

ULTRA SLIMPAK® II MODEL WV168-2000

True RMS AC Input Limit Alarm

Installation and Calibration Instructions

NOTE: The unit has been shipped with the Power Clips attached. Please remove the clips before installing the module on the DIN rail. If the Power Clips are chosen as the means to route power, they can be installed once the modules are in place on the DIN rail.

DIN Rail Mounting

The WV168 mounts on a 35mm TS35 DIN rail, by simply hooking one side of the mounting foot over the rail and pressing the module towards the rail until it locks into place. To remove the unit from the rail, place the tip of a flat-bladed screwdriver under the release clip on either the top or the bottom of the module and pry up until the module releases from the rail. See Figure 1.



Figure 1

until the two tabs lock firmly in place. This may require pressing on the front side of the upper and lower terminal blocks for a positive fit. The board slides in where the switch and the switch position chart on the case can be viewed together.

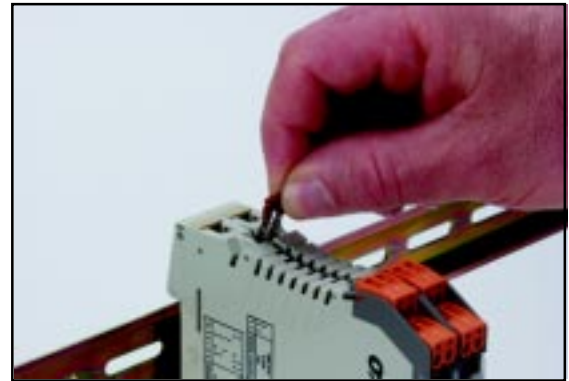
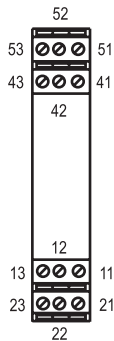


Figure 2

Wiring Connections



Pin	Description
11	N.O. Relay B
12	Com. Relay B
13	N.C. Relay B
21	DC Power (+)
22	DC Power (-)
23	No Connection
41	AC Input (Hot)
42	AC Input (Neutral)
43	No Connection
51	N.O. Relay A
52	Com. Relay A
53	N.C. Relay A

Description

There are two standard versions of the WV168, the WV168-2000 and the WV168-2001. The WV168-2000 uses standard (non-latching) relays - when a power loss occurs, the form "C" relay transitions to its "relaxed" state. The WV168-2001 uses latching relays - when a power loss occurs, the relay remains in its current position. A manual reset is required to change the state of the relay.

Input Range Configuration

Unless otherwise specified, the factory presets the Model WV168 as follows:

Input:	mVAC
Range:	0-500mV
Output:	Dual, SPDT
Trip:	A: HI, B: LO
Failsafe:	No
Deadband:	A, B: minimum

Power Connections

The power jumper clips (see Figure 2) are used to distribute power to a maximum of 16 modules. In applications using more than 16 modules, power wiring must be connected to the first and last module, and distributed to the remaining modules using the power clips. This technique allows for "hot swapping" of a module without interrupting power to the remaining units.

Opening the Case

The case can be opened by simultaneously pressing in on the two ribbed tabs located at the top and bottom of the front cap of the case and sliding out the circuit board. This provides easy access to the DIP switch for range selection. To close the case, slide the board back in

1. For other ranges, refer to the Switch Settings Table. Reconfigure switches S1 and S2 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 to ON for a Hi trip setpoint or to OFF for a Low trip setpoint. (A can be set for a high trip and B can be set for a low trip.)
4. Set position 4 of S1 to ON for failsafe operation (e.g. alarm trips upon power failure) or OFF for non-failsafe operation (only on the -2000 version).

Switch Settings

Function	S1								S2	
	1	2	3	4	5	6	7	8	1	4
Voltage Input										
250V	-	-	-	-	■	■	■	■		■
150V	-	-	-	-	■	■		■		■
50V	-	-	-	-	■		■	■		■
20V	-	-	-	-	■			■		■
5V	-	-	-	-		■	■	■		■
500mV	-	-	-	-		■		■		■
150mV	-	-	-	-			■	■		■
50mV	-	-	-	-				■		■
Current Input										
20mA	-	-	-	-	■	■				■
100mA	-	-	-	-	■	■	■			■
Remote Cal Enable	■	-	-	-	-	-	-	-	-	-
A Hi/Low (Hi)	-	■	-	-	-	-	-	-	-	-
B Hi/Low (Hi)	-	-	■	-	-	-	-	-	-	-
Failsafe	-	-	-	■	-	-	-	-	-	-

Key: ■ = 1 = ON or Closed; - = n/a

Diagnostic LEDs

Other than when executing the pushbutton calibration routine, the LED's operate under the following conditions:

RUN (Green): On when unit is powered.
Flashes at 2Hz when the input is under range.
Flashes at 8Hz when the input is over range.

SETPOINT A (Red): On when Setpoint A is tripped.
On when setting Setpoint A.
Flashes while calibrating the input level.

SETPOINT B (Red): On when Setpoint B is tripped.
On when setting Setpoint B.
On while calibrating the input level.

An Over/Under Range condition exists at or near the operational range limits.

Operation

The WV168 limit alarm setpoints can be configured for HI or LO, failsafe or non-failsafe operation (failsafe is only available on the -2000). Both setpoints have individually adjustable deadbands. In a tripped condition, the setpoint is exceeded and the appropriate red LED

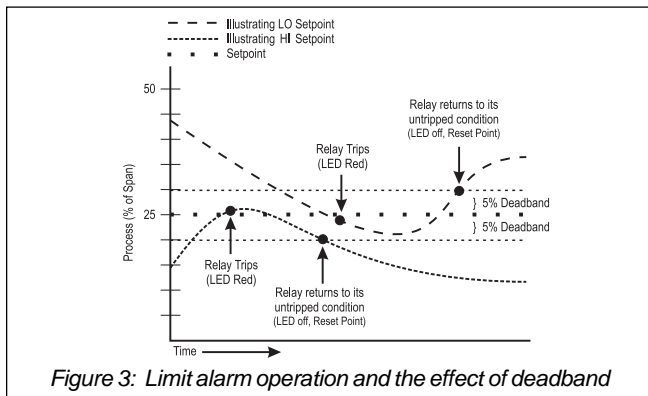


Figure 3: Limit alarm operation and the effect of deadband

will illuminate. The trip will reset only when the process falls below the HI release point or rises above the LO release point (see Figure 3). Minimum deadband values are listed in the specifications.

For proper deadband operation, the HI setpoint must always be set above the LO setpoint. In failsafe operation (-2000 only), the relay is energized when the process is below the HI setpoint or above the LO setpoint (opposite for non-failsafe). In the failsafe mode, a power failure results in an alarm state output.

Calibration

For best results, calibration should be performed in the operating environment, mounted on a DIN rail, allowing at least one hour for thermal equilibrium of the system. The input range and setpoints can be calibrated in any order. Refer to the calibration flow chart, Figure 6. This procedure will set the input range first and then proceed to the setpoints.

NOTE:

Setting the input range is NOT required. You can select a full scale range from the DIP switch selections and then proceed to step six and calibrate the setpoints within that DIP switch range.

1. Connect the input to a calibrated AC source. Apply power and allow the system to reach thermal equilibrium.

2. Adjust the input signal to the desired maximum and observe that the Green LED is on or flashing. Push and hold the CAL button for 4 seconds. The Green LED will be flashing and the upper Red LED will be on. Press the CAL button twice. This brings you to the beginning of the input cal section. (At this point, you can exit the calibration procedure without saving new data by pressing the CAL button.) The Green and both Red LEDs should be flashing. Press and hold the CAL button for 10 seconds or until the Upper Red LED is flashing. Press and hold the CAL button for 4 seconds. The upper Red LED will be flashing and the Green and lower Red LEDs will be on.

3. Apply the maximum input signal level and push the CAL button. The upper Red LED will still be flashing and the lower Red LED will be on.

4. Apply the minimum input signal level and push the CAL button. All three LEDs should be on.

5. Push the CAL button again. The calibration data is now saved. The Green LED should be on if the input is within the calibrated range.

6. The Setpoints can now be set. This procedure assumes Setpoint A is a HI trip setpoint and Setpoint B is a LOW trip setpoint. Unlike previous models, there is no deadband pot to adjust - simply set the trip point and the release point for each relay.

Adjust the input signal to the desired trip voltage for Setpoint A and observe that the Green LED is on. Push and hold the CAL button for 4 seconds. The Green LED will be flashing and the upper Red LED will be on. Press and hold the CAL button for 4 seconds. Both the upper Red LED and the Green LED will be flashing.

7. With the trip voltage applied to the input, press the CAL button. The Green LED will now be flashing.

8. For the minimum deadband, press the CAL button, otherwise, reduce the input voltage to the desired release point and press the CAL button. All three LEDs will be on. To save the calibration, press the CAL button. The Green LED should be on.

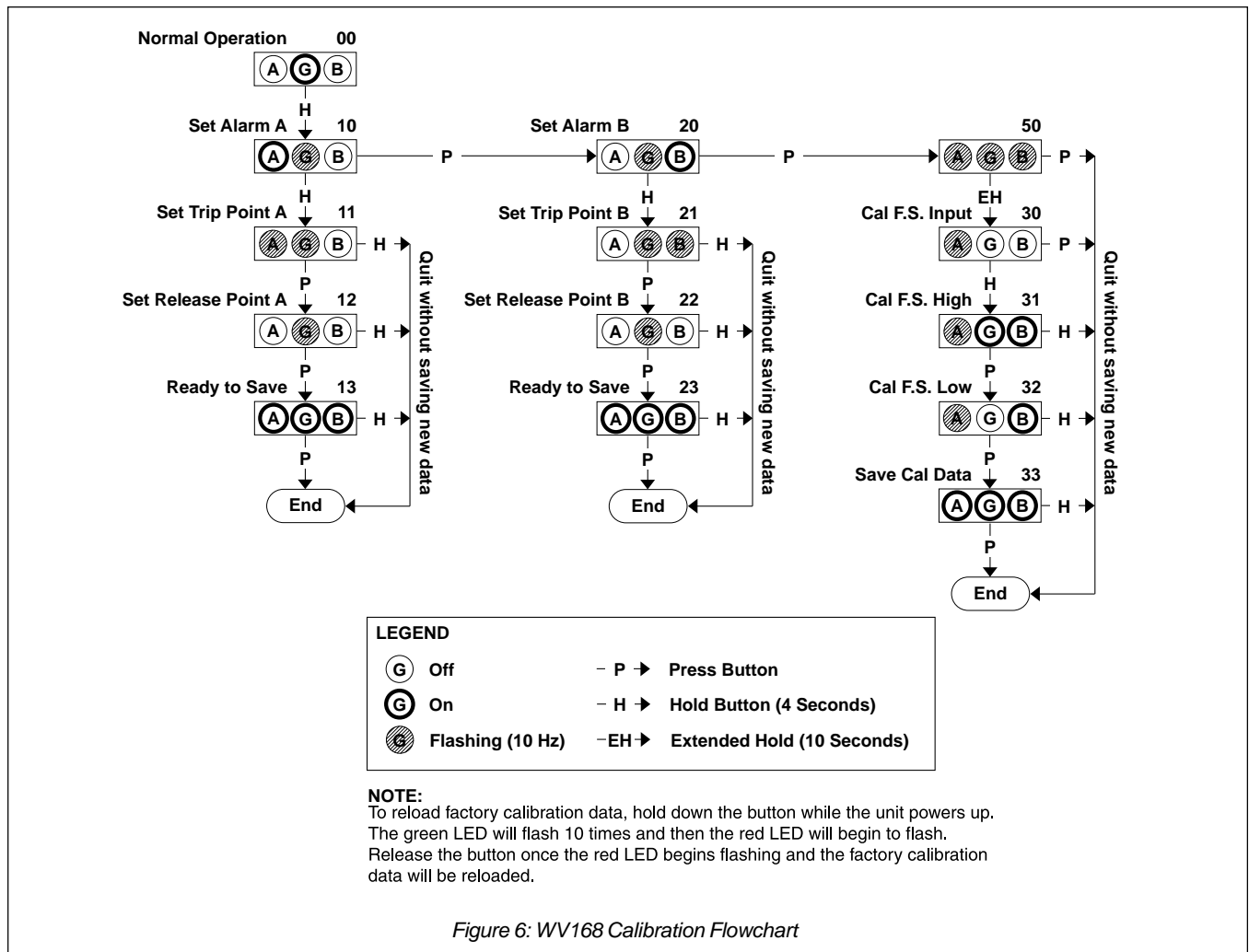
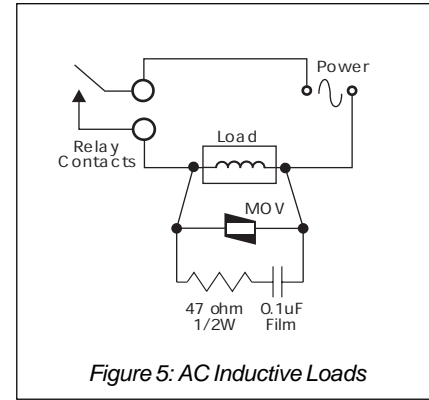
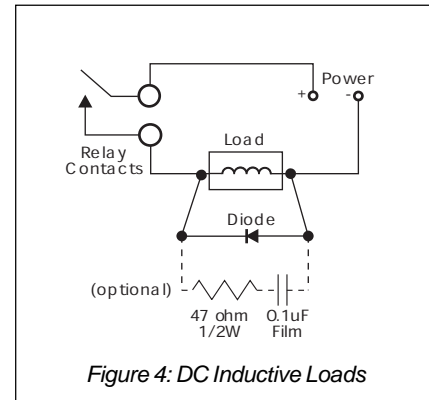
9. Adjust the input signal to the desired trip voltage for Setpoint B and observe that the Green LED is on. Push and hold the CAL button for 4 seconds. The Green LED will be flashing and the upper Red LED will be on. Press the CAL button once. The lower Red LED will be on and the Green LED will be flashing.

10. Press and hold the CAL button for 4 seconds. Both the Lower Red LED and the Green LED will be flashing. With the trip voltage applied to the input, press the CAL button. The Green LED will now be flashing.

11. For the minimum deadband, press the CAL button, otherwise, increase the input voltage to the desired release point and press the CAL button. All three LEDs will be on. To save the calibration, press the CAL button. The Green LED should be on.

Relay Protection and EMI Suppression

When switching inductive loads, maximum relay life and transient EMI suppression is achieved using external protection (see Figures 4 and 5). Place all protection devices directly across the load and minimize all lead lengths. For AC inductive loads, place a properly rated MOV across the load in parallel with a series RC snubber. Use a 0.01 to 0.1uF pulse film capacitor (foil polypropylene recommended) of sufficient voltage, and a 47 Ohm, 1/2W carbon resistor. For DC inductive loads, place a diode across the load (PRV > DC supply, 1N4006 recommended) with (+) to cathode and (-) to anode (the RC snubber is an optional enhancement).



Specifications

Inputs

RMS Voltage Input

Ranges: 50mV, 150mV, 500mV, 5V, 20V, 50V, 150V & 250V
Impedance: >100k ohms; Overvoltage: 200Vrms, max.

RMS Current Input

Range: 20mA & 100mA; Impedance: 10 ohms, typical
Overcurrent: 170mA rms, max; Overvoltage: 60VDC

Minimum Deadband

Range	Deadband
50mV	0.2% (100uV)
150mV	0.2% (300uV)
500mV	0.2% (1mV)
5V	0.1% (5mV)
20V	0.1% (20mV)
50V	0.1% (50mV)
150V	0.1% (150mV)
250V	0.1% (250mV)
20mA	0.1% (20uA)
100mA	0.1% (100uA)

Response Time

Dynamic Deadband

Relay status will change when proper setpoint/process condition exists for 100mSec or greater

Normal Mode

<250mSec (analog filtering)

Setpoint Effectivity

Setpoints are pushbutton adjustable over 100% of the selected input span.

Setpoint Repeatability

>200mV/10mA: 0.1% of full scale (constant temperature) <200mV/10mA: 0.2% of full scale

Relay Contacts

2 SPDT (form C) Relays; 1 relay per setpoint

Current rating (general use)

120VAC: 5A; 240VAC: 2A; 28VDC: 5A

Material: Gold flash over silver alloy

Electrical Life: 10⁵ operations

Reset Switch

For unlatching the relay once the process is no longer in the alarm state (WV168-2001 only).

Local Range Selection

By DIP switch

Stability

±100ppm of FS/°C

Common Mode Rejection

120dB @ DC, >90dB @ 60Hz, or better

Isolation

≥ 1800VDC or peak AC between contacts, input & power

ESD Susceptibility

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

Humidity

Operating: 15 to 95% RH non-condensing @45°C

Soak: 90% RH non-condensing for 24hrs @60°C

Temperature

Operating: 0 to 60°C

Storage: -25 to +85°C

Power

9 to 30VDC

1.2W typical, (3.25W max w/ both relays energized)

Host Module Interface

IR link

Size

DIN rail case – 0.69" wide (17.5mm), 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 Relative Humidity

15% to 95%RH non-condensing at 45°C

Non-operating Relative Humidity

90%RH at 60°C for 24 hours

Agency Approvals (EMC & Safety)

CE, EN61326, EN61010-1

UL and CSA Combined mark

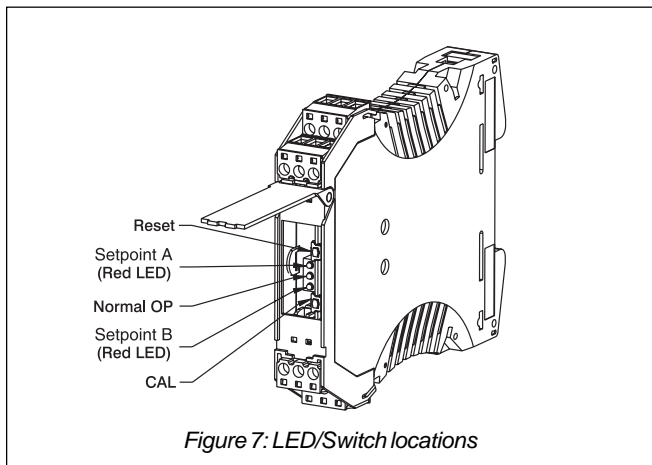
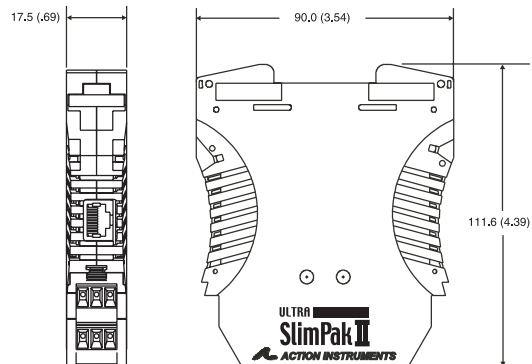


Figure 7: LED/Switch locations

Dimensions

Dimensions are in mm (inches)



invensys

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Factory Assistance

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