HF series
Hall effect joysticks

Distinctive features and specifications

- ❑ 1, 2 & 3 axis configurations
- ❑ CANbus J1939 and CANopen options
- ❑ USB 1.1 HID interface option
- ❑ Dual sensors for redundancy
- ❑ Voltage regulator, 24V supply option
- ❑ Connectorized housing

MECHANICAL (FOR X, Y AXIS)

- Break Out Force: 1.3N (0.3lbf)
- Operating Force: 2.8N (0.63lbf)
- Maximum Applied Force: 200N (45.00lbf)
- Mechanical Angle of Movement: 36º (18º from center)
- Expected Life: 5 million
- Material: Glass filled nylon
- Package Size: 5.75" x 4.50" x 3.25"
- Lever Action: Single spring, omnidirectional

ENVIRONMENTAL

- Operating Temperature: -40ºC to 85ºC (-40ºF to 185ºF)
- Storage Temperature: -40ºC to 85ºC (-40ºF to 185ºF)
- Sealing (IP): Up to IP68*
- EMC Immunity Level (V/M): EN61000-4-3
- EMC Emissions Level: EN61000-6-3:2001
- ESD: EN61000-4-2
- Output linearity: ±200mV
- Dual output interlinearity (X/Y): ±400mV
- Dual output interlinearity (Z): ±600mV

MECHANICAL (FOR Z AXIS)

- Break Out Torque: 0.09N·m (0.80lbf·in)
- Operating Torque: 0.121N·m(1.07lbf·in)
- Maximum Allowable Torque: 2.50N·m(22.13lbf·in)
- Hand Mechanical Angle: 60º (30º from center)
- Handle Action: Spring centering, rotational
- Expected Life: 5 million

ELECTRICAL

- Sensor: Hall effect
- Supply Voltage Operating: 5VDC±0.01VDC
- Reverse Polarity Max: -10VDC
- Overvoltage Max: 20VDC
- Output Voltage: See options
- Output Impedance: 2Ω

NOTES:

– All values are nominal.

– Exact specifications may be subject to configuration. Contact Technical Support for the performance of your specific configuration.

* Excludes some handle options.

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Overview

HF | | | | |

SERIES

Limiter Plate

S	Square	□
R	Round	○
X	Slotted	⚌
Y	Slotted	‖
P	Plus	✛
C	Cross	✕
W	Guided Feel Square	
Z	Guided Feel Round	

Handle

10	Ball Tip (2 Axis)
11	Tapered (2 Axis)
22	1 Pushbutton (2 Axis)
27	1 Pushbutton (2 Axis), IP67 Sealed
33	3 Axis
44	1 Pushbutton (3 Axis)
45	2 Pushbuttons (3 Axis)
46	Low Profile (3 Axis)
50	3 Axis, IP67 Sealed
51	3 Axis, 1 Pushbutton, IP67 Sealed
52	3 Axis, 2 Pushbutton, IP67 Sealed
55	3 Axis, 2 Pushbutton, IP67 Sealed

Mounting

1	Drop-in
4	Rear Mount

Output Options

0	0V to 5V
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-Horizontal, Mini B termination
2-U	USB-Vertical cable exit
1-J	Cursor Emulation
0-V	0V to 5V (Voltage regulator)*
B-V	±10V (Voltage regulator)**
2-C	CANbus J1939
3-C	CANopen

NOTES

1. The HF Series joysticks are supplied with a Hirose DF11-12DP-2DS9(24) connector (male receptacle). (Fig 1)
~~Cable not included. Please request at order entry. Cable~~ connector (female socket) is Hirose DF11-12DS-2C. (Fig 2)
Connector specifications: 12 position 2mm pitch dual row (2x6) pin header.

Wire Color	Description
Black	Ground
Red	Power
Blue/White	X-Axis (Dual Output)
Blue	X-Axis
Yellow/Black	Y-Axis (Dual Output)
Yellow	Y-Axis
Green/Black	Z-Axis (Dual Output)
Green	Z-Axis
Orange	Button 1
White	Button Common
Violet	Button 2

* Requires operating voltage 6V ≥ 35V
** Requires operating voltage 11V ≥ 35V


Fig 1

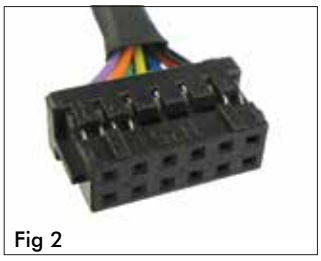
Fig 2

Up to IP68 available.

Mounting accessories. Standard hardware includes: gasket, clamping ring, and four #4-40x3/4 Phil Ph MS SS screws.

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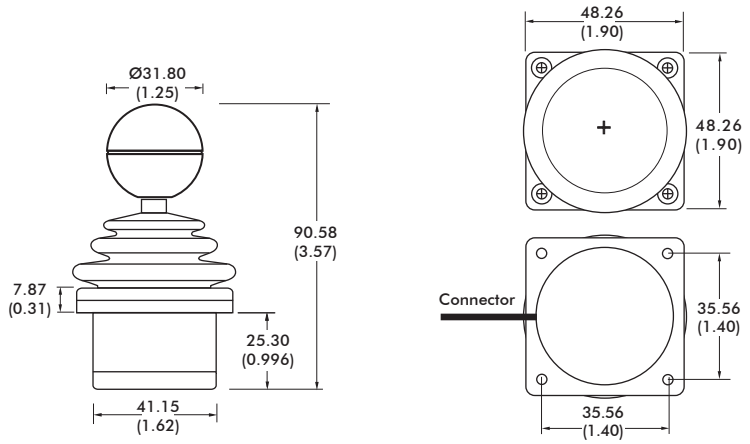

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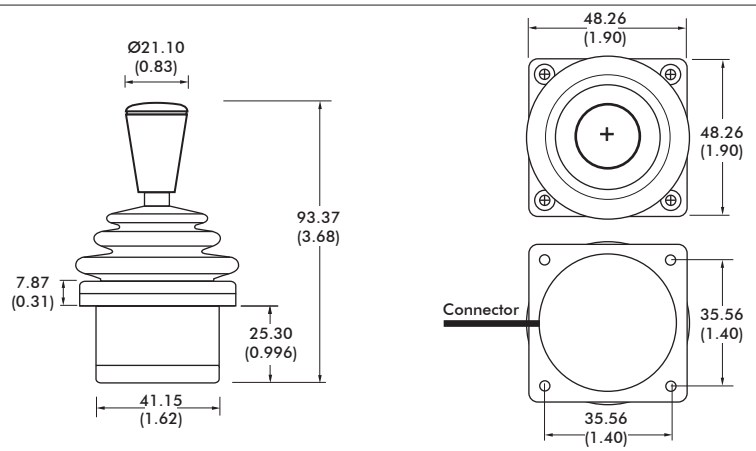

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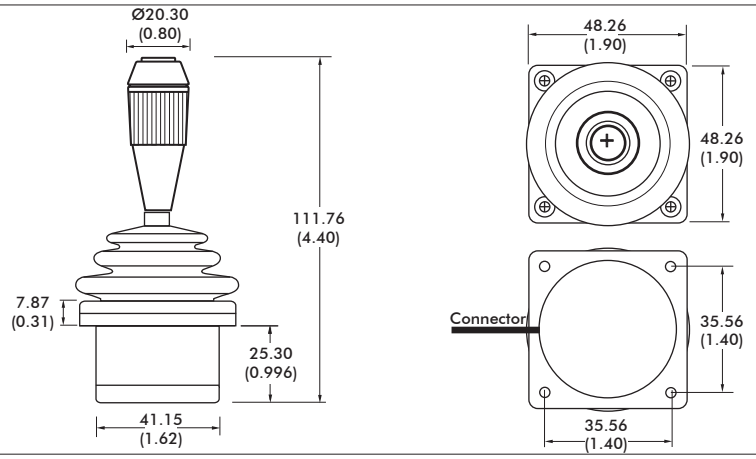

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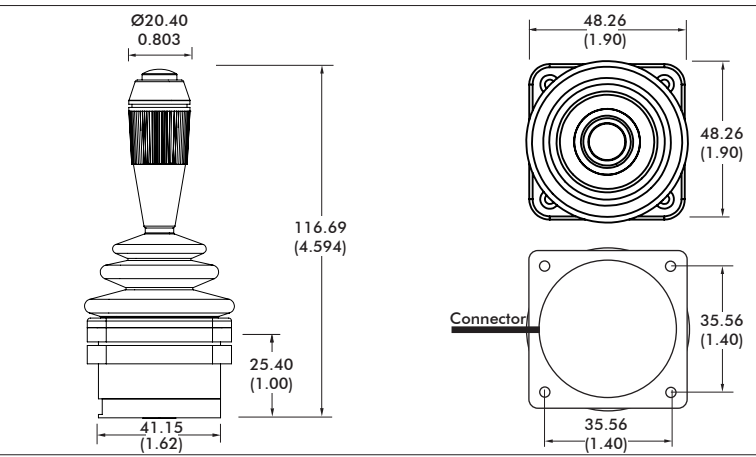

Note: The company reserves the right to change specifications without notice.

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Overview

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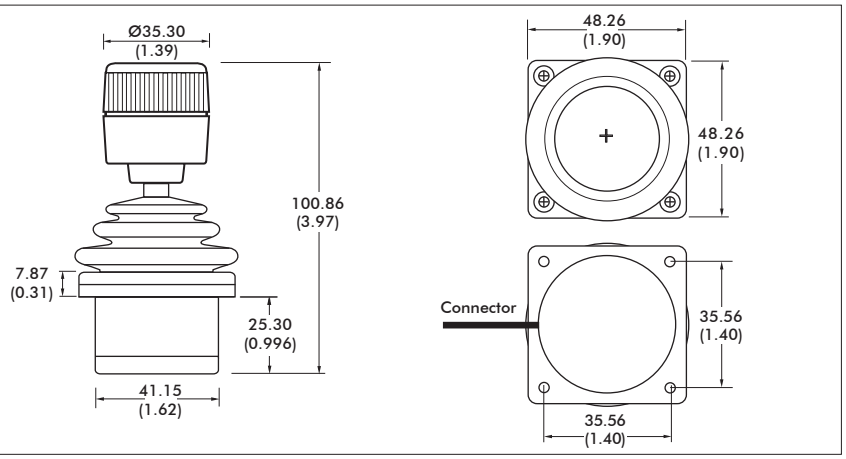

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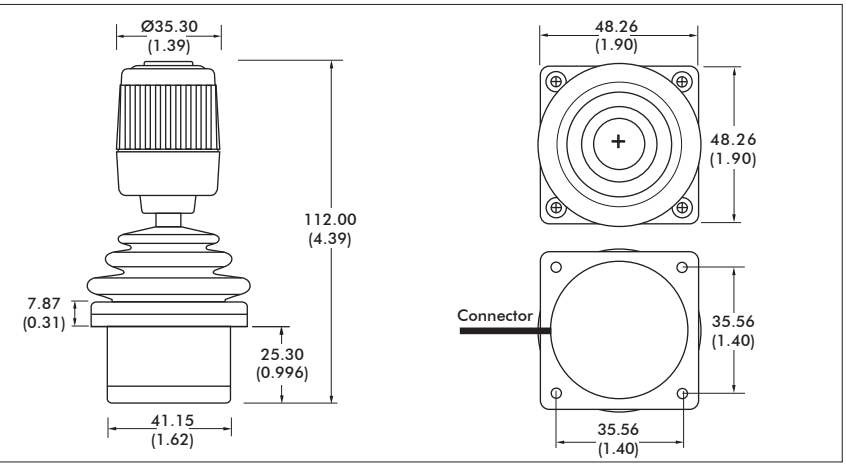

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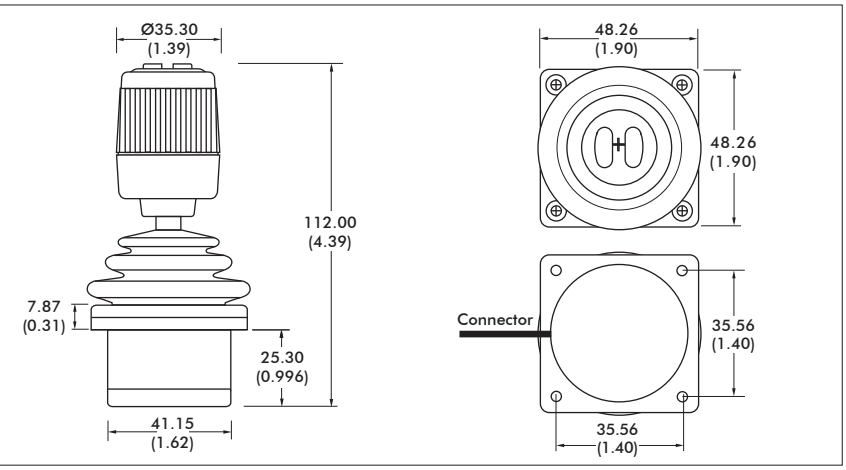

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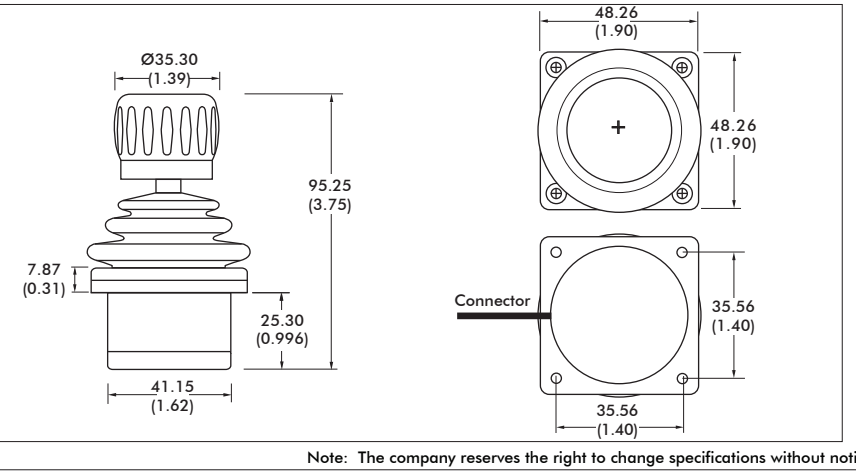

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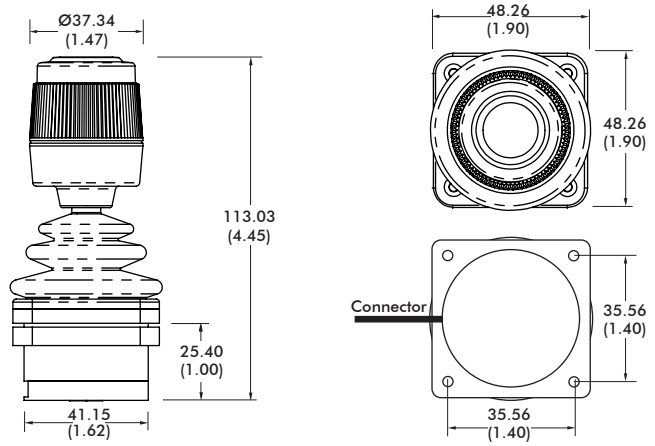

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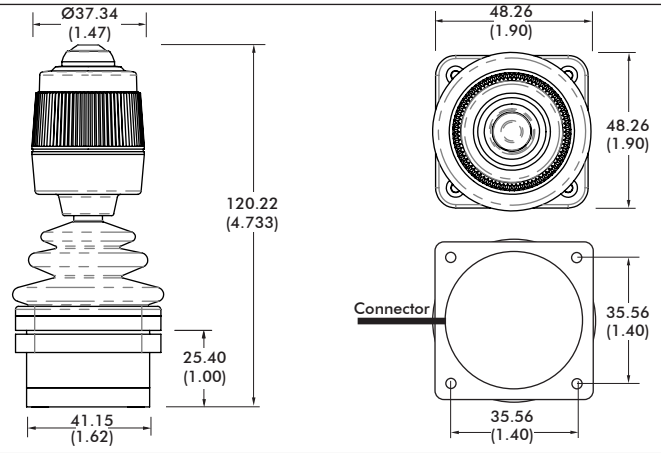

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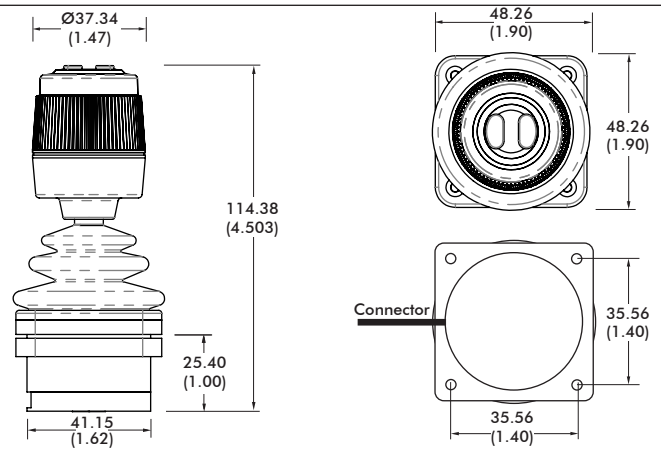

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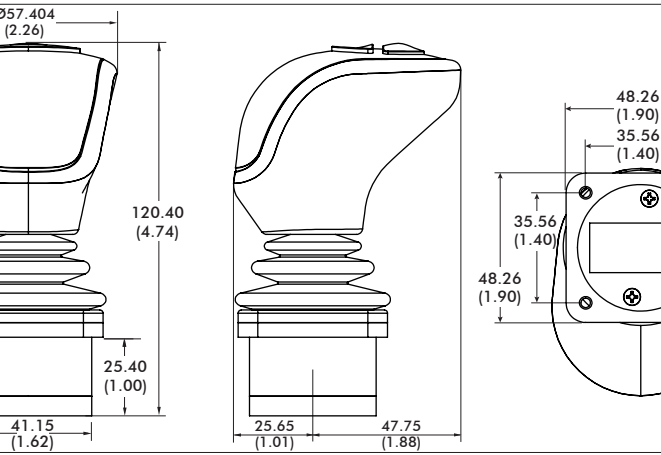

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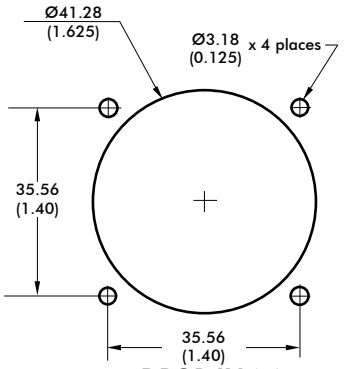
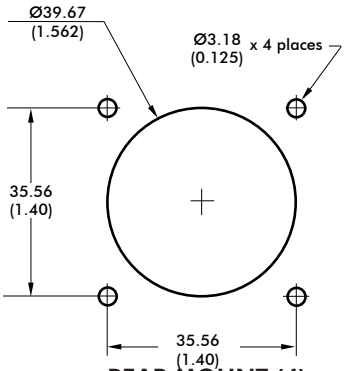
Overview

PANEL CUT-OUT DIMENSIONS



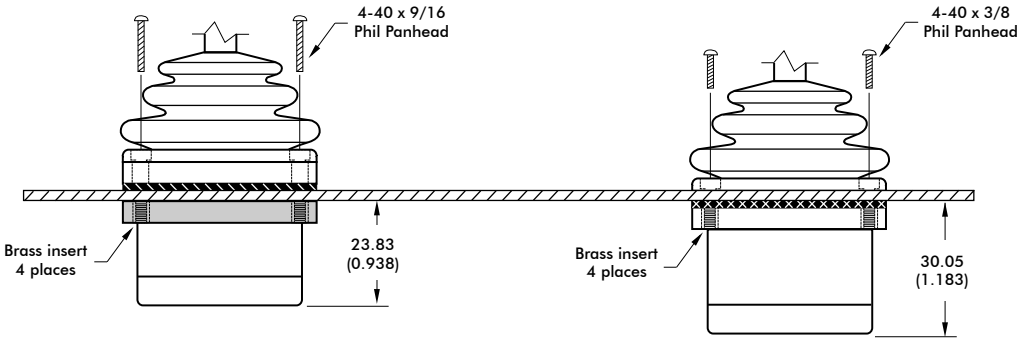
DROP-IN (1)



REAR MOUNT (4)

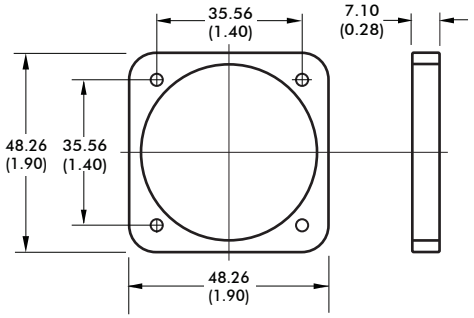
* Not available for Option 11 and 55 Handles

MOUNTING OPTIONS

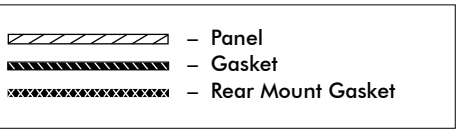


DROP-IN (1) REAR MOUNT (4)

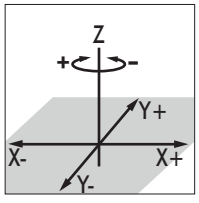
CLAMPING RING



NOTES:
- For DROP-IN mounting, the panel thickness can be 1.17mm to 3.17mm (0.046in to 0.125in).
- For REAR MOUNT the maximum panel thickness is 1.6mm (0.063in).
- A panel thickness of 1/16" (1.6mm/0.063in) was considered for all the below-panel depth values.
- The below-panel depth is extended by 7.11mm (0.28in) with the USB, Cursor Emulation, Voltage Regulator options.



NOTES:
1. Dimensions are in mm/(inch).
2. Axis orientation:



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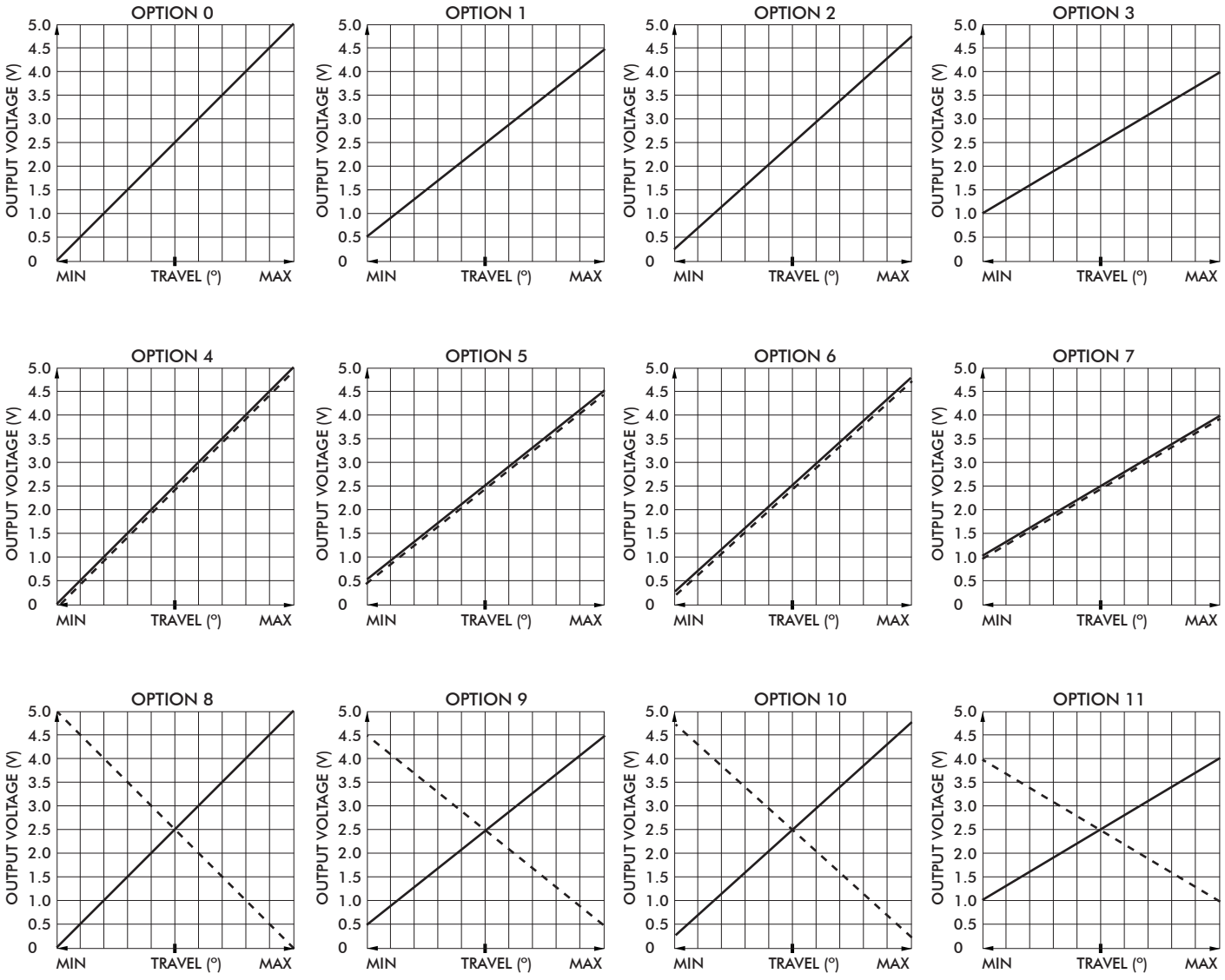
VOLTAGE OUTPUT OPTIONS



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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 and Linux. 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
- Standard Male Type A Connector

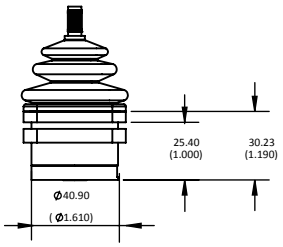
CURSOR EMULATION
The Cursor Emulation option converts multi-axis joystick output into a mouse, trackball, or cursor control device. The joystick's internal microprocessor converts absolute axis position into a cursor velocity, which is translated as a relative trackball or mouse position.

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 marine and military applications.

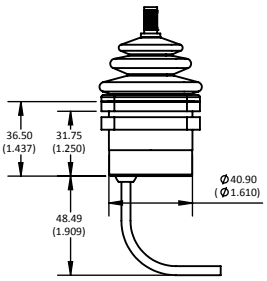
FEATURES
- HID compliant "pointing device"
- Plug-and-play with USB option
- Ideal for marine GPS and navigation

TERMINATION OPTIONS
0-U USB Male Type A to mini B
2-U USB Male Type A to verticle cable termination

I/O COMPLEMENT/ USER SPECIFIED PARAMETERS:



HF USB HORIZONTAL



HF USB VERTICAL

ADDITIONAL OUTPUT OPTIONS

VOLTAGE REGULATOR
The Voltage Regulator option may be used when the operating supply voltage is 11V to 35V..

User Specified Output Voltage:
- 0-5VDC
- ±10VDC

ELECTRICAL SPECIFICATIONS
• Supply Voltage: 11V to 35V
• Supply Current: 90mA max

WIRING SPECIFICATION
- Red wire: Supply (+35V max.)
- Black wire: Ground
- Blue wire: X axis output
- Yellow wire: Y axis output
- Green wire: Z axis output
- White wire: Pushbutton common wire
- Orange,violet,grey,brown,pink,bl/wt/y/bk, gn/bk,gy/w wire: Pushbutton outputs

CANbus

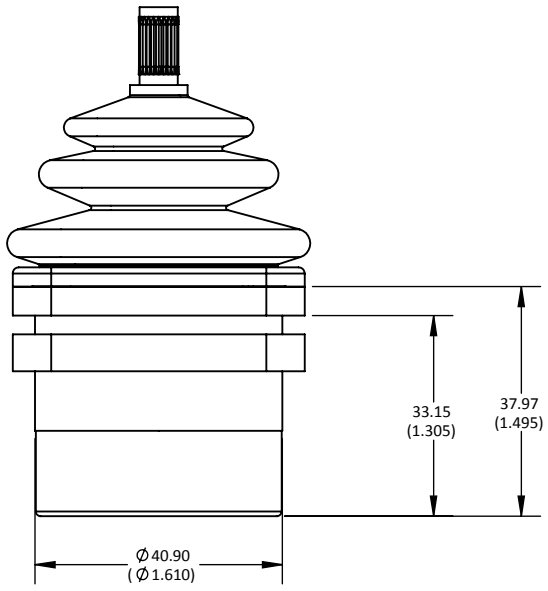
CANbus ELECTRICAL SPECIFICATIONS

- Operating voltage: 6V to 35V
- Current consumption: TBD
  (typical: 35mA @ 12V, 18mA @ 24V, 15mA @ 30V)
- Output signal: CANbus
- Reverse connection protected: Yes
- Short-circuit protected against + UB max: Yes
- Short-circuit protected against GND: Yes
- CAN: ISO 11898, CAN specification 2.0A/ 2.0B
- Protocol: CANJ1939, CANJ1939-71, CANopen
- Baud rate: 125kbit/s, 250kbit/s, 500kbit/s, 1Mbit/s
- CAN ID: 11/29 bit/s as requested
- BJM/EJM cycle time: 50ms (standard)/15ms (optional)
- Terminating resistor: Optional
- Operating temperature: -40^0 to +85^{0}C (-40°F to 185°F)
- Storage temperature: -40^0 to +85^{0}C (-40°F to 185°F)
- Wiring specifications: 22AWG, PTFE, 22" ±.125"

Red:	Supply power
Black:	Ground
Green:	CAN High data
White:	CAN Low data
Blue:	Identifier Select LSB
Orange:	Identifier Select MSB

MOUNTING

Below panel dimensions for CANbus configurations



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