

MS series

Mid-size Hall effect joysticks

Distinctive features and specifications



- Compact size
- 1, 2 and 3 axis configurations
- Sealing level up to IP67 (above panel)
- Available with USB
- Redundant outputs available
- 10 million life cycles
- Available with J1939 CANbus and CANopen

MECHANICAL (FOR X AND Y AXIS)

- Break Out Force: 5.6N (1.25lbf)
- Operating Force: 7.5N (1.70lbf)
- Maximum Applied Force: 650N (145lbf)
- Mechanical Angle of Movement: 40°
- Expected Life: 10 million cycles
- Material: Glass reinforced nylon
- Lever Action (Centering): Spring centering

ELECTRICAL

- Sensor: Hall effect
- Supply Voltage Operating: 5.00VDC
- Reverse Polarity Max: -14.5VDC
- Transient Overvoltage Max : 18VDC
- Output Impedance: 6Ω
- Current Consumption Max: 10mA max per axis
- Return to Center Voltage (No Load): ±200mV

MECHANICAL (FOR Z AXIS)

- Break Out Force: 0.15N·m (1.33lbf-in)
- Operating Force: 0.25N·m (2.21lbf-in)
- Maximum Allowable Force: 4.50N·m (39.83lbf-in)
- Hand Mechanical Angle: 68°
- Handle Action: Spring return
- Expected Life: 1 million cycles

STANDARD SWITCH CHARACTERISTICS/RATINGS

- Electrical Resistive Load:
5A (depending on the chosen switch)
- Electrical Inductive Load:
3A (depending on the chosen switch)
- Low Level: 10mA @ 30mV
(depending on the chosen switch)
- Electrical Life: 1 million cycles 5A @ 28 VDC resistive snap-action (depending on the chosen switch)
- Mechanical Life: 1 million cycles
- Environmental Seal: IP68
- Action: Momentary, snap-action
- Operating Force: 7.5N±2.0N (1.69lbf±0.45lbf)
- Total Travel: 0.080 inches max
- Over Travel: 0.010 inches min

ENVIRONMENTAL

- Operating Temperature: -25°C to 70°C (-13°F to 158°F)
- Storage Temperature: -40°C to 70°C (-40°F to 158°F)
- Sealing (IP): Up to IP67*
- EMC Immunity Level (V/M): IEC 61000-4-3:2006
- EMC Emissions Level: IEC 61000-4-8:2009
- ESD: IEC 61000-4-2:2008

* above panel

NOTES:

- All values are nominal.
- Exact specifications may be subject to configuration.
- Contact Technical Support for the performance of your specific configuration.

Note: The company reserves the right to change specifications without notice.

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Overview

| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| MS | | | | | |
| SERIES | Front Buttons | Side Buttons | Spring Tension | Output Options | Additional Options |
| | N None O One W Two | 0 None U One Upper Position L One Lower Position F Two D Deadman | 00 Standard | 0 0V to 5V (Rail to Rail) 1 0.5V to 4.5V 2 0.25V to 4.75V 3 1V to 4V 4 0V to 5V – Sensor 1 0V to 5V – Sensor 2 5 0.5V to 4.5V – Sensor 1 0.5V to 4.5V – Sensor 2 6 0.25V to 4.75V – Sensor 1 0.25V to 4.75V – Sensor 2 7 1V to 4V – Sensor 1 1V to 4V – Sensor 2 8 0V to 5V – Sensor 1 5V to 0V – Sensor 2 9 0.5V to 4.5V – Sensor 1 4.5V to 0.5V – Sensor 2 10 0.25V to 4.75V – Sensor 1 4.75V to 0.25V – Sensor 2 11 1V to 4V – Sensor 1 4V to 1V – Sensor 2 0-U USB 1-J Cursor Emulation 2-C CANbus J1939 3-C CANopen | V Voltage Regulator E Environmental Sealing * |
| Handle | Top Buttons | Limiter Plate | | | |
| 10 Ball Tip 42 Stock Grip 31 Short Stock Grip 23 Low Profile ¹ (2 Axis) 24 Low Profile ¹ (3 Axis) 54 Low Profile ¹ Square Front (2 Axis) 55 Low Profile ¹ Square Front (3 Axis) | 0 None 1 One 2 Two R Rocker | S Square  R Round  X Slotted  Y Slotted  P Plus  D Diamond  G Guided Feel – Square H Guided Feel – Round | | | |

NOTES:

1. Low Profile handles are offered in two options:

Low Profile



Low Profile Square Front



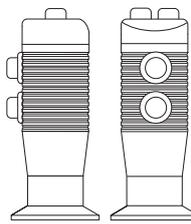
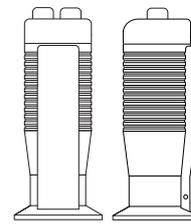
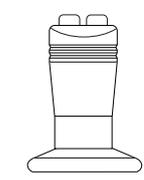
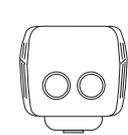
2. CANbus, USB or Voltage Regulator are mutually exclusive.



*Environmental sealing level available up to IP67. Dependent upon handle configuration.



Mounting accessories. Standard hardware includes: 4 screws (6-32x7/8) Phil.

| | | | | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| STOCK GRIP HANDLE¹ | | | | SHORT STOCK GRIP HANDLE² | LOW PROFILE SQUARE FRONT³ |
|  | |  | |  |  |
| Top and Side buttons | | Deadman | | Top buttons | |
| AVAILABLE BUTTON COLORS | | | | | |
|  |  |  |  |  |  |
| White | Gray | Black | Red ⁴ | Orange | Yellow |
| | | | |  |  |
| | | | | Green | Blue |
| | | | | |  |
| | | | | | Purple |

* Above panel, actual rating is dependent upon configuration

NOTES:

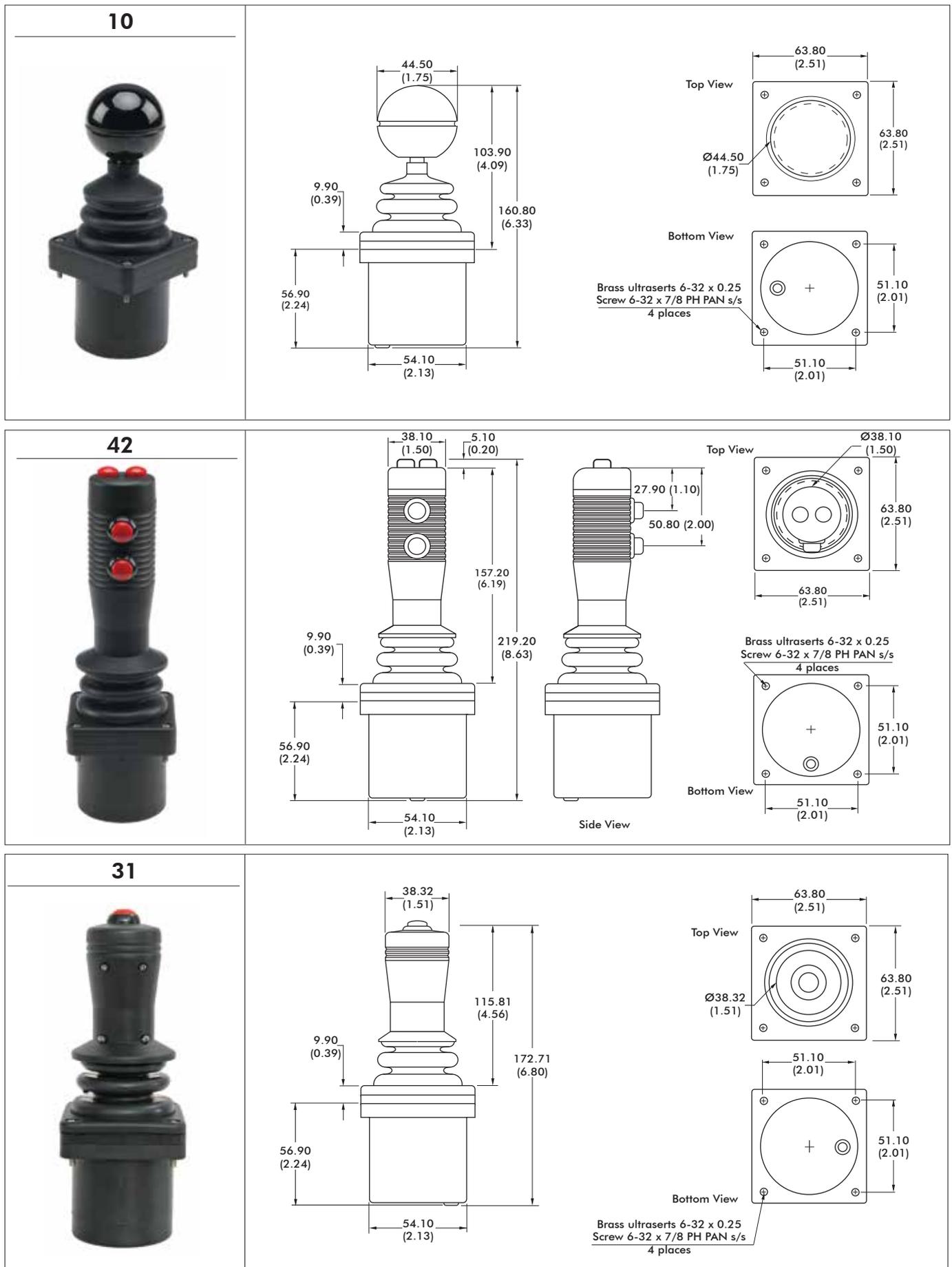
- The maximum possible configuration for the Stock Grip handle is up to 2 Top Buttons and 2 Side Buttons. A handle with a Deadman can have 2 Top Buttons, but no Side Buttons.
- The maximum possible configuration for the Short Stock Grip handle is up to 2 Top Buttons. It is not possible with Deadman, Index Trigger, or Side Buttons.
- The maximum possible configuration for the Low Profile Square Front handle is up to 2 Front Buttons. It is not possible with Deadman, Index Trigger, or Top Buttons.
- If unspecified, the pushbuttons will have snap action momentary switches with red button caps.
- Starting from the strain relief, the cable is 406mm (16in) long, 6.40mm (0.25in) stripped with plug, covered with an

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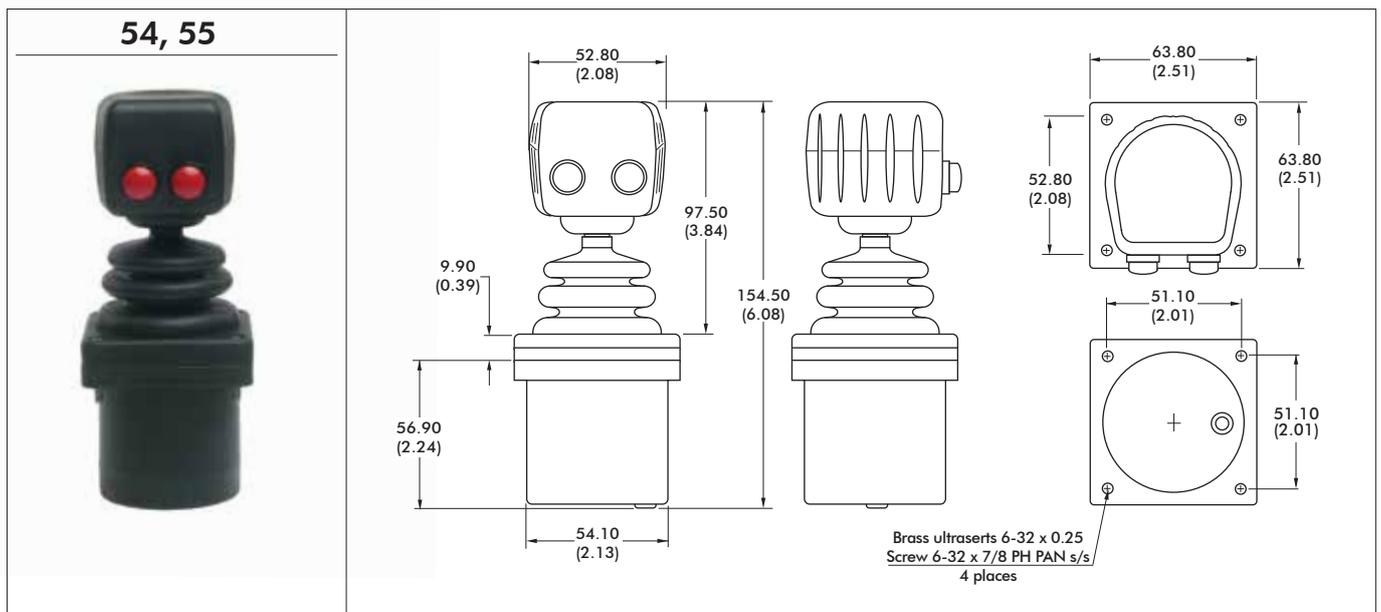
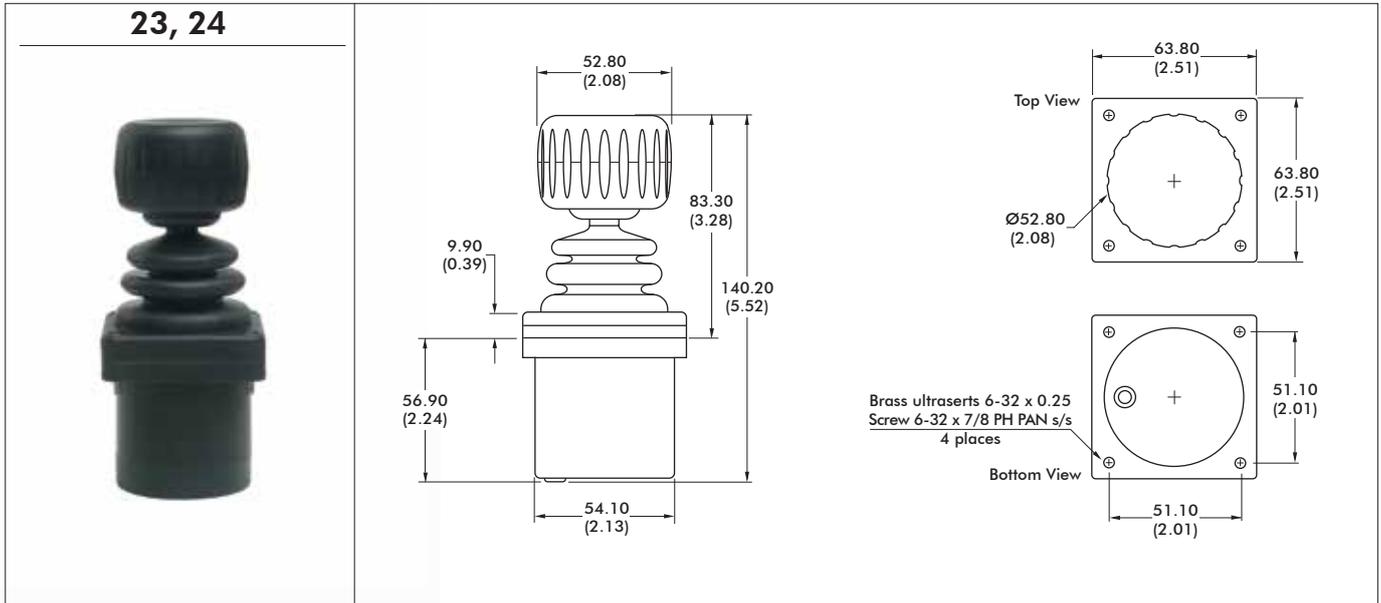


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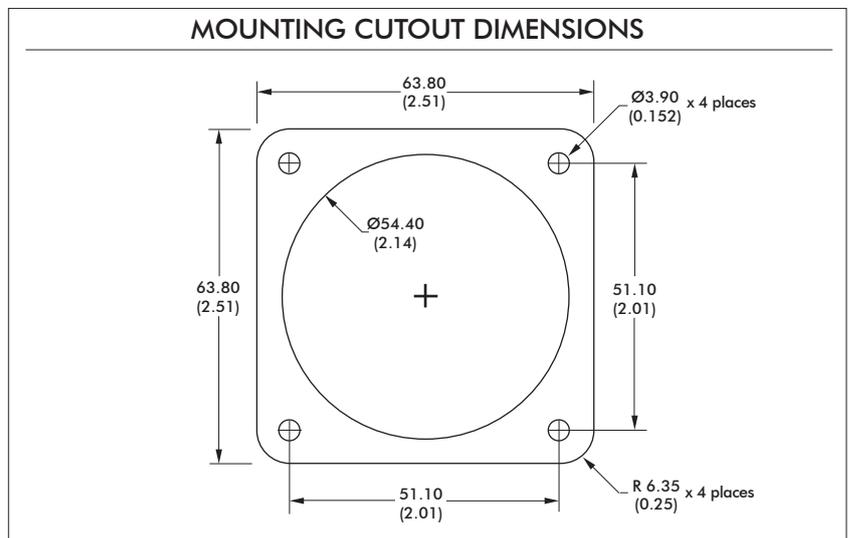
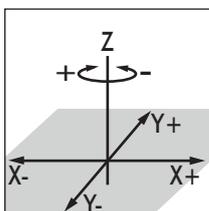
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NOTES

1. Dimensions are in mm/(inch).
2. Standard configurations feature a rubber grommet as indicated in the above drawings. An optional plastic strain relief is available and will increase under panel mounting depth by 19.05 (0.75).
3. Actual strain relief position may vary.
4. Axis orientation:



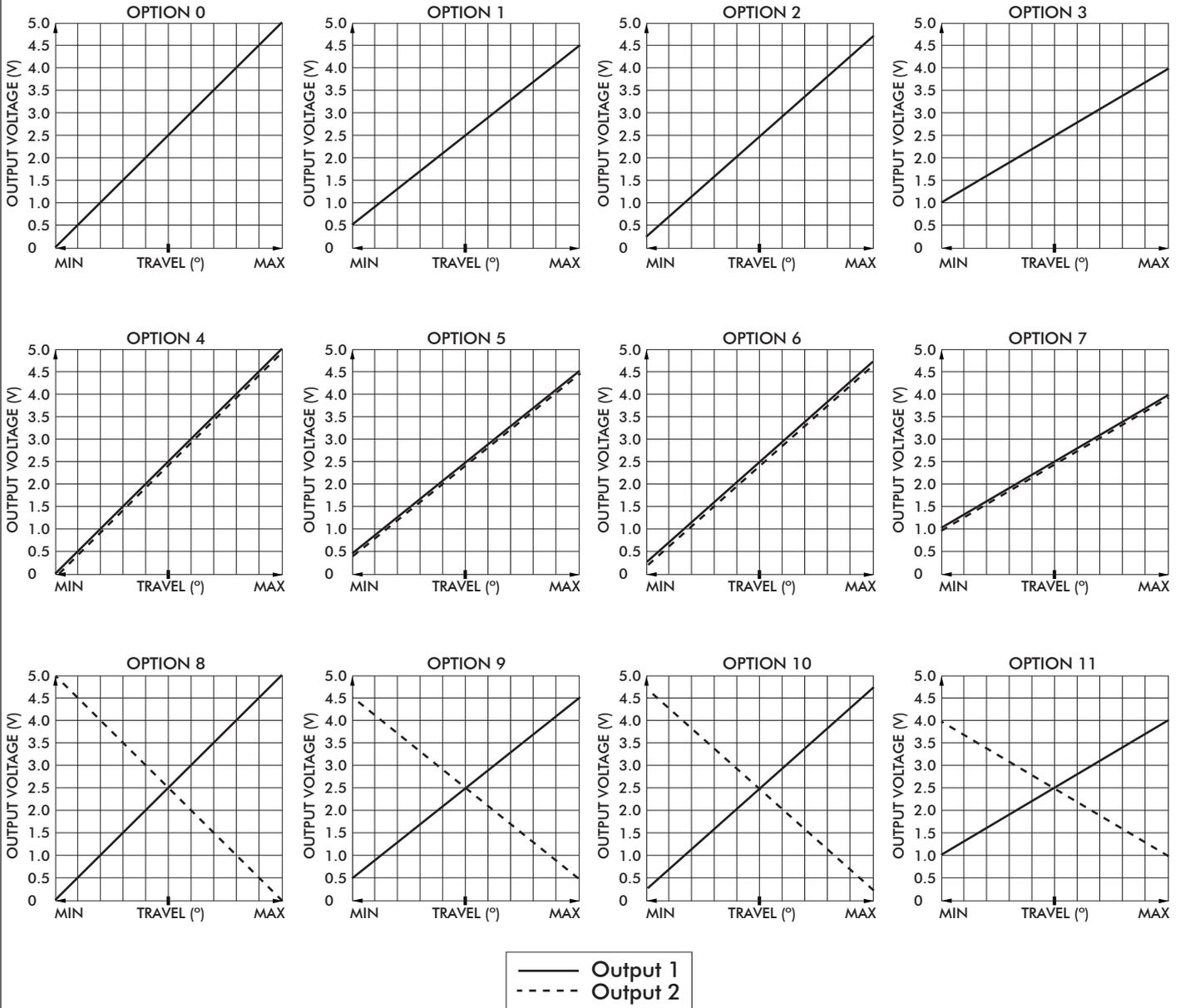
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VOLTAGE OUTPUT OPTIONS



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USB

USB

Featuring USB 1.1 HID compliant interface, APEM's USB joysticks are recognized as standard HID "game controller" devices. Adhering to the HID specification, APEM's USB joysticks are plug-and-play with most versions of Windows. Joystick button and axis assignments are dependent upon the controlled application.

FEATURES

- USB 1.1 HID compliant "game controller" device
- Easy to install and operate
- Functions determined by controlled application

SUPPLIED WIRING

USB: USB Male Type A Connector with overmolded cable

CURSOR EMULATION

The Cursor Emulation option converts multi-axis joystick output into a mouse, trackball, or cursor control device. The joystick's internal microprocessor converts absolute axis position into a cursor velocity, which is translated as a relative trackball or mouse position.

APPLICATIONS

The Cursor Emulation option is ideal for vehicle applications subjected to dirt and high vibration which makes operating a traditional cursor control device difficult. The Cursor Emulation option is widely used in shipboard and military applications.

FEATURES

- HID compliant "pointing device"
- Plug-and-play with USB option

SUPPLIED WIRING

USB: USB Male Type A Connector with overmolded cable

ADDITIONAL OUTPUT OPTIONS

VOLTAGE REGULATOR

The Voltage Regulator is a multi-wired analog option used to mate to a variety of industrial control voltages. The Voltage Regulator may be used when the supply or output voltage is greater than 5V or when bipolar output is required.

User Specified Output Voltage:

- 0-5 VDC
- 0-10 VDC
- ± 5 VDC
- ± 10 VDC

ELECTRICAL SPECIFICATIONS

- Supply Voltage: (Output Voltage + 1VDC) to 30VDC
- Supply Current: 90mA max

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CANBUS

CANbus J1939

APEM's MS CANbus joysticks conform to the SAE J1939 serial bus specification used for communications between electronic control units and vehicle components. The MS CANbus option provides extension for up to 24 digital I/O and 11 analog inputs.

ELECTRICAL SPECIFICATIONS

- | | |
|-------------------|----------------------------------------|
| • Supply Voltage: | 6VDC to 35 VDC |
| • Supply Current: | 15mA min, +5mA per LED, +10mA per axis |

WIRING SPECIFICATION

- | | |
|----------------|-----------------------|
| • Red Wire: | Supply Power |
| • Black Wire: | Ground |
| • Green Wire: | CAN high data |
| • White Wire: | CAN low data |
| • Blue Wire: | Identifier Select LSB |
| • Orange Wire: | Identifier Select MSB |

ENVIRONMENTAL

- | | |
|--------------------------|----------------------------------|
| • Operating temperature: | -25°C to +70°C (-13°F to +158°F) |
| • Storage temperature: | -40°C to +70°C (-40°F to +158°F) |

CONNECTOR OPTIONS:

- Cable assembly with Deutsch DTM04 style plugs

CANbus CONFIGURATION:

- Contact Technical Support for assistance

CANopen

- Contact Technical Support for assistance with CANopen configuration.