

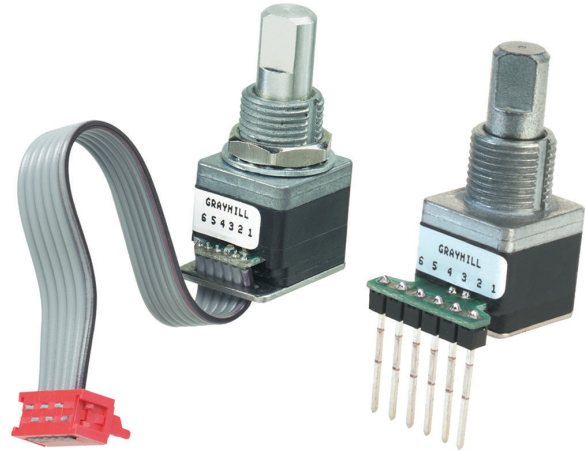
## SERIES 62A,V,D 1/2" Package

### FEATURES

- Low Cost
- Long Life
- Available in 3.3 or 5.0 Vdc Operating Voltages
- High Torque Version to Emphasize Rotational Feel
- Economical Size
- Optically Coupled for More than a Million Cycles
- Optional Integral Pushbutton
- Compatible with CMOS, TTL and HCMOS Logic Levels
- Available in 12, 16, 20, 24 and 32 Detent Positions (Non-detent also available)
- Choice of Cable Lengths and Terminations

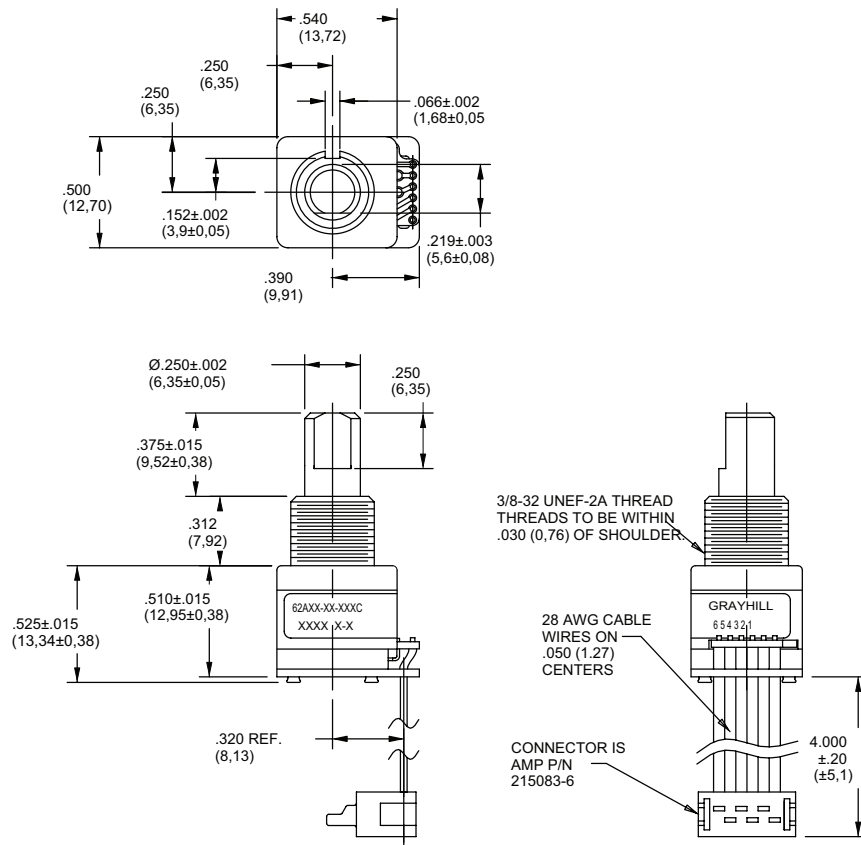
### APPLICATIONS

- Global Positioning/Driver Information Systems
- Medical Equipment



### DIMENSIONS in inches (and millimeters)

#### Cable Version



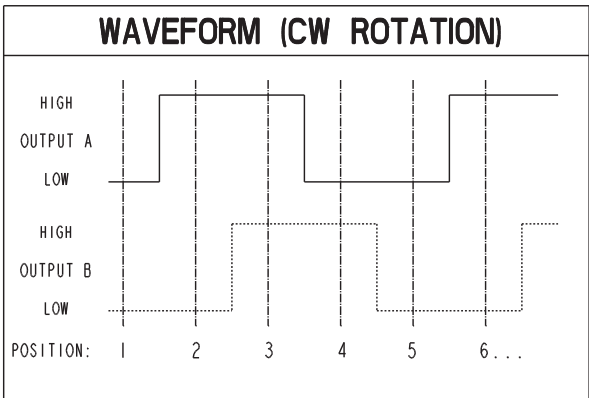
DIMENSIONS in inches (and millimeters)



SUPPLY CURRENT & LOGIC OUTPUT CHARACTERISTICS

|                               |                 | A & D STYLE                                                                                                                | V STYLE                                                                                                                    |
|-------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| OPERATING VOLTAGE:            |                 | 5.00 ± .25 Vdc.                                                                                                            | 3.30 ± .125 Vdc.                                                                                                           |
| SUPPLY CURRENT:               |                 | 30 mA MAXIMUM.                                                                                                             | 50 mA MAXIMUM.                                                                                                             |
| LOGIC OUTPUT CHARACTERISTICS: | SMT OPTICS      | PUSH-PULL OUTPUTS COMPATIBLE WITH CMOS, TTL AND HCMOS LOGIC.                                                               |                                                                                                                            |
|                               |                 | LOGIC HIGH: $V_{OH} = 4.5 \text{ Vdc MIN AT } I_{OH} = -8.0 \text{ mA \& } V_{CC} = 5.00 \text{ Vdc.}$                     | N/A                                                                                                                        |
|                               |                 | LOGIC LOW: $V_{OL} = 0.5 \text{ Vdc MAX AT } I_{OL} = 8.0 \text{ mA.}$                                                     | N/A                                                                                                                        |
|                               | WIREBOND OPTICS | OPEN COLLECTOR PHOTOTRANSISTOR OUTPUT.                                                                                     |                                                                                                                            |
|                               |                 | LOGIC HIGH: $V_{OH} = 3.8 \text{ Vdc MIN at } V_{CC} = 5.00 \text{ Vdc WITH } 2.2\text{K}\Omega \text{ PULL-UP RESISTOR.}$ | LOGIC HIGH: $V_{OH} = 2.3 \text{ Vdc MIN at } V_{CC} = 3.30 \text{ Vdc WITH } 2.2\text{K}\Omega \text{ PULL-UP RESISTOR.}$ |
|                               |                 | LOGIC LOW: $V_{OL} = 0.8 \text{ Vdc MAX AT } I_{OL} = 2.0 \text{ mA WITH } 2.2\text{K}\Omega \text{ PULL-UP RESISTOR.}$    | LOGIC LOW: $V_{OL} = 0.8 \text{ Vdc MAX AT } I_{OL} = 1.0 \text{ mA WITH } 2.2\text{K}\Omega \text{ PULL-UP RESISTOR.}$    |

**WAVEFORM AND TRUTH TABLE** Standard Quadrature 2-Bit Code

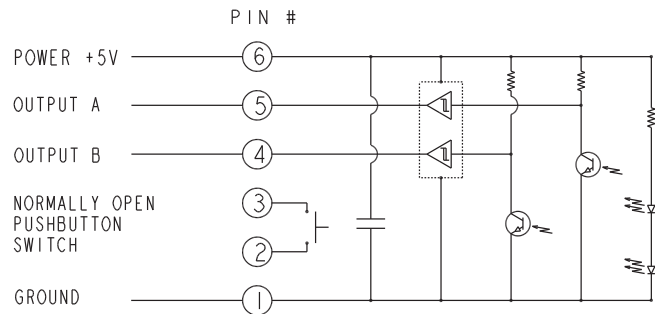


**TRUTH TABLE (CW ROTATION)**

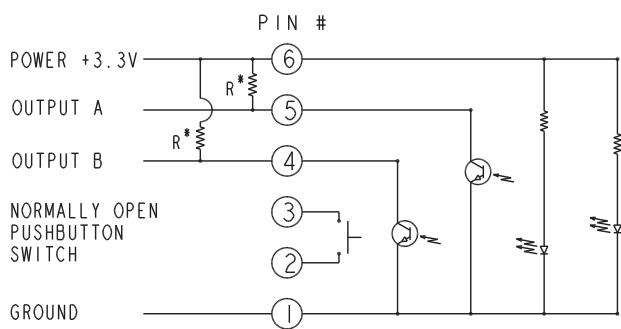
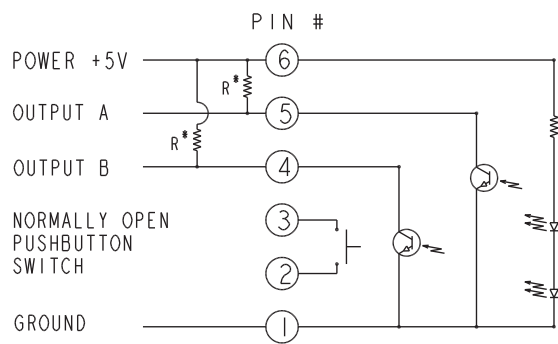
| POSITION | OUTPUT A | OUTPUT B |
|----------|----------|----------|
| 1        |          |          |
| 2        | ○        |          |
| 3        | ○        | ○        |
| 4        |          | ○        |

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

**CIRCUITRY: SURFACE MOUNT OPTICS** Pushpull Outputs (62A22, 62A15, 62A11)



**CIRCUITRY: WIREBOND OPTICS** Open Collector Outputs (All Others)



\* 2.2kΩ EXTERNAL PULL-UP RESISTORS  
REQUIRED FOR OPERATION

## SPECIFICATIONS

### Electrical and Mechanical Ratings

**Pushbutton Rating:** 5 Vdc, 10 mA, resistive  
**Pushbutton Contact Resistance:** less than 10 ohms (TTL or CMOS compatible)

**Pushbutton Life:** 3 million actuations min.

**Pushbutton Contact Bounce:** less than 4 mS at make and less than 10 mS at break

**Pushbutton Actuation Force:** 1000 ±300 grams

**Pushbutton Travel:** .010/.025 inch

**Coding:** 2-bit quadrature coded output

**Voltage Breakdown:** 250 Vac between mutually insulated parts

**Rotational Life:** 1,000,000 cycles minimum (One cycle is a rotation through all positions and a full return)

**Optical Rise and Fall Times:** less than 30 mS maximum

### Operating Torque:

Style A and V: 2.0 ±1.4 in-oz. initially

Style D: 3.5 ±1.4 in-oz initially

Non-detent: less than 1.5 in-oz initially

**Shaft Push Out Force:** 45 lbs minimum

**Mounting Torque:** 15 in-lbs maximum

**Terminal Strength:** 15 lbs cable pull-out force minimum

**Operating Speed:** 100 RPM maximum

**Axial Shaft Play:** .010 maximum

### Environmental Ratings

**Operating Temperature Range:** -40°C to 85°C

**Storage Temperature Range:**

-55°C to 100°C

**Relative Humidity:** 90–95% at 40°C

for 96 hours

**Vibration Resistance:** Harmonic motion with amplitude of 15G, within a varied 10 to 2000 Hz frequency for 12 hours per MIL-STD-202, Method 204

**Mechanical Shock:** Test 1: 100G for 6 mS, half sine, 12.3 ft/s; Test 2: 100G for 6 mS, sawtooth, 9.7 ft/s

### Materials and Finishes

**Code Housing:** Reinforced thermoplastic

**Shaft:** Zinc or aluminum

**Bushing:** Zinc casting

**Shaft Retaining Ring:** Stainless steel

**Detent Spring:** Stainless steel

**Printed Circuit Boards:** NEMA grade FR-4 gold over nickel or palladium

**Terminals:** Brass, tin-plated

**Mounting Hardware:** One brass, nickel-plated nut and zinc-plated spring steel with clear trivalent chromate finish lockwasher supplied with each switch. Nut is 0.094 inches thick by

0.435 inches across flats.

**Rotor:** Thermoplastic

**Code Housing:** Thermoplastic

**Pushbutton Dome:** Stainless steel

**Dome Retaining Disk:** Thermoplastic

**Pushbutton Housing:** Thermoplastic

**Phototransistor:** Planar Silicon NPN

**Infrared Emitter:** Gallium aluminum arsenide

**Pushbutton Contact:** Brass, nickel-plated

**Flex Cable:** 28AWG, stranded/top coated wire, PVC coated on .050 or .100" centers (cabled version)

**Header Pins:** Phosphor bronze, tin-plated

**Spacer:** ABS

**Backplate/Strain Relief:** Stainless steel

## ORDERING INFORMATION

|  |                                                                                                                                                                                                                        |                                         |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
|  | <b>Series</b>                                                                                                                                                                                                          |                                         |
|  | <b>Style:</b> A = 1/2" package, 5.0 Vdc Input, D = high torque w/5.0 Vdc input, V = 3.3 Vdc input                                                                                                                      |                                         |
|  | <b>Angle of Throw:</b>                                                                                                                                                                                                 |                                         |
|  | <b>Detent</b>                                                                                                                                                                                                          | <b>Non-detent (Styles A&amp;V only)</b> |
|  | 11 = 11.25° or 32 positions                                                                                                                                                                                            | 01 = 11.25° or 32 positions             |
|  | 15 = 15° or 24 positions                                                                                                                                                                                               | 05 = 15° or 24 positions                |
|  | 18 = 18° or 20 positions                                                                                                                                                                                               | 08 = 18° or 20 positions                |
|  | 22 = 22.5° or 16 positions                                                                                                                                                                                             | 02 = 22.5° or 16 positions              |
|  | 30 = 30° or 12 positions                                                                                                                                                                                               | 03 = 30° or 12 positions                |
|  | <b>Pushbutton Option:</b> 01 = w/o pushbutton, 02 = with pushbutton                                                                                                                                                    |                                         |
|  | <b>Termination:</b> S = Stripped cable; .050" centers<br>SH = Stripped cable; .100" centers<br>C = Connector; .050" centers<br>CH = Connector; .100" centers<br>P = Pin; .100" centers                                 |                                         |
|  | <b>Cable Length:</b> Cable Termination: 040 = 4.0in. Cable is terminated with Amp P/N 215083-6. See Amp Mateability Guide for Mating Connector details.<br>*Eliminate cable length if ordering pins. (Ex: 62A22-02-P). |                                         |

These switches have Quadrature 2-bit code output and an optional shaft actuated pushbutton switch.

Custom materials, styles, colors, and markings are available. Control knobs available.

**Available from your local Grayhill Component Distributor.**

For prices and discounts, contact a local Sales Office, an authorized local Distributor, or Grayhill.