

## COMPACT DESIGN



With Pushbuttons

Without Pushbuttons

The z-axis mechanism of the miniature Hall effect joystick knob means that it can rotate horizontally up to 60°. Z-Axis options include detent, friction hold or spring return to center. Its compact design is the ideal solution where space is limited and precision control is required, while its robust construction is suited for demanding applications.

The JHT joystick has been tested to five million cycles in all directions with no degradation of performance. The Z-Axis and/or pushbuttons have been tested to one million cycles. Various gating options are also available. The JHT Z-Axis electronics are sealed to IP68S and can withstand EMI/RFI per SAE J1113 specifications. The JHT Z-Axis has numerous applications and is ideal for construction equipment, unmanned vehicles, hydraulic controls, industrial vehicle controls, medical and surgical equipment, remote control boxes and surveillance cameras.

## Features:

- 60° rotational movement of the ergonomic knob
- Compact design
- Contactless analog output Hall effect technology
- 5 million operational cycles in all directions (Joystick)
- Joystick electronics sealed per IP68S
- Optional pushbutton switches available
- 3.3V SPI & 5V SPI or Analog Output Options
- RoHS compliant

### Environmental Ratings and Materials:

#### ENVIRONMENTAL:

**Operating Temp Range:** -40°C to +85°C

**Seal:** Joystick electronics without pushbutton sealed to IP68S  
Keypad electronics sealed to IP65S

**EMI/RFI:** Withstand per SAE J1113

#### MATERIALS:

**Housing:** Thermoplastic, black

**Bellows:** Silicone, black. Additional materials available, contact factory.

### Standard Characteristics/Ratings:

#### GENERAL:

**Sensor Type:** Hall effect analog, factory programmed ground and supply line break detection; over voltage and reverse voltage protection

**Design:** Contactless sensing

**ELECTRICAL RATINGS:** Rated at Vcc = 5V @ 20°C Load = 1ma (4.7KΩ)

#### Electrical - Analog Joystick

	Units	Min	Typ	Max
Supply Voltage	VDC	4.5	5	5.5
Output Voltage Tolerance at Center	VDC @ 5V Vcc	-25	N/A	+25
Output Voltage Tolerance Full Travel	VDC @ 5V Vcc	-25	N/A	+25
Supply Current* (B = 0, Vcc = 5V, Io = 0)	mA	N/A	10	12
Output Impedance	kΩ	N/A	1	N/A

\*Single output per axis. Dual output per axis available. Supply current 20mA typical.

#### Electrical - Joystick Z-Axis Return to Center

	Units	Min	Typ	Max
Supply Voltage	VDC	4.5	5	5.5
Output 1+2 Voltage, +Z, -Z 0° Deflection	VDC @ 5V Vcc	2.25	2.50	2.75
Output 1+2 at Full Travel +Z Direction	VDC @ 5V Vcc	4.25	4.50	4.55
Output 1+2 at Full Travel -Z Direction	VDC @ 5V Vcc	0.45	0.50	0.75
Supply current (per sensor) B = 0, Vcc = 5V, Io = 0	mA	N/A	N/A	10.0
Output - Source Current Limit B = -X, Vo = 0	mA	-1.0	N/A	1.0

#### Electrical - Joystick Z-Axis Friction

	Units	Min	Typ	Max
Supply Voltage	VDC	4.5	5	5.5
Output 1+2 at Full Travel +Z Direction	VDC @ 5V Vcc	4.25	4.50	4.55
Output 1+2 at Full Travel -Z Direction	VDC @ 5V Vcc	0.45	0.50	0.75
Supply Current (per sensor) (B = 0, Vcc = 5V, Io = 0)	mA	N/A	N/A	10
Output - Source Current Limit B = -X, Vo = 0	mA	-1.0	N/A	1.0

#### Electrical - Joystick Z-Axis 3 Detent

	Units	Min	Typ	Max
Supply Voltage	VDC	4.5	5	5.5
Output 1+2 Voltage, +Z, -Z 0° Deflection	VDC @ 5V Vcc	2.25	2.50	2.75
Output 1+2 at Full Travel +Z Direction	VDC @ 5V Vcc	4.25	4.50	4.55
Output 1+2 at Full Travel -Z Direction	VDC @ 5V Vcc	0.45	0.50	0.75
Supply current (per sensor) B = 0, Vcc = 5V, Io = 0	mA	N/A	N/A	10.0
Output - Source Current Limit B = -X, Vo = 0	mA	-1.0	N/A	1.0

#### Joystick

**Mechanical Life:** 5,000,000 cycles in all directions

	Units	Min	Typ	Max
Travel Angle	Degrees	18	20	22
Over Travel Angle	Degrees	0.5	1.0	1.5
Max Allowable Radial Force (Styles 11, 12 & 21) @ GRP	Lbs.	N/A	N/A	50
Max Allowable Radial Force (All Other Styles) @ GRP	Lbs.	N/A	N/A	15

#### Z-Axis

**Mechanical Life:** 1,000,000 cycles in all directions

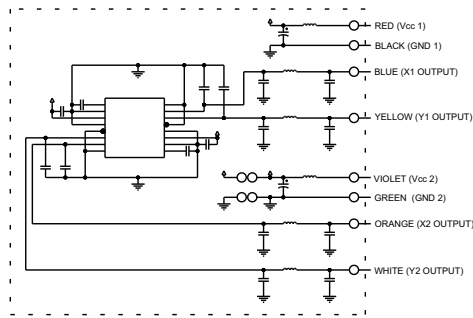
	Units	Min	Typ	Max
Travel Angle (Total)	Degrees	56	60	64
Operational Torque with Detent	OZ	10	20	30
Operational Torque with Friction Hold	OZ	1.0	4.0	7.0
Operational Torque Return to Center	OZ	8.0	16	24

Specifications Subject To Change Without Notice

# MINIATURE Z-AXIS HALL EFFECT JOYSTICK

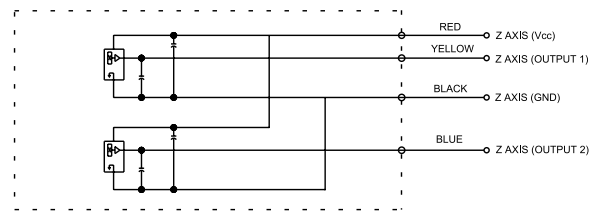
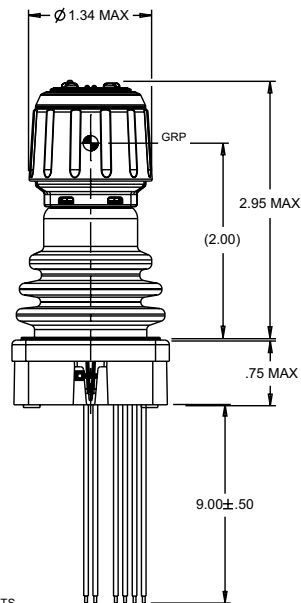
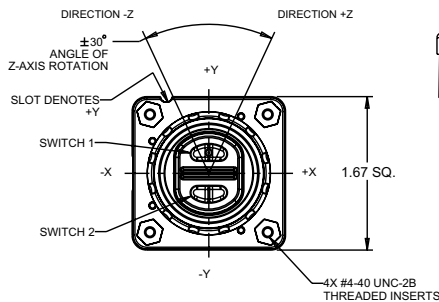
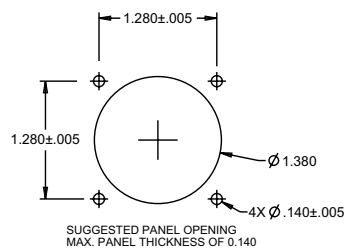
**JHT**  
Z-AXIS MINI  
JOYSTICK

## COMPACT DESIGN



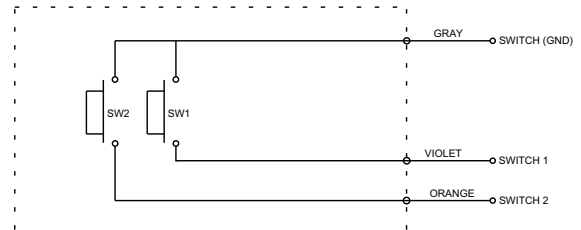
**GENERAL SCHEMATIC**

(WIRE BUNDLE 1)  
ALL OUTPUTS ARE NOT PRESENT IN ALL CONFIGURATIONS



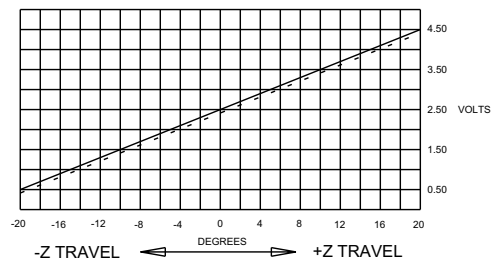
**Z AXIS SCHEMATIC**

(WIRE BUNDLE 2)  
ALL WIRES ARE NOT PRESENT IN ALL CONFIGURATIONS



**KEYPAD SCHEMATIC**

## Z-Axis Output



(Output 2 present on dual output options only)

## JHT Z-AXIS PART NUMBER CODE

JHT	XX	X	X	XX	X	N
Switch/Boot Style (All Half Boot)	Gating*	Operating Force	Joystick Output 1	Joystick Output 2	Termination	
32. Z-Axis with Detent, Single Output	1. Gated; Single axis – Return to Center	1.1 lb	AA. 2.5 +/- 2.0VDC	NONE	1. 24 AWG Wire Leads	
42. Z-Axis with Friction Hold, Single Output	2. Gated; Two axis – Return to Center		BB. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC	2. Cable, 22 AWG (19/34) PVC / Polyurethane outer jacket (11" long not shown)***	
52. Z-Axis Return to Center, Single Output	3. Omni-directional; Round Smooth Feel		CC. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC		
62. Z-Axis with Detent, Dual Output	4. Omni-directional; Round On-Axis and Off-Axis Guided Feel		DD. 2.5 +/- 1.5VDC	NONE		
72. Z-Axis with Friction Hold, Dual Output	5. Omni-directional; Round On-Axis Guided Feel		EE. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC		
82. Z-Axis Return to Center, Dual Output			FF. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC		
92. Z-Axis with Detent, Single Output with Two Pushbuttons			GG. 0.5 - 4.5VDC	0.5 - 4.5VDC		
A2. Z-Axis with Friction, Single Output with Two Pushbuttons			HH. 1.0 - 4.0VDC	1.0 - 4.0VDC		
B2. Z-Axis Return to Center, Single Output with Two Pushbuttons			JJ. SPI, 3.3V Supply**	NONE		
C2. Z-Axis with Detent, Dual Output with Two Pushbuttons			KK. SPI, 5V Supply**	NONE		
D2. Z-Axis with Friction, Dual Output with Two Pushbuttons			LL. CANopen***	NONE		
E2. Z-Axis Return to Center, Dual Output with Two Pushbuttons			MM. J1939***	NONE		

\*Gated = Restricted movement in XY axis only. Gating Icons shown on page 111 in the JHT mini joystick section.

\*\*Z-Axis and Pushbuttons are not part of the SPI message.

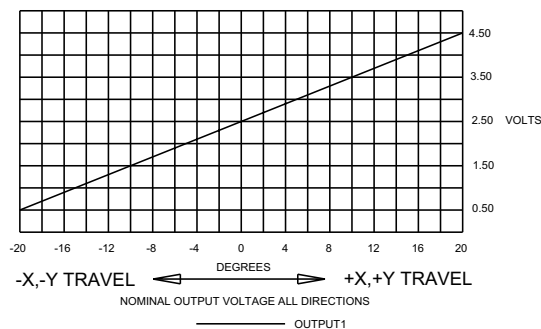
\*\*\*Outputs LL & MM must be used with termination option 2. Cable termination option only available with LL & MM options.

NOTES (Applies to Joystick Output Only):

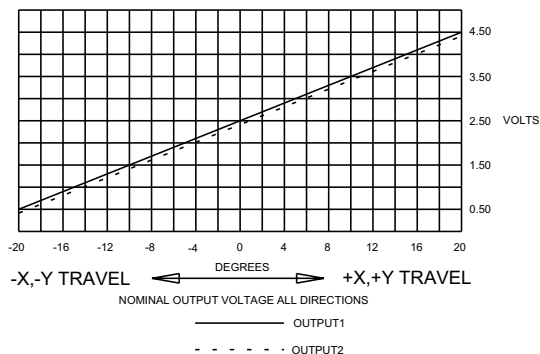
- Outputs are from the center to the full travel position in each direction.
- Options "AA", "BB", "CC", "DD", "EE" and "FF" provide increased voltage in +X, +Y; and decreasing voltage in -X, -Y direction from one output per axis.
- Options "GG" and "HH" provide increasing voltages in all directions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

## Joystick Output Configuration

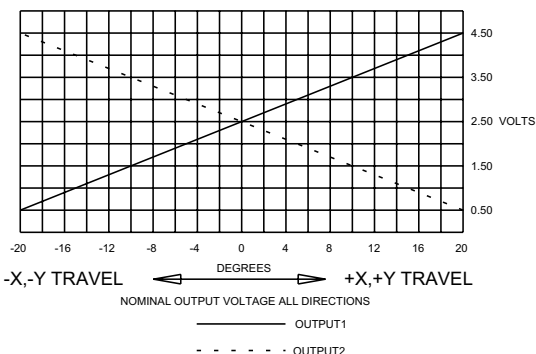
**OPTION AA**



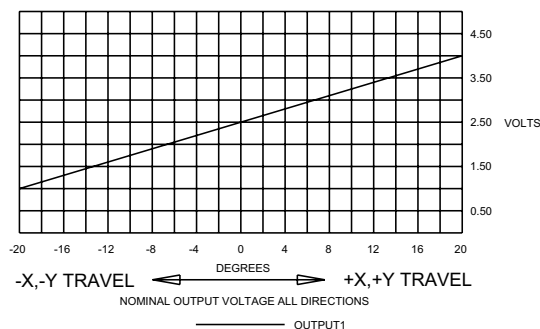
**OPTION BB**



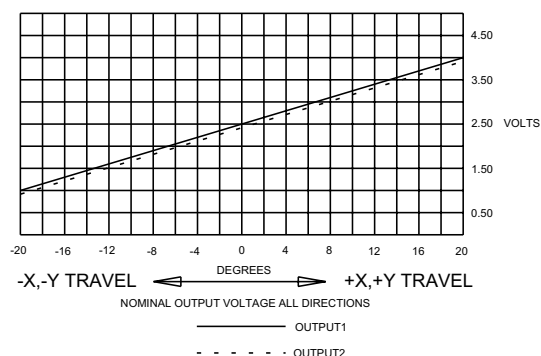
**OPTION CC**



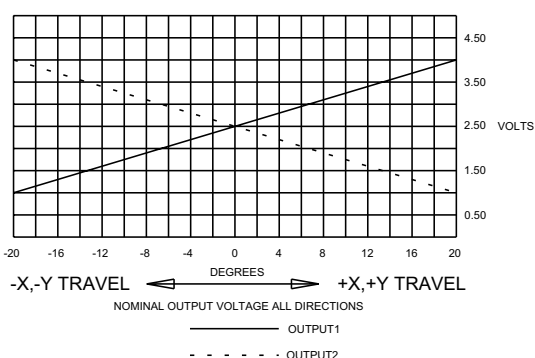
**OPTION DD**



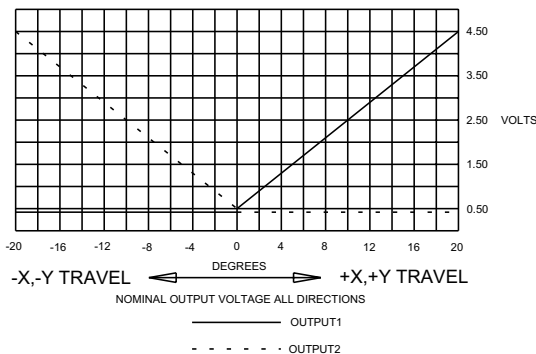
**OPTION EE**



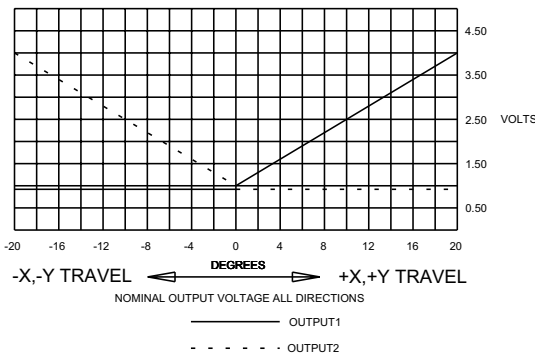
**OPTION FF**



**OPTION GG**



**OPTION HH**



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