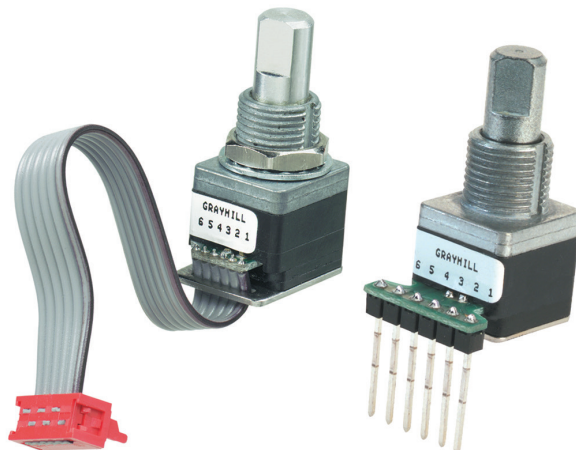


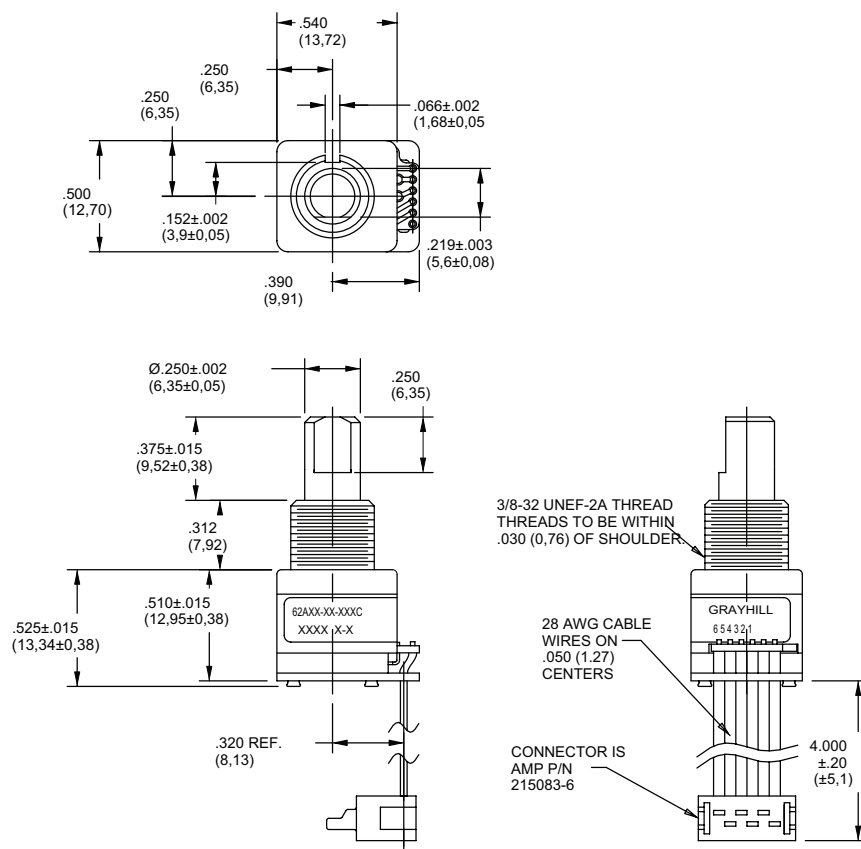
FEATURES

- 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

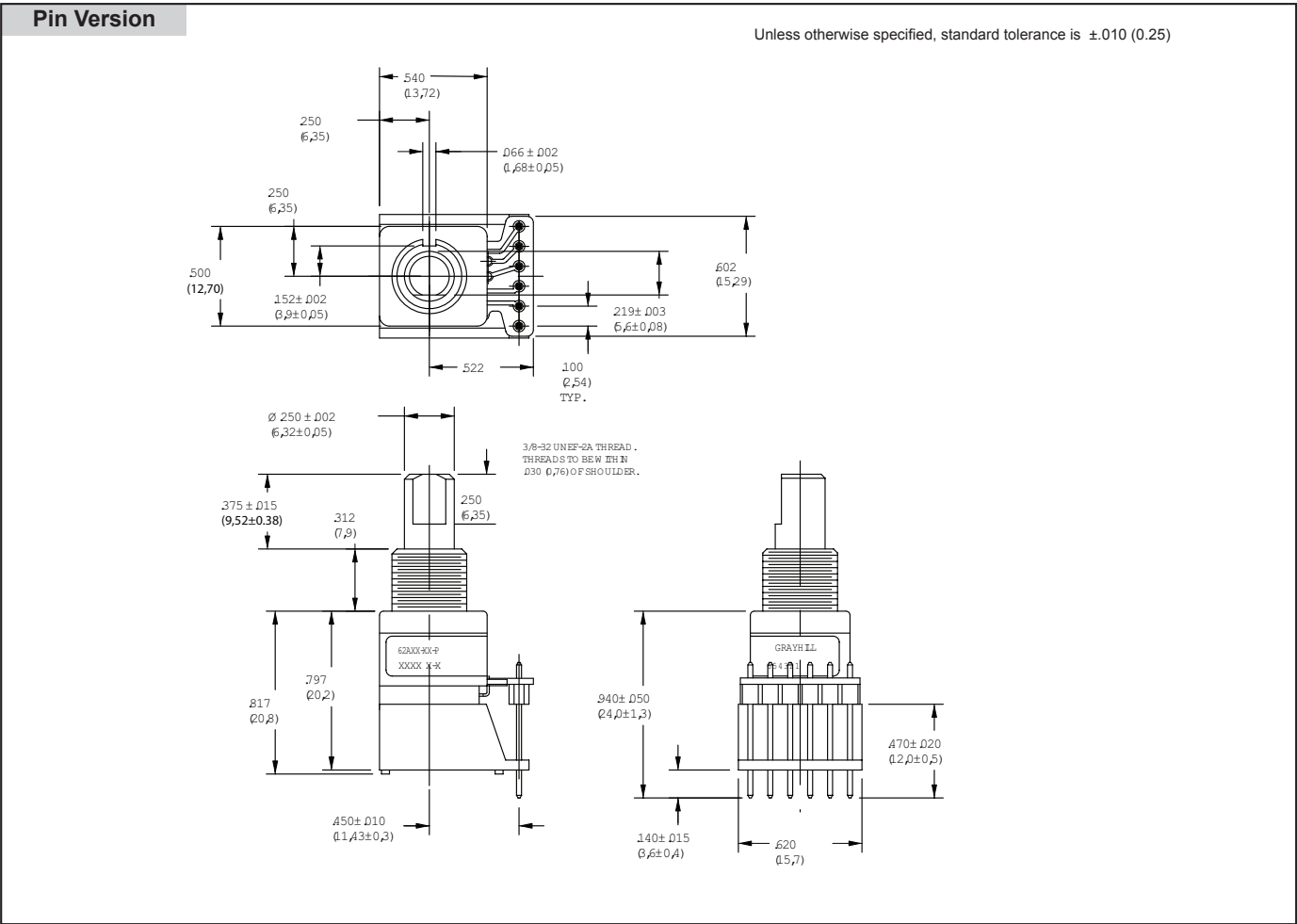
- Global Positioning/Driver Information Systems
- Medical Equipment



Cable Version



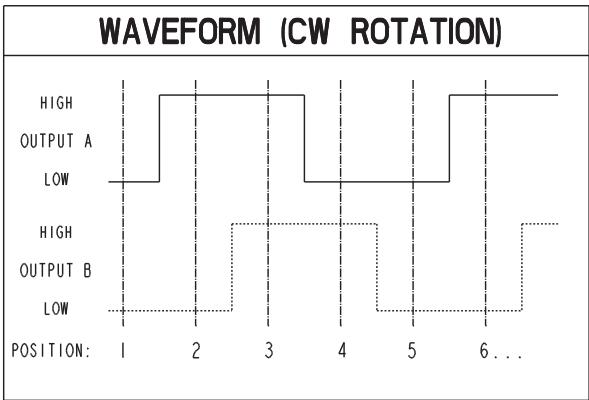
DIMENSIONS in inches (and millimeters)



SUPPLY CURRENT & LOGIC OUTPUT CHARACTERISTICS

		A & D STYLE	V STYLE
OPERATING VOLTAGE:		5.00 $\pm$.25 Vdc.	3.30 $\pm$.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: $V_{OH} = 4.5$ Vdc MIN AT $I_{OH} = -8.0$ mA & $V_{CC} = 5.00$ Vdc.	N/A
		LOGIC LOW: $V_{OL} = 0.5$ Vdc MAX AT $I_{OL} = 8.0$ mA.	N/A
	WIREBOND OPTICS	OPEN COLLECTOR PHOTOTRANSISTOR OUTPUT.	
		LOGIC HIGH: $V_{OH} = 3.8$ Vdc MIN at $V_{CC} = 5.00$ Vdc WITH 2.2K Ω PULL-UP RESISTOR.	LOGIC HIGH: $V_{OH} = 2.3$ Vdc MIN at $V_{CC} = 3.30$ Vdc WITH 2.2K Ω PULL-UP RESISTOR.
		LOGIC LOW: $V_{OL} = 0.8$ Vdc MAX AT $I_{OL} = 2.0$ mA WITH 2.2K Ω PULL-UP RESISTOR.	LOGIC LOW: $V_{OL} = 0.8$ Vdc MAX AT $I_{OL} = 1.0$ mA WITH 2.2K Ω PULL-UP RESISTOR.

WAVEFORM AND TRUTH TABLE Standard Quadrature 2-Bit Code

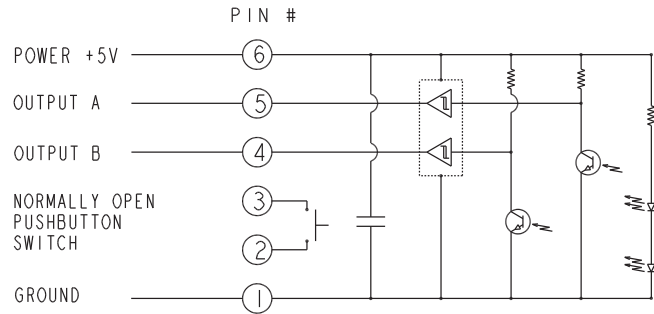


TRUTH TABLE (CW ROTATION)

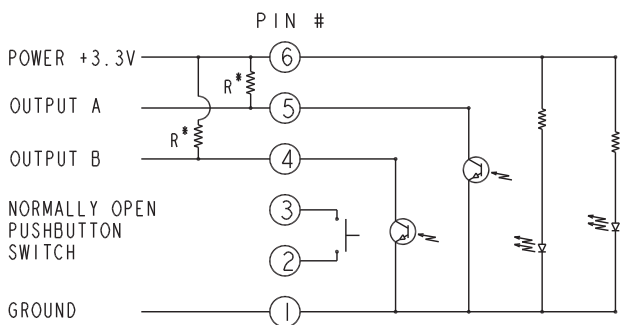
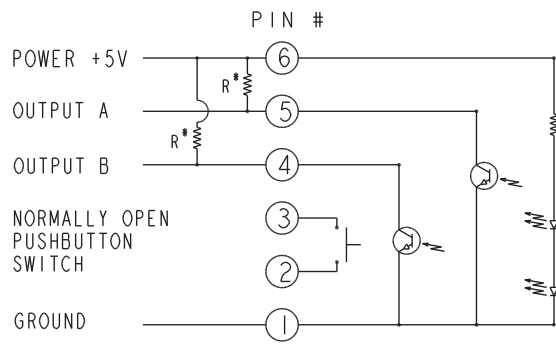
POSITION	OUTPUT A	OUTPUT B
1		
2	○	
3	○	○
4		○

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

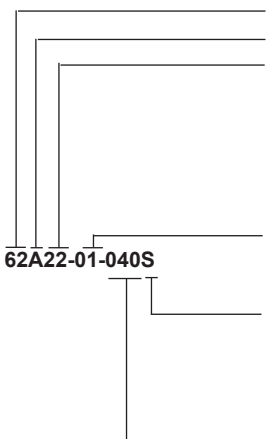
Flex Cable: 28AWG, stranded/top coated wire, PVC coated on .050 or .100" centers (cabled version)

Header Pins: Phosphor bronze, tin-plated

Spacer: ABS

Backplate/Strain Relief: Stainless steel

ORDERING INFORMATION



Series

Style: A = 1/2" package, 5.0 Vdc Input, D = high torque w/5.0 Vdc input, V = 3.3 Vdc input

Angle of Throw:

Detent

11 = 11.25° or 32 positions	Non-detent (Styles A&V only)
15 = 15° or 24 positions	01 = 11.25° or 32 positions
18 = 18° or 20 positions	05 = 15° or 24 positions
22 = 22.5° or 16 positions	08 = 18° or 20 positions
30 = 30° or 12 positions	02 = 22.5° or 16 positions
	03 = 30° or 12 positions

Pushbutton Option: 01 = w/o pushbutton, 02 = with pushbutton

Termination: S = Stripped cable; .050" centers
SH = Stripped cable; .100" centers
C = Connector; .050" centers
CH = Connector; .100" centers
P = Pin; .100" centers

Cable Length: Cable Termination: 040 = 4.0in. Cable is terminated with Amp P/N 215083-6. See Amp Mateability Guide for Mating Connector details.
*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.