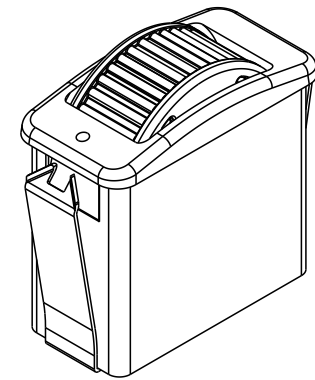


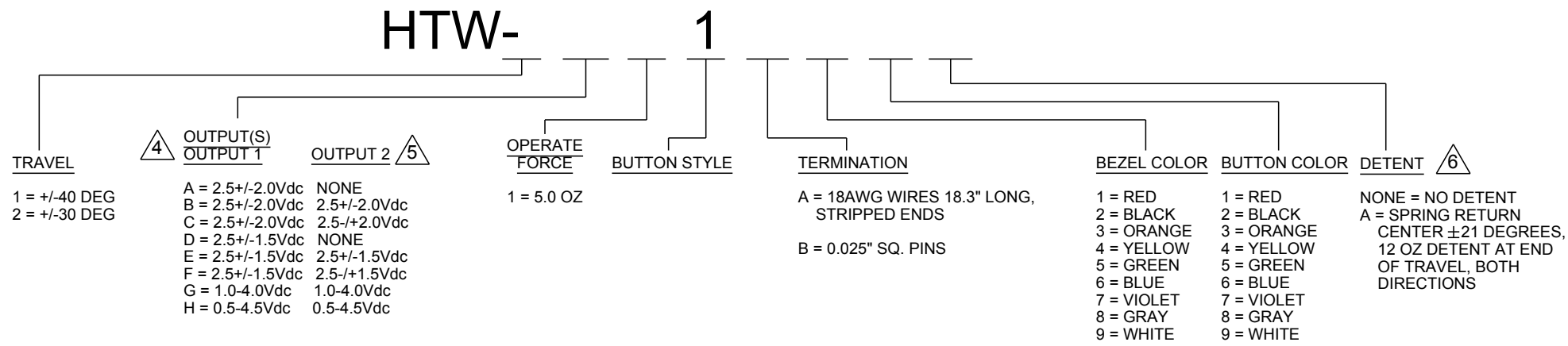
NOTES: (D)

- DRAWING TO BE INTERPRETED IN ACCORDANCE WITH THE CURRENT REVISION OF ASME Y14.5
- THIS PART/PRODUCT IS TO BE MANUFACTURED WITH THE LATEST APPLICABLE REGULATIONS OF EC DIRECTIVES FOR THE RESTRICTION OF THE USE OF HAZARDOUS SUBSTANCES IN ELECTRICAL AND ELECTRONIC EQUIPMENT (ROHS), WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) AND REGISTRATION, EVALUATION, AUTHORIZATION AND RESTRICTION OF CHEMICALS (REACH).
- MARKING TO INCLUDE:  
"OTTO" P/N & DATE CODE "YYWW"
- OUTPUTS ARE FROM THE CENTER POSITION TO THE FULL TRAVEL POSITION IN EACH DIRECTION.  
OPTIONS "A" "B" "C" "D" "E" "F" PROVIDE INCREASING VOLTAGE IN DIRECTION 1 AND DECREASING VOLTAGE IN DIRECTION 2 FROM A SINGLE OUTPUT.  
OPTION "G" AND "H" PROVIDE INCREASING VOLTAGES IN BOTH DIRECTIONS FROM TWO SEPARATE OUTPUTS.  
OPTION "B" AND "E" PROVIDE REDUNDANT OUTPUT 2 WHICH DUPLICATES OUTPUT 1  
OPTION "C" AND "F" PROVIDE REDUNDANT OUTPUT 2 WHICH IS INVERSE OF OUTPUT 1
- OPTION "B" AND "E" PROVIDE REDUNDANT OUTPUT 2 WHICH DUPLICATES OUTPUT 1  
OPTION "C" AND "F" PROVIDE REDUNDANT OUTPUT 2 WHICH IS INVERSE OF OUTPUT 1
- DETENTED SWITCH FULL TRAVEL IS  $\pm 30^\circ$  MAX.  
DETENTED SWITCHES REACH FULL OUTPUT BEFORE ENGAGING DETENTS.

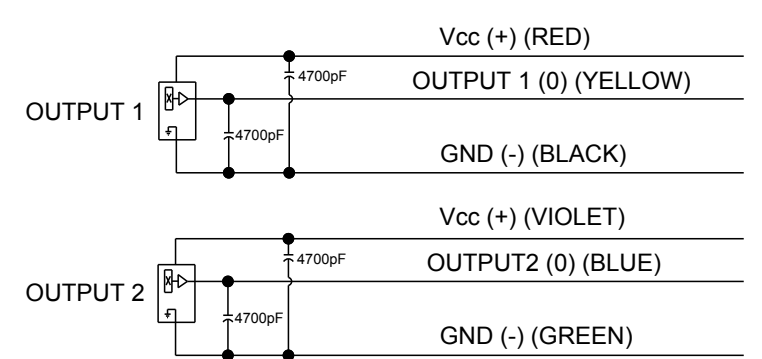
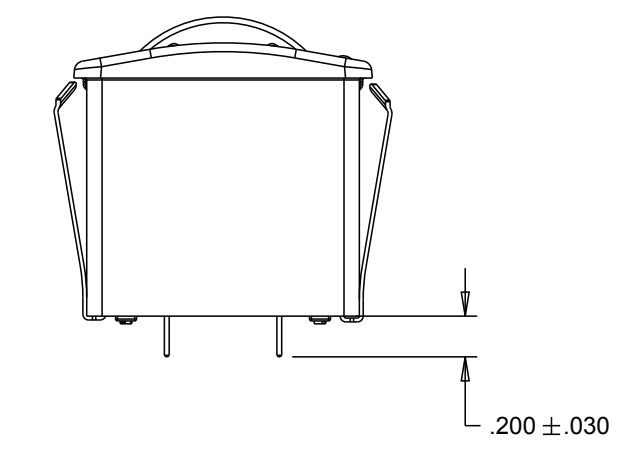
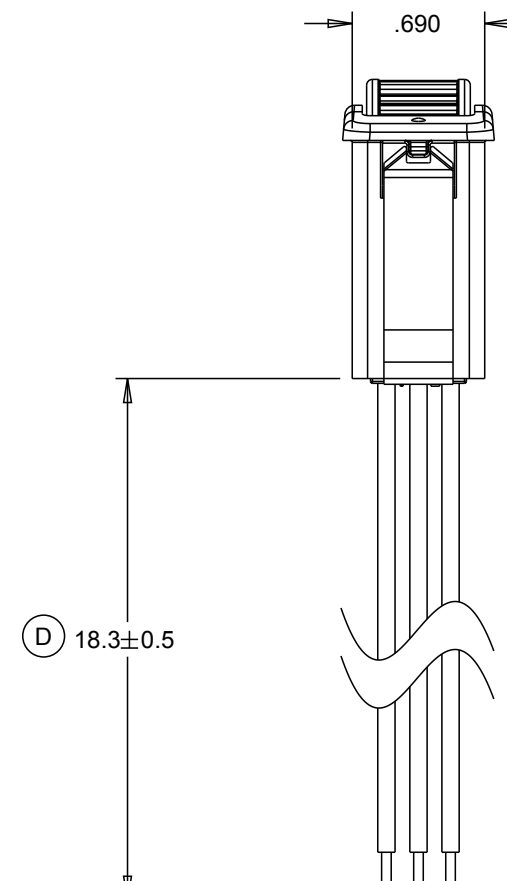
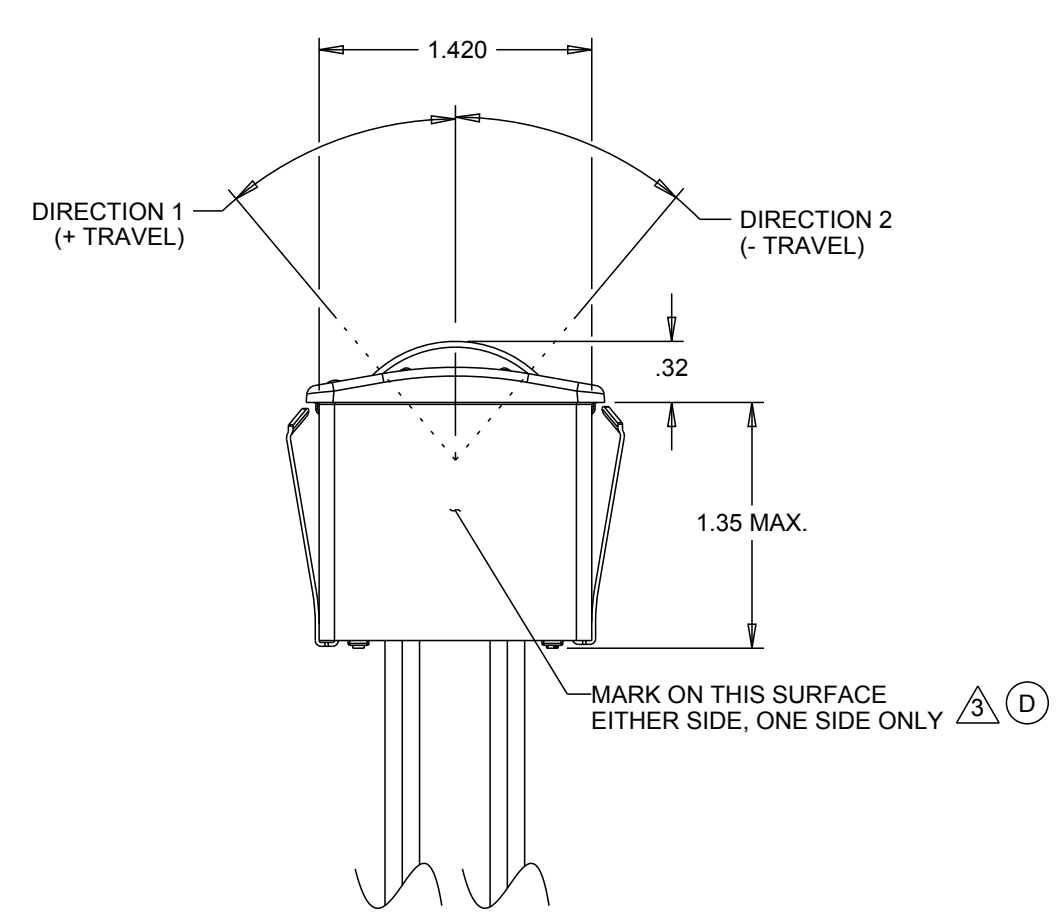
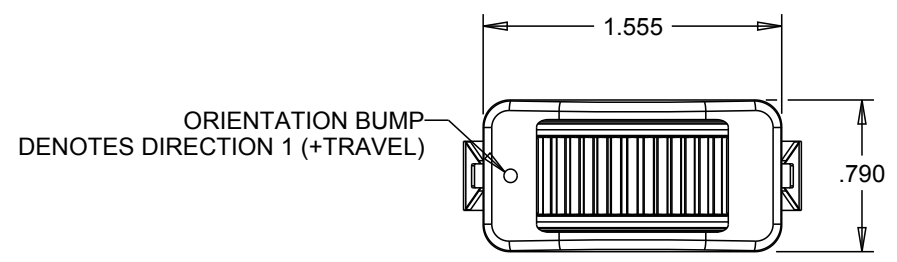
| HTW-__1__ |        |           |     |
|-----------|--------|-----------|-----|
| REV       | OCN #  | DATE      | APR |
| A         | 047995 | 24 MAR 09 | LBG |
| B         | 061319 | 19 MAY 11 | DCF |
| C         | 066712 | 27 JUL 12 | DCF |
| D         | 070633 | 24 MAY 13 | DCF |



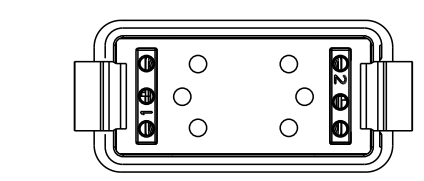
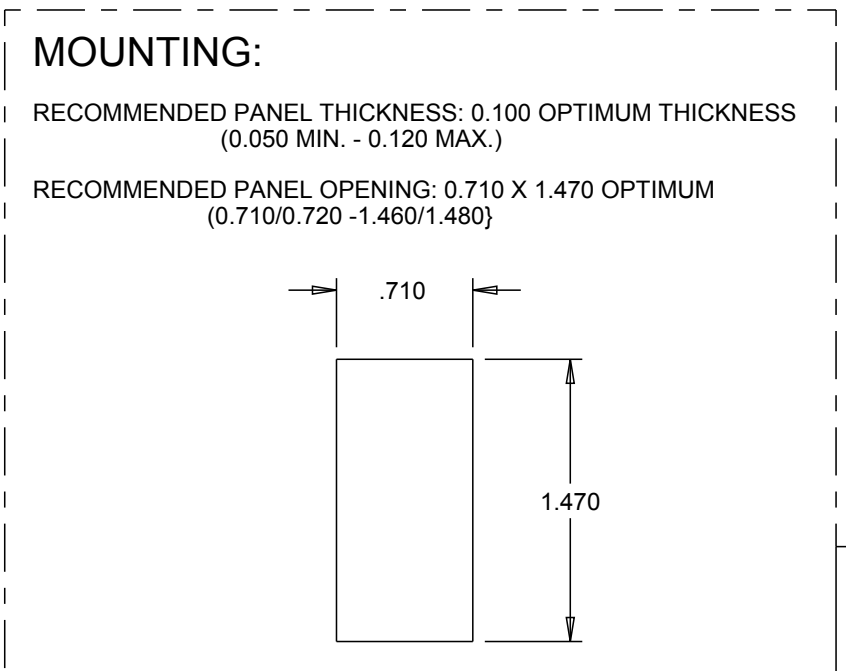
SCALE 1:1



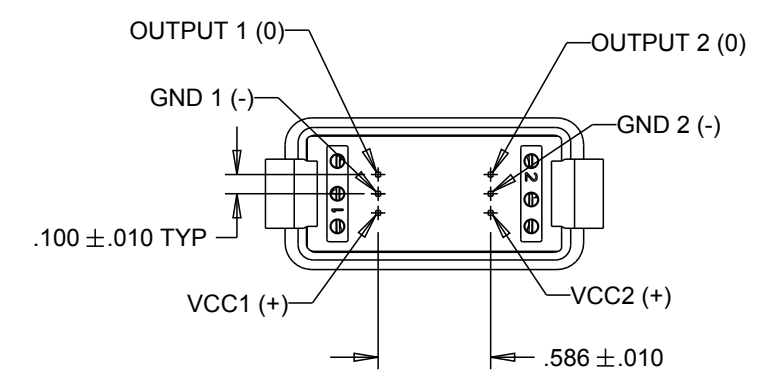
| SWITCH CHARACTERISTICS  |                           |   |      |      |
|---|---------------------------|---|------|------|
| ELECTRICAL  |                           |   |      |      |
| RATED AT  | UNITS                     | MIN   | TYP  | MAX  |
| V <sub>CC</sub> = 5V @ 25°C<br>LOAD = 1ma (4.7K $\Omega$ )                            |                           |   |      |      |
| SUPPLY VOLTAGE  | VDC                       | 4.50  | 5.00 | 5.50 |
| OUTPUT VOLTAGE, TOLERANCE AT CENTER (SEE APPROPRIATE GRAPH FOR OUTPUT VALUES)         | VDC AT 5V V <sub>CC</sub> | -.15  | NA   | +.15 |
| OUTPUT VOLTAGE, TOLERANCE AT CENTER (FOR DETENT VERSION A ONLY)                       | VDC AT 5V V <sub>CC</sub> | -.25  | NA   | +.25 |
| OUTPUT VOLTAGE, TOLERANCE FULL TRAVEL (SEE APPROPRIATE GRAPH FOR OUTPUT VALUES)       | VDC AT 5V V <sub>CC</sub> | -.25  | NA   | +.25 |
| SUPPLY CURRENT OPTIONS A & D<br>B=0, V <sub>CC</sub> =5V, I <sub>OUT</sub> =0         | mA                        | NA  | NA   | 10   |
| SUPPLY CURRENT FOR ALL OTHER OPTIONS<br>B=0, V <sub>CC</sub> =5V, I <sub>OUT</sub> =0 | mA                        | NA  | NA   | 20   |
| MECHANICAL  |                           |   |      |      |
| MECHANICAL LIFE FULL FORWARD TO FULL BACK   |                           | 3,000,000                                     |      |      |
| MECHANICAL DETENT CYCLE LIFE PER DETENT (D)   |                           | 100,000                                       |      |      |
| MAXIMUM ALLOWABLE RADIAL LOAD   | LBS                       | NA  | NA   | 30   |
| ENVIRONMENTAL   |                           |   |      |      |
| OPERATING TEMPERATURE   | °C                        | -40   | 20   | 85   |
| HUMIDITY  |                           | 96% RH, 70°C, 96 HRS                          |      |      |
| VIBRATION   |                           | PER MIL-810F MINIMUM INTEGRITY (D)            |      |      |
| ELECTRONICS SEAL INTEGRITY  |                           | WATERTIGHT PER IP68S. 1 METER (D)             |      |      |
| MECHANICAL SEAL INTEGRITY   |                           | UNSEALED (D)                                  |      |      |
| EMI/RFI WITHSTAND   |                           | PER SAE J1113 CONTACT FACTORY FOR DETAILS (D) |      |      |
| MATERIAL  |                           |   |      |      |
| BUTTON TOP  |                           | THERMOPLASTIC                                 |      |      |
| BEZEL   |                           | THERMOPLASTIC                                 |      |      |
| SNAP ARMS   |                           | STAINLESS STEEL                               |      |      |



OUTPUT 2 IS NOT PRESENT IN ALL CONFIGURATIONS



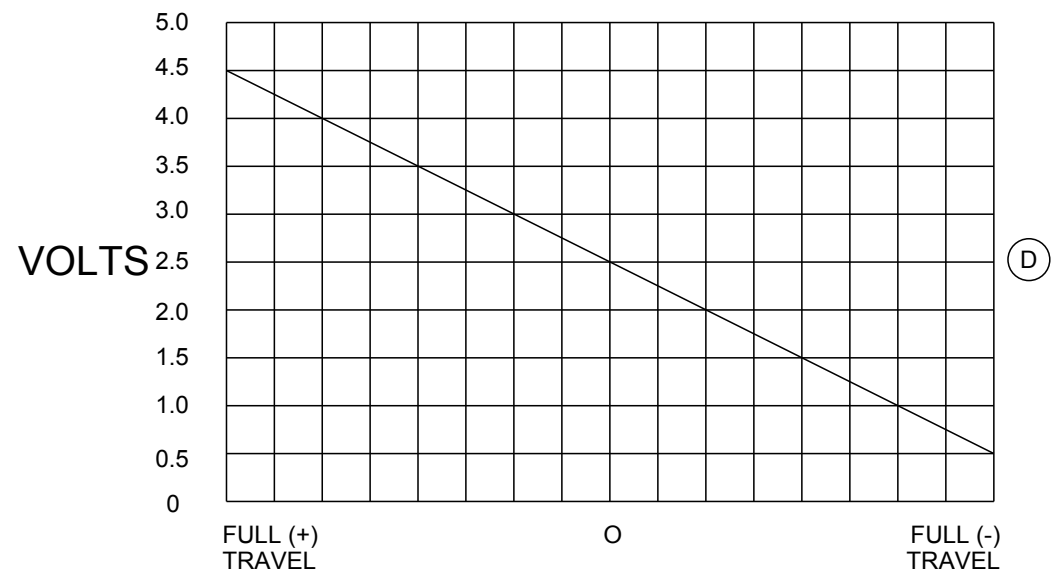
NOT ALL WIRES ARE PRESENT IN ALL OUTPUT CONFIGURATIONS



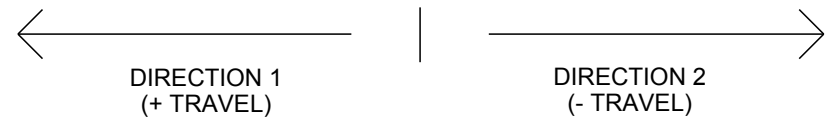
**PINNED TERMINATION**  
NOT ALL PINS ARE PRESENT IN ALL OUTPUT CONFIGURATIONS

|   |                               |  |                  |                         |                                 |
|---|-------------------------------|--|------------------|-------------------------|---------------------------------|
| UNLESS OTHERWISE SPECIFIED:<br>DIMENSIONS ARE IN INCHES.<br>TOLERANCES:<br>.XX ±.03<br>.XXX ±.010<br>ANGLES $\pm 2^\circ$<br>DO NOT SCALE | CARPENTERSVILLE, ILLINOIS USA | DESCRIPTION  |                  |                         |                                 |
|   |                               | HTW, PROPORTIONAL THUMBWHEEL, KNURLED WHEEL, SPRING RETURN |                  |                         |                                 |
|   |                               | DRWN. TH<br>CHKD. DCF<br>APPD. AH                          | SIZE<br><b>C</b> | FSCM NO<br><b>21649</b> | DRAWING NO.<br><b>HTW-__1__</b> |
| THIRD ANGLE PROJECTION  |                               | Scale 1:1  |                  | Sheet 1 OF 2            |                                 |

### OPTION A



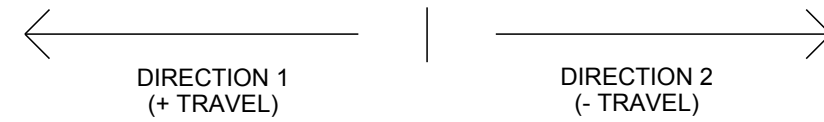
OUTPUT 1 ———  
OUTPUT 2 ·····



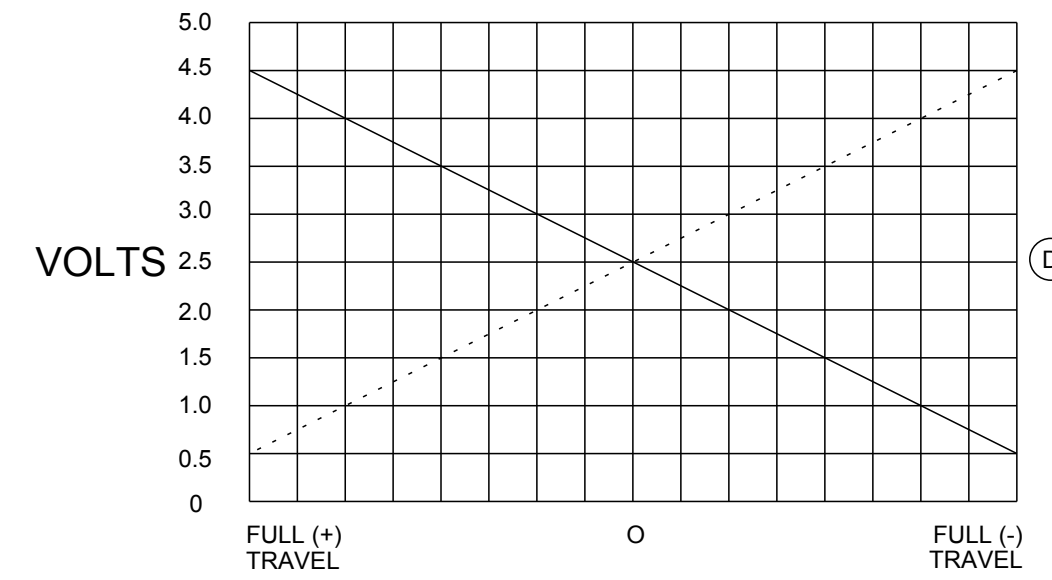
### OPTION B



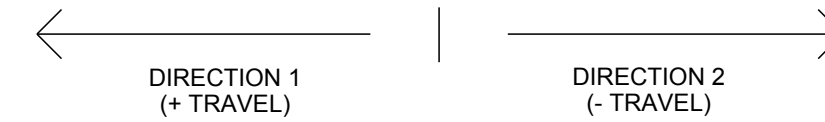
OUTPUT 1 ———  
OUTPUT 2 ·····



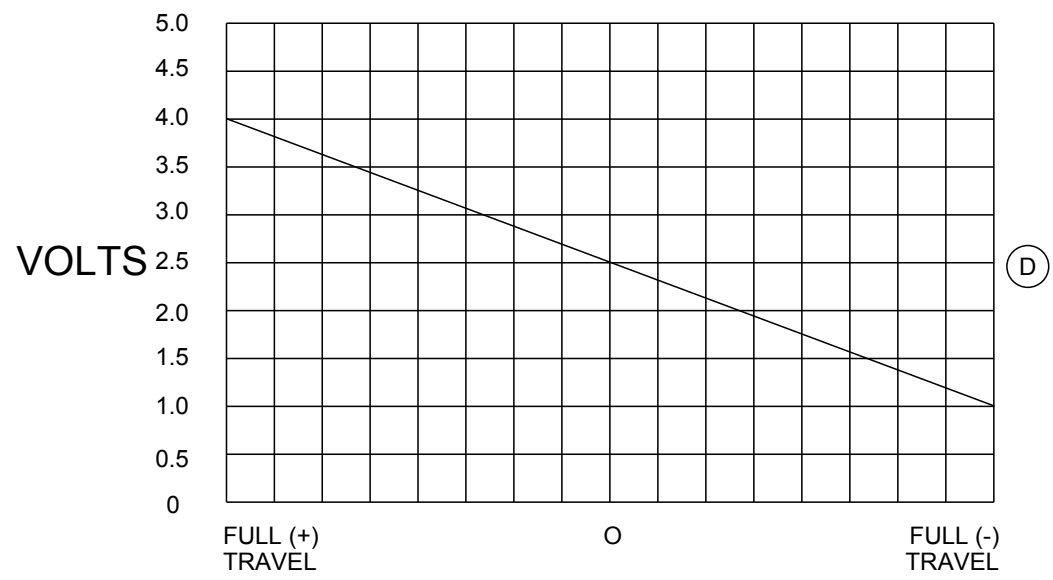
### OPTION C



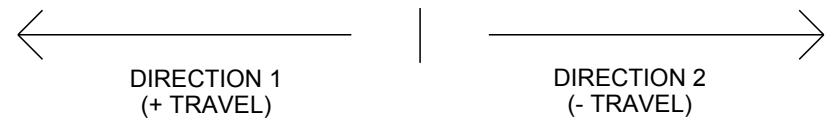
OUTPUT 1 ———  
OUTPUT 2 ·····



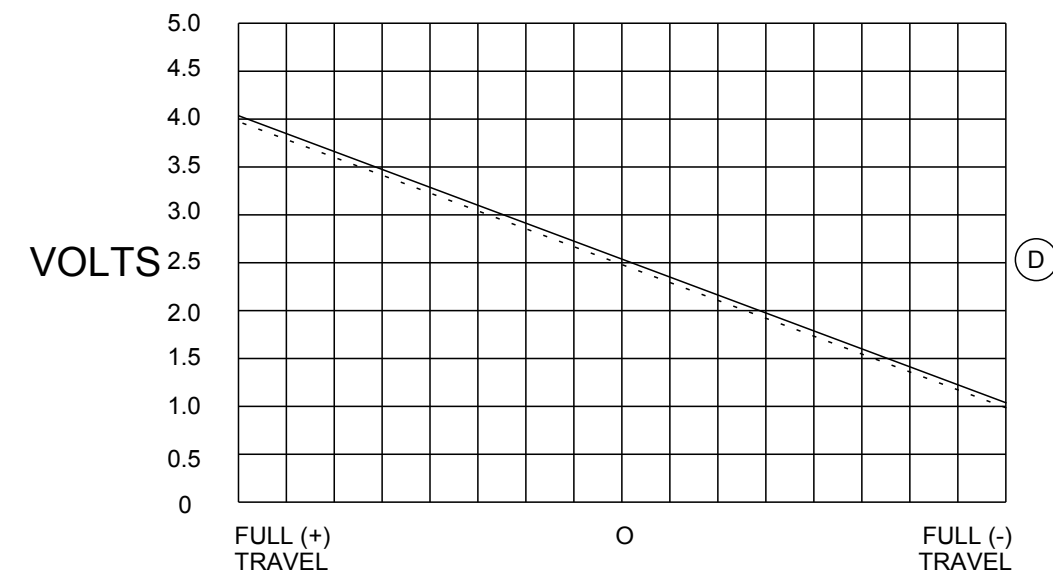
### OPTION D



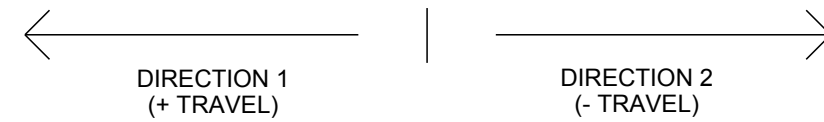
OUTPUT 1 ———  
OUTPUT 2 ·····



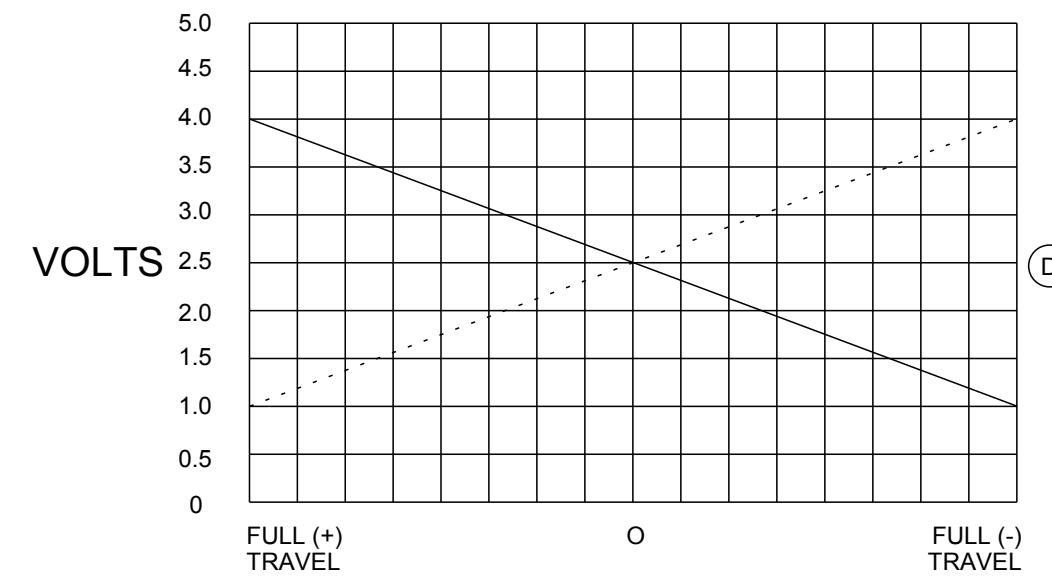
### OPTION E



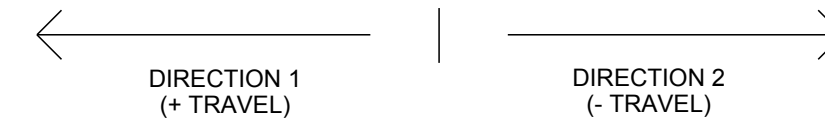
OUTPUT 1 ———  
OUTPUT 2 ·····



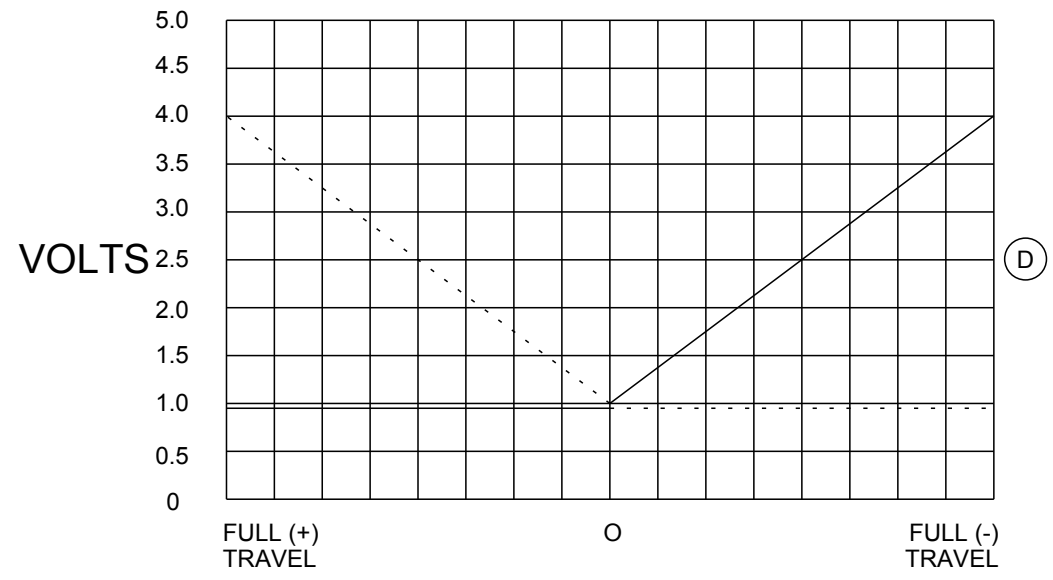
### OPTION F



OUTPUT 1 ———  
OUTPUT 2 ·····



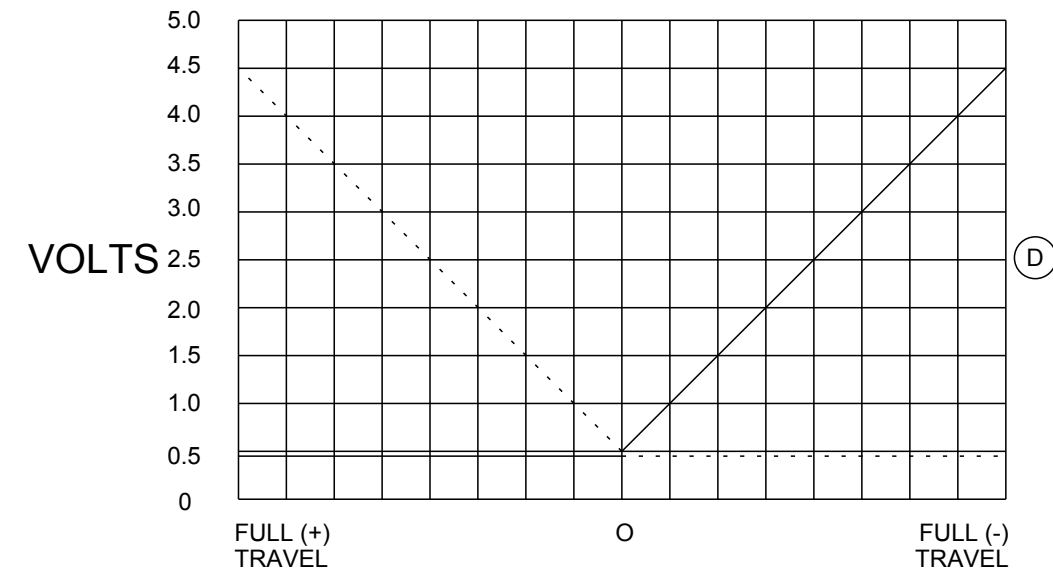
### OPTION G



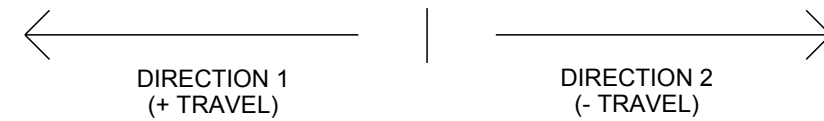
OUTPUT 1 ———  
OUTPUT 2 ·····



### OPTION H



OUTPUT 1 ———  
OUTPUT 2 ·····



UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES.  
TOLERANCES ARE AS LISTED.  
MUST BE FREE FROM BURRS  
AND SHARP EDGES

TOLERANCES  
.XX ±.03  
.XXX ±.010  
ANGLES ±2°  
DO NOT SCALE DRAWING

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OF OTTO ENGINEERING, INC.

|           |                           |              |              |          |
|-----------|---------------------------|--------------|--------------|----------|
| DRWN. TH  | SIZE                      | FSCM NO      | DRAWING NO.  | REV.     |
| CHKD. DCF | <b>C</b>                  | <b>21649</b> | HTW-__1__    | <b>D</b> |
| APPD. AH  |                           |              |              |          |
| WT.       | THIRD ANGLE<br>PROJECTION | Scale 1:1    | Sheet 2 OF 2 |          |

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