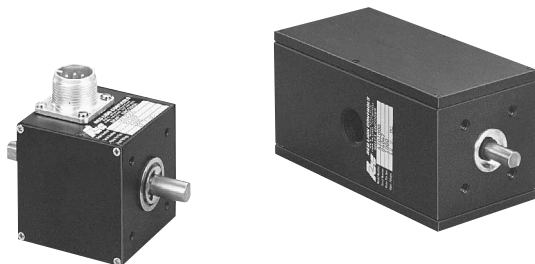




Tel +1 (717) 767-6511  
 Fax +1 (717) 764-0839  
 www.redlion-controls.com

Bulletin No. RPGB/H-N  
 Drawing No. LP0202  
 Released 4/03

## ROTARY PULSE GENERATORS (RPG'S) TRANSFORM SHAFT ROTATION TO COUNT PULSE TRAINS FOR COUNTERS, TACHOMETERS, MOTION MONITORS & CONTROLS



- **CURRENT SINK OUTPUTS**
- **HIGH PULSE PER REVOLUTION (PPR) RATES**  
 Up to 1200 PPR for fine, high-resolution counting or precision speed measurement from slow shaft speeds.
- **QUADRATURE OUTPUT**  
 For position measurement, bi-directional counting and in systems with backlash counting requirements.
- **EASY INSTALLATION**  
 Eliminates air-gap, sensing distance, and beam alignment procedures of other types of sensing.
- **IDEAL FOR DUSTY, DIRTY ENVIRONMENTS**  
 Where "Non Contact" sensing means are impractical.

RPG's contain an L.E.D. light source and a photo sensor that scans a shaft-mounted, slotted disc. An internal pulse-shaping amplifier circuit delivers a rectangular pulse signal from the current sinking output in response to the passing slots as it rotates. RPG's can be direct-coupled to a machine shaft by means of a flexible-bellows, spring, or rubber sleeve type coupling that allows

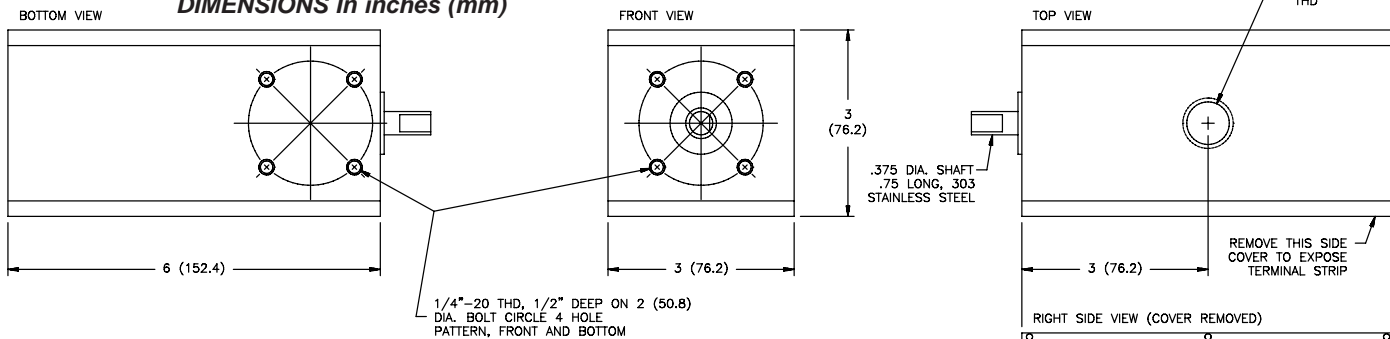
for axial and radial misalignment. They can also be coupled with light instrument timing-belts. Timing-belt drives also allow convenient gear-up or gear-down speed ratio changes that can be useful for obtaining non-standard PPR rates.

### MODEL RPGH - HEAVY-DUTY SEALED HOUSING

These heavy duty units feature a heavy cast aluminum housing with 1/4" thick aluminum cover plates and O-ring seals. Heavy duty bearings are double-sealed and allow radial shaft loading of 30 lbs (13.6 Kg) and axial loading of 10 lbs (4.5 Kg). Starting Torque is 1 oz-in (7.06 N-mm). Weight of the RPGH is 3.8 lbs (1.7 Kg). Maximum operating speed is 6000 RPM.

A 1/2" (12.7 mm) NPT Conduit entry permits signal wiring to be run via flex-conduit to an internal terminal block. Electrical characteristics are identical to those for the Model RPGB. Terminal board markings correspond to the Pin-Out identification of the RPGB.

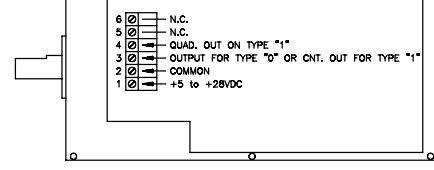
#### MODEL RPGH - DIMENSIONS In inches (mm)



#### ORDERING INFORMATION

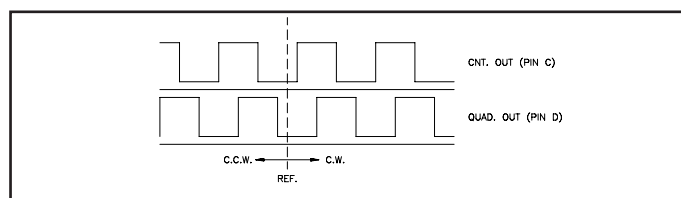
MODEL NO.	DESCRIPTION	PPR*	PART NUMBER
RPGH	Single Channel Type "0"	600	4700600
		1000	4701000
		1200	4701200
RPGFC	Flexible Coupling (1" Length) 0.250"-0.375"	--	RPGFC002
	Flexible Coupling (1" Length) 0.375"-0.375"	--	RPGFC003

\* Only Stock PPR's listed, other PPR's as well as Quad. (Type "1") output available on special order.



### ABOUT QUADRATURE OUTPUT

A quadrature output consists of two pulse trains, one of which is 90° (electrical) out of phase with the other. By virtue of this arrangement the direction of motion can be determined. Referring to the following waveform, when the CNT output (Pin C) goes from low to high while the Quadrature output (Pin D) is low, the motion is counter-clockwise.



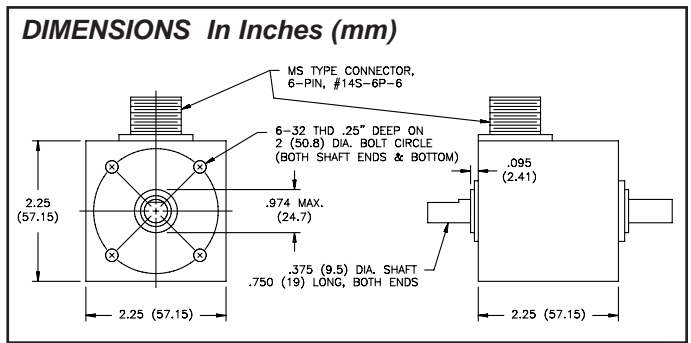
# MODEL RPGB - UP TO 1200PPR, WITH SINGLE CHANNEL OR QUADRATURE OUTPUT FOR GENERAL INDUSTRIAL SERVICE

## SPECIFICATIONS

- SUPPLY VOLTAGE:** +5 to +28 VDC
- OUTPUT:** Current Sinking  
**Type "0" Single Channel:** 250 mA max.  
**Type "1" Quadrature:** 250 mA max. per output  
 (Quad. Phase relationship is 90° ±36°)

*Note: NPN Transistor outputs have 1.5 KΩ load resistors returned to supply for internal feed back purposes. This does not interfere with the ability to use these outputs as conventional "Open-Collector" outputs as long as the supply voltage for the RPGB is supplied by the indicator or control receiving its output signal. The RPGB's internal load resistor also allows the output to be used as a current source, however, load current must be limited to 1 mA max.*

- MAXIMUM SHAFT SPEED:** 6000 RPM
- MAXIMUM PULSE RATE:**  
**Type "0" Single Channel:** 20 KHz  
**Type "1" Quadrature:** 20 KHz  
 PPR available up to 1270 for both type "1" and "0".
- HOUSING:** Black non-corrosive finished 6063-T6 aluminum.
- BEARINGS:** ABEC3 double sealed ball bearings
- RADIAL SHAFT LOAD:** 20 lbs. operating (9 kg)
- AXIAL SHAFT LOAD:** 10 lbs operating (4.5 kg)
- STARTING TORQUE:** 0.38 oz-in (2.68 N-mm)
- MOMENT OF INERTIA:**  $2.5 \times 10^{-3}$  oz-in-sec<sup>2</sup> ( $1.77 \times 10^{-2}$  N-mm-sec<sup>2</sup>)
- CONNECTIONS:** Mating 6-pin MS connector #14S-6P-6 or cable/connector assembly (4-wire shielded), 10' (3.05 m), 25' (7.62 m), or 50' (15.24 m) long, must be ordered separately. Consult factory for special lengths.
- OPERATING TEMPERATURE:** 0° to 70 °C.
- WEIGHT:** 10 oz (283.5 g)

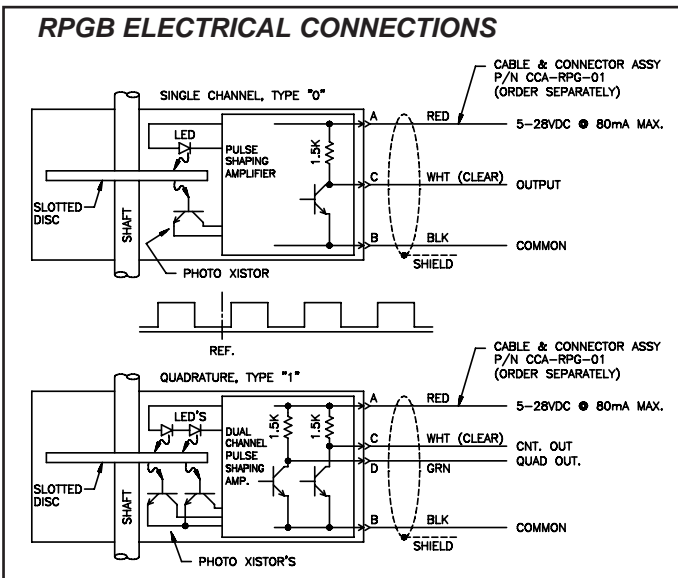


## ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PPR*	PART NUMBER
RPGB	Type "0" Single Channel	60	4600060
		100	4600100
		600	4600600
		1000	4601000
		1200	4601200
	** Type "1" Quadrature	10	4610010
		12	4610012
		100	4610100
		120	4610120
		500	4610500
600	4610600		
RPGFC	Flexible Coupling (1" Length) 0.250"-0.375"	--	RPGFC002
	Flexible Coupling (1" Length) 0.375"-0.375"	--	RPGFC003
Mating 6-Pin MS Connector			2101100
10' 6-Pin 4-Wire Cable/Connector			CCARPG01
25' 6-Pin 4-Wire Cable/Connector			CCARPG25
50' 6-Pin 4-Wire Cable/Connector			CCARPG50

\* Other PPR's available on special order, only stock PPR's listed.

\*\* For quadrature PPR's above 600, the Gemini Series or a Model BDMD can be used to double or quadruple the effective PPR's listed, (See the Accessory section of the Catalog.)



## Cable Connections

The tables below list the pin connections from the RPGB single channel and quadrature encoder to the optional CCARPG cable.

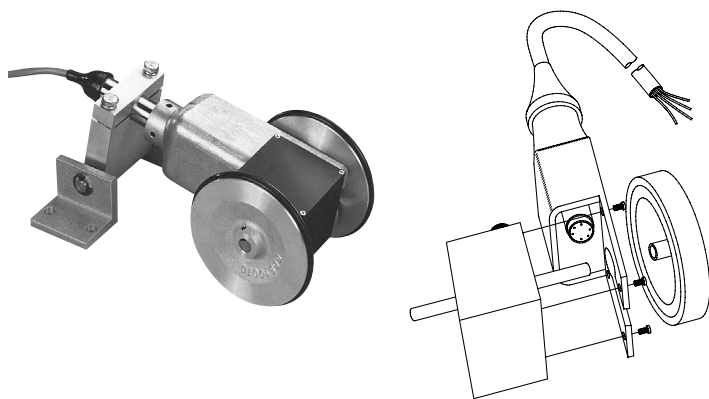
### SINGLE CHANNEL OUTPUT

RPGB PIN	FUNCTION	CCARPG WIRE
A	+VOLTS DC	RED
B	COMMON	BLACK
C	DATA A	WHITE
D	NO CONNECTION	
E	NO CONNECTION	
F	NO CONNECTION	

### QUADRATURE

RPGB PIN	FUNCTION	CCARPG WIRE
A	+VOLTS DC	RED
B	COMMON	BLACK
C	DATA A	WHITE
D	DATA B	GREEN
E	NO CONNECTION	
F	NO CONNECTION	

## LENGTH SENSOR CONVERSION BRACKET (P/N LSCB1000) ADAPTS RPGB ROTARY PULSE GENERATOR TO LENGTH MEASUREMENT



- FOR BI-DIRECTIONAL MOTION APPLICATIONS REQUIRING QUADRATURE
- FOR FINE RESOLUTION, HIGH-PULSE-RATE APPLICATIONS

### DESCRIPTION

This conversion bracket allows the customer to assemble a custom length sensor by purchasing the following items separately.

1. Length Sensor Conversion Bracket (P/N LSCB1000)
2. RPGB with appropriate PPR and Single Channel or Quadrature Output.
3. One or two measuring wheels. Install OF & OK measuring wheels with set screw hub facing RPGB shaft (as shown). Apply thread locking material to wheel set screw threads during installation to RPGB shaft.
4. Hinge Clamp Assembly (P/N LSAHC001)

*Note: To complete installation, insure guards, shields or other devices are in place to protect personnel from rotating equipment.*

The tubular arm length of this bracket, related to the wheel axis center-line of the RPGB is 6.8" similar to the LSQ. The 10' long, 4-wire, shielded cable (included with conversion bracket) has the same color coding as described for the RPGB cable P/N CCARPG01. Screws for mounting the conversion bracket to the RPGB are included.

### LENGTH SENSOR MEASUREMENT ACCURACY

Factors which affect measurement accuracy include Measuring Wheel accuracy and wear, and material conditions. Ideally, materials which are hard, thin and strong provide good readings, conversely, soft, thick and elastic materials can present problems in obtaining true readings. The great majority of these situations, where this effect is consistent, can be compensated for by applying a multiplier to the quadrature output pulse train so as to obtain a corrected measurement. Counter or Rate Indicators with "input scaling" can compensate for Measuring Wheel wear and material elastic and compliance errors. In addition, English/Metric conversions may also be accomplished (See RLC catalog for more information).

### ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
LSCB	Length Sensor Conversion Bracket for RPGB	LSCB1000
	Length Sensor Conversion Bracket for RPGB (Special Length)	LSCB1099
--	Hinge Clamp Assembly for Model LSC & Conversion Bracket (Above)	LSAHC001

## LENGTH SENSOR ACCESSORIES SEPARATE LENGTH MEASURING WHEELS - DIMENSIONS In Inches (mm)

WHEEL CODE	OR	WHEEL CODE	OF	WHEEL CODE	OK
	<p>Round Section Replaceable Tire .210" Section Dia. Black Neoprene</p> <p>8-32 UNF Set Screw .376" (9.6) Bore +.001" / -.000"</p> <p>Cast Alum.</p> <p>3/8" (9.5)</p> <p><b>FOR USE ON: Metal, paper, foil, film and hard plastics. Line contact on material being measured, convenient when available measuring track is narrow or for measuring on end of roller beside passing material.</b></p> <p>Max. Speed: 600 RPM</p>	<p>Tan, Smooth Polyurethane Tread</p> <p>10-32 UNF Set Screw</p> <p>.376" (9.6) Bore +.001" / -.000"</p> <p>Cast Alum.</p> <p>1" (25.4)</p> <p><b>FOR USE ON: Soft, smooth materials such as soft paper, matting, cardboard, fine weave textiles. Broad wheel tread minimizes contact pressure and tan polyurethane tread minimizes marking.</b></p> <p>Max. Speed: 600 RPM Balanced version of 1ft. circumference available. Balanced to ANSI S2.19-1989 Quality Grade 6.3 @ 3000 RPM.</p>	<p>Diamond Knurled Aluminum Tread</p> <p>10-32 UNF Set Screw</p> <p>.376" (9.6) Bore +.001" / -.000"</p> <p>Cast Alum.</p> <p>1" (25.4)</p> <p><b>FOR USE ON: Rubber, coarse weave fabrics, rough wood surfaces, foam, insulation.</b></p> <p>Max. Speed: 600 RPM Balanced version of 1ft. circumference available. Balanced to ANSI S2.19-1989 Quality Grade 6.3 @ 3000 RPM.</p>		

### SELECTING APPROPRIATE WHEEL SIZE & PPR (Pulses Per Rev.) OF ROTARY PULSE GENERATOR

When the desired output of an RPG and wheel combination is either in feet or inch units, selection of the proper combination is relatively straight forward. For example, with a 1-foot wheel circumference, a 1 PPR Rotary Pulse Generator will deliver 1 pulse/ft, 12 PPR would deliver 12 pulses/ft (1 pulse/inch); 100 PPR would yield 100 pulses/ft; and 120 PPR would permit measuring to 1/10th of an inch (1/120th of a foot).

Measuring in yards or meters, however, is a bit more involved since a 1-yard or 1-meter circumference wheel would be prohibitively large. Instead, 4/10 yard and 4/10 meter wheels can be used in conjunction with RPGB.

# WHEELS & REPLACEMENT TIRES FOR CODE OR WHEELS

## ORDERING INFORMATION

WHEEL CODE	CIRCUMFERENCE	TOLERANCE	PART NUMBER
<b>OR</b>	1 foot (1/3 yd)	±0.40%	WF1000OR
	1/3 meter	±0.40%	WM0333OR
	4/10ths yard	±0.40%	WY0400OR
	4/10ths meter	±0.40%	WM0400OR
<b>OF</b>	1 foot (1/3 yd)	±0.35%	WF1000OF
	1/3 meter	±0.30%	WM0333OF
	4/10ths yard	±0.30%	WY0400OF
	4/10ths meter	±0.30%	WM0400OF
<b>BF</b> (Balanced)	1 foot (1/3 yd)	±0.40%	WF1000BF

WHEEL CODE	CIRCUMFERENCE	TOLERANCE	PART NUMBER
<b>OK</b>	1 foot (1/3 yd)	±0.35%	WF1000OK
	1/3 meter	±0.30%	WM0333OK
	4/10ths yard	±0.30%	WY0400OK
	4/10ths meter	±0.30%	WM0400OK
<b>BK</b> (Balanced)	1 foot (1/3 yd)	±0.35%	WF1000BK
Replacement Tires for <b>OR</b> Wheels	1 foot (1/3 yd)		TORF1000
	1/3 meter		TORM0333
	4/10ths yard		TORY0400
	4/10ths meter		TORM0400

*Note: After installation of measuring wheels, ensure guards, shields or other devices are in place to protect personnel from rotating equipment.*

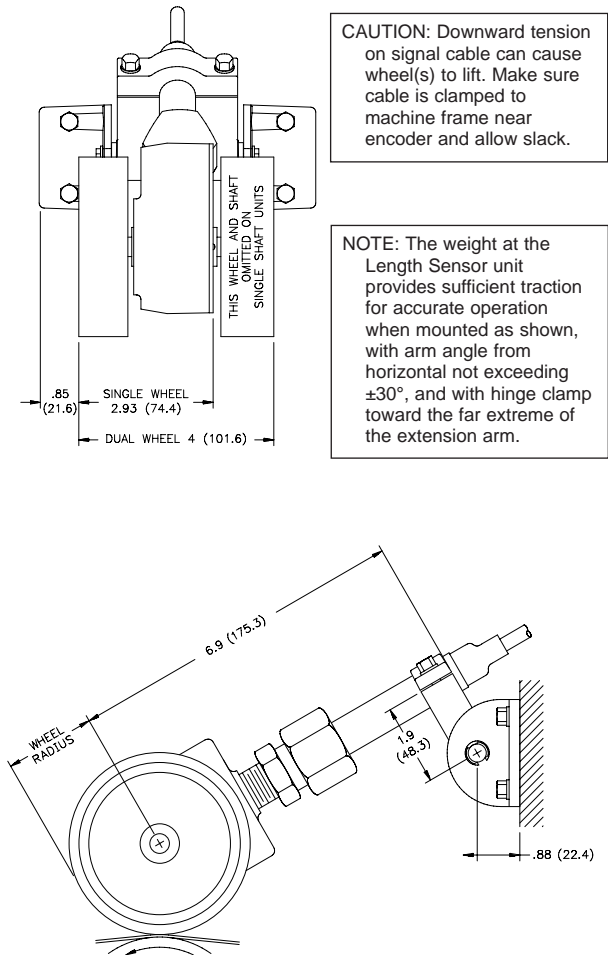
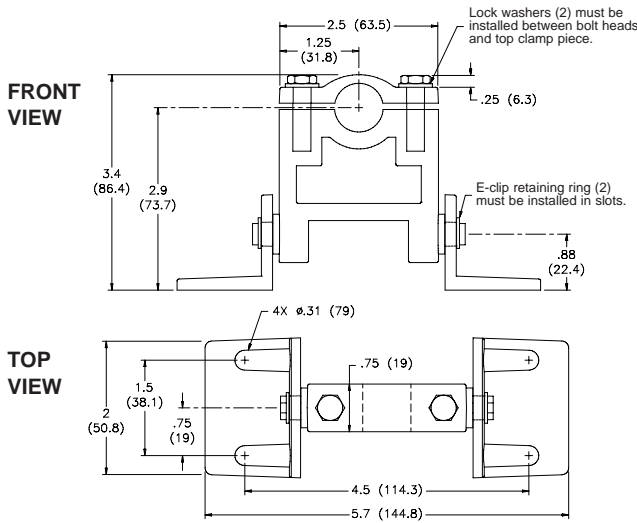
## MODEL LSAHC - LENGTH SENSOR HINGE CLAMP ASSEMBLY

The Length Sensor Hinge Clamp Assembly provides an easy method for attachment and mounting of Model LSC and LSQ Length Sensors and LSCB1 Conversion Bracket. The removable top on the solid zinc LSAHC mounting block allows quick installation of the Length Sensor handle tube and provides secure clamping retention. The mounting block pivots freely in zinc right angle brackets to allow mounting the assembly via clearance holes for 1/4" dia. bolts.

The lock washers must be used as indicated (between the bolt head and the top clamp piece). Assemble the top clamp piece as follows.

1. Tighten both bolts so that the top clamp half draws down evenly on the sensor tube.
2. Tighten the bolts until both lock washers are flat.
3. Then turn each bolt an additional 1/2 to 3/4 turn.

### DIMENSIONS In inches (mm)



### ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
LSAHC	Length Sensor Hinge Clamp Assembly for Model LSC, LSQ, and LSCB1	LSAHC001

Length Sensors should be mounted so measuring wheel(s) contact ribbon, strip or web as it passes over a roller. As an alternative, wheel(s) can be driven by roller surface next to material being measured.