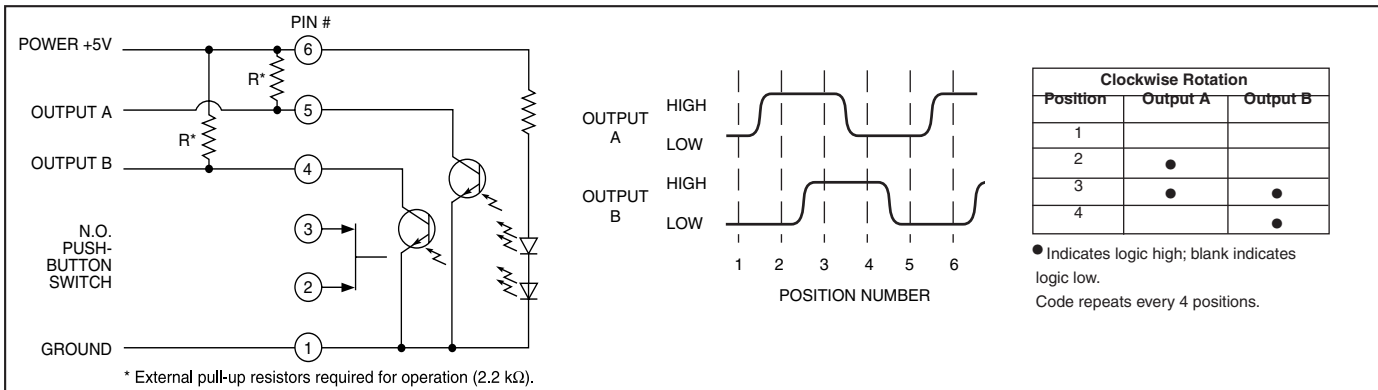


CIRCUITRY, TRUTH TABLE, AND WAVEFORM Standard Quadrature 2-Bit Code

SPECIFICATIONS
Environmental Specifications
Operating Temp. Range: -40°C to 85°C

Storage Temp. Range: -55°C to 100°C

Humidity: 96 Hours at 90–95% humidity at 40°C

Mechanical Vibration: Harmonic motion with amplitude of 15G's, within a varied frequency of 10 to 2000 Hz

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: 25mA max at 5.25Vdc

Output: Open collector phototransistor, external pull up resistors are required

Output Code: 2-Bit quadrature, channel A leads channel B by 90° electrically during clockwise rotation of the shaft

Logic Output Characteristics:

Logic High shall be no less than 3.8 Vdc

Logic Low shall be no greater than 0.8Vdc

Minimum Sink Current: 2.0 mA

Power Consumption: 132mW maximum (includes power in 2 pull-up resistors)

Mechanical Life:

Non-Detent 3 Million Cycles

Low & Medium 1 Million Cycles

High 1/2 Million Cycles

1 cycle is a rotation through all positions and a full return

AVERAGE ROTATIONAL TORQUE SPECIFICATIONS			
	LOW	MEDIUM	HIGH
	±0.50 IN-OZ	±1.40 IN-OZ	±1.60 IN-OZ
8 POSITION	1.10	1.85	2.75
12 POSITION	1.00	1.70	2.95
16 POSITION	1.40	2.35	3.40
20 POSITION	1.35	2.05	2.80
24 POSITION	1.25	1.95	2.95
32 POSITION	0.95	1.40	2.15

Torque shall be within 50% of initial value throughout life

Mounting Torque: 15 in-lbs maximum

Shaft Push-Out Force: 45 lbs minimum

Shaft Pull-Out Force: 45 lbs minimum

Terminal Strength: 15 lbs minimum terminal

pull-out force for cable or header termination

Solderability: 95% free of pin holes and voids

Pushbutton Electrical & Mechanical Specifications
Rating: 10 mA at 5 Vdc

Contact Resistance: <10Ω

Life: 3 million actuations minimum

Contact Bounce: <4 ms Make, <10 ms Break

Actuation Force: 9-950±150grams, 5-510±150 grams, 4-400±100 grams, 3-300±90 grams, 2-200±75 grams

Shaft Travel: .025±.010 inch

Materials and Finishes
Bushing: Zamak 2

Shaft: Aluminum or Zamak 2

Retaining Ring: Stainless steel

Pushbutton Actuator: Zytel 70G33L

Detent Spring: Music wire

Detent Ball: Stainless steel

Code Housing: Polyamide polymer, nylon 6/10 alloy UL94HB

Code Rotor: Delrin 100

Printed Circuit Boards: NEMA grade FR-4, double clad with copper, plated with gold over nickel

Infrared Emitting Diode Chips: Gallium aluminum arsenide

Silicon Phototransistor Chips: Gold and Aluminum Alloys

Resistor: Metal oxide on ceramic substrate

Solder Pins: Brass, plated with tin

Pushbutton Dome: Stainless steel

Backplate: Stainless steel

Cable: Copper stranded with topcoat in PVC insulation (Cable version only)

Connector (.050 Center): PA4.6 with tin over nickel plated phosphor bronze

Connector (.100 Center): Nylon UL94V-2, tin plated copper alloy

Label: TT406 Thermal transfer cast film

Solder: Sn/Ag/Cu, Lead-Free, No Clean

Lubricating Grease: NYE nyogel 774L

Hex Nut: Nickel, plated with brass

Lockwasher: Zinc Plated Spring Steel with Clear Trivalent Chromate Finish

Header: Hi-Temp glass filled thermoplastic UL94V-0, phosphor bronze (pin versions only)

Strain Relief: Glass filled thermoplastic (.100 center cable versions only)

OPTIONS

Contact Grayhill for custom terminations, shaft and bushing configurations, rotational torque pushbutton force, and code output.

ORDERING INFORMATION
Angle of Throw

 45=45° for Code Change and 8 Detent Positions
 30=30° for Code Change and 12 Detent Positions
 22=22.5° for Code Change and 16 Detent Positions
 18=18° for Code Change and 20 Detent Positions
 15=15° for Code Change and 24 Detent Positions
 11=11.25° for Code Change and 32 Detent Positions

Rotational Torque Option

 N = Non-detent
 L = Low Torque (available with 0, 4, 5, 9 pushbutton only)
 M = Medium Torque (available with 0, 5, 9 pushbutton only)
 H = High Torque (available with 0, 9 pushbutton only)

Termination

 C = .050 Center Ribbon Cable with Connector
 S = .050 Center Ribbon Cable with .100 Stripped End
 P = .050 Center Pins with .130 Length
 CH = .100 Center Ribbon Cable with Connector
 SH = .100 Center Ribbon Cable with .100 Stripped End
 PH = .100 Center Pins with .230 Length

Cable Length

 Cable Termination: 040=4.0in or 040in. Cable is terminated with Amp Connector P/N 3-640442-6
 See Amp Mateability Guide for mating connector details.

Pushbutton Option

 0 = NO PUSHBUTTON 4 = 400 Grams
 9 = 950 Grams 3 = 300 Grams
 5 = 510 Grams 2 = 200 Grams

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