SERIES 60AR
Rugged and Sealed Joystick

FEATURES
• Three-in-One Joystick, Optical Encoder and Pushbutton
• Shaft and panel sealed to IP67 against liquids and particulates
• Choices of knobs, cable length and termination
• Customized solutions available

APPLICATIONS
• Aerospace
• Military vehicles and devices
• Mobile electronics for outdoor use

DIMENSIONS
in inches (and millimeters)

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

ORDERING INFORMATION
Angle of Throw: 18° = 18° or 20 positions, 08° = Non-detent or 20 positions, 00° = Non-turn
Joystick: 4= Four contacts & four directions; 8= Four contacts & eight directions
Termination: 0.050” center P= pin header; C= connector; S= stripped cable
Cable Length: 020 thru 250 in 1/2 inch increments, 060= 6.0 inch cable, leave blank if pinned

For prices and custom configurations, contact a local sales office, an authorized distributor, or Grayhill’s sales department.
**Optical and Mechanical Encoders**

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**Specifications**

**Environmental Specifications**

Operating Temperature Range: -40°C to 85°C
Storage Temperature Range: -40°C to 100°C
Humidity: 96 hours at 90-95% humidity at 40°C
Mechanical Vibration: Harmonic motion with amplitude of 15g, within a varied 10 to 2000 Hz frequency for 12 hours
Mechanical shock:
- Test 1: 100g for 6Ms half sine wave with velocity change of 12.3 ft/s.
- Test 2: 100g for 6 Ms sawtooth wave with velocity change of 9.7 ft/s.
Shaft and panel Seal: IP67, 1 meter submersion for 30 minutes

**Joystick Electrical & Mechanical Specifications**

Supply Current: 5 Ma, maximum
Logic Output Characteristics: Neutral Position: 2.5±0.5 Vdc, High-state Position: >4.5 Vdc, Low-state Position: <0.5 Vdc
Mechanical Life (Joystick): 500k actuations, minimum in each direction
Actuation Force (Joystick): 1320±660g (X&Y directions only)
Angle of Throw: 4.0°±1.5° (X&Y directions only, at electrical contact)

**Pushbutton Electrical & Mechanical Specifications Rating:**

10 Ma at 5 Vdc, resistive
Contact Resistance: Less than 10 Ω
Contact Bounce: <4 Ms make, <10 Ms break
Mechanical Life (Pushbutton): 1 million actuations, minimum
Actuation Force (Pushbutton): 1500±450g
Pushbutton Travel: .018±.005 in

**Rotary Electrical & Mechanical Specifications**

Operating Voltage: 5.00±25 Vdc
Supply Current: 20 Ma, maximum at 5 Vdc
Minimum Sink Current: 2.0 Ma for 5 Vdc
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 3.5 Vdc, Logic-low shall be no greater than 1.0 Vdc
Optical Rise Time: 30 ms, maximum
Optical Fall Time: 30 ms, maximum
Mechanical Life (Rotational): 1 million cycles, minimum (1 cycle is a rotation through all positions and a full return)
Average Rotational Torque: 4.6±2.0 in-oz, initial
Shaft Push-out Force: 60 lbs, minimum before failure
Shaft Side-load Force: 25 lbs, maximum before failure
Terminal Strength: 15 lbs pull-out force, minimum for cable or header termination
Solderability: 95% free of pin holes or voids
Maximum Rotational Speed: 100 Rpm
Mounting Torque: 15 in-lbs maximum

**Speciﬁcations are subject to change**