



The TH Single Axis Throttle is a heavy duty friction clutch joystick delivering proportional control. Designed for prolonged use and durable enough to withstand rough operation, commonly used applications include material handling and mobile equipment. The TH Single Axis Throttle utilizes non-contacting Hall effect technology. Configuration options include mechanical detents and electronic microswitches.

KEY FEATURES

- Rugged, hand operation**
- Hall effect sensing**
- Single axis friction clutch operation**
- Optional mechanical detents with microswitches**
- CANbus J1939 and USB options**
- Redundant output available**
- Sealed up to IP68**



TH series

Single-axis throttle joysticks

OPTION SELECTION

TH												
SERIES	FRONT BUTTONS		SIDE BUTTONS*			MECHANICAL DETENTS		OUTPUT OPTIONS				
	0	None	0	None	0	None	0	0V to 5V (Rail to Rail)				
	1	One	U	One - Upper Position	1	-35°	1	0.5V to 4.5V				
			L	One - Lower Position	2	0°	2	0.25V to 4.75V				
			T	Two	3	+35°	3	0V to 5V - Sensor 1 0V to 5V - Sensor 2				
			D	Deadman	4	-35° and 0°	4	0.5V to 4.5V - Sensor 1 0.5V to 4.5V - Sensor 2				
			M	Multifunction (includes Index Trigger)	5	-35° and +35°	5	0.25V to 4.75V - Sensor 1 0.25V to 4.75V - Sensor 2				
			P	Palm Grip (includes 1 Front Button)	6	0° and +35°	6	0V to 5V - Sensor 1 5V to 0V - Sensor 2				
				* - All that apply.	7	-35°, 0° and +35°	7	0.5V to 4.5V - Sensor 1 4.5V to 0.5V - Sensor 2				
							8	0.25V to 4.75V - Sensor 1 4.75V to 0.25V - Sensor 2				
								0-U USB				
								0-D Discrete				
								2-C CANbus				
HANDLE			TOP BUTTONS		MICROSWITCHES		MOUNTING OPTIONS		ADDITIONAL OPTIONS			
0	Ball Tip		0	None	0	None	R	Rear mount			V	Voltage Regulator
1	Stock Grip ^{1, 2}		1	One	1	-35°	D	Drop-in			D	Dual Decode ₉
2	Short Stock Grip ¹		2	Two	2	0°				AD	Analog Deadband	
3	Multifunction Square ³		3	Multifunction*	3	+35°				DC	Center Detect	
4	Multifunction Oval ³			* - Multifunction handle will be specified in an extension	4	-35° and 0°				P	Proximity Sensor	
5	Palm Grip				5	-35° and +35°				E	Environmental Sealing	
X	No Handle ⁸				6	0° and +35°						
Z	Custom Handle ⁸				7	-35°, 0° and +35°						

NOTES:

1. Refer to next page for information on standard configurations for throttles with Stock Grip and Short Stock Grip handles.
2. Stock Grip handles can have either a Deadman or a Proximity Switch.
3. Refer to next page for information on standard configurations for joysticks with Multifunction handles.
4. Multifunction handles can have either an Index Trigger or a Proximity Switch.
5. Multifunction handle orders should be accompanied by drawing of button/component placement.
6. Multifunction handle requires Drop-in mounting.
7. Option X (no handle) and Option Z (custom handle) may require discussion with Technical Support.
8. Dual Decode cannot be used with CANbus, USB, or Voltage Regulator.



Up to IP68 available.

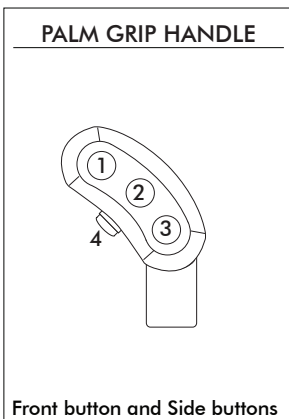
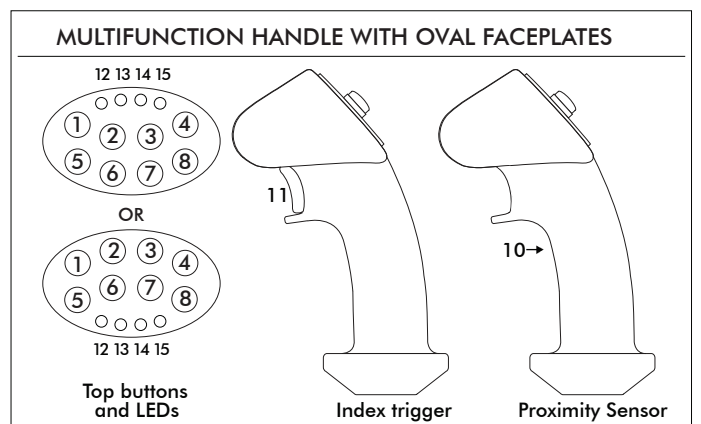
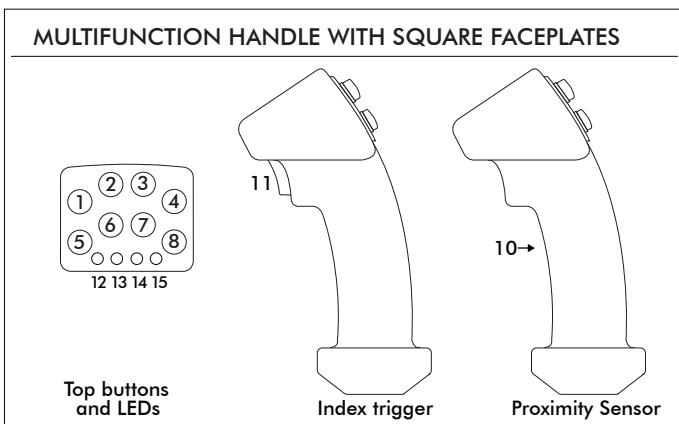
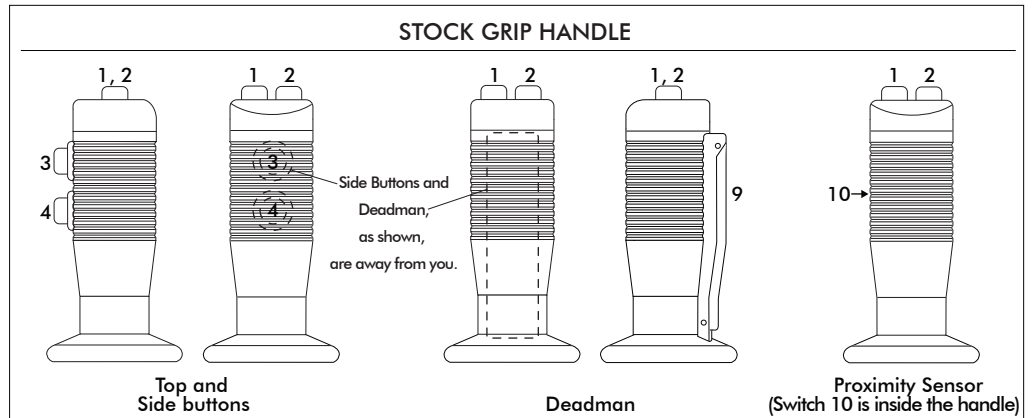
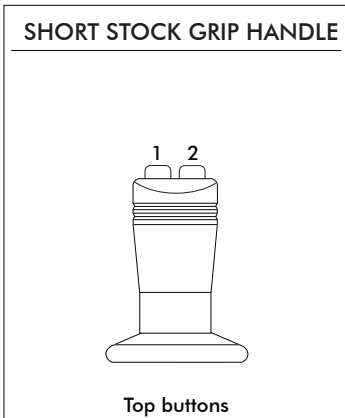


Mounting accessories. Standard hardware includes: 1 gasket, 4 screws (10-32x3/4 Phillips Flat Head), 4 washers (#10 Split Lock), 4 nuts (10-332 Hex). The gasket and the mounting hardware are shipped off the throttle, in a separate bag.

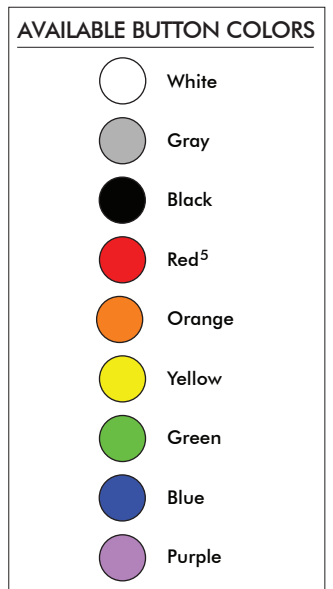
TH series

Single-axis throttle joysticks

STANDARD CONFIGURATIONS



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)	
GRAY	Switch 3 (optional)	
BROWN	Switch 4 (optional)	
PINK	Switch 5 (optional)	
BLUE/WHITE	Switch 6 (optional)	
YELLOW/BLACK	Switch 7 (optional)	
GREEN/BLACK	Switch 8 (optional)	
PURPLE/WHITE	Deadman - Switch 9 (optional)	
YELLOW/WHITE	Proximity Sensor - Switch 10 (optional)	
RED/WHITE	Index trigger - Switch 11 (optional)	
LIGHT GREEN	LED - 12 (optional)	
LIGHT ORANGE	LED - 13 (optional)	
GRAY/WHITE	LED - 14 (optional)	
BLACK/WHITE	LED - 15 (optional)	



NOTES:

* - Starting from the strain relief, the cable is 406mm (16in) long, 6.40mm (0.25in) stripped with plug, covered with an expandable cable sleeve.

1. The maximum possible configuration for the Short Stock Grip handle is up to 2 Top Buttons. It is not possible with Deadman, Index Trigger, Proximity Switch, or Side Buttons.
2. The maximum possible configuration for the Stock Grip handle is up to 2 Top Buttons and 2 Side Buttons. A handle with a Deadman or a Proximity Sensor can have 2 Top Buttons, but no Side Buttons.
3. A Multifunction handle can have a maximum of 8 Top Buttons and 4 LEDs on the faceplate, and an Index Trigger or a Proximity Sensor.
4. For non-standard configurations contact Technical Support. We can customize the faceplate according to your exact needs. For faceplate examples, see next page.
5. If unspecified, the pushbuttons will have snap action momentary switches with red button caps.
6. Switches will always be wired according to the position number on the handle and the Default Wire Color Code.

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

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Single-axis throttle joysticks

FACEPLATE EXAMPLES

OVAL



1



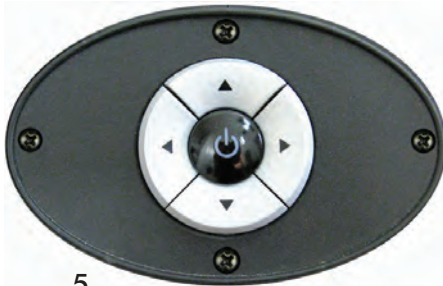
2



3



4



5



6



7



8



9

SQUARE



10



11



12



13



14



15



16



17

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SPECIFICATIONS

MECHANICAL

Break Out Force	-	6.6N (1.50lbf)
Operating Force	-	7.7N (1.70lbf)
Mechanical Angle of Movement	-	70°
Expected Life	-	10 million cycles
Mass/weight	-	Varies
Material	-	Glass reinforced nylon
Lever Action (Centering)	-	Friction

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 61000-4-8:2009
EMC Emissions Level	-	IEC 61000-4-3:2006
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 Impedance	-	6Ω
Current Consumption Max	-	10mA
Error Signal	-	2%

ELECTRICAL MICROSWITCH

Electrical rating	-	0.1 A at 30 VDC (resistive load)
Operating speed	-	1 mm to 250 mm/s
Operating frequency	-	Mechanical: 240 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	-	100 MΩ min. (at 500 VDC)
Contact resistance	-	100 mΩ max.
Dielectric strength	-	600 VAC, 50/60 Hz for 1 min between terminals of the same polarity 1,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts
Vibration resistance	-	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	-	Destruction: 1,000 m/s ² (approx. 100G) max. Malfunction: 200 m/s ² (approx. 20G) max.
Durability	-	Mechanical: 1,000,000 operations min.(60 operations/min) Electrical: 100,000 operations min.(30 operations/min)
Sealing	-	IP67 (excluding solder terminals)
Operating temperature	-	-40°C to +85C

STANDARD SWITCH CHARACTERISTICS/RATINGS

Electrical Resistive Load:	-	5A
Electrical Inductive Load:	-	3A
DWV:	-	1050Vrms
Low Level:	-	10mA @ 30mV
Electrical Life:	-	25,000 cycles 5A @ 28VDC resistive snap-action
Mechanical Life:	-	1million cycles
Environmental Seal:	-	IP67
Action:	-	Momentary, snap-action
Operating Force:	-	1.7 lbs +/- 0.5 lb
Total Travel:	-	0.080 inches max
Over Travel:	-	0.010 inches min

CANbus OUTPUT VERSION

Supply Voltage Range (Vdc)	-	6V to 40V
CANbus version	-	J1939

NOTES:

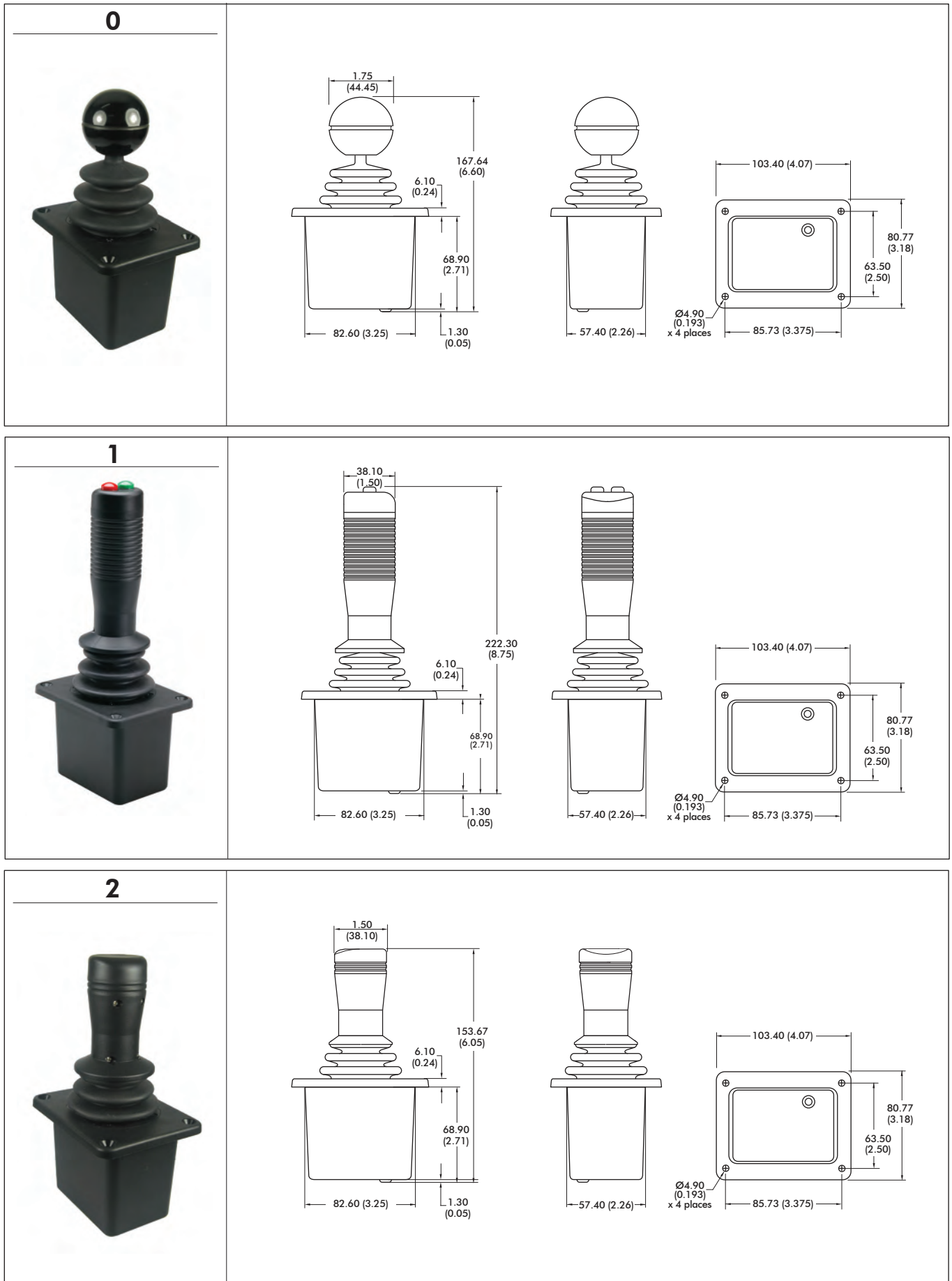
- All values are nominal
- Exact specifications may be subject to configuration.
Contact Technical Support for the performance of your specific configuration.
- * Excludes some handle options.

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DIMENSIONAL DRAWINGS



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Single-axis throttle joysticks

DIMENSIONAL DRAWINGS - continued

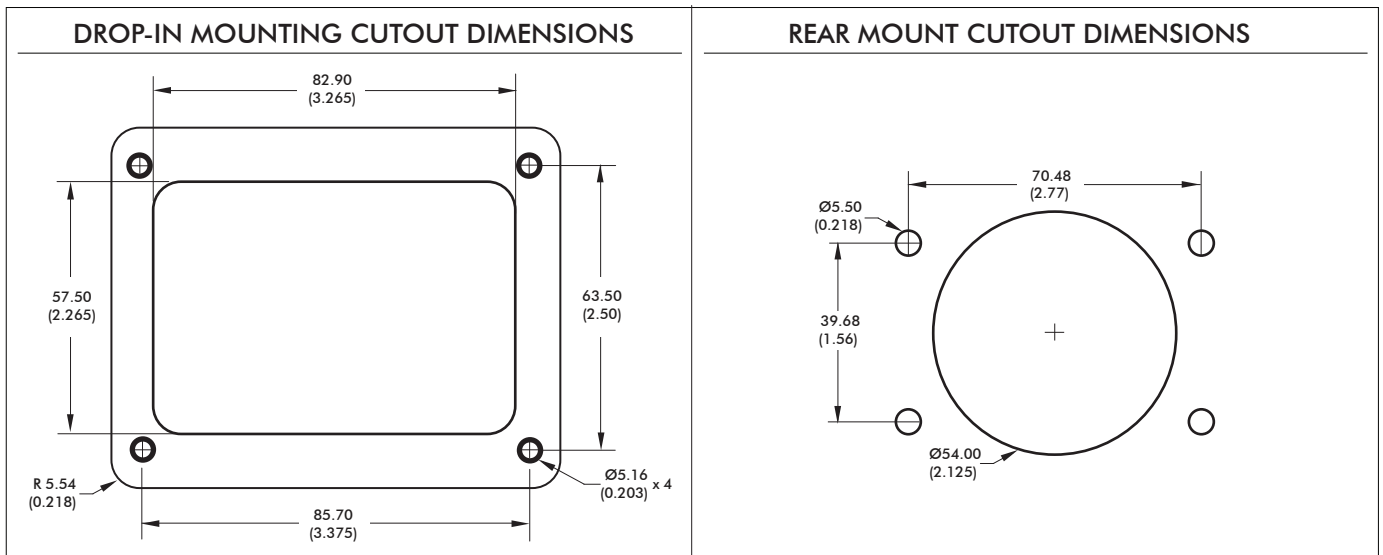
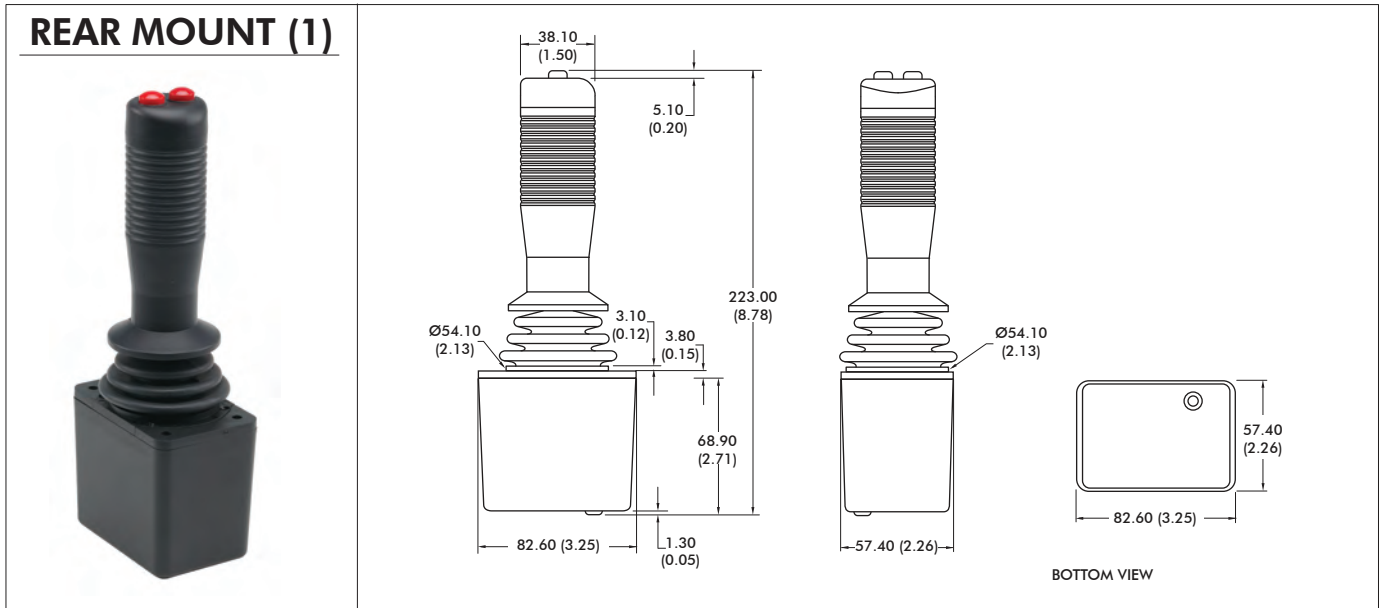


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TH series

Single-axis throttle joysticks

DIMENSIONAL DRAWINGS - continued



NOTE:

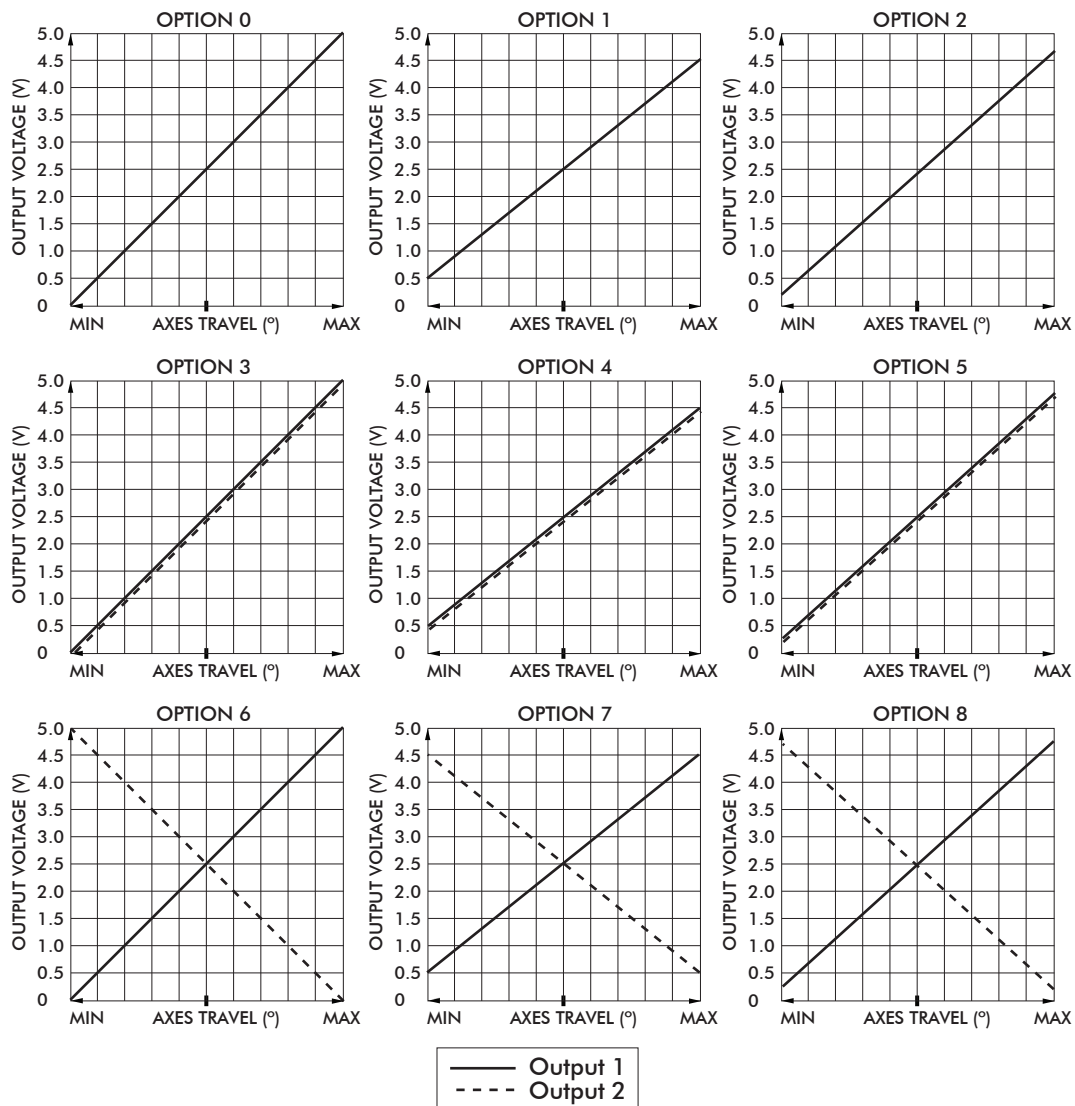
1. Dimensions are in mm/(inch)

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CONFIGURATION OPTIONS

LINEAR OUTPUT OPTIONS



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Single-axis throttle joysticks

CONFIGURATION OPTIONS - continued

ADDITIONAL OUTPUT OPTIONS

CANbus J1939

CH Products TH CANbus Throttles conform to the SAE J1939 serial bus specification used for communications between electronic control units and vehicle components.

FEATURES

- CANbus J1939
- Up to 16 digital and 3 analog inputs
- Accommodates a 6-40VDC power supply

ELECTRICAL SPECIFICATIONS

Supply Power:	-	6 – 40 VDC
Supply Current:	-	15mA min, +5mA per LED, +6mA 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
Orange Wire	-	Identifier Select

CONNECTOR OPTIONS:

- Cable assembly with Deutsch DT04 style plugs
- External I/O harnessing per customer specification

CANbus CONFIGURATION CHART

- Contact factory for assistance

BAUD RATE (Check one)		250K	500K	1000K		BLUE WIRE	ORANGE WIRE		
11 BIT IDENTIFIER (CAN2.0A) (Hex)	#1 TX	1	0			G	G		
	RX								
	#2 TX						G		
	RX								
	#3 TX					G			
	RX								
	#4 TX								
	RX								
29 BIT IDENTIFIER (CAN2.0B) (Hex)	#1 TX	3	2	1	0	G	G		
	RX								
	#2 TX						G		
	RX								
	#3 TX					G			
	RX								
	#4 TX								
	RX								
8 BYTE TX DATA FRAME (Binary)	7	6	5	4	3	2	1	0	IDENTIFIER SELECT WIRES (SUPPLIED IN PIGTAIL)
8 BYTE RX DATA FRAME (Binary)									
AXIS DATA TYPE (Check one)	SIGNED CHAR (+/-127)	UNSigned CHAR (0-255)	UNSigned INT (0-1023)	UNSigned INT (0-4095)					G=TIED TO 0V (BLACK WIRE)

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

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Single-axis throttle joysticks

CONFIGURATION OPTIONS - continued

ADDITIONAL OUTPUT OPTIONS

PLUG-AND-PLAY SOLUTIONS: USB

Featuring USB 1.1 HID compliant interface, CH Products' USB throttles are recognized as standard HID "game controller" devices. Adhering to the HID specification, CH Products' USB throttles are plug-and-play with most versions of Windows and Linux. Joystick button and axes assignments are dependent upon the controlled application.

FEATURES

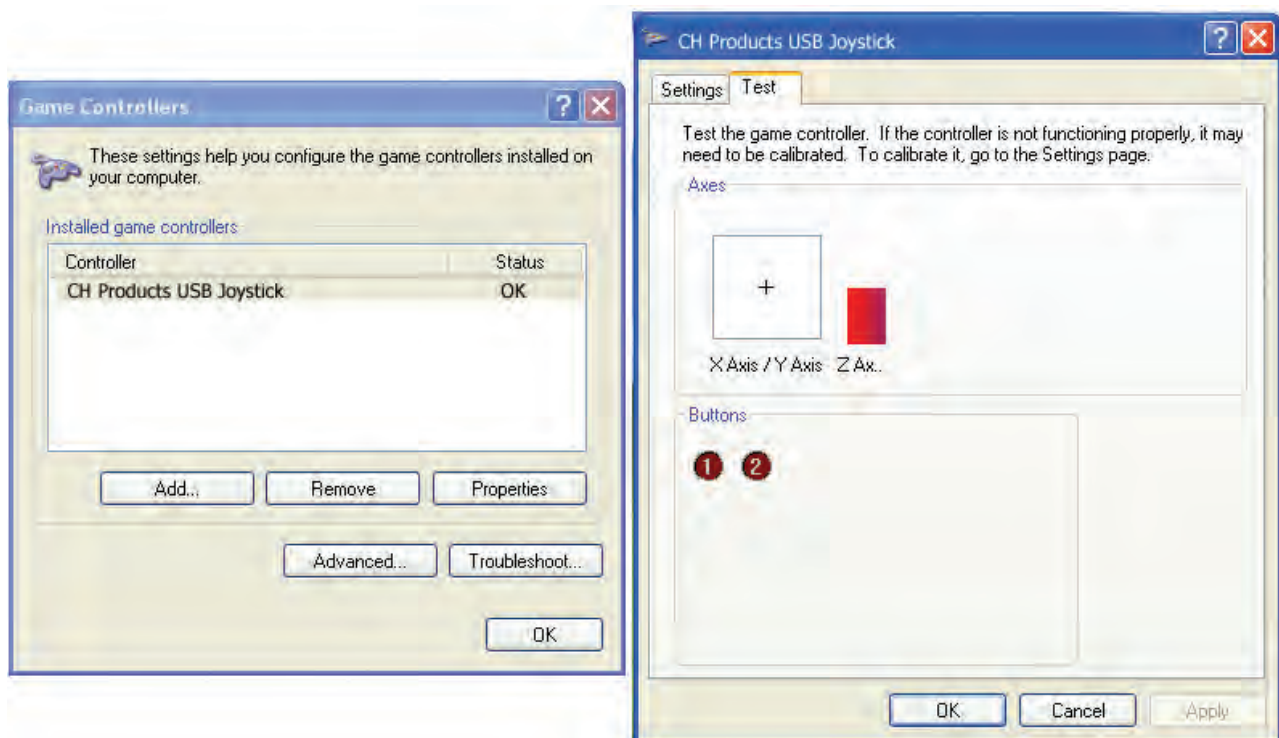
- USB 1.1 HID compliant "game controller" device
- Easy to install and operate
- Functions determined by controlled application.
- Standard male type "A" connector

SUPPLIED WIRING

USB: USB Male Type A Connector with over-molded cable
(Optional ruggedized military connectors are available.)



USB Male Type A Connector



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CONFIGURATION OPTIONS - continued

ADDITIONAL OUTPUT OPTIONS

VOLTAGE REGULATOR

The Voltage Regulator is a multi-wired analog option to mate a Hall effect throttle 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
White wire	-	Pushbutton common wire
Orange,violet,gray,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.

ELECTRICAL SPECIFICATIONS

Supply Power	-	4.5VDC to 5.5VDC
Supply Current	-	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
White wire	-	Pushbutton common wire
Orange,violet,gray,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

TH series

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

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. Featuring a microcontroller, an a/d converter, and 4 to 8 optically isolated solid state switches, the Discrete Output provides an electronic "switch stick" function. Switch combinations and firing angles are programmed to the application's requirement.

APPLICATIONS

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

DC SPECIFICATIONS

Supply Voltage Operating	-	5.0- 40VDC input power
Supply Current	-	30mA + 10mA per hall sensor
Sourcing Outputs	-	70V AC/DC @ 1.6A max.
Sinking Outputs	-	70V AC/DC @ 3.6A max.
Discrete Output Max	-	60VDC/AC, 3.2A per discrete output

WIRING

Red Wire	-	customer power supply 5 - 40VDC
Black Wire	-	customer power supply ground
Blue Wire	-	X axis output
Blue/White Wire	-	X axis discrete output
White Wire	-	pushbutton common wire
Orange,violet,gray,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire	-	pushbutton outputs

I/O COMPLEMENT AND USER SPECIFIED PARAMETERS:

Up to 3 axes and 6 discrete outputs sourcing or sinking discrete

DISCRETE OUTPUT CONFIGURATION FORM:

Discrete Output	Sourcing	Sinking	AC	DC
Xfwd				
Xrev				

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

TH series

Single-axis throttle joysticks

CONFIGURATION OPTIONS - continued

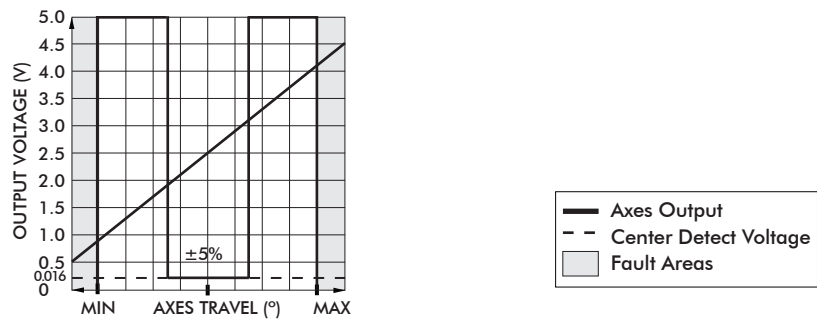
ADDITIONAL OUTPUT OPTIONS

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 "MCR" for a motion control system or as a brake release for an overhauling load.



DC SPECIFICATIONS

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

WIRING

Red Wire	-	power supply 4.5 - 5.5VDC
Black Wire	-	ground
Blue Wire	-	X axis output
Blue/White Wire	-	X 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

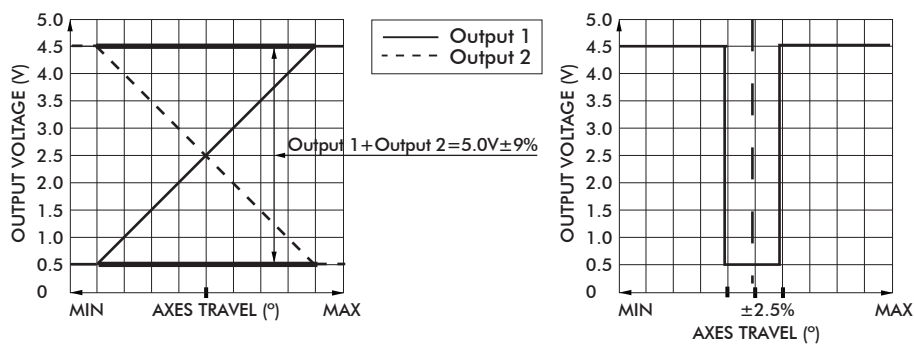
ADDITIONAL OUTPUT OPTIONS

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	-	Customer power supply 4.5VDC-5.5VDC
Black wire	-	Ground
Blue wire	-	X axis output
Bl/wt wire	-	X 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