MINIATURE Z-AXIS HALL EFFECT JOYSTICK

COMPACT DESIGN

JHT Z-Axis

With Pushbuttons

Without Pushbuttons

The JHT Z-Axis Miniature Series Hall Effect Joystick allows for a 60° rotational movement of the knob at the top of the joystick. 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 surgery equipment and surveillance video cameras.

Features:

- **60° rotational movement of the 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 and 5V SPI Output Options**
- **RoHS/WEEE/Reach 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, 1o = 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, 1o = 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, 1o = 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

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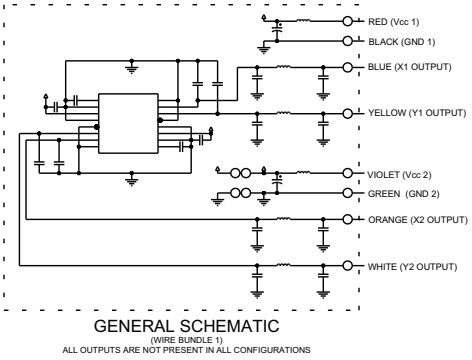
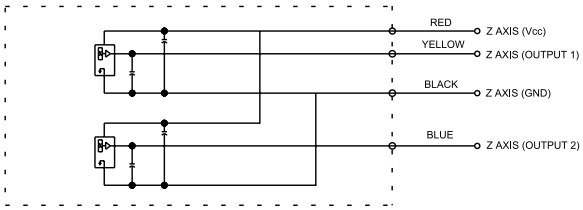
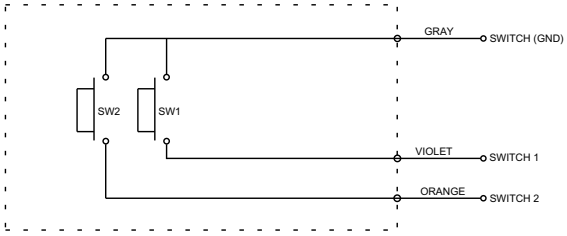
COMPACT DESIGN



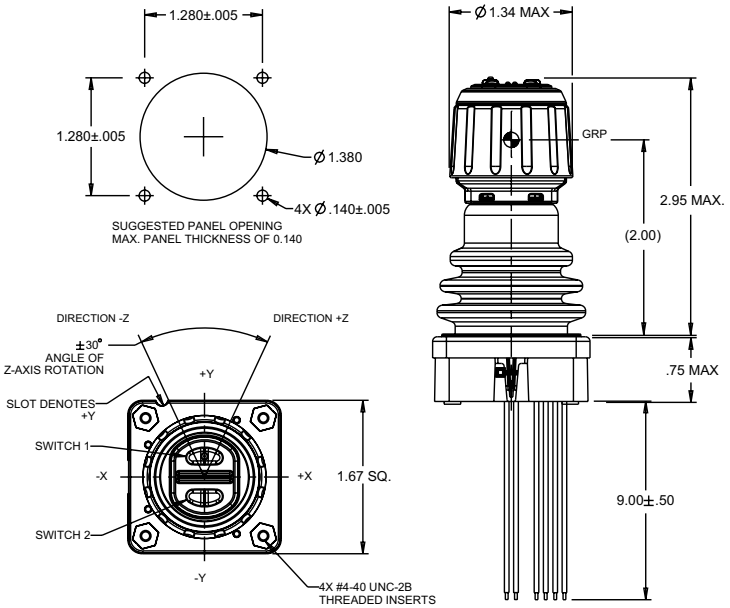
GENERAL SCHEMATIC
(WIRE BUNDLE 1)
ALL OUTPUTS ARE NOT PRESENT IN ALL CONFIGURATIONS

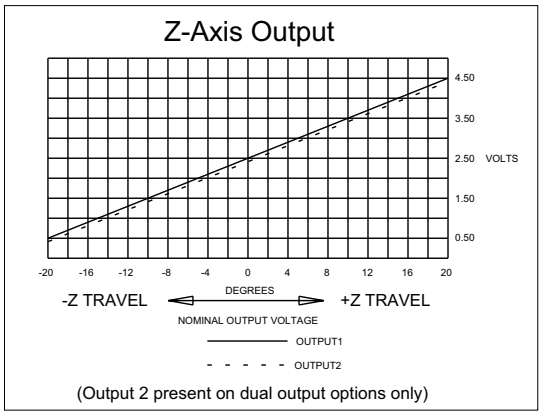


Z AXIS SCHEMATIC
(WIRE BUNDLE 2)
ALL WIRES ARE NOT PRESENT IN ALL CONFIGURATIONS



KEYPAD SCHEMATIC





(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)

- **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 wtih 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

Gating*

- **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

Operating Force

- **1.** 1 lb

Joystick Output 1	Joystick Output 2
AA. 2.5 +/- 2.0VDC	NONE
BB. 2.5 +/- 2.0VDC	2.5 +/- 2.0VDC
CC. 2.5 +/- 2.0VDC	2.5 -/+ 2.0VDC
DD. 2.5 +/- 1.5VDC	NONE
EE. 2.5 +/- 1.5VDC	2.5 +/- 1.5VDC
FF. 2.5 +/- 1.5VDC	2.5 -/+ 1.5VDC
GG. 0.5 - 4.5VDC	0.5 - 4.5VDC
HH. 1.0 - 4.0VDC	1.0 - 4.0VDC
JJ. SPI, 3.3V Supply**	NONE
KK. SPI, 5V Supply**	NONE

Termination

- **1.** 24 AWG Wire Leads

*Gated = Restricted movement in XY axis only. Gating Icons shown on page 89 in the JHT mini joystick section.
**Z-Axis and Pushbuttons are not part of the SPI message.

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.

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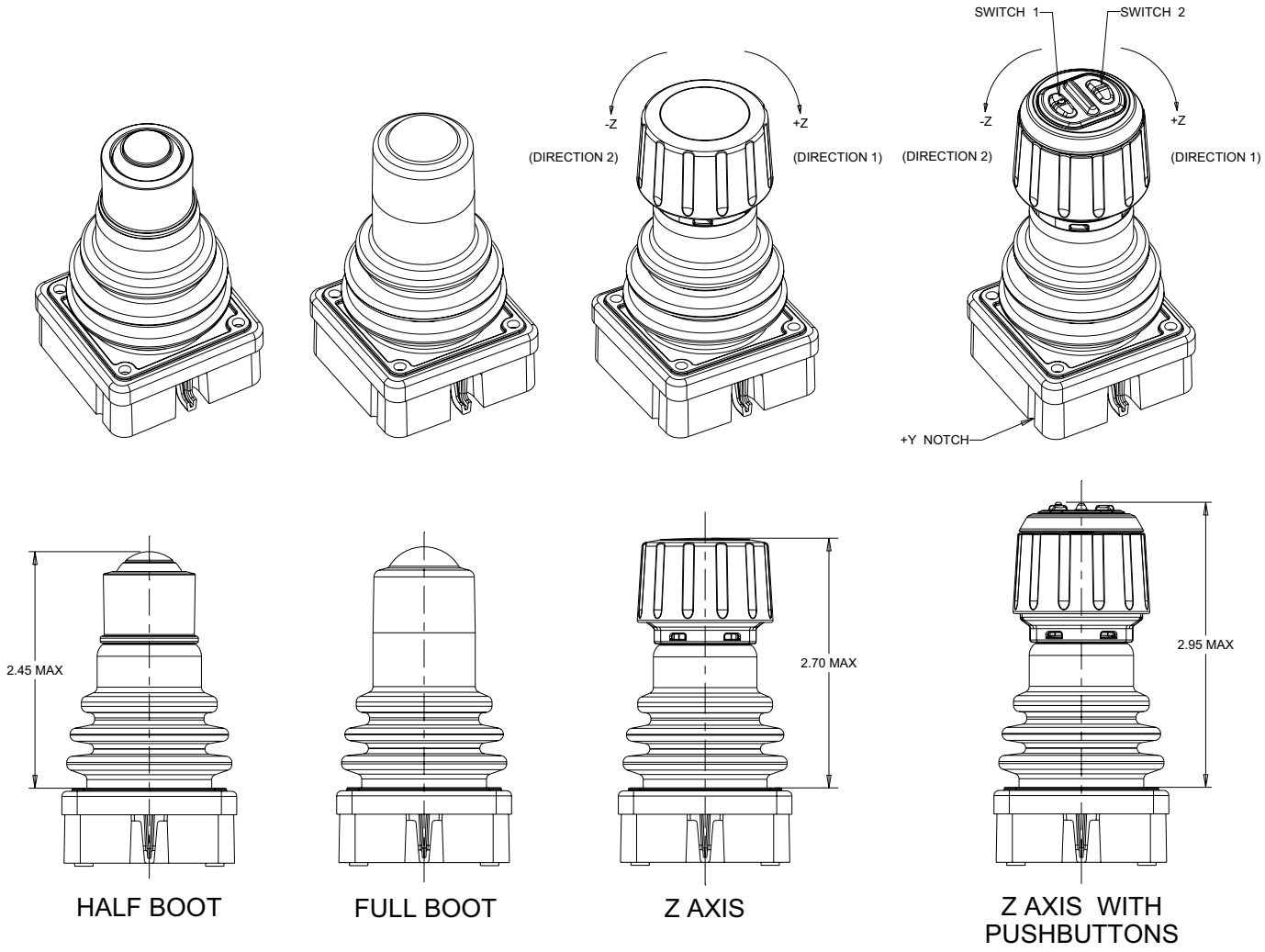
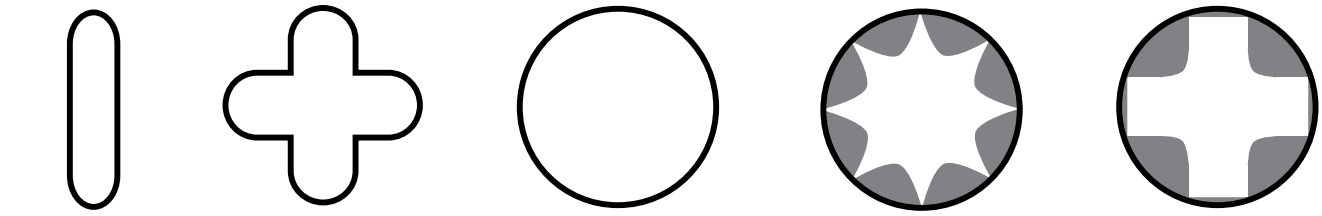
COMPACT DESIGN

JHT Switch/Style Boot Configuration



JHT and JHT Z-Axis Icons Demonstrating Feel*



Gated;
Single Axis -
Return to Center

Gated;
Two Axis -
Return to Center

Omnidirectional;
Round Smooth Feel

Omnidirectional;
Round On-Axis and
Off-Axis Guided Feel**

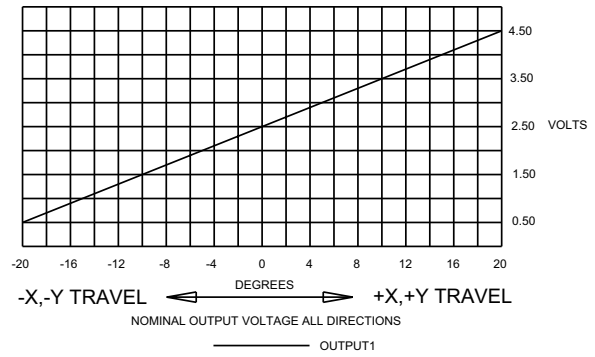
Omnidirectional;
Round On-Axis
Guided Feel

*Feel defined by shading.
**Full output available in all directions. Contact factory for details.

MINIATURE HALL EFFECT JOYSTICK

COMPACT DESIGN

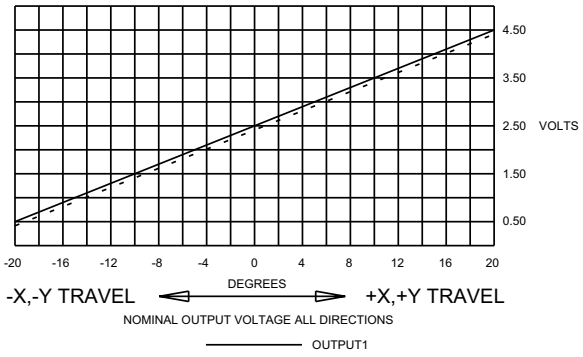
OPTION AA



NOMINAL OUTPUT VOLTAGE ALL DIRECTIONS

OUTPUT1

OPTION BB

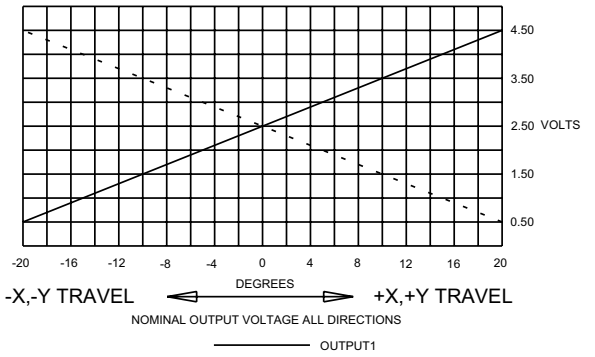


NOMINAL OUTPUT VOLTAGE ALL DIRECTIONS

OUTPUT1

OUTPUT2

OPTION CC

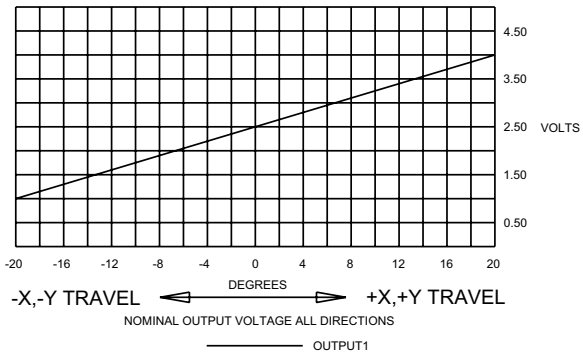


NOMINAL OUTPUT VOLTAGE ALL DIRECTIONS

OUTPUT1

OUTPUT2

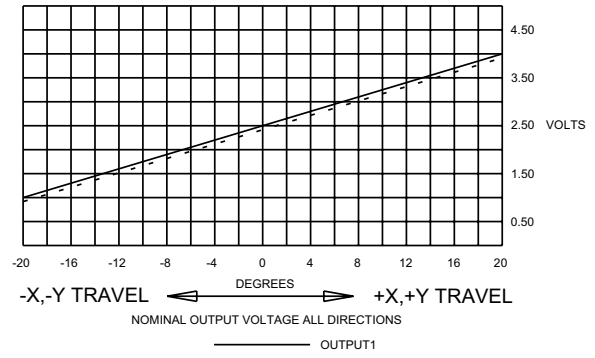
OPTION DD



NOMINAL OUTPUT VOLTAGE ALL DIRECTIONS

OUTPUT1

OPTION EE

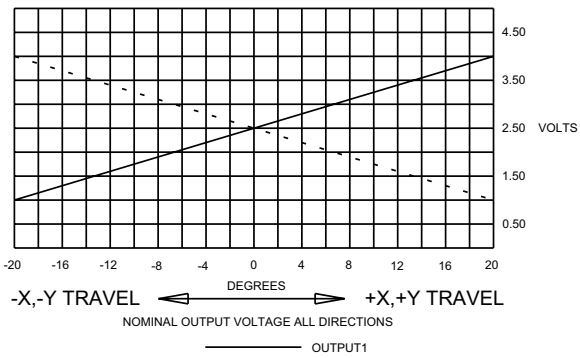


NOMINAL OUTPUT VOLTAGE ALL DIRECTIONS

OUTPUT1

OUTPUT2

OPTION FF

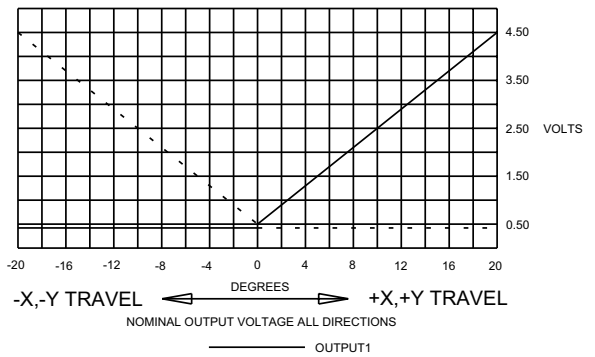


NOMINAL OUTPUT VOLTAGE ALL DIRECTIONS

OUTPUT1

OUTPUT2

OPTION GG

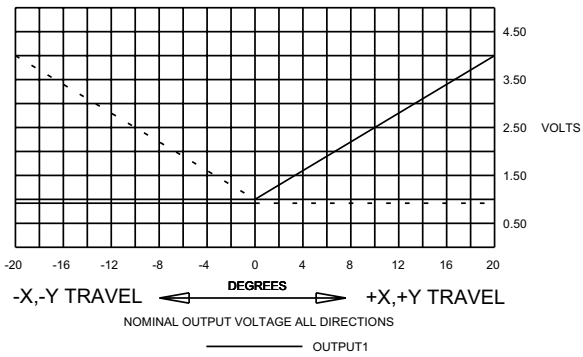


NOMINAL OUTPUT VOLTAGE ALL DIRECTIONS

OUTPUT1

OUTPUT2

OPTION HH



NOMINAL OUTPUT VOLTAGE ALL DIRECTIONS

OUTPUT1

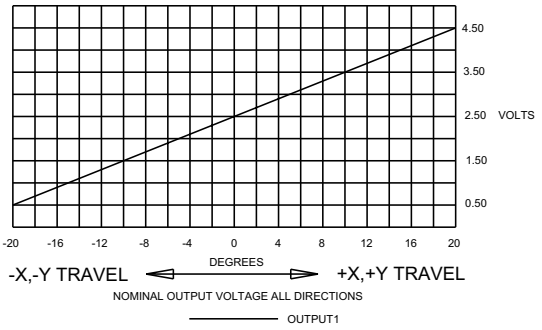
OUTPUT2

MINIATURE Z-AXIS HALL EFFECT JOYSTICK

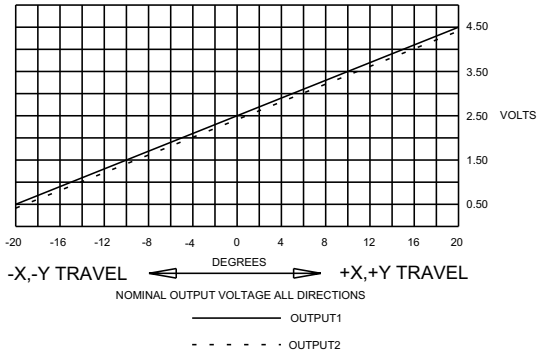
COMPACT DESIGN

Joystick Output Configuration

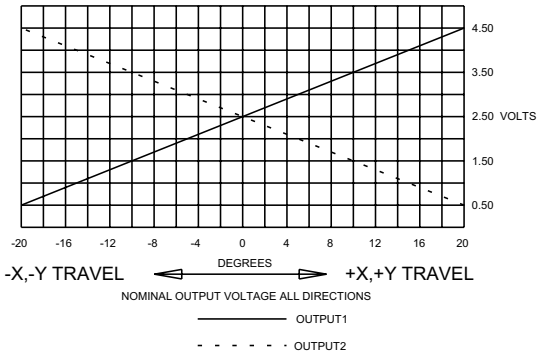
OPTION AA



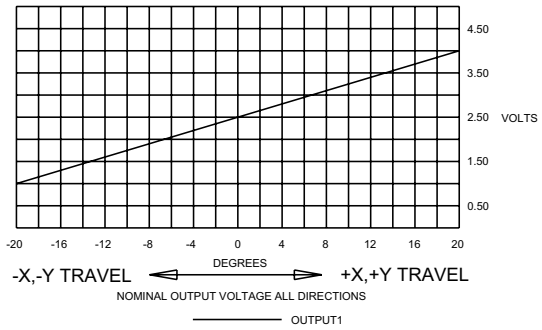
OPTION BB



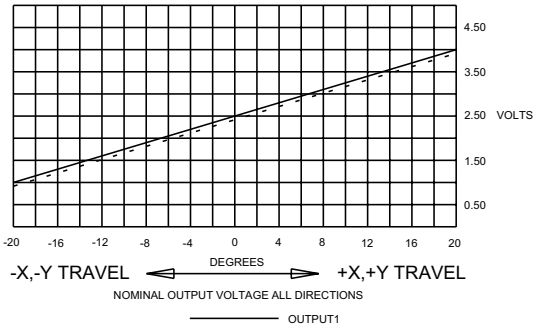
OPTION CC



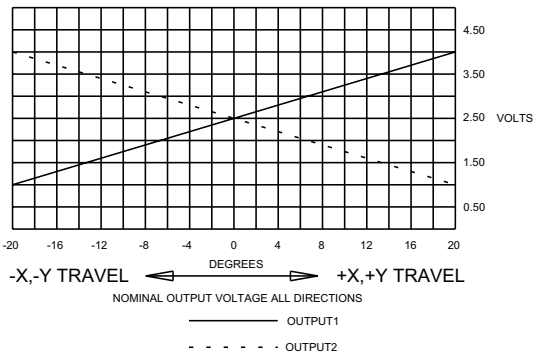
OPTION DD



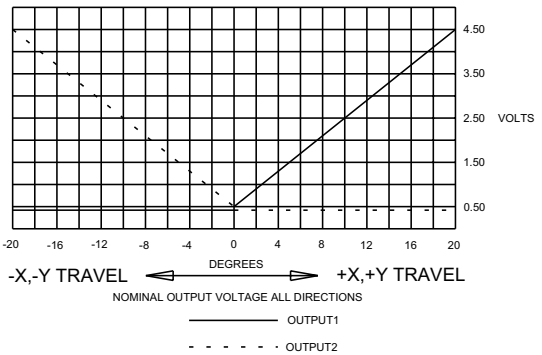
OPTION EE



OPTION FF



OPTION GG



OPTION HH