2 & 4-WAY LINEAR HALL EFFECT TOGGLE

HTL4 with Castle 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 protected against 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**
- **RoHS & WEEE compliant**

Standard Characteristics/Ratings:

MECHANICAL:

Mechanical Life:	1,000,000 all directions
Travel Angle:	23° min to 27° max
Operating Force with Boot:	16 oz typical to 20 oz max (at top of button) @ 25°C
Max Allowable Vertical & Radial Force on Button:	25.0 lbs.
Max Allowable Torque on Button:	7.5 lbs.

ELECTRICAL RATINGS:

HTL2: Rated at Vcc = 5V @ 20°C Load = 1mA (4–7KΩ)

Electrical	Units	Min	Typ	Max
Supply Voltage	VDC	4.5	5	5.5
Output Voltage Tolerance at Center *(see graph for output values)*	VDC @ 5V Vcc	-0.25	N/A	+0.25
Output Voltage Tolerance at Full Travel *(see graph for output values)*	VDC @ 5V Vcc	-0.25	N/A	+0.25
Supply Current per Sensor	mA	N/A	8	10
Output Source Current	mA	-1	N/A	1
Output Resistance (Io ≤ 2mA)	Ω	N/A	1	10

HTL4: Rated at Vcc = 5V @ 20°C Load = 1mA (4–7KΩ)

Electrical	Units	Min	Typ	Max
Supply Voltage	VDC	4.5	5	5.5
Output Voltage Tolerance at Center *(see graph for output values)*	VDC @ 5V Vcc	-0.25	N/A	+0.25
Output Voltage Tolerance at Full Travel *(see graph for output values)*	VDC @ 5V Vcc	-0.25	N/A	+0.25
Supply Current per Sensor	mA	N/A	8	10
Output Source Current Limit	mA	-1	N/A	+1

ELECTRONICS:

Seal Integrity:	Electronics IP68S

ENVIRONMENTAL:

Operating Temp Range:	-40°C to +85°C
Storage Temp Range:	-40°C to +85°C
RFI:	Withstand 100V/M, 14Hz to 1GHz
EMI:	Withstand per MIL-STD-46 ID/SAE J1113-22 at 50Hz and 60Hz

MATERIALS:

Boot:	Elastomer
Button:	Thermoplastic, black
Case:	Thermoplastic, black
Flange:	Thermoplastic, black
Wires:	22 AWG
Mounting Hardware:	Panel fastener assembly

LINEAR HALL EFFECT TOGGLE

2 & 4-WAY LINEAR HALL EFFECT TOGGLE

HTL2 PART NUMBER CODE

HTL2 – X X X X 1 X XX X X

Button Style	Case Style	Seal	Travel	Operating Force	Output 1 ①	Output 2 ②	Termination	Button Color
1. Castle	**1.** 0.970" SQ.	**1.** Dusttight	**1.** 25°	**1.** 16 oz	**AA.** 2.5 +/- 2.0VDC	NONE	**1.** Wire Leads	**2.** Black
2. External Castle Boot		**2.** Watertight			**BB.** 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC	**2.** Pins	
3. Short Double Stadium					**CC.** 2.5 +/- 2.0VDC	2.5 -/+ 2.0VDC		
4. Tall Concave Stadium					**DD.** 2.5 +/- 1.5VDC	NONE		
5. External Bat Handle Boot					**EE.** 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC		
6. External Smooth Boot					**FF.** 2.5 +/- 1.5VDC	2.5 -/+ 1.5VDC		
7. Long Concave Y Axis Button					**GG.** 0.5 - 4.5VDC	0.5 - 4.5VDC		
					HH. 1.0 - 4.0VDC	1.0 - 4.0VDC		

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

HTL4 PART NUMBER CODE

HTL4 – X 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.** Ungated ③	**1.** 16 oz	**AA.** 2.5 +/- 2.0VDC	NONE	**1.** Wire Leads 22 AWG 18"	**2.** Black
2. External Castle Boot		**2.** Watertight		**2.** Gated ④		**BB.** 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC	**2.** Pins	
3. Short Double Stadium				**3.** Ungated Smooth Feel		**CC.** 2.5 +/- 2.0VDC	2.5 -/+ 2.0VDC		
4. Tall Concave Stadium						**DD.** 2.5 +/- 1.5VDC	NONE		
5. External Bat Handle Boot						**EE.** 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC		
6. External Smooth Boot						**FF.** 2.5 +/- 1.5VDC	2.5 -/+ 1.5VDC		
7. Long Concave Y Axis Button						**GG.** 0.5 - 4.5VDC	0.5 - 4.5VDC		
						HH. 1.0 - 4.0VDC	1.0 - 4.0VDC		

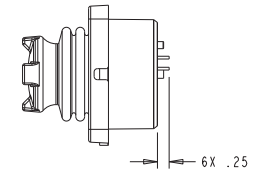
① Outputs are from the center to the full travel position in each direction. Options "AA," "BB," "CC," "DD," "EE," and "FF" provide increased voltage in +X, +Y; and decreasing voltage in -X, -Y direction from one output per axis. Options "GG" and "HH" provide increasing voltages in all directions (+X,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

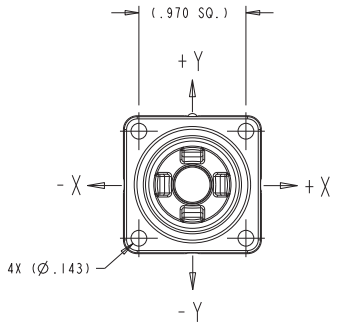
② Options "BB" and "EE" provide redundant output 2 which duplicates output 1. Options "CC" and "FF" provide redundant output 2 which is inverse of output 1.

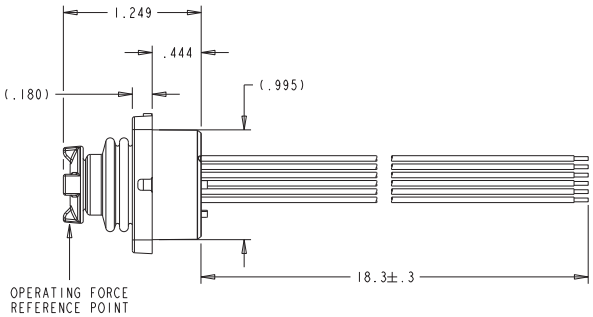
③ Ungated = Omnidirectional

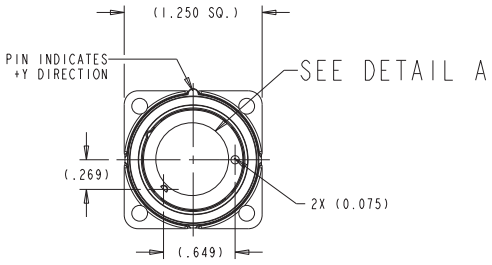
④ Gated = Restricted movement in XY axis only

2 & 4-WAY LINEAR HALL EFFECT TOGGLE

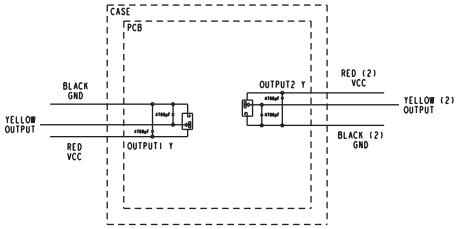


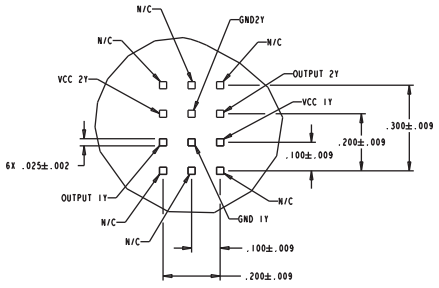






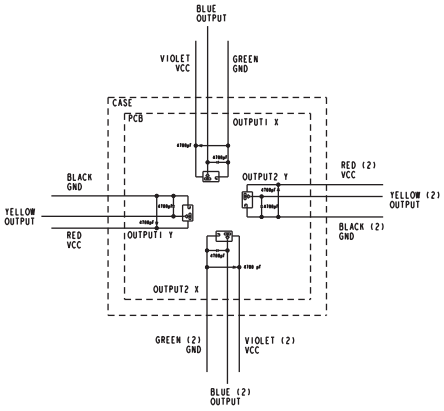
HTL2 FOOTPRINT





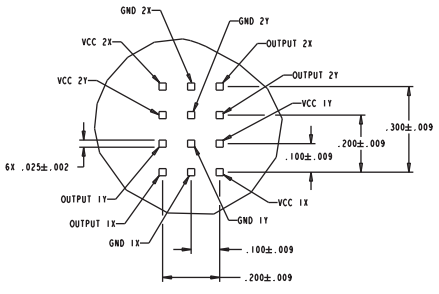
DETAIL A
ALL PINS NOT PRESENT IN ALL CONFIGURATIONS

HTL4 FOOTPRINT

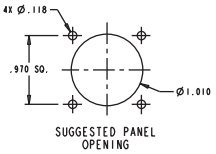


ALL WIRES NOT PRESENT
IN ALL CONFIGURATIONS.

OUTPUT2 NOT PRESENT
IN ALL CONFIGURATIONS.



DETAIL A



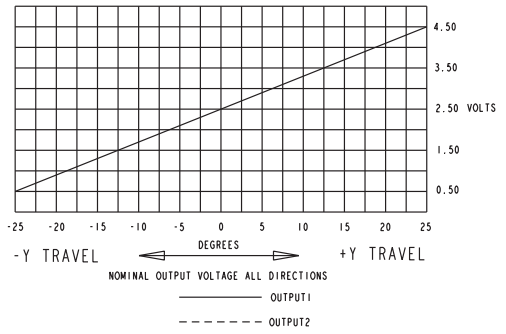
SUGGESTED PANEL
OPENING

LINEAR HALL EFFECT TOGGLE

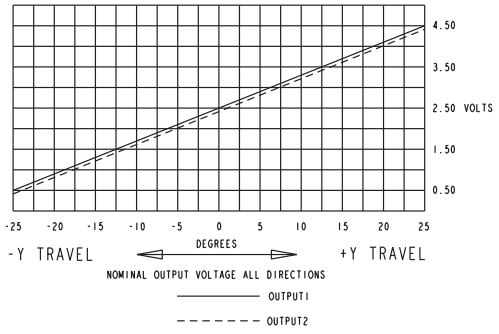
2 & 4-WAY LINEAR HALL EFFECT TOGGLE

HTL2 OUTPUTS

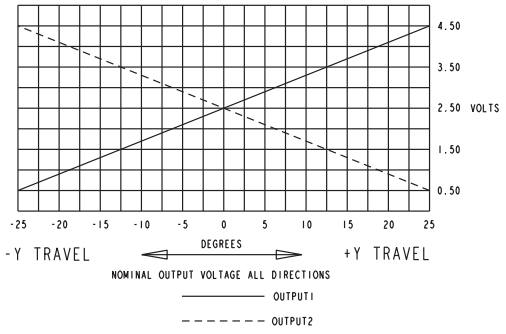
OPTION AA



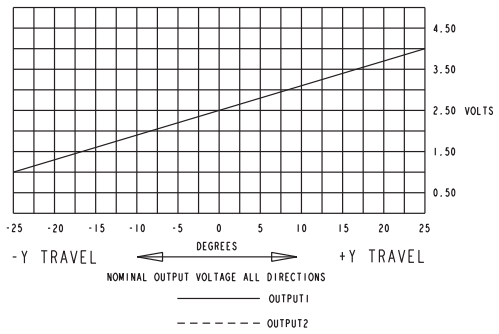
OPTION BB



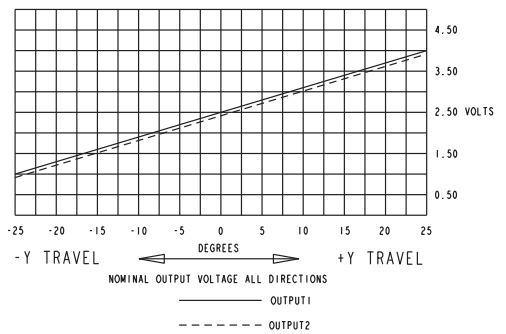
OPTION CC



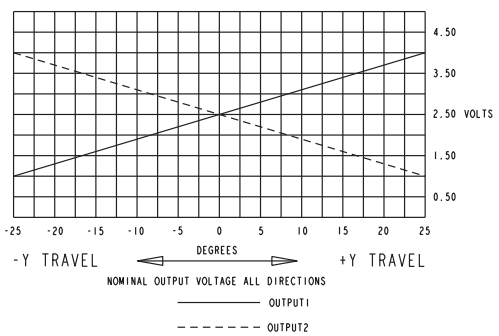
OPTION DD



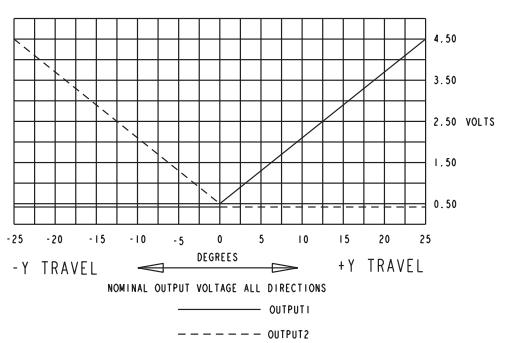
OPTION EE



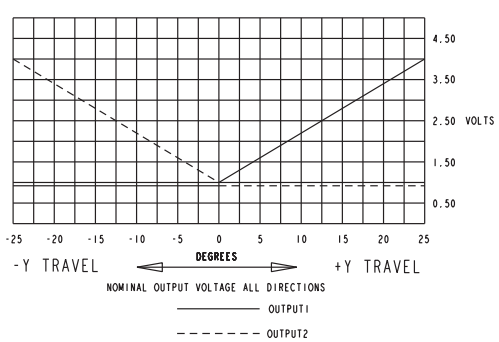
OPTION FF



OPTION GG



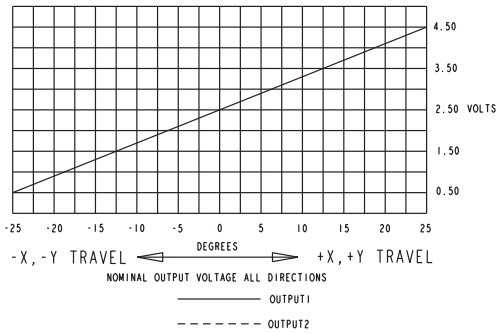
OPTION HH



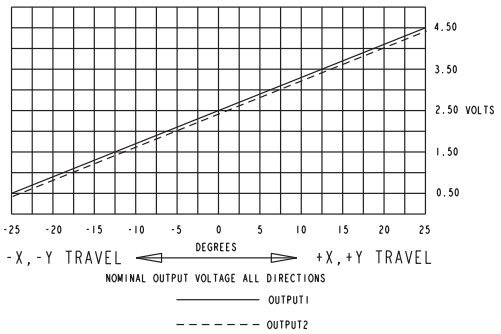
2 & 4-WAY LINEAR HALL EFFECT TOGGLE

HTL4 OUTPUTS

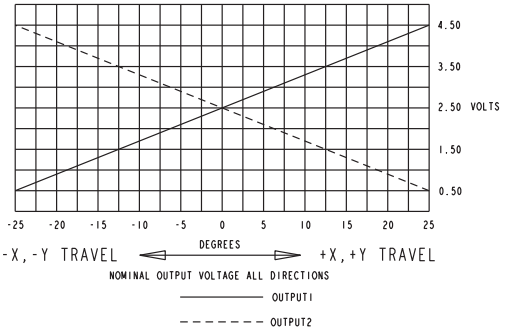
OPTION AA



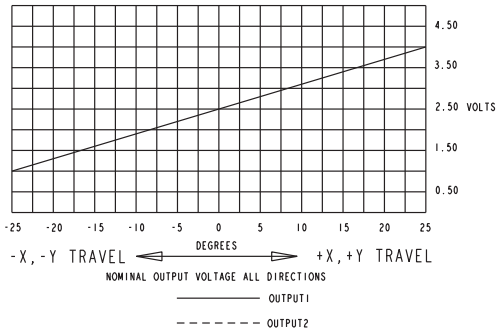
OPTION BB



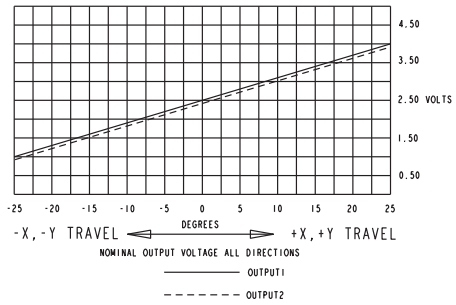
OPTION CC



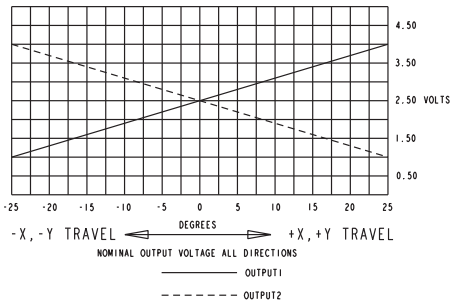
OPTION DD



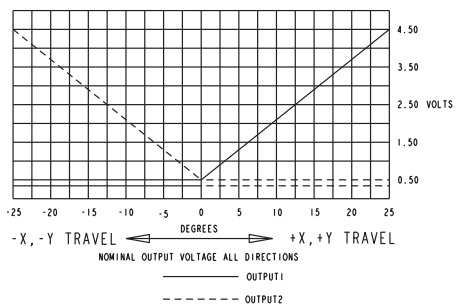
OPTION EE



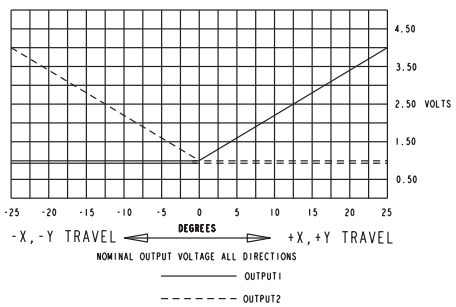
OPTION FF



OPTION GG

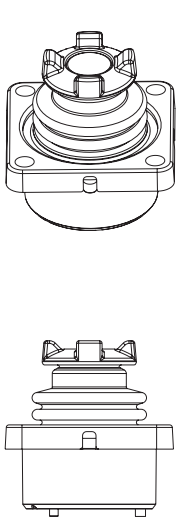


OPTION HH

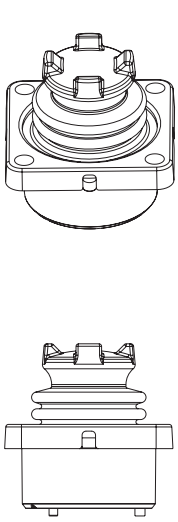


LINEAR HALL EFFECT TOGGLE

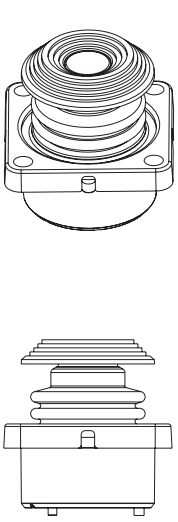
BUTTON STYLE



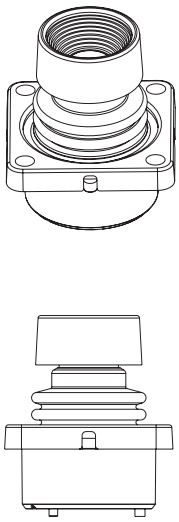
BUTTON STYLE 1
(CASTLE)



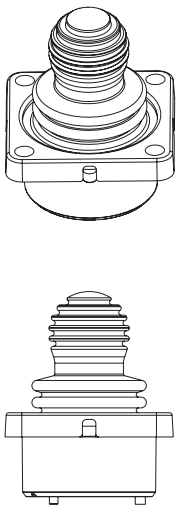
BUTTON STYLE 2
(EXTERNAL CASTLE BOOT)



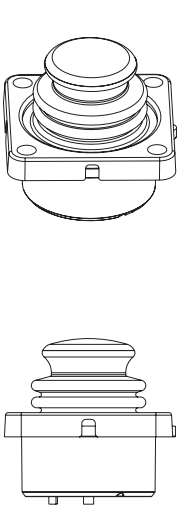
BUTTON STYLE 3
(SHORT DOUBLE STADIUM)



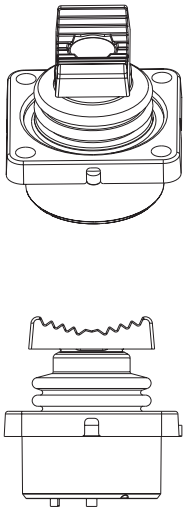
BUTTON STYLE 4
(TALL CONCAVE STADIUM)



BUTTON STYLE 5
(EXTERNAL BAT
HANDLE BOOT)



BUTTON STYLE 6
(EXTERNAL SMOOTH BOOT)



BUTTON STYLE 7
(LONG CONCAVE
Y AXIS BUTTON)