

SERIES 60A Joystick

FEATURES

- Optical Encoder, Pushbutton, and Joystick in One Shaft
- Long Life, High Reliability
- Compatible with CMOS, HCMOS, and TTL Logic
- Choices of Cable Length and Termination
- Customized Solutions Available

APPLICATIONS

- Global Positioning/Driver Information Systems
- Medical Equipment Control
- Radio Control
- Robotics
- Commercial Appliances



DIMENSIONS in inches (and millimeters)

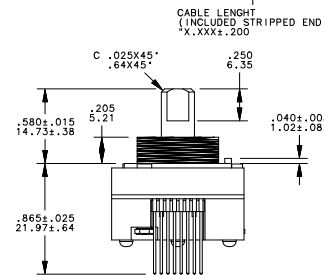
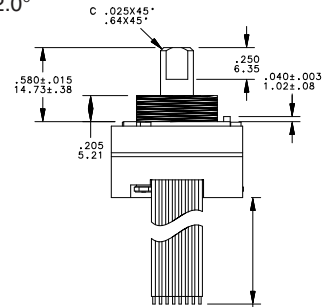
Stripped Cable Version



Pin Version



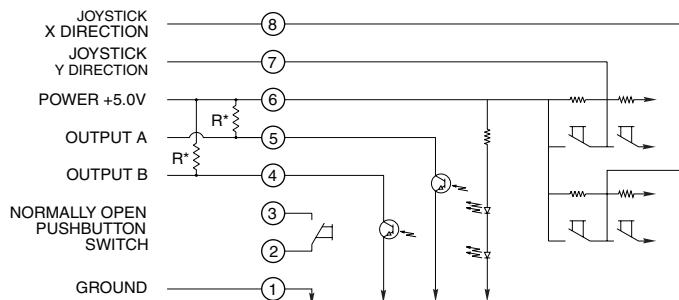
Unless otherwise specified, standard tolerance are:
 Linear $\pm .025$
 Diameter $\pm .010$
 Angle $\pm 2.0^\circ$



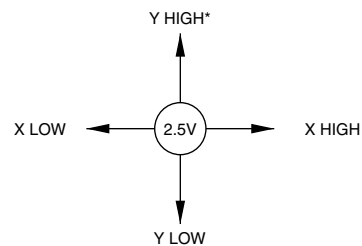
CABLE LENGTH (INCLUDED STRIPPED END)
 X, XXX ± .200

HEADER IS SAMTEC
 P/N: MTMS-108-58-T-S-485
 OR EQUIVALENT

CIRCUITRY AND JOYSTICK OPERATION Standard Quadrature 2-Bit Code



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



* DEFINED BY LOCATING PIN ON TOP OF HOUSING

WAVEFORM AND TRUTH TABLE Standard Quadrature 2-Bit Code



SPECIFICATIONS

Rotary Electrical and Mechanical Ratings
Operating Voltage: 5.00 ± 0.25 Vdc
Supply Current: 20 mA maximum at 5 Vdc
Output: Open collector phototransistor. External pull up resistors are required
Output Code: 2-Bit quadrature, channel A leads channel B by 90° electrically during clockwise rotation of the shaft
Logic Output Characteristics:
 High: No less than 3.5 Vdc
 Low: No greater than 1.0 Vdc
Minimum Sink Current: 2.0 mA
Power Consumption: 100 mW maximum
Mechanical Life: 1 million rotational cycles of operation (1 cycle is a rotation through all positions and a full return)
Average Rotational Torque: 2.0 ± 1.0 in-oz initially, torque shall be within 50% of initial value throughout life
Mounting Torque: 15 in-lbs. maximum
Shaft Push-Out Force: 45 lbs minimum
Shaft Pull-Out Force: 45 lbs minimum
Terminal Strength: 15 lbs terminal pull-out force minimum for cabled and header termination
Solderability: 95% free of pin holes and voids

Pushbutton Electrical and Mechanical Ratings
Rating: 10 mA at 5 Vdc resistive
Contact Resistance: less than 10 ohms
Life: 1 million actuations minimum
Contact Bounce: < 4 mS make, 10 mS break
Actuation Force: 400 ± 150 grams force
Shaft Travel: 0.020 ± 0.010 inches

ORDERING INFORMATION

Series
Angle of Throw: Detent: 18 = 18° or 20 positions; Non-detent: 08 = 18° or 20 positions; Non-Turn: 00 = Joystick and Pushbutton only
Joystick Contacts: 2 = 2 Discrete Contacts
 4 = 4 Discrete Contacts
 8 = 4 Contacts in 8 possible directions

Termination: S = Stripped cable; .050" centers; C = Connector; .050" centers; P = Pin; .050" centers
Cable Termination: 040 = 4.0in. Cable is terminated with Amp Connector P/N 215083-8.
 See Amp Mateability Guide for mating connector details.
**Eliminate cable length if ordering pins (Ex: 60A18-4-P)*

60A18-4-040S

Available from your local Grayhill Component Distributor.
 For prices and discounts, contact a local Sales Office, an authorized local Distributor, or Grayhill.

Joystick Electrical and Mechanical Ratings
Supply Current: 5 mA maximum
Output Code: 2-Bit
Logic Output Characteristics:
 Neutral: 2.5 ± 0.5 Vdc
 High: > 4.5 Vdc
 Low: < 0.5 Vdc
Angle of Throw: 8° ± 2° in all directions
Life: 500,000 actuations in each direction

Environmental Ratings
Operating Temperature Range: -40°C to 85°C
Storage Temperature Range: -55°C to 100°C
Relative Humidity: 96 hours at 90-85% humidity at 40°C
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 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
Assembly Studs: 305 Stainless steel
Detent Housing: Polyamide polymer (nylon 6/10 alloy)
Printed Circuit Boards: Glass cloth epoxy double clad with copper gold over nickel plated
Infrared Emitting Diode Chips: Gallium aluminum arsenide
Silicon Phototransistor Chips: Gold and aluminum alloys

Resistors: Metal oxide on ceramic substrate
Solder Pins: Brass, Plated with tin
Shaft: Polyamide polymer (nylon 6/10 alloy) with stainless steel insert
Detent Balls: Carbon steel plated with nickel
Detent Springs: Music wire plated with tin
Code Rotor: 33% Glass reinforced nylon 66
Pushbutton Dome: Stainless steel
Pushbutton Dome Retainer: Polycarbonate
Joystick Housing: Polyamide polymer (nylon 6/10 alloy)
Joystick Contact: Stainless steel, silicone rubber, brass with silver cladding, high-temp thermoplastic, phosphor bronze with silver cladding
Cable: Copper stranded with plating in PVC insulation
Connector: PA 4.6 with tin over nickel plated phosphor bronze
Lockwashers: Stainless steel with passivate finish
Hex Nuts: 303 Stainless steel
Label: TT406 Thermal transfer cast film
Solder: Sn/Ag/Cu, Lead-Free, No Clean
Mounting Nut: Polyurethane
Lubricating Grease: Nye nyogel 774L

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

Optical and Mechanical Encoders

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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