UA28 - Rotary Optical Encoder with Magnetic Detent

FEATURES

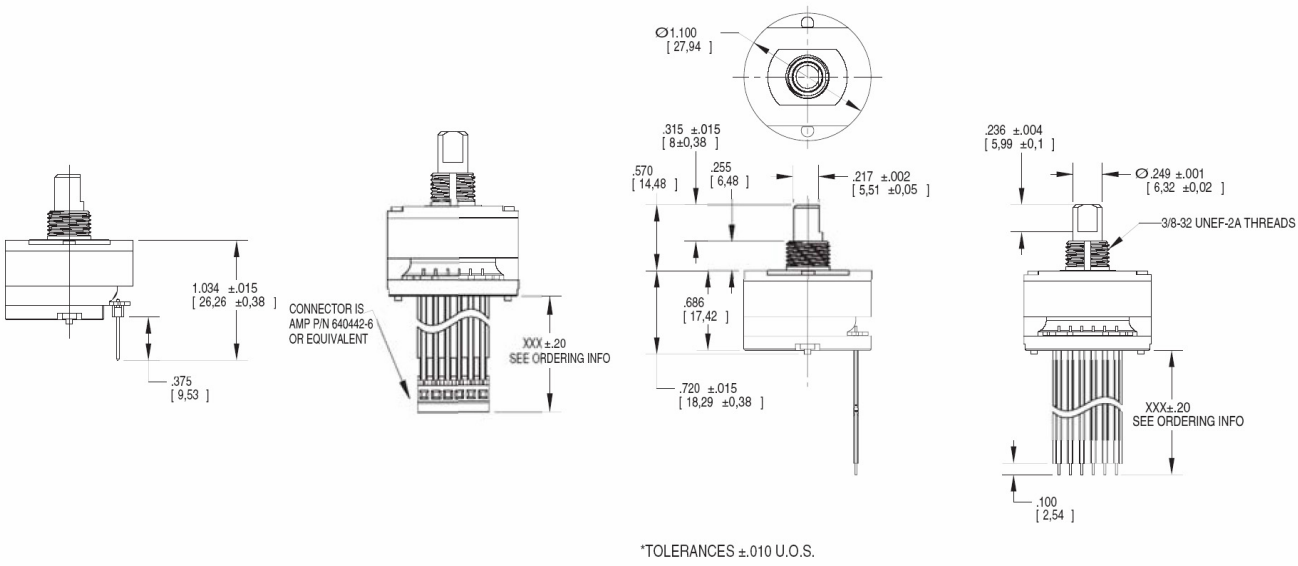
- Smooth Magnetic Detent
- 8 Million Rotational Cycles, Ten Times the Life of a Mechanical Detent System
- Optional Integrated Pushbutton
- Available in 8, 16, 24 and 32 Positions
- Choice of Cable Lengths

Applications

- Instrumentation
- Medical
- Audio

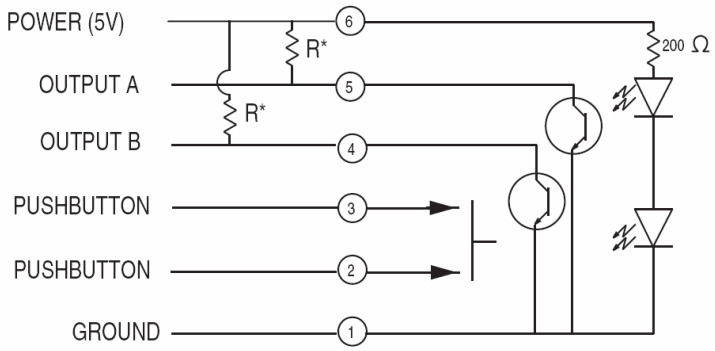
PRODUCT DIMENSIONS In inches (and millimeters)

Pinned Version | **Cable Version** | **Stripped Version**



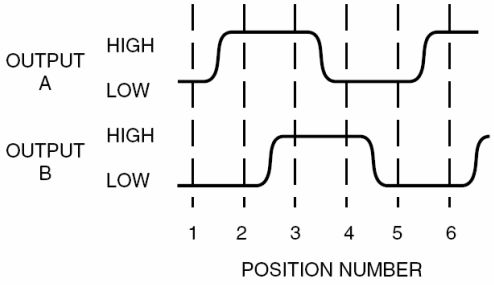
*TOLERANCES ±.010 U.O.S.

ELECTRICAL BLOCK DIAGRAM



*EXTERNAL 2.2k Ω PULL-UP RESISTORS REQUIRED FOR OPERATION.

WAVEFORM AND TRUTH TABLE



Clockwise Rotation		
Position	Output A	Output B
1		
2	•	
3	•	•
4		•

• Indicates logic high; blank indicates logic low. Code repeats every 4 positions.

SPECIFICATIONS

Environmental Specifications

Operating Temperature Range: -40°Cto 85° C
Storage Temperature Range: -55° C to 100°C
Humidity: 96 hours at 90-95% humidity at 40°C
Mechanical Vibration: Harmonic motion with amplitude of 15 g, within a varied frequency of 10 to 2000 Hz
Mechanical Shock:
Test 1: 100 g for 6 ms half-sine wave with a velocity change of 12.3 ft/sec
Test 2: 100 g for 6 ms sawtooth wave with a velocity change of 9.7 ft/sec

Rotary Electrical and Mechanical Specifications

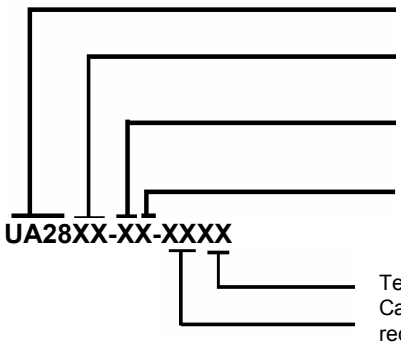
Operating Voltage: 5.00±.25 Vdc
Supply Current: 30 mA maximum at 5 Vdc
Output: Open collector phototransistor, external pull-up resistors are required
Output Code: Two-bit quadrature, channel A leads channel B by 90° electrically during clockwise rotation of the shaft
Logic Output Characteristics:
Logic high signal shall be no less than 3.0 Vdc
Logic low signal shall be no greater than 1.0 Vdc
Minimum Sink Current: 2.0 mA
Power Consumption: 150 mW maximum
Mechanical Life: 10 million rotational cycles of operation. One cycle is a rotation through all positions and a full return
Average Rotational Torque: H=2.00 in-oz M=1.00 in-oz, L=.50 in-oz
Mounting Torque: 15 in-oz maximum
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 and Mechanical Specifications

Rating: 10 mA **at 5 Vdc**
Contact Resistance: <10 ohms
Life: 3 million actuations minimum
Contact Bounce: <4 ms make,<10 ms break
Actuation Force: 2=200±75 grams, 3=300±90 grams, 4=510±150 grams
Shaft Travel: .25 ± .010 inches

Materials and Finishes

Bushing: Zinc Diecast, Cadmium Plated per QQP-416, Class II, Type II
Insert Molded into 25% Glass Reinforced Nylon Zytel FR-50
Shaft: NdFeB XE-3594 over Grilamid LV23H
Stator: Powdered Metal per F-0000-20
Through Bolts: 305 Stainless Steel
Through Bolts Nuts: Stainless Steel
Spacer Washer: Brass
Snap Dome: Stainless Steel
Printed Circuit Boards: Nema Grade FR4, Double Clad with Copper, Plated with Gold over Nickel
Infrared Light 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
Code Rotor: Acetal (Delrin 100)
Code Housing: Polyamide Polymer (Nylon 6/10 Alloy)
Backplate Strain Relief: Hiloy-610
Cable: Copper Standard with Topcoat in PVC Insulation (Cabled Versions Only)
Connector: PA4.6 with Tin/Lead Plated Phosphor Bronze (Cable/Connector Versions)
Label: TT406 Thermal Transfer Cast Film
Solder: 60/40 Tin Lead, No Clean - Low Residue Flux
Mounting Hex Nut: Cadmium Over 1/2 Hard Brass
Lockwasher: 8-18 Stainless Steel, Passivate Finish
Pin Header: Hi-Temp Glass Filled Thermo-plastic UL94V-0, Phosphor Bronze (Pinned Versions Only)



Series
Angle of Throw: 45 = 45° for code change and 8 detent positions, 22 = 22.5° for code change and 16 detent positions, 15 = 15° for code change and 24 detent positions, 11 = 11.25° for code change and 32 detent positions.
Rotational Torque: H=High Torque (2.00 in-oz), M=Medium Torque (1.00 in-oz), L=Low Torque (.50 in-oz)

Pushbutton Option: 0=Non-Pushbutton, 2 = 200 grams, 3 = 300 grams, 4 = 510 grams

Termination: CH =.100 Cable with connector, SH = Cable with Stripped-End, PH = Pin Header
Cable Lenght: 020 thru 250 in 1/2" increments (three digits are eliminated if pinned termination is required) Example: 060 = 6.0" cable, 135 = 13.5 cable.