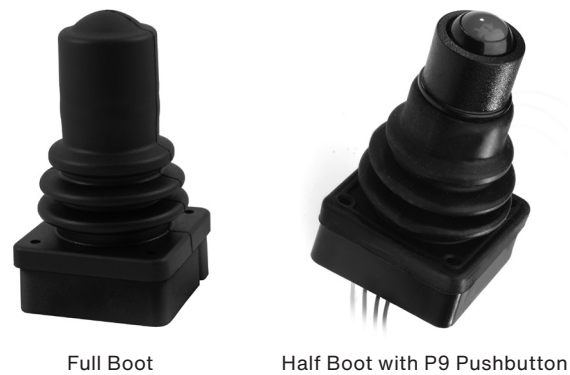


JHT Miniature Joystick

The JHT miniature Hall effect joystick’s compact design and robust construction is the ideal solution where space is limited and precision control is required. Ideal applications include: robotics, construction equipment, hydraulic controls, medical and surgery equipment, security and surveillance video cameras. The JHT has been tested up to 5 million cycles with no degradation of electrical performance or boot wear. Electronics are sealed to IP6K8S and EMI/RFI immunity are per SAE J1113 specifications. See JHT Z-axis pages for Z-axis options.

FEATURES:

- Compact design excellent for armrest and panel mounting
- CANbus, SPI, PWM, or single or redundant analog output
- Up to 5 million operational cycles in all directions
- Electronics sealed per IP6K8S
- Single or omni-directional gating options
- Optional pushbutton switch(es) available
- RoHS compliant



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				
	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.				
MECHANICAL:				
Joystick Mechanical Life:	Up to 5,000,000 cycles in all directions			
P9 Mechanical Life:	Up to 1,250,000 cycles			
Travel Angle:	18° min to 22° max, 20° typical			
Overtravel Angle:	0.5° min to 1.5° max, 1° typical			
Joystick Operating Force:	With bellows, at grip 0.5 lb. min to 1.5 lbs. max over temperature range			
P9 Operating Force:	@20°C 8 oz min to 16 oz max, 12 oz typical			
ENVIRONMENTAL:				
Operating Temp Range:	-40°C to +85°C			
Seal:	Electronics seal to IP6K8S			
RFI/EMI:	Withstand per SAE J1113			
MATERIALS:				
Housing:	Thermoplastic, black			
Bellows:	Silicone, black. Additional materials available, contact factory.			

JHT Joystick Part Number Code

JHT -	XX	X	X	XX	X	X
Switch/Boot Style	Gating*	Operating Force	Output 1	Output 2	Termination	P9 Button Color**
11. With P9 Pushbutton & Full Boot 12. With P9 Pushbutton & Half Boot 21. Without Pushbutton & with Full Boot	1. Gated: Single Axis - Return to Center 2. Gated: Two Axis - Return to Center 3. Omni-directional; Round Smooth Feel 4. Omni-directional; Round On-Axis and Off-Axis Guided Feel 5. Omni-directional; Round On-Axis Guided Feel	1. 1 lb	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 JJ. SPI, 3.3V Supply*** KK. SPI, 5V Supply*** LL. CANopen**** MM. J1939****	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 NONE NONE NONE	1. 24 AWG Wire Leads 2. Cable, 22 AWG (19/34) PVC / Polyurethane outer jacket (11" long not shown)****	N. None 1. Red 2. Black 3. Orange 4. Yellow 5. Green 6. Blue 7. Purple 8. Gray 9. White

*Gated = Restricted movement in XY axis only.
See Gating Icons-next page.

**Applies only to half boot with pushbutton option.

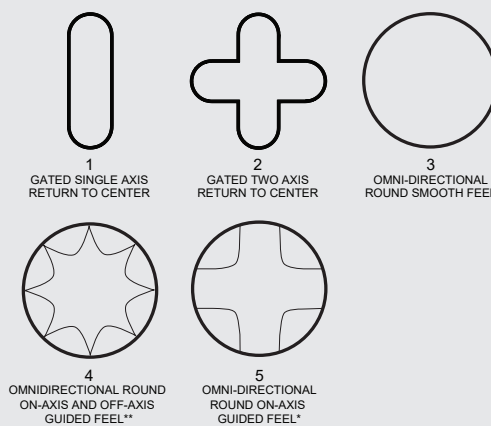
***P9'S are not part of the SPI output.

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

NOTES:

- 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.

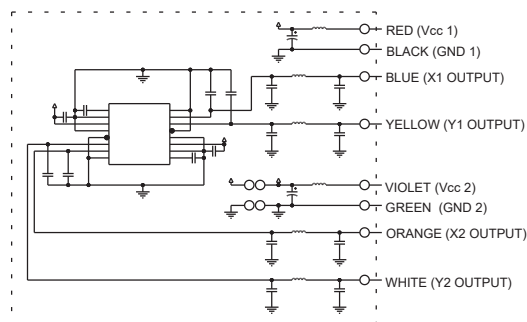
JHT Gating Icons



*Feel defined by shading.

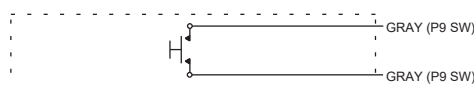
**Full output available in all directions. Contact factory for details.

JHT Joystick Schematics



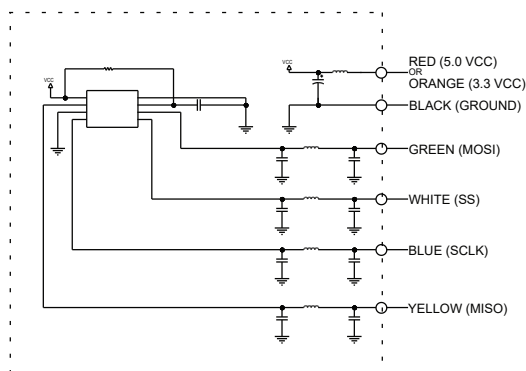
GENERAL SCHEMATIC
(WIRE BUNDLE 1)

ALL OUTPUTS ARE NOT PRESENT IN ALL CONFIGURATIONS



PUSHBUTTON SCHEMATIC
(WIRE BUNDLE 2)

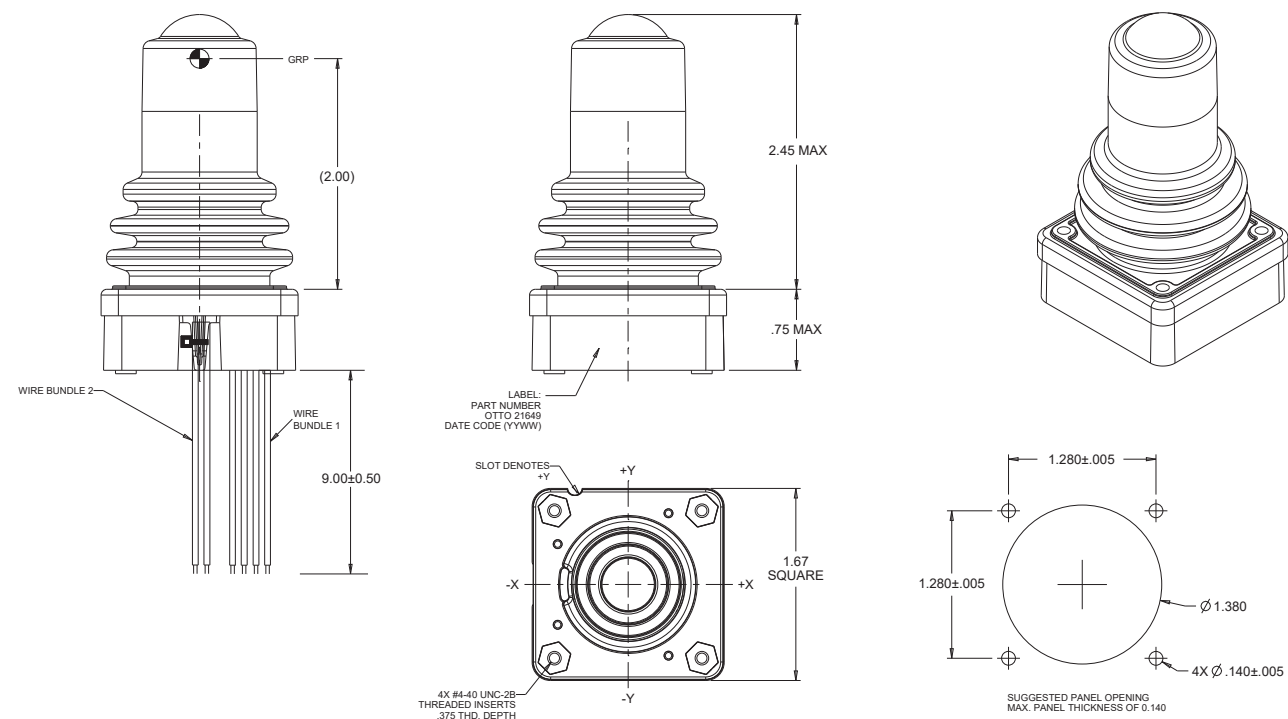
ALL WIRES ARE NOT PRESENT IN ALL CONFIGURATIONS



SPI SCHEMATIC
(WIRE BUNDLE 1)

ONLY ONE SUPPLY WIRE IS PRESENT WITH EACH CONFIGURATION

FULL BOOT VERSION SHOWN



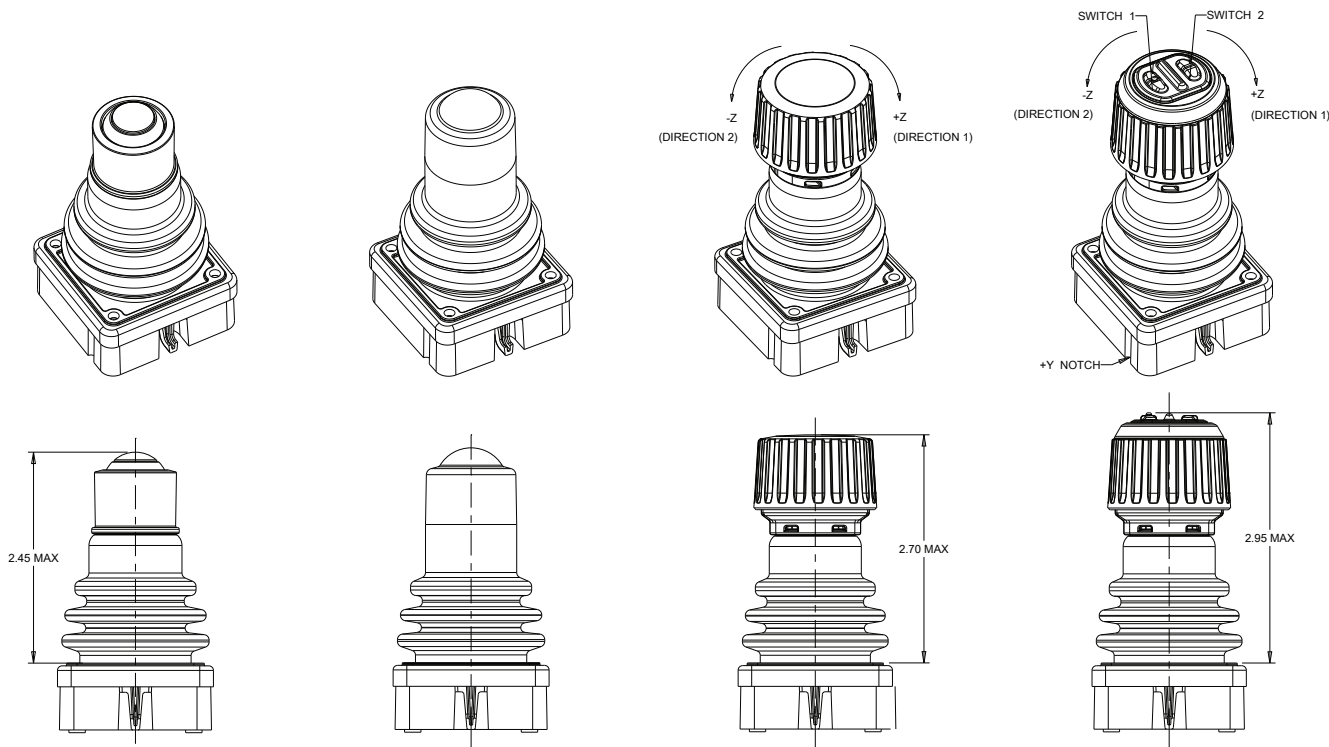
JHT Joystick Switch/Style Boot Configuration

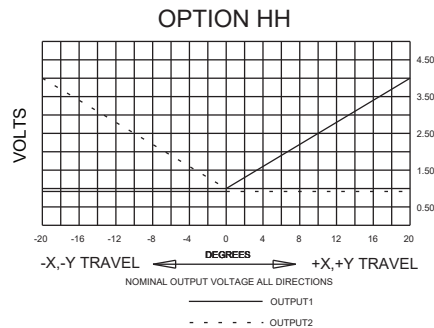
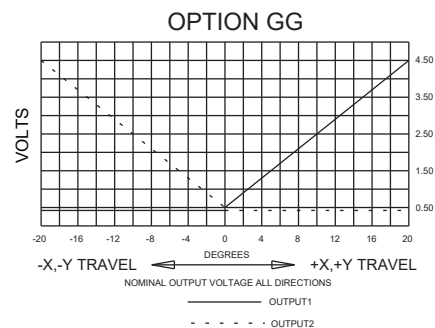
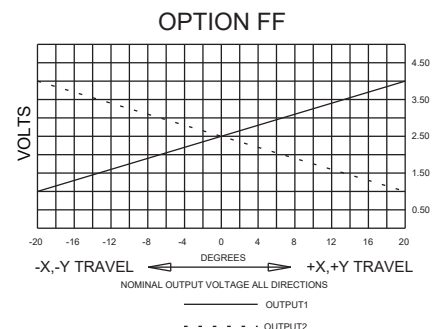
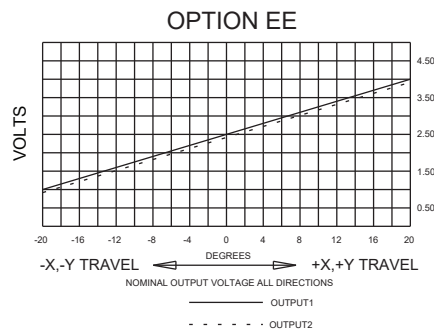
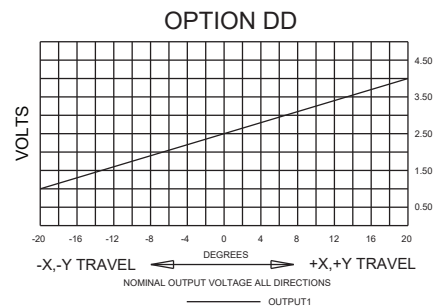
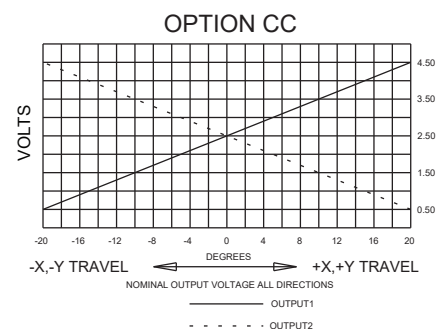
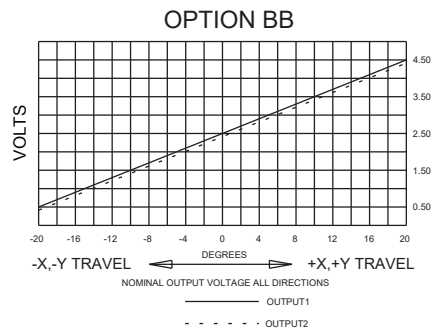
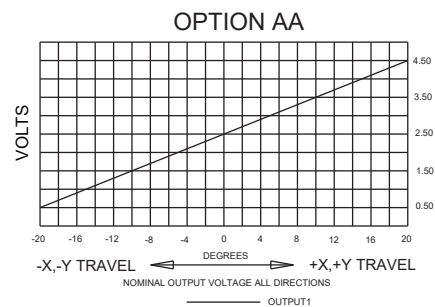
HALF BOOT

FULL BOOT

Z AXIS

Z AXIS WITH PUSHBUTTONS





JHT Z-Axis Miniature Joystick

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 up to 5 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 IP6K8S 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
- Up to 5 million operational cycles in all directions (*Joystick*)
- Joystick electronics sealed per IP6K8S
- Optional pushbutton switches available
- 3.3V SPI and 5V SPI or analog output
- RoHS compliant



JHT Z-Axis with Pushbuttons



JHT Z-Axis without Pushbuttons

Environmental Ratings and Materials:

ENVIRONMENTAL:

Operating Temp Range: -40°C to +85°C

Seal: Joystick electronics without pushbutton sealed to IP6K8S
Keypad electronics sealed to IP6K5S

EMI/RFI: Withstand per SAE J1113

MATERIALS:

Housing: Thermoplastic, black

Bel lows: 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 @ 5V Vcc	VDC	-.25	N/A	+.25
Output Voltage Tolerance Full Travel @ 5V Vcc	VDC	-.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 @ 5V Vcc	VDC	2.25	2.50	2.75
Output 1+2 at Full Travel +Z Direction @ 5V Vcc	VDC	4.25	4.50	4.55
Output 1+2 at Full Travel -Z Direction @ 5V Vcc	VDC	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 @ 5V Vcc	VDC	4.25	4.50	4.55
Output 1+2 at Full Travel -Z Direction @ 5V Vcc	VDC	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 @ 5V Vcc	VDC	2.25	2.50	2.75
Output 1+2 at Full Travel +Z Direction @ 5V Vcc	VDC	4.25	4.50	4.55
Output 1+2 at Full Travel -Z Direction @ 5V Vcc	VDC	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: Up to 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: Up to 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

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 42. Z-Axis with Friction Hold, Single Output 52. Z-Axis Return to Center, Single Output 62. Z-Axis with Detent, Dual Output 72. Z-Axis with Friction Hold, Dual Output 82. Z-Axis Return to Center, Dual Output 92. Z-Axis with Detent, Single Output with Two Pushbuttons A2. Z-Axis with Friction, Single Output with Two Pushbuttons B2. Z-Axis Return to Center, Single Output with Two Pushbuttons C2. Z-Axis with Detent, Dual Output with Two Pushbuttons D2. Z-Axis with Friction, Dual Output with Two Pushbuttons E2. Z-Axis Return to Center, Dual Output with Two Pushbuttons	1. Gated; Single axis - Return to Center 2. Gated: Two axis - Return to Center 3. Omni-directional; Round Smooth Feel 4. Omni-directional; Round On-Axis and Off-Axis Guided Feel 5. Omni-directional; Round On-Axis Guided Feel	1.1 lb	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 JJ. SPI, 3.3V Supply** KK. SPI, 5V Supply** LL. CANopen*** MM. J1939***	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 NONE NONE NONE	1. 24 AWG Wire Leads 2. Cable, 22 AWG (19/34) PVC / Polyurethane outer jacket (11" long not shown)***	

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

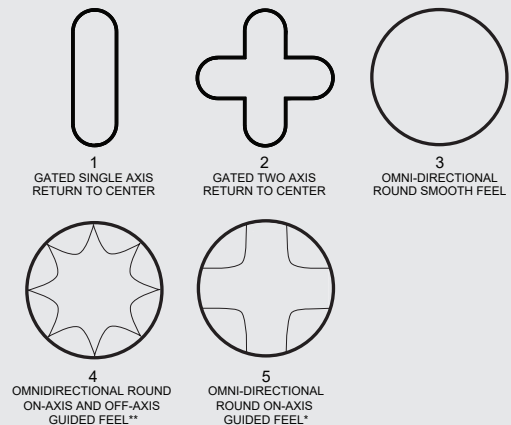
**Z-Axis and Pushbuttons are not part of the SPI message.

***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.

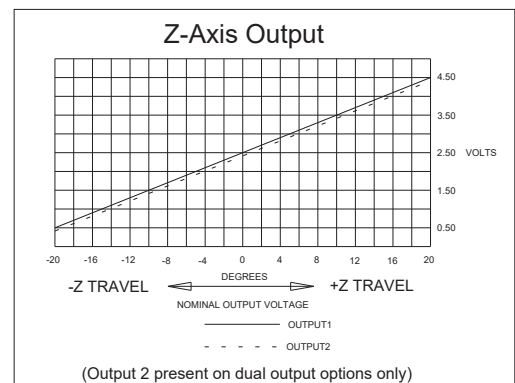
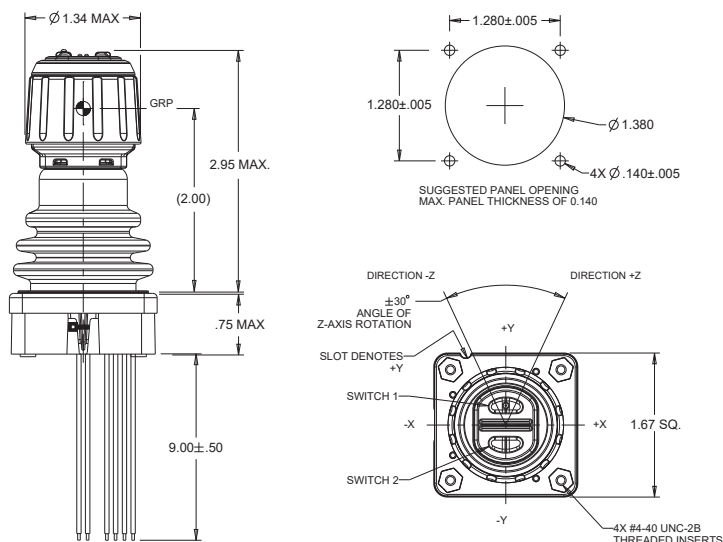
JHT Z-Axis Gating Icons



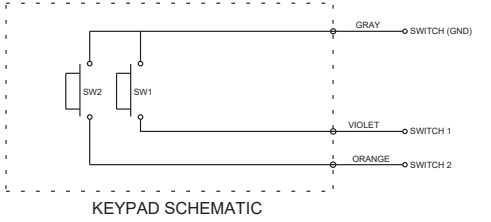
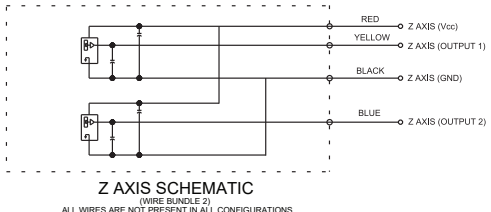
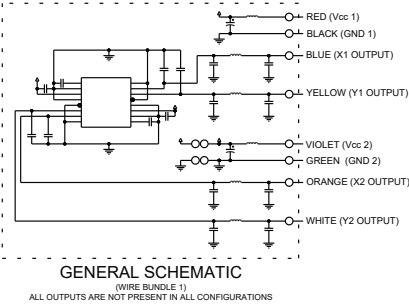
*Feel defined by shading.

**Full output available in all directions. Contact factory for details.

JHT Z-Axis Joystick Drawings



JHT Z-Axis Joystick Schematics



JHT Z-Axis Joystick Outputs

