SERIES 60AD

Optical Encoder with integrated Joystick and Pushbutton

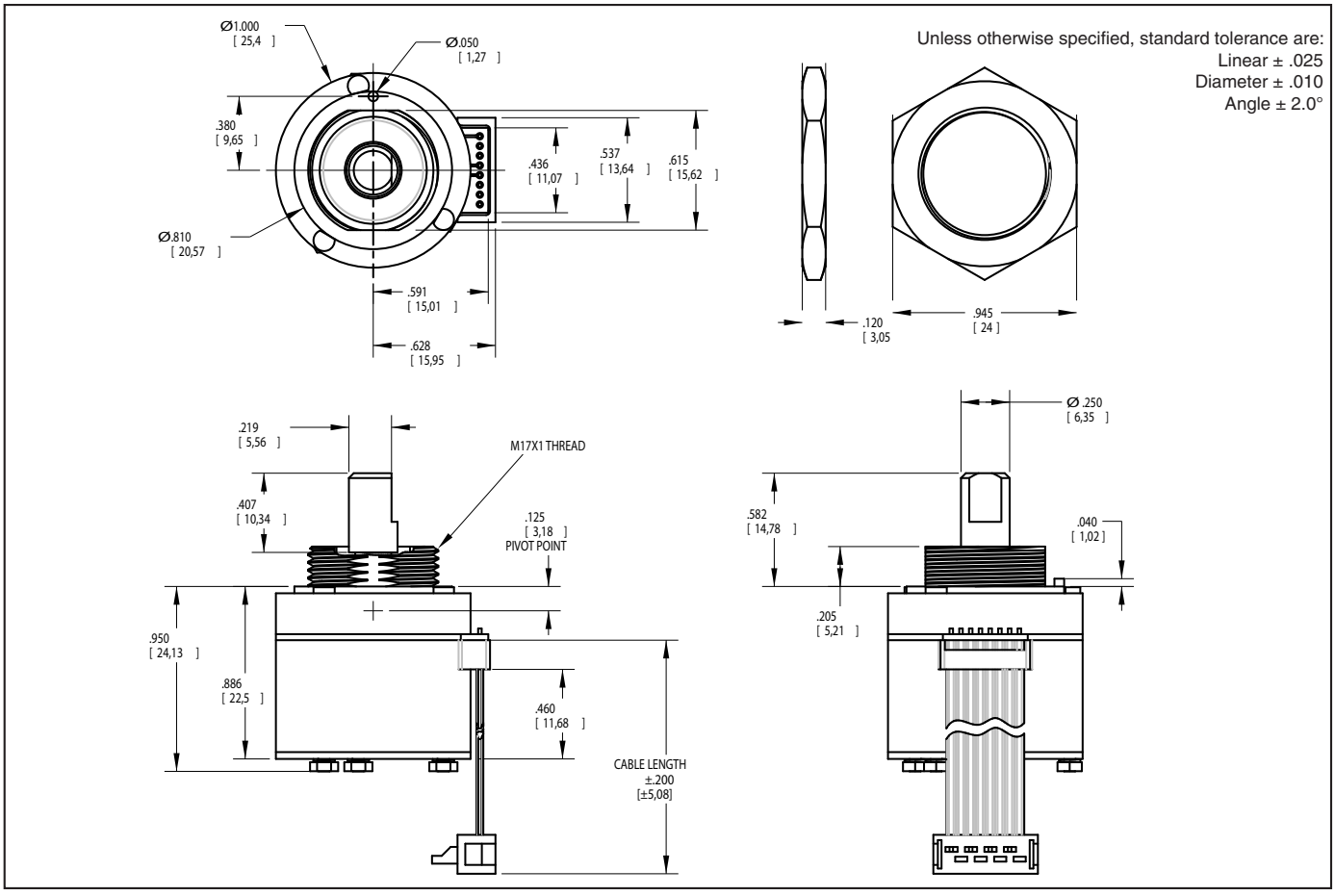
FEATURES

- Dome contacts provide excellent tactile feedback in all directions
- Choices of actuation force, cable length and termination
- Customized solutions available

APPLICATIONS

- Aerospace
- Automotive
- Medical devices

DIMENSIONS in inches (and millimeters)



ORDERING INFORMATION

		OPTION		
		L	M	H
1	ACTUATION FORCE (JOYSTICK) [g]	550±200	725±200	1050±250
2	ACTUATION FORCE (PUSHBUTTON) [g]	625±200	800±200	1100±250
3	AVERAGE ROTATIONAL TORQUE [in-oz]	1.50±0.75	3.50±1.75	5.00±2.00

60AD18-4-M-060S

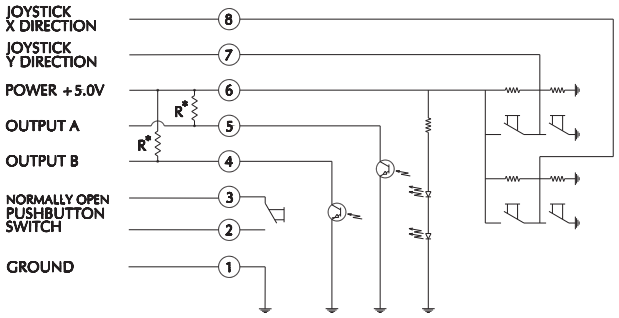
Angle of Throw: 18= 18° or 20 positions
Joystick: 4= Four contacts & directions;
8= Four contacts & eight directions

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
Force Option: (see table) L=low, M=medium, H=high

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

JOYSTICK OPERATION + ENCODER WAVEFORM AND TRUTH TABLE Standard Quadrature 2-Bit Code

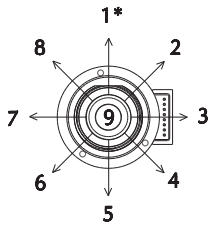
SWITCH SCHEMATIC



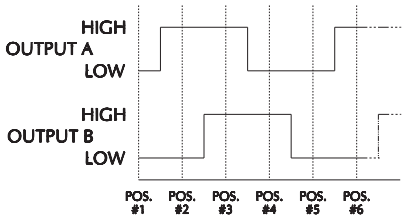
*EXTERNAL PULL-UP RESISTORS REQUIRED FOR OPERATION (2.2kΩ).

JOYSTICK POSITION DIAGRAM

* INDICATES DIRECTION OF D-FLAT ON BUSHING



ENCODER WAVEFORM (C.W. ROTATION)



ENCODER TRUTH TABLE (C.W. ROTATION)

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

◯ INDICATES LOGIC-HIGH
○ INDICATES LOGIC-LOW
CODE REPEATS EVERY FOUR POSITIONS

JOYSTICK TRUTH TABLE

POSITION	X OUTPUT	Y OUTPUT
1	NEUTRAL	HIGH
2	HIGH	HIGH
3	HIGH	NEUTRAL
4	HIGH	LOW
5	NEUTRAL	LOW
6	LOW	LOW
7	LOW	NEUTRAL
8	LOW	HIGH
9	NEUTRAL	NEUTRAL

SPECIFICATIONS

Rotary Specifications

Operating Voltage: 5.00 ± 0.25 Vdc
Supply Current: 20mA max at 5 Vdc
Minimum Sink Current: 2.0mA at 5 Vdc
Power Consumption: 0.1mW max at 5 Vdc
Output: Open collector phototransistor, 2.2k Ω external pull-up resistors are required
Output Code: 2-Bit quadrature, channel A leads channel B by 90° in clockwise rotation
Logic Output Characteristics:
High: No less than 3.5 Vdc
Low: No greater than 1.0 Vdc
Mechanical Life: 1 million rotational cycles (through all positions and a full return)
Rotational Torque: see table
Maximum Rotational Speed: 100 RPM
Mounting Torque: 15 in-lbs. maximum
Shaft Push/Pull Out Force: 45 lbs min.
Shaft Side-Load Force: 20 lbs. min.
Terminal Strength: 15 lbs pull-out force min.

Pushbutton Specifications

Rating: 10 mA at 5 Vdc resistive
Contact Resistance: less than 10 ohms
Contact Bounce: < 4ms make, <10 ms break
Mechanical Life: 1 million actuations min.
Actuation Force: see table
Pushbutton Travel: .027 ± .010 in.

Joystick Specifications

Supply Current: 5mA max
Output Code: 2-Bit
Logic Output Characteristics:
Neutral Position: 2.5 ± 0.5 Vdc
High-State Position: >4.5 Vdc
Low-State Position: <0.5 Vdc
Mechanical Life: 500k cycles min.
Actuation Force: see table
Angle of Throw: 3.5° +2°/-1°

Environmental Ratings

Operating Temp. Range: -40°C to 85°C
Storage Temp. 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 10 to 2000 Hz for 12 hours
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

Materials and Finishes

Detent Housing: Nylon 6/10
Shaft: Nylon 6/10
Shaft Insert: 303 stainless steel
Joystick Housing: Nylon 6,10
Centering Plate: Nylon 6,10
Detent Balls: Carbon steel
Detent Springs: Music wire
Dome Contacts: Stainless steel
Dome Housings: Polycarbonate over brass-lead frame
Dome Retainers: Nylon 6,0; 30% glass-filled
Joystick Actuators: Polyphthalamide; 50% glass filled
Pushbutton Dome Retainer: Polycarbonate
Printed Circuit Board: NEMA grade FR-4. Glass-cloth epoxy, double clad with copper
Infrared Emitter: Gallium arsenide
Phototransistor: Planar silicon
Resistors: Metal oxide on ceramic substrate
Solder: 95.5% SN, 3% AG, 0.5% CU

OPTIONS

Contact Grayhill for custom terminations, rotational torque, number of positions, shaft configurations, and resolutions.

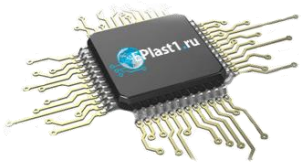
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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