

MEDIUM HALL EFFECT JOYSTICK

JHM
MEDIUM
JOYSTICK

UP TO 10 MILLION OPERATIONAL CYCLES IN ALL DIRECTIONS



Handle Style 32 with
2 Pushbuttons



Handle Style 61
with Rocker and
5 Switches

The JHM series Medium Hall Effect Joystick is a full function operator control that will fit in an armrest, on a panel, or any other location where a shallow behind panel depth joystick is needed. It utilizes Hall effect technology for long life and reliability. Electronics are sealed up to IP68S with an operational life of ten million cycles in all directions.

The standard JHM offers 19 handle styles, 18 output configuration choices and 9 gating options.

Output options include CANopen, J1939, PWM, USB, analog and digital control outputs, and redundant sensors. The JHM offers a variety of switches and handle styles such as a ball handle, a lockout handle, a G3-D grip and handles with pushbuttons, rockers and 5-button keypads.

Gating options include single axis, dual axis, friction y-axis, and various omnidirectional selections that include omnidirectional round smooth feel, omnidirectional on-axis and off-axis guided feel and omnidirectional square on-axis guided feel.

Features:

- Designed for armrest & panel mounting
- Shorter behind panel depth
- Contactless analog output Hall effect technology
- Electronics sealed up to IP68S
- Up to 10 million operational cycles in all directions
- Available with a variety of grip & switch options
- Redundant sensors available
- Various output configurations
 - CANopen
 - J1939
 - USB
 - PWM
 - Serial
 - Analog
- Variety of gating options
- RoHS compliant

Your official representative

ALDERS
Indicate. Control. Connect.

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| Standard Characteristics/Ratings: | | | | |
|---|---|------------|------------|------------|
| Sensor Type: | Hall effect analog, factory programmed with temperature compensation, ground and supply line break detection, and over voltage and reverse voltage protection options. | | | |
| Design: | Contactless sensing using dual bar permanent magnet | | | |
| ELECTRICAL RATINGS: Joystick Rated at 5V @ 20°C, Load = 1ma (4.7kΩ) | | | | |
| Electrical | Units | Min | Typ | Max |
| Supply Voltage, Vcc | VDC | 4.5 | 5.0 | 5.5 |
| Output Voltage Tolerance at Center AA, BB, CC, DD, EE, FF, GG & HH | 5V Vcc | -0.25 | N/A | +0.25 |
| Output Voltage Tolerance at Center AT, BT, CT, DT, ET & FT | 5V Vcc | -0.15 | N/A | +0.15 |
| Output Voltage Tolerance Full Travel | 5V Vcc | -0.25 | N/A | +0.25 |
| Supply Current Per Sensor | mA | N/A | N/A | 10.00 |
| Output Source Current Limit | mA | -1.00 | N/A | 1.00 |
| ELECTRICAL RATINGS: U2 Rated at Vcc = 5V @ 25°C, Load = 1ma (4.7kΩ) | | | | |
| Electrical | Units | Min | Typ | Max |
| Supply Voltage, Vcc | VDC | 4.5 | 5.0 | 5.5 |
| Output Voltage +, - 0° Deflection | 5V Vcc | 2.25 | 2.50 | 2.75 |
| Output at Full Travel Direction -Z | 5V Vcc | 0.45 | 0.50 | 0.75 |
| Output at Full Travel Direction +Z | 5V Vcc | 4.25 | 4.50 | 4.55 |
| Supply Current B-0, Vcc=5V, Io=0 | mA | N/A | N/A | 10.00 |
| ELECTRICAL RATINGS: P9 Switches Rated at 10mA Resistive Load at 5VDC | | | | |
| Electrical Life: | 1,000,000 cycles | | | |
| MECHANICAL (JOYSTICK): | | | | |
| Mechanical Life: | 5 Million Cycles, High Force 10 Million Cycles, Low Force 2.5 Million Cycles, Outputs JJ, KK, MM, Rear Mount 250,000 Cycles, Friction Held, High Force Boot Life up to 1 Million Cycles | | | |
| Mechanical (Operating Force w/Boot) Travel Angle | Units | Min | Typ | Max |
| | Degrees | 18° | 20° | 22° |
| High Force @ 2" GRP (Return to Center) | Lbs. | 0.5 | 1.25 | 2.0 |
| Low Force @ 2" GRP (Return to Center) | Lbs. | 0.5 | 1.0 | 1.5 |
| High Force @ 3" GRP (Return to Center) | Lbs. | 0.5 | 1.0 | 1.5 |
| Low Force @ 3" GRP (Return to Center) | Lbs. | 0.4 | 0.7 | 1.0 |
| High Force @ 4" GRP (Return to Center) Handle Styles 51, 52, 53 | Lbs. | 1.2 | 2.5 | 3.8 |
| Low Force @ 4" GRP (Return to Center) Handle Styles 51, 52, 53 | Lbs. | 0.4 | 0.8 | 1.2 |
| High Force (w/Boot) Y Direction @ 2" GRP (Friction) | Lbs. | 1.5 | 4.5 | 7.5 |
| High Force (w/Boot) Friction @ 3" GRP, Y Direction | Lbs. | 1.0 | 3.5 | 6.0 |
| High Force (w/Boot) Friction @ 4" GRP (Handle Styles 51, 52, 53), Y Direction | Lbs. | 0.8 | 2.4 | 4.0 |
| MECHANICAL (U2 SWITCH): 2,500,000 Cycle Mechanical Life | | | | |
| Mechanical | Units | Min | Typ | Max |
| Operating Force | Oz. | 3.5 | 6.5 | 9.5 |
| MECHANICAL (P9 SWITCH): 1,250,000 Cycle Mechanical Life | | | | |
| Mechanical | Units | Min | Typ | Max |
| Operating Force | Oz. | 8 | 12 | 16 |
| MECHANICAL (KEYPAD PUSHBUTTONS): 3,000,000 Cycle Mechanical Life | | | | |
| Mechanical | Units | Min | Typ | Max |
| Operating Force | Oz. | 2 | 8 | 10 |
| ENVIRONMENTAL | | | | |
| Electronics (Handles 11, 12, 21, 35, 41, 53, 71, 72) | IP68S | | | |
| Seal | Handle styles 34 and 35 panel sealed to IP68S | | | |
| RFI / EMI | Withstand per SAE J1113 | | | |

HALL EFFECT CONTROLS

HALL EFFECT TECHNOLOGY JOYSTICK

JHM PART NUMBER CODE

| | | | | | | |
|---|--|---|---|--|---|---|
| <p>JHM - XX</p> <p>Handle Style*</p> <ul style="list-style-type: none"> 11. No Handle ① 12. Standard - Blank ① 21. With Hall effect Rocker 31. With Pushbutton-Top Handle, Half Boot 32. With 2 Pushbuttons - Handle 33. With 3 Pushbuttons 34. With Pushbutton - Top Handle, Full Boot ② 35. No Pushbutton - Top Handle, Full Boot ①② 41. Lockout ① 51. G3-D, Rocker and Operator Presence ② 52. G3-D, Rocker ③ 53. G3-D, Blank ①③ 54. G3-D, Operator Presence 61. 5-Button Keypad & Hall Rocker Right ③⑤ 62. 5-Button Keypad & Hall Rocker Left ③⑤ 63. 7-Button Keypad & Hall Rocker Right ⑤ 64. 7-Button Keypad & Hall Rocker Left ⑤ 71. Ball Handle, Large, Thermoset ① 72. Ball Handle, Small, Rubber ① | <p>X</p> <p>Gating</p> <ul style="list-style-type: none"> 1. Gated; Single axis – Return to Center 2. Gated; Dual axis – Return to Center 3. Omni-directional; Round Smooth Feel 4. Omni-directional; On-Axis and Off-Axis Guided Feel 5. Omni-directional; Round On-Axis Guided Feel 6. Friction - Single axis ①④ 7. Friction Y-axis; Return to Center X-axis ①④ 8. Omni-directional; Square Smooth Feel 9. Omni-directional; Square On-axis Guided Feel | <p>X</p> <p>Force</p> <ul style="list-style-type: none"> 1. Low ④ 2. High | <p>XX</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <p>Output 1**</p> <ul style="list-style-type: none"> AA. 2.5 +/- 2.0VDC BB. 2.5 +/- 2.0VDC CC. 2.5 +/- 2.0VDC DD. 2.5 +/- 1.5VDC EE. 2.5 +/- 1.5VDC FF. 2.5 +/- 1.5VDC GG. 0.5 - 4.5VDC HH. 1.0 - 4.0VDC AT. 2.5 +/- 2.0VDC BT. 2.5 +/- 2.0VDC CT. 2.5 +/- 2.0VDC DT. 2.5 +/- 1.5VDC ET. 2.5 +/- 1.5VDC FT. 2.5 +/- 1.5VDC JJ. CANbus J1939 KK. CANopen LL. PWM MM. USB </td> <td style="vertical-align: top; width: 50%;"> <p>Output 2</p> <ul style="list-style-type: none"> NONE 2.5 +/- 2.0VDC 2.5 +/- 2.0VDC NONE 2.5 +/- 1.5VDC 2.5 +/- 1.5VDC 0.5 - 4.5VDC 1.0 - 4.0VDC NONE 2.5 +/- 2.0VDC 2.5 +/- 2.0VDC NONE 2.5 +/- 1.5VDC 2.5 +/- 1.5VDC NONE^⑤ NONE^⑤ NONE NONE^⑤ </td> </tr> </table> | <p>Output 1**</p> <ul style="list-style-type: none"> AA. 2.5 +/- 2.0VDC BB. 2.5 +/- 2.0VDC CC. 2.5 +/- 2.0VDC DD. 2.5 +/- 1.5VDC EE. 2.5 +/- 1.5VDC FF. 2.5 +/- 1.5VDC GG. 0.5 - 4.5VDC HH. 1.0 - 4.0VDC AT. 2.5 +/- 2.0VDC BT. 2.5 +/- 2.0VDC CT. 2.5 +/- 2.0VDC DT. 2.5 +/- 1.5VDC ET. 2.5 +/- 1.5VDC FT. 2.5 +/- 1.5VDC JJ. CANbus J1939 KK. CANopen LL. PWM MM. USB | <p>Output 2</p> <ul style="list-style-type: none"> NONE 2.5 +/- 2.0VDC 2.5 +/- 2.0VDC NONE 2.5 +/- 1.5VDC 2.5 +/- 1.5VDC 0.5 - 4.5VDC 1.0 - 4.0VDC NONE 2.5 +/- 2.0VDC 2.5 +/- 2.0VDC NONE 2.5 +/- 1.5VDC 2.5 +/- 1.5VDC NONE^⑤ NONE^⑤ NONE NONE^⑤ | <p>X</p> <p>Termination***</p> <ul style="list-style-type: none"> 1. Wire Leads 24 AWG SAE AS22759 ③ 2. Cable, 22AWG (19/34), PVC/Polyurethane Outer Jacket 3. USB 2.0 HID Joystick USB Mini B |
| <p>Output 1**</p> <ul style="list-style-type: none"> AA. 2.5 +/- 2.0VDC BB. 2.5 +/- 2.0VDC CC. 2.5 +/- 2.0VDC DD. 2.5 +/- 1.5VDC EE. 2.5 +/- 1.5VDC FF. 2.5 +/- 1.5VDC GG. 0.5 - 4.5VDC HH. 1.0 - 4.0VDC AT. 2.5 +/- 2.0VDC BT. 2.5 +/- 2.0VDC CT. 2.5 +/- 2.0VDC DT. 2.5 +/- 1.5VDC ET. 2.5 +/- 1.5VDC FT. 2.5 +/- 1.5VDC JJ. CANbus J1939 KK. CANopen LL. PWM MM. USB | <p>Output 2</p> <ul style="list-style-type: none"> NONE 2.5 +/- 2.0VDC 2.5 +/- 2.0VDC NONE 2.5 +/- 1.5VDC 2.5 +/- 1.5VDC 0.5 - 4.5VDC 1.0 - 4.0VDC NONE 2.5 +/- 2.0VDC 2.5 +/- 2.0VDC NONE 2.5 +/- 1.5VDC 2.5 +/- 1.5VDC NONE^⑤ NONE^⑤ NONE NONE^⑤ | | | | | |

* Wire loop not in handle style 11, 12, 35, 41, 53 and 71.

**Outputs are from the center to the full travel position in each direction. Options "AA", "BB", "CC", "DD", "EE", "FF", "AT", "BT", "CT", "DT", "ET" and "FT" provide increased voltage in +x, +y; and decreasing voltage in -x, -y for output 1. Options "GG" and "HH" provide increasing voltages in all directions (+x, +y, -x, -y) for output 1 and output 2.

Options "BB", "EE", "BT", "ET" provide redundant output 2 which duplicates output 1.

Options "CC", "FF", "CT", "FT" provide redundant output 2 which is inverse of output 1.

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.

***Outputs "AA" through "FT" and "LL" utilize termination 1, outputs "JJ" and "KK" utilize termination 2, and output "MM" utilizes termination 3.

① Friction hold only available with handle styles 11, 12, 35, 41, 53, 71 and 72.

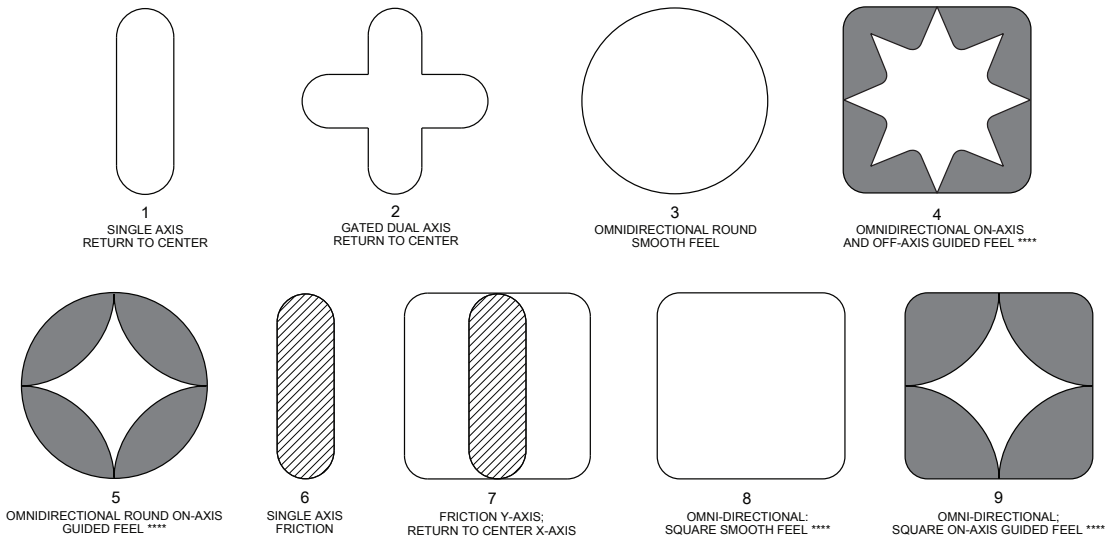
② Watertight panel seal applies to handle style 34 and 35.

③ Handle styles 61, 62 have the following wires for the 5-button switch array: 26 AWG, MIL-W-22759/33. Handle styles 52, 53 have the following wires for the handle wires: 22 AWG, UL1569.

④ Low force not available with gating options 6 and 7.

⑤ Outputs "JJ", "KK" and "MM" not available with handle styles 61, 62, 63 and 64.

JHM GATING ICONS



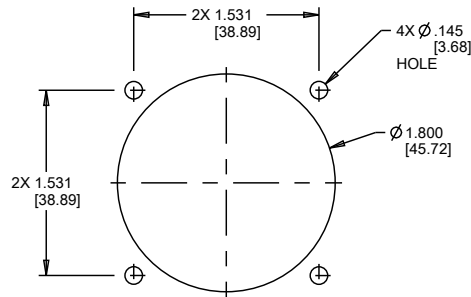
**** FEEL DEFINED BY SHADING

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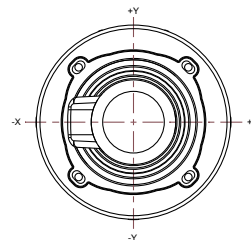
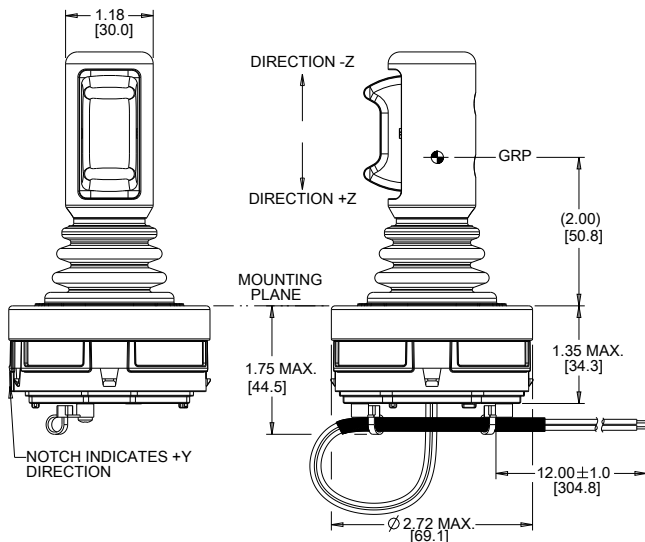
JHM Suggested Panel Opening



SUGGESTED PANEL OPENING
REAR MOUNT
(ALL HANDLE STYLES EXCEPT HANDLE 51)
PANEL THICKNESS .06

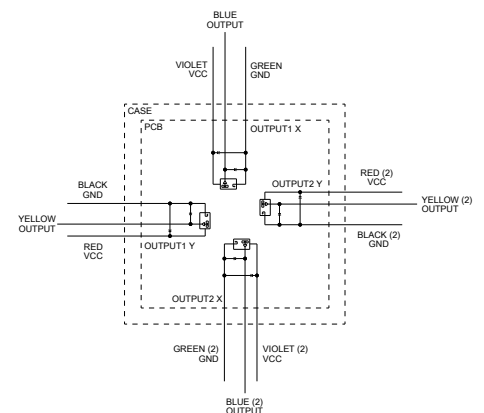
Mounting Hardware Information

| MOUNTING HARDWARE INFORMATION | |
|---|----------------|
| MATERIAL: | |
| MOUNTING HARDWARE (EXCEPT HANDLE STYLE 51) | 4X M3X0.5X14MM |



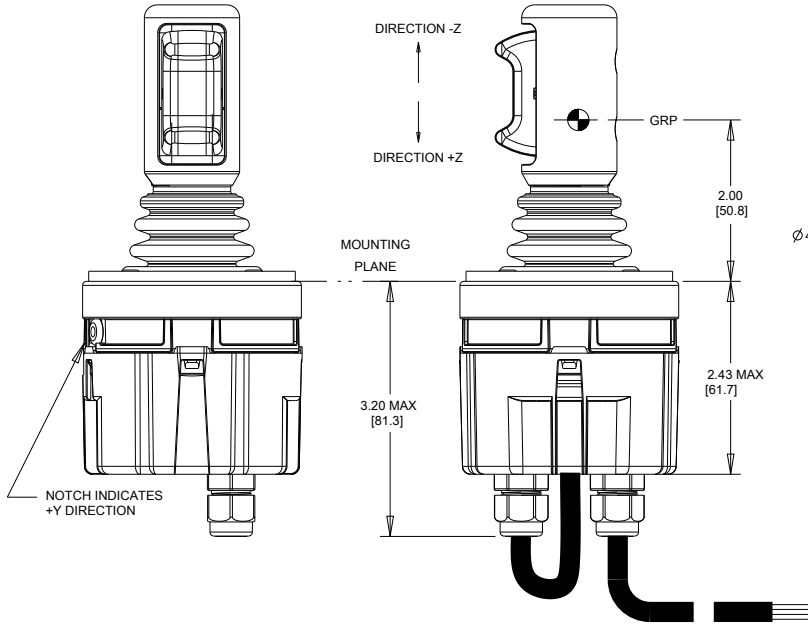
JHM Outputs AA-FT and LL (Output Graph at end of JHM section)

| PWM PRODUCT SPECIFICATIONS | | | | |
|---------------------------------------|-----|------|------|------|
| ELECTRICAL: | | | | |
| PWM INTERFACE | | | | |
| SUPPLY VOLTAGE, Vcc | VDC | 4.5 | N/A | 18.0 |
| OUTPUT FREQUENCY | Hz | 460 | 500 | 540 |
| AMPLITUDE LOW | A | 0.0 | N/A | .020 |
| AMPLITUDE HIGH PULLUP REQUIRED | VDC | 3.0 | N/A | 12.0 |
| PWM OUTPUT @ +X AND +Y FULL TRAVEL | % | 80.0 | 90.0 | 92.0 |
| PWM OUTPUT @ ZERO TRAVEL | % | 42.0 | 50.0 | 58.0 |
| PWM OUTPUT @ -X AND -Y FULL TRAVEL | % | 8.0 | 10.0 | 20.0 |



HALL EFFECT TECHNOLOGY JOYSTICK

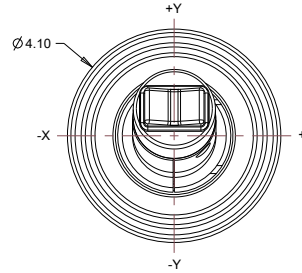
Rear Mount Style



JHM Outputs JJ and KK

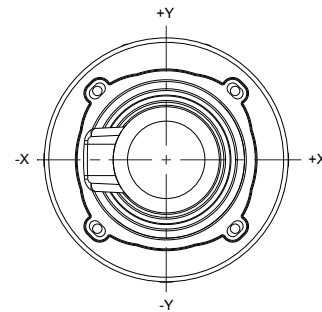
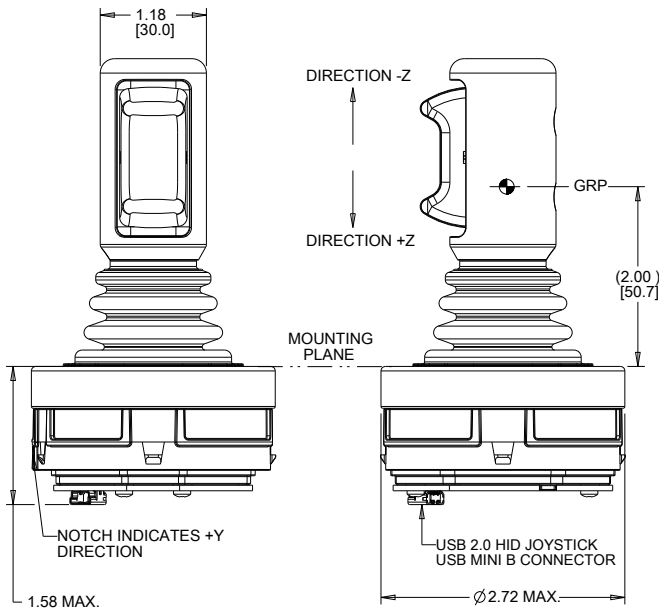
| FUNCTION | COLOR |
|----------|--------|
| CAN HIGH | YELLOW |
| -SUPPLY | BLACK |
| +SUPPLY | RED |
| CAN LOW | GREEN |
| SHIELD | DRAIN |

| PRODUCT SPECIFICATIONS | | | | |
|------------------------------|-------|-------------|-----|-----|
| ELECTRICAL: | | | | |
| JOYSTICK CAN OPEN | | | | |
| | UNITS | MIN | TYP | MAX |
| SUPPLY VOLTAGE | VDC | 9 | N/A | 32 |
| NODE IDENTIFIER | | 10 DECIMAL | | |
| BAUD RATE | | 125K bits/s | | |
| TRANSMISSION REPETITION RATE | | 100 ms | | |
| JOYSTICK J1939 | | | | |
| | UNITS | MIN | TYP | MAX |
| SUPPLY VOLTAGE | VDC | 9 | N/A | 32 |
| SOURCE ADDRESS | | 51 DECIMAL | | |
| BAUD RATE | | 250K bits/s | | |
| TRANSMISSION REPETITION RATE | | 100 ms | | |



JHM Output MM

| PRODUCT SPECIFICATIONS | |
|--|--|
| ELECTRICAL: | |
| JOYSTICK POWERED BY STANDARD USB INTERFACE | |

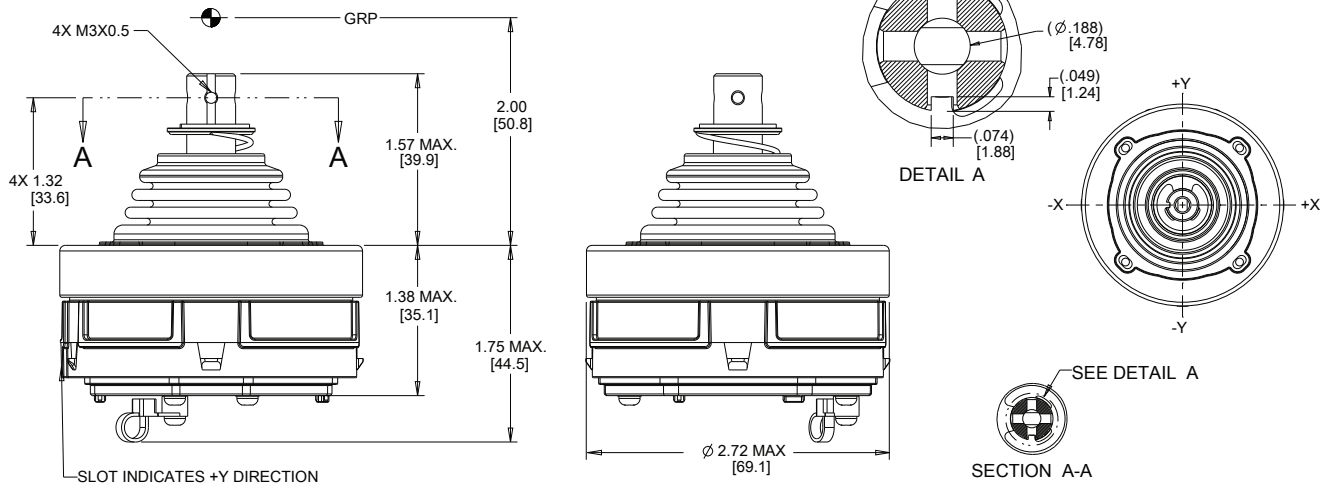


Wires and Strain Relief not shown in all views for clarity.

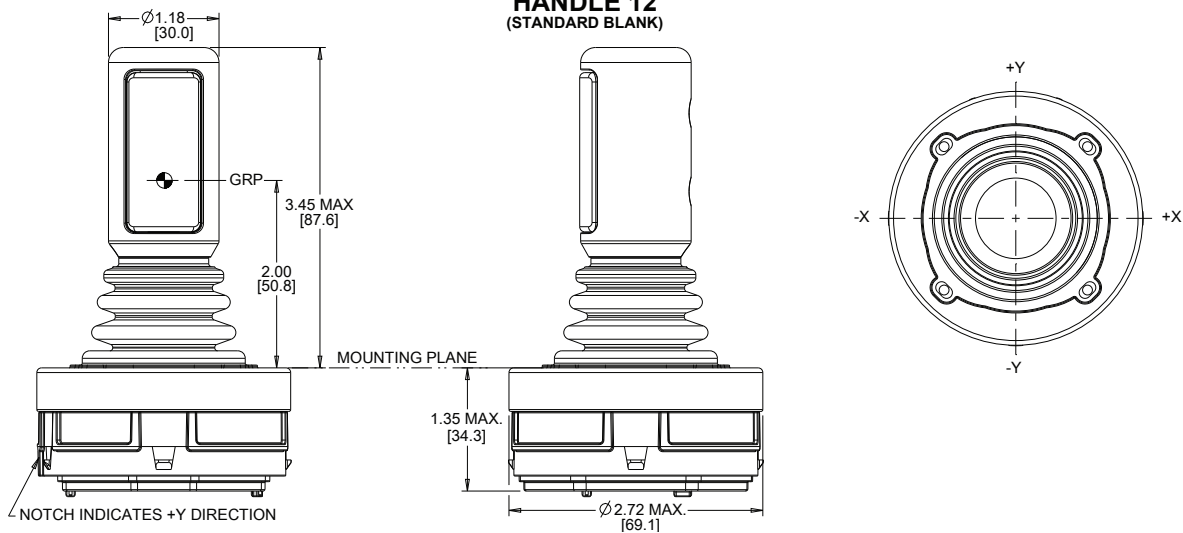
MEDIUM HALL EFFECT JOYSTICK

UP TO 10 MILLION OPERATIONAL CYCLES IN ALL DIRECTIONS

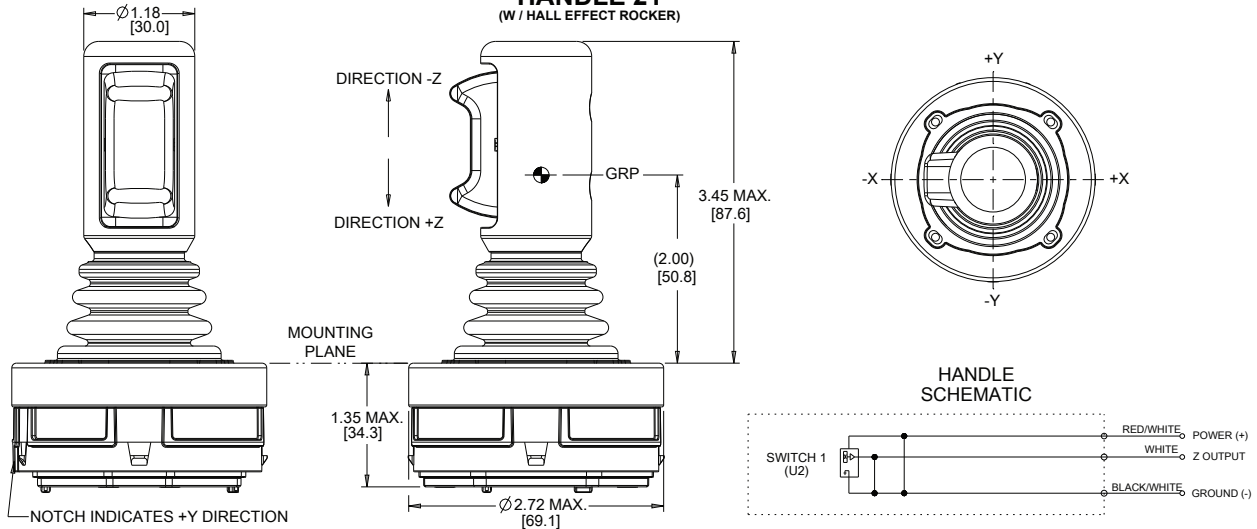
HANDLE 11 (No Handle)



HANDLE 12 (STANDARD BLANK)



HANDLE 21 (W / HALL EFFECT ROCKER)

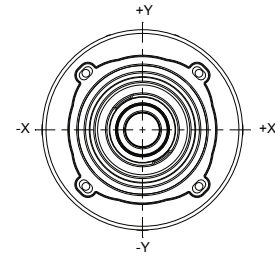
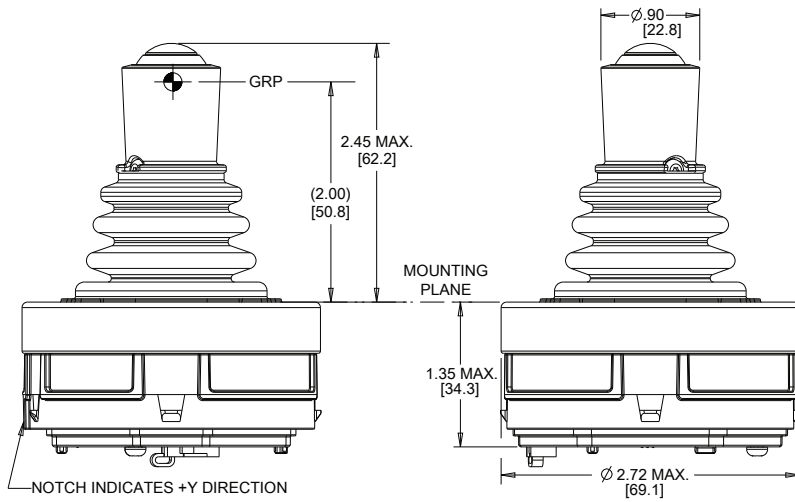


Wires and Strain Relief not shown in all views for clarity.

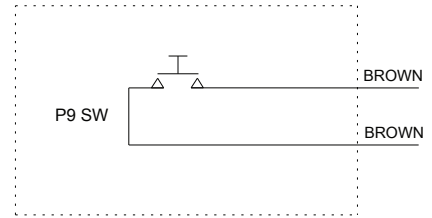
HALL EFFECT TECHNOLOGY JOYSTICK

HANDLE 31

(W / PUSHBUTTON, TOP HANDLE, HALF BOOT)

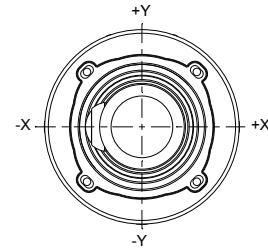
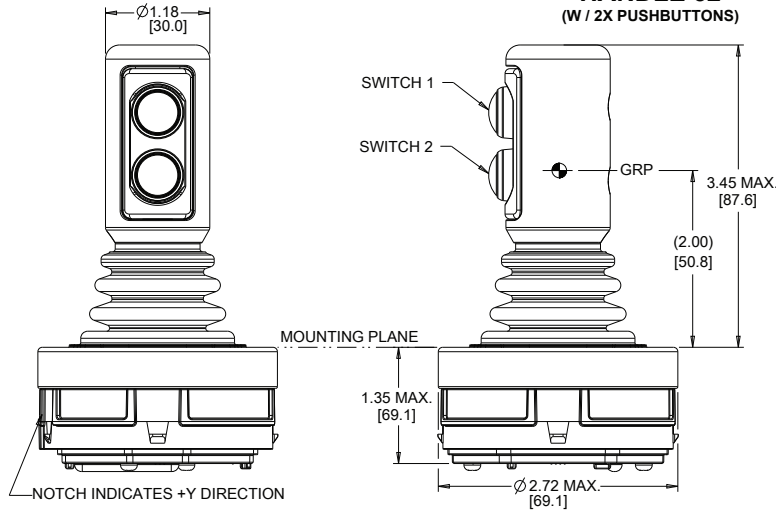


HANDLE SCHEMATIC

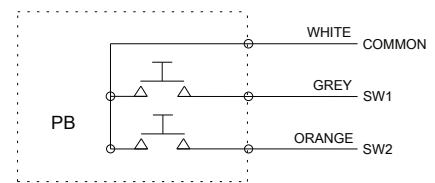


HANDLE 32

(W / 2X PUSHBUTTONS)

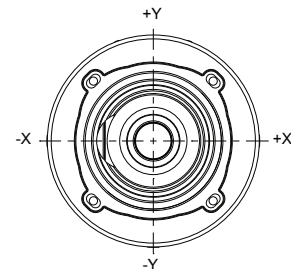
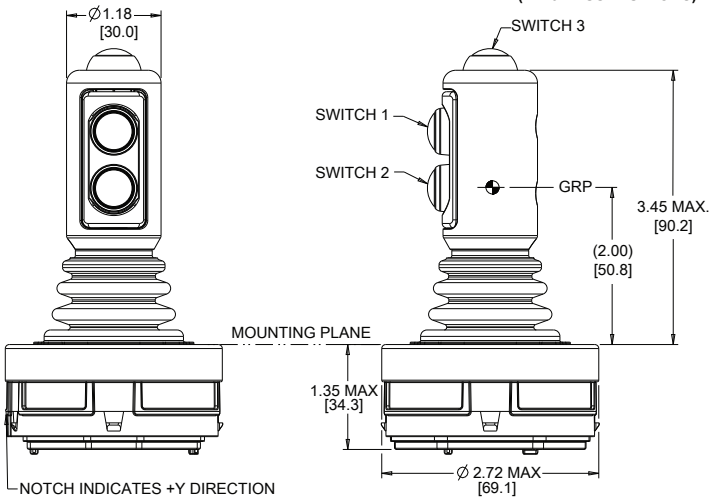


HANDLE SCHEMATIC

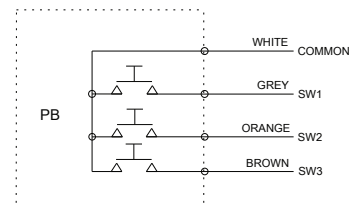


HANDLE 33

(W / 3X PUSHBUTTONS)



HANDLE SCHEMATIC

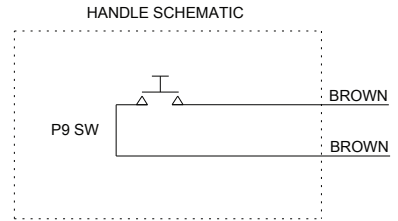
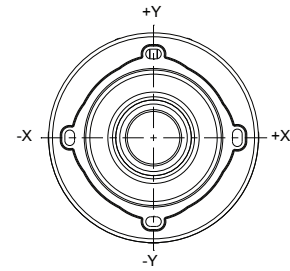
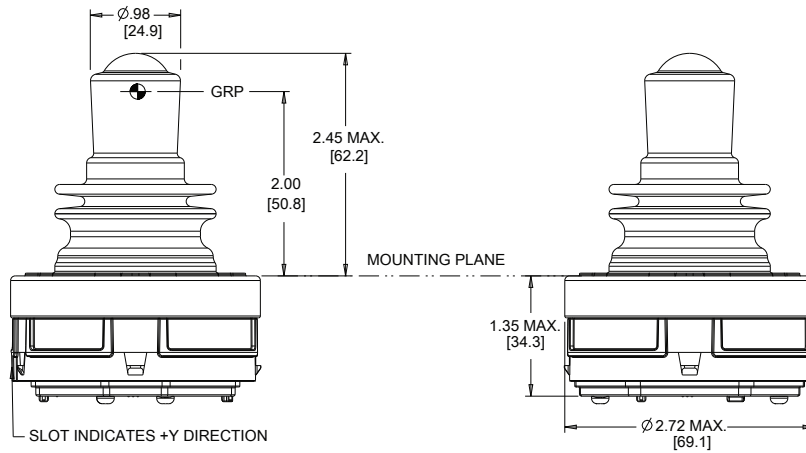


Wires and Strain Relief not shown in all views for clarity.

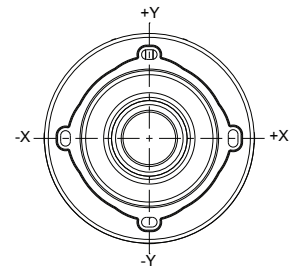
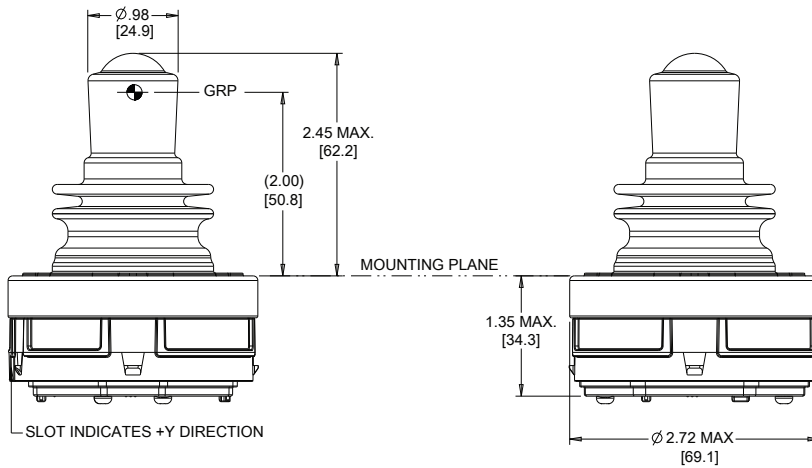
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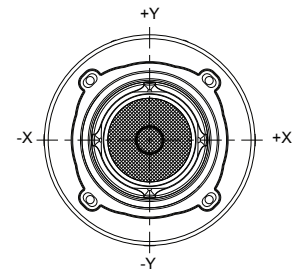
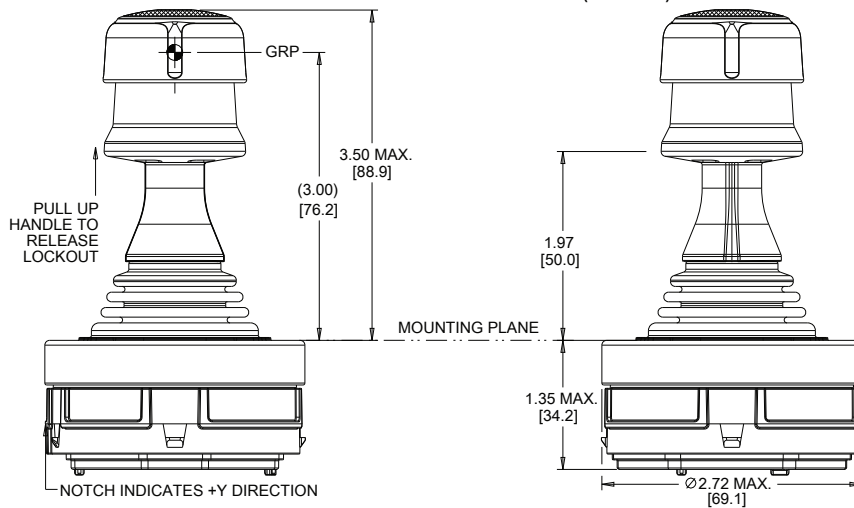
HANDLE 34 (W / PUSHBUTTON, TOP HANDLE, FULL BOOT)



HANDLE 35 (NO PUSHBUTTON, TOP HANDLE, FULL BOOT)



HANDLE 41 (LOCKOUT)

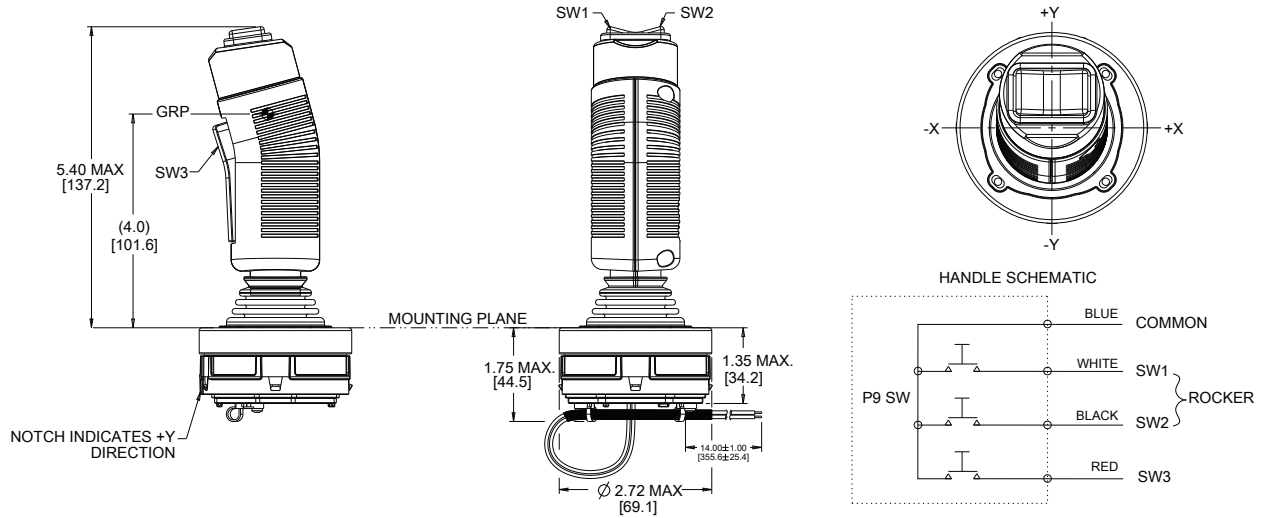


Wires and Strain Relief not shown in all views for clarity.

HALL EFFECT TECHNOLOGY JOYSTICK

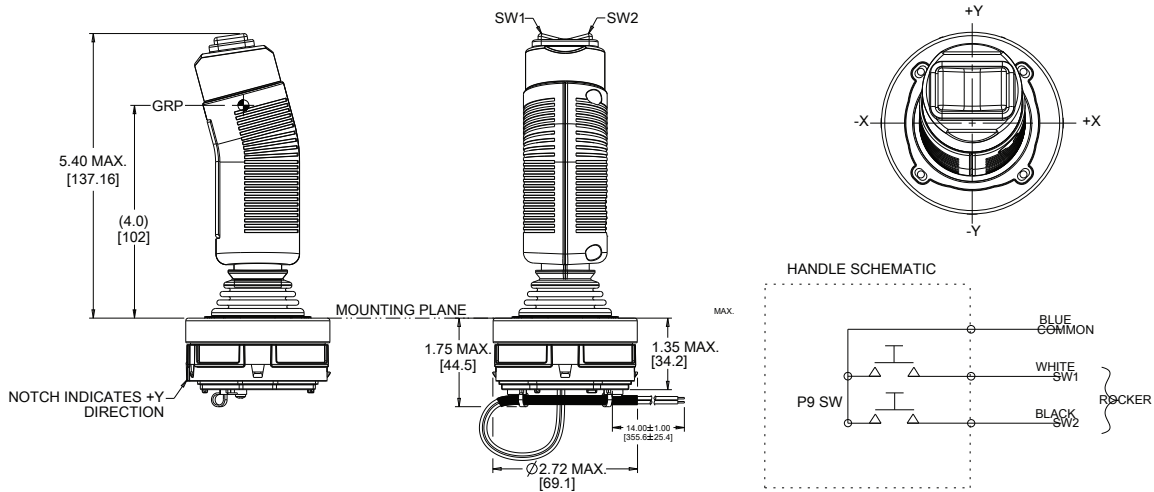
HANDLE 51

(G3-D WITH ROCKER AND OPERATOR PRESENCE)



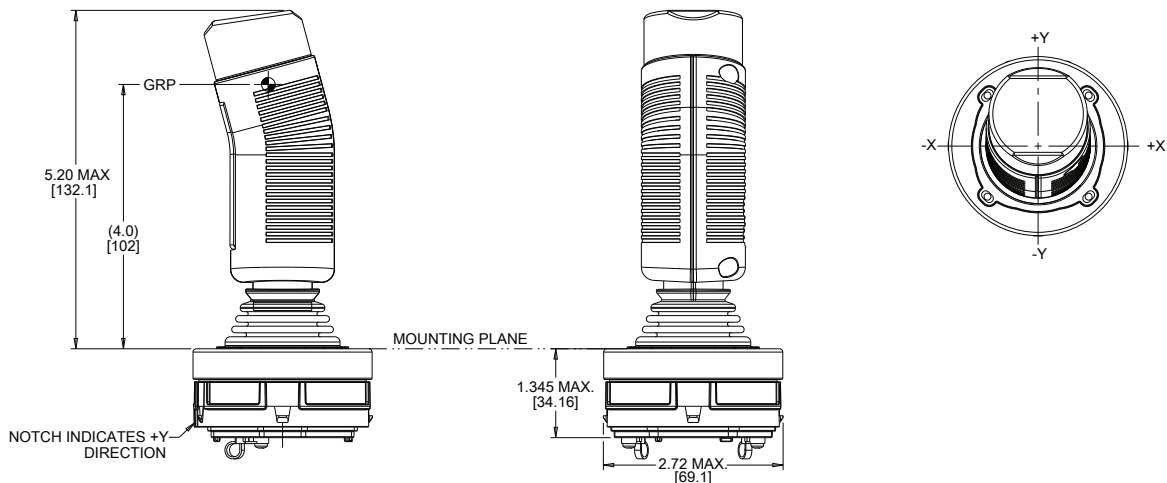
HANDLE 52

(G3-D WITH ROCKER)



HANDLE 53

(G3-D)

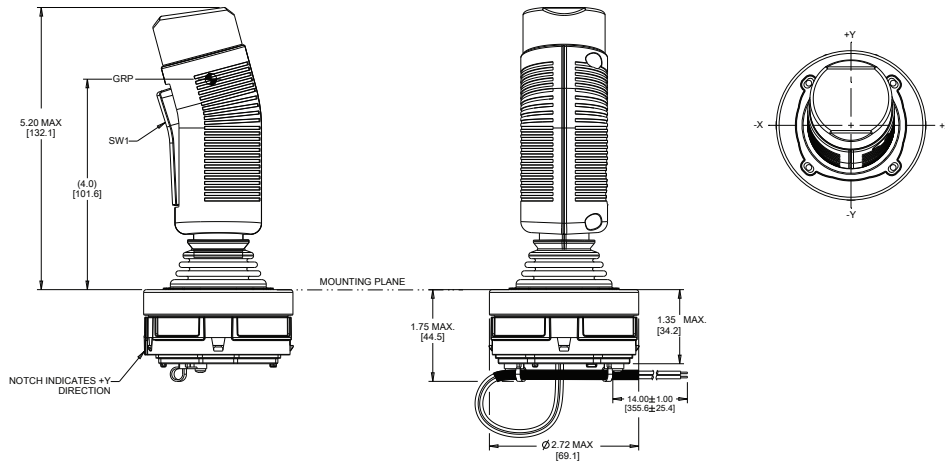


Wires and Strain Relief not shown in all views for clarity.

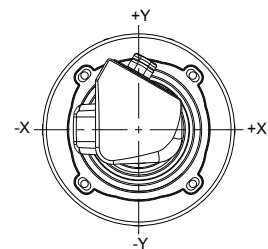
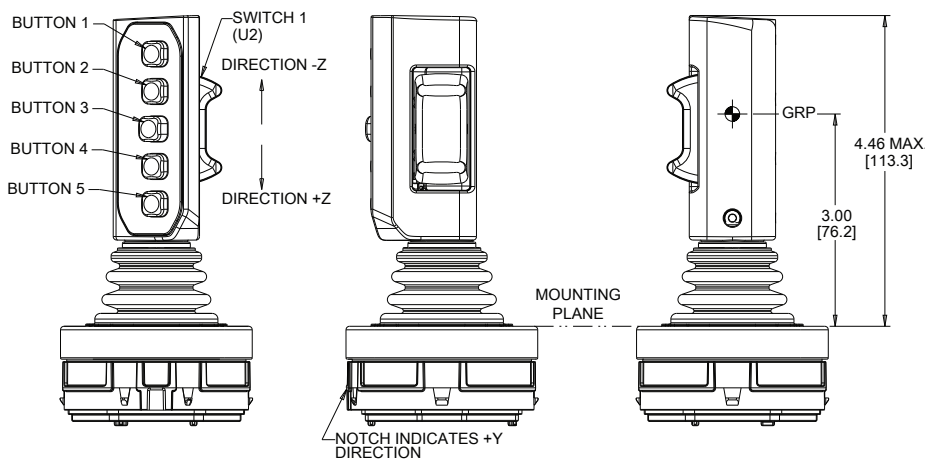
MEDIUM HALL EFFECT JOYSTICK

HALL EFFECT TECHNOLOGY JOYSTICK

HANDLE 54 (G3-D WITH OPERATOR PRESENCE)

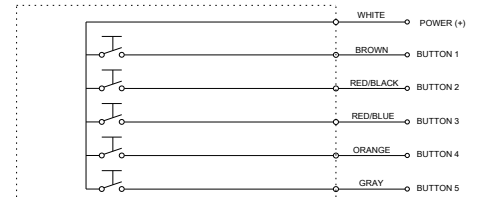


HANDLE 61 (5-BUTTON KEYPAD & HALL ROCKER RIGHT)

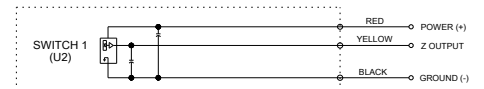


Right-Handed Version

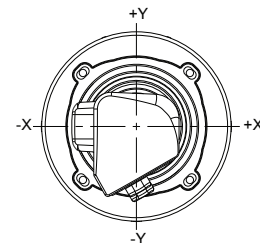
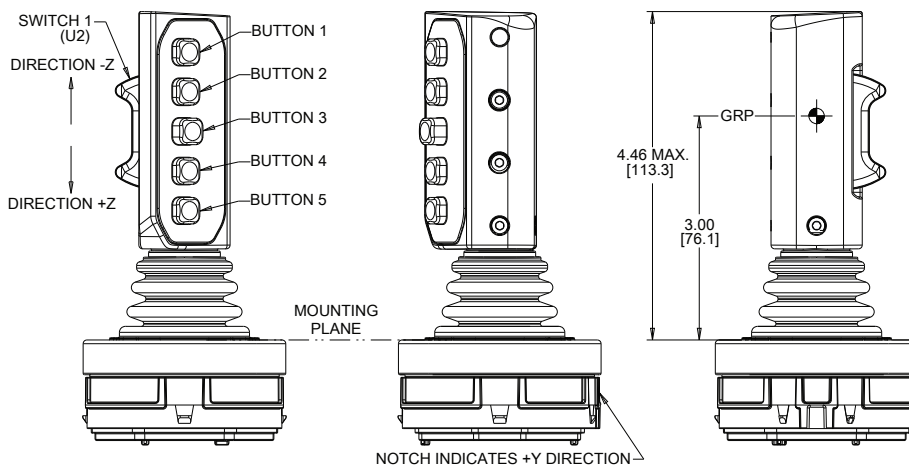
BUTTON SCHEMATIC



HANDLE SCHEMATIC



HANDLE 62 (5-BUTTON KEYPAD & HALL ROCKER LEFT)



Left-Handed Version

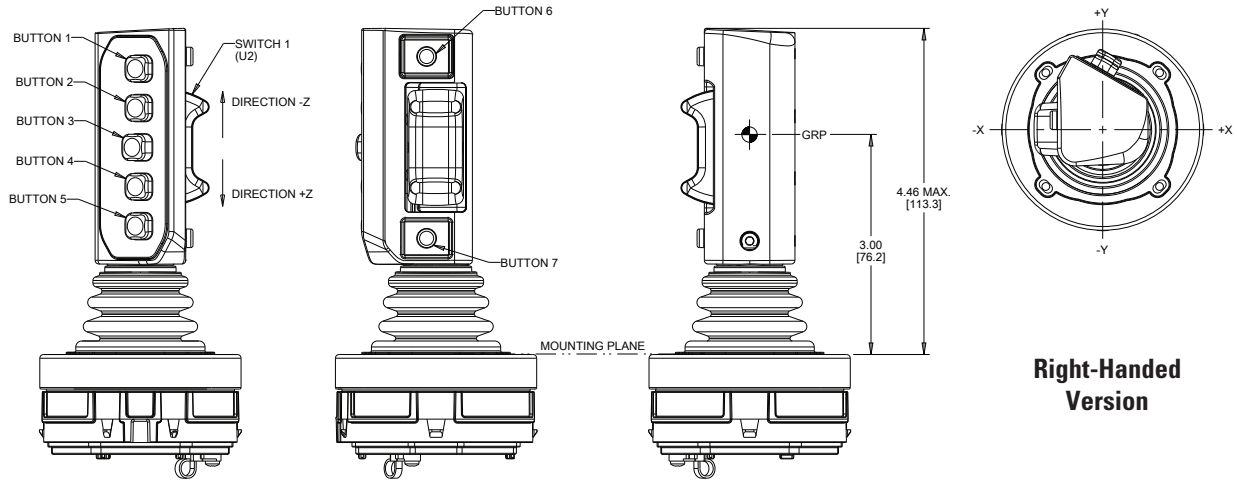
Wires and Strain Relief not shown in all views for clarity.

MEDIUM HALL EFFECT JOYSTICK

UP TO 10 MILLION OPERATIONAL CYCLES IN ALL DIRECTIONS

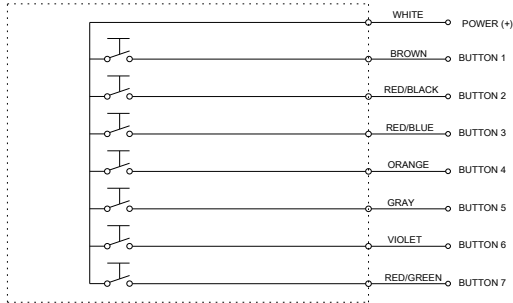
HANDLE 63

(7-BUTTON KEYPAD & HALL ROCKER RIGHT)

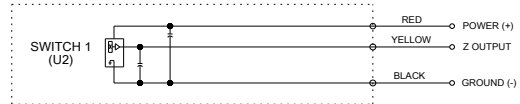


**Right-Handed
Version**

BUTTON SCHEMATIC

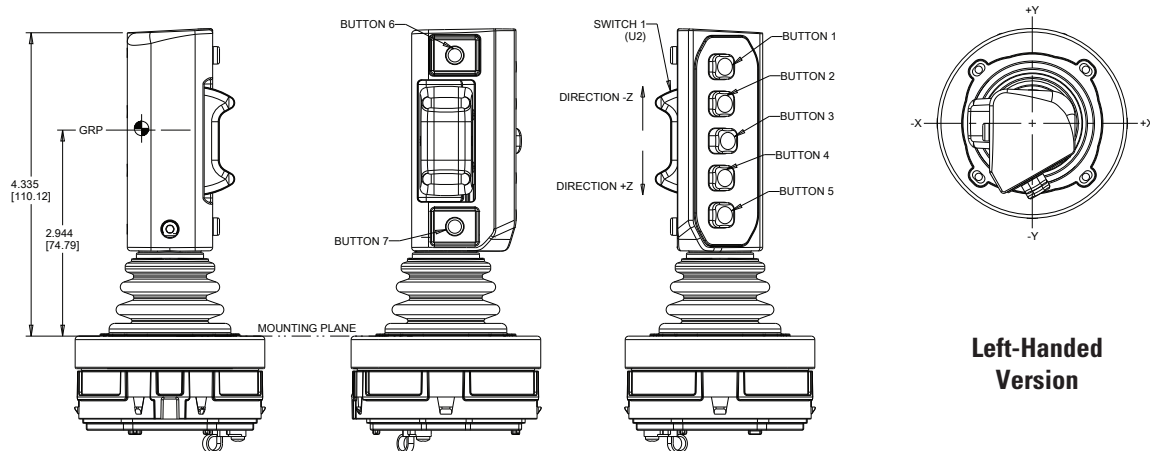


HANDLE SCHEMATIC



HANDLE 64

(7-BUTTON KEYPAD & HALL ROCKER LEFT)

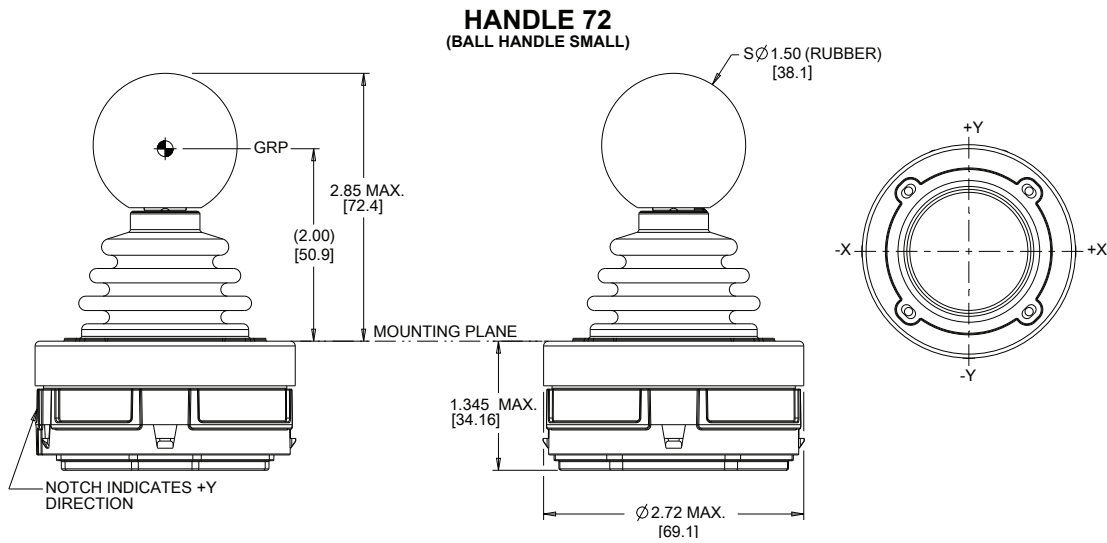
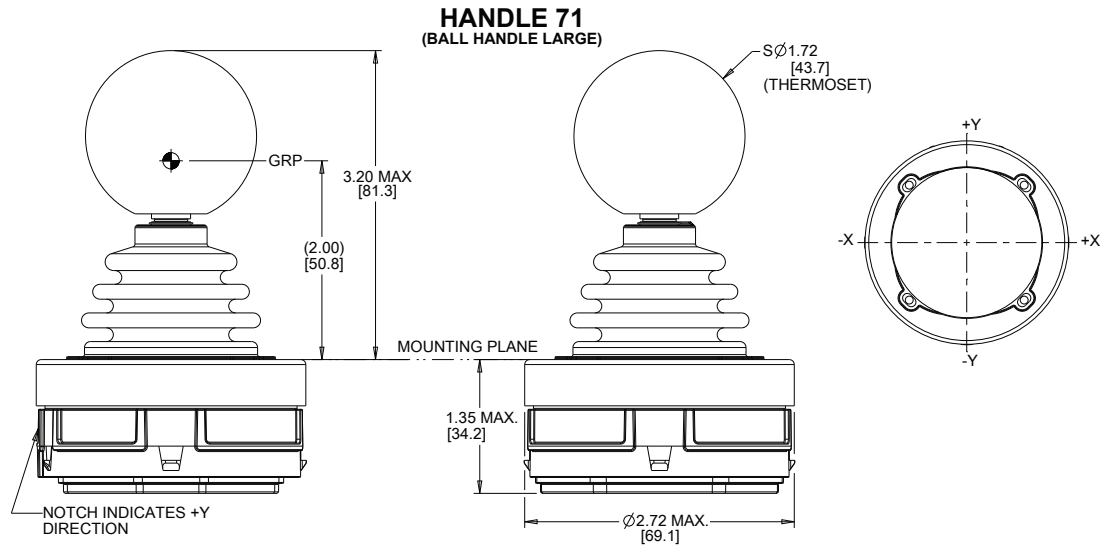


**Left-Handed
Version**

Wires and Strain Relief not shown in all views for clarity.

MEDIUM HALL EFFECT JOYSTICK

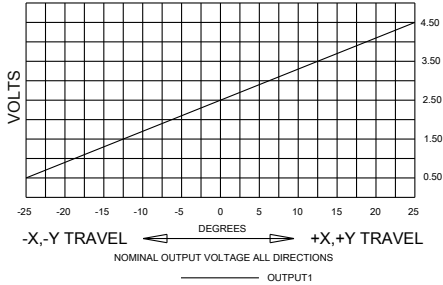
UP TO 10 MILLION OPERATIONAL CYCLES IN ALL DIRECTIONS



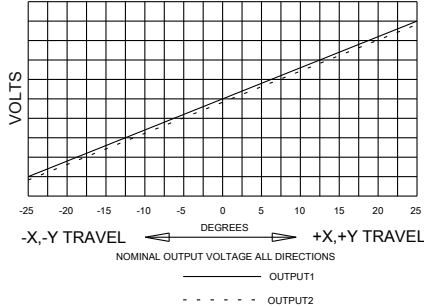
UP TO 10 MILLION OPERATIONAL CYCLES IN ALL DIRECTIONS

JHM OUTPUTS

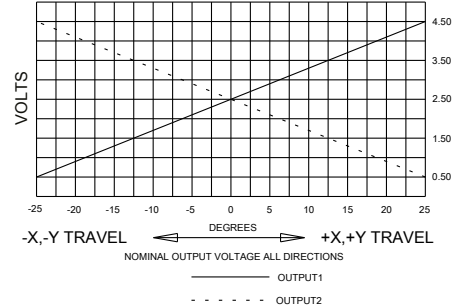
OPTION AA & AT



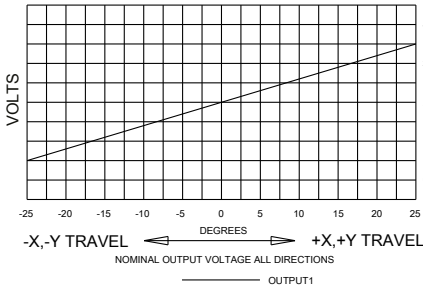
OPTION BB & BT



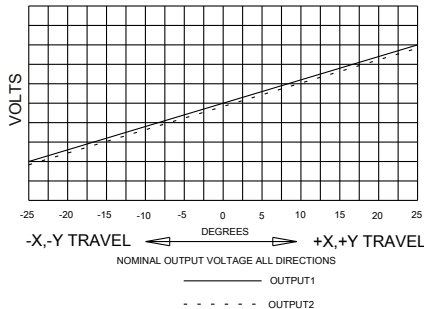
OPTION CC & CT



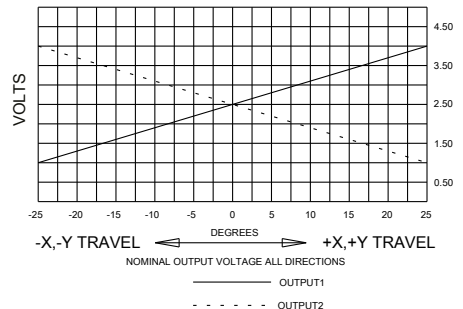
OPTION DD & DT



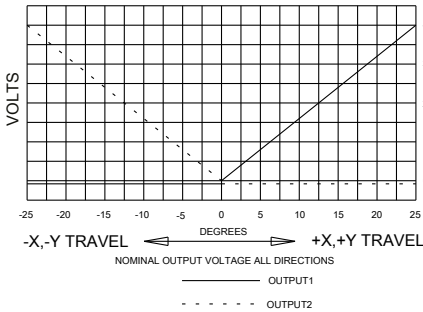
OPTION EE & ET



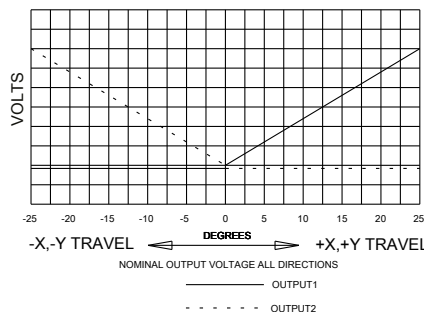
OPTION FF & FT



OPTION GG



OPTION HH



OPTION LL

