

LINEAR HALL EFFECT FINGER JOYSTICK

HTL
HALL EFFECT
JOYSTICK

2 & 4-WAY LINEAR HALL EFFECT FINGER JOYSTICK



HTL4 with External
Castle Boot Style
Button



HTL2 with Tall
Concave Stadium
Boot Style Button

The HTL series provides all of the performance of a full size, dual axis joystick in a miniature package that can be mounted in control handles, armrests and panels. The Hall effect sensors are immune to electromagnetic and radio frequency interference up to 100V/M. Programmable sensors with built-in temperature compensation ensure consistent and repeatable operation. The HTL series has excellent tactile feel for improved operator control and is available with either dusttight or IP68S watertight seal. A wide variety of output configurations are available to satisfy different applications.

Features:

- Designed for grip, armrest & panel mounting
- Proven contactless analog output Hall effect technology
- Redundant outputs available
- 1 million cycles
- Electronics watertight to IP68S
- Outstanding EMI/RFI immunity
- Variety of button styles
- Tighter center tolerance options
- RoHS compliant
- PWM output option

Standard Characteristics/Ratings:

MECHANICAL:

Mechanical Life: 1,000,000 all directions

Travel Angle: 23° min to 27° max, 25° typical

Operating Force with Boot: 16 oz typical to 20 oz max (at top of button) @ 20°C

Max Allowable Vertical & Radial Force on Button: 25.0 lbs.

Max Allowable Torque on Button about Shaft Axis: 5.5 lbs.

ELECTRICAL RATINGS:

HTL2: Rated at Vcc = 5V @ 20°C Load = 1mA (4.7KΩ)

Electrical	Units	Min	Typ	Max
Supply Voltage	VDC	4.50	5.00	5.50
Output Voltage Tolerance at Center AA, BB, CC, DD, EE, FF, GG & HH @ 5V Vcc	VDC	-0.25	N/A	+0.25
Output Voltage Tolerance at Center AT, BT, CT, DT, ET and FT @ 5V Vcc	VDC	-0.15	N/A	+0.15
Output Voltage Tolerance at Full Travel (see graph for output values) @ 5V Vcc	VDC	-0.25	N/A	+0.25
Supply Current per Sensor B=0, Vcc=5V, Iout=0	mA	N/A	N/A	10.00
Output Source Current Limit B=X*, Vo=0	mA	-1.00	N/A	1.00

HTL4: Rated at Vcc = 5V @ 20°C Load = 1mA (4.7KΩ)

Electrical	Units	Min	Typ	Max
Supply Voltage	VDC	4.50	5.00	5.5
Output Voltage Tolerance at Center AA, BB, CC, DD, EE, FF, GG & HH @ 5V Vcc	VDC	-0.25	N/A	+0.25
Output Voltage Tolerance at Center AT, BT, CT, DT, ET and FT @ 5V Vcc	VDC	-0.15	N/A	+0.15
Output Voltage Tolerance at Full Travel (see graph for output values) @ 5V Vcc	VDC	-0.25	N/A	+0.25
Supply Current per Sensor B=0, Vcc=5V, Iout=0	mA	N/A	N/A	10.00
Output Source Current Limit B=X*, Vo=0	mA	-1.00	N/A	1.00

ELECTRONICS

Seal Integrity: Electronics IP68S

ENVIRONMENTAL:

Operating Temp Range: -40°C to +85°C

Storage Temp Range: -40°C to +85°C

RFI: Withstand per SAE J1113

EMI: Withstand per SAE J1113

MATERIALS:

Boot: Elastomer

Button: Thermoplastic, black

Case: Thermoplastic, black

Flange: Thermoplastic, black

Wires: 22 or 24 AWG

Mounting Hardware: Panel fastener assembly

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2 & 4-WAY LINEAR HALL EFFECT TOGGLE

HTL2 PART NUMBER CODE

HTL2	-	X	X	X	X	X	XX	X	X	
Button Style	Case Style	Seal	Travel	Detent	Operating Force	Output 1 ①	Output 2 ②	Termination	Button Color	
1. Castle	1. 0.970" SQ.	1. Dusttight	1. 25°	1. None	1. 16 oz	AA. 2.5 +/- 2.0VDC	NONE	1. Wire Leads	2. Black	
2. External Castle Boot		2. Watertight Panel Seal*		2. Detent at 50% travel (not available with button style 7)		BB. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC	22 AWG, UL 1569		
3. Short Double Stadium						CC. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC			
4. Tall Concave Stadium						DD. 2.5 +/- 1.5VDC	NONE	2. Pins		
5. External Bat Handle Boot						EE. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC	3. Wire Leads		
6. External Smooth Boot						FF. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC	24 AWG, SAE AS22759		
7. Long Concave Y Axis Button						GG. 0.5 - 4.5VDC	0.5 - 4.5VDC			
8. Low Profile Button						HH. 1.0 - 4.0VDC	1.0 - 4.0VDC			
						AT. 2.5 +/- 2.0VDC	NONE**			
						BT. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC**			
						CT. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC**			
						DT. 2.5 +/- 1.5VDC	NONE**			
						ET. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC**			
						FT. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC**			

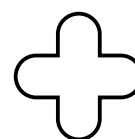
HTL4 PART NUMBER CODE

HTL4	-	X	X	X	X	X	XX	X	X	
Button Style	Case Style	Seal	Travel	Gating***	Operating Force	Output 1 ①	Output 2 ②	Termination	Button Color	
1. Castle	1. 0.970" SQ.	1. Dusttight	1. 25°	1. Omnidirectional; Square; On-Axis and Off-Axis Guided Feel	1. 16 oz	AA. 2.5 +/- 2.0VDC	NONE	1. Wire Leads	2. Black	
2. External Castle Boot		2. Watertight Panel Seal*		2. Gated; Two Axis Return to Center		BB. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC	22 AWG, UL 1569		
3. Short Double Stadium				3. Omnidirectional; Round; Smooth Feel		CC. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC			
4. Tall Concave Stadium				4. Omnidirectional; Round; On-Axis Guided Feel		DD. 2.5 +/- 1.5VDC	NONE	2. Pins		
5. External Bat Handle Boot				5. Omnidirectional; Square; On-Axis and Off-Axis Guided Feel with Detent at 50% Travel		EE. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC	3. Wire Leads		
6. External Smooth Boot				6. Omnidirectional; Round; Smooth Feel with Detent at 50% Travel		FF. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC	24 AWG, SAE AS22759		
				7. Omnidirectional; Round; On-Axis Guided Feel with Detent at 50% Travel		GG. 0.5 - 4.5VDC	0.5 - 4.5VDC	4. Wire Leads		
				8. Omnidirectional; Square; On-Axis Guided Feel		HH. 1.0 - 4.0VDC	1.0 - 4.0VDC	22 AWG, UL 1569		
						AT. 2.5 +/- 2.0VDC	NONE**	shared powers and grounds (see schematic)		
						BT. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC**			
						CT. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC**			
						DT. 2.5 +/- 1.5VDC	NONE**			
						ET. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC**	5. Wire Leads		
						FT. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC**	24 AWG, SAE AS22759		
								shared powers and grounds (see schematic)		

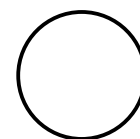
GATING ICONS



Omnidirectional Square On-Axis and Off-Axis Guided Feel****



Gated Two Axis Return to Center



Omnidirectional Round Smooth Feel



Omnidirectional Round On-Axis Guided Feel****



Single Axis (HTL2 version)

****Feel defined by shading.

* Watertight panel seal option available with button styles 2, 5, 6 and 8.

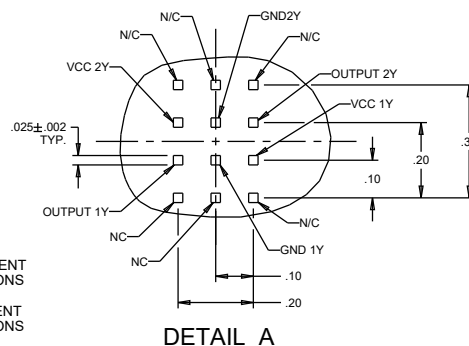
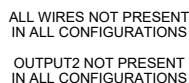
** Options AT, BT, CT, DT, ET and FT are identical to options AA, BB, CC, DD, EE and FF respectively except with a tighter center tolerance.

***Gating options 5, 6 and 7 not available with button style 7.

① Outputs are from the center to the full travel position in each direction. Options "AA," "BB," "CC," "DD," "EE," and "FF" provide increased voltage in +Y; and decreasing voltage in -Y direction from one output per axis with the HTL2 and increased voltage in +X, +Y; and decreasing voltage in -X, -Y direction from one output per axis with the HTL4. Options "GG" and "HH" provide increasing voltages in all directions (+Y, -Y with the HTL2 and +X, +Y, -X, -Y with the HTL4) from 2 outputs per axis.

② Options "BB" and "EE" provide redundant output 2 which duplicates output 1. Options "CC" and "FF" provide redundant output 2 which is inverse of output 1.

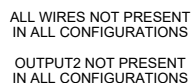
HALL EFFECT CONTROLS



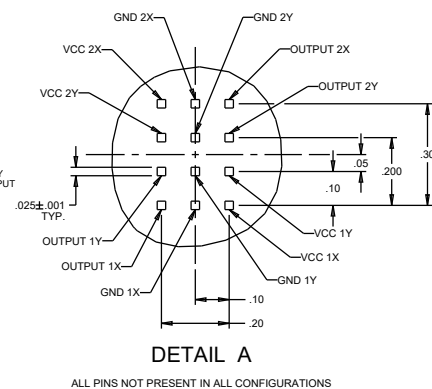
DETAIL A

ALL PINS NOT PRESENT IN ALL CONFIGURATIONS

HTL4 FOOTPRINT



TERMINATION STYLE 1, 2, AND 3



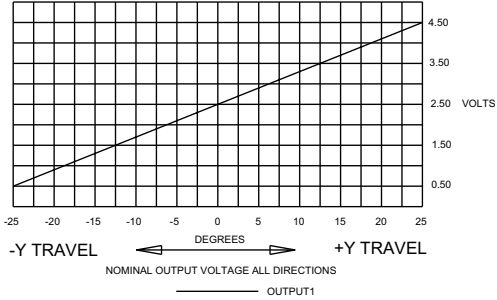
DETAIL A

ALL PINS NOT PRESENT IN ALL CONFIGURATIONS

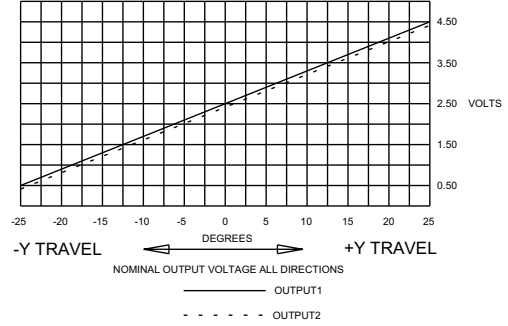
2 & 4-WAY LINEAR HALL EFFECT TOGGLE

HTL2 OUTPUTS

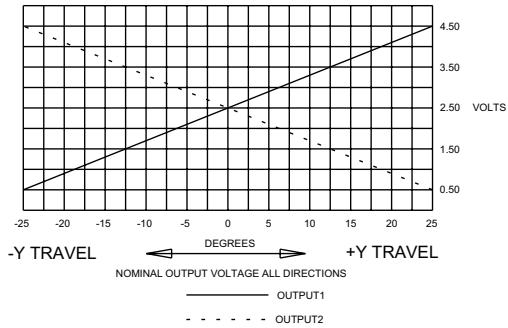
OPTION AA & AT



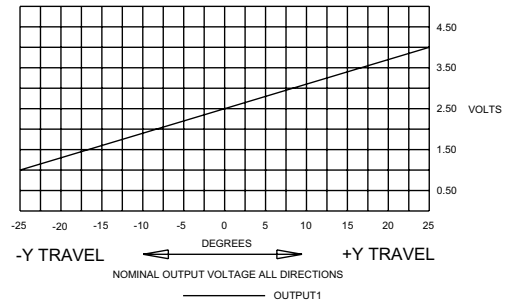
OPTION BB & BT



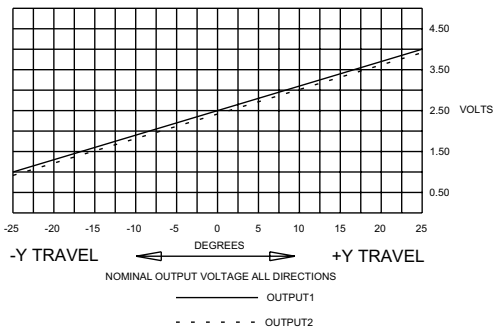
OPTION CC & CT



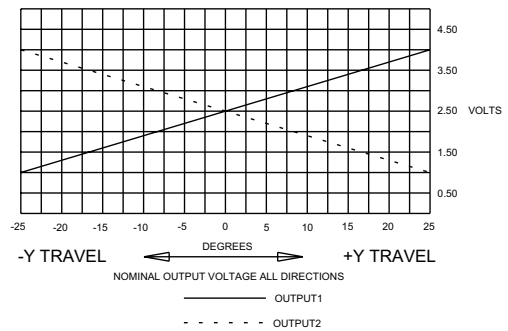
OPTION DD & DT



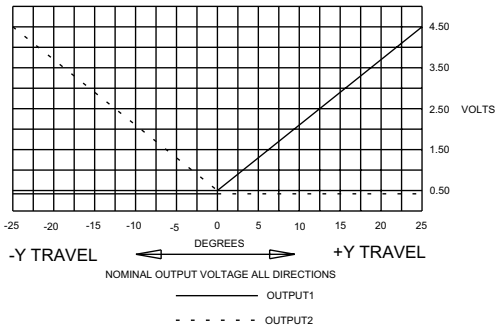
OPTION EE & ET



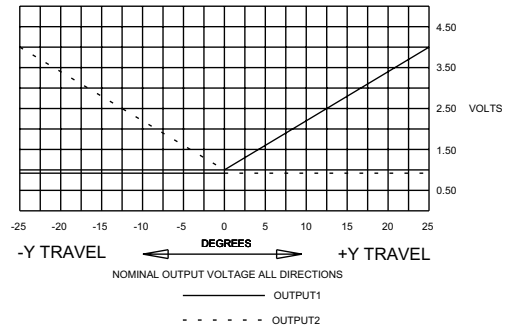
OPTION FF & FT



OPTION GG



OPTION HH



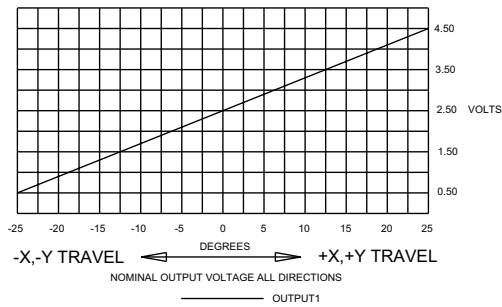
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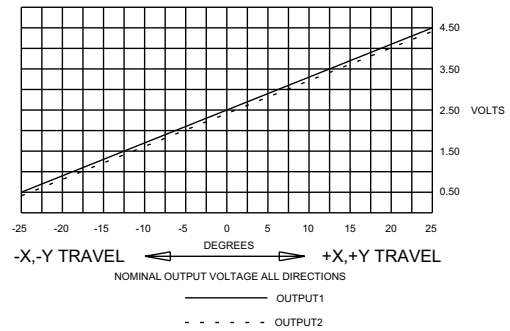
2 & 4-WAY LINEAR HALL EFFECT TOGGLE

HTL4 OUTPUTS

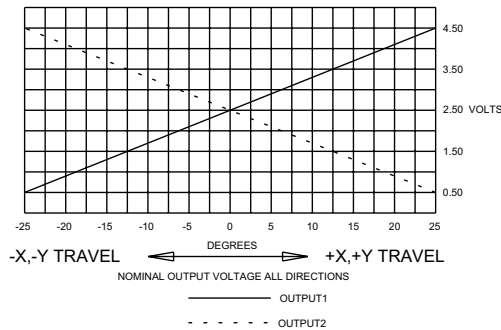
OPTION AA & AT



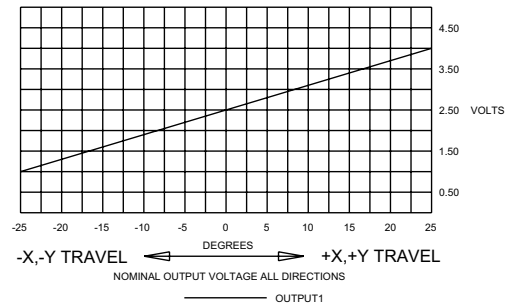
OPTION BB & BT



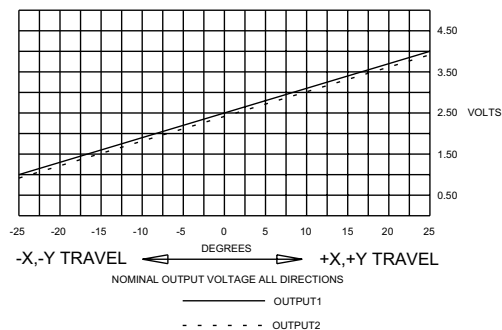
OPTION CC & CT



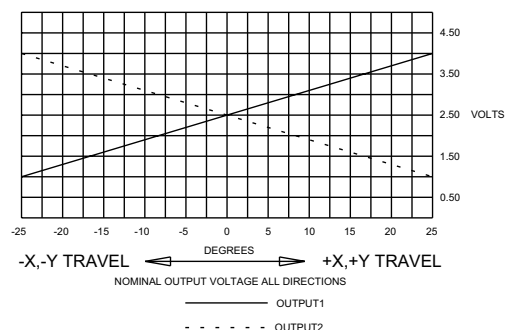
OPTION DD & DT



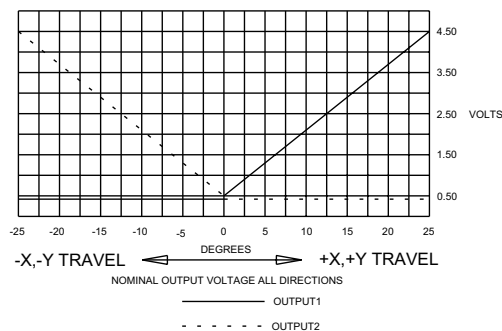
OPTION EE & ET



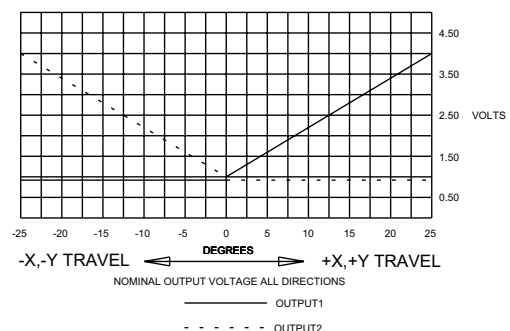
OPTION FF & FT



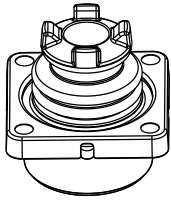
OPTION GG



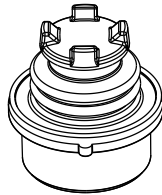
OPTION HH



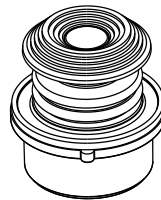
BUTTON CONFIGURATIONS



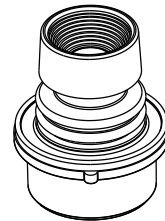
BUTTON STYLE 1
(CASTLE)



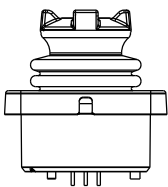
BUTTON STYLE 2
(EXTERNAL CASTLE BOOT)



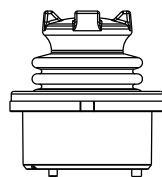
BUTTON STYLE 3
(SHORT DOUBLE STADIUM)



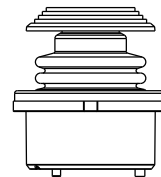
BUTTON STYLE 4
(TALL CONCAVE STADIUM)



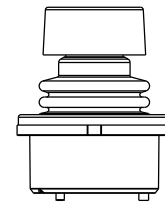
BUTTON STYLE 5
(EXTERNAL BAT
HANDLE BOOT)



BUTTON STYLE 6
(EXTERNAL SMOOTH BOOT)



BUTTON STYLE 7
(LONG CONCAVE Y AXIS BUTTON)
(AVAILABLE FOR HTL2 ONLY)



BUTTON STYLE 8
(LOW PROFILE BUTTON)
(AVAILABLE FOR HTL2 ONLY)

