



- Hall effect sensing
- Ergonomic design
- Multiple faceplate configurations
- Sealed up to IP67
- CANbus J1939, CANopen & analog output options

MECHANICAL (FOR X AND Y AXIS)

- Break Out Force: 7.6N (1.70lbf)
- Operating Force: 13.8N (3.10lbf)
- Maximum Applied Force: 1000.8N (225.00lbf)
- Mechanical Angle of Movement: 38°
- Expected Life: 1 million cycles
- Lever Action (Centering): Spring centering
- Material: Glass reinforced nylon

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: IP65 to IP67
- EMC Immunity Level (V/M): IEC 61000-4-8:2009
- EMC Emissions Level: IEC 61000-4-3:2006
- ESD: IEC 61000-4-2:2008

ELECTRICAL SENSOR

- Sensor: Hall effect
- Resolution: 1.22mV
- Supply Voltage Range: 5.00V±0.01V
- Reverse Polarity Max: -10V
- Overvoltage Max: 20V
- Output Impedance: 2Ω
- Return to Center Voltage Tolerance: ±200mV initial
- Supply Current: 13mA per sensor

CANbus OUTPUT VERSION

- Supply Voltage Range: 6V to 35V
- CANbus Version: J1939, CANopen

STANDARD PUSHBUTTON SWITCH CHARACTERISTICS/RATINGS

- Max Current / Voltage Rating with Resistive Load: 400mA 32VAC - 100mA 50VDC - 125mA 125VAC
- Low Level: 10mA @ 30mV
- Electrical Life at Full Load: 500,000 cycles
- Mechanical Life: 1 million cycles
- Environmental Seal: IP67
- Action: Momentary, pushbutton
- Operating Force: 7N±3N (1.57lbf±0.67lbf)
- Total Travel: 1.9mm (0.07 inches)±0.3mm (0.01 inches)

INDEX TRIGGER 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: 25,000 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

NOTES:

All values are nominal.
Exact specifications may be subject to configuration.
Contact Technical Support for the performance of your specific configuration.

AG series

Agricultural grips

Overview

AG								
SERIES	Faceplate P Plastic - Custom populated M Metal - Custom populated ¹ X None	Operator Presence 0 None	Spring Tension² 1 Standard 2 Heavy 3 Handle only, no spring	Terminations P Standard wire harness ³ D Deutsch connectors B 5 pole binder connector ⁴				
Handle 1 Gray 2 Black	Index Trigger 1 Momentary	Limiter Plate S Square R Round X Slotted Y Slotted P Plus G Guided feel H Guided feel Q Handle only	Output Options 00 0V to 5V (Rail to Rail) 01 0.5V to 4.5V 02 0.25V to 4.75V 03 1V to 4V 04 0V to 5V - Sensor 1 0V to 5V - Sensor 2 05 0.5V to 4.5V - Sensor 1 0.5V to 4.5V - Sensor 2 06 0.25V to 4.75V - Sensor 1 0.25V to 4.75V - Sensor 2 07 1V to 4V - Sensor 1 1V to 4V - Sensor 2 08 0V to 5V - Sensor 1 5V to 0V - Sensor 2 09 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 12 Cursor Emulation 13 Discrete Outputs 14 USB 15 Voltage Regulator 16 CANbus J1939 17 CANopen 20 Custom ²	Sealing E Environmental Sealing N Not Sealed				

NOTES:

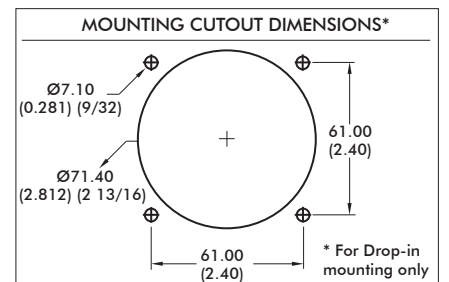
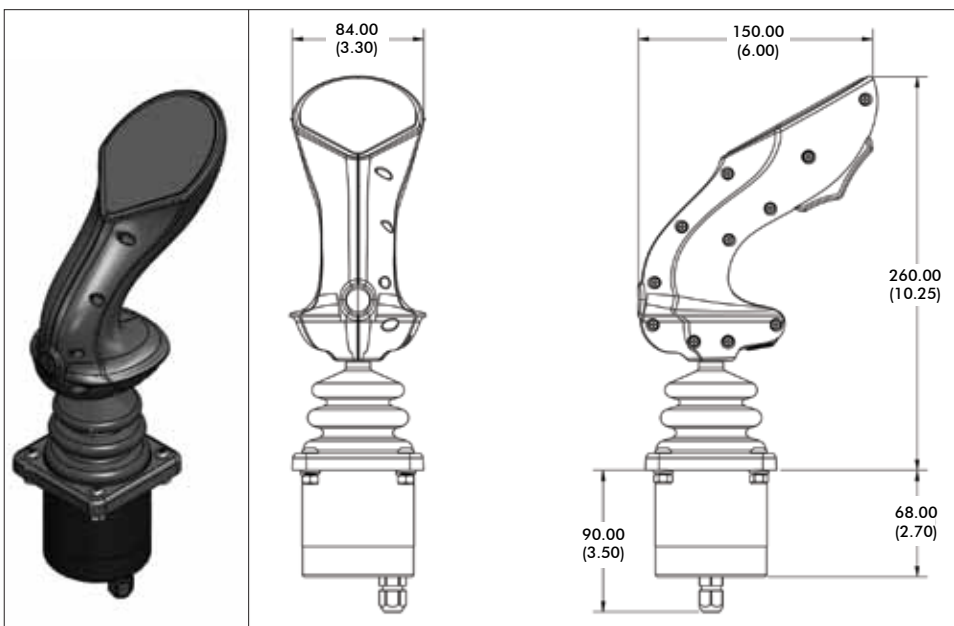
- Contact Technical Support for custom options.
- X/Y axis spring tension. Contact Technical Support for information on best possible spring for your chosen configuration.
- Standard wire harness is 22AWG, 18" long.
- Only one identifier wire if CANbus.



Sealed up to IP67. Dependent upon handle configuration.

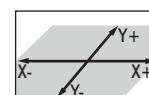


Mounting accessories. Standard hardware includes: 1 gasket, 4 nuts (1/4-20), 4 washers (1/4), 4 hex head screws (1/4-20x1 1/4).



NOTES:

- Dimensions are in mm/(inch).
- Actual strain relief position may vary.
- 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.
- Axis orientation:



FACEPLATE OPTIONS

The AG series may be configured with a black anodized aluminum or a plastic faceplate, providing a near limitless combination of pushbutton and linear device configuration options. Faceplate configuration options include proportional Hall effect pushbuttons, latching LED pushbuttons, LED indicators, and proportional miniature joysticks.



JOYSTICK AND GRIP OPTIONS

The AG series handle can be fitted onto a one or two axis Hall effect joystick mechanism or it can be supplied as just a Fixed Grip™.



INDEX TRIGGER

The AG series handle is available with a normally open momentary index trigger.

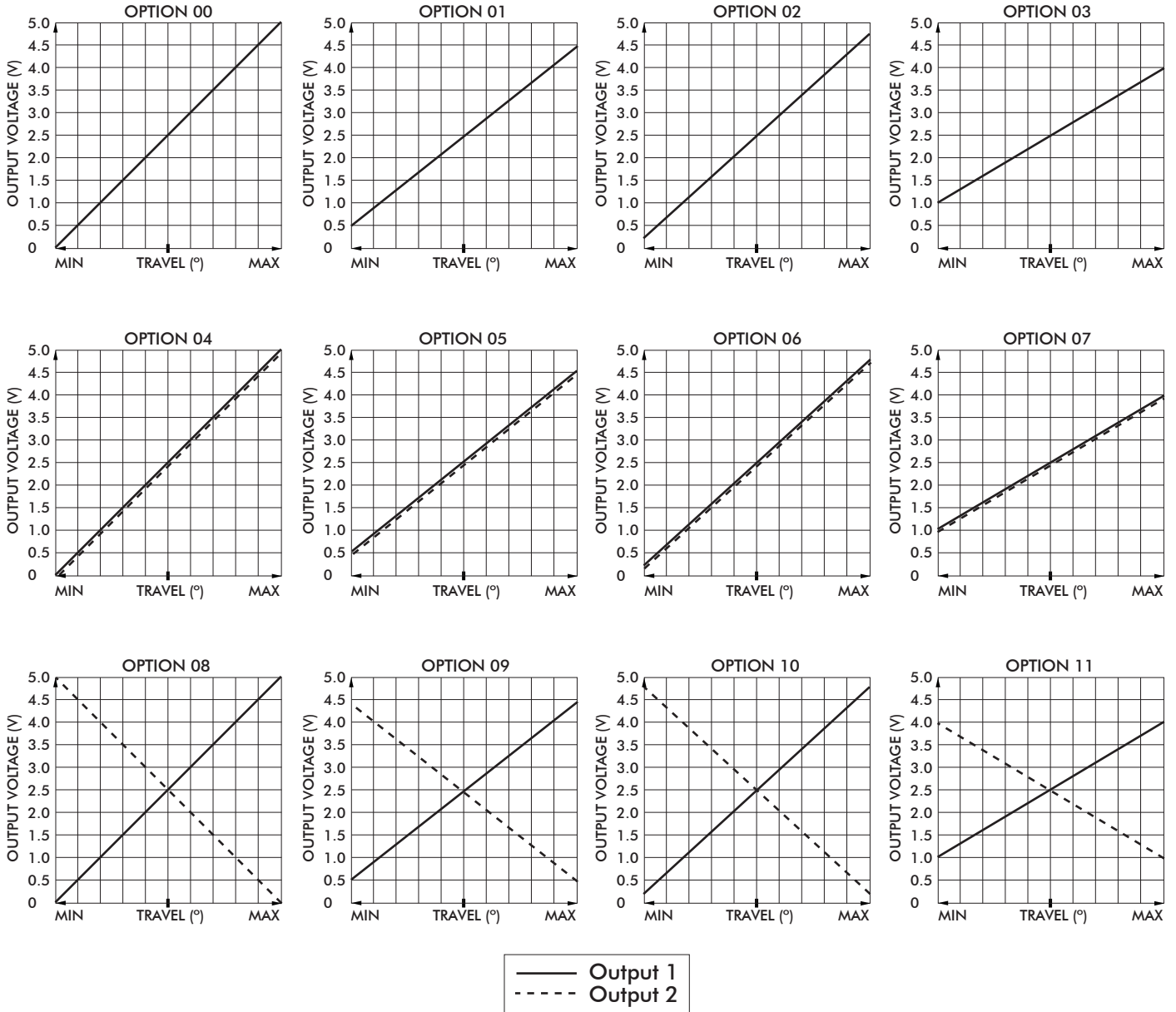


AG series

Agricultural grips

Overview

VOLTAGE OUTPUT OPTIONS



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



AG series

Agricultural grips

Overview

CANBUS

CANbus J1939

APEM's CANbus joysticks conform to the SAE J1939 serial bus specification used for communications between electronic control units and vehicle components. The AG CANbus option provides I/O extension for up to eight digital and 4 analog inputs, or four digital inputs and a switch matrix of 4 x 6 for up to 24 switches.

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

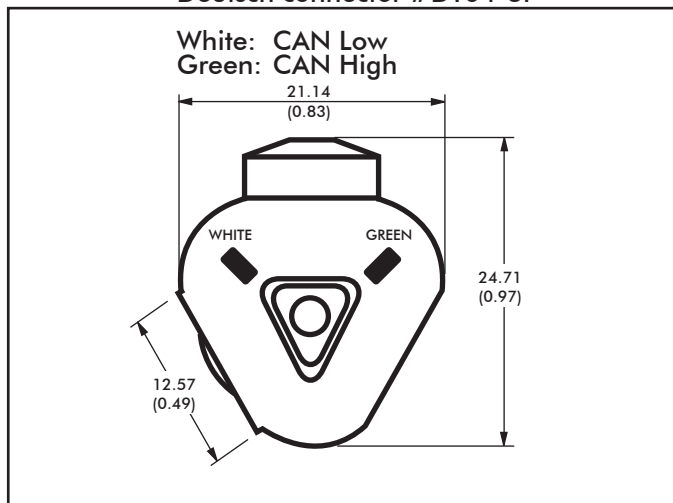
CANbus CONFIGURATION

- Contact Technical Support for assistance.

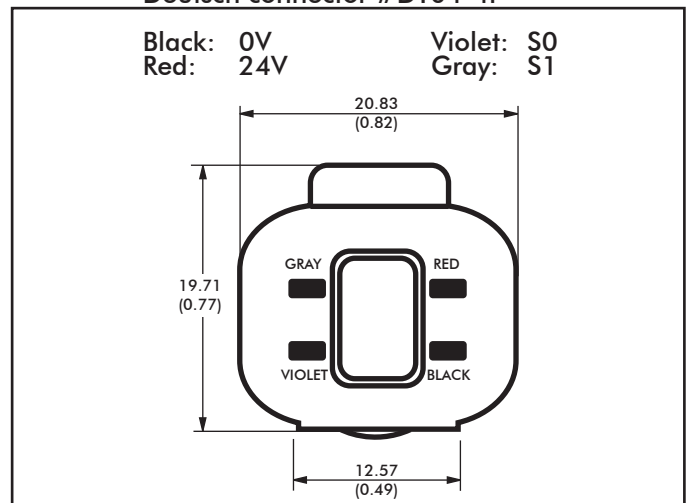
PINOUT INFORMATION

The CANbus AG series joystick is available with industry standard Deutsch connectors #DT04-3P and #DT04-4P for easy installation. The pinouts are listed below.

Deutsch connector #DT04-3P



Deutsch connector #DT04-4P



NOTES:

1. Dimensions are in mm/(inch).
2. Standard cable harness is 450mm (18inch) long, 22AWG, with flying leads.

CANopen

- Contact Technical Support for assistance with CANopen configuration.

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
- ±5VDC
- ±10VDC

ELECTRICAL SPECIFICATIONS

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