SERIES 67C

Hall-Effect Joystick with Integrated Pushbutton and Optical Encoder

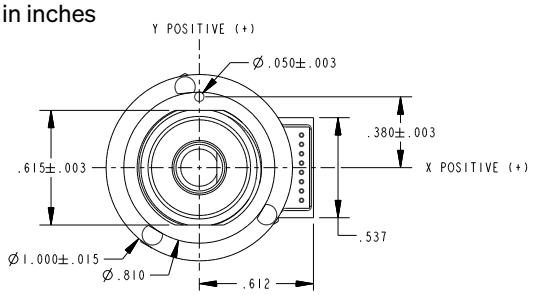
FEATURES

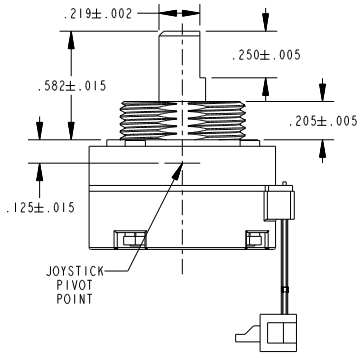
- Proportional joystick, pushbutton, and optical encoder functions from a single shaft
- Analog joystick outputs are proportional to angle of shaft deflection
- Long life, high reliability
- Choices of cable length and termination
- Customized solutions available

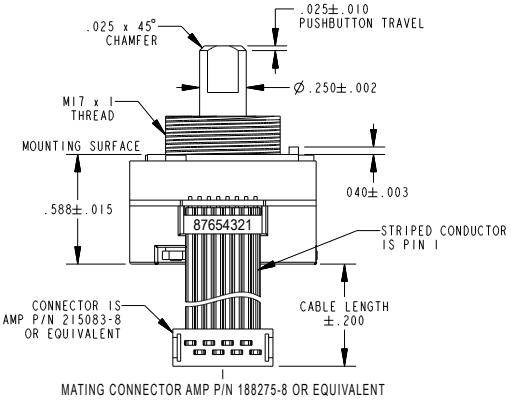
APPLICATIONS

- Global positioning/driver information systems
- Entertainment equipment
- Medical equipment controls
- Radio control belly boxes
- Robotics
- Aerospace
- Avionics
- Security camera controls

DIMENSIONS in inches

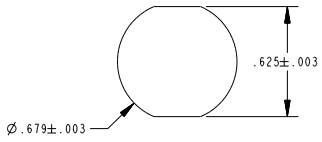




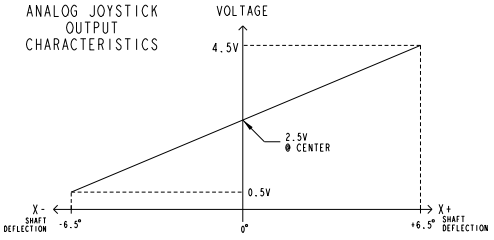


MATING CONNECTOR AMP P/N 188275-8 OR EQUIVALENT

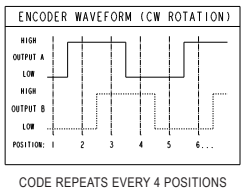
Recommended Panel Cutout



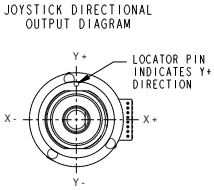
JOYSTICK OUTPUT WAVEFORM AND BLOCK DIAGRAM

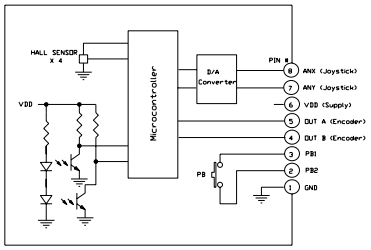


OUTPUT SHOWN IS TYPCIAL FOR VDD = 5.00V AND NOT NECESSARILY TO SCALE
BEHAVIOR IS SHOWN FOR X-AXIS AS EXAMPLE
BEHAVIOR OF Y-AXIS IS SAME AS X-AXIS



CODE REPEATS EVERY 4 POSITIONS
20 POSITIONS PER REVOLUTION





Specifications are subject to change.

SPECIFICATIONS

General Electrical Specifications

Operating Voltage on Pin 6 (VDD)	5.0 ± 0.25 V
Absolute Maximum Voltage* on Pin 6 (VDD)	-0.3 V minimum, 6.5 V maximum
Operating Current	8 mA typ., 12 mA, maximum

Joystick Electrical and Mechanical Ratings

Sensing Method	Hall-effect, proportional to angle of deflection
Output Voltage (Pins 7 & 8)	Analog (Ratiometric to operating voltage)
Output at Center Position	50% VDD
Output at Full Travel	10% VDD (for X-, Y- directions) 90% VDD (for X+, Y+ directions)
Output Tolerance	± 2% VDD (at center and at full travel)
Output Current	200 µA, maximum
Angle of Throw	6.5° + 2° / -1° in main directions; 9.0° ± 0.1° in diagonals
Life	500,000 actuations in each of the four main directions

Rotary Electrical and Mechanical Ratings

Output Code (Pins 4 & 5)	2-bit quadrature: Channel "A" leads channel "B" by 90° electrically during clockwise rotation of the shaft
Output Type	Push/pull
Output Low Voltage	0.6 V maximum for IOL = 2 mA
Output High Voltage	4.3 V minimum for IOH = -1.5 mA, (VDD = 5.0 V)
Mechanical Life	1 million rotational cycles of operation (1 cycle is a rotation through all positions and a full return)
Mounting Torque	15 in-oz maximum
Shaft Push-Out Force	45 lbs minimum
Shaft Pull-Out Force	45 lbs minimum
Solderability	95% free of pin holes and voids
Detents	20 position
Torque	Initially 3.5 ± 1.5 in-oz average of all positions, with a 1.5 in-oz maximum range (Max position – Min position) = Range After 1 million cycles, average torque shall not change by more than 50% of the initial value

Soldering Recommendation

Hand solder only per IPC J-STD-001

Pushbutton Electrical and Mechanical Ratings

Rating	10 mA at 5 Vdc resistive
Absolute Maximum Voltage* on Pins 2 & 3	6.0 V
Contact Resistance	Less than 10 ohms
Life	1 million actuations minimum
Contact Bounce	< 4 mS make, <10 mS break
Actuation Force	960 ± 150 grams (700 grams dome)
Pushbutton Travel	0.025 ± 0.010 inches

Environmental Ratings

Operating Temperature Range	-40 °C to 85 °C
Storage Temperature Range	-55 °C to 100 °C
Relative Humidity	96 hrs at 90-95% humidity at 40 °C
Vibration	Harmonic motion with amplitude of 15 g, within a varied 10 – 2000 Hz frequency for 12 hrs
Mechanical Shock	Test 1: 100 g for 6 ms half-sine wave with a velocity change of 12.3 ft/s Test 2: 100 g for 6 ms sawtooth wave with a velocity change of 9.7 ft/s

Materials and Finishes

Pin Header	Terminals: Phosphor bronze; Insulator: Nylon 4/6; plated with tin
Cable	Copper stranded with silver plating in PVC insulation, 28 AWG
Connector	Nylon 4/6; 30% Glass-filled ; Tin-plated phosphor bronze terminals
Mounting Nut	Polyurethane
Shaft	Thermoplastic
ROHS Compliant	

EMC Ratings

Radiated Immunity	Passed 10 V/m: 80-2700 MHz per IEC 61000-4-3
Conducted Immunity	Passed 10 V/m: 0.15 80 MHz per IEC 61000-4-6
Radiated Emissions	Passed EN 55022 Class B
Conducted Emissions	Passed EN 55022 Class B
Electrostatic Discharge	Passed 15kV contact/25kV air discharge per IEC 61000-4-2
Power Frequency Magnetic Field	Passed 30 A/m per IEC 61000-4-8

* Exceeding the Absolute Maximum Voltage may result in permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied.

ORDERING INFORMATION

For prices and custom configurations, contact a local sales office, an authorized distributor, or Grayhill's sales department.

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Series

Rotational Encoder Resolution
18 = 18°, 20 positions
08 = Non-detent, 20 positions
00 = Non-turn

Joystick Directions
8 = 4 sensors, 8 directions (no gating)

Force Option
M = Medium forces

Termination
S = Stripped cable
C = Cable with connector
P = Pin header

Cable Length
020 = 2.0 in. cable
040 = 4.0 in. cable
060 = 6.0 in. cable
2-in. Increments
Leave blank if choosing pin header
Examples:
67C18-8-M-020 = 2.0 in. cable with connector
67C18-8-M-P = Pin header