

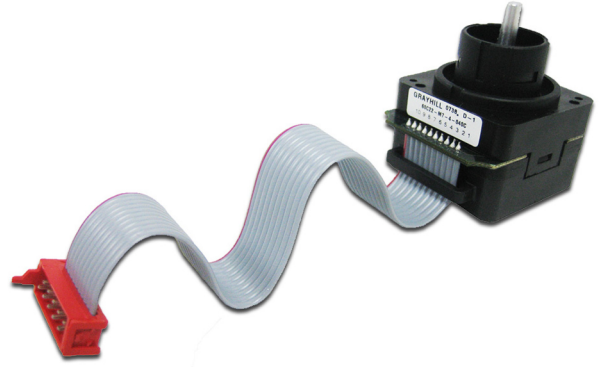
SERIES 60C Multi-Function Joystick

FEATURES

- Three-in-One Joystick, Optical Encoder and Pushbutton
- Compact Packaging
- Choices of Cable Length and Termination
- Customized Solutions Available

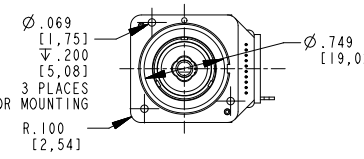
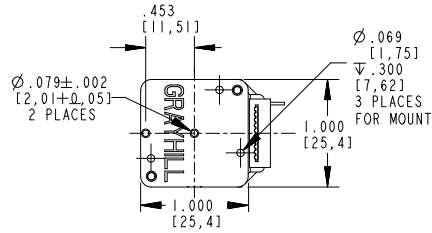
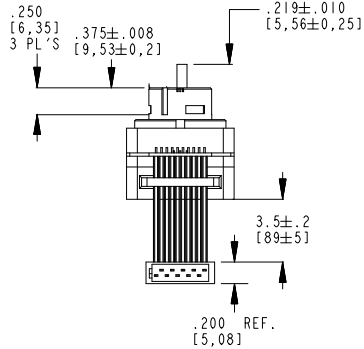
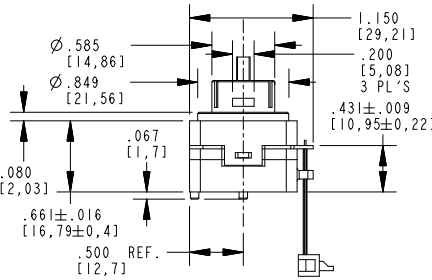
APPLICATIONS

- Avionics
- Medical Equipment
- Automotive Navigation, Information & Entertainment Equipment

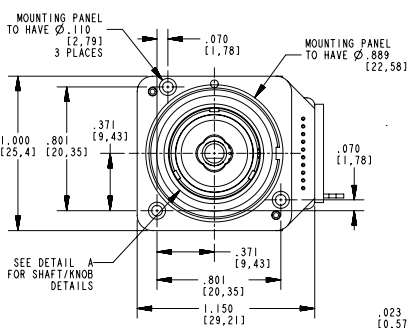


DIMENSIONS in inches (and millimeters)

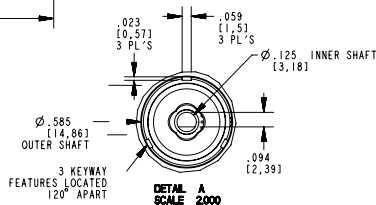
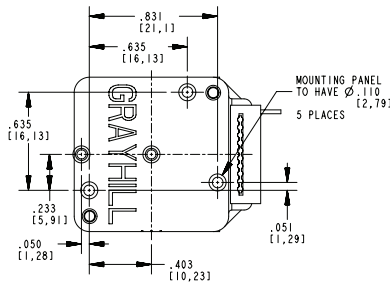
Unless otherwise specified, standard tolerance are:
 Linear $\pm .025$
 Diameter $\pm .010$
 Angle $\pm 2.0^\circ$



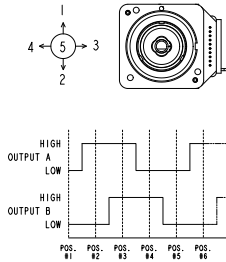
FRONT MOUNTING



REAR MOUNTING



JOYSTICK OPERATION ENCODER WAVEFORM



TRUTH TABLE Standard Quadrature 2-Bit Code

○ INDICATES LOGIC HIGH
 ○ INDICATES LOGIC LOW

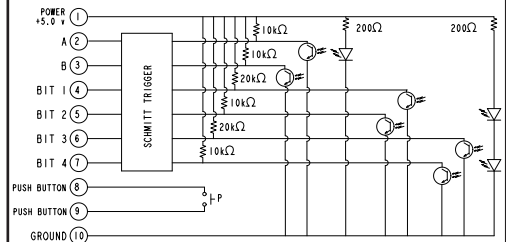
JOYSTICK

POSITION	BIT 1	BIT 2	BIT 3	BIT 4
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○

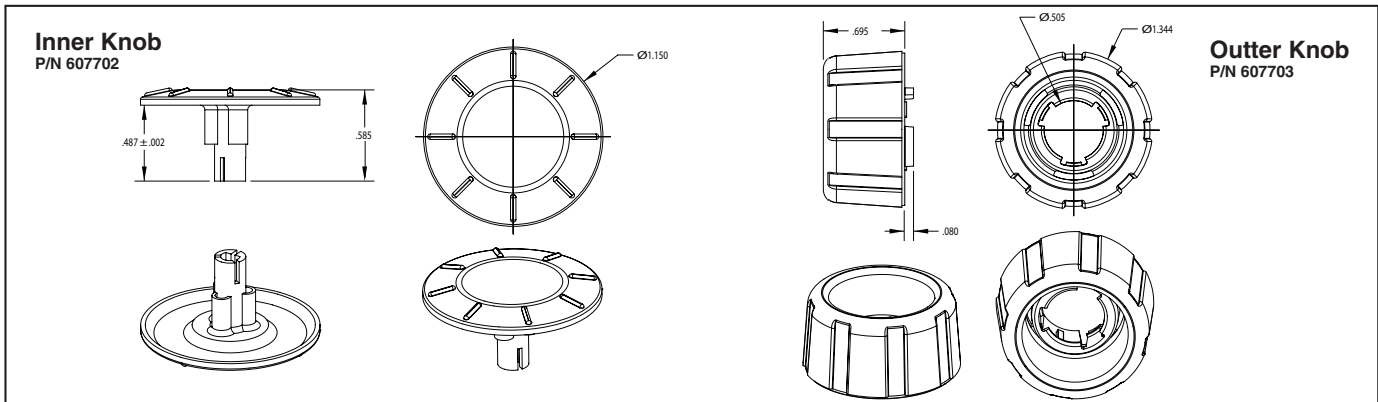
ENCODER

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

SWITCH SCHEMATIC



CONTROL KNOBS



SPECIFICATIONS

Rotary

Electrical and Mechanical Ratings

Operating Voltage: 5.00 ± 0.25 Vdc

Supply Current: 35mA TYP at 5 Vdc

Power Consumption: 175mW TYP at 5Vdc

Output: Direct output from inverting Schmitt trigger

Output Code: 2-Bit quadrature, channel A leads channel B by 90° in cw rotation

Logic Output Characteristics:

High: No less than 3.5 Vdc

Low: No greater than 1.0 Vdc

Mechanical Life: 500K rotational cycles (through all positions and a full return)

Rotational Torque: medium torque option 3.00±2.00 in-oz, torque shall be within 50% of initial value throughout life

Mounting Torque: 15 in-lbs. maximum

Shaft Push/Pull Out Force: 25 lbs minimum

Terminal Strength: 15 lbs terminal minimum

Joystick

Electrical and Mechanical Ratings

Operating Voltage: 5.00 ± 0.25 Vdc

Supply Current: 35mA at TYP at 5 Vdc

Power Consumption: 175mW TYP at 5Vdc

Output: Direct output from inverting Schmitt trigger

Logic Output Characteristics:

High: No less than 3.5 Vdc

Low: No greater than 1.0 Vdc

Mechanical Life: 500K cycles

(through all positions and a full return)

Angle of Throw: 8° max. in all directions

Pushbutton

Electrical and Mechanical Ratings

Rating: 10 mA at 5 Vdc resistive

Contact Resistance: less than 10 ohms

Contact Bounce: < 4ms make, 10 ms break

Mechanical Life: 500K actuations minimum

Actuation Force: option 7 = 485 ± 115grams

Pushbutton Travel: 0.033 ± 0.015 inches to contact; 0.075 inches maximum

Environmental Ratings

Operating Temperature Range: -40°C to 85°C

Storage Temperature Range: -55°C to 100°C

Relative Humidity: 96 hours at 90-95% humidity at 40°C

Vibration: Harmonic motion with amplitude of 15g, within a varied 10 to 2000 Hz

Mechanical Shock:

Test 1: 100g for 6ms half-sine wave with a velocity change of 12.3 ft/s

Test 2: 100g for 6ms sawtooth wave with a velocity change of 9.7 ft/s

Thermocycle: 4 hours cycling between -40°C to 85°C

Materials and Finishes

Bushing: Thermoplastic

Shaft Outer: Thermoplastic

Upper Housing: Thermoplastic

Pushbutton Rocker: Thermoplastic

Pushbutton Actuator: Thermoplastic

Inner Shaft Slide: Thermoplastic

Slider Plate: Thermoplastic

Backplate: Thermoplastic

Lightpipe, Joystick: Thermoplastic

Lightpipe, 16 pos: Thermoplastic

Centering Profile: Thermoplastic

Shaft Inner: Aluminum

Pins: Stainless steel

Barbed Rivet: Stainless steel

Detent Balls: Carbon steel 100 with nickel finish

Centering Balls: Carbon steel 100 with nickel finish

Detent Springs: Tinned music wire

Centering Springs: Tinned music wire

Cable ASM: .050 round conductor flat cable, PVC coated. Conductors are stranded, top-coated wire

Solder: 95.5% SN, 4% AG, 0.5% CU

Dome: Stainless steel

PCB 16 Pos: NEMA grade FR-4. Plating is gold or palladium over nickel

Infrared Emitter: Gallium aluminum arsenide

Phototransistor: Planar silicon

Resistor: Carbon film

Schmitt Trigger: RoHS Compliant TSSOP, 14 pin

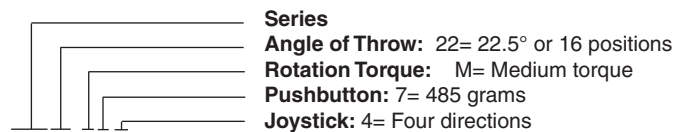
Lubricating Grease: Nyogel 774L

Label: TT406 Thermal transfer cast film

OPTIONS

Contact Grayhill for custom terminations, rotational torque, number of positions, shaft configurations, and resolutions. Control knobs are also available.

ORDERING INFORMATION



60C22-M7-4-060S

Termination: 0.050" center ribbon cable with; C= Connector; S= 0.1" stripped end

Cable Length: 025 thru 250 in 1/2 inch increments, 060= 6.0 inch cable