ULTRA SLIMPAK® II
WV428
DC Powered Thermocouple Input
Isolating Signal Conditioner

WV428-2000

High Accuracy Signal Conditioner with an Isolated,
Linearized DC Voltage or Current Output

$C \epsilon$ $c \mathbf{\Re L}_{US}$

- ■ Lower Power Requirements with SmartPower
- ■ Improved Accuracy
- ■ Bussed Power with Plug-in Power Clips
- ■ Removable Terminals for Easy Service
- ■ Approved for use in Class I Div 2 Group A, B, C, D areas
- ■ RoHS Compliant
- ■ Touch Cal for Best Stability and Accuracy
- ■ DIP Switch Configuration
- ■ Optional E-mail Notification of Alarms

Description

The Ultra SlimPak II is an exciting new line of isolating signal conditioners from Action Instruments with greater accuracy and better stability than virtually any other signal conditioners on the market today. The Ultra SlimPak II features Smart Power, which eliminates wasted power for low loop resistance loads in the current output mode.

The WV428 supports B, C, E, J, K, N, R, S & T thermocouples that are DIP switch selectable. The WV428 also supports a millivolt range of –20 to +80mVDC. The input accuracy of the WV428 is ±0.05% with a CJC error of £ ±1°C. Both voltage and current have an input accuracy of 0.015% of full scale. Outputs include 0-10V, 0-20mA and 4-20mA. The WV428 is recognized for use in Class 1, Division 2, Groups A, B, C, D hazardous locations.

Smart Power

The Ultra SlimPak II uses Smart Power to control its output supply. Smart Power automatically adjusts the the voltage to drive the output loop to the required current. A low impedance current loop will subsequently require less voltage than a loop with higher impedance. Previous designs provided only a single supply at the highest voltage required to drive the highest impedance load. Using Smart Power results in power savings and reduces the operating temperature of the signal conditioner.

Approved for use in Class I Div 2 Group A, B, C, D areas

Users can now enjoy significant labor savings over traditional protection methods since there is no need for explosion proof enclosures and conduits.

A Class I hazardous location is one in which flammable gases or vapors may be present in the air to be ignitable or explosive (typical applications include petroleum refineries, spray finishing areas, utility gas plants and fuel servicing areas).

A Division 2 area is one in which the flammable gases or vapors are normally not present in an explosive concentration, but could accidentally exist.

Group A is acetylene; Group B includes hydrogen; Group C includes ether; and Group D includes hydrocarbons, fuels and solvents.

Instant Accuracy™

Instant Accuracy maximizes accuracy and performance during warmup and during changes in ambient temperature. This patented cold-junction compensation technique utilizes two temperature sensors to measure the differential temperature near the terminal block. Using heat transfer calculations with the measured differential temperature and the known thermal conductivity of the PCB, the terminal junction temperature is determined with extreme accuracy. Even during unstable thermal states such as start-up, ambient temperature changes, or changing load or power, the WV408 performs extremely accurate thermocouple temperature measurement. Instant Accuracy improves system performance and productivity due to reduced warm-up time, fewer temperature measurement errors, and tighter process control for higher quality. Most significantly, it allows calibration to be checked quickly and accurately without the effects of rapid ambient temperature changes due to opening a control panel door, which often causes erroneous readings and miscalibrations - a common cause of measurement errors.

Enhanced LED Diagnostics

Other than when executing the pushbutton calibration routine, the LEDs blink under the following conditions:

GREEN:

Flashes at 2Hz when the input is under range.
Flashes at 8Hz when the input is over range.

RED:

Flashes at 2Hz when the output is under range.
Flashes at 8Hz when the output is over range.

YELLOW: Flashes at 2Hz for a TC burnout.

An Under Range condition exists when the signal is lower than the operational low value minus 6.25% of the operational span. An Over Range condition exists when the signal is higher than the operational high value plus 6.25% of the operational span.

A voltage output short circuit may cause an under range condition (RED blinking at 2Hz rate). A current output open circuit may cause an over range condition (RED blinking at an 8Hz rate).

Eurotherm®

There could be two or more LEDs blinking at the same time, which means the module has more than one error condition. Only when all error conditions have been removed, will the LEDs be back to normal (Green ON, Red and Yellow Off).

Configuring Modules

Unless otherwise specified, the factory presets the Model WV428 as follows:

Input:	Type J thermocouple
Range:	-210°C to 760°C
	(-346°F to 1400°F)
Output:	4–20mADC
Burnout:	Upscale
Remote Cal:	Off

1. For other ranges, refer to the SWITCH SETTINGS table. Reconfigure switch S1 for the desired input type and range.

2. Set position 1 of S1 to ON if a WVC16 will be utilized and remote calibration capability is desired.

3. Set position 2 and 3 of S1 for the desired output type.

5. Set positions 4-7 of S1 for the desired input range.

It is also possible to remotely select the setpoints using an Ethernet connection and the optional WVC16 WebView Communications Interface module.
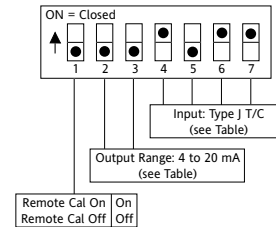
Calibration

See the calibration flowchart in Figure 3. The complete calibration procedure is contained in the Installation & Calibration Instructions document, which is available on our website

Note that Custom Calibration (option C620) is available from the factory (settings **MUST** be within the units specifications). For a C620, specify the following:

a) Input Type, Range & Units (°C or °F).

b) Output Type, Range & Units (mA, V).

c) Burnout (Upscale or Downscale).

Function	S1						
	1	2	3	4	5	6	7
Input							
Type B Thermocouple	-	-	-	■	■	■	
Type C Thermocouple	-	-	-	■	■		■
Type E Thermocouple	-	-	-	■	■		
Type J Thermocouple	-	-	-	■		■	■
Type K Thermocouple	-	-	-	■		■	
Type N Thermocouple	-	-	-	■			■
Type R Thermocouple	-	-	-	■			
Type S Thermocouple	-	-	-		■	■	■
Type T Thermocouple	-	-	-		■	■	
-20mV to +80mV	-	-	-	■	■	■	■
Remote Cal Enable	■	-	-	-	-	-	-
Output Range							
0 to 10V	-	■	■	-	-	-	-
0 to 20mA	-		■	-	-	-	-
4 to 20mA	-			-	-	-	-
Key: ■ = 1 = ON or Closed; - = n/a							

Default Switch Settings
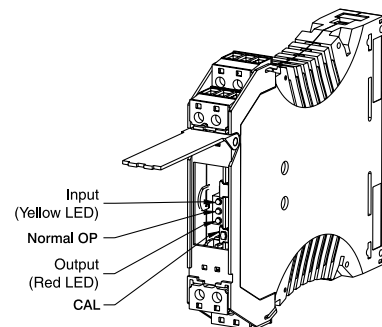
Figure 1: Switch Settings
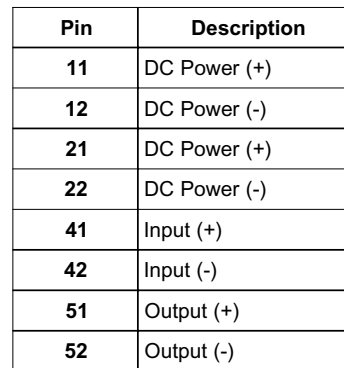
Pin	Description
11	DC Power (+)
12	DC Power (-)
21	DC Power (+)
22	DC Power (-)
41	Input (+)
42	Input (-)
51	Output (+)
52	Output (-)

Figure 2: Wiring Connections

-20mV to 80mV = Type E & 80mV Range
-20mV to 50mV = Type C, J, K & N
0mV to 20mV = Type B, R, S & T

LEGEND

◯ Off		– P →	Press Button
◯ On		– H →	Hold Button (4 Seconds)
▨ Flashing (10 Hz)		–EH→	Extended Hold (10 Seconds)

NOTE:
To reload factory calibration data, hold down the button while the unit powers up. The green LED will flash 10 times and then the red LED will begin to flash. Release the button once the red LED begins flashing and the factory calibration data will be reloaded.

Figure 3: Calibration Flowchart

Specifications

Inputs:

  Thermocouples:

Type	°C		°F	
B	75 to 1800		167 to 3272	
C	0 to 2315		32 to 4199	
E	-200 to 1000		-328 to 1832	
J	-210 to 760		-346 to 1400	
K	-200 to 1370		-328 to 2498	
N	-200 to 1300		-328 to 2372	
R	0 to 1760		32 to 3200	
S	0 to 1760		32 to 3200	
T	-200 to 400		-328 to 752	

  Millivolts: -20 to +80mV

  Accuracy: ±0.05% of F.S. & CJC to ±1°C

Pushbutton Adjustment:

  Effective zero offset: +95% (Inputs >10mV)

  Effective span turn-down: = -95%

Outputs:

  Voltage: 0 to 10VDC

  Source Impedance: <10 ohms

  Drive: 10mA

  Current: 0 to 20mA

  Source Impedance: >100k ohms

  Compliance: 20V @ 20mA (1k ohms max)

Output Accuracy: ±0.05% of Full Scale

Local Range Selection: By DIP switch

Burnout Detection: Programmable for upscale, downscale or none

Response Time: 100mSec (10 to 90%)

Stability: ±100ppm of full scale/°C (±0.01%/°C)

Common Mode Rejection: 120dB @ DC, >90dB @ 60Hz, or better

Isolation: 1800VDC or peak AC between input, output & power

ESD Susceptibility: Capable of meeting IEC 801-2 level 3 (8kV)

Power: 9-30VDC; 1.0W typ., 2.0W max

Host Module Interface: IR Link

Size: DIN rail case – refer to Dimensions drawing

Operating Temperature: 0°C to +60°C (32°F to 140°F)

Storage Temperature: -25°C to +85°C (-13°F to 185°F)

Operating Humidity: 15% to 95% RHNC @ 45°C

Storage Humidity: 90% RHNC @ 60°C for 24 hours

Agency Approvals (EMC & Safety):

  UL recognized per standard UL508 (File No.E99775)

  CE Conformance per EMC directive 2004/108/EC and Low Voltage directive 2006/95/EC (Input < 75VDC, only).

  RoHS Compliant

Note that detailed installation instructions are available on our website.

Ordering Information

Specify:

1. Model:
   WV428-2000
2. Optional Custom Factory Calibration (specify **C620**, see required settings under "Calibration, page 2).
3. Accessories.

Accessories

All WV Series modules will mount on standard TS35 (model MD03) DIN rail. In addition, the following accessories are available:

WVC16	Communications Interface
MD03	TS35 x 7.5 DIN Rail (2 meters)
WV905	24VDC Power Supply (0.5 Amp)
H910	24VDC Power Supply (1 Amp)
H915	24VDC Power Supply (2.3 Amp)
MB03	End Bracket for MD03
C650	Utility software for WVC16

Dimensions

Dimensions are in millimeters (inches)

12.7 (.50) 90.0 (3.54) 111.6 (4.39)

ULTRA
SlimPak II
ACTION INSTRUMENTS
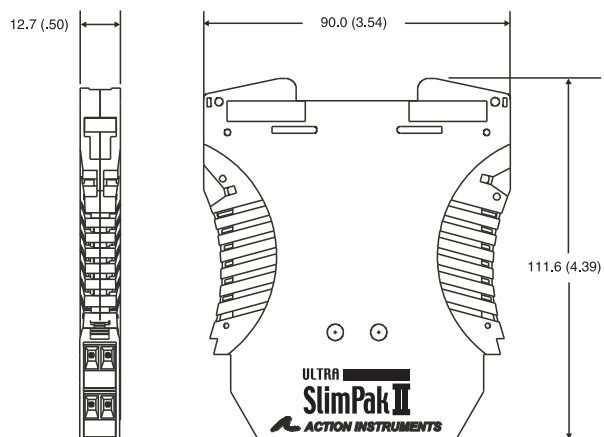
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