



Optical Encoders

SERIES 62SG Compact / Cost Effective

FEATURES

- Just 0.3-inch behind panel depth
- Over 1 million rotational cycles
- 2-bit gray code output
- Quadrature coding
- Available in 16, 24 and 32 detent positions
- Optional integrated pushbutton
- Light pipe technology
- Cost competitive with mechanical encoders at higher volumes

APPLICATIONS

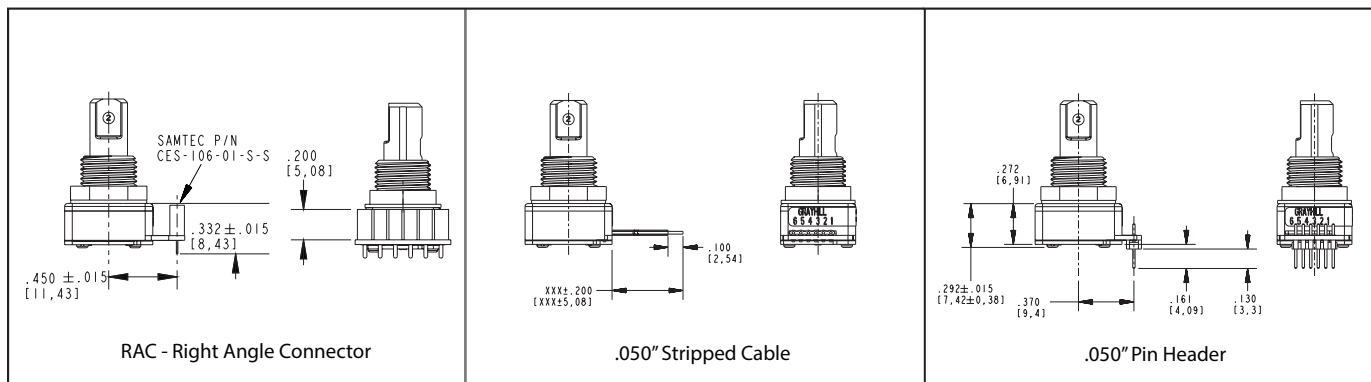
- Automotive
 - audio systems
 - navigation systems
- Medical
 - patient monitoring systems
- Test & Measurement
 - analyzers
 - oscilloscopes
- Audio & Video
 - consumer electronics
 - professional editing equipment



DIMENSIONS in inches (and millimeters)



OTHER TERMINATION OPTIONS



Optical and Mechanical Encoders

WAVEFORM AND TRUTH TABLE

WAVEFORM (CW ROTATION)

POSITION	OUTPUT A	OUTPUT B
1		
2	○	
3	○	○
4		○

BLANK = LOGIC LOW ○ = LOGIC HIGH
CODE REPEATS EVERY FOUR POSITIONS.

*EXTERNAL 10 kΩ PULL-UP RESISTORS REQUIRED FOR OPERATION
**NOISE FILTERING CAPACITOR, LESS THAN 1000 pF

SPECIFICATIONS

Environmental Specifications

- Operating Temperature:** -40°C to 85°C
- Storage Temperature:** -40°C to 85°C
- Humidity:** 96 hours@90-95% humidity@40°C
- Mechanical Vibration:** Harmonic motion with amplitude of 15g within a varied frequency of 10 to 2000 Hz for 12 hours
- Mechanical Shock:**
 - Test 1:** 100g for 6 ms half-sine wave with a velocity change of 12.3 ft/s.
 - Test 2:** 100g for 6 ms sawtooth wave with a velocity change of 9.7 ft/s.

Rotary Electrical and Mechanical Specifications

- Operating Voltage:** 5.00 ± 0.25 Vdc
- Supply Current:** 30 mA maximum
- Logic Output Characteristics:**
 - Logic High:** $V_{OH} = 3.0$ Vdc MIN at $V_{CC} = 4.75$ Vdc with 10 kΩ PULL-UP RESISTOR
 - Logic Low:** $V_{OL} = 1.0$ Vdc MAX at $V_{CC} = 5.25$ Vdc with 10 kΩ PULL-UP RESISTOR
- Output:** Open Collector Phototransistor
- Optical Rise Time:** 30ms maximum
- Optical Fall Time:** 30ms maximum

	L	M	H
16-POSITION	1.70±1.05	2.10±1.20	3.05±1.50
24-POSITION	1.15±0.75	1.50±0.75	2.80±1.40
32-POSITION	1.00±0.65	1.20±0.8	1.50±0.9

40% of initial value after 1 million cycles.

- Mechanical Life:** 1,000,000 cycles of operation. 1 cycle is a rotation through all positions and a full return
- Mounting Torque:** 15in-lbs. maximum
- Shaft Pushout Force:** 45 lbs. minimum
- Terminal Strength:** 15 lbs. cable pull out force minimum
- Solderability:** 95% free of pin holes & voids

Pushbutton Electrical and Mechanical Specifications

- Rating:** 30 mA @ 5 Vdc
- Contact Resistance:** <10 Ω (Compatible with CMOS or TTL)
- Life:** 1 million actuations minimum
- Contact Bounce:** <4 ms make, <10ms break
- Actuation Force:** 5 = 550 ± 200 grams
9 = 1050 ± 200 grams
- Shaft Travel:** .020 ± .008 inch

Materials and Finishes

- Bushing:** Zamak 2
- Shaft:** Zamak 2
- Detent Ball:** 302 Stainless Steel
- Detent Spring:** Music Wire
- Retaining Ring:** 301 Stainless Steel

- Code Housing:** Nylon 6/6 25% glass reinforced. Zytel FR-50
- Light Pipe:** Lexan, GE
- Code Rotor:** Delrin 100
- Pushbutton Actuator:** Glass Reinforced nylon 6/6. Zytel 70G33L. UL 94
- Pushbutton Dome:** 301 Stainless Steel
- Printed Circuit Board:** NEMA Grade FR4, Double clad with copper, Plated with gold over nickel
- Infrared Emitting Diode:** Gallium Aluminum Arsenide
- Phototransistor Diode:** NPN Silicon
- Resistor:** Metal oxide on ceramic substrate
- Spacer:** Pet plastic
- Backplate:** 302 Stainless Steel
- Label:** TT406 thermal transfer cast film
- Solder:** 96.5% tin / 3% silver / 0.5% copper. No clean
- Hex Nut:** Brass, Plated with nickel
- Lockwasher:** Zinc Plated Spring Steel with Clear Trivalent Chromate Finish
- Cable:** Copper Stranded with topcoat in PVC insulation
- Connector (.050 center):** PA4.6 with tin/nickel plated phosphor bronze.

Series

Style: SG

Angle of Throw: 11 = 11.25° code change and 32 detent positions;
15 = 15° code change and 24 detent positions;
22 = 22.5° code change and 16 detent positions

Rotational Torque Option: L = Low Torque, M = Medium Torque, H = High Torque

Pushbutton Option: 0 = No pushbutton, 5 = 550 grams, 9 = 1050 grams

Termination:
C = .050 Center Ribbon Cable with connector, S = .050 Center Ribbon Cable with .100 stripped end,
P = .050 Center Pin, RAC = Right Angle Connector; .050" centers

Cable Length: 020 = 2.00" Cable, 040 = 4.00" Cable, 060 = 6.00" Cable, leave blank if pinned
*Eliminate cable length if ordering "P" or "RAC" termination option

*62SG15-L5-RAC available as standard P/N, for additional options, please contact Grayhill

ROTATIONAL TORQUE AND PUSHBUTTON AVAILABILITY

	PUSHBUTTON			
	0 NONE	5 550 GRAMS	9 1050 GRAMS	
ROTATIONAL TORQUE	L	L0	L5	L9
	M	M0	M5	M9
	H	H0	NOT AVAILABLE	H9