



- Rugged, hand operation
- Hall effect sensing
- Sealed up to IP68
- 10 million life cycles
- Redundant outputs available
- Analog, USB and custom outputs
- CANbus J1939 and CANopen options available

**MECHANICAL (FOR X AND Y AXIS)**

- Break Out Force: 7.7N (1.70lbf)
- Operating Force: 14.0N (3.10lbf)
- Maximum Applied Force: 1000.0N (225.00lbf)
- Mechanical Angle of Movement: 38°
- Expected Life: 10 million cycles
- Lever Action (Centering): Spring centering
- Material: Glass reinforced nylon

**ELECTRICAL**

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

**MECHANICAL (FOR Z AXIS)**

- Break Out Torque: 0.6N·m (5.31lbf·in)
- Operating Torque: 1.1N·m (9.74lbf·in)
- Maximum Allowable Torque: 24.5N·m (216.84lbf·in)
- Hand Mechanical Angle: 42°
- Expected Life: 10 million cycles

**STANDARD SWITCH CHARACTERISTICS/RATINGS**

- Electrical Resistive Load: 5A (depending on the chosen switch)
- Electrical Inductive Load: 3A (depending on the chosen switch)
- Low Level: 10mA @ 30mV (depending on the chosen switch)
- Electrical Life: 1 million cycles 5A @ 28 VDC resistive snap-action (depending on the chosen switch)
- Mechanical Life: 1 million cycles
- Environmental Seal: IP67
- Action: Momentary, snap-action
- Operating Force: 7.5N±2.0N (1.69lbf±0.45lbf)
- Total Travel: 0.080 inches max
- Over Travel: 0.010 inches min

**ENVIRONMENTAL<sup>1</sup>**

- 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: To IP65<sup>2</sup>
- EMC Immunity Level (V/M): IEC 61000-4-8:2009
- EMC Emissions Level: IEC 61000-4-3:2006
- ESD: IEC 61000-4-2:2008






**NOTES:**

- All values are nominal.
- Exact specifications may be subject to configuration.
- Contact Technical Support for the performance of your specific configuration.
- 1 Environmental specifications are for joysticks configured with analog output voltage. Specifications may vary for other outputs.
- 2 Excludes some handle options.

# HG series

## Hand grip Hall effect joysticks

### Overview

HG			
<b>SERIES</b>	<b>Top Buttons</b>	<b>Limiter Plate</b>	<b>Output Options</b>
	<b>0</b> None <b>1</b> One <b>2</b> Two <b>M</b> Multifunction* * - Multifunction handle will be specified in an extension	<b>S</b> Square  <b>R</b> Round  <b>X</b> Slotted  <b>Y</b> Slotted  <b>P</b> Plus  <b>G</b> Guided Feel – Square <b>H</b> Guided Feel – Round	<b>0</b> 0V to 5V <b>1</b> 0.5V to 4.5V <b>2</b> 0.25V to 4.75V <b>3</b> 1V to 4V <b>4</b> 0V to 5V – Sensor 1 0V to 5V – Sensor 2 <b>5</b> 0.5V to 4.5V – Sensor 1 0.5V to 4.5V – Sensor 2 <b>6</b> 0.25V to 4.75V – Sensor 1 0.25V to 4.75V – Sensor 2 <b>7</b> 1V to 4V – Sensor 1 1V to 4V – Sensor 2 <b>8</b> 0V to 5V – Sensor 1 5V to 0V – Sensor 2 <b>9</b> 0.5V to 4.5V – Sensor 1 4.5V to 0.5V – Sensor 2 <b>10</b> 0.25V to 4.75V – Sensor 1 4.75V to 0.25V – Sensor 2 <b>11</b> 1V to 4V – Sensor 1 4V to 1V – Sensor 2 <b>0-U</b> USB <b>0-D</b> Discrete <b>1-J</b> Cursor Emulation <b>2-C</b> CANbus J1939 <b>3-C</b> CANopen
<b>Handle<sup>1</sup></b>	<b>Side Buttons</b>	<b>Spring Tension<sup>5</sup></b>	<b>Additional Options</b>
<b>10</b> Ball Tip (2 axis) <b>21</b> Stock Grip (2 axis) <b>22</b> Short Stock Grip (2 axis) <b>33</b> Multifunction Square (2 axis) <b>43</b> Multifunction Square (3 axis) <b>34</b> Multifunction Oval (2 axis) <b>44</b> Multifunction Oval (3 axis)	<b>0</b> None <b>U</b> One - Upper Position <b>L</b> One - Lower Position <b>T</b> Two <b>D</b> Deadman <b>I</b> Index Trigger <b>P</b> Proximity Sensor	<b>00</b> Standard <b>10</b> Light <sup>6</sup> <b>20</b> Heavy	<b>V</b> Voltage Regulator <b>E</b> Environmental Sealing*

**NOTES:**

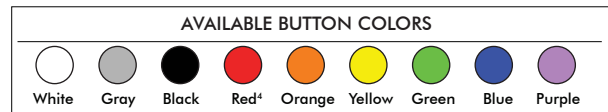
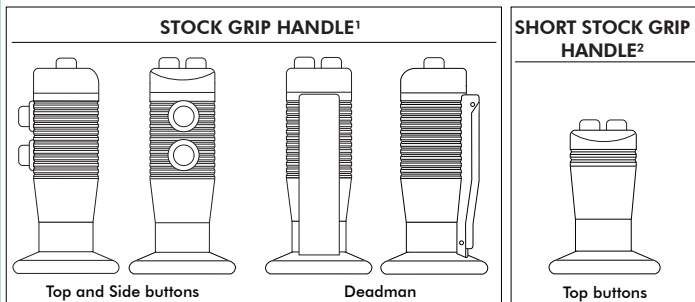
1. Refer to previous page for information on standard configurations for joysticks with Stock Grip, Short Stock Grip, and Multifunction handles.
2. Multifunction handles can have an Index Trigger.
3. Multifunction handle orders should be accompanied by drawing of button/component placement.
4. Multifunction handle requires Drop-in mounting.
5. X/Y axis spring tension. Contact Technical Support for information on best possible spring for your chosen configuration.
6. Not recommended for use with multifunction handles.
7. CANbus, USB and Voltage Regulator are mutually exclusive.



\*Environmental sealing level available up to IP68. Dependent upon handle configuration.

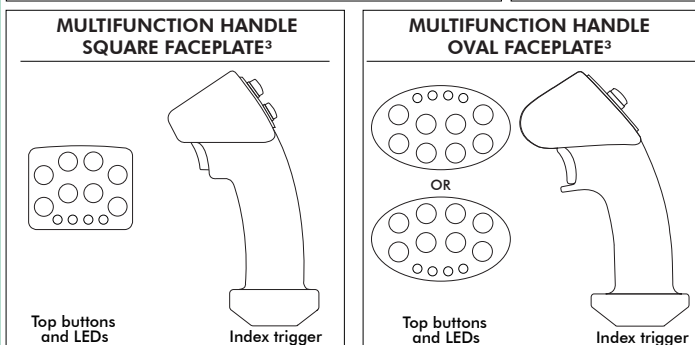


Mounting accessories. Standard hardware includes: 1 gasket, 4 nuts (1/4-20), 4 washers (1/4), 4 hex head screws (1/4-20x1 1/4).



**NOTES:**

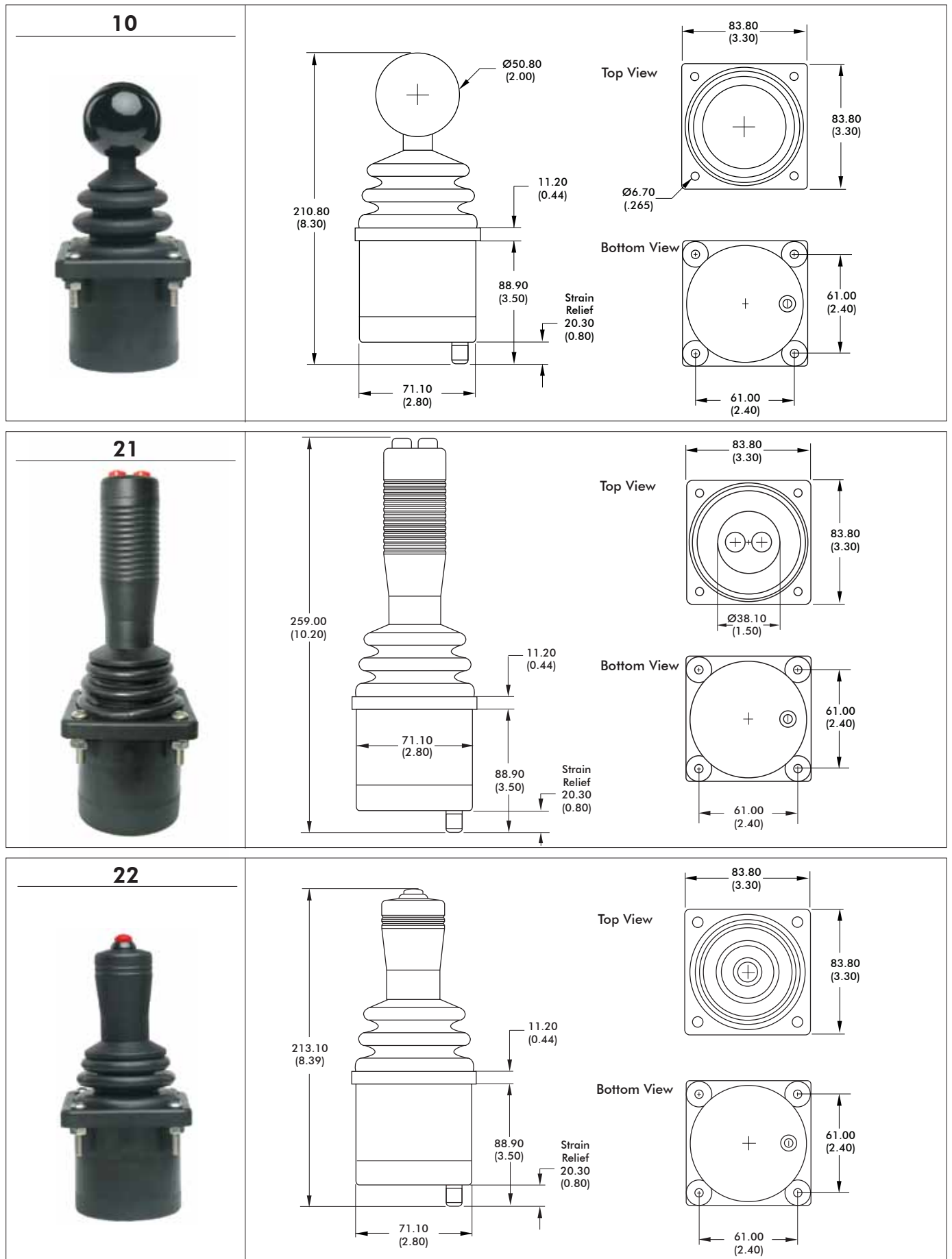
1. The maximum possible configuration for the Stock Grip handle is up to 2 Top Buttons and 2 Side Buttons. A handle with a Deadman can have 2 Top Buttons, but no Side Buttons.
2. The maximum possible configuration for the Short Stock Grip handle is up to 2 Top Buttons.
3. For non-standard configurations contact Technical Support. We can customize the faceplate according to your exact needs.
4. If unspecified, the pushbuttons will have snap action momentary switches with red button caps.
5. Starting from the strain relief, the cable is 406mm (16in) long, 6.40mm (0.25in) stripped with plug, covered with an expandable cable sleeve.



# HG series

## Hand grip Hall effect joysticks

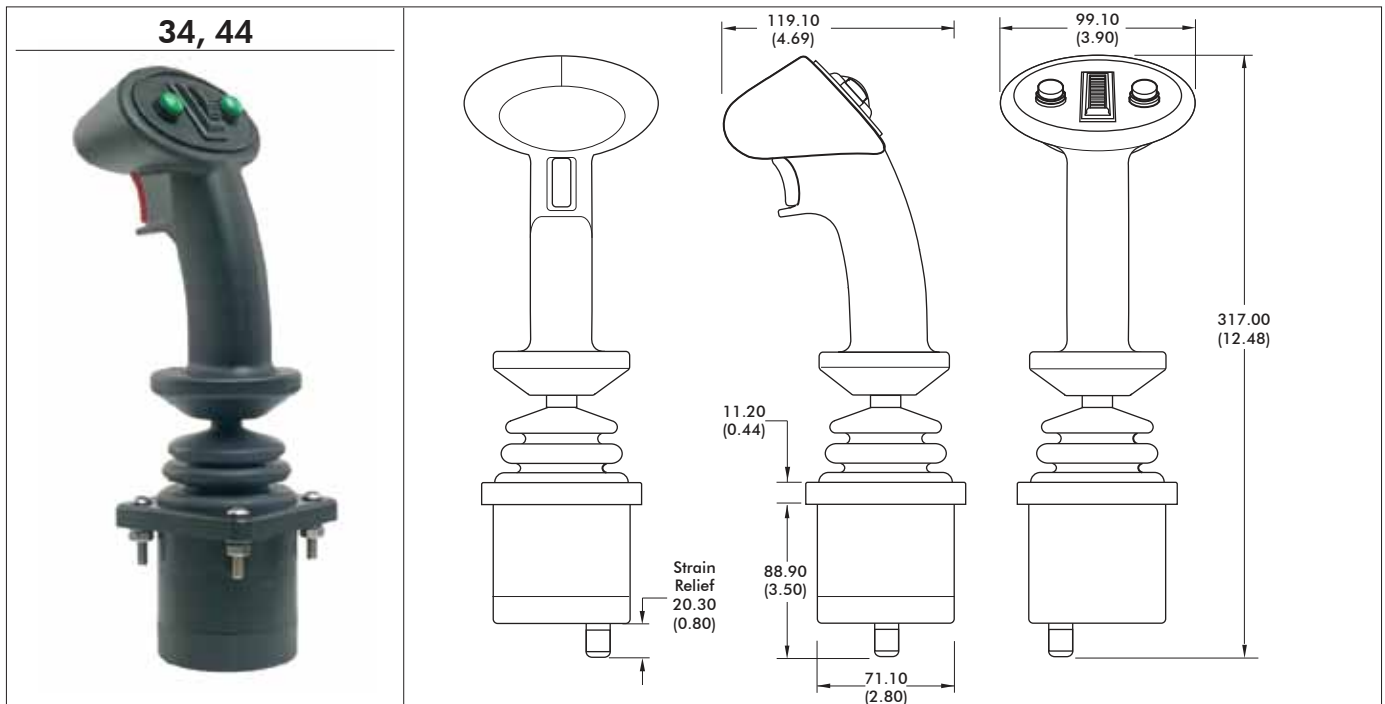
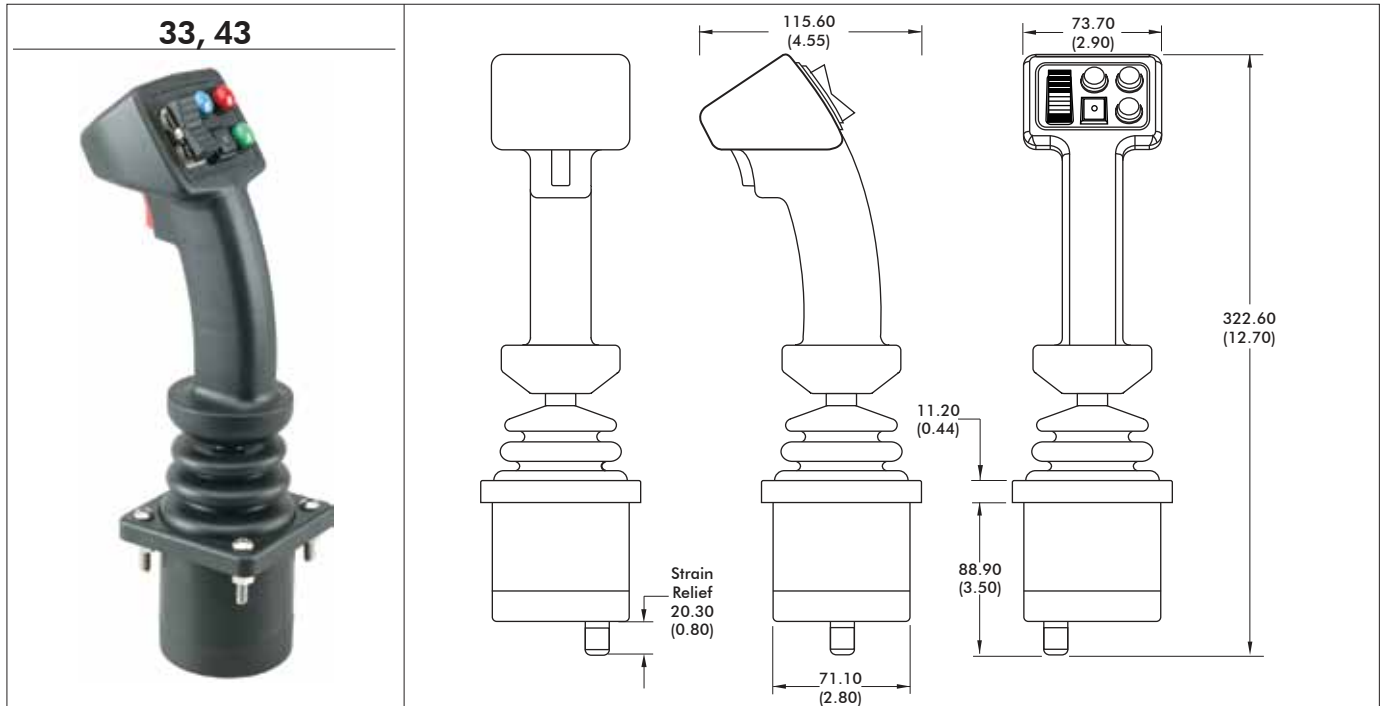
Overview



# HG series

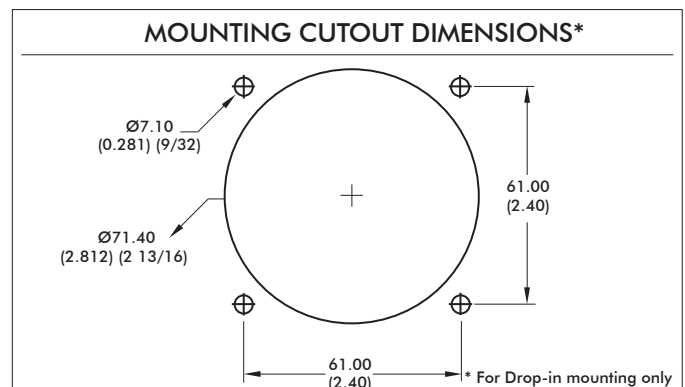
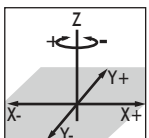
## Hand grip Hall effect joysticks

Overview



**NOTES:**

1. Dimensions are in mm/(inch).
2. Actual strain relief position may vary.
3. For below panel lower profile housings, the strain relief [20.30/(0.80)] can be replaced with a rubber grommet [1.27/(0.05)], and the standard housing cap [18.54/(0.73)] can be replaced with a short cap [11.94/(0.47)]. These options are available only for joysticks without additional boards, except USB.
4. Axis orientation:

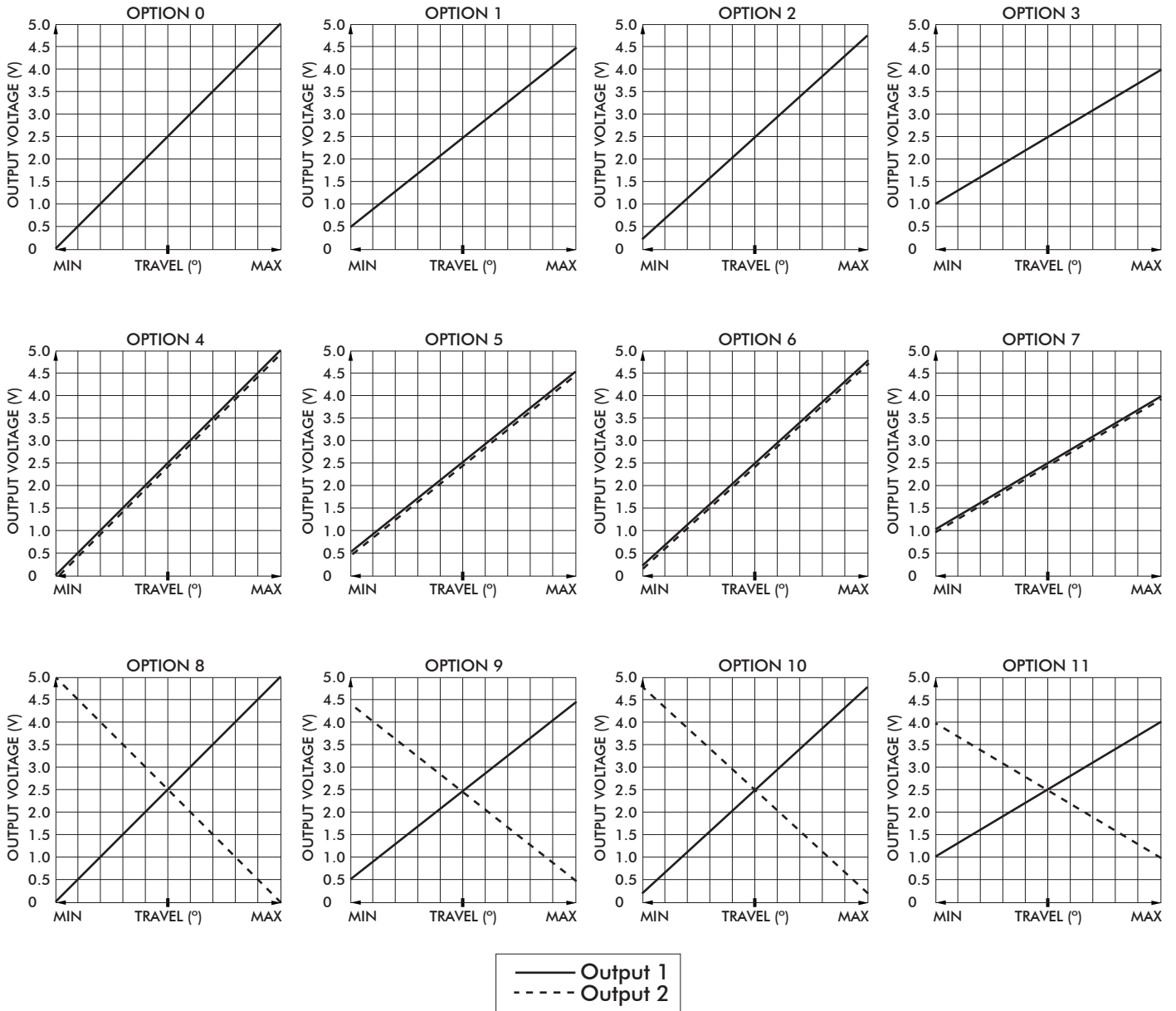


# HG series

## Hand grip Hall effect joysticks

Overview

### VOLTAGE OUTPUT OPTIONS



# HG series

## Hand grip Hall effect joysticks

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. 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

#### SUPPLIED WIRING

USB: USB Male Type A Connector with overmolded cable

#### 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 shipboard and military applications.

#### FEATURES

- HID compliant "pointing device"
- Plug-and-play with USB option

#### SUPPLIED WIRING

USB: USB Male Type A Connector with overmolded cable



# HG series

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Overview

### CANBUS

#### CANbus J1939

APEM's HG CANbus joysticks conform to the SAE J1939 serial bus specification used for communications between electronic control units and vehicle components. The HG CANbus option provides I/O extension for up to 24 digital and 11 analog inputs.

#### ELECTRICAL SPECIFICATIONS

- Supply Voltage: 6VDC to 35 VDC
- Supply Current: 15mA min, +5mA per LED, +10mA per axis

#### WIRING SPECIFICATION

- Red Wire: Supply Power
- Black Wire: Ground
- Green Wire: CAN high data
- White Wire: CAN low data
- Blue Wire: Identifier Select LSB
- Orange Wire: Identifier Select MSB

#### 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)

#### CONNECTOR OPTIONS:

- Cable assembly with Deutsch DT04 style plugs

#### CANbus CONFIGURATION:

- Contact Technical Support for assistance

#### CANopen

- Contact Technical Support for assistance with CANopen configuration.

# HG series

## Hand grip Hall effect joysticks

Overview

### ADDITIONAL OUTPUT OPTIONS

#### DISCRETE OUTPUT

Discrete Output is a microprocessor based option providing up to 6 hi voltage/hi current, on/off outputs as well as proportional outputs. The Discrete Output provides an electronic "switch stick" function.

#### APPLICATIONS

The Discrete Output option is designed for small motor, reversing starters or hydraulic solenoid actuations.

#### DC SPECIFICATIONS

- Supply Voltage Operating: 6.0VDC to 35VDC input power
- Supply Current: 30mA + 10mA per Hall sensor
- Sourcing Outputs: 70V AC/DC @ 1.6A max.
- Sinking Outputs: 70V AC/DC @ 3.2A max.
- Discrete Output Max: 60VDC/AC, 3.2A per discrete output

#### I/O COMPLEMENT AND USER SPECIFIED PARAMETERS:

Up to 3 axis and 6 discrete sourcing or sinking outputs.

#### DISCRETE OUTPUT CONFIGURATION FORM:

Discrete Output	Sourcing	Sinking	AC	DC
Xfwd				
Xrev				
Yfwd				
Yrev				
Zfwd				
Zrev				

#### SAMPLE OF COMPLETED FORM:

(Please enter required choices for each applicable axis and return form to factory.)

Discrete Output	Sourcing	Sinking	AC	DC
Xfwd		X		X
Xrev		X		X
Yfwd	X			X
Yrev	X			X
Zfwd		X		X
Zrev		X		X

#### 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 Output Voltage:

- 0-5VDC
- 0-10VDC
- $\pm 5$ VDC
- $\pm 10$ VDC

#### ELECTRICAL SPECIFICATIONS

- Supply Voltage: (Output Voltage + 1VDC) to 30VDC
- Supply Current: 90mA max