

## NOTES:

- MARKING TO INCLUDE:  
 "OTTO" P/N & DATE CODE "YYWW".  
 OUTPUTS ARE FROM THE CENTER TO THE FULL TRAVEL POSITION.  
 OPTIONS "AA", "BB", "CC", "DD", "EE", "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.  
 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.  
 4. THIS PART/PRODUCT IS TO BE MANUFACTURED WITH THE APPLICABLE REGULATIONS OF EC DIRECTIVES 2002/95/EC AND 2002/96/EC. RESTRICTION OF THE USE OF HAZARDOUS SUBSTANCES IN ELECTRICAL AND ELECTRONIC EQUIPMENT (RoHS) AND WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE).  
 SEE PAGE 3 FOR ALTERNATE BUTTON DESIGN.

HTL2-

## BUTTON STYLE

- 1 : CASTLE
- 2 : EXTERNAL CASTLE BOOT
- 3 : SHORT DOUBLE STADIUM
- 4 : TALL CONCAVE STADIUM
- 5 : EXTERNAL BAT HANDLE BOOT
- 6 : EXTERNAL SMOOTH BOOT
- 7 : LONG CONCAVE Y AXIS BUTTON

## CASE STYLE

1 : .970 SQ.

## SEAL

- 1 : DUSTTIGHT
- 2 : WATERTIGHT

## TRAVEL

1 : 25 DEGREES

## OPERATE FORCE

1 : 16 OZ

## OUTPUT 1

- AA : 2.5+/-2.0 VDC  
 BB : 2.5+/-2.0 VDC  
 CC : 2.5+/-2.0 VDC  
 DD : 2.5+/-1.5 VDC  
 EE : 2.5+/-1.5 VDC  
 FF : 2.5+/-1.5 VDC  
 GG : 0.5-4.5 VDC  
 HH : 1-4 VDC

## OUTPUT 2

- NONE  
 2.5+/-2.0 VDC  
 2.5+/-2.0 VDC  
 NONE  
 2.5+/-1.5 VDC  
 2.5+/-1.5 VDC  
 0.5-4.5 VDC  
 1-4 VDC

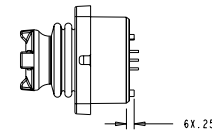
## TERMINATION

- 1 : WIRE LEADS
- 2 : PINS

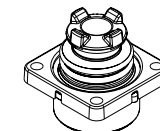
## BUTTON COLOR

2 : BLACK

| REV | OCN    | DATE      | APR |
|-----|--------|-----------|-----|
| A   | 044213 | 17 JUL 08 | LBC |
| B   | 046891 | 19 JAN 09 | LBC |

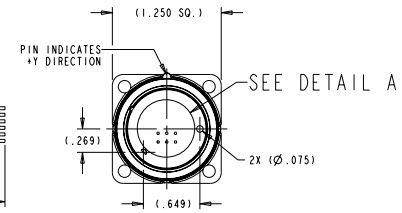
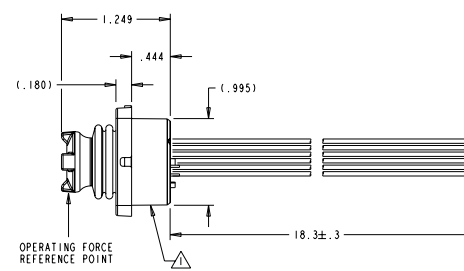
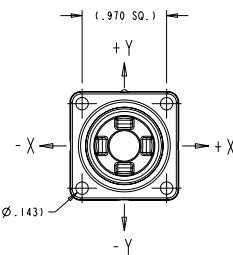


PINS NOT PRESENT IN ALL CONFIGURATIONS

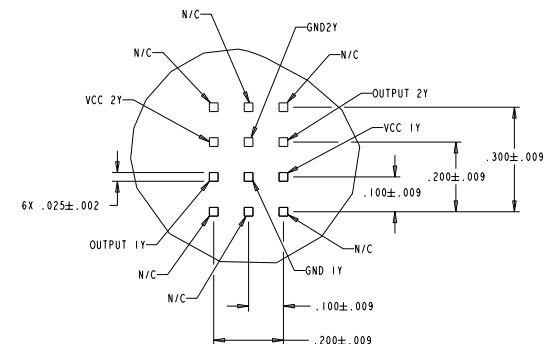
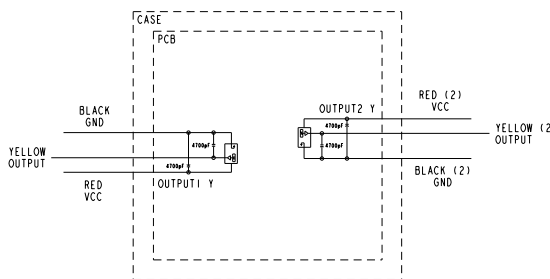


SCALE 1:1

| PRODUCT SPECIFICATIONS                                                               |                                                                  |       |       |       |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------|-------|-------|-------|
| ELECTRICAL:                                                                          |                                                                  |       |       |       |
| RATED AT<br>V <sub>cc</sub> = 5V @ 20°C<br>LOAD = 1mA (4.7KΩ)                        | UNITS                                                            | MIN   | TYP   | MAX   |
| SUPPLY VOLTAGE, V <sub>cc</sub>                                                      | VDC                                                              | 4.50  | 5.00  | 5.50  |
| OUTPUT VOLTAGE TOLERANCE<br>AT CENTER (SEE APPROPRIATE<br>GRAPH FOR OUTPUT VALUES)   | VDC<br>@5V V <sub>cc</sub>                                       | -.25  |       | +.25  |
| OUTPUT VOLTAGE TOLERANCE<br>FULL TRAVEL (SEE APPROPRIATE<br>GRAPH FOR OUTPUT VALUES) | VDC<br>@5V V <sub>cc</sub>                                       | -.25  |       | +.25  |
| SUPPLY CURRENT<br>B=0, V <sub>cc</sub> =5V, I <sub>o</sub> =0                        | mA                                                               |       | 32.00 | 40.00 |
| OUTPUT<br>SOURCE CURRENT LIMIT<br>B=-X, V <sub>o</sub> =0                            | mA                                                               | -1.00 |       | 1.00  |
| OUTPUT RESISTANCE<br>I <sub>o</sub> ≤ -2 mA                                          | Ω                                                                |       | 1.00  | 10.00 |
| MECHANICAL:                                                                          |                                                                  |       |       |       |
| MECHANICAL LIFE<br>ALL DIRECTIONS                                                    | 1,000,000 CYCLES                                                 |       |       |       |
| TRAVEL ANGLE                                                                         | DEGREES                                                          | 23    | 25    | 27    |
| OPERATING FORCE (W/BOOT)<br>AT TOP OF BUTTON, @ 20°C                                 | OZ                                                               |       | 16    | 20    |
| MAX. ALLOWABLE VERTICAL<br>FORCE ON BUTTON                                           | LBS                                                              |       |       | 25    |
| MAX. ALLOWABLE RADIAL<br>FORCE ON BUTTON                                             | LBS                                                              |       |       | 25    |
| MAX. ALLOWABLE<br>TORQUE ON BUTTON                                                   | IN-LBS                                                           |       |       | 7.5   |
| ENVIRONMENTAL:                                                                       |                                                                  |       |       |       |
| OPERATING TEMPERATURE                                                                | °C                                                               | -40   | 20    | 85    |
| ELECTRONICS SEAL INTEGRITY                                                           | WATERTIGHT PER IP68S, 1 METER                                    |       |       |       |
| RF SUSCEPTIBILITY                                                                    | 100 V/m FROM 14 KHz TO 1 GHz                                     |       |       |       |
| EM SUSCEPTIBILITY                                                                    | PER MIL-STD 461D, METHOD RE101 (SAE J113-22)<br>AT 50 AND 60 Hz. |       |       |       |
| MATERIAL:                                                                            |                                                                  |       |       |       |
| BOOT                                                                                 | ELASTOMER, BLACK                                                 |       |       |       |
| BUTTON                                                                               | THERMOPLASTIC, BLACK                                             |       |       |       |
| CASE                                                                                 | THERMOPLASTIC, BLACK                                             |       |       |       |
| FLANGE                                                                               | THERMOPLASTIC, BLACK                                             |       |       |       |
| WIRES (IF PRESENT)                                                                   | 22 AWG, UL1569, COLOR PER SCHEMATIC                              |       |       |       |
| HARDWARE                                                                             | 4X ITW FASTEX PANEL FASTENER<br>P/N 36030002 OR EQUIVALENT       |       |       |       |



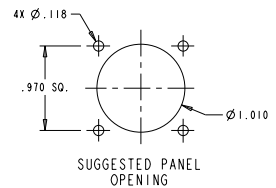
B



DETAIL A

SCALE 4:1

ALL PINS NOT PRESENT IN ALL CONFIGURATIONS

SUGGESTED PANEL  
OPENINGBLUE (2)  
OUTPUTALL WIRES NOT PRESENT  
IN ALL CONFIGURATIONSOUTPUT2 NOT PRESENT  
IN ALL CONFIGURATIONS

UNLESS OTHERWISE  
 SPECIFIED:  
 DIMENSIONS ARE  
 IN INCHES.  
 TOLERANCES:  
 .XX ±.03  
 .XXX ±.010  
 ANGLES ±.2°  
 DO NOT SCALE

MANUFACTURING  
 SPC

**OTTO**  
 CARPENTERSVILLE, ILLINOIS USA

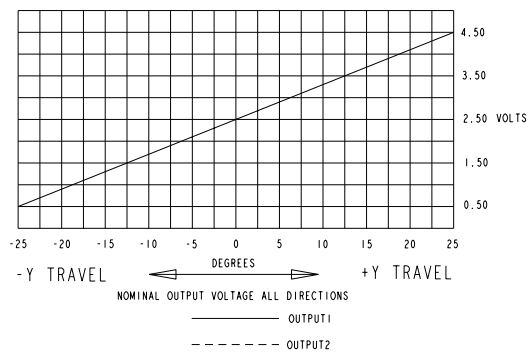
DESCRIPTION  
 HTL2, LINEAR HALL EFFECT  
 2-WAY TOGGLE

| DRWN | RCW | SIZE | FSCM NO | DRAWING NO.   | REV. |
|------|-----|------|---------|---------------|------|
| CHKD | LBC | C    | 21649   | HTL2- - - - - | B    |
| APPD | AH  |      |         |               |      |
| WT.  |     |      |         |               |      |

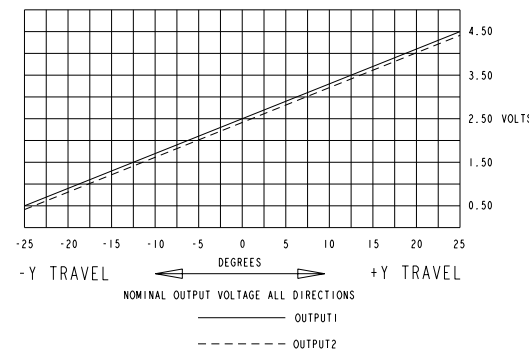
Scale 1:1 Sheet 1 of 4

| HTL2----- |        |           |     |
|-----------|--------|-----------|-----|
| REV       | OCN    | DATE      | APR |
| A         | 044213 | 17 JUL 08 | LBG |
| B         | 046891 | 19 JAN 09 | LBG |

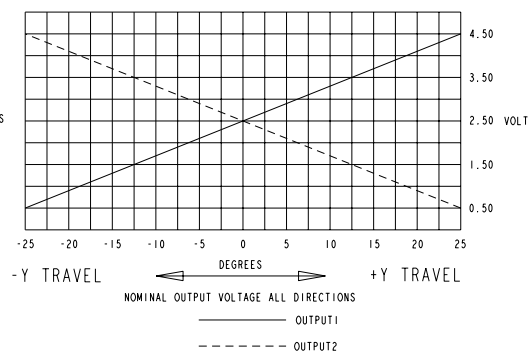
OPTION AA



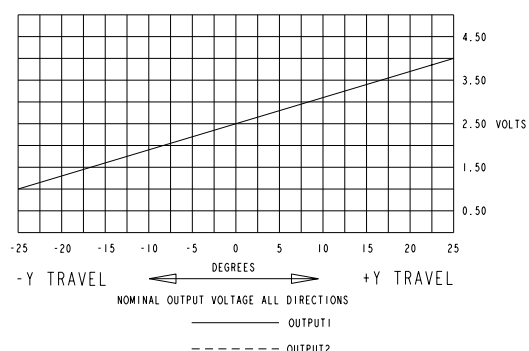
OPTION BB



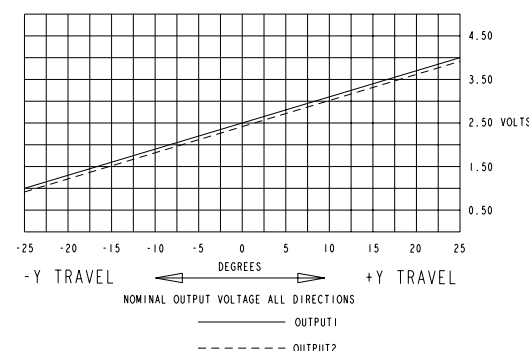
OPTION CC



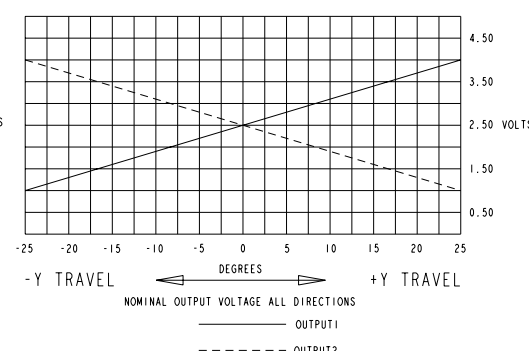
OPTION DD



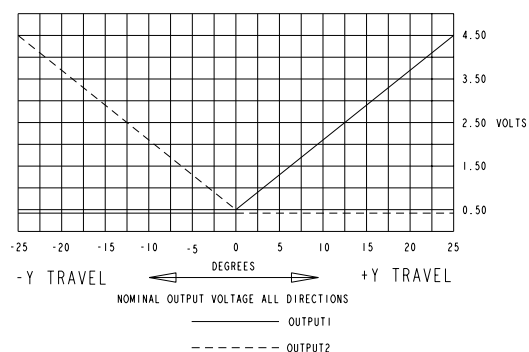
OPTION EE



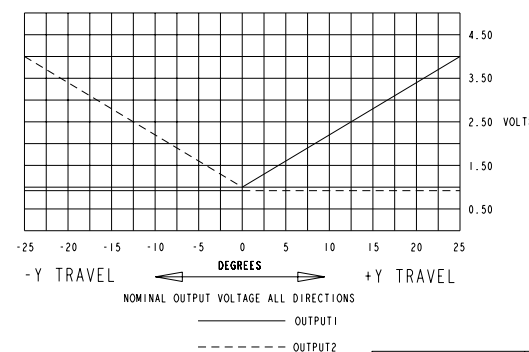
OPTION FF



OPTION GG

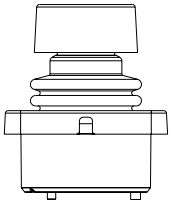
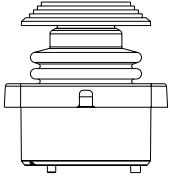
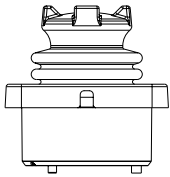
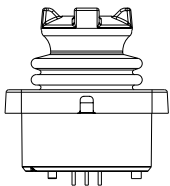
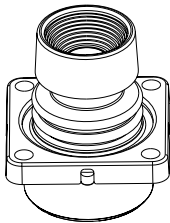
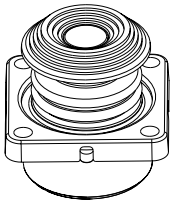
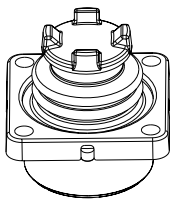
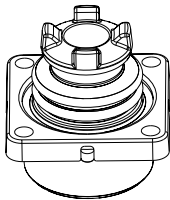


OPTION HH



|                                                                                                                                    |            |       |                                                                                                                                                                           |           |      |         |             |      |
|------------------------------------------------------------------------------------------------------------------------------------|------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------|---------|-------------|------|
| UNLESS OTHERWISE SPECIFIED<br>DIMENSIONS ARE IN INCHES.<br>TOLERANCES ARE AS LISTED.<br>MUST BE FREE FROM BURRS<br>AND SHARP EDGES | TOLERANCES |       | THIS DOCUMENT IS THE CONFIDENTIAL<br>PROPERTY OF OTTO ENGINEERING, INC..<br>IT IS NOT TO BE USED IN ANY WAY<br>DETRIMENTAL TO THE INTERESTS<br>OF OTTO ENGINEERING, INC.. | DRWN: RCW | SIZE | FSCM NO | DRAWING NO. | REV. |
|                                                                                                                                    | XX         | ±.03  |                                                                                                                                                                           | CHKD: LBG | C    | 21649   | HTL2-----   | B    |
|                                                                                                                                    | .XX        | ±.010 |                                                                                                                                                                           | APPD: AH  |      |         |             |      |

|               |        |           |     |
|---------------|--------|-----------|-----|
| HTL2- - - - - |        |           |     |
| REV           | OCN #  | DATE      | APR |
| A             | 044213 | 17 JUL 08 | LBG |
| B             | 046891 | 19 JAN 09 | LBG |



BUTTON STYLE 1  
 (CASTLE)

BUTTON STYLE 2  
 (EXTERNAL CASTLE BOOT)

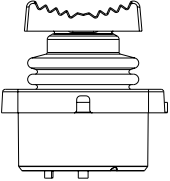
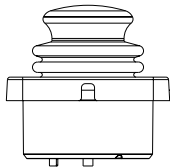
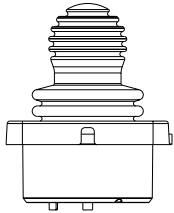
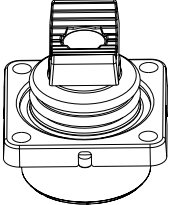
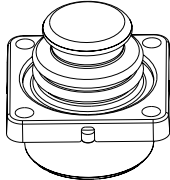
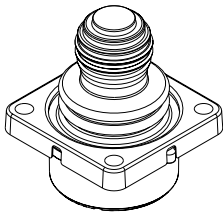
BUTTON STYLE 3  
 (SHORT DOUBLE STADIUM)

BUTTON STYLE 4  
 (TALL CONCAVE STADIUM)

BUTTON STYLE CONFIGURATION

|                                                                                                                                    |            |                      |                                                                                                                                                                           |           |           |         |               |      |
|------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|---------|---------------|------|
| UNLESS OTHERWISE SPECIFIED<br>DIMENSIONS ARE IN INCHES.<br>TOLERANCES ARE AS LISTED.<br>MUST BE FREE FROM BURRS<br>AND SHARP EDGES | TOLERANCES |                      | THIS DOCUMENT IS THE CONFIDENTIAL<br>PROPERTY OF OTTO ENGINEERING, INC..<br>IT IS NOT TO BE USED IN ANY WAY<br>DETRIMENTAL TO THE INTERESTS<br>OF OTTO ENGINEERING, INC.. | DRWN: RCW | SIZE      | FSCM NO | DRAWING NO.   | REV. |
|                                                                                                                                    | XX         | ±.03                 |                                                                                                                                                                           | CHKD: LBG | C         | 21649   | HTL2- - - - - | B    |
|                                                                                                                                    | XXX        | ±.010                |                                                                                                                                                                           | APPD: AH  |           |         |               |      |
| ANGLES ±2°                                                                                                                         |            | DO NOT SCALE DRAWING | 1/4"=1" ANGLE<br>PROJECTION                                                                                                                                               |           | Scale 1:1 |         | Sheet 3 OF 4  |      |

|               |        |           |     |
|---------------|--------|-----------|-----|
| HTL2- - - - - |        |           |     |
| REV           | OCN    | DATE      | APR |
| A             | 044213 | 17 JUL 08 | LBG |
| B             | 046891 | 19 JAN 09 | LBG |



BUTTON STYLE 5  
 (EXTERNAL BAT  
 HANDLE BOOT)

BUTTON STYLE 6  
 (EXTERNAL SMOOTH BOOT)

BUTTON STYLE 7  
 (LONG CONCAVE Y AXIS BUTTON)

BUTTON STYLE CONFIGURATION

|                                                                                                                                    |            |       |                                                                                                                                                                           |           |      |                           |               |              |
|------------------------------------------------------------------------------------------------------------------------------------|------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------|---------------------------|---------------|--------------|
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|                                                                                                                                    | XX         | ±.03  |                                                                                                                                                                           | CHKD: LBG | C    | 21649                     | HTL2- - - - - | B            |
|                                                                                                                                    | XXX        | ±.010 |                                                                                                                                                                           | APPD: AH  |      |                           |               |              |
| DO NOT SCALE DRAWING                                                                                                               |            |       |                                                                                                                                                                           | WT.       |      | IS/NO ANGLE<br>PROJECTION | Scale 1:1     | Sheet 4 OF 4 |