# SERIES 62AG

Price Competitive Solution

## FEATURES

- Over 1 million rotational cycles
- 2-bit gray code output
- Quadrature coding
- Available in 16, 20, 24 and 32 detent positions
- Choices of cable length and terminations
- Available for 5Vdc and 3.3Vdc
- Optional integrated pushbutton
- Patented light pipe technology
- Cost competitive with mechanical encoders at higher volumes

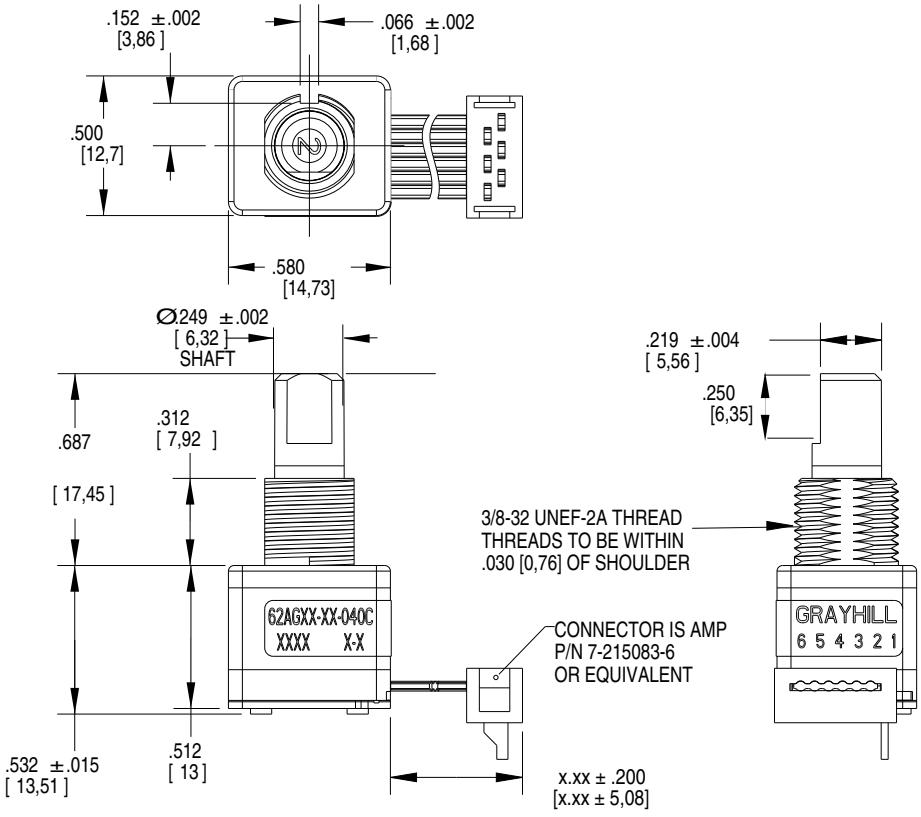
## APPLICATIONS

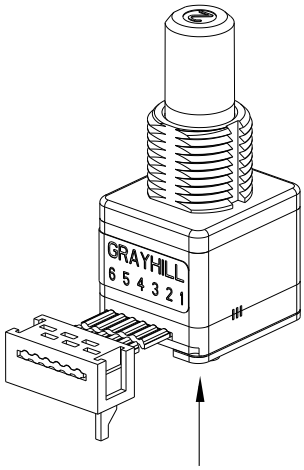
- Automotive
  - audio systems
  - navigation systems
- Medical
  - patient monitoring systems
- Test & Measurement
  - analyzers
  - oscilloscopes
- Audio & Video
  - consumer electronics
  - professional editing equipment




## DIMENSIONS in inches (and millimeters)

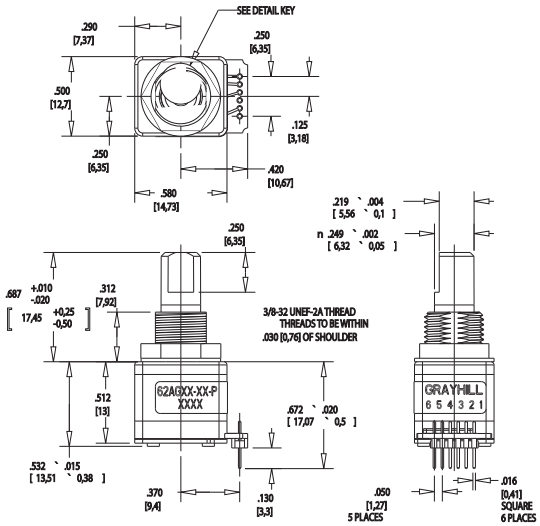
Unless otherwise specified, standard tolerances are:
Linear ± .025
Diameter ± .010
Angle ± 2.0°



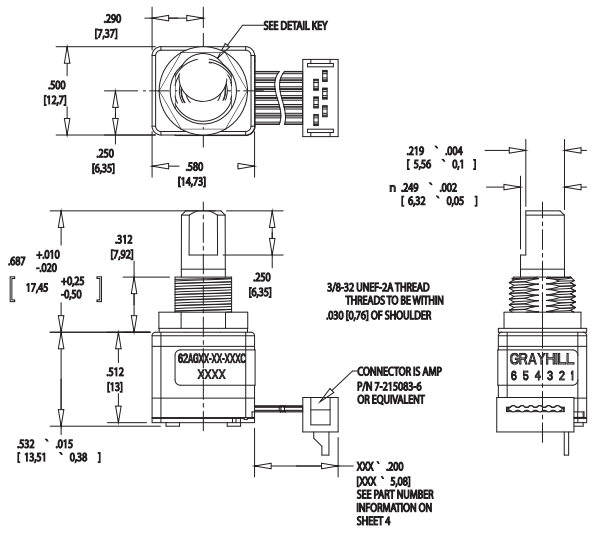




NOTE: GRAYHILL ALLOWS MULTIPLE ORIENTATIONS FOR THE GRAYHILL TEXT ON THE BACKPLATE.

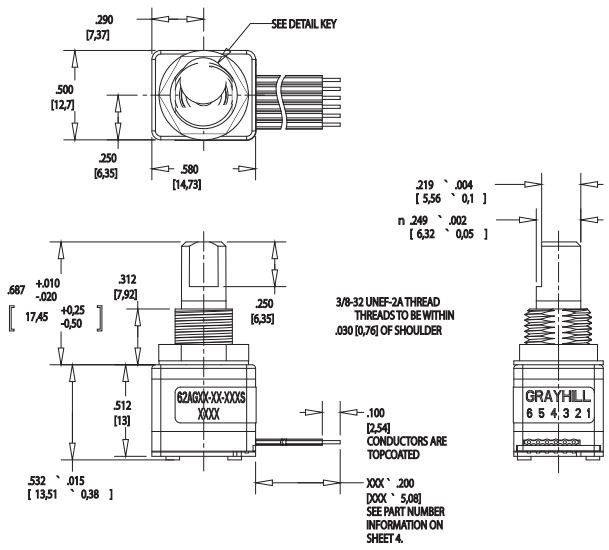
## Termination Options




P - .050 Center Pins with 0.185 inch length



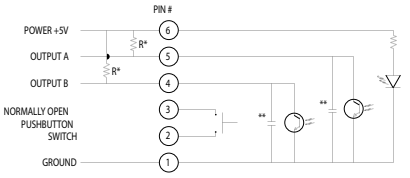

C - .050 Center Ribbon Cable with connector




S - .050 Center Ribbon Cable with .100 stripped end

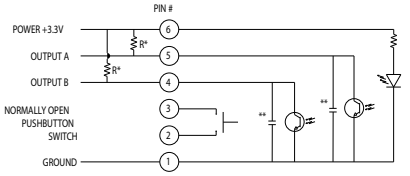
## WAVEFORM AND TRUTH TABLE

Standard 5.0V
(Style AG)

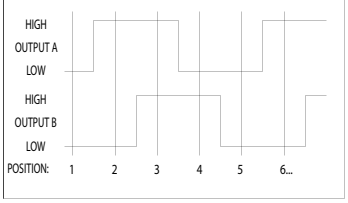


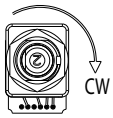

*10K Ω PULL-UP RESISTOR REQUIRED FOR OPERATION
**NOISE FILTERING CAPACITOR, LESS THAN 1000pf

Standard 3.3V
(Style VG)




WAVEFORM (CW ROTATION)



CW ROTATION

TRUTH TABLE (CW ROTATION)

| POSITION | OUTPUT A | OUTPUT B |
|---|---|---|
| 1 | | |
| 2 | ● | |
| 3 | ● | ● |
| 4 | | ● |

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

## 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:
AG Style 5.00±0.25 Vdc
VG Style 3.30±0.125 Vdc
Supply Current:
AG Style 30 mA maximum
VG Style 30 mA maximum
Logic Output Characteristics:
AG Style - Logic high no less than 3.0 Vdc. Logic low shall be no greater than 1.0 Vdc.
VG Style - Logic high no less than 2.0 Vdc. Logic low shall be no greater than 1.0 Vdc.
Output: Open Collector Phototransistor
Optical Rise Time: 30ms maximum.
Optical Fall Time: 30ms maximum.

Average Rotational Torque:
Low = 2.0±1.4 in-oz initially.
High = 3.5±1.4 in-oz initially.
50% 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
Maximum rotational speed: 100 rpm.

### Pushbutton Electrical and Mechanical Specifications

Rating: 10 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 = 510±150 grams, 9 = 950±200 grams
Shaft Travel: .017 ± .008 INCH

### Materials and Finishes

Bushing: Zamak 2
Shaft: Zamak 2

Detent Rotor: Reinforced Nylon Zytel 70G33L UL 94
Detent Spring: 303 Stainless Steel
Housing, Upper: Nylon 6/6 25% glass reinforced. Zytec FR-50
Light Pipe: Lexan, GE
Code Rotor: Delrin 100
Housing, Lower: Nylon 6/6 25% glass reinforced. Zytec FR-50
Pushbutton Actuator: Reinforced nylon. Zytel 70G33L. UL 94
Pushbutton Dome: Stainless Steel
Printed Circuit Board: NEMA Grade FR4, Double clad with copper, Plated with gold over nickel
Infrared Emitting Diode: Gallium Arsenide
Phototransistor Diode: NPN Silicon
Resistor: Metal oxide on ceramic substrate
Spacer: Pet plastic
Backplate: 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.

62AGXX-XX-XXXX

- Series
- Style: AG = 5.0V; VG = 3.3V
- Angle of Throw: 11 = 11.25° code change and 32 detent positions; 15 = 15° code change and 24 detent positions
  18 = 18° code change and 20 detent positions; 22 = 22.5° code change and 16 detent positions
- Rotational Torque Option: L = Low Torque, H = High Torque, N = No Detent
- Pushbutton Option: 0 = No pushbutton, 5 = 510 grams, 9 = 950 grams
- Termination:
  C = .050 Center Ribbon Cable with connector, S = .050 Center Ribbon Cable with .100 stripped end,
  P = .050 Center Pins with 0.185 inch length
- Cable Length:
  020 = 2.0 inch cable, 030 = 3.0 inch cable, 040 = 4.0 inch cable, 050 = 5.0 inch cable, 060 = 6.0 inch cable

Available from your local Grayhill Distributor. For prices and discounts, contact a local sales office, an authorized distributor, or Grayhill.