

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.



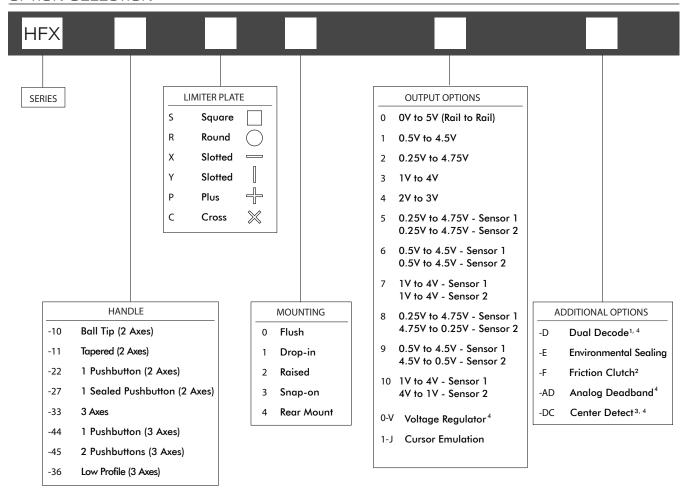
KEY FEATURES

- ☐ 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



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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.

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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	

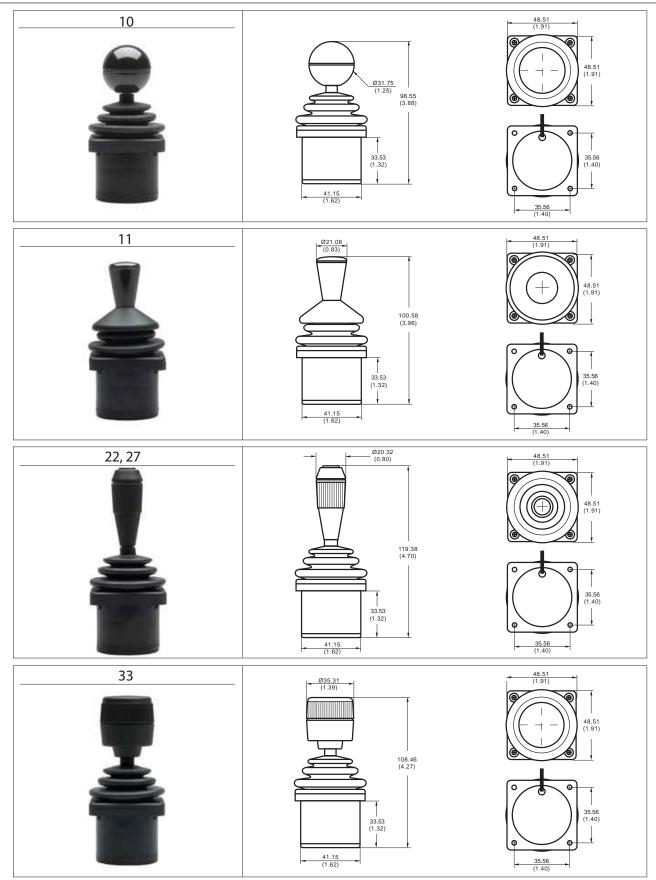
ELECTRICAL			
Sensor	_	Hall effect	
Resolution	_	Infinite	
Supply Voltage Operating	_	5.00VDC	
Reverse Polarity Max	_	-14.5VDC	
Overvoltage Max	_	18VDC	
Output Voltage	_	See options	
Output Impedance	_	6Ω	
Current Consumption Max	_	10mA per axis	
Return to Center Voltage (No Load)	_	±200mV	
Output Ramp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

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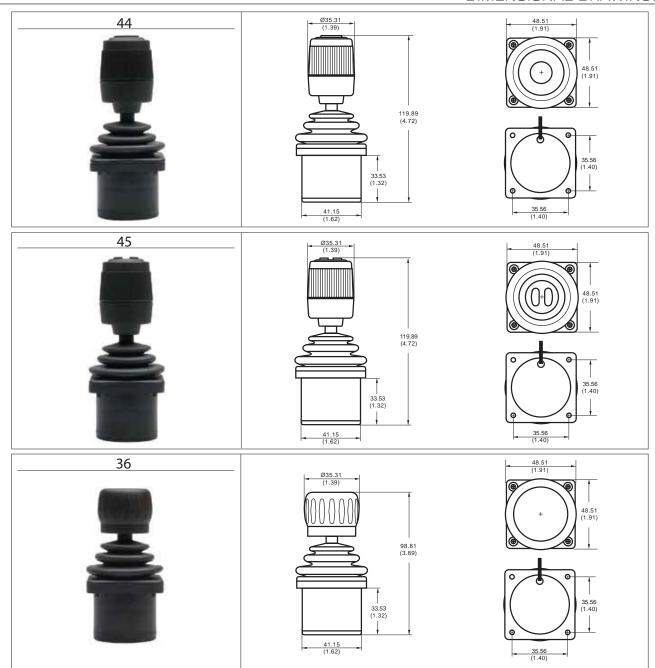
DIMENSIONAL DRAWINGS



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

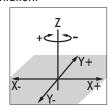
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DIMENSIONAL DRAWINGS



NOTES:

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



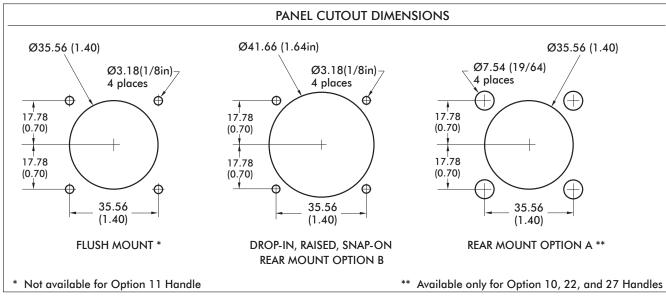
DEFAULT WIRE COLOR CODE*			
COLOR	FUNCTION	AWG	
RED	Vcc or Vdd		
BLACK	Ground		
BLUE	X Axis	28	
YELLOW	Y Axis		
GREEN	Z Axis		
WHITE	Switch Common (optional)		
ORANGE	Switch 1 (optional)	22	
VIOLET	Switch 2 (optional)		

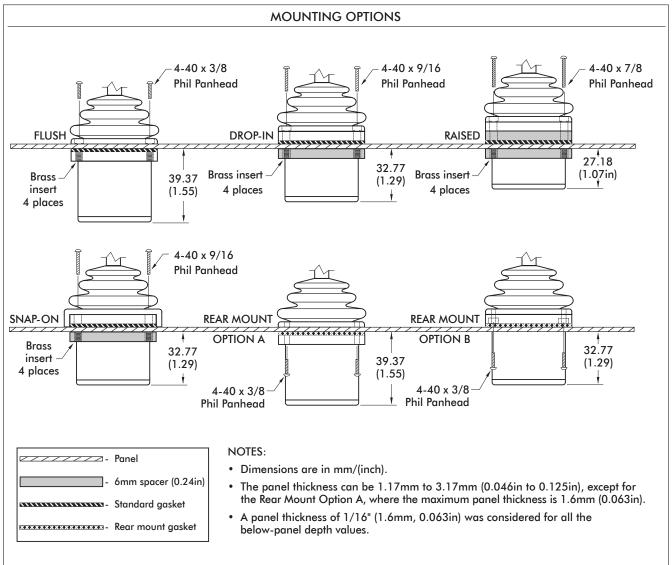
^{* -} Starting from the strain relief, the leads are 178mm (7in) long, 3.18mm (0.125in) stripped.

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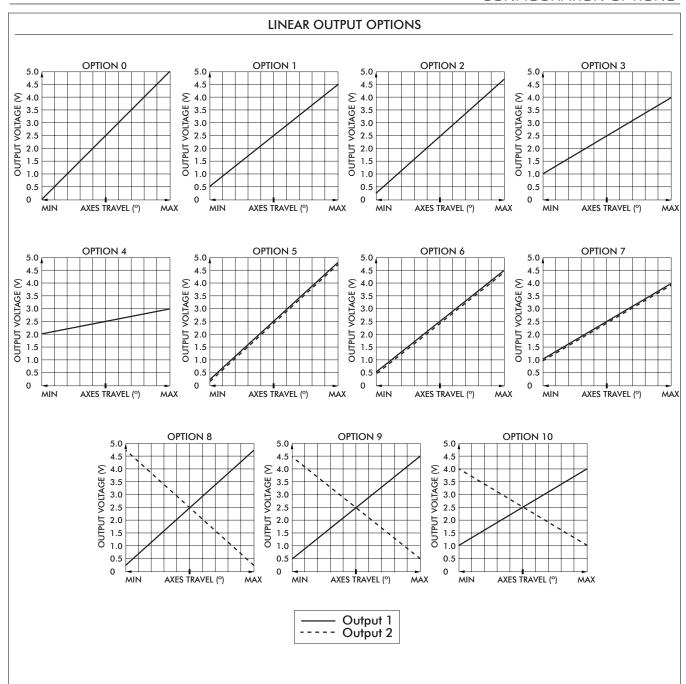
DIMENSIONAL DRAWINGS - continued





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CONFIGURATION OPTIONS



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CONFIGURATION OPTIONS - continued

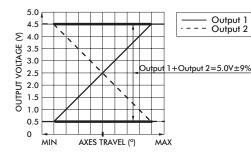
ADDITIONAL OUTPUT OPTIONS

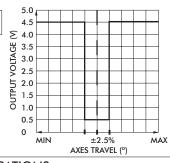
DUAL DECODE

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 inversed 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 Black wire Customer power supply 4.5VDC-5.5VDC
 Customer power supply ground

Yellow wire - X axis output
Yellow wire - Y axis output
Green wire - Z axis output

Blue/White wire
Yellow/Black wire
Green/Black wire
White wire
Y axis dual decode logic output
Y axis dual decode logic output
Z axis dual decode logic output
Y bushbutton common wire

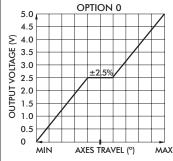
Orange, violet, grey, brown, pink, bl/wt/y/bk, gn/bk, gy/w wire - Pushbutton outputs

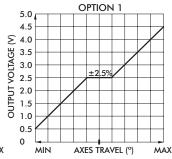
ANALOG DEADBAND

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 $+/-2.5^{\circ}$ from center.

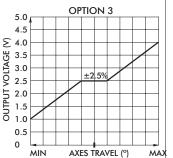
APPLICATIONS

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.









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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

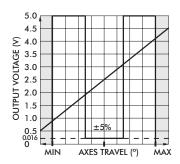
White wire Pushbutton common wire Orange, violet, grey, brown, pink, bl/wt/y/bk, gn/bk, gy/w wire - Pushbutton outputs

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 X axis output Blue Wire 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

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

WIRING SPECIFICATION

Supply power 5-30VDC Red wire Black wire Ground Blue wire X axis output Yellow wire Y axis output Green wire Z axis output

Pushbutton common wire White wire Orange,violet,gray,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire - Pushbutton outputs

FRICTION CLUTCH

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

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