# HF series

Proportional multi-axis fingertip controllers • non-contacting Hall effect technology

## DISTINCTIVE FEATURES

**One, two or three axis**
**Analog outputs**
**CAN bus J1939 and CANopen options**
**USB 2.0 HID interface options**
**Connectorized housing**

## ENVIRONMENTAL SPECIFICATIONS

- Operating Temperature: -40 °C to +85 °C (-40 °F to +185 °F)
- Storage Temperature: -40 °C to +85 °C (-40 °F to +185 °F)
- Above Panel Sealing: Up to IP67 (subject to final specifications)
- EMC Immunity Level (V/M): EN61000-4-3
- EMC Emissions Level: EN61000-6-3:2001
- ESD: EN61000-4-3 Level 2 (±4 kv contact, ± 6 kv air)
- Output linearity:  ±200 mV
- Dual output interlinearity (X/Y):  ±400 mV
- Dual output interlinearity (Z):  ±600 mV

## SENSOR SPECIFICATIONS

- Sensor: Hall effect, single or dual
- Supply Voltage Range: 5 VDC ±0.01 VDC
- Supply Current: 40 mA typical / 50 mA max (3 axis)
- Reverse Polarity Max: -10 VDC
- Transient Overvoltage Max: 16 VDC
- Ratiometric Output Voltage: see output options
- Output Current: 8 mA
- Output Load: 1 K ohm min
- Output Impedance: 2 Ω

## MATERIALS

- Shaft:  Stainless Steel
- Boot:   Silicone
- Handles:  Glass filled nylon*
- Body: Glass filled nylon

The company reserves the right to change specifications without notice.

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## TERMINATION (ANALOG OUTPUTS ONLY)

• The HF series (Output options 0-11) features a
**Hirose DF11-12DP-2DS9 (24)** header (male receptacle)
(Fig 1)

• The mating harness is not included but may be specified at
the time of order.  Contact your APEM sales representative.
This optional harness features a Hirose DF11-12DS-2C
connector (female socket)(Fig. 2) to individual stripped and
tinned wire leads.

• Header specifications:  12 position, 2mm pitch dual row
(2x6) pin header

• Wire harness specifications:  22AWG Teflon, 25cm multi-
conductor with heat shrink.  Hirose **DF11-12DS-2C** to
stripped and tinned wire leads



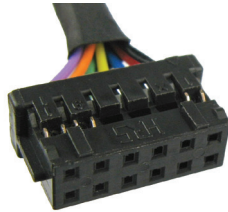**Fig. 1**
**Hirose DF11-12DP-2DS9(24) header**



**Fig. 2**
**Mating wire harness fitted with Hirose DF11-12DS-2C connector**

* Most handles, dependent upon configurations

JOYSTICK HEADER - HIROSE DF11-12DP-2DS9 (24) PINOUT (FIG 1)

| PIN 2 | PIN 4 | PIN 6 | PIN 8 | PIN 10 | PIN 12 |
|---|---|---|---|---|---|
| RED | BLUE | YELLOW | GREEN | WHITE | -- |
| BLACK | BLU/WHT | YEL/BLK | GRN/BLK | ORANGE | VIOLET |
| PIN 1 | PIN 3 | PIN 5 | PIN 7 | PIN 9 | PIN 11 |

MATING WIRE HARNESS COLOR DEFINITION (FIG 2)

| HIROSE DF11-12DS-2C CONNECTOR PIN # | WIRE COLOR | JOYSTICK FUNCTION |
|---|---|---|
| 1 | Black | Ground |
| 2 | Red | Supply power |
| 3 | Blue / white | X axis (dual output) |
| 4 | Blue | X axis |
| 5 | Yellow / black | Y axis (dual output) |
| 6 | Yellow | Y axis |
| 7 | Green / black | Z axis (dual output) |
| 8 | Green | Z axis |
| 9 | Orange | Button one |
| 10 | White | Button common |
| 11 | Violet | Button two |
| 12 | -- | -- |

## MECHANICAL SPECIFICATIONS

X/Y AXIS

• Break Out Force: 1.3 N (0.3 lbf)

• Operating Force: 2.8 N (0.63 lbf)

• Expected Mechanical Life: 5 million lifecycles

• Lever Action:  Single spring, omnidirectional

• Deflection Angle:

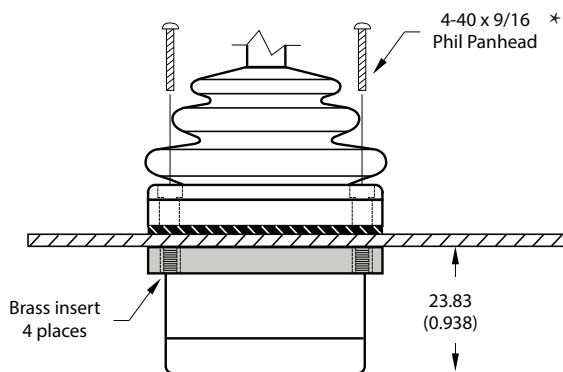| Limiter plate | Cardinal axis (±) | Diagonal axis (±) |
|---|---|---|
| Square / Diamond | 13.5° | 20 |
| Circular | 15.8° | n/a |
| Slot X | 15.8° | n/a |
| Slot Y | 15.8° | n/a |
| Cross | 15.8° | n/a |

Z AXIS

• Break Out Torque: 0.09 Nm (0.80 lbf in)

• Operating Torque: 0.121 Nm (1.07 lbf in)

• Degrees of rotation: 60° (30° from center)

• Expected Mechanical Life: 5 million lifecycles

• Handle Action:  Spring centering

# HF series

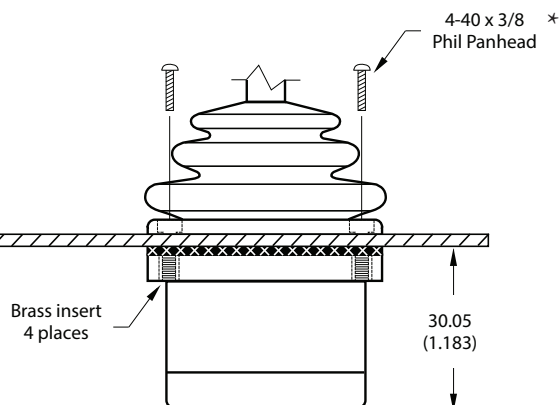## Proportional multi-axis fingertip controllers • non-contacting Hall effect technology
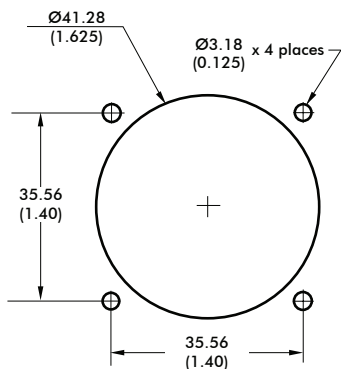
## GENERAL MOUNTING OPTIONS

DROP-IN MOUNT

REAR MOUNT

4-40 x 9/16 * Phil Panhead

4-40 x 3/8 * Phil Panhead

Brass insert 4 places

23.83 (0.938)

Brass insert 4 places

30.05 (1.183)

* = Recommended maximum torque: 0.1 - 0.125 Nm evenly per screw (18 oz-in).

## PANEL CUT-OUT

DROP-IN MOUNT

Ø41.28 (1.625)

Ø3.18 (0.125) x 4 places

35.56 (1.40)

35.56 (1.40)

CLAMPING RING

35.56 (1.40)

7.10 (0.28)

48.26 (1.90)

35.56 (1.40)

48.26 (1.90)

REAR MOUNT

Ø41.91 (1.650)

Ø3.18 (0.125) x 4 places

35.56 (1.40)

35.56 (1.40)
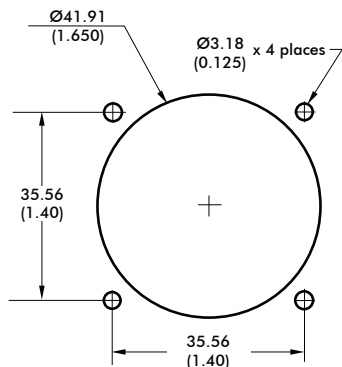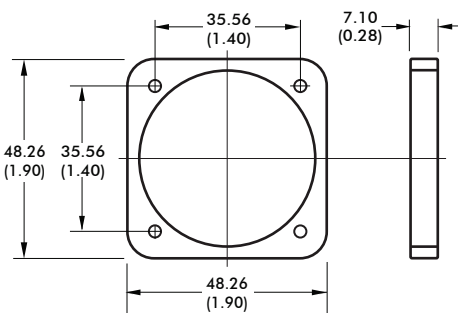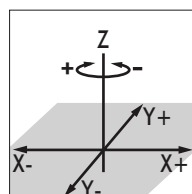
Not available for option 55 handles

AXIS ORIENTATION

Z
+ -
Y+
X-    X+
Y-

NOTES:

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

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## CAN J1939 INTERFACE SPECIFICATION

The HF Series joystick  can be configured with a maximum of three axis and two buttons.  All axis and button data are delivered on a CAN 2.0B compliant physical interface. Two additional signals allow configuration of the controller Source Address. Controller messages are delivered per the SAE J1939-71 message protocol.

### CAN 2.0B INTERFACE PARAMETERS

- Baud rate: 250 kbps
- Transmission repetition rate: 50ms
- BJMl/EJMl interval time: 20ms
- Terminating resistor: No
  (available by special request to factory)

### CAN MESSAGE PROTOCOL

- Primary Axis and button data on Basic Joystick Message 1 (BJM1):
  - Priority: 3
  - Base PGN: 0xFDD6
  - Source address: 0x16
  - Data field: 8 bytes
- Z-Axis data on Extended Joystick Message 1 ( EJMl):
- Priority: 3
- Base PGN: 0xFDD7
- Source address: 0x16
- Data field: 8 bytes

### CAN MESSAGE ADDRESSES

Alternate source addresses may be selected by gounding combinations of the blue and/or orange wires. For further information, please see TERMINATION on page 6.

| CAN SOURCE ADDRESS | ORANGE WIRE | BLUE WIRE |
|---|---|---|
| 0x16 (default) | OPEN | OPEN |
| 0x26 | OPEN | Grounded |
| 0x36 | Grounded | OPEN |
| 0x46 | Grounded | Grounded |

### BJM1 DATA FIELD STRUCTURE:

| START POSITION (BYTE/BIT) | LENGTH (BITS) | FUNCTION |
|---|---|---|
| 1/1 | 2 | Primary X-axis neutral position status |
| 1/3 | 2 | Primary X-axis left position status |
| 1/5 | 2 | Primary X-axis right position status |
| 1/7 to 2/8 | 10 | Primary X-axis position data |
| 3/1 | 2 | Primary Y-axis neutral position status |
| 3/3 | 2 | Primary Y-axis down position status |
| 3/5 | 2 | Primary Y-axis up position status |
| 3/7 to 4/8 | 10 | Primary Y-axis position data |
| 6/5 | 2 | Button 2 status |
| 6/7 | 2 | Button 1 status |

### EJM1 DATA FIELD STRUCTURE:

| START POSITION (BYTE/BIT) | LENGTH (BITS) | FUNCTION |
|---|---|---|
| 5/1 | 2 | Primary Z-axis neutral position status |
| 5/3 | 2 | Primary Z-axis counter-clockwise position status |
| 5/5 | 2 | Primary Z-axis clockwise position status |
| 5/7 TO 6/8 | 10 | Primary Z-axis position data |

### CUSTOM CAN BUS J1939 FIRMWARE*

- Baud rate: 125 kbps, 500 kbps, 1Mbps
  (250 kbps default)
- Custom CAN addresses
- Custom CAN bus output

* Custom CAN bus firmware available upon request.

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## CANOPEN INTERFACE SPECIFICATION

CANOPEN INTERFACE PARAMETERS*

- Baud rate: 250 kbps
- Node ID: 20h
- Buttons: 1A0H (180H + NODE ID)
- Analog (axis) outputs: 2A0h (280h + Node ID)
- Heartbeat (500ms): 720h (700h + Node ID)
- Axis resolution: 8 bit
- Network Management: Auto start enabled

### CANOPEN NODE ID SELECTION

Alternate NODE IDs may be selected by gounding the blue and/or orange wires. For further information, please see TERMINATION on page 6.

| NODE ID SELECT | ORANGE WIRE | BLUE WIRE |
|---|---|---|
| 20H (default) | OPEN | OPEN |
| 21H | OPEN | Grounded |
| 22H | Grounded | OPEN |
| 23H | Grounded | Grounded |

### CANOPEN BUTTON OUTPUT CONFIGURATION

| BUTTON STATUS IS TRANSMITTED IN THE ONE BYTE DATA FIELD OF FRAMES WITH AN IDENTIFIER OF 1A0 (DEFAULT) | |
|---|---|
| Identifier | Byte 0 |
| 1A0 | Buttons (2:0) |

### CANOPEN ANALOG OUTPUT CONFIGURATION

| EIGHT BIT ANALOG DATA IS TRANSMITTED IN THE THREE BYTE DATA FIELD OF FRAMES WITH AN IDENTIFIER OF 2A0 (DEFAULT) | | | |
|---|---|---|---|
| Identifier | Byte 0 | Byte 1 | Byte 2 |
| 2A0 | A_IN0 (7:0) | A_IN1 (7:0) | A_IN2 (7:0) |

### CUSTOM CANOPEN FIRMWARE*

- Baud rate: 125 kbps, 500 kbps, 1Mbps (250 kbps default)
- Custom Node IDs (default 20 hexadecimal)
- 10-bit axis resolution
- 12-bit axis resolution
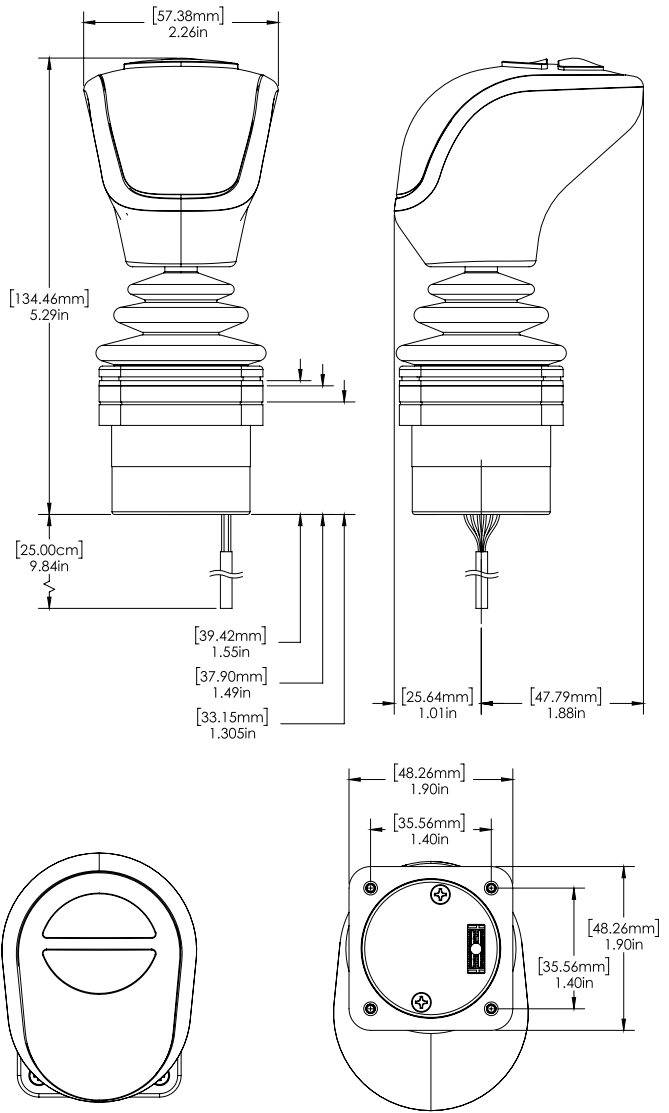- Signed resolution
- Custom CANopen output

## CANOPEN LSS INTERFACE SPECIFICATION

The CANopen LSS interface option follows the CiA305 and CiA401 standards for CAN in automation. The node ID, baud rate and additional configurations can be set and stored in the EEPROM by Service Data Object. The default settings are as follows:

## CANOPEN LSS INTERFACE SPECIFICATION

CANOPEN INTERFACE PARAMETERS*

- Baud rate: 250 kbps
- Node ID: 20h (default)
- Buttons: 1A0H (180H + NODE ID)
- Analog (axis) outputs: 2A0h (280h + Node ID)
- Heartbeat (500ms): 720h (700h + Node ID)
- Axis resolution: 10-bit
- Network Management: Auto start enabled

### CANOPEN LSS BUTTON OUTPUT CONFIGURATION

| BUTTON STATUS IS TRANSMITTED IN THE ONE BYTE DATA FIELD OF FRAMES WITH AN IDENTIFIER OF 1A0 (DEFAULT) | |
|---|---|
| Identifier | Byte 0 |
| 1A0 | Buttons (2:0) |

### CANOPEN LSS ANALOG OUTPUT CONFIGURATION

| TEN BIT ANALOG DATA IS TRANSMITTED IN THE SIX BYTE DATA FIELD OF FRAMES WITH AN IDENTIFIER OF 2A0 (DEFAULT) | | | |
|---|---|---|---|
| Identifier | Byte 0 | Byte 1 | Byte 2 |
| 2A0 | A_IN0 (7:0) | A_IN0 (9:8) | A_IN1 (7:0) |
| Identifier | Byte 3 | Byte 4 | Byte 5 |
| 2A0 | A_IN1 (9:8) | A_IN2 (7:0) | A_IN2 (9:8) |

* Custom CAN bus firmware available upon request.

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## TERMINATION (CAN OUTPUTS ONLY)

- HF series joysticks configured with CAN outputs (Output options 2C and 3C **only**) feature a **JST B6B-PH-S(LF)(SN)** header (male receptacle) (Fig 1) and are supplied with a mating wire harness (Fig 2)
- Header specifications:  JST B6B-PH-S(LF)(SN) - 6 position, 2mm pitch, single row header (Fig 1)
- Mating wire harness specifications:  Six conductor, 22 AWG, 56 cm PTFE, JST PHR-6 to stripped and tinned wire leads (Fig 2)

### Fig. 1

+ X

- Y        + Y

- X

JST B6B-PH-S(LF)(SN) header

### Fig. 2

Mating wire harness fitted with JST PHR-6 connector

HEADER PINOUT AND MATING WIRE HARNESS COLOR DEFINITION

| HEADER PINOUT | | | MATING WIRE HARNESS |
|---|---|---|---|
| JST B6B-PH-S(LF)(SN) HEADER PIN # | CAN BUS FUNCTION | CANOPEN FUNCTION | WIRE COLOR |
| 1 | Supply power (7 to 35 VDC) | Supply power (7 to 35 VDC) | Red |
| 2 | Ground | Ground | Black |
| 3 | ID select MSB | Node ID select MSB | Orange |
| 4 | ID select LSB | Node ID select LSB | Blue |
| 5 | CAN Hi | CAN Hi | Green |
| 6 | CAN Lo | CAN Lo | White |

* Custom CAN bus firmware available upon request.

## CANOPEN LSS INTERFACE SPECIFICATIONS

The CANopen LSS interface option follows the CiA305 and CiA401 standards for CAN in automation.  The node ID, baud rate and additional configurations can be set and stored in the EEPROM by Service Data Object.  The default settings are as follows:

| SETTINGS | DEFAULT CONFIGURATION |
|---|---|
| Baud rate | 250 kbits/s |
| Node ID | 20h |
| Analog (axis) outputs | 2A0h (280h + Node ID) |
| Buttons | 1A0h (180h + Node ID) |
| Heartbeat (500ms) | 720h (700h + Node ID) |
| Axis Resolution | Unsigned 10-bit |

## CAN BUS SPECIFICATIONS

DIMENSIONS

[57.38mm] 2.26in

[134.46mm] 5.29in

[25.00cm] 9.84in

[39.42mm] 1.55in

[37.90mm] 1.49in

[33.15mm] 1.305in

[25.64mm] 1.01in

[47.79mm] 1.88in

[48.26mm] 1.90in

[35.56mm] 1.40in

[48.26mm] 1.90in

[35.56mm] 1.40in

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## USB SPECIFICATIONS

- Supply Voltage Range:  5.00 VDC
- Maximum current:  70 mA
- USB version:  2.0

### USB GAME CONTROLLER
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
- 12-bit (0 to 4095) axis resolution

### Termination (supplied cable)

- USB Male Type A Connector (198 cm)
  - (72" +/-1") - overmolded cabled - Mini B to Male Type A USB connector (option 0U)
  - (84" +/-1") - overmolded cable - Male Type A USB connector (option 2U)

### USB CURSOR EMULATION
The Cursor Emulation option converts multi-axis joystick output into a mouse or cursor control device.  The Cursor Emulation option is ideal for vehicle applications subjected to dirt and high vibration which makes operating a traditional cursor control device difficult.  Cursor simulation is only compatible with Window OS.

### Features

- HID compliant "mouse" device

### Button Function

- B1:  Left Mouse Click
- B2:  Right Mouse Click

### Termination (supplied cable)

- USB Male Type A Connector (185 cm):
  - (72" +/-1") - overmolded cabled - Mini B to Male Type A USB connector

### SUPPORTED OPERATING SYSTEMS:  USB GAME CONTROLLER AND CURSOR EMULATION

### Windows Operating System

- Windows 7
- Windows 8.1
- Windows 10

### Linux Operating System
APEM's USB joysticks are compatible with Linux, although system compatibility is not guaranteed.  The user is responsible for verifying specific Linux OS compatibility.

### Custom Firmware
Custom configurations and firmware is availableupon request.  Available options include:

- 8-bit axis resolution
- 10-bit axis resolution
- Signed bit axis resolution
- Custom USB product name

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## VOLTAGE REGULATOR SPECIFICATIONS

The Voltage Regulator allows APEM's Hall effect joysticks to operate with a range of supply voltages..

**Voltage Regulator - Unipolar**

• Supply Voltage Range:  8-35 VDC

• Output Voltage Range:  see output options

• Maximum Current: 90 mA

**Voltage Regulator - Bipolar**

• Supply Voltage Range:  11-35 VDC

• Output Voltage Range:  ±10 VDC

• Maximum Current: 90 mA

**Termination (flying leads)**

• 28 AWG 20.32 cm (8.0") ±1.54 cm (1") PTFE

WIRE DEFINITION)

| WIRE COLOR | JOYSTICK FUNCTION |
|---|---|
| Black | Ground |
| Red | Supply 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 one |
| White | Button common |
| Violet | Button two |

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## Proportional multi-axis fingertip controllers • non-contacting Hall effect technology

### BUILD YOUR PART NUMBER

| HF | ___ | ___ | ___ | ___ | ___ | ___ |

SERIES

**HANDLE**

| 10 | Ball tip (2 axis, no button) |
|----|----|
| 11 | Tapered (2 axis, no button) |
| 22 | 1 Pushbutton (2 axis) |
| 27 | 1 Pushbutton (2 axis), IP67 sealed |
| 33 | 3 Axis, no button |
| 44 | 1 Pushbutton (3 axis) |
| 45 | 2 Pushbuttons (3 axis) |
| 46 | Low profile (3 axis, no button) |
| 50 | 3 Axis, IP67 Sealed, no button |
| 51 | 3 Axis, 1 Pushbutton, IP67 sealed |
| 52 | 3 Axis, 2 Pushbuttons, IP67 sealed |
| 55 | 3 Axis, 2 Pushbuttons, IP67 Sealed, Ergonomic Handle* |
| 56 | 3 Axis, No Button, IP67 Sealed, Ergonomic Handle* |
| 57 | 3 Axis, 3 Pushbuttons, IP67 Sealed, Ergonomic Handle* |

**LIMITER PLATE**

| S | Square ☐ |
|---|---|
| D | Diamond ◇ |
| R | Round ○ |
| X | Slotted — |
| Y | Slotted ‖ |
| P | Plus ✛ |
| C | Cross ✖ |
| W | Guided Feel Square |
| Z | Guided Feel Round |
| L | Locked X and Y axis [7] |

**MOUNTING**

| 1 | Drop-in |
|---|---|
| 4 | Rear Mount * |

\* Rear mount not available with handles 55 & 56

**TERMINATION [8]**

| NONE | Output option (0 - 11), mating wire harness not included |
|------|---|
| A | Output options (0 - 11), harness included |

**ADDITIONAL**

| R | Restricted / locked Z axis [9] |
|---|---|
| NS | No Soft Touch (55, 56, 57 handles only*) |

**OUTPUT OPTIONS[1]**

| 0 | 0V-5V |
|---|---|
| 1 | 0.5V-4.5V |
| 2 | 0.25V-4.75V |
| 3 | 1V-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 |
| 0U | USB-Horizontal, mini B termination[2] (game controller) |
| 2U | USB-Vertical cable exit[3] (game controller) |
| 1J | USB-Horizontal, mini B termination[2] (Cursor Emulation) |
| 0V | **0V TO 5V** (Voltage Regulator) [4] |
| BV | **±10V** (Voltage Regulator)[5] |
| 2C | **CAN** bus J1939 [6] |
| 3C | **CAN**open [6] |
| 4C | **CAN**open LSS [6] |

1  Output voltage is ratiometric to supple voltage.

2  Cable length is 6" ±1" fside of joystick to Male Type A USB connector.

3  Cable length is 84" ±1" from bottom of joystick to Male Type A USB connector.

4  Requires operating voltage 7V ≥ 35V.

5  Requires operating voltage 11V ≥ 35V.

6 Operating voltage:  7 - 35VDC.

7  L "locked" limiter plate is only recommended for handles with a rotational third / Z axis.  Handles (33 - 56)
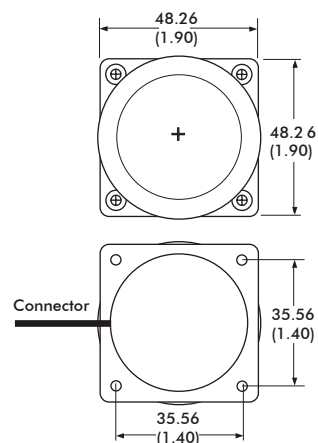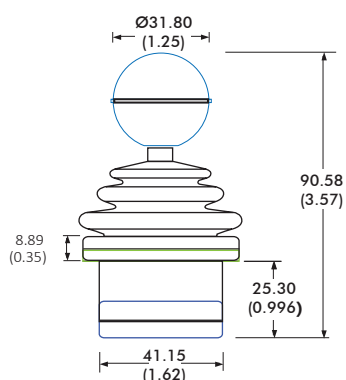
8  Optional mating wire harnesses may be selected for option options 0-11.  Termination is included for output options 0U, 2U, 1J, 0V, BV, 2C, 3C, 4C.

9  R - restricts or locks the Z axis function on handles 33-56.  This option prevents the handle from rotating.
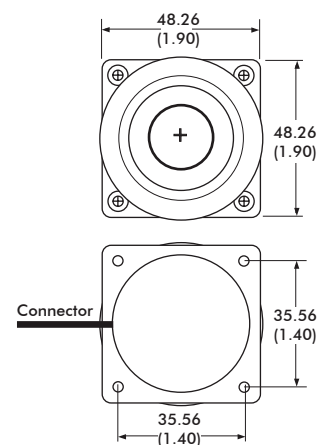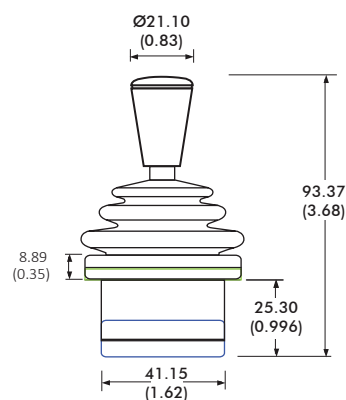
# HF series

Proportional multi-axis fingertip controllers •
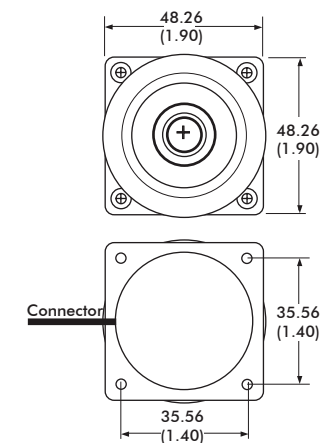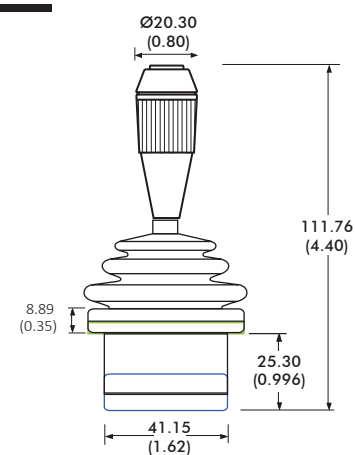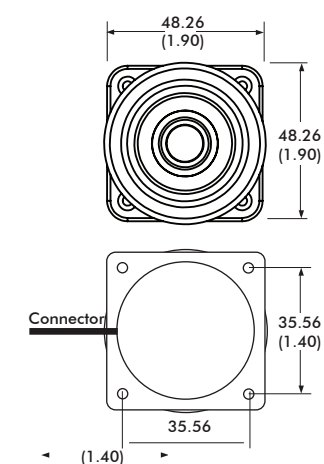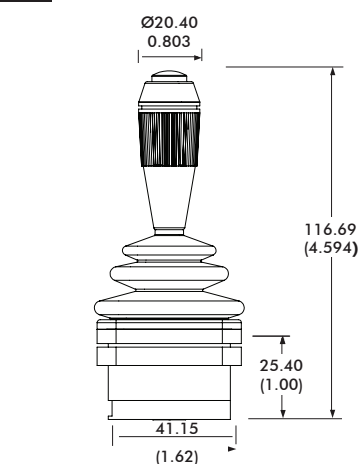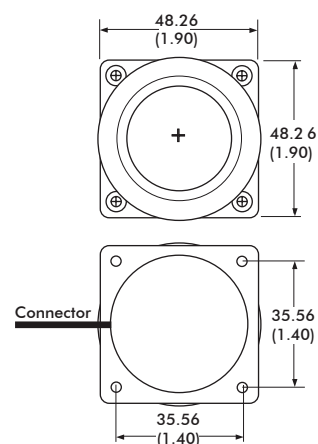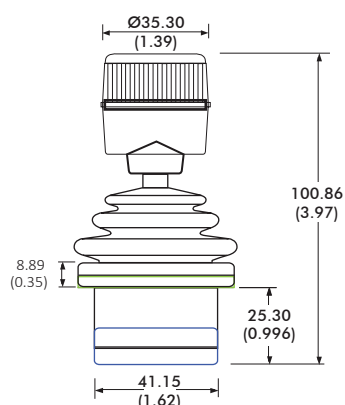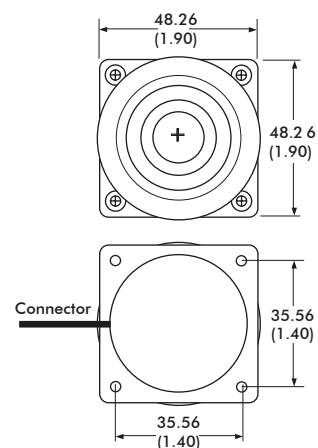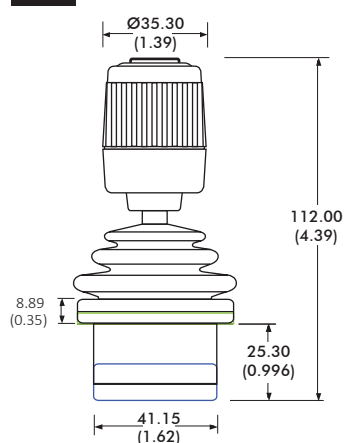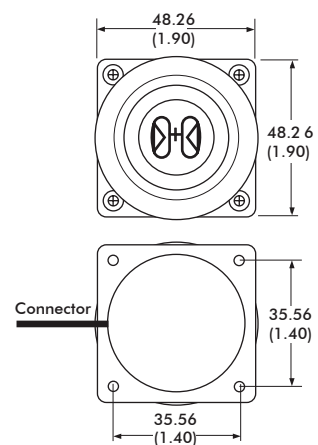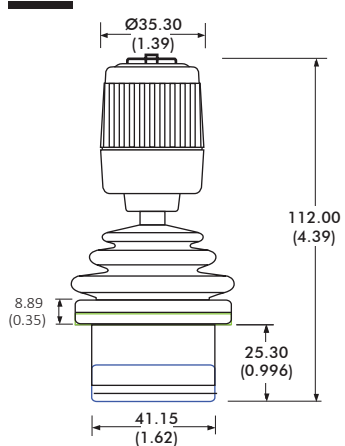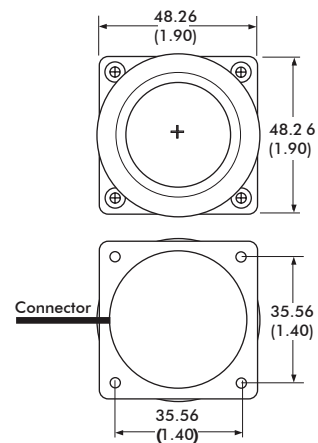non-contacting Hall effect technology

## HANDLE 10



Ø31.80
(1.25)

90.58
(3.57)

8.89
(0.35)

25.30
(0.996)

41.15
(1.62)

48.26
(1.90)

48.2 6
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 11



Ø21.10
(0.83)

93.37
(3.68)

8.89
(0.35)

25.30
(0.996)

41.15
(1.62)

48.26
(1.90)

48.26
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 22



Ø20.30
(0.80)

111.76
(4.40)

8.89
(0.35)

25.30
(0.996)

41.15
(1.62)

48.26
(1.90)

48.26
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 27



Ø20.40
0.803

116.69
(4.594)

25.40
(1.00)

41.15
(1.62)

48.26
(1.90)

48.26
(1.90)

Connector

35.56
(1.40)

35.56

(1.40)

# HF series

Proportional multi-axis fingertip controllers •
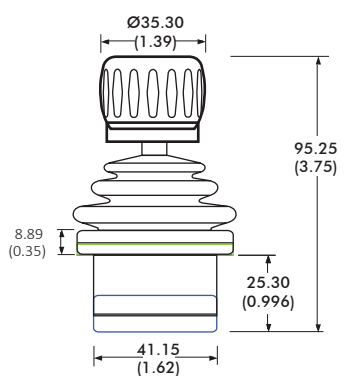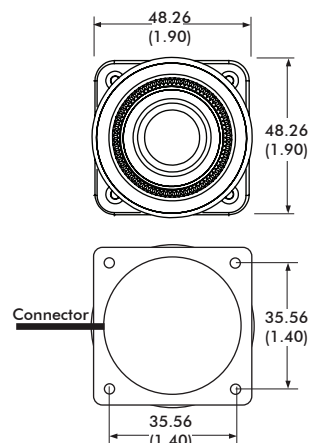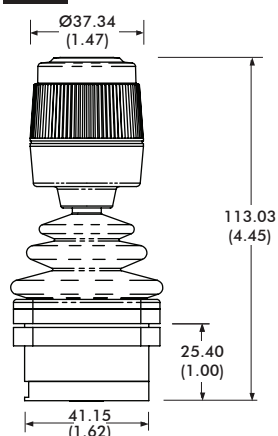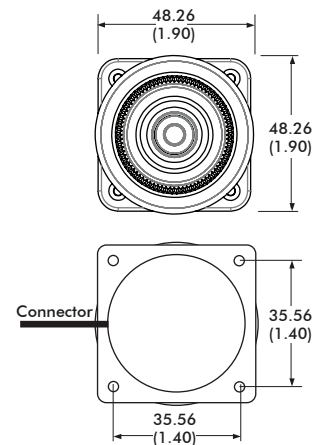non-contacting Hall effect technology

## HANDLE 33



Ø35.30
(1.39)

100.86
(3.97)

8.89
(0.35)

25.30
(0.996)

41.15
(1.62)

48.26
(1.90)

48.2 6
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 44



Ø35.30
(1.39)

112.00
(4.39)

8.89
(0.35)

25.30
(0.996)

41.15
(1.62)

48.26
(1.90)

48.2 6
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 45



Ø35.30
(1.39)

112.00
(4.39)

8.89
(0.35)

25.30
(0.996)

41.15
(1.62)

48.26
(1.90)

48.2 6
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 46



Ø35.30
(1.39)

95.25
(3.75)

8.89
(0.35)

25.30
(0.996)

41.15
(1.62)

48.26
(1.90)
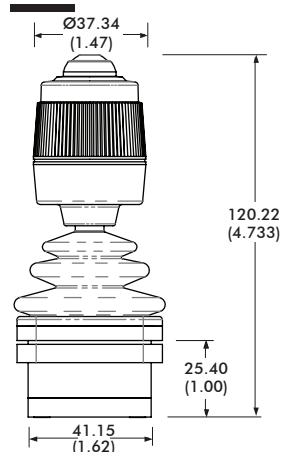
48.2 6
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

# HF series

Proportional multi-axis fingertip controllers •
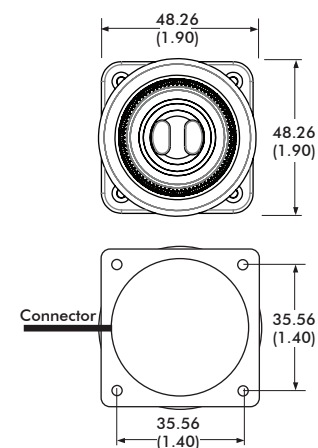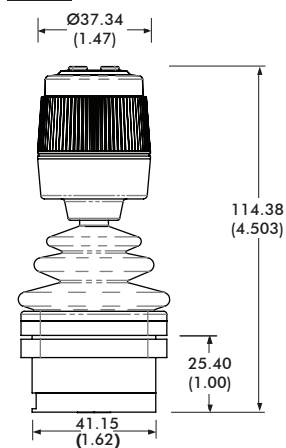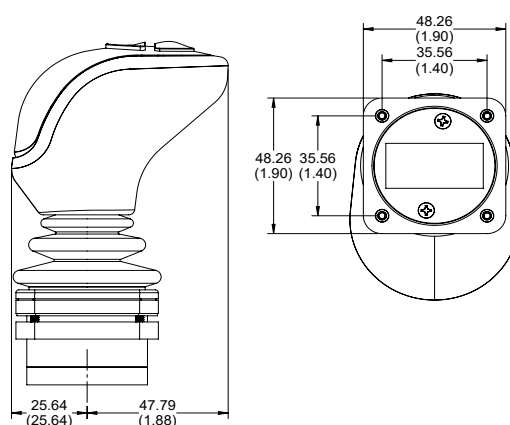non-contacting Hall effect technology

## HANDLE 50



Ø37.34
(1.47)

113.03
(4.45)

25.40
(1.00)

41.15
(1.62)

48.26
(1.90)

48.26
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 51



Ø37.34
(1.47)

120.22
(4.733)

25.40
(1.00)

41.15
(1.62)

48.26
(1.90)

48.26
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 52



Ø37.34
(1.47)

114.38
(4.503)

25.40
(1.00)

41.15
(1.62)

48.26
(1.90)

48.26
(1.90)

Connector

35.56
(1.40)

35.56
(1.40)

## HANDLE 55



57.40
(2.26)

120.40
(4.75)

25.40
(1.00)

41.15
(1.62)

25.64
(25.64)

47.79
(1.88)

48.26
(1.90)
35.56
(1.40)

48.26  35.56
(1.90)  (1.40)

# HF series

Proportional multi-axis fingertip controllers •
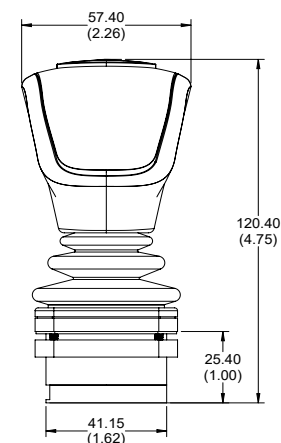non-contacting Hall effect technology

## HANDLE 56



57.40
(2.26)

116.84
(4.60)

25.40
(1.00)

41.15
(1.62)

25.64
(25.64)

47.79
(1.88)

48.26
(1.90)
35.56
(1.40)

48.26  35.56
(1.90)  (1.40)

## HANDLE 5X



57.40
(2.26)

120.40
(4.75)

25.40
(1.00)

41.15
(1.62)

25.64
(25.64)

47.79
(1.88)

48.26
(1.90)
35.56
(1.40)

48.26  35.56
(1.90)  (1.40)

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Apem](#):

HFX36S10  HF10R11  HFX22S10  HFX11S10  HFX33S10  HF44S10  HF45S10U  HF45R10  HFX33R13  HF10S11  HF45S12  HF22Y12  HF10S10  HF10P10  HFX44S10  HFX45S10  HFX10S10  HFX245S10  HF22Y10  HF33Y10  HF45S11  HF27Y11  HF22R10  HF11S10U  HF46Y10  HF11P10  HF44Y10  HF33P10  HF27R11  HF22R10U  HF22S10U  HF11Y10  HF27S10U  HF27P10  HF44R10  HF11S11  HF46S10  HF11X10  HF45Y10  HF44S12  HF45S40U  HF46S411  HF45S40  HF11R11  HF11R10  HF45R41  HF27Y10  HF45P12  HF22Y10U  HF46S41  HF45S41J  HF10Y40  HF22S10  HF22X10U  HF11R10U  HF27Y12  HF33R10  HF45R10U  HF11P11  HF45P10  HF44P10  HF10Y10  HF44R11  HF44S11  HF11R15  HF44R12  HF46S10U  HF22P10  HF44R10U  HF33S11  HF10S10U  HF46P10  HF44R40V  HF45W11  HF46R10U  HF3396  HF3395  HF55S10  HF52S10  HF3397  HF46R10  HF55Y10  HF11Y11  HF22R40U  HF55S11  HF44P10U  HF50S10  HF51S10  HF22S12  HF50W18  HF46S110  HF27R111  HF11X41  HF11Z11  HF52S40U  HF55Z10U