G428-0001

ULTRA SLIMPAK®
G428-0001
T/C Input Field Configurable Isolator

Provides an Isolated, Linearized DC Output
in Proportion to a Thermocouple Input

- Field Configurable Input Ranges for J, K, T, R, S, E, and B Type Thermocouples
- Eliminates Ground Loops
- Field Configurable Output Ranges: 0-5V, 0-10V, 0-1mA, 0-20mA and 4-20mA
- Ultra Slim Housing for High Density Installations
- Flexible Power Supply Accepts 9 to 30 VDC
- ASIC Technology for Enhanced Reliability
- RoHS Compliant

Description
The G428 is a DIN rail mount, thermocouple input signal conditioner with 1800VDC isolation between input, output and power. The field configurable input and output offer flexible, wide ranging capability for J, K, T, R, S, E and B type thermocouples.

The G428 input can be configured for over 60 thermocouple temperature ranges (see Table 6). The output is linear to temperature and can be set for either 0-5V, 0-10V, 0-1mA, 0-20mA or 4-20mA.

Wide ranging, precision zero and span pots allow 50% adjustablity of offset and span turn-down within each of the ranges. For example, the 0-1000°C range could be offset and turned down to provide a 4-20mA signal representing 500-1000°C. Similarly, adjustment can be referenced to the output range. The example above could be used to provide a 12-20mA signal from a 750 to 1000°C temperature input.

Application
Three way isolation in the G428 completely eliminates ground loops from any source. Isolation protects expensive SCADA systems from ground faults and allows the noise reduction benefits of grounded thermocouples to be realized.

The G428 is equipped with cold junction compensation (CJC) circuitry to provide ice-point reference. Upscale or downscale thermocouple burnout detection is switch selectable.

High density DIN rail mounting offers an extremely compact solution to save valuable panel space.

Diagnostic LEDs
The G428 is equipped with front panel LEDs for INPUT (green), TROUBLE (yellow) and CAL OK (yellow). At start-up, both the INPUT and the CAL OK LEDs flash alternately for 10 seconds.

INPUT
This green LED is lit continuously when the input is within the specified range. In the full temperature range setting, for the overrange condition the LED flashes at 8Hz; for the under range condition it flashes at 4Hz. In a sub-range temperature setting, for the overrange condition the LED flashes at 1Hz; for the under range condition it flashes at 0.5Hz.

CAL OK
This yellow LED is continuously on when the device is calibrated.

TROUBLE
This yellow LED is off during the normal operation. Consult factory if this LED is on, indicating a microprocessor malfunction.

Configuration
The G428 offers 50% input zero and span adjustablity within each of the fullscale input ranges. Unless otherwise specified, the factory presets the Model G428 as follows:

Input:	J-type
Range:	0 to 500°C
Output:	4 to 20mA
Burn Out:	Upscale

The DC power input accepts any DC source between 9 and 30V; typically a 12V or 24VDC source is used (see Accessories).

For other I/O ranges, refer to Tables 1 through 6 and reconfigure switches SW1 and SW2 for the desired input type range and output.

***WARNING:** Do not change switch settings with power applied. Severe damage will result!*

1. Choose the desired temperature range from Table 6, then use Table 1 and 2 to configure the switches (as described in the following steps) for thermocouple type and range.

2. With DC power off, position input switches 1 and 2 of SW2 for the desired burnout detection mode.

3. Set positions 4 through 10 of SW2 for the desired thermocouple range and type.

4. Set positions 1 through 8 of SW1 for the desired output signal. (Table 4)

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Calibration

1. After configuring the dip switches, connect the input to a calibrated thermocouple source. Connect the output to the device (or a load approximately equivalent to the device) and apply power.

Note: *To maximize thermal stability, final calibration should be performed in the operation installation, allowing approximately 1 to 2 hours for warm up and thermal equilibrium of the system.*

2. Set the calibrator to the desired minimum input and adjust the zero potentiometer for the desired minimum output.

3. Set the calibrator to the desired maximum input and adjust the span potentiometer for the desired maximum output.

4. Repeat steps 2 and 3, if necessary for best accuracy.

Table 5:
G428 Thermocouple Accuracy

TC Type	Temperature Range	Accuracy
J	-200 to 750¡ C (-328 to 1382¡ F)	+/-2.0¡ C (+/-3.6¡ F)
K	-200 to 140¡ C (-328 to -220¡ F)	+/-5.0¡ C (+/-9.0¡ F)
K	-140 to 1250¡ C (-220 to 2282¡ F)	+/-2.0¡ C (+/-3.6¡ F)
K	1250 to 1370¡ C (2282 to 2498¡ F)	+/-4.0¡ C (+/-7.2¡ F)
E	-150 to 1000¡ C (-238 to 1832¡ F)	+/-2.5¡ C (+/-4.5¡ F)
T	-150 to 400¡ C (-238 to 752¡ F)	+/-3.0¡ C (+/-5.4¡ F)
R	50 to 1760¡ C (122 to 3200¡ F)	+/-6.0¡ C (+/-10.8¡ F)
S	50 to 1760¡ C (122 to 3200¡ F)	+/-6.0¡ C (+/-10.8¡ F)
B	500 to 1820¡ C (932 to 3308¡ F)	+/-5.0¡ C (+/-9.0¡ F)

Table 1:
G428 T/C Types

Type	SW2		
	8	9	10
B	■	■	■
E	■	■	
J	■		■
K	■		
R		■	■
S		■	
T			■
Key: ■ = 1 = ON or Closed			

Table 2:
G428 Range Settings

Range	SW2			
	4	5	6	7
1	■		■	
2	■	■	■	
3		■		■
4	■	■		
5	■		■	■
6	■	■	■	■
7	■			■
8	■			
9		■	■	■
10		■	■	
11			■	
12		■		
13			■	■
14	■	■		■
15				■
16				
Key: ■ = 1 = ON or Closed				

Table 3:
G428 Burnout Settings

Burnout	SW2	
	1	2
Not Allowed	■	■
Upscale	■	
Downscale		■
None		
Key: ■ = 1 = ON or Closed		

Table 4:
G428 Output Settings

Output	SW1							
	1	2	3	4	5	6	7	8
0 to 5V	■	■	■	■				
0 to 10V	■		■	■				
0 to 1mA		■	■	■				
4 to 20mA						■	■	■
0 to 20mA	■	■				■	■	■
Key: ■ = 1 = ON or Closed								

Table 6: G428 Thermocouple Range Settings

TC Type	Range	Temperature Range
B	6	500 to 1820¡ C (932 to 3308¡ F)
	7	1000 to 1820¡ C (1832 to 3308¡ F)
	8	500 to 1000¡ C (932 to 1832¡ F)
	11	500 to 1820¡ C (932 to 3308¡ F)
	12	750 to 1000¡ C (1382 to1832¡ F)
E	2	-18 to 1000¡ C (0 to 1832¡ F)
	3	-18 to 500¡ C (0 to 932¡ F)
	4	-18 to 250¡ C (0 to 482¡ F)
	5	-18 to 125¡ C (0 to 257¡ F)
	8	500 to 1000¡ C (932 to 1832¡ F)
	9	250 to 500¡ C (482 to 932¡ F)
	10	125 to 250¡ C (257 to 482¡ F)
	12	750 to 1000¡ C (1382 to 1832¡ F)
	13	375 to 500¡ C (707 to 932¡ F)
	14	-150 to 750¡ C (-238 to 1382¡ F)
	15	-150 to 250¡ C (-238 to 482¡ F)
	16	-150 to 0¡ C (-238 to 32¡ F)
J	2	-18 to 750¡ C (0 to 1382¡ F)
	3	-18 to 500¡ C (0 to 932¡ F)
	4	-18 to 250¡ C (0 to 482¡ F)
	5	-18 to 125¡ C (0 to 257¡ F)
	8	500 to 750¡ C (932 to 1382¡ F)
	9	250 to 500¡ C (482 to 932¡ F)
	10	125 to 250¡ C (257 to 482¡ F)
	13	375 to 500¡ C (707 to 932¡ F)
	14	-200 to 750¡ C (-328 to 1382¡ F)
	15	-200 to 250¡ C (-328 to 482¡ F)
	16	-200 to 0¡ C (-328 to 32¡ F)

TC Type	Range	Temperature Range
K	1	-18 to 1370¡ C (0 to 2498¡ F)
	2	-18 to 1000¡ C (0 to 1832¡ F)
	3	-18 to 500¡ C (0 to 932¡ F)
	4	-18 to 250¡ C (0 to 482¡ F)
	5	-18 to 125¡ C (0 to 257¡ F)
	7	1000 to 1370¡ C (1832 to 2498¡ F)
	8	500 to 1000¡ C (932 to 1832¡ F)
	9	250 to 500¡ C (482 to 932¡ F)
	10	125 to 250¡ C (257 to 482¡ F)
	12	750 to 1000¡ C (1382 to1832¡ F)
	13	375 to 500¡ C (707 to 932¡ F)
	14	-200 to 750¡ C (-328 to 1382¡ F)
	15	-200 to 250¡ C (-328 to 482¡ F)
	16	-200 to 0¡ C (-328 to 32¡ F)
R, S	1	50 to 1760¡ C (122 to 3200¡ F)
	2	50 to 1000¡ C (122 to 1832¡ F)
	3	50 to 500¡ C (122 to 932¡ F)
	4	50 to 250¡ C (122 to 482¡ F)
	7	1000 to 1760¡ C (1832 to 3200¡ F)
	8	500 to 1000¡ C (932 to 1832¡ F)
	9	250 to 500¡ C (482 to 932¡ F)
	10	125 to 250¡ C (257 to 482¡ F)
	12	750 to 1000¡ C (1382 to 1832¡ F)
	13	375 to 500¡ C (707 to 932¡ F)
T	3	-18 to 400¡ C (0 to 752¡ F)
	4	-18 to 250¡ C (0 to 482¡ F)
	5	-18 to 125¡ C (0 to 257¡ F)
	9	250 to 40¡ C (482 to 752¡ F)
	10	125 to 250¡ C (257 to 482¡ F)
	13	375 to 400¡ C (707 to 752¡ F)
	14	-150 to 400¡ C (-238 to 752¡ F)
	15	-150 to 250¡ C (-238 to 482¡ F)
	16	-150 to 0¡ C (-238 to 32¡ F)

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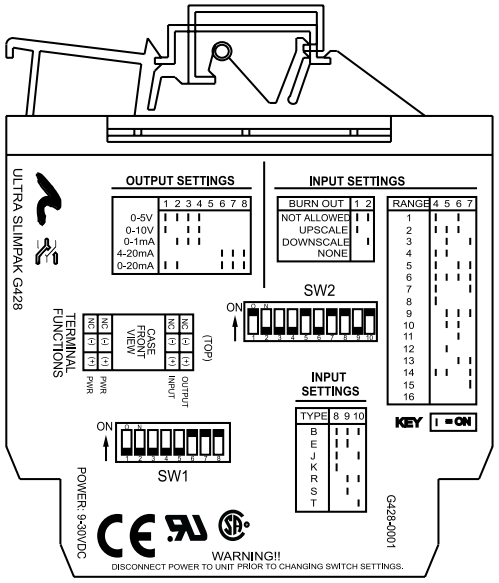

Figure 1: G428 Factory Cal: J-Type, 0-500°C, 4-20mA, Upscale

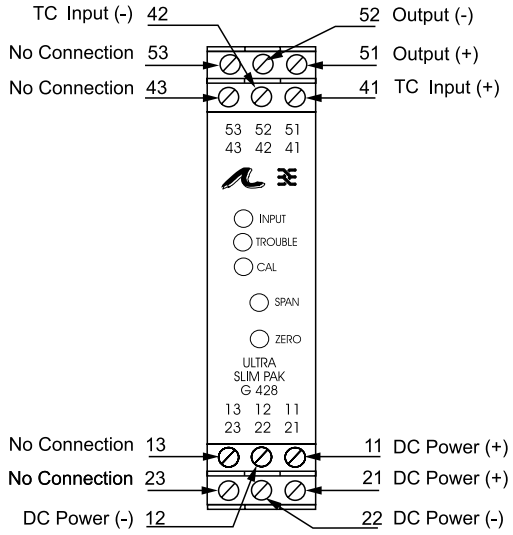

Figure 2: Wiring Diagram for G428

Note: All Ultra SlimPak modules are designed to operate in ambient temperatures from 0 to 55°C when mounted on a horizontal DIN rail. If five or more modules are mounted on a vertical rail, circulating air or model HS01 Heat Sink is recommended. Refer to HS01 Technical Bulletin (#721-0549-00) or contact the factory for assistance.

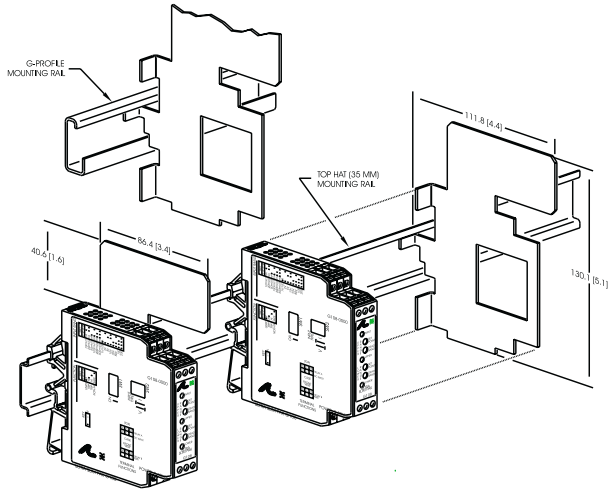

Figure 3: Mounting Multiple Modules

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Specifications

Inputs:

Sensor Types: J, K, T, R, S, E, B

Input Ranges: See Table 6.

Impedance: >1M Ohms

Bias Current (burnout detection): <1.5microamp

Overvoltage: ±10V differential

Common Mode (Input to Gnd): 1800VDC, max.

Zero and Span Adjustability:

50% of any selected range

Output:

Voltage

Output: 0-5V, 0-10V

Source Impedance: <10 Ohms

Drive: 10mA, max.

Current

Output: 0-1mA, 0-20mA, 4-20mA

Source Impedance: >100K Ohms

Compliance:

0-1mA; 7.5V, max.(7.5K Ohms)

0-20mA; 12V, max.(600 Ohms)

4-20mA; 12V, max.(600 Ohms)

Accuracy (Including Linearity, Hysteresis):

see Table 5

Stability:

±0.04% of the maximum full scale range per ºC change in ambient temperature, maximum.

Response Time (10 to 90%):

500mSec., typical.

Common Mode Rejection:

DC to 60Hz: 120dB

Isolation:

1800VDC between input, output & power.

EMC Compliance (CE Mark):

Emissions: EN50081-1

Immunity: EN50082-2

Safety: EN50178

LED Indication:

INPUT (Green):

continuously on if input is within selected range, flashes otherwise

TROUBLE (Yellow):

off during normal device operation.

CAL OK (Yellow):

continuously on in normal device operation

Thermocouple Burnout Detect:

Field configurable upscale, downscale, or disabled

Humidity (Non-Condensing):

Operating: 15 to 95% @ 45°C

Soak: 90% for 24 hours @ 65°C

Temperature Range:

Operating: 0 to 55°C (32 to 131°F)

Storage: -25 to 70°C (-13 to 158°F)

Power:

Consumption: 1.5W typical, 2.5W max.

Range: 9 to 30VDC

Terminations and Wire:

Screw terminals for 12-22 AWG. Use twisted pair for output and power connections.

Weight:

0.54 lbs

Agency Approvals:

CSA certified per standard C22.2, No. 0-M91 and 142-M1987 (File No. LR42272)

UL recognized per standard UL508 (File No.E99775)

CE Conformance per EMC directive 89/336/EEC and Low Voltage 73/23/EEC

RoHS Compliant

Ordering Information

Models & Accessories

Specify:

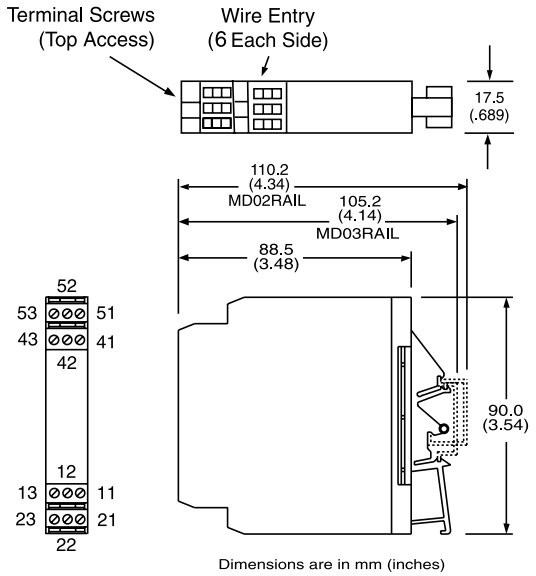
1. Model: **G428-0001**
2. Accessories: (see Accessories)
3. Optional Custom Factory Calibration; specify **C620** with desired input and output range.

Accessories

All SlimPak "G" series modules will mount on standard TS32 (model MD02) or TS35 (model MD03) DIN rail. In addition, the following accessories are available:

HS01	Heat Sink
MD03	TS35 x 7.5 DIN rail
WV905	24VDC Power Supply (0.5A)
H910	24VDC Power Supply (1A)
H915	24VDC Power Supply (2.3A)
MB03	End Bracket for MD03
C664	I/O Descriptive Tag

Dimensions



Dimensions are in mm (inches)

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Factory Assistance

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