CH Products

an APEM Group Company

CJ series

Ergonomic multifunction joysticks

The CJ Series joystick features an ergonomic multifunction handle purposely designed for safety critical hand-operated applications. Available as a one or two axes joystick, the CJ Series utilizes non-contacting Hall effect technology for over 10 million operations. The CJ Series features an industry common mounting cutout and hole pattern, allowing it to easily replace early generation third-party joysticks in existing OEM applications.
Environmentally sealed up to IP68 for protection against the ingress of dust and liquids, the CJ Series is ideally suited for construction vehicles including cranes, loaders and excavators.

KEY FEATURES

- ❑ **Ergonomic and versatile design**
- ❑ **1 and 2 axes configurations**
- ❑ **Sealed up to IP68**
- ❑ **10 million life cycles**
- ❑ **Redundant outputs available**
- ❑ **Available with CANbus and USB outputs**
- ❑ **Industry common mounting cutout and hole pattern**

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OPTION SELECTION

CJ [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

SERIES

LOWER FACE BUTTONS

N	None
A	One switch in position A
B	One switch in position B
C	One switch in center
W	Two switches
X	Custom[3]

OPERATOR DEADMAN LEVER

N	None
D	Deadman Paddle
P	Proximity Sensor

SPRING TENSION[1]

0	Standard
1	Light
2	Heavy

OUTPUT OPTIONS

00	0V to 5V
01	0.5V to 4.5V
02	0.25V to 4.75V
03	1V to 4V
04	0V to 5V - Sensor 1 0V to 5V - Sensor 2
05	0.5V to 4.5V - Sensor 1 0.5V to 4.5V - Sensor 2
06	0.25V to 4.75V - Sensor 1 0.25V to 4.75V - Sensor 2
07	1V to 4V - Sensor 1 1V to 4V - Sensor 2
08	0V to 5V - Sensor 1 5V to 0V - Sensor 2
09	0.5V to 4.5V - Sensor 1 4.5V to 0.5V - Sensor 2
10	0.25V to 4.75V - Sensor 1 4.75V to 0.25V - Sensor 2
11	1V to 4V - Sensor 1 4V to 1V - Sensor 2
12	Discrete
13	USB
14	Cursor Emulation
15	CANbus J1939
XX	Custom[3]

ADDITIONAL OPTIONS

N	None
V	Voltage Regulator
D	Dual Decode[2]
DC	Center Detect
AD	Analog Deadband
E	Environmental Sealing*

UPPER FACE BUTTONS

0	None
1	One
2	Two
3	Three
4	Four
5	Five
6	Six
X	Custom[3]

LIMITER PLATE

S	Square
R	Round
X	Slotted
Y	Slotted
P	Plus
D	Diamond
W	Guided Feel Square
Z	Guided Feel Round

NOTES:

1. X/Y axes spring tension. Contact Technical Support for information on the best possible spring for your chosen configuration.
2. Dual Decode cannot be used with CANbus, USB, or Voltage Regulator.
3. Contact factory for custom options.

*Environmental sealing level available up to IP68. Dependent upon handle configuration.

Mounting accessories. Standard hardware includes: 4 screws (6-32x7/8)

LOWER FACE BUTTONS

N A B C W

Note: The company reserves the right to change specifications without notice.

DEFAULT WIRE COLOR CODE*		
COLOR	FUNCTION	AWG
RED	Vcc or Vdd	28
BLACK	Ground	
BLUE	X Axis	
YELLOW	Y Axis	
GREEN	Z Axis	
WHITE	Switch Common (optional)	22
ORANGE	Switch 1 (optional)	
VIOLET	Switch 2 (optional)	
GRAY	Switch 3 (optional)	
BROWN	Switch 4 (optional)	
PINK	Switch 5 (optional)	
BLUE/WHITE	Switch 6 (optional)	
YELLOW/BLACK	Switch 7 (optional)	
GREEN/BLACK	Switch 8 (optional)	
VIOLET/WHITE	Deadman - Switch 9 (optional)	
YELLOW/WHITE	Proximity Sensor - Switch 10 (optional)	
RED/WHITE	Index Trigger - Switch 11 (optional)	
LIGHT GREEN	LED 12 (optional)	
LIGHT ORANGE	LED 13 (optional)	
GRAY/WHITE	LED 14 (optional)	
BLACK/WHITE	LED 15 (optional)	

AVAILABLE BUTTON COLORS
White
Gray
Black
Red[2]
Orange
Yellow
Green
Blue
Purple

* - Starting from the stain relief, the cable is 400mm (16in) long, 6mm (0.25in) stripped with plug, covered with an expandable cable sleeve.

NOTES:

1. The maximum possible configuration for the CJ handle is up to 2 Lower Face Buttons, 6 Top Face Buttons, and a Deadman lever.
2. If unspecified, the pushbuttons will have momentary n/o switches with red actuators.

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SPECIFICATIONS

MECHANICAL (FOR X AND Y AXES)		
Break Out Force	–	5.6N (1.26lbf)
Operating Force	–	7.6N (1.70lbf)
Maximum Applied Force	–	649.4N (146lbf)
Mechanical Angle of Movement	–	40° (±20°)
Expected Life	–	10 million cycles
Material	–	Glass reinforced nylon
Lever Action (Centering)	–	Spring centering

ENVIRONMENTAL		
Operating Temperature	–	-40°C to 85°C (-40°F to 185°F)
Storage Temperature	–	-40°C to 85°C (-40°F to 185°F)
Sealing (IP)	–	Up to IP68
EMC Immunity Level (V/M)	–	IEC 61000-4-3:2006
EMC Emissions Level	–	IEC 61000-4-8:2009
ESD	–	IEC 61000-4-2:2008

ELECTRICAL SENSOR		
Resolution	–	1.22mV
Supply Voltage Range	–	5.00V±0.01V
Reverse Polarity Max	–	-10V
Overvoltage Max	–	20V
Output Impedance	–	2Ω
Return to Center Voltage Tolerance	–	±200mV initial
Supply Current	–	13mA per sensor

STANDARD PUSHBUTTON SWITCH CHARACTERISTICS/RATINGS		
Max Current / Voltage Rating with Resistive Load:	–	400mA 32VAC - 100mA 50VDC - 125mA 125VAC
Low Level:	–	10mA @ 30mV
Electrical Life at Full Load:	–	500,000 cycles
Mechanical Life:	–	1 million cycles
Environmental Seal:	–	IP67
Action:	–	Momentary, pushbutton
Operating Force:	–	7N±3N (1.57lbf±0.67lbf)
Total Travel:	–	1.9mm (0.07in)±0.3mm (0.01in)

CAN OUTPUT VERSION		
Supply Voltage Range (Vdc)	–	6V to 40V
Can Version	–	J1939

NOTES:

- All values are nominal
- Exact specifications may be subject to configuration.
  Contact Technical Support for the performance of your specific configuration.

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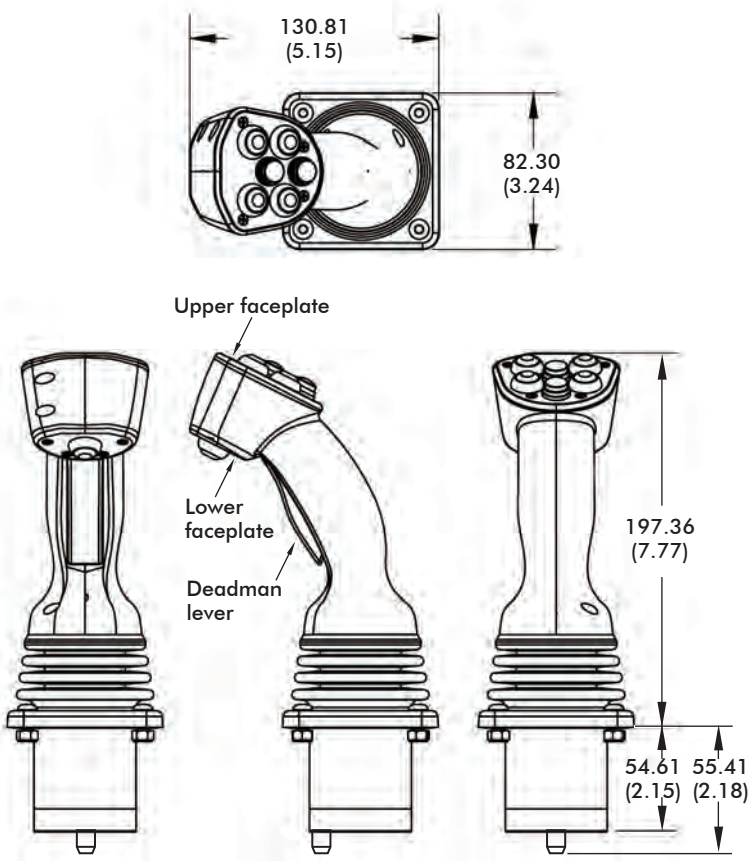
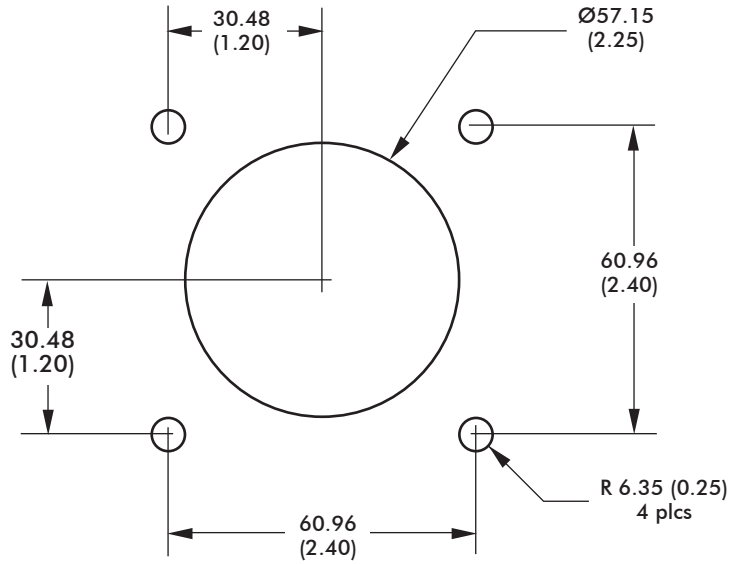
DIMENSIONAL DRAWINGS



STANDARD PANEL CUTOUT DIMENSIONS



NOTE:
Dimensions are in mm/(in)

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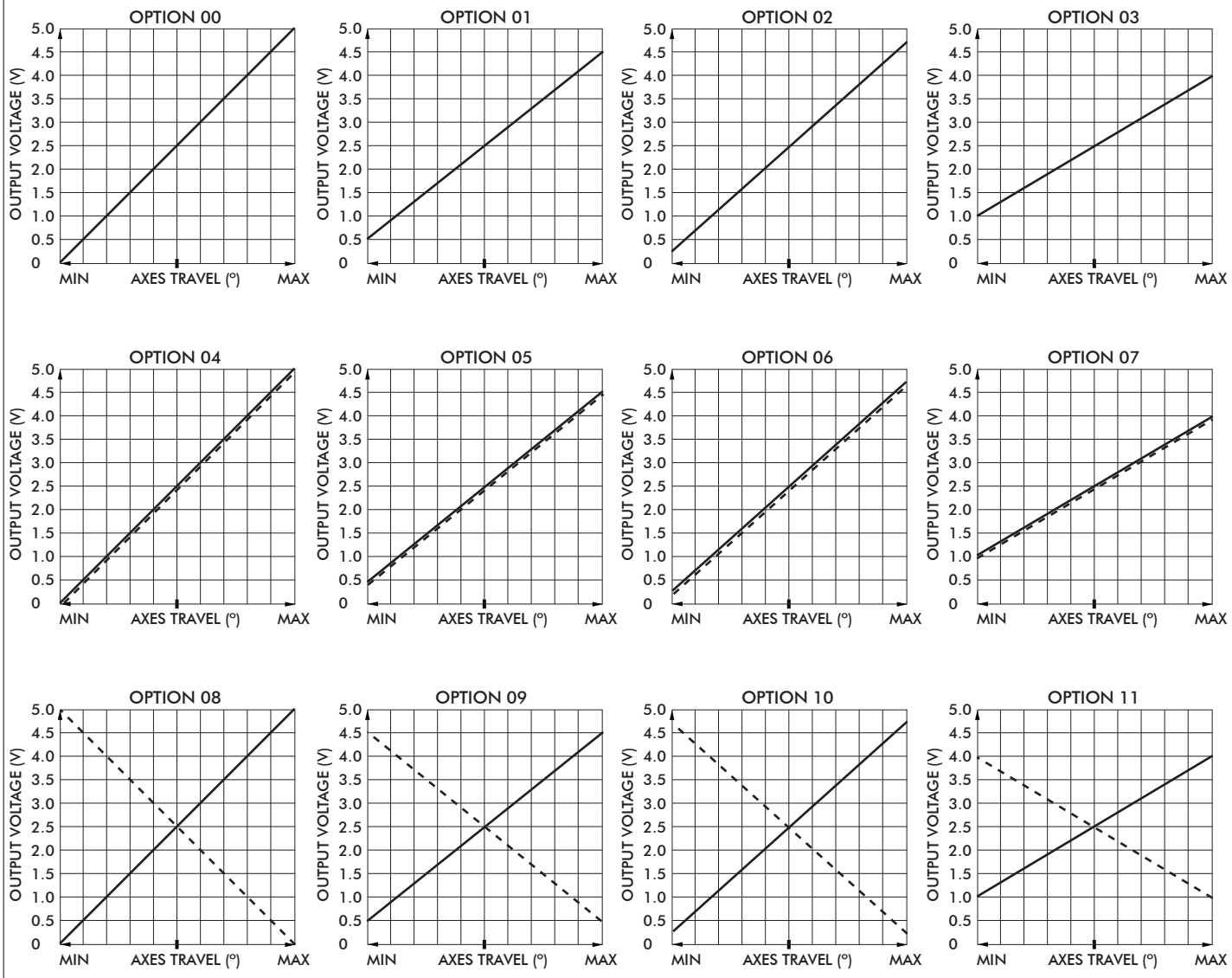
CONFIGURATION OPTIONS

LINEAR OUTPUT OPTIONS



ADDITIONAL OUTPUT OPTIONS

CANbus J1939

CH Products CJ Series CANbus joysticks conform to the SAE J1939 serial bus specification used for communications between electronic control units and vehicle components.

FEATURES

- CANbus J1939
- Extended I/O for up to 16 digital inputs (or a combination of digital inputs and a switch matrix) and eight analog inputs.
- Accommodates a 6-40VDC power supply

ELECTRICAL SPECIFICATIONS		
Supply Power:	-	6 – 40 VDC
Supply Current:	-	15mA min, +5mA per LED, +6mA per axis

WIRING SPECIFICATION		
Red Wire	-	Supply Power
Black Wire	-	Ground
Green Wire	-	CAN high data
White Wire	-	CAN low data
Blue Wire	-	Identifier Select
Orange Wire	-	Identifier Select

CONNECTOR OPTIONS:

- Cable assembly with Deutsch DT04 style plugs
- External I/O harnessing per customer specification

CANbus CONFIGURATION CHART

- Contact factory for assistance

BAUD RATE (Check one)			250K		500K		1000K						MSB GRAY WIRE	LSB VIOLET WIRE
11 BIT IDENTIFIER (CAN2.0A)	#1	TX	1		0		FILL IN 1 TX AND 1 RX IDENTIFIER FOR EACH WIRE COMBINATION AT RIGHT						G	G
		RX												
	#2	TX												G
		RX												
	#3	TX											G	
		RX												
	#4	TX												
		RX												
29 BIT IDENTIFIER (CAN2.0B)	#1	TX	3		2		1		0		FILL IN 1 TX AND 1 RX IDENTIFIER FOR EACH WIRE COMBO AT RIGHT		G	G
		RX												
	#2	TX												G
		RX												
	#3	TX											G	
		RX												
	#4	TX												
		RX												
8 BYTE TX DATA FRAME			7		6		5		4		3	2	1	0
			7											
8 BYTE RX DATA FRAME			7											
AXIS DATA TYPE (Check one)			SIGNED CHAR (+/-127)		UNSIGNED CHAR (0-255)		UNSIGNED INT (0-1023)		UNSIGNED INT (0-4095)					

Note: The company reserves the right to change specifications without notice.

CONFIGURATION OPTIONS - continued

ADDITIONAL OUTPUT OPTIONS

PLUG-AND-PLAY SOLUTIONS:

USB

Featuring USB 1.1 HID compliant interface, CH Products' USB joysticks are recognized as standard HID "game controller" devices. Adhering to the HID specification, CH Products' USB joysticks are plug-and-play with most versions of Windows and Linux. Joystick button and axes assignments are dependent upon the controlled application.

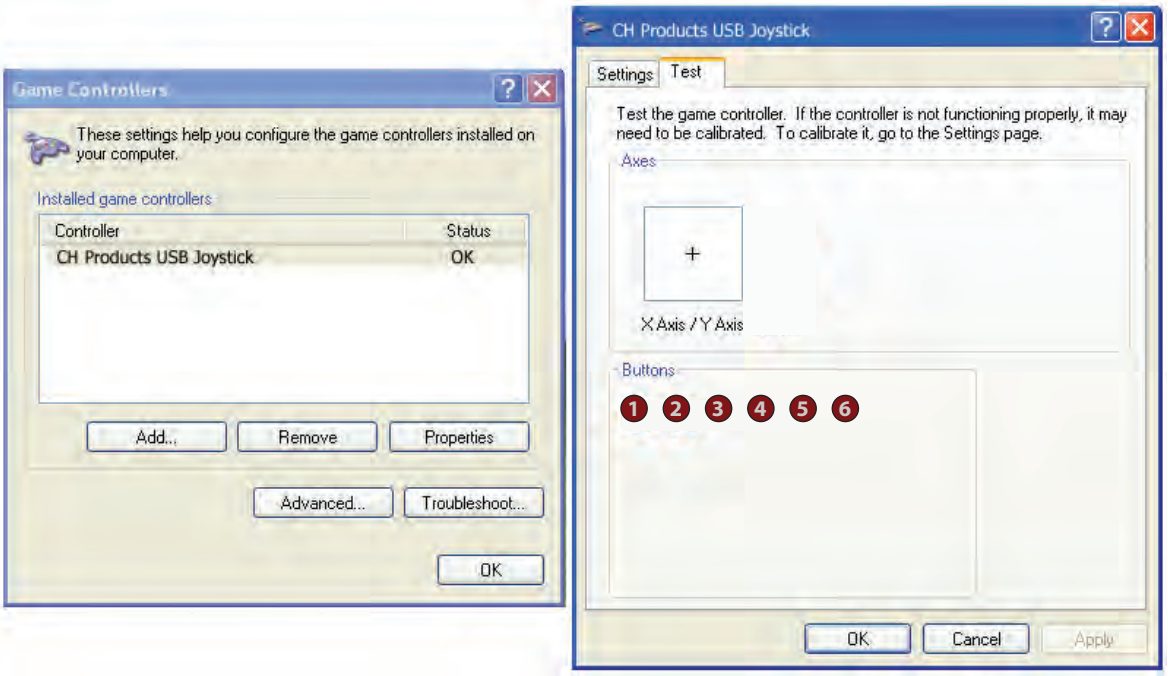
FEATURES

- USB 1.1 HID compliant "game controller" device
- Easy to install and operate
- Functions determined by controlled application
- Standard Male Type A Connector

USB Male Type A Connector

SUPPLIED WIRING

USB: USB Male Type A Connector with overmolded cable
(Optional ruggedized military connectors are available.)



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CONFIGURATION OPTIONS - continued

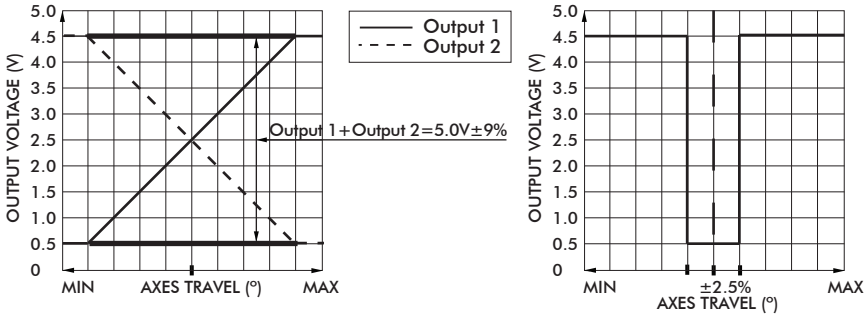
ADDITIONAL OUTPUT OPTIONS

DUAL DECODE

Dual Decode utilizes a microprocessor to monitor two linear opposite-ramp signals for each joystick axis and provides one proportional (0.5VDC – 4.5VDC) and one logical output accordingly. The dual inversed signals are continuously monitored and a logical signal of 0VDC is provided for over-range (>4.5VDC), under-range (<0.5VDC) and signal tracking (sum of both signals equals 4.5V +/-10%) error. A logical signal of 5.0VDC is provided for a properly functioning joystick deflected from center.

APPLICATIONS

Dual Decode provides a center detect function as well as error tracking, making it ideal for high liability, safety critical applications.



ELECTRICAL SPECIFICATIONS		
Supply Power	-	4.5VDC to 5.5VDC
Supply Current	-	30mA +10mA per axis

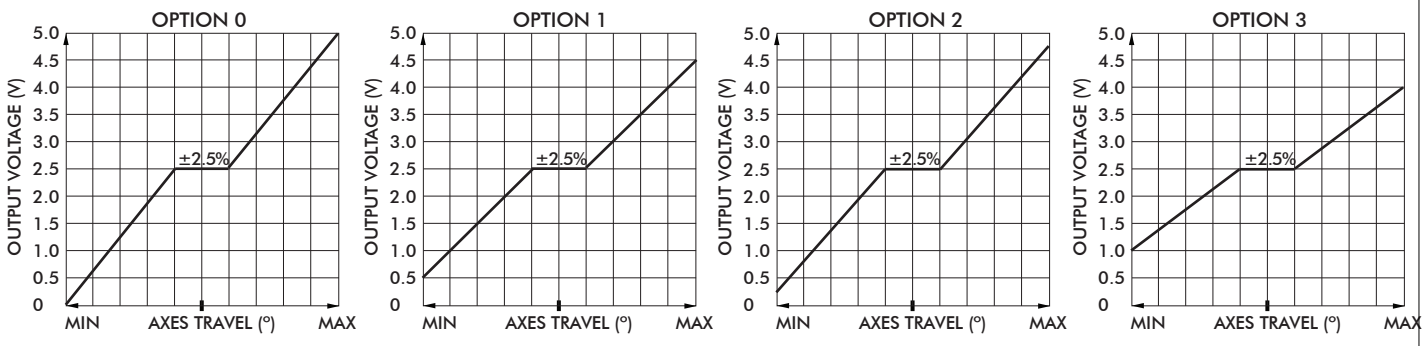
WIRING SPECIFICATION		
Red wire	-	Customer power supply 4.5VDC-5.5VDC
Black wire	-	Ground
Blue wire	-	X axis output
Yellow wire	-	Y axis output
Blue/White wire	-	X axis dual decode logic output
Yellow/Black wire	-	Y axis dual decode logic output
White wire	-	Pushbutton common wire
Orange,violet,gray,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

ANALOG DEADBAND

Analog Deadband utilizes an analog circuit to monitor proportional joystick outputs and enhance return to center accuracy over multiple axes. A constant output of 2.5VDC +/- 2.5% is provided while the joystick is at center.

APPLICATIONS

Analog Deadband effectively eliminates mechanical return-to-center error, making it ideally suited for safety critical applications susceptible to drift and motion control systems lacking center position trim.



Note: The company reserves the right to change specifications without notice.

ADDITIONAL OUTPUT OPTIONS

ELECTRICAL SPECIFICATIONS		
Supply Power	-	4.5VDC to 5.5VDC
Supply Current	-	10mA per axis

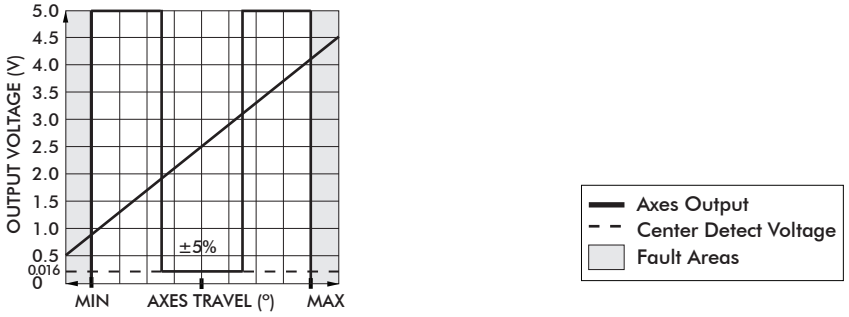
WIRING SPECIFICATION		
Red wire	-	Customer power supply 4.5-5.5vdc
Black wire	-	Ground
Blue wire	-	X axis output
Yellow wire	-	Y axis output
White wire	-	Pushbutton common wire
Orange,violet,gray,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

CENTER DETECT

Center Detect utilizes a microprocessor to monitor joystick output and provides both logic and proportional signals for enhanced operator safety. Specified for a joystick normally ranged 0.5VDC to 4.5VDC, the microprocessor continuously monitors the proportional output and provides HI logic signal (5.0VDC) when moved off center and a LO logical signal (0VDC) for an over-range (>4.5VDC) or under-range (<0.5VDC).

APPLICATIONS

Center Detect is ideal for safety critical applications including master relay control "MRC" for a motion control system or as a brake release for an overhauling load.



ELECTRICAL SPECIFICATIONS		
Supply Power	-	4.5V to 5.5V
Supply Current	-	30mA + 10mA per axis

WIRING SPECIFICATION		
Red Wire	-	Power supply 4.5 - 5.5VDC
Black Wire	-	Ground
Blue Wire	-	X axis output
Yellow Wire	-	Y axis output
Blue/White Wire	-	X axis center detect logic output
Yellow/Black Wire	-	Y axis center detect logic output
White Wire	-	Pushbutton common wire
Orange,violet,gray,brown,pink,bl/wt,y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

CONFIGURATION OPTIONS - continued

ADDITIONAL OUTPUT OPTIONS

DISCRETE OUTPUT

Discrete Output is a microprocessor based option that provides up to six hi voltage/hi current, on/off outputs as well as proportional signals. Featuring a microcontroller, an a/d converter, and four to eight optically isolated solid state switches, the Discrete Output provides an electronic "switch stick" function. Switch combinations and firing angles are programmed to the application's requirement.

APPLICATIONS

The Discrete Output option is designed for small motor, reversing starters or hydraulic solenoid actuations.

DC SPECIFICATIONS		
Supply Voltage Operating	-	5.0- 40VDC input power
Supply Current	-	30mA + 10mA per Hall sensor
Sourcing Outputs	-	70V AC/DC @ 1.6A max.
Sinking Outputs	-	70V AC/DC @ 3.6A max.
Discrete Output Max	-	60VDC/AC, 3.2A per discrete output

WIRING		
Red Wire	-	Customer power supply 5 - 40VDC
Black Wire	-	Customer power supply ground
Blue Wire	-	X axis output
Yellow Wire	-	Y axis output
Blue/White Wire	-	X axis discrete output
Yellow/Black Wire	-	Y axis discrete output
White Wire	-	Pushbutton common wire
Orange,violet,gray,brown,pink,bl/wt,y/bk,gn/bk,gy/w wire	-	Pushbutton outputs

I/O COMPLEMENT AND USER SPECIFIED PARAMETERS:

Up to three axes and six discrete sourcing or sinking outputs.

DISCRETE OUTPUT CONFIGURATION FORM:

Discrete Output	Sourcing	Sinking	AC	DC
Xfwd				
Xrev				
Yfwd				
Yrev				
Zfwd				
Zrev				

SAMPLE OF COMPLETED FORM:
(Please enter required choices for each applicable axis and return form to factory.)

Discrete Output	Sourcing	Sinking	AC	DC
Xfwd		X		X
Xrev		X		X
Yfwd	X			X
Yrev	X			X
Zfwd		X		X
Zrev		X		X

Note: The company reserves the right to change specifications without notice.

ADDITIONAL OUTPUT OPTIONS

VOLTAGE REGULATOR

The Voltage Regulator is a multi-wired analog option used to mate to a variety of industrial control voltages. The Voltage Regulator may be used when the supply or output voltage is greater than 5V or when bipolar output is required.

User Specified Supply Voltage:

- 5 VDC
- 10 VDC
- 12 VDC
- 24 – 30 VDC
- Custom supply options available.

User Specified Output Voltage:

- 0-5 VDC
- 0-10 VDC
- +/-5 VDC
- +/-10 VDC
- Custom outputs available.

ELECTRICAL SPECIFICATIONS		
Supply Power	-	5VDC to 30VDC
Supply Current	-	90mA max

WIRING SPECIFICATION		
Red wire	-	Supply power 5-30VDC
Black wire	-	Ground
Blue wire	-	X axis output
Yellow wire	-	Y axis output
White wire	-	Pushbutton common wire
Orange,violet,grey,brown,pink,bl/wt/y/bk,gn/bk,gy/w wire	-	Pushbutton outputs