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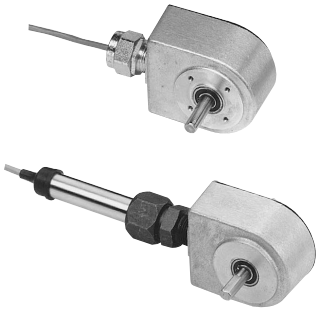
Bulletin No. RPG/LSC-M
Drawing No. LP0212
Released 3/03

MODEL RPGC - SINGLE CHANNEL OUTPUT ROTARY PULSE GENERATOR
MODEL LSC - SINGLE CHANNEL OUTPUT LENGTH SENSOR

- *VARIOUS PULSE PER REVOLUTION (PPR) RATES*
  Up to 200 PPR for fine, high-resolution counting or precision speed measurement from slow shaft speeds.
- *UP TO 10 KHz OUTPUT FREQUENCY*
- *CURRENT SINK OUTPUT*
- *MODEL LSC AVAILABLE WITH:*
  Single or Dual Ended Shaft
- *SEALED PRECISION BALL BEARINGS*
- *RUGGED CAST ALUMINUM HOUSING*



- *3/8" DIA. STAINLESS STEEL SHAFT*
- *WIDE INPUT SUPPLY VOLTAGE RANGE & LOW CURRENT OPERATION*
- *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.

DESCRIPTION

The RPGC and LSC are rugged, incremental encoders that convert shaft rotation into a current sinking pulse train.

Internally, a single L.E.D. light source and a photologic sensor in conjunction with a shaft-mounted, durable, metal-etched encoder disc, provides signal accuracy and reliability to 10 KHz. The DC input power supply requirement is a versatile +8 to +35 VDC, and is reverse polarity protected. The NPN Open Collector Transistor Output is current limited to 40 mA and is compatible with most RLC counters, rate indicators, controllers and accessories.

All units are packaged in a rugged cast aluminum housing with a gasketed, rear aluminum cover. The 3/8" (9.53 mm) diameter heavy duty stainless steel shaft and sealed, lifetime-lubricated precision ball bearings are preloaded for minimum end play and rated for continuous use up to 6000 RPM. The RPGC and LSCS are designed to meet NEMA 13/IP54 environmental requirements. All units are supplied with 10 feet (3M) of PVC jacketed 3-wire, 22 AWG cable with stranded shield wire and 100% foil shield coverage. Operating Temperature range is -18°C to +60°C.

MODEL RPGC

The RPGC can be direct-coupled to a machine shaft by means of a flexible bellows, spring or rubber sleeve type coupler, etc., that allows for axial and radial misalignment. They can also be coupled with instrument timing belts and pulleys or gears. The housing may be rigidly face-mounted with the 4, #8-32 threaded holes. The RPGC's 3-wire shielded cable exits through a cord connector.

MODEL LSC

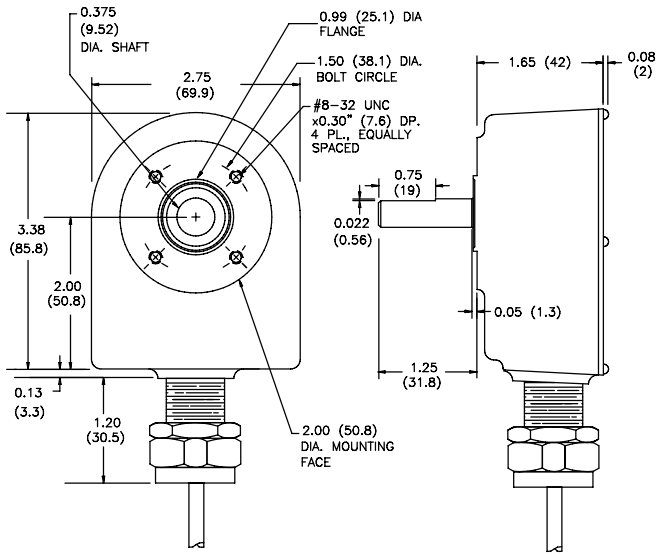
The LSC is available in both Single Ended Shaft *(LSCS)* and Double Ended Shaft *(LSCD)* versions, both of which include a Stainless Steel Handle Tube for mounting and 10 feet (3.05 M) of 3-wire shielded cable. When mounted to a Length Sensor Hinge Clamp Assembly *(See Model LSAHC001)* and coupled with one or two Measuring Wheels *(See Measuring Wheels)*, a low cost, versatile and highly accurate length measurement system can be configured.

RPGC ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PPR	PART NUMBER
RPGC	Rotary Pulse Generator	1	RPGC0001
		10	RPGC0010
		12	RPGC0012
		60	RPGC0060
		100	RPGC0100
		*120	RPGC0120
		*200	RPGC0200
RPGFC	Flexible Coupling (1" Length) 0.250" - 0.375"	--	RPGFC002
	Flexible Coupling (1" Length) 0.375" - 0.375"	--	RPGFC003

* RPG's and LSC's with 120 and 200 PPR outputs employ an internal doubling circuit and deliver a fixed 50 µsec ±20% output pulse at the leading and trailing edge of a passing slot. Additional doubling in external indicators or circuits may not be applicable. These outputs derated to 7300 Hz due to internal x2 circuitry.

RPGC DIMENSIONS In inches (mm)

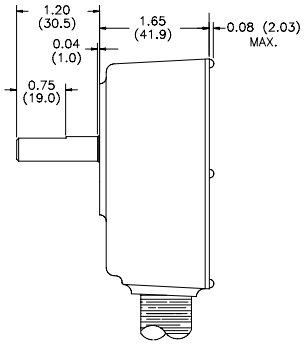


LENGTH SENSOR MEASUREMENT ACCURACY

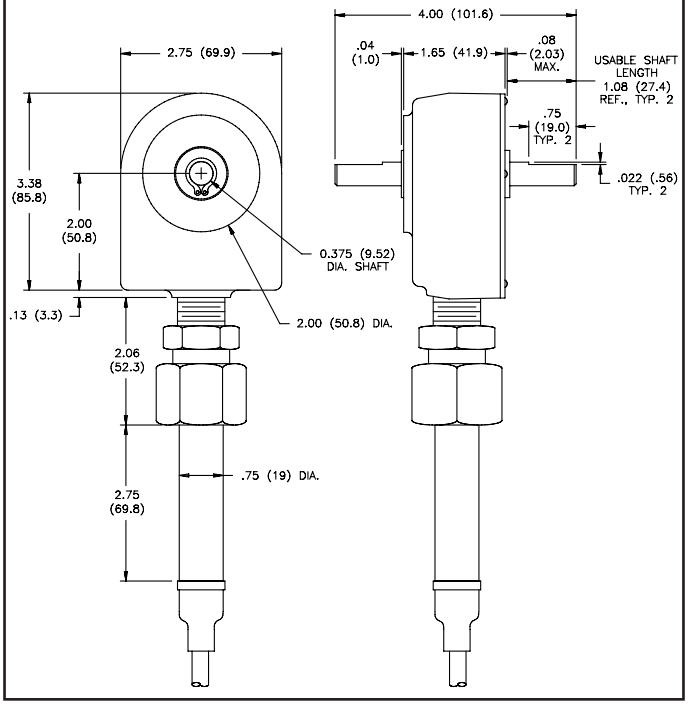
Factors which affect measurement accuracy include Measuring Wheel accuracy and wear, and material conditions. Ideally, materials which are hard, thin and strong provide good readings. Conversely, soft, thick and elastic materials can present problems in obtaining true readings. The great majority of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

LSCS DIMENSIONS In inches (mm)

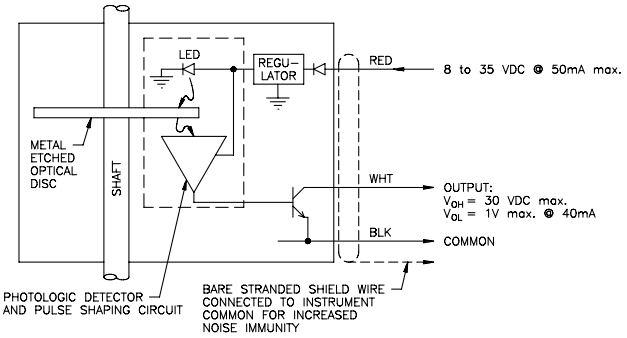
This is the side view of the Model LSCS. All other dimensions (including the handle tube) are the same as the Model LSCD. See below.



LSCD DIMENSIONS In inches (mm)



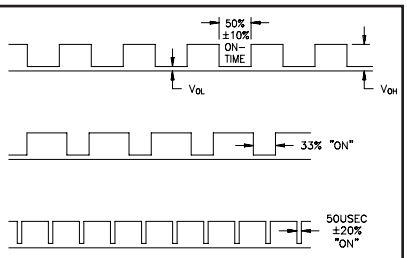
RPGC/LSC EQUIVALENT CIRCUIT & CONNECTIONS



Square wave output for RPGC & LSC units with PPR 1, 10, 12, 60, and 100. Square wave, 50/50 duty cycle ±10%.

LSCS00/3, LSCS03/3, LSCS33/3, and LSCS0020 use 1/3 yd. or 1/3 mtr wheels with internal ÷ 3 circuits. 66/33 duty cycle.

****RPGC & LSC 120 and 200 PPR units utilize internal doubling. (50 µsec ±20% neg. going pulse.)**



RPGC FREQUENCY OUTPUT AT MAXIMUM 6000 RPM

RPGC PPR	FREQ. @ 6000 RPM MAX.
1	100 Hz
10	1000 Hz
12	1200 Hz
60	6000 Hz
100	10000 Hz
*120	7300 Hz
**200	7300 Hz

*RPM derated to 3600.
**RPM derated to 2200 RPM (7300 Hz) due to internal x2 circuitry.

RPGC/LSC MECHANICAL SPECIFICATIONS

1. **MAXIMUM MECHANICAL SPEED:** 6000 RPM
2. **RADIAL SHAFT LOAD:** 15 lbs. max. (66.7N)
3. **AXIAL SHAFT LOAD:** 15 lbs. max. (66.7N)
4. **STARTING TORQUE:** 3 oz.-in. (21.2N-mm)
5. **MOMENT OF INERTIA:**
   RPGC = 2.82 x 10^{-4} oz. - in. - sec.^{2} (1.99 x 10^{-3}N - mm - sec^2)
   LSCS = 2.82 x 10^{-4} oz. - in. - sec.^{2} (1.99 x 10^{-3}N - mm - sec^2)
   LSCD = 3.09 x 10^{-4} oz. - in. - sec.^{2} (2.19 x 10^{-3}N - mm - sec^2)
6. **OPERATING TEMPERATURE:** -18°C to +60°C (0°F to +140°F)
7. **WEIGHT (LESS CABLE):**
   RPGC = 15 oz (0.42 Kg)
   LSCS = 22 oz (0.62 Kg)
   LSCD = 22 oz (0.62 Kg)

RPGC/LSC ELECTRICAL SPECIFICATIONS

1. **SUPPLY VOLTAGE:** +8 to +35 VDC *(including power supply ripple)* @ 50 mA max. *(30 mA typ.)*; Reverse polarity protected.
2. **OUTPUTS:** NPN Open Collector Transistor;
   V_{OH} = 30 VDC max., V_{OL} = 1 V max. @ 40 mA
   Output current is limited to 40 mA.
3. **OUTPUT FREQUENCY:** Up to 10 KHz
4. **CABLE CONNECTIONS:**
   RED = +VDC; BLACK = Common; WHITE = NPN O.C. Output.

LENGTH SENSOR MOUNTING CONSIDERATION

1. 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.
2. Note: The weight at the Length Sensor unit provides sufficient traction for accurate operation when mounted, with arm angle from horizontal not exceeding ±30°.
3. Tension on signal cable can cause wheel*(s)* to lift. Make sure cable is clamped to machine frame near LSC and allow slack.

LSC ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PPR	OUTPUT PULSE RATE CODE	PART NUMBER
LSC	Length Sensor - Single Shaft	1	1/Foot	LSCS0001
		10	10/Foot	LSCS0010
		12	1/inch	LSCS0012
		20	60/Mt or Yd	LSCS0020
		60	60/Foot	LSCS0060
		100	100/Foot	LSCS0100
		120	10/Inch	LSCS0120
		200	600/Mt or Yd	LSCS0200
		.333	1/Mt or Yd	LSCS00/3
		3.333	10/Mt or Yd	LSCS03/3
		33.333	100/Mt or Yd	LSCS33/3
LSC	Length Sensor - Double Shaft	1	1/Foot	LSCD0001
		10	10/Foot	LSCD0010
		12	1/inch	LSCD0012
		20	60/Mt or Yd	LSCD0020
		60	60/Foot	LSCD0060
		100	100/Foot	LSCD0100
		120	10/Inch	LSCD0120
		200	600/Mt or Yd	LSCD0200
		.333	1/Mt or Yd	LSCD00/3
		3.333	10/Mt or Yd	LSCD03/3
		33.333	100/Mt or Yd	LSCD33/3

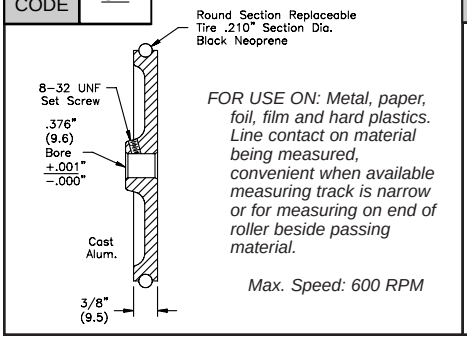
* RPG's and LSC's with 120 & 200 PPR outputs employ an internal doubling circuit and deliver a fixed 50 µsec ±20% output pulse at the leading and trailing edge of a passing slot. Additional doubling in external indicators or circuits may not be applicable. These outputs derated to 7300 Hz due to internal x2 circuitry.

Note: Wheels and mounting brackets sold separately, see Length Sensor Accessories.

LENGTH SENSOR ACCESSORIES

SEPARATE LENGTH MEASURING WHEELS - DIMENSIONS In Inches (mm)

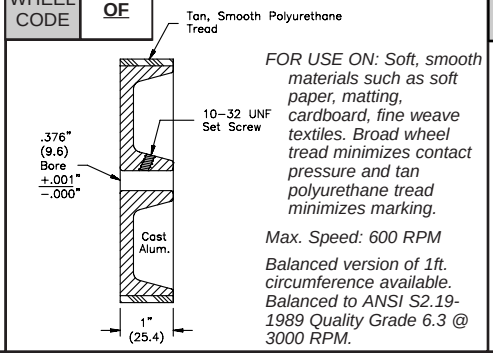
WHEEL CODE OR



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.

Max. Speed: 600 RPM

WHEEL CODE OF

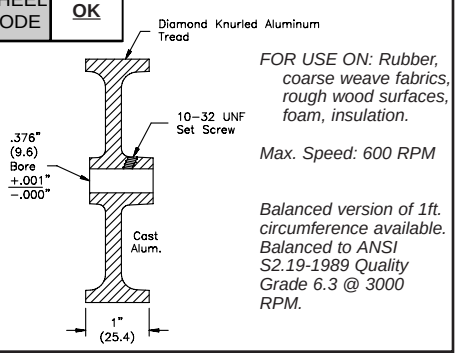


FOR USE ON: Soft, smooth materials such as soft paper, matting, cardboard, fine weave textiles. Broad wheel tread minimizes contact pressure and tan polyurethane tread minimizes marking.

Max. Speed: 600 RPM

Balanced version of 1ft. circumference available. Balanced to ANSI S2.19-1989 Quality Grade 6.3 @ 3000 RPM.

WHEEL CODE OK



FOR USE ON: Rubber, coarse weave fabrics, rough wood surfaces, foam, insulation.

Max. Speed: 600 RPM

Balanced version of 1ft. circumference available. Balanced to ANSI S2.19-1989 Quality Grade 6.3 @ 3000 RPM.

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
OR	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
OF	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
BF (Balanced)	1 foot (1/3 yd)	±0.40%	WF1000BF

WHEEL CODE	CIRCUMFERENCE	TOLERANCE	PART NUMBER
OK	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
BK (Balanced)	1 foot (1/3 yd)	±0.35%	WF1000BK
Replacement Tires for **OR** Wheels	1 foot (1/3 yd)		TORF1000
	1/3 meter		TORM0333
	4/10ths yard		TORY0400
	4/10ths meter		TORM0400

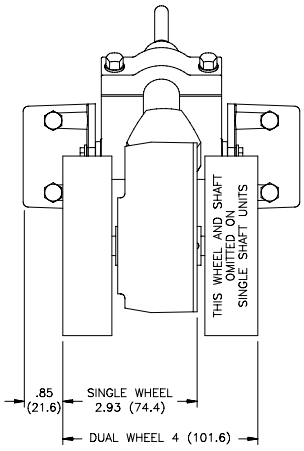
Note: After installation of measuring wheels, ensure guards,shields or other devices are in place to protect personnel from rotating equipment.

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 ½ to ¾ turn.

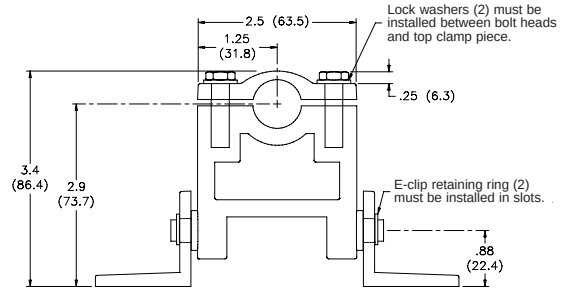


CAUTION: Downward tension on signal cable can cause wheel(s) to lift. Make sure cable is clamped to machine frame near encoder and allow slack.

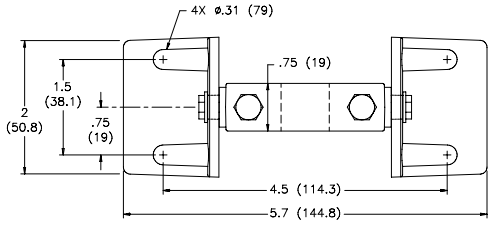
NOTE: The weight at the Length Sensor unit provides sufficient traction for accurate operation when mounted as shown, with arm angle from horizontal not exceeding ±30°, and with hinge clamp toward the far extreme of the extension arm.

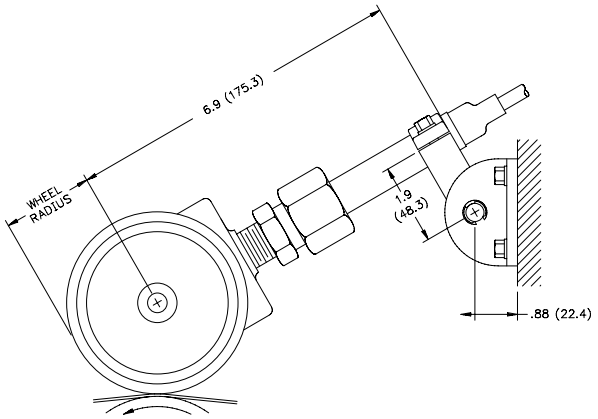
DIMENSIONS In inches (mm)

FRONT VIEW



TOP VIEW





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.

ORDERING INFORMATION

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

Red Lion Controls
20 Willow Springs Circle
York PA 17402
Tel +1 (717) 767-6511
Fax +1 (717) 764-0839

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