

TH series

Proportional single axis throttle controllers •
non-contacting Hall effect technology



DISTINCTIVE FEATURES

Friction hold

Single or redundant outputs



ENVIRONMENTAL SPECIFICATIONS

- Operating Temperature: -25 °C to +70 °C (-13 °F to +158 °F)
- Storage Temperature: -40 °C to +70 °C (-40 °F to +158 °F)
- Above Panel Sealing: Up to IP63 (subject to handle configuration)
- EMC Immunity Level: EN61000-4-3: 2006
- EMC Emissions Level: EN61000-4-8: 2009
- ESD: EN61000-4-2: 2008



ELECTRICAL SPECIFICATIONS

- Supply Voltage range: 5.00 VDC \pm 0.01 VDC
- Reverse Polarity Max: -14.5 VDC
- Ratiometric Output Voltage: See options
- Transient Overvoltage max: 18 V
- Output Impedance: 6 Ω
- Return to Center Voltage Tolerance: \pm 200 mV initial
- Current Consumption Max: 10 mA



MECHANICAL SPECIFICATIONS

- Operating Force: 7.7 N (1.70 lbf)
- Break Out Force: 6.6 N (1.50 lbf)
- Mechanical Angle of Movement: 70°
- Expected Life: 10 million lifecycles
- Mass /weight: Varies
- Lever Action (centering): Friction

The company reserves the right to change specifications without notice.



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MATERIALS

- Body: Glass Filled Nylon
- Handles: Glass Filled Nylon

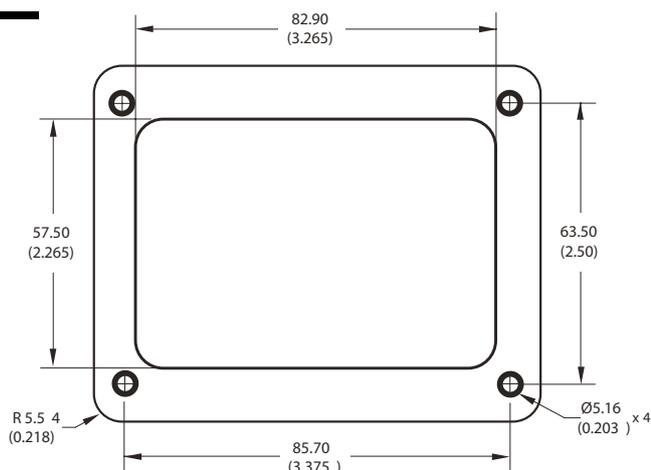


ELECTRICAL MICROSWITCH

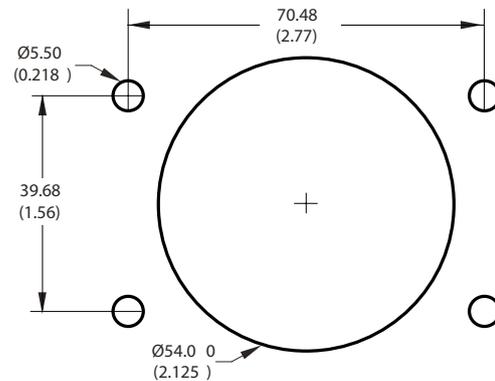
- Electrical rating: 0.1A at 30VDC (resistive load)
- Insulation resistance: 100 MΩ min (at 500VDC)
- Contact resistance: 100 MΩ max
- Dielectric strength: 600VAC, 50/60 Hz for 1 min between terminals of the same polarity; 1,000VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground and between each terminal and non current-carrying metal parts
- Vibration resistance: Malfunction 10 to 55Hz, 1.5mm double amplitude
- Shock resistance: Destruction 1,000 m/s² (approx.100G) max
Malfunction 200 m/s² (approx. 20G) max
- Durability: Mechanical 1,000,000 operations min. (60 operations/min)
Electrical 100,000 operations min. (30 operations/min)



DROP-IN MOUNTING CUT-OUT DIMENSIONS



REAR MOUNT CUT-OUT DIMENSIONS



CAN J1939 INTERFACE SPECIFICATION

The TH Series utilizes redundant Hall effect sensors to measure the primary X and Y axis. The CAN controller support various button configurations as well as proportional thumbwheels and mini-joysticks for additional axis data.

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 KHz
- Transmission repetition rate: 50ms
- BJMI/EJMI interval time: 20ms
- Terminating resistor: No
(available by special request to factory)
- Connection to Deutsch DTM04-6P connector:

Pin	Color	Function
1	White	CAN Lo
2	Green	CAN Hi
3	Blue	Source Address SEL 1
4	Orange	Source Address SEL 0
5	Black	Ground
6	Red	6 - 35 VDC

* Operating force: configuration option «L»



CAN J1939 INTERFACE SPECIFICATION (CONTINUED)

CAN MESSAGE PROTOCOL

- Primary Axis and button data on Basic Joystick Message 1 (BJM1):
 - Priority: 3
 - Base PGN: 0xFDD6
 - Source address: 0x10¹
 - Data field: 8 bytes
- Redundant Axis data on Extended Joystick Message 1 (EJM1):
 - Priority: 3
 - Base PGN: 0xFDD7
 - Source address: 0x10¹
 - Data field: 8 bytes
- Additional thumbwheels and mini-joysticks data on Extended Joystick Message 2 (EJM2):
 - Priority: 3
 - Base PGN: 0xFDD9
 - Source address: 0x10¹
 - Data field : 8 bytes

Note 1: Alternate source addresses can be configured by grounding of the blue and/or orange wires.

- Source address= 0x10: ORANGE= floating , BLUE= floating (default)
- Source address= 0x20: ORANGE= floating, BLUE= grounded
- Source address= 0x30: ORANGE= grounded, BLUE= floating
- Source address= 0x40: ORANGE= grounded, BLUE= 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
6/1	2	Button 4 status
6/3	2	Button 3 status
6/5	2	Button 2 status
6/7	2	Button 1 status
7/1	2	Button 8 status (Paddle if 6 button configuration) ²
7/3	2	Button 7 status (Trigger if 6 button configuration) ²
7/5	2	Button 6 status
7/7	2	Button 5 status
8/5	2	Button 10 status (Paddle if 8 button configuration) ²
8/7	2	Button 9 status (Trigger if 8 button configuration) ²

Note 2: If configured with no buttons, trigger and/or paddle would be positioned in Button n+1 and Button n+2.

EJM1 DATA FIELD STRUCTURE:

START POSITION (BYTE/BIT)	LENGTH (BITS)	FUNCTION
1/1	2	Redundant X-axis neutral position status
1/3	2	Redundant X-axis left position status
1/5	2	Redundant X-axis right position status
1/7 to 2/8	10	Redundant X-axis position data
3/1	2	Redundant Y-axis neutral position status
3/3	2	Redundant Y-axis down position status
3/5	2	Redundant Y-axis up position status
3/7 to 4/8	10	Redundant Y-axis position data

EJM2 DATA FIELD STRUCTURE:

START POSITION (BYTE/BIT)	LENGTH (BITS)	FUNCTION
1/1	2	A-axis neutral position status
1/3	2	A-axis left position status
1/5	2	A-axis right position status
1/7 to 2/8	10	A-axis position data
3/1	2	B-axis neutral position status
3/3	2	B-axis left position status
3/5	2	B-axis right position status
3/7 to 4/8	10	B-axis position data
5/1	2	C-axis neutral position status
5/3	2	C-axis left position status
5/5	2	C-axis right position status
5/7 to 6/8	10	C-axis position data

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BUILD YOUR PART NUMBER

SERIES	HANDLE ¹	FRONT BUTTONS	TOP BUTTONS	SIDE BUTTONS	MICROSWITCHES	
TH						
0	Ball Tip	0	None	0	None	
1	Stock Grip	1	One	U	1	-35°
2	Short Stock Grip		2	L	2	0°
5	Palm Grip ²			T	3	+35°
				D	4	-35° and 0°
				P	5	-35° and +35°
					6	0° and +35°
					7	-35°, 0 and +35°

MECHANICAL DETENTS	MOUNTING OPTIONS	OUTPUT OPTIONS	ADDITIONAL OPTIONS
0	R	0	E
1	Rear mount	1	Environmental sealing ³
2	D	2	
3	Drop-in	3	
4		4	
5		5	
6		6	
7		7	
		8	

NOTES

¹ See information on standard configurations for throttle handles

² Palm Grip handle requires drop-in mounting

³ Environmental sealing level available up to IP63 and dependant on handle configuration



ABOUT THIS SERIES

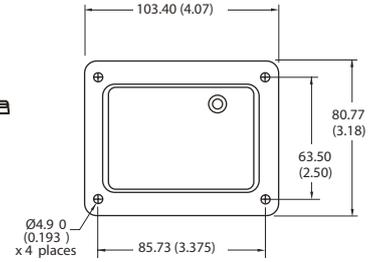
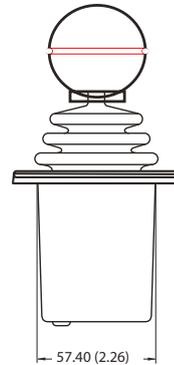
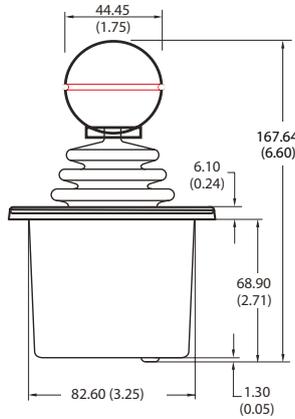


Mounting accessories : standard hardware includes: 1 gasket, 4 screws (10-32x3/4 Phillips flat head), 4 washers (#10 split lock), 4 nuts (10-32 hex). The gasket and mounting hardware are shipped off the throttle, in a separate bag.

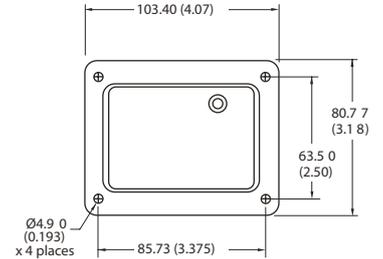
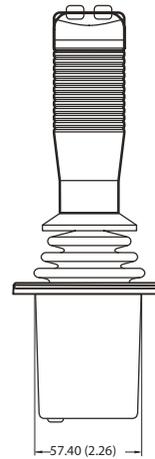
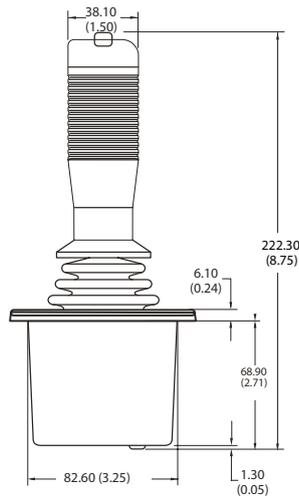
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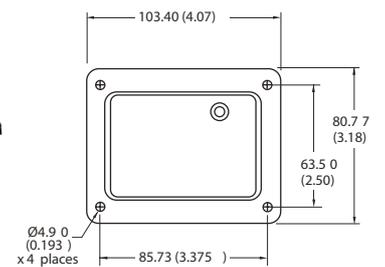
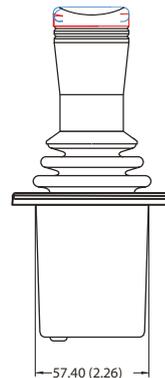
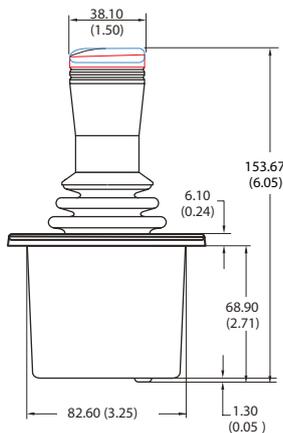
HANDLE 0 - BALL TIP



HANDLE 1 - STOCK GRIP



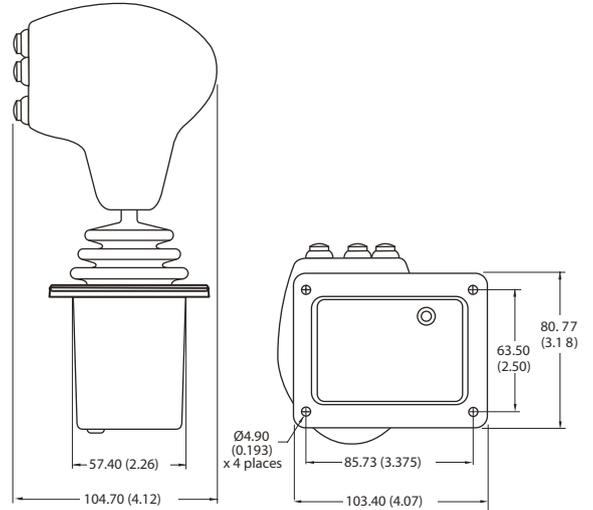
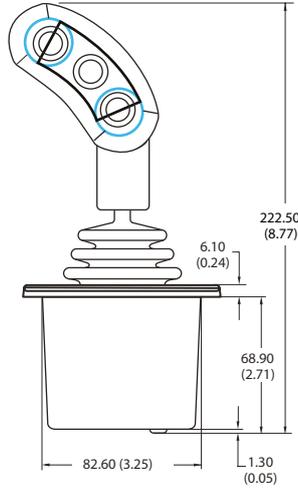
HANDLE 2 - SHORT STOCK GRIP



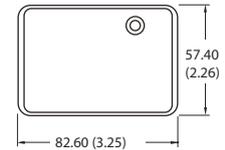
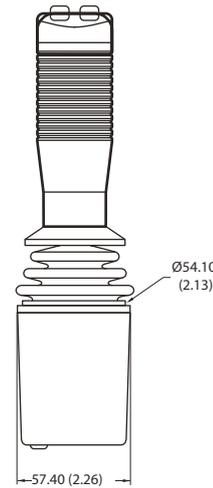
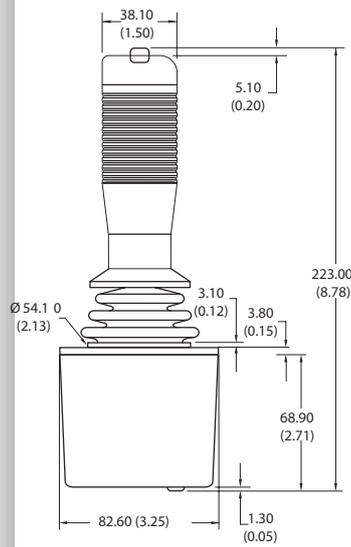
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HANDLE 5 - PALM GRIP



REAR MOUNT

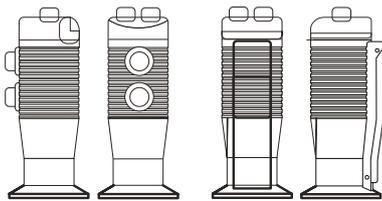


BOTTOM VIEW



HANDLE OPTIONS

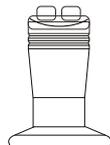
STOCK GRIP HANDLE (1)



Top & Side Buttons

Operator Presence Paddle

SHORT STOCK GRIP HANDLE (2)



Top Buttons

PALM GRIP HANDLE



Front Button and Side Buttons

AVAILABLE BUTTON COLORS



White, Gray, Black, Red (4), Orange, Yellow, Green, Blue, Purple

- 1 The maximum possible configuration for the Stock Grip handle is up to 2 Top Buttons and 2 Side Buttons.
- 2 The maximum possible configuration for the Short Stock Grip handle is up to 2 Top Buttons. Operator Presence Paddle, Index Trigger & Side buttons not available with this handle.
- 3 For non-standard configurations, contact APEM's Product Support Team
- 4 If unspecified, the pushbuttons will have snap action momentary switches with red button caps.

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