

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

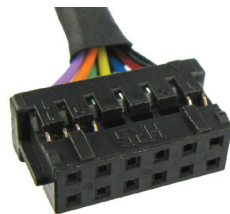


Fig. 2
Mating wire harness fitted with
Hirose DF11-12DS-2C connector

* 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)
- Deflection Angle: 36° (±18° from center)
- Expected Mechanical Life: 5 million lifecycles
- Lever Action: Single spring, omnidirectional

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



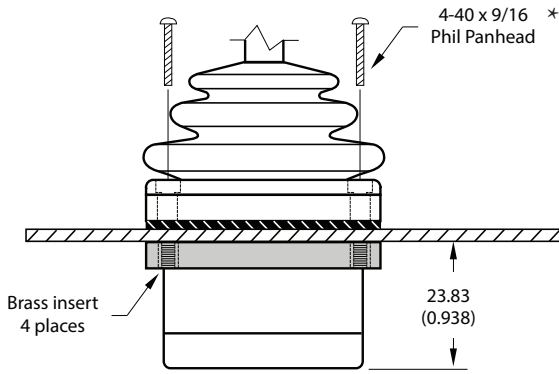
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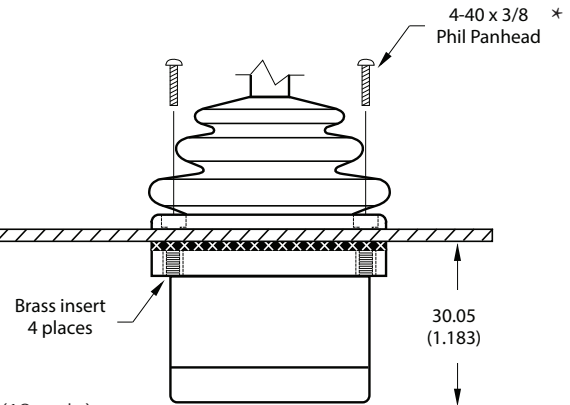


GENERAL MOUNTING OPTIONS

DROP-IN MOUNT



REAR MOUNT

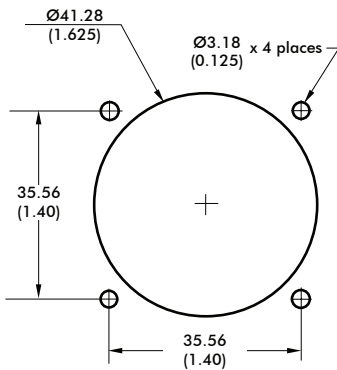


* = Recommended maximum torque: 0.1 - 0.125 Nm evenly per screw (18 oz-in).

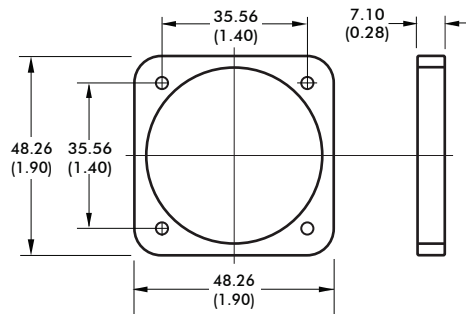


PANEL CUT-OUT

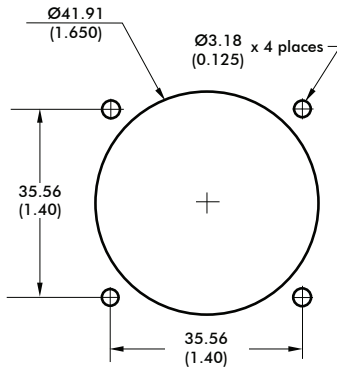
DROP-IN MOUNT



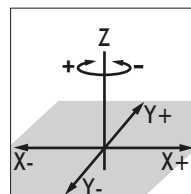
CLAMPING RING



REAR MOUNT



AXIS ORIENTATION



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.

Not available for option 55 handles

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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
- BJMI/EJMI 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 (EJMI):
 - Priority: 3
 - Base PGN: 0xFDD7
 - Source address: 0x16
 - Data field: 8 bytes

CAN MESSAGE ADDRESSES

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

CAN SOURCE ADDRESS	ORANGE WIRE	BLUE WIRE
0x13 (default)	OPEN	OPEN
0x23	OPEN	Grounded
0x33	Grounded	OPEN
0x43	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

EJMI 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 grounding 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

Fig. 2



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

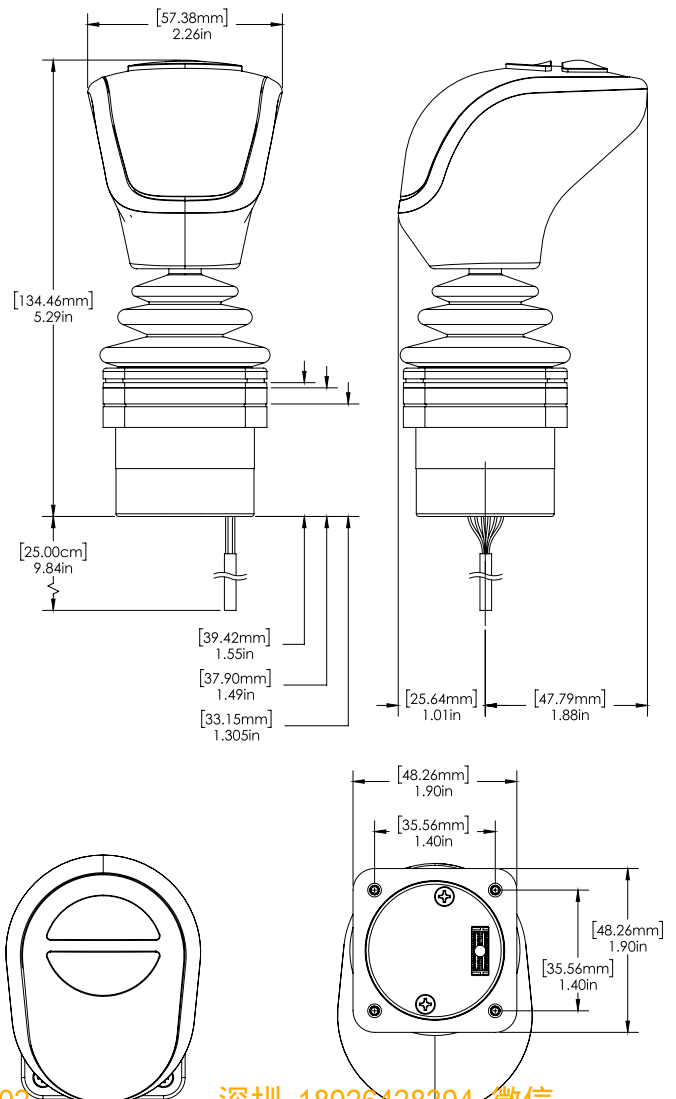
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SETTINGS	DEFAULT CONFIGURATION
Baud rate	250 kbits/s
Node ID	20h
Analog (axis) outputs	2A0h (280h + Node ID)
Buttons	1A0h (180h + Node ID)
Heartbeat (500ms)	720h (700h + Node ID)
Axis Resolution	Unsigned 10-bit

CAN BUS SPECIFICATIONS

DIMENSIONS



* Custom CAN bus firmware available upon request.

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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 (option 0U)

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 available upon 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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BUILD YOUR PART NUMBER

SERIES	HANDLE	LIMITER PLATE	MOUNTING	TERMINATION ⁸	ADDITIONAL																																																																		
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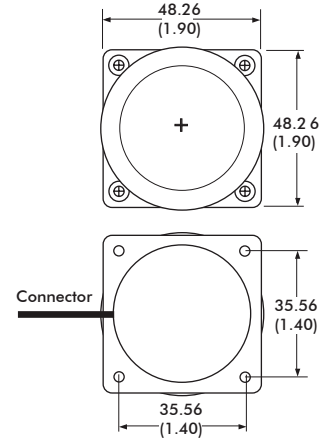
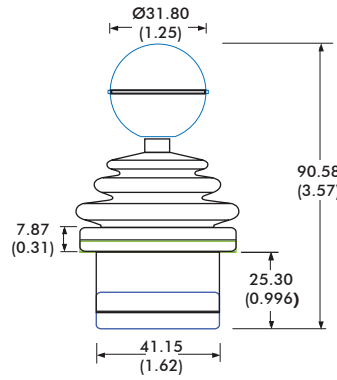
1 Output voltage is ratiometric to supply voltage.
 2 Cable length is 6" ±1" fside of joystick to Male Type A USB connector.
 3 Cable length is 84" ±1" from bottom of joystick to Male Type A USB connector.
 4 Requires operating voltage 7V ≥ 35V.
 5 Requires operating voltage 11V ≥ 35V.
 6 Operating voltage: 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.



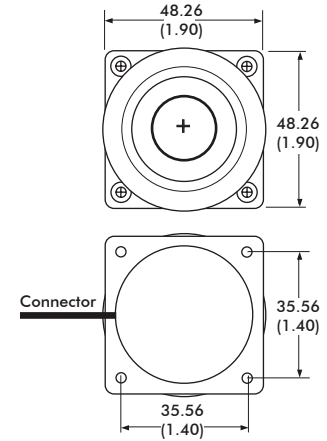
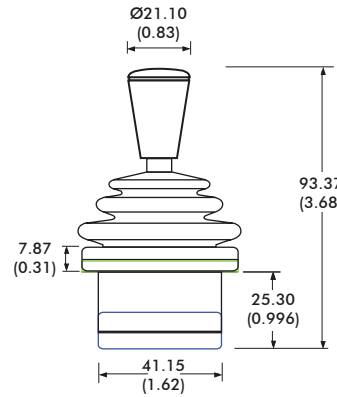
HF series

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

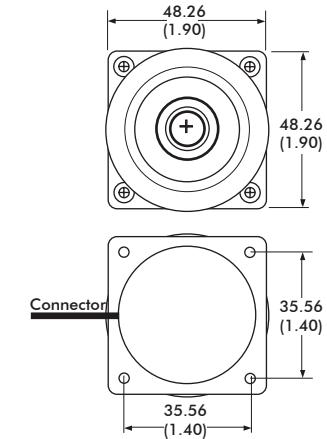
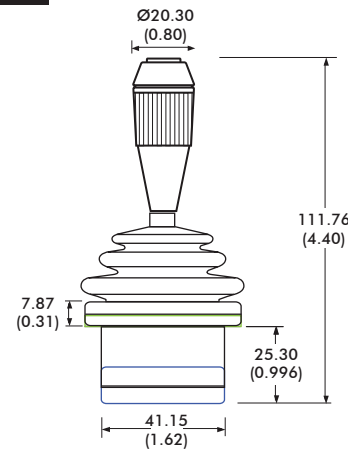
HANDLE 10



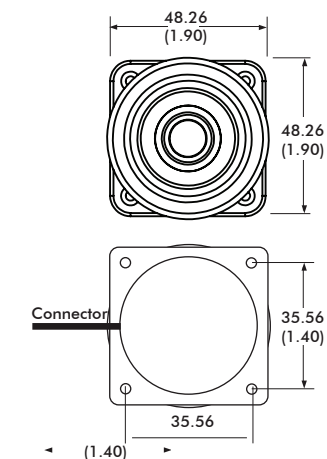
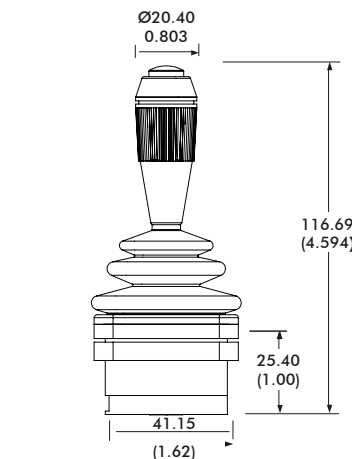
HANDLE 11



HANDLE 22



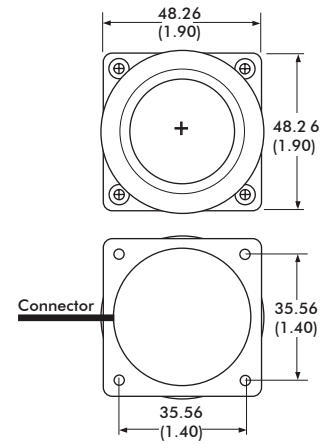
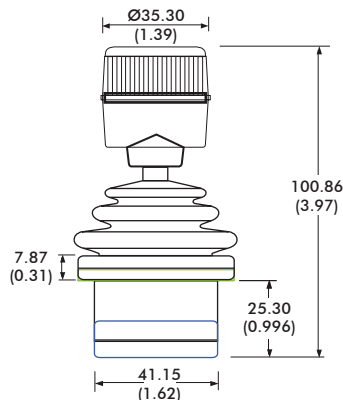
HANDLE 27



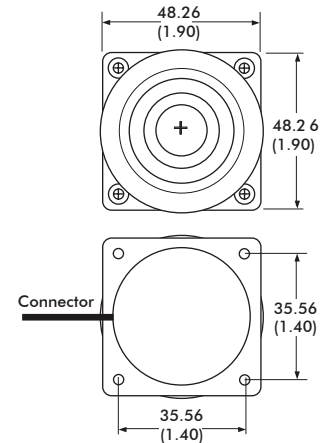
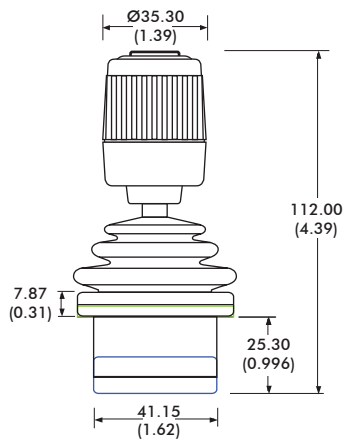
HF series

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

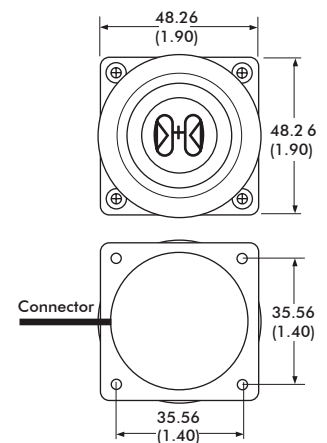
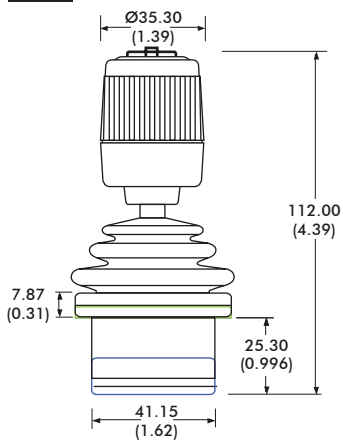
HANDLE 33



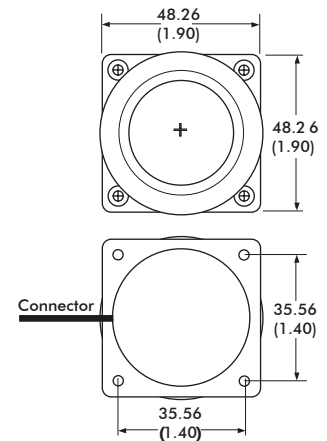
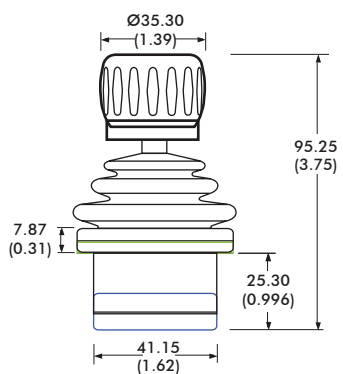
HANDLE 44



HANDLE 45



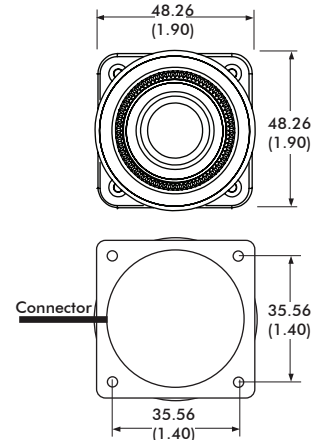
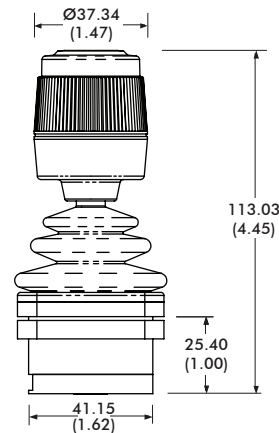
HANDLE 46



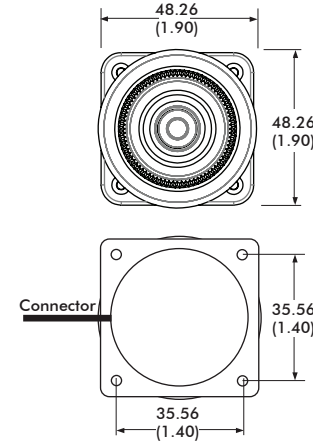
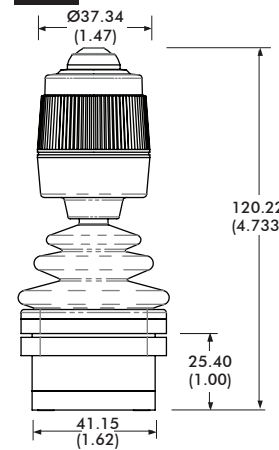
HF series

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

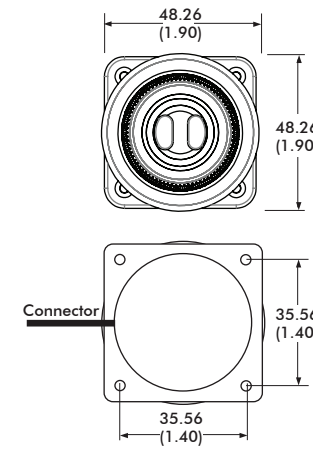
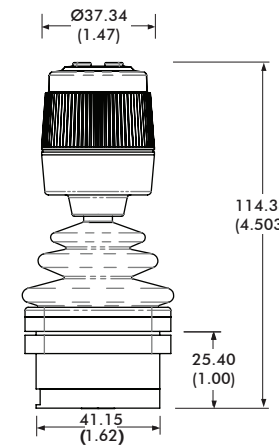
HANDLE 50



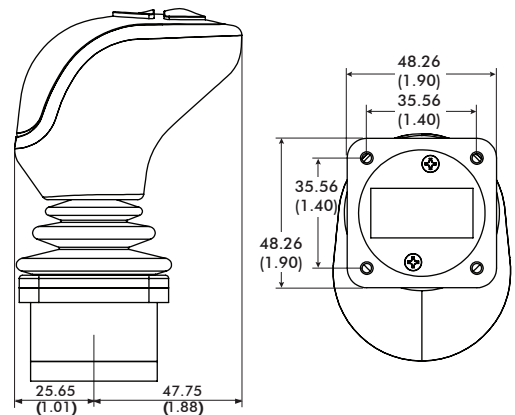
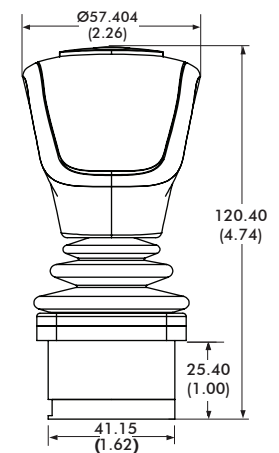
HANDLE 51



HANDLE 52



HANDLE 55





HFX series I

First generation Hall effect joysticks



The HFX Series I Joystick is designed for precision finger operated applications requiring proportional control and long trouble-free life. Featuring non-contacting Hall effect technology for three million lifecycle performance, the HFX Series I may be specified as a one, two, or three axes joystick. Featuring APEM's core Hall effect technology and patented joystick mechanism, the HFX Series I has been field tested and proven for more than a dozen years. The HFX Series I joystick's compact size, low operational force and high reliability make it ideally suited for clean environment applications including coordinate measuring machines, CCTV equipment and broadcast camera control.



KEY FEATURES

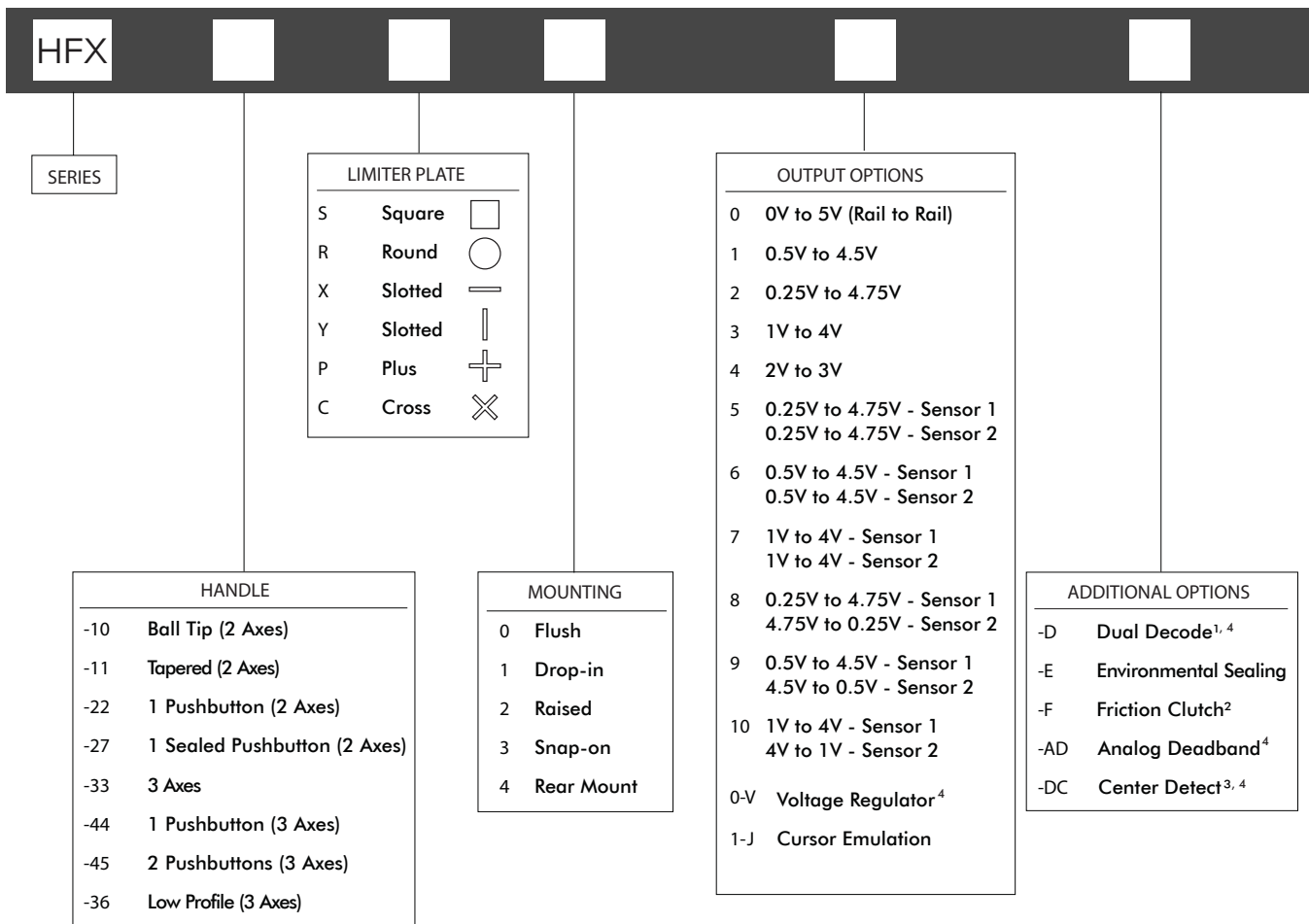
- Hall effect technology
- Precision analog control
- One, two, or three axes operation
- Range of fingertip handle options
- Rated for 3 million lifecycles
- Sealing up to IP68 above panel



HFX series I

First generation Hall effect joysticks

OPTION SELECTION



NOTES

1. Dual Decode cannot be used with the Voltage Regulator. Dual Decode requires Output Option 8.
2. Friction Clutch requires limiter plates R, X, or Y.
3. Center Detect requires output Option 1.
4. Depth below panel increases by 10mm (0.394in) for Voltage Regulator, Dual Decode, Analog Deadband, and Center Detect Output Options.



Up to IP68 available.



Mounting accessories. Standard hardware includes: gasket, clamping ring, and four 40-3/4Phil Ph MS SS screws.



HFX series I

First generation Hall effect joysticks

SPECIFICATIONS

MECHANICAL (FOR X, Y AXES)

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°)
Expected Life	-	3 million cycles
Material	-	Glass filled nylon
Lever Action	-	Single spring omnidirectional

MECHANICAL (FOR Z AXIS)

Break Out Torque	-	0.09N-m (0.80lbf-in)
Operating Torque	-	0.121N-m (1.07lbf-in)
Maximum Allowable Torque	-	0.150N-m (1.33lbf-in)
Hand Mechanical Angle	-	60° (±30°)
Handle Action	-	Spring centering, rotational
Expected Life	-	3 million cycles

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)	-	IP65 to IP68*
EMC Immunity Level (V/M)	-	IEC 61000-4-3: 2006
EMC Emissions Level	-	IEC 61000-4-8: 1993/A1: 2000
ESD	-	IEC 61000-4-2: 2008

ELECTRICAL

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

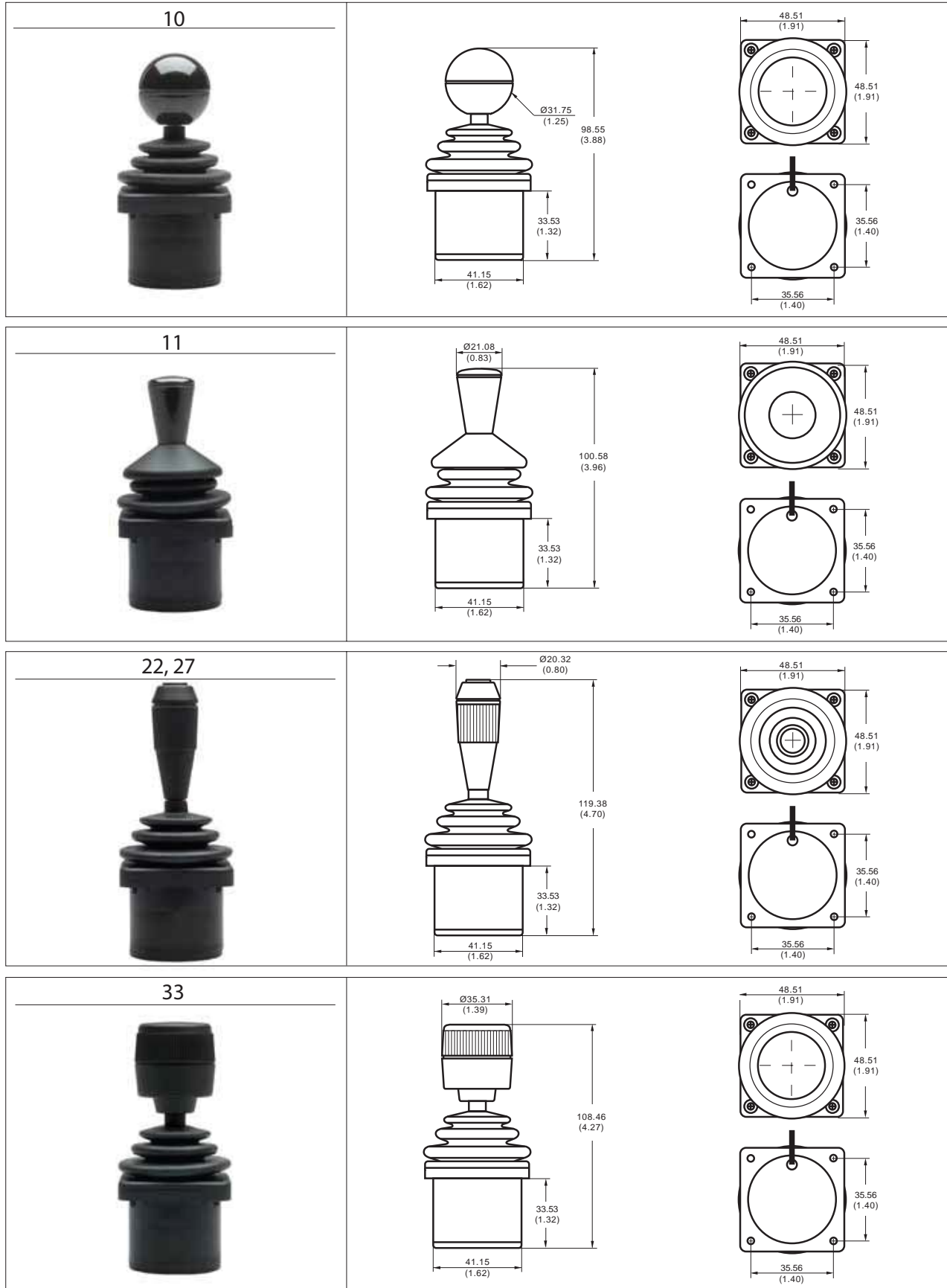
NOTES:

- 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

HFX series I

First generation Hall effect joysticks

DIMENSIONAL DRAWINGS

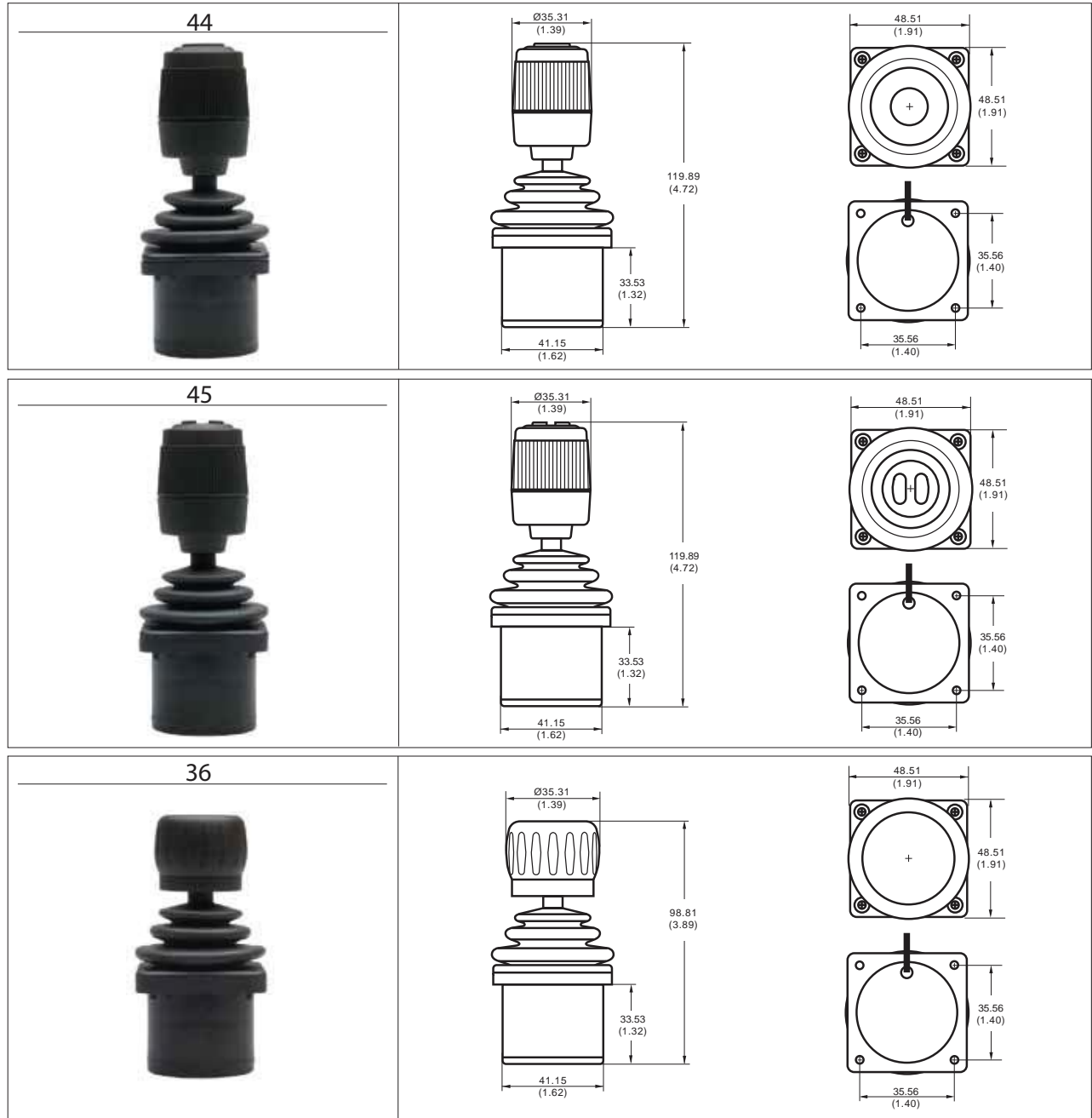


Note: The company reserves the right to change specifications without notice.

HFX series I

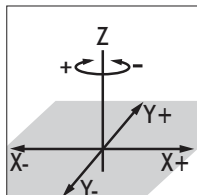
First generation Hall effect joysticks

DIMENSIONAL DRAWINGS



NOTES:

1. Dimensions are in mm/(inch).
2. Depth below panel increases by 10mm (0.394in) for Voltage Regulator, Dual Decode, Analog Deadband, and Center Detect Output Options.
3. Axes orientation:



DEFAULT WIRE COLOR CODE*		
COLOR	FUNCTION	AWG
RED	Vcc or Vdd	28
BLACK	Ground	
BLUE	X Axis	
YELLOW	Y Axis	
GREEN	Z Axis	
WHITE	Switch Common (optional)	22
ORANGE	Switch 1 (optional)	
VIOLET	Switch 2 (optional)	

* - Starting from the strain relief, the leads are 178mm (7in) long, 3.18mm (0.125in) stripped.

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

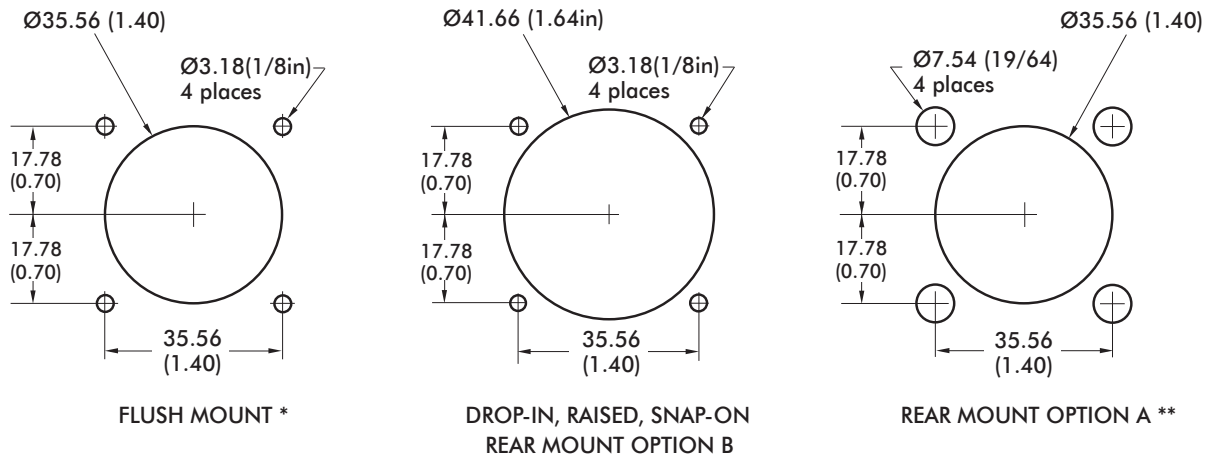


HFX series I

First generation Hall effect joysticks

DIMENSIONAL DRAWINGS - continued

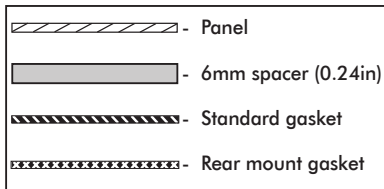
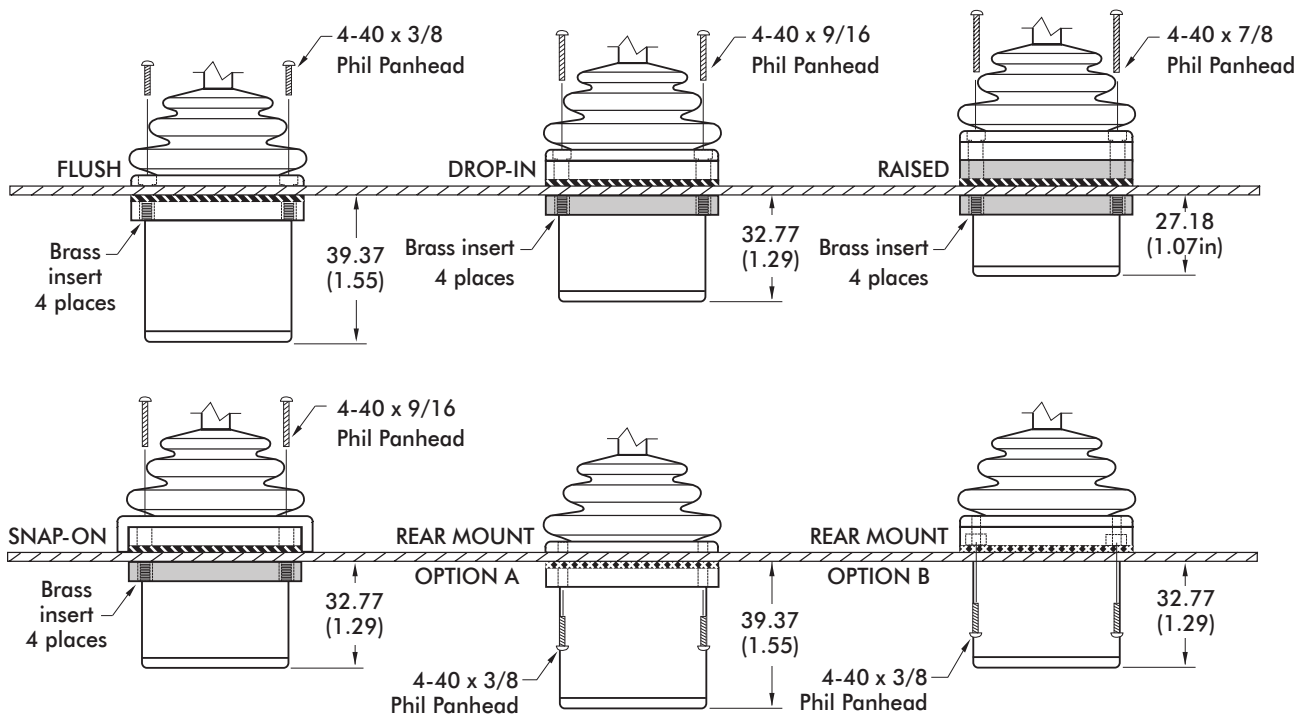
PANEL CUTOUT DIMENSIONS



* Not available for Option 11 Handle

** Available only for Option 10, 22, and 27 Handles

MOUNTING OPTIONS



NOTES:

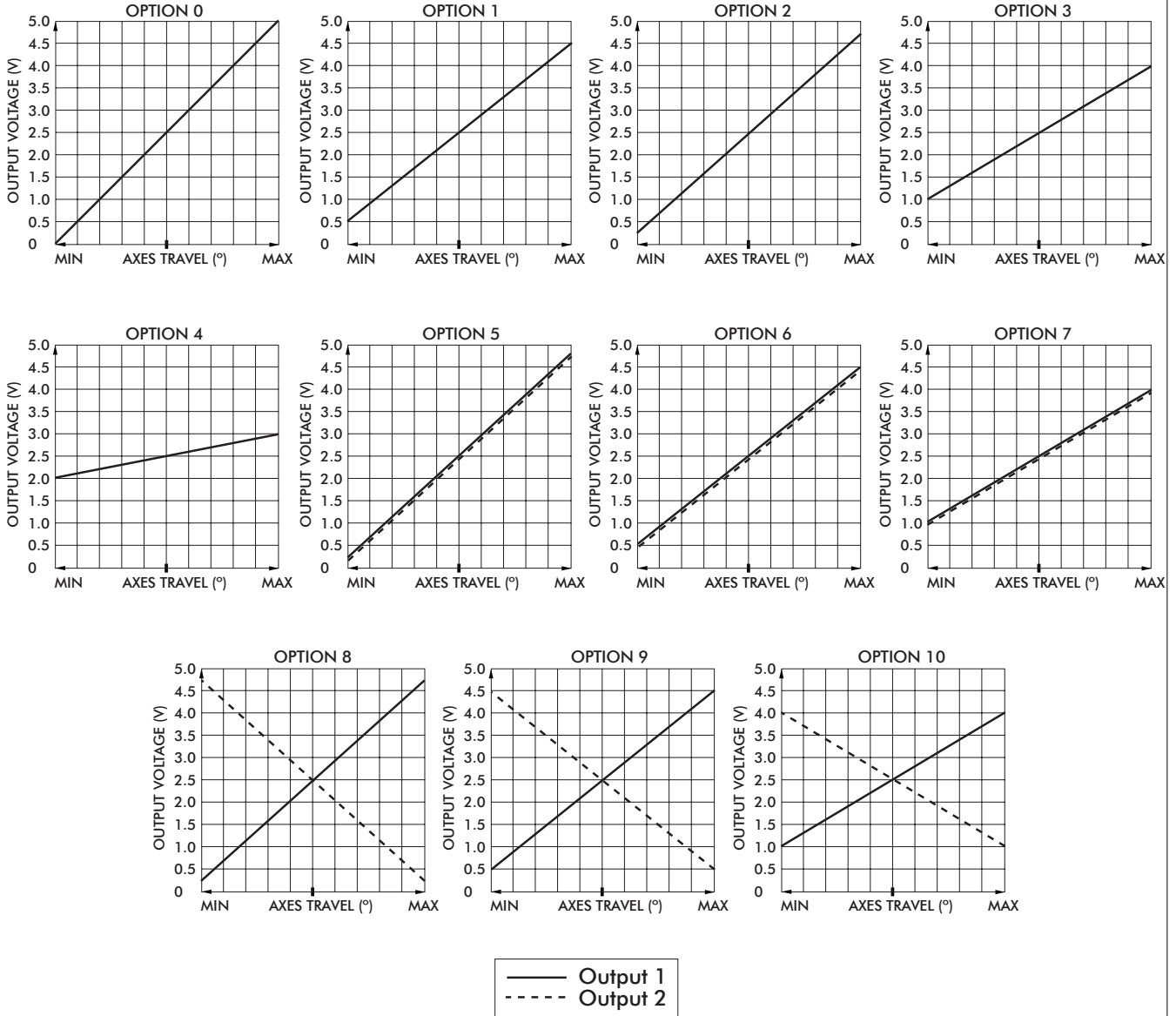
- Dimensions are in mm/(inch).
- The panel thickness can be 1.17mm to 3.17mm (0.046in to 0.125in), except for the Rear Mount Option A, where the maximum panel thickness is 1.6mm (0.063in).
- A panel thickness of 1/16" (1.6mm, 0.063in) was considered for all the below-panel depth values.

HFX series I

First generation Hall effect joysticks

CONFIGURATION OPTIONS

LINEAR OUTPUT OPTIONS



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



HFX series I

First generation Hall effect joysticks

CONFIGURATION OPTIONS - continued

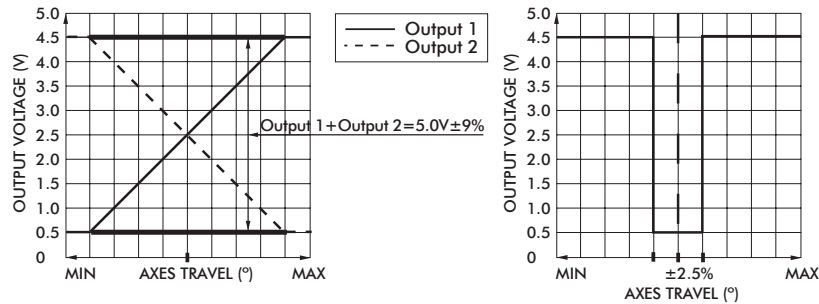
ADDITIONAL OUTPUT OPTIONS

DUAL DECODE

Dual Decode utilizes a microprocessor to monitor two linear opposite-ramp signals for each joystick axis and provides one proportional (0.5VDC – 4.5VDC) and one logical output accordingly. The dual inverted signals are continuously monitored and a logical signal of 0VDC is provided for over-range (>4.5VDC), under-range (<0.5VDC) and signal tracking (sum of both signals equals 4.5V +/-10%) error. A logical signal of 5.0VDC is provided for a properly functioning joystick deflected from center.

APPLICATIONS

Dual Decode provides a center detect function as well as error tracking, making it ideal for high liability, safety critical applications.



ELECTRICAL SPECIFICATIONS

Supply Power	-	4.5VDC to 5.5VDC
Supply Current	-	30mA + 10mA per axis

WIRING SPECIFICATION

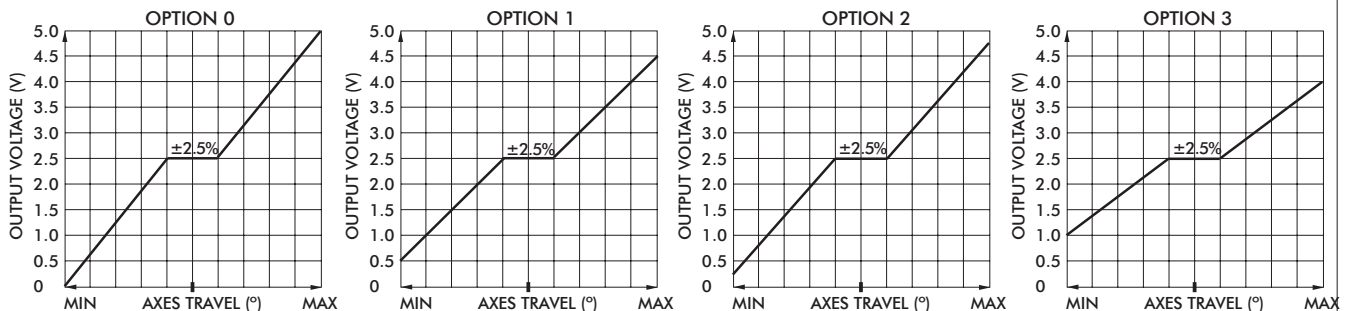
Red wire	-	Customer power supply 4.5VDC-5.5VDC
Black wire	-	Customer power supply ground
Blue wire	-	X axis output
Yellow wire	-	Y axis output
Green wire	-	Z axis output
Blue/White wire	-	X axis dual decode logic output
Yellow/Black wire	-	Y axis dual decode logic output
Green/Black wire	-	Z axis dual decode logic output
White wire	-	Pushbutton common wire
Orange,violet,grey,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

ANALOG DEADBAND

Analog Deadband utilizes an analog circuit to monitor proportional joystick outputs and enhance return to center accuracy over multiple axes. Specified for joysticks with normally ranged outputs of 0vdc – 5vdc at full axis travel, a constant output of 2.5vdc is provided for the joystick's position +/-2.5° from center.

APPLICATIONS

Analog Deadband effectively eliminates mechanical return-to-center error, making it ideally suited for safety critical applications susceptible to drift and motion control systems lacking center position trim.



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

HFX series I

First generation Hall effect joysticks

CONFIGURATION OPTIONS - continued

ADDITIONAL OUTPUT OPTIONS

ELECTRICAL SPECIFICATIONS

Supply Power	-	4.5VDC to 5.5VDC
Supply Current	-	10mA per axis

WIRING SPECIFICATION

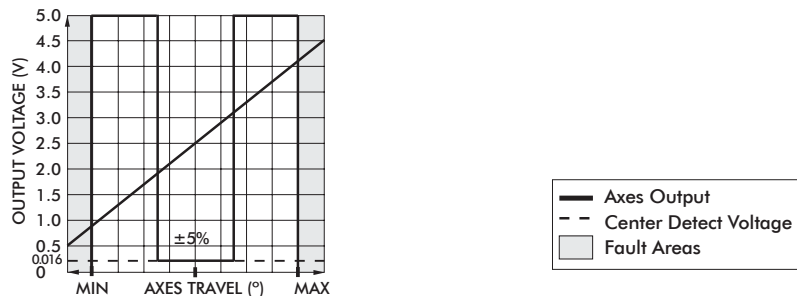
Red wire	-	Customer power supply 4.5-5.5vdc
Black wire	-	Customer power supply ground
Blue wire	-	X axis output
Yellow wire	-	Y axis output
Green wire	-	Z axis output
White wire	-	Pushbutton common wire
Orange,violet,gre,y,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

CENTER DETECT

Center Detect utilizes a microprocessor to monitor joystick output and provides both logic and proportional signals for enhanced operator safety. Specified for a joystick normally ranged 0.5VDC to 4.5VDC, the microprocessor continuously monitors the proportional output and provides HI logic signal (5.0VDC) when moved off center and an LO logical signal (0VDC) for an over-range (>4.5VDC) or under-range (<0.5VDC).

APPLICATIONS

Center Detect is ideal for safety critical applications including master relay control "MRC" for a motion control systems or as a brake release for an overhauling load.



ELECTRICAL SPECIFICATIONS

Supply Power	-	4.5V to 5.5V
Supply Current	-	30mA + 10mA per axis

WIRING SPECIFICATION

Red Wire	-	Power supply 4.5 - 5.5VDC
Black Wire	-	Ground
Blue Wire	-	X axis output
Yellow Wire	-	Y axis output
Green Wire	-	Z axis output
Blue/White Wire	-	X axis center detect logic output
Yellow/Black Wire	-	Y axis center detect logic output
Green/Black Wire	-	Z axis center detect logic output
White Wire	-	Pushbutton common wire
Orange,violet,gray,brown,pink,bl/wt,y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

HFX series I

First generation Hall effect joysticks

CONFIGURATION OPTIONS - continued

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 Supply Voltage:

- 5 VDC
- 10 VDC
- 12 VDC
- 24 – 30 VDC
- Custom supply options available.

User Specified Output Voltage:

- 0-5 VDC
- 0-10 VDC
- +/-5 VDC
- +/-10 VDC
- Custom outputs available.

ELECTRICAL SPECIFICATIONS

Supply Power	-	5VDC to 30VDC
Supply Current	-	90mA max

WIRING SPECIFICATION

Red wire	-	Supply power 5-30VDC
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,gray,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

FRICITION CLUTCH

The Friction Clutch option provides absolute positioning. The joystick does not mechanically return to center, the handle maintains its position when released.

