

# LINEAR HALL EFFECT FINGER JOYSTICK

**HTL**  
HALL EFFECT  
JOYSTICK

## 2 & 4-WAY LINEAR HALL EFFECT FINGER JOYSTICK



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 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
- RoHS/WEEE/Reach 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	N/A	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-461D/SAE J1113-22 at 50Hz and 60Hz

##### MATERIALS:

<b>Boot:</b>	Elastomer
<b>Button:</b>	Thermoplastic, black
<b>Case:</b>	Thermoplastic, black
<b>Flange:</b>	Thermoplastic, black
<b>Wires:</b>	22 or 24 AWG
<b>Mounting Hardware:</b>	Panel fastener assembly

## 2 & 4-WAY LINEAR HALL EFFECT FINGER JOYSTICK

### 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	22 AWG,			
3. Short Double Stadium					CC. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC	UL 1569			
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,			
7. Long Concave Y Axis Button					GG. 0.5 - 4.5VDC	0.5 - 4.5VDC	SAE AS22759			
					HH. 1.0 - 4.0VDC	1.0 - 4.0VDC				

\* Watertight sealed option available with button styles 2, 5 and 6.

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	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 Guided Feel**	1. 16 oz	AA. 2.5 +/- 2.0VDC	NONE	1. Wire Leads	2. Black
2. External Castle Boot		2. Watertight *		2. Gated; Dual 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	2. Pins	
4. Tall Concave Stadium						DD. 2.5 +/- 1.5VDC	NONE	3. Wire Leads	
5. External Bat Handle Boot						EE. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC	24 AWG SAE AS22759	
6. External Smooth Boot						FF. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC	4. Wire Leads	
7. Long Concave Y Axis Button						GG. 0.5 - 4.5VDC	0.5 - 4.5VDC	22 AWG, UL 1569 shared powers and grounds (see schematic)	
						HH. 1.0 - 4.0VDC	1.0 - 4.0VDC	5. Wire Leads	
								24 AWG, SAE AS22759 shared powers and grounds (see schematic)	

\* Watertight sealed option available with button styles 2, 5 and 6.

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.

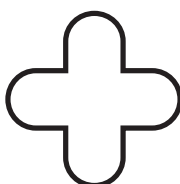
② Options "BB" and "EE" provide redundant output 2 which duplicates output 1. Options "CC" and "FF" provide redundant output 2 which is inverse of output 1.

\*\*Positive tactile feel when moved off X and Y axis positions.

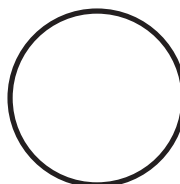
### Gating Icons



Omnidirectional  
Square On-Axis-  
Guided Feel\*\*\*



Gated  
Dual Axis  
Return to Center



Omnidirectional  
Round  
Smooth Feel



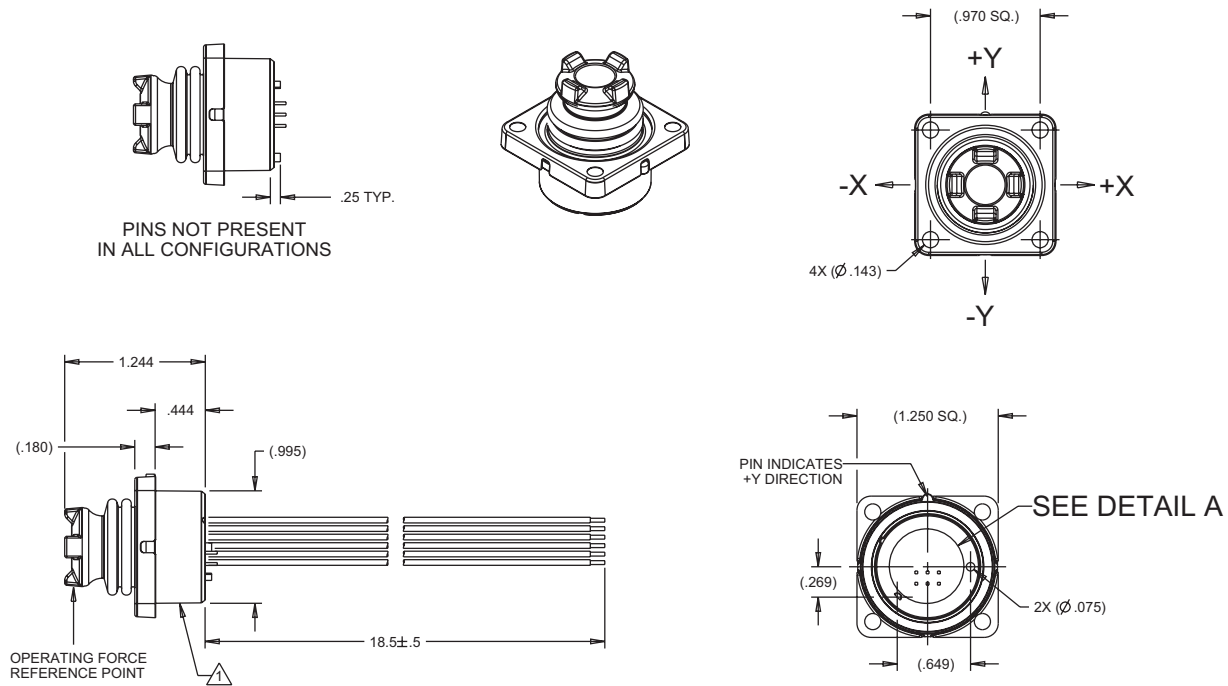
Single Axis  
(HTL2 version)

\*\*\*Feel defined by shading.

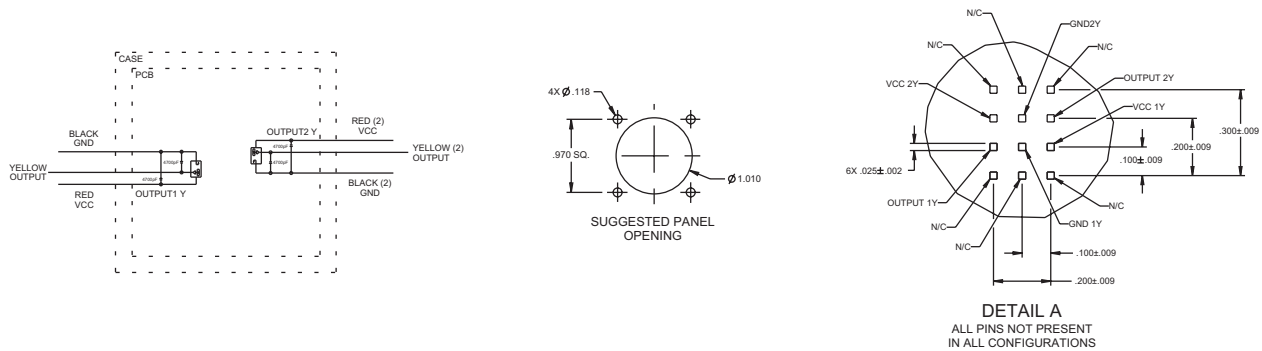
# LINEAR HALL EFFECT TOGGLE

**HTL**  
HALL EFFECT  
TOGGLE

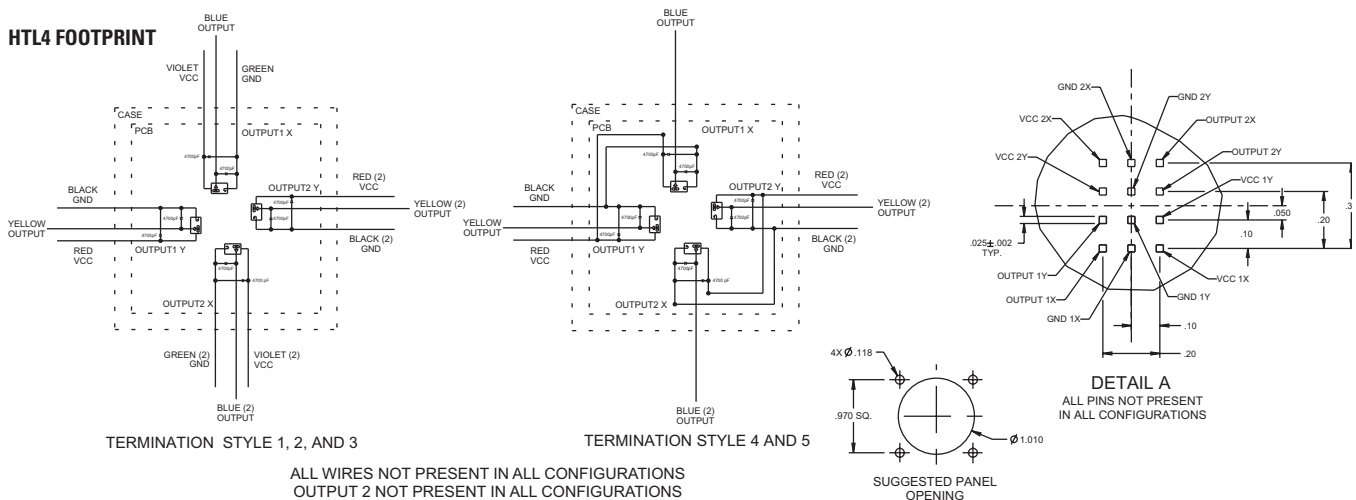
## 2 & 4-WAY LINEAR HALL EFFECT TOGGLE



### HTL2 FOOTPRINT



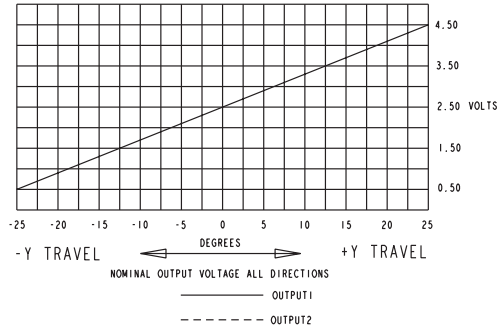
### HTL4 FOOTPRINT



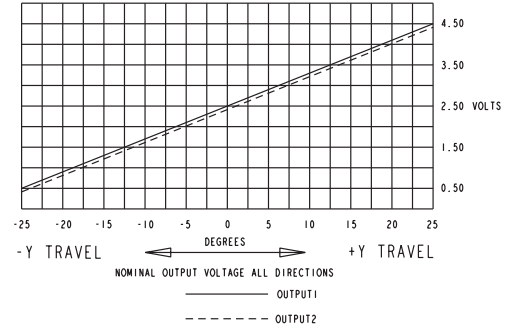
## 2 & 4-WAY LINEAR HALL EFFECT TOGGLE

### HTL2 OUTPUTS

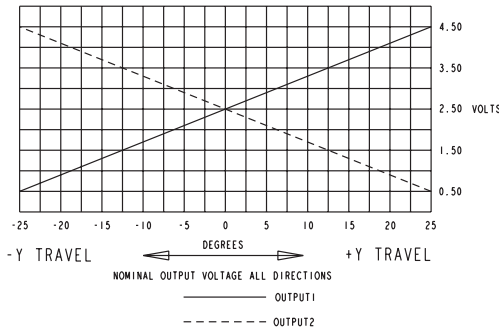
OPTION AA



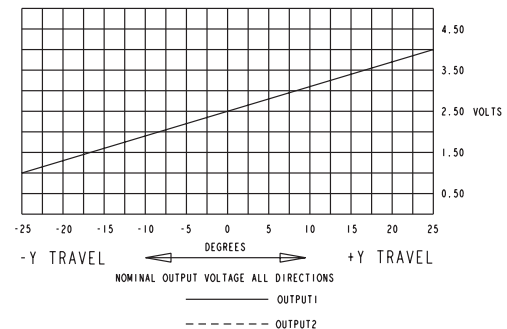
OPTION BB



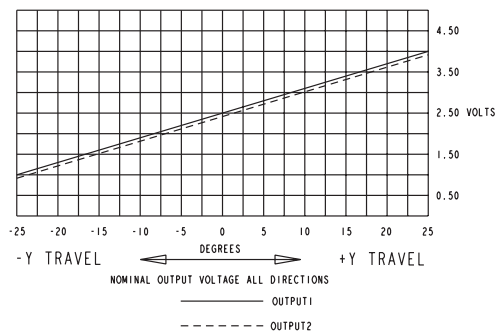
OPTION CC



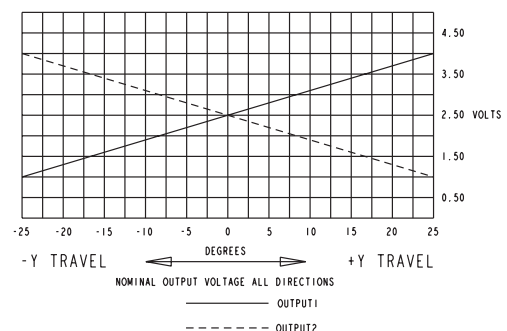
OPTION DD



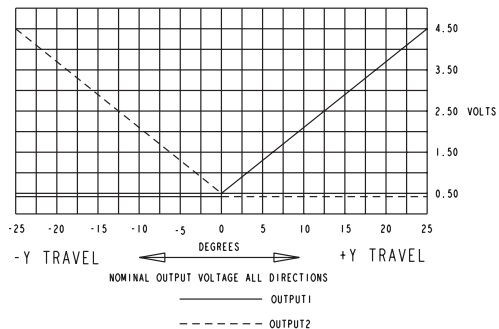
OPTION EE



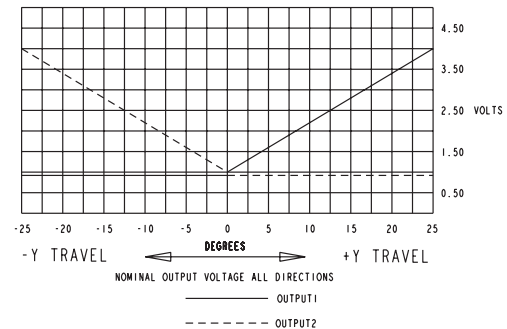
OPTION FF



OPTION GG



OPTION HH





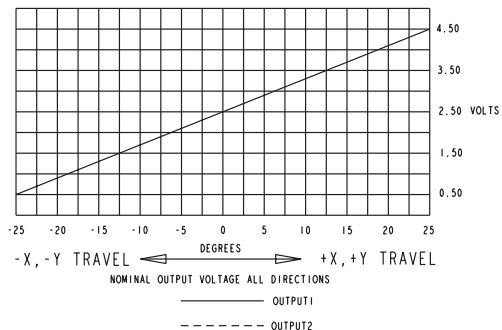
# LINEAR HALL EFFECT TOGGLE

HTL  
HALL EFFECT  
TOGGLE

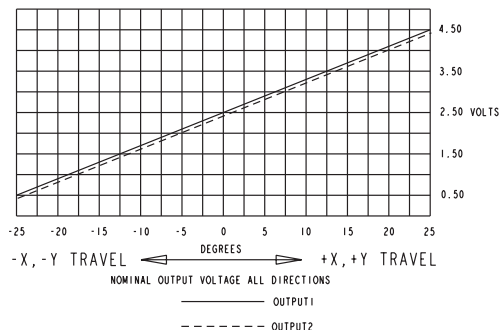
## 2 & 4-WAY LINEAR HALL EFFECT TOGGLE

### HTL4 OUTPUTS

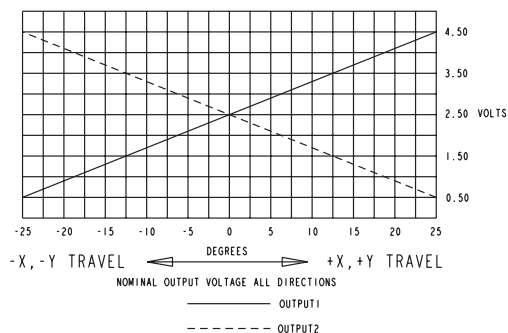
OPTION AA



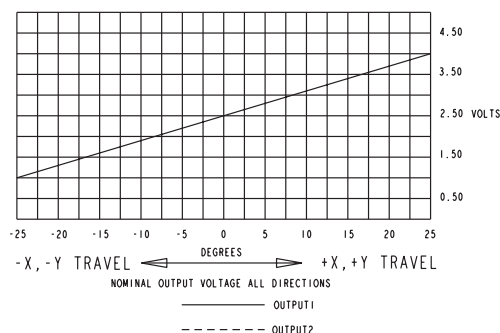
OPTION BB



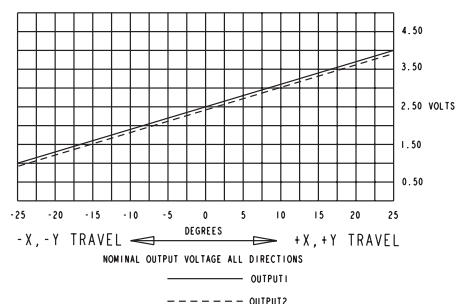
OPTION CC



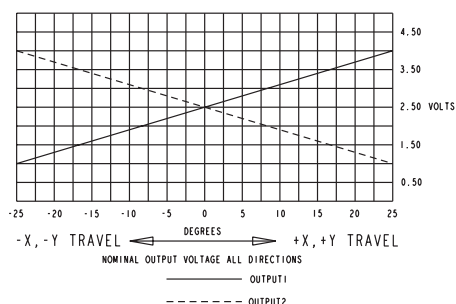
OPTION DD



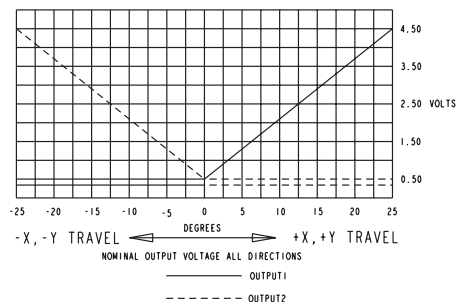
OPTION EE



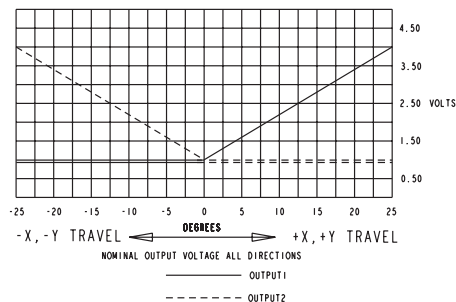
OPTION FF



OPTION GG

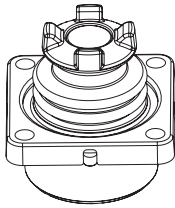


OPTION HH

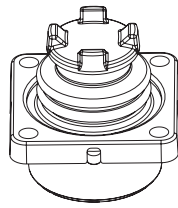


# LINEAR HALL EFFECT TOGGLE

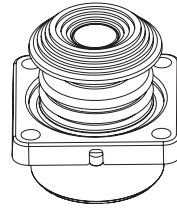
## BUTTON STYLE



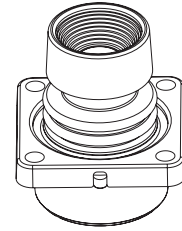
BUTTON STYLE 1  
(CASTLE)



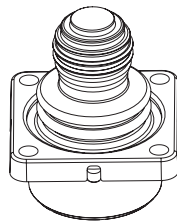
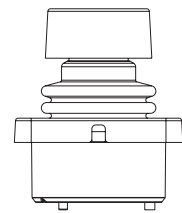
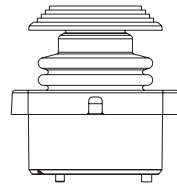
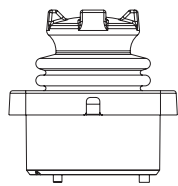
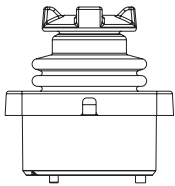
BUTTON STYLE 2  
(EXTERNAL CASTLE BOOT)



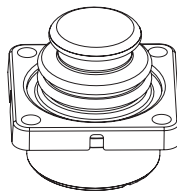
BUTTON STYLE 3  
(SHORT DOUBLE STADIUM)



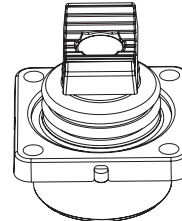
BUTTON STYLE 4  
(TALL CONCAVE STADIUM)



BUTTON STYLE 5  
(EXTERNAL BAT  
HANDLE BOOT)



BUTTON STYLE 6  
(EXTERNAL SMOOTH BOOT)



BUTTON STYLE 7  
(LONG CONCAVE  
Y AXIS BUTTON)

