



- Compact size
- 1, 2 and 3 axis configurations
- Sealed up to IP68
- 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
- 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 IP68
- EMC Immunity Level (V/M): IEC 61000-4-3:2006
- EMC Emissions Level: IEC 61000-4-8:2009
- ESD: IEC 61000-4-2:2008







NOTES:

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

MS series

Mid-size Hall effect joysticks

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-D Discrete 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



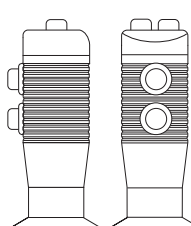
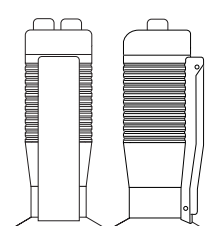
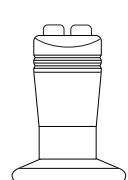
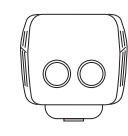
2. CANbus, USB or Voltage Regulator are mutually exclusive.












*Environmental sealing level available up to IP68. 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		Top buttons	

AVAILABLE BUTTON COLORS

								
White	Gray	Black	Red ⁴	Orange	Yellow	Green	Blue	Purple

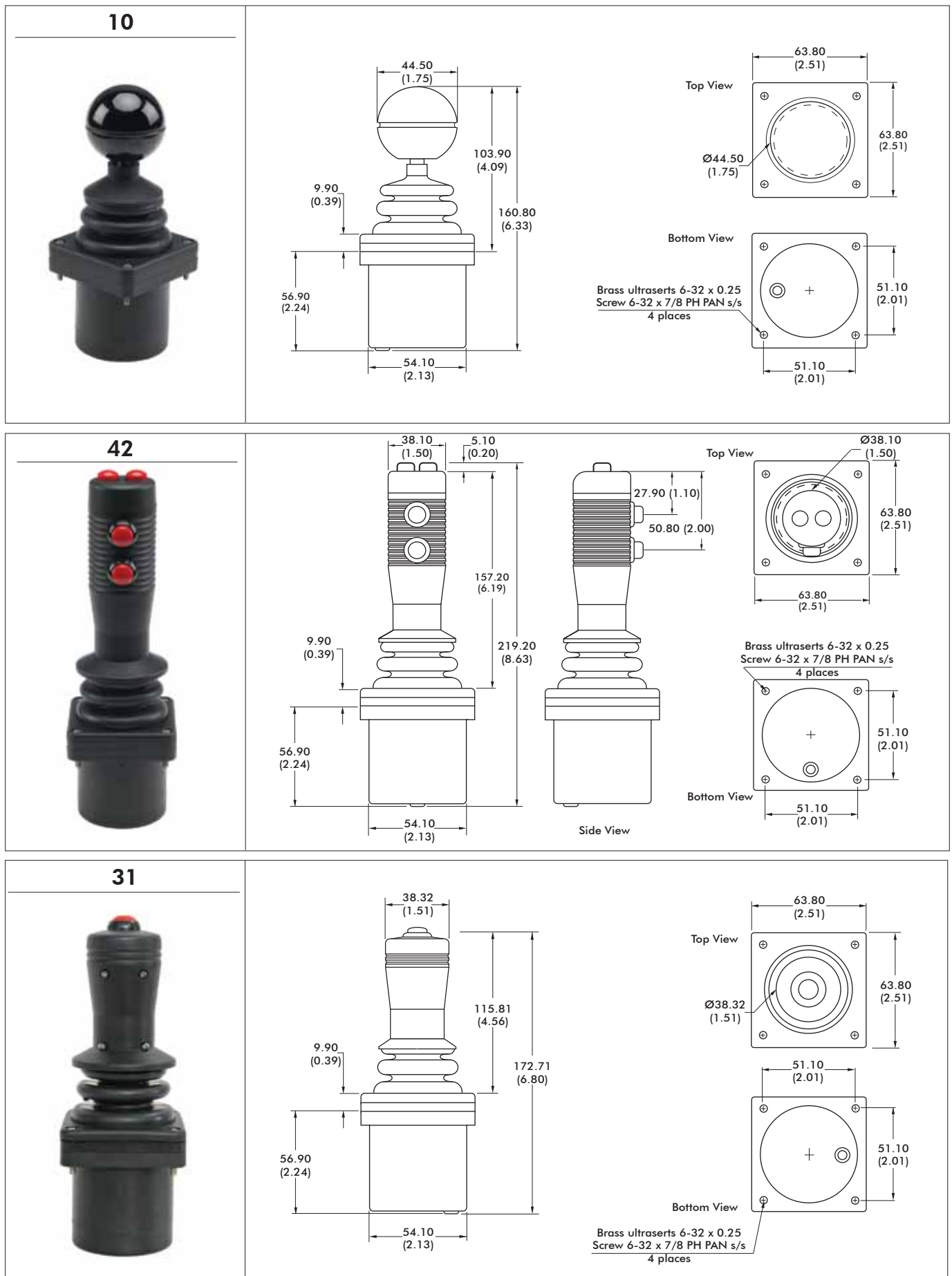
NOTES:

- 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 expandable cable sleeve.

MS series

Mid-size Hall effect joysticks

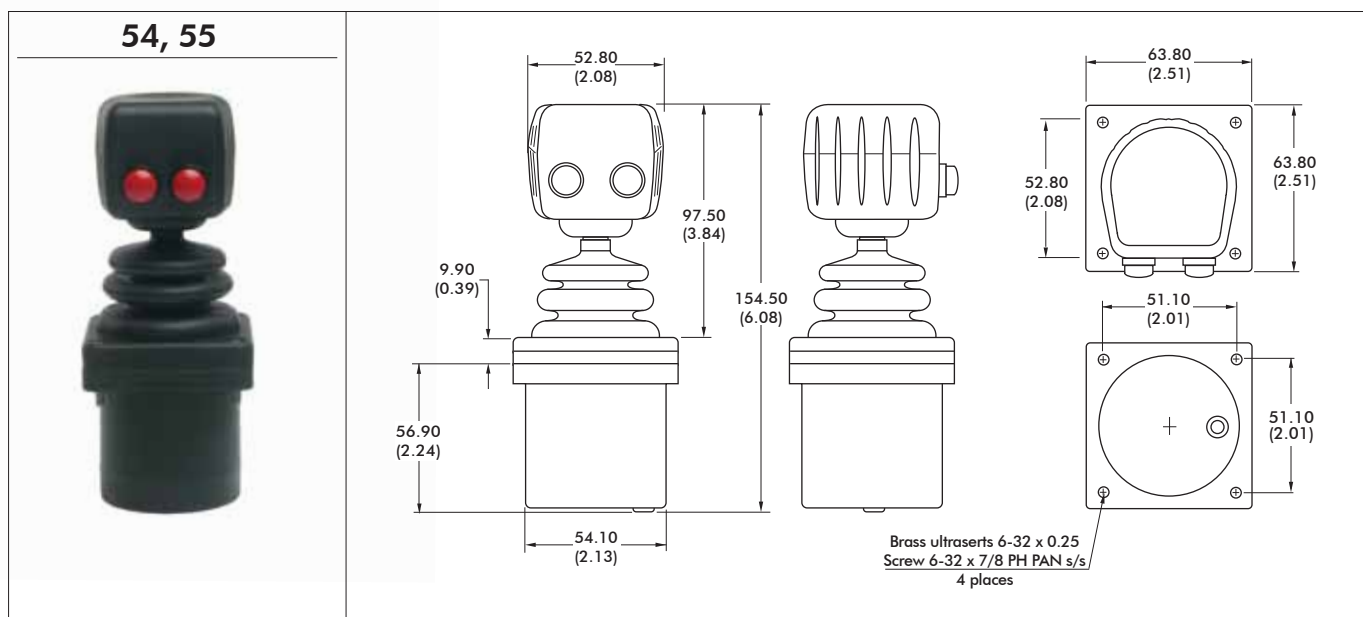
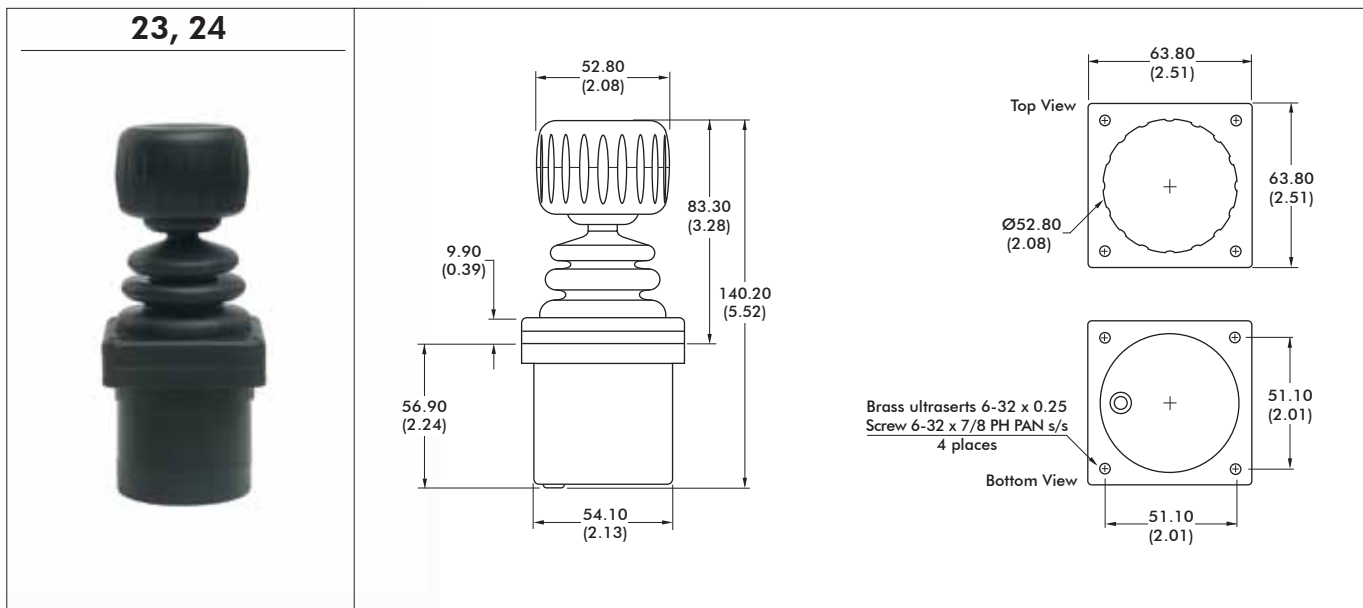
Overview



MS series

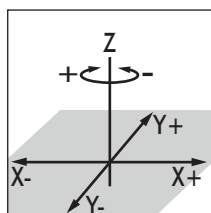
Mid-size Hall effect joysticks

Overview

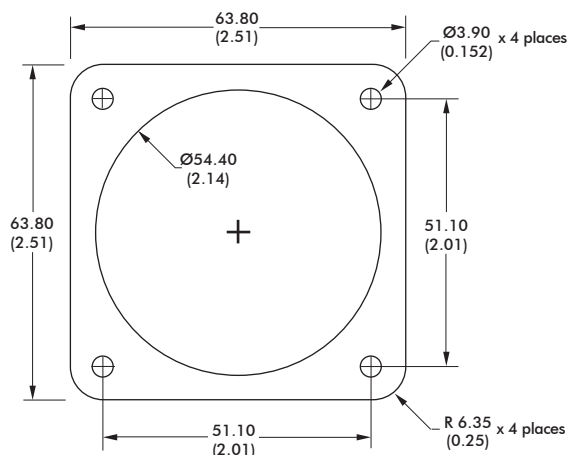


NOTES

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:



MOUNTING CUTOUT DIMENSIONS

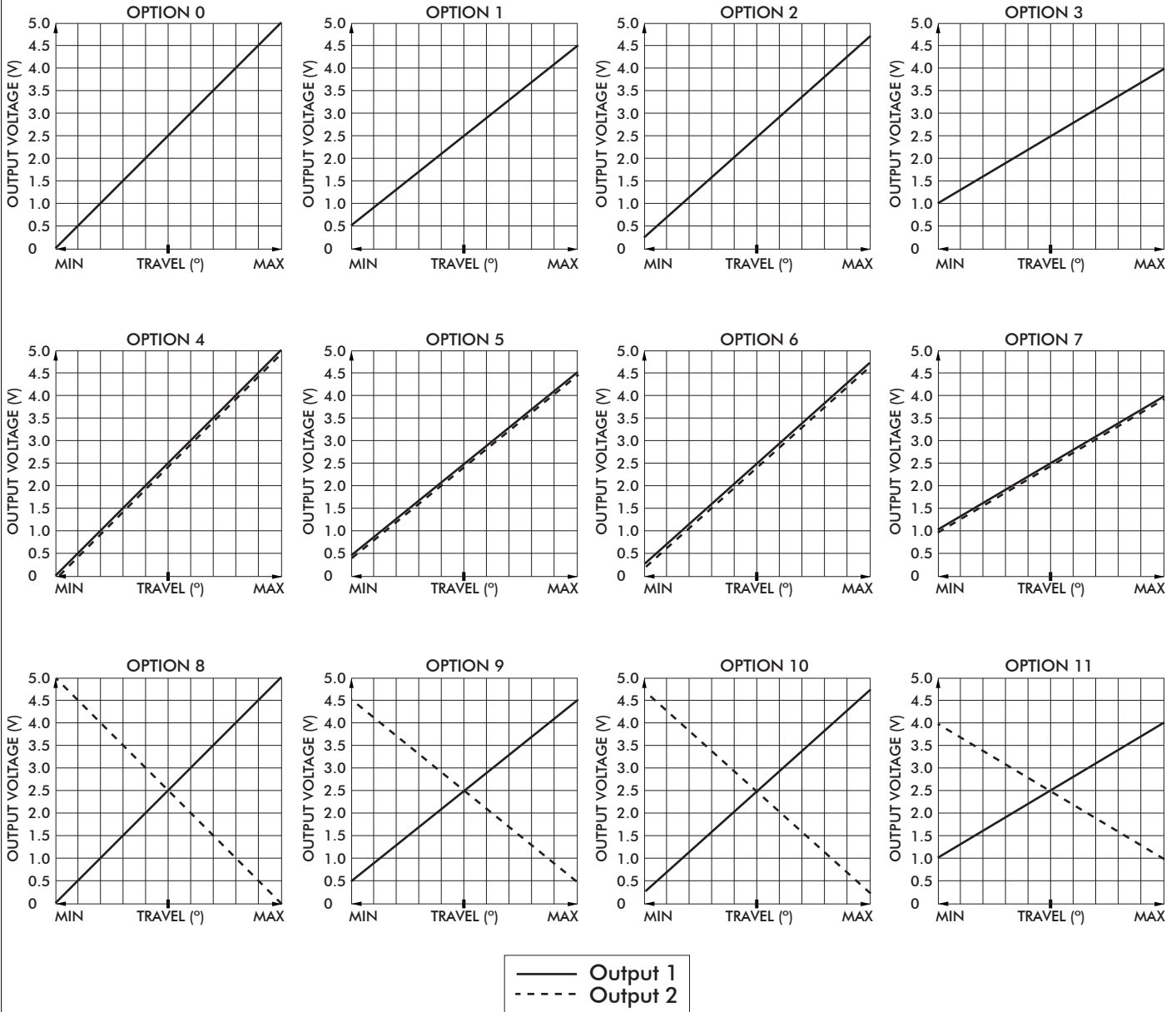


MS series

Mid-size Hall effect joysticks

Overview

VOLTAGE OUTPUT OPTIONS



MS series

Mid-size Hall effect joysticks

Overview

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

MS series

Mid-size Hall effect joysticks

Overview

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 DT04 style plugs

CANbus CONFIGURATION:

- Contact Technical Support for assistance

CANopen

- Contact Technical Support for assistance with CANopen configuration.