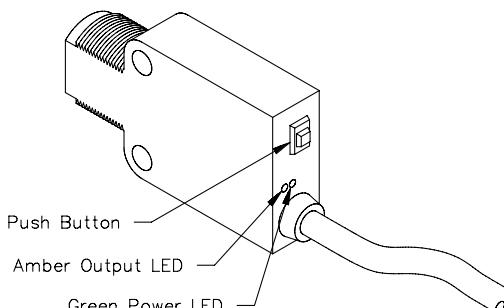
### SETTING SENSITIVITY

The unit features an extremely simple method for setting sensitivity (gain).

Simply hold the push button until the LED flashes rapidly, 5 times. The sensor is automatically set to maximum gain.

Reduce gain by pressing the push button briefly ("clicking" it) up to 7 times; gain will reduce in single increments with each click. Amber and green LEDs alternate after the lowest setting is reached.

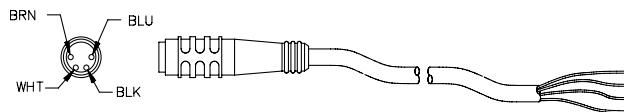
If the gain is accidentally set too low, hold the push button until gain increases to the maximum level, then click the push button down to the appropriate level. Gain may be readjusted in this way at any time.



## ORDERING INFORMATION

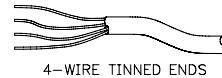
MODEL NO.	DESCRIPTION	PART NUMBERS	
		w/ 2 Meter Cable	w/ Pico Connector
RRMDC	Retroreflective DC Photo-Electric Sensor	RRMDC000	RRMDC001
PRMDC	Proximity (Diffuse) DC Photo-Electric Sensor	PRMDC000	PRMDC001
EMMDC	DC Emitter (Opposed Beam Pair)	EMMDC000	EMMDC001
RCMDC	DC Receiver (Opposed Beam Pair)	RCMDC000	RCMDC001
MB2	Bottom Mount Bracket Kit	MBM20000	
MB3	Side Mount Bracket Kit	MBM30000	
RT1	1-1/2" Dia. Prismatic Reflector (Model RRMDC)	RT100000	
RT2	3" Dia. Prismatic Reflector (Model RRMDC)	RT200000	
CCMPE	Pico-Style Quick Disconnect Connector & Cable, 2 meters	CCMPE000	

## CCMPE

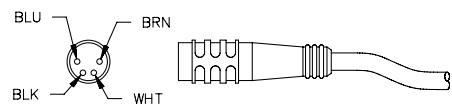


4-PIN FEMALE PICO-STYLE CONNECTOR [ 6.5' (2 m) ]

## WIRE OPTIONS



4-WIRE TINNED ENDS

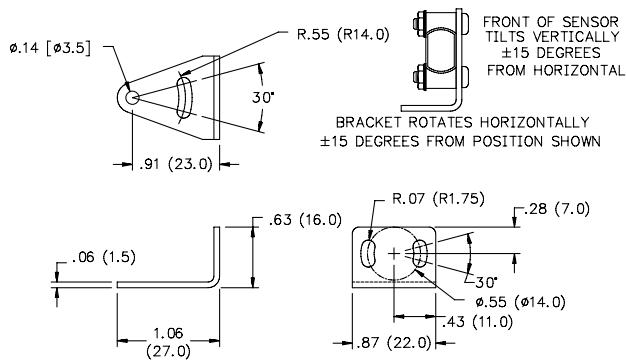


4-PIN MALE PICO-STYLE CONNECTOR

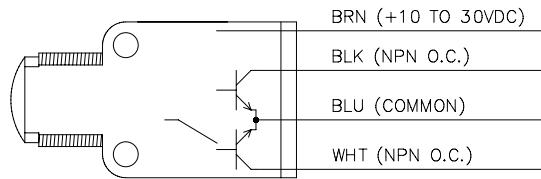
## MOUNTING

Various mounting methods have been designed to simplify alignment and provide versatility in any industrial environment. The integral 12 mm threaded lense can be interchanged with existing threaded entries common to 12 mm barrel sensors and inductive proximity switches. The threaded lens can also be installed into panel thicknesses of 3/16" through a 0.51" diameter hole and tightened into place with the supplied mounting nut. Two #4 screw clearance through-holes on 0.55" centers are available for side mounting or side nesting of multiple units on 1/2" centers for scanning large areas or for code reading applications. Units may also be mounted using the stainless steel Bottom-Mount or Side-Mount Bracket Kits (Models MBM2 or MBM3). These brackets allow 2 axes of movement & greatly simplify alignment.

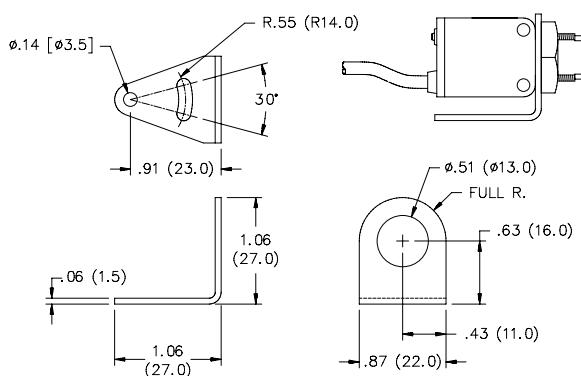
## MBM3



## WIRING DIAGRAM



## MBM2



### **LIMITED WARRANTY**

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

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