

HF series

Hall effect joysticks

Distinctive features and specifications



- Connectorized housing
- Shallow mounting depth <1.00"
- 1, 2 and 3 axis configurations
- Voltage regulator, 24V supply option
- USB 2.0 HID interface options
- CAN bus J1939 and CANopen options

| MECHANICAL (FOR X, Y AXIS) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Break Out Force: 1.3N (0.3lbf) • Operating Force: 2.8N (0.63lbf) • Maximum Applied Force: 200N (45.00lbf) • Mechanical Angle of Movement: 36° (18° 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 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Operating Temperature: -40°C to 85°C (-40°F to 185°F) • Storage Temperature: -40°C to 85°C (-40°F to 185°F) • Sealing (IP): Up to IP67* • 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) |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Break Out Torque: 0.09Nm (0.80lbf in) • Operating Torque: 0.121Nm(1.07lbf in) • Maximum Allowable Torque: 2.50Nm(22.13lbf in) • Hand Mechanical Angle: 60° (30° from center) • Handle Action: Spring centering, rotational • Expected Life: 5 million |

| SENSOR SPECIFICATIONS |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Sensor: Hall effect, single or dual • Supply Voltage Range: 5VDC ±0.01VDC • Supply Current: 40mA typical / 50mA max (3 axis) • Reverse Polarity Max: -10VDC • Transient Overvoltage Max: 16VDC • Ratiometric Output Voltage: See options • Output Current: 8mA • Output Load: 1K ohm min. • 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.

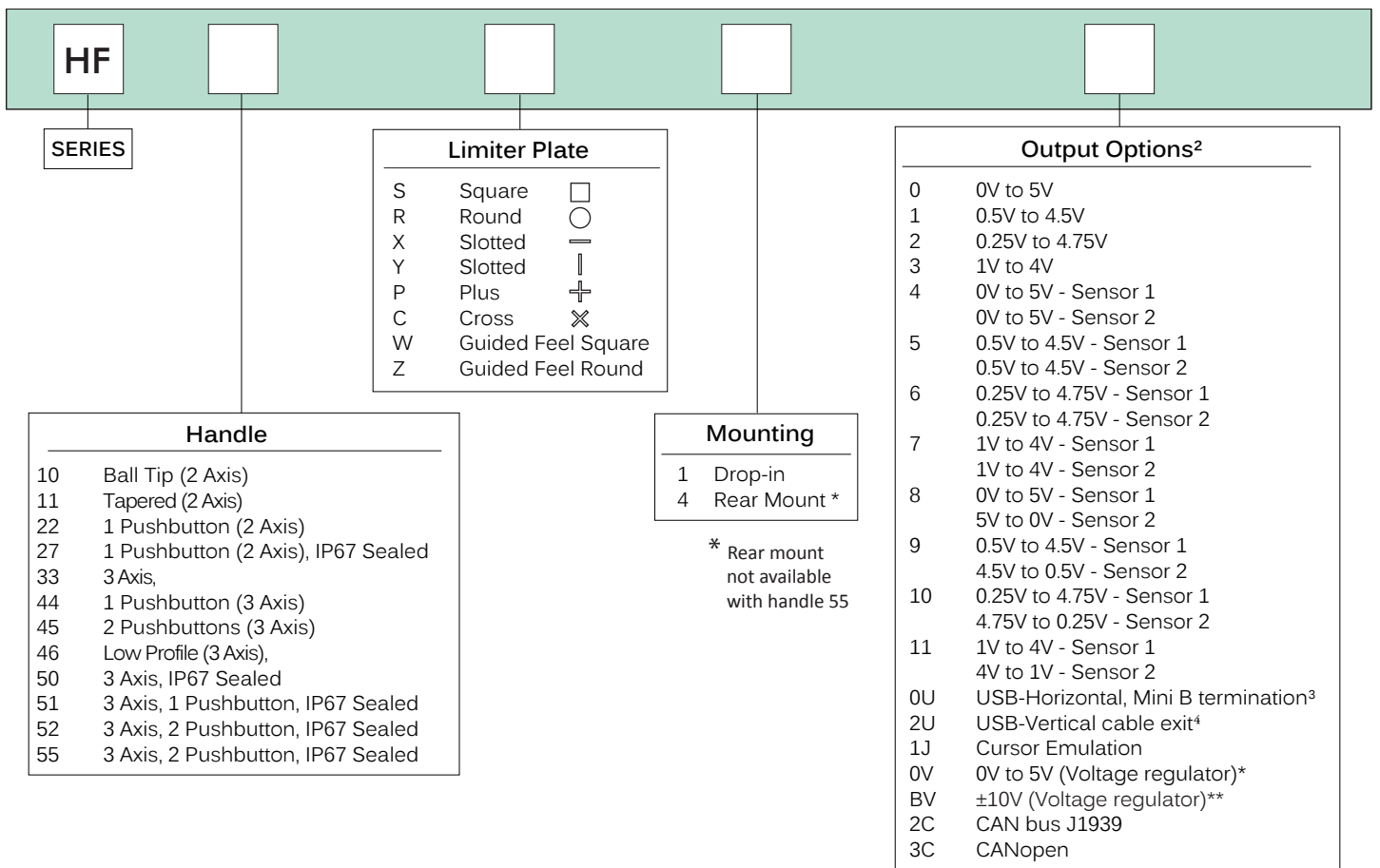


Note: The company reserves the right to change specifications without notice.

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Overview



NOTES

- 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 $6V \geq 35V$
- ** Requires operating voltage $11V \geq 35V$



Up to IP67 available.



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

- Output voltage is ratiometric to supply voltage
- Cable length is 6' from side of joystick to USB connector
- Cable length is 7' from side of joystick to USB connector


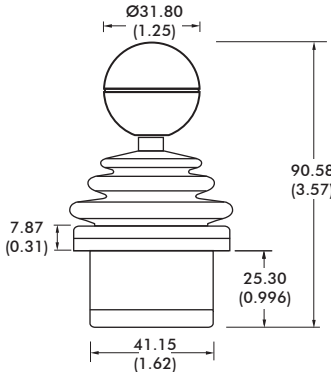
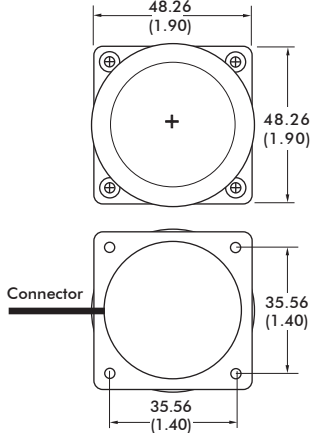

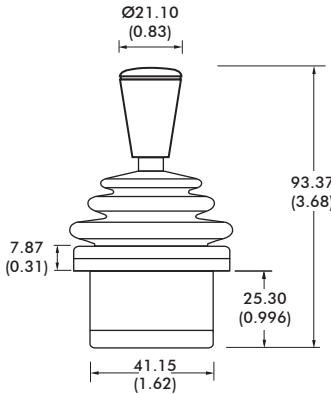
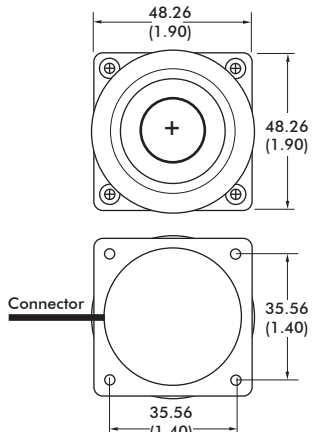

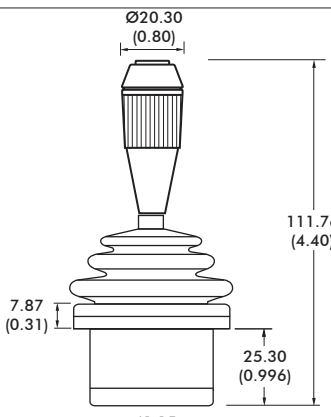
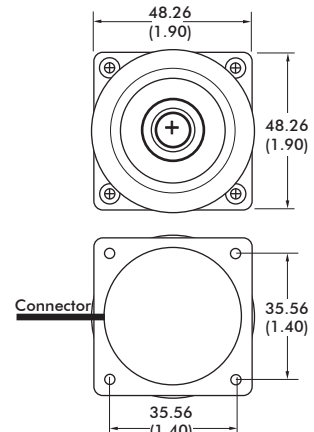

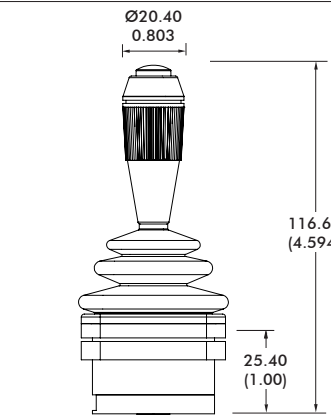
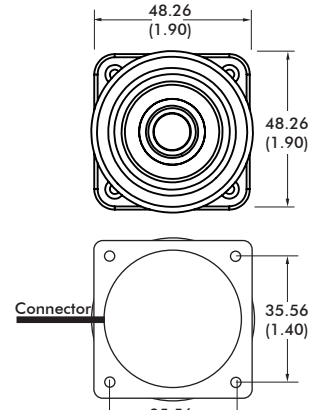


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| <p style="text-align: center;">10</p>  |  <p> $\varnothing 31.80$ (1.25) 90.58 (3.57) 7.87 (0.31) 25.30 (0.996) 41.15 (1.62) </p> |  <p> 48.26 (1.90) 48.26 (1.90) Connector 35.56 (1.40) 35.56 (1.40) </p> |
| <p style="text-align: center;">11</p>  |  <p> $\varnothing 21.10$ (0.83) 93.37 (3.68) 7.87 (0.31) 25.30 (0.996) 41.15 (1.62) </p> |  <p> 48.26 (1.90) 48.26 (1.90) Connector 35.56 (1.40) 35.56 (1.40) </p> |
| <p style="text-align: center;">22</p>  |  <p> $\varnothing 20.30$ (0.80) 111.76 (4.40) 7.87 (0.31) 25.30 (0.996) 41.15 (1.62) </p> |  <p> 48.26 (1.90) 48.26 (1.90) Connector 35.56 (1.40) 35.56 (1.40) </p> |
| <p style="text-align: center;">27</p>  |  <p> $\varnothing 20.40$ 0.803 116.69 (4.594) 25.40 (1.00) 41.15 (1.62) </p> |  <p> 48.26 (1.90) 48.26 (1.90) Connector 35.56 (1.40) 35.56 (1.40) </p> |

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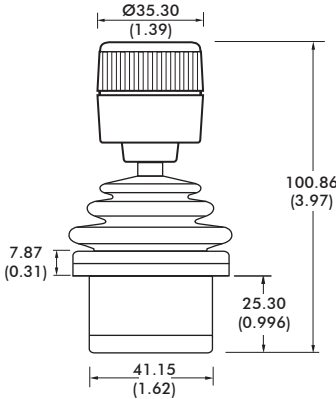
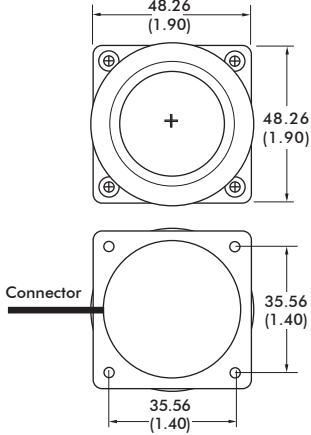

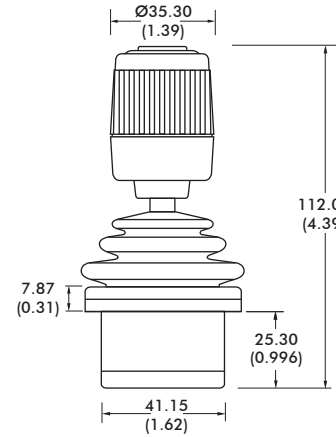
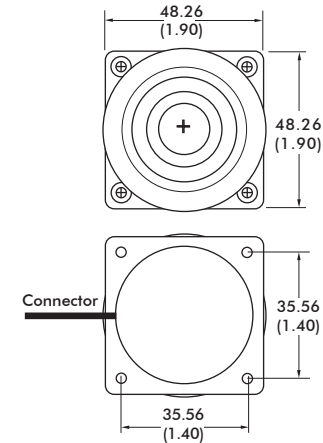

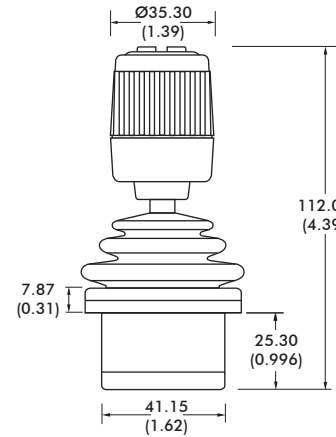
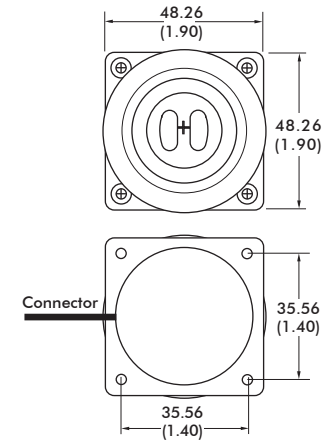

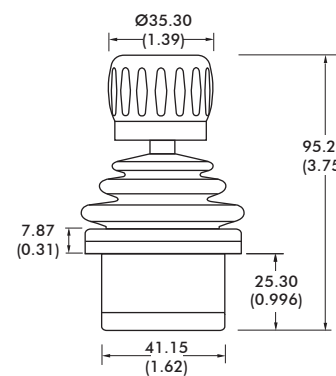
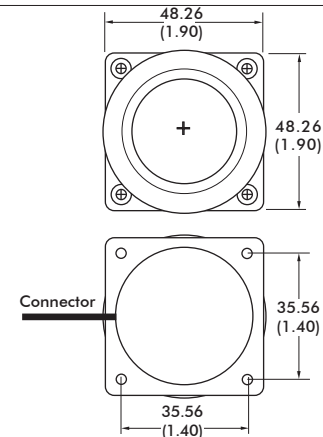
APEM

www.apem.com

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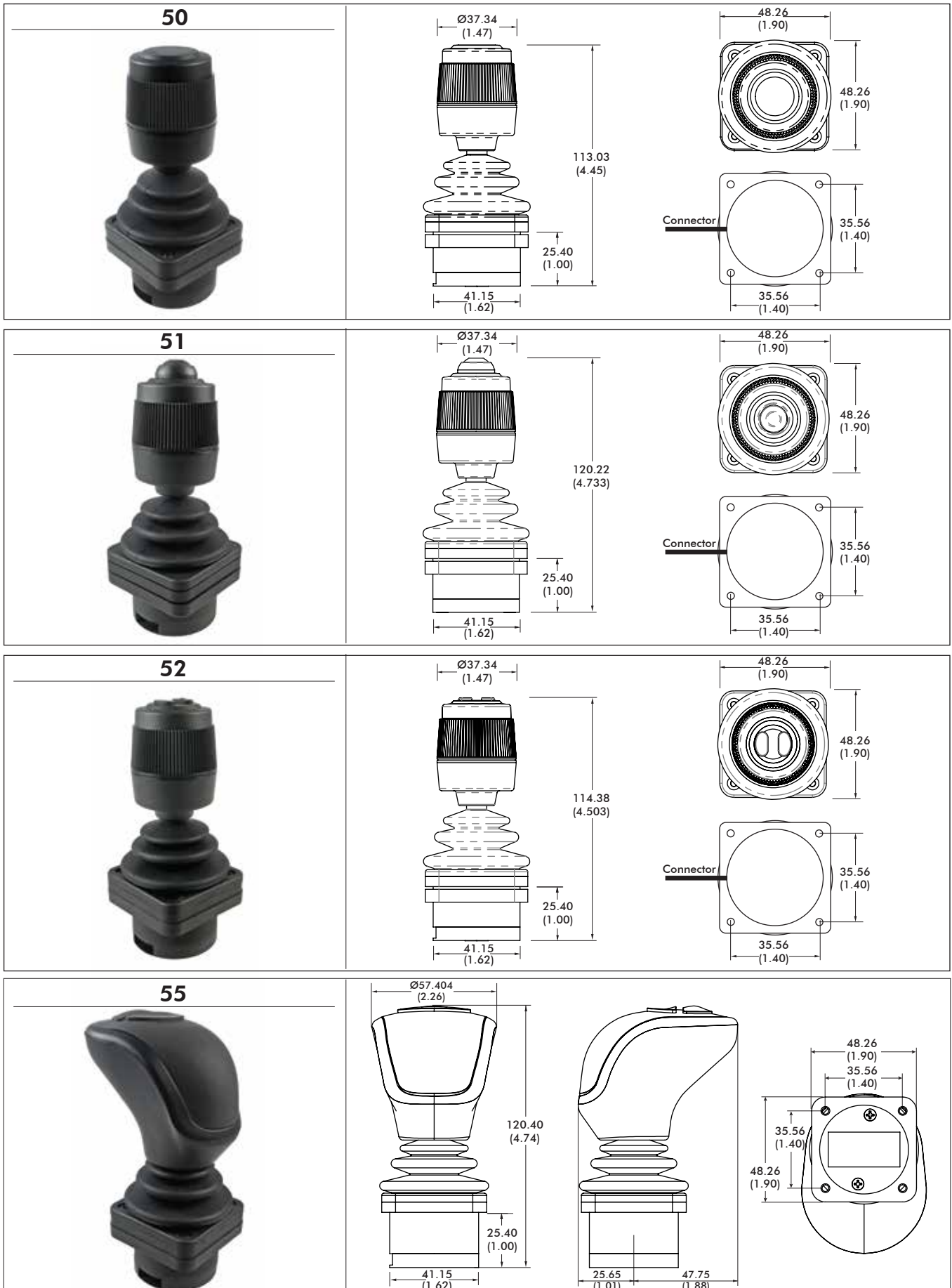
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| <p style="text-align: center;">45</p>  |  |  |
| <p style="text-align: center;">46</p>  |  |  |

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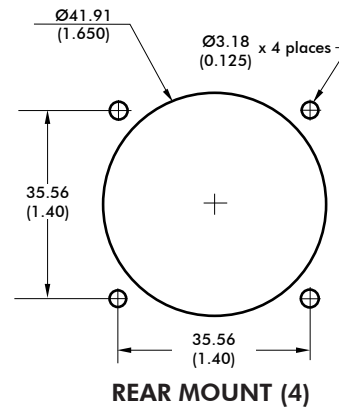
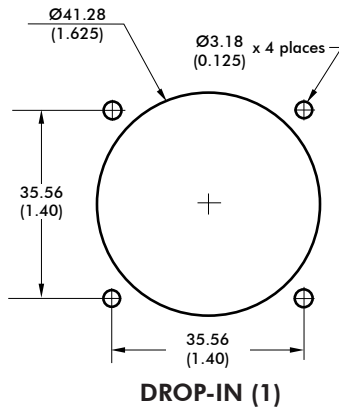
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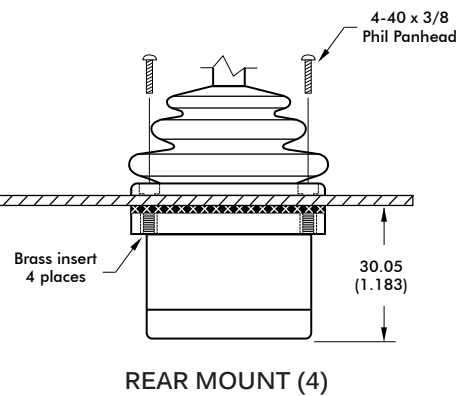
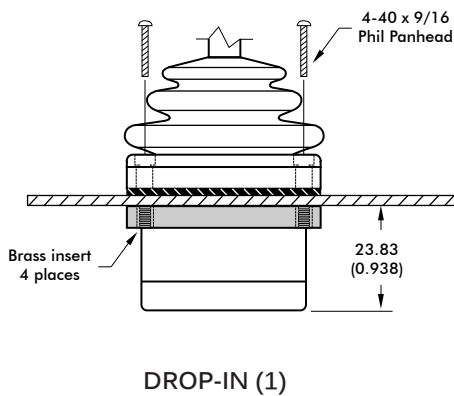
Overview

PANEL CUT-OUT DIMENSIONS

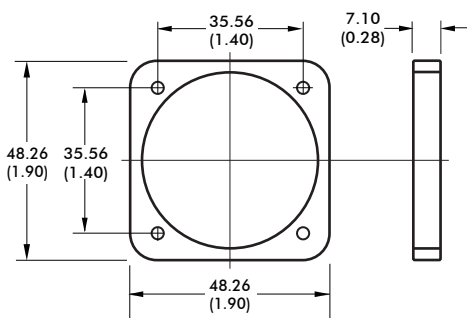


* Not available for Option 11 and 55 Handles

MOUNTING OPTIONS



CLAMPING RING



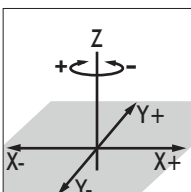
NOTES:

- 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.

- Panel
- Gasket
- Rear Mount Gasket

NOTES:

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

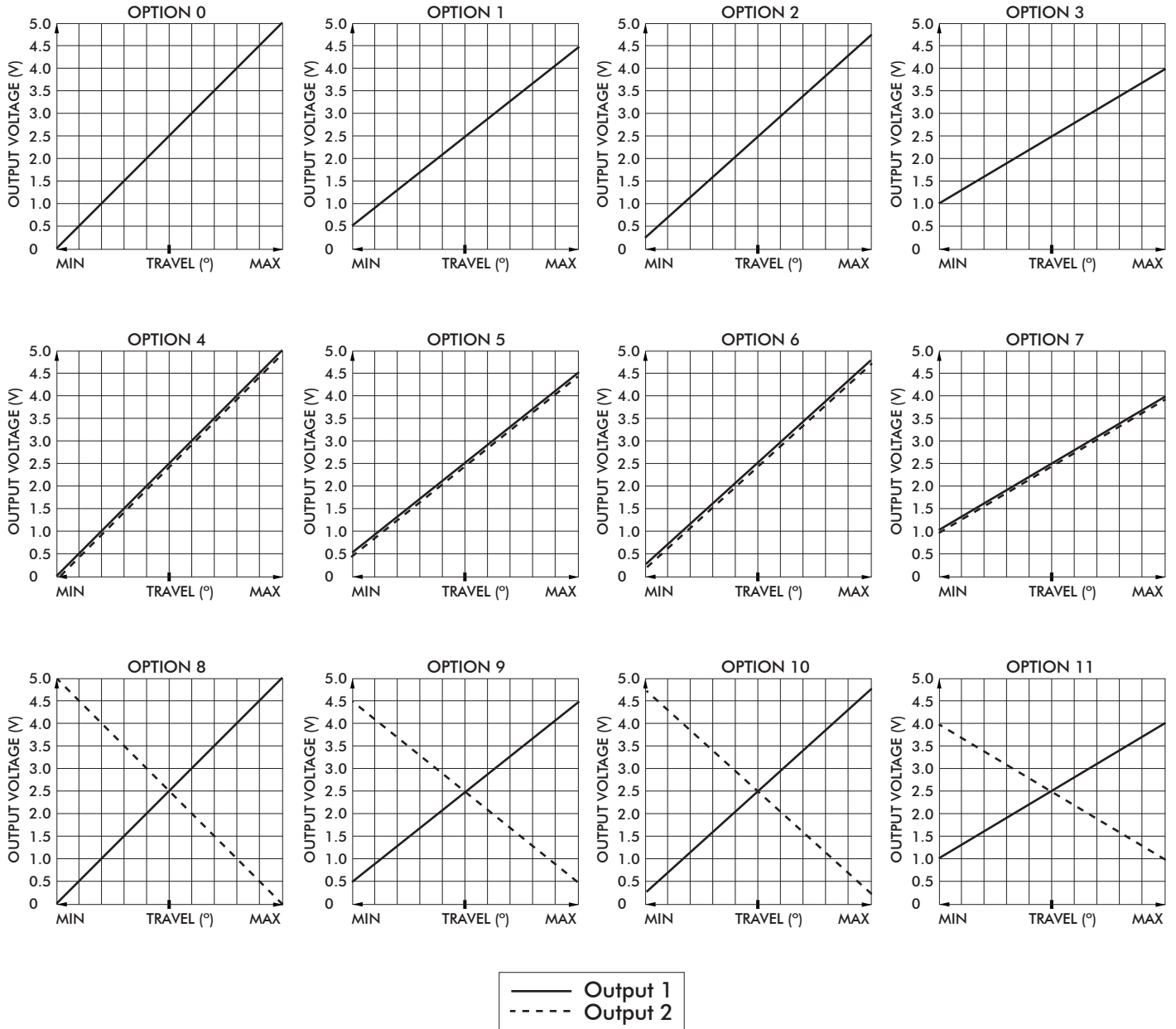


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VOLTAGE OUTPUT OPTIONS¹



¹ Voltage outputs are ratiometric to supply voltage

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USB

USB

Featuring USB 2.0 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 2.0 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 a multi-axis joystick into a mouse, trackball, or cursor control device.

APPLICATIONS

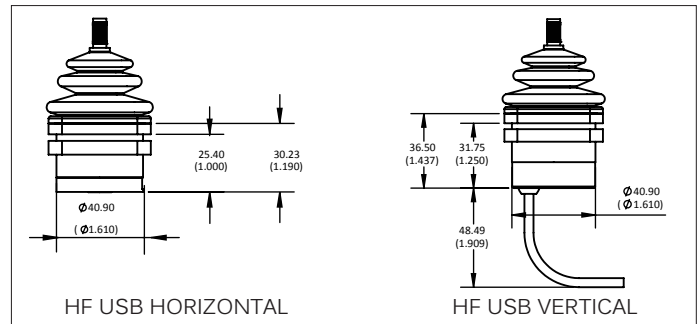
The Cursor Emulation option is ideal for vehicle applications subjected to dirt and high vibration which makes operating a traditional cursor control device difficult. The Cursor Emulation option is widely used in marine and military applications.

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
Cable length is 6' from side of joystick to USB connector
- 2-U USB Male Type A to vertical cable termination
Cable length is 7' from side of joystick to USB connector



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

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CAN bus

CAN bus ELECTRICAL SPECIFICATIONS

- Operating voltage: 6V to 35V
 - Current consumption: TBD
(typical: 35mA @ 12V, 18mA @ 24V, 15mA @ 30V)
 - Output signal: CAN bus
 - 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: Not included. Available upon request
-
- Operating temperature: -40^o to +85^oC (-40^oF to 185^oF)
 - Storage temperature: -40^o to +85^oC (-40^oF to 185^oF)
 - 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 CAN bus configurations

