

## DRG-AR-AC AC Input, Field Configurable Limit Alarm

Instruction Sheet M2396/0796

### DESCRIPTION

The DRG-AR-AC is a DIN rail mount, AC voltage or current input limit alarm with dual setpoints and two contact closure outputs. The field configurable input and alarm functions offer flexible setpoint capability. Input voltage spans from 100mV to 200VAC and input current spans from 10mA to 100mAAC can be field configured. For current input spans of 1 to 5 Amps a 0.1W (5W) shunt resistor should be used.

The DRG-AR-AC is configurable as a single or dual setpoint alarm, with HI or LO trips and failsafe or non-failsafe operation. Also included are adjustable deadbands (0.25 to 5% of full scale input) for each setpoint and a flexible DC power supply which accepts any voltage between 9 and 30VDC.

### DIAGNOSTIC LEDES

The DRG-AR-AC is equipped with three front panel LEDs. The first is a dual function LED labeled INPUT. This green LED indicates DC power and input signal status. Active DC power is indicated by an illuminated LED. If this LED is off, check DC power and wiring connection. If the input signal is more than 110% of the full scale range, the LED will flash at 8 Hz.

Two red LEDs indicate the relay state for each setpoint. An illuminated red LED indicates the tripped condition.

### OUTPUT

The DRG-AR-AC is equipped with two SPDT (form C) relays, rated at 120VAC or 28VDC at 5 amperes. Each of these relays is independently controlled by the field configurable setpoint and deadband.

### OPERATION

The field configurable DRG-AR-AC limit alarm setpoints can be configured for HI or LO, failsafe or non-failsafe operation. Each of the setpoints have a respective HI or LO deadband. In a tripped condition, the setpoint is exceeded and the appropriate red LED will illuminate. The trip will reset only when the process falls below the HI deadband or rises above the low deadband (see Figure 1). For proper deadband operation, the HI setpoint must always be set above the LO setpoint.

In failsafe operation, 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.

### DYNAMIC DEADBAND

LSI circuitry in the DRG-AR-AC prevents false trips by repeatedly sampling the input. The input must re

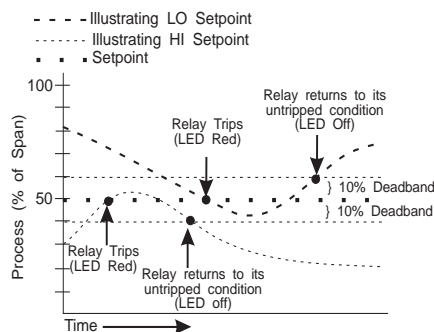


Figure 1: Limit alarm operation and effect of deadband(s).

main beyond the setpoint for 100 milliseconds, uninterrupted, to qualify as a valid trip condition. Likewise, the input must fall outside the deadband

and remain there for 100 milliseconds to return the alarm to an untripped condition. This effectively results in a “dynamic deadband” —based on time— in addition to the normal deadband.

### CONFIGURATION

Unless otherwise specified, the factory presets the Model DRG-AR-AC as follows:

Input:	Voltage
Range:	0-500mVAC
Output:	Dual, SPDT
Trip:	A:HI, B:LO
Failsafe:	No
Deadband:	A, B: 0.25%

The DC power input accepts any DC source between 9 and 30V, typically a 12V or 24VDC source is used.

For other I/O ranges, refer to Table 1 and Figure 4 to reconfigure switches SW2, SW3 and SW4 for the desired input type, range and function.

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

1. With DC power off, position input switch "SW1-9,10" for voltage or current.

2. Set position 1 through position 8 of input range switch "SW1" for the desired input range (see Table 1).

3. Set position 1 and 2 of function switch "SW2" to ON for a HI trip setpoint or OFF for a LO trip (see Figure 4).

4. Set position 4 of function switch "SW2" to ON for non-failsafe operation or OFF for failsafe operation (e.g. alarm trips when power fails).



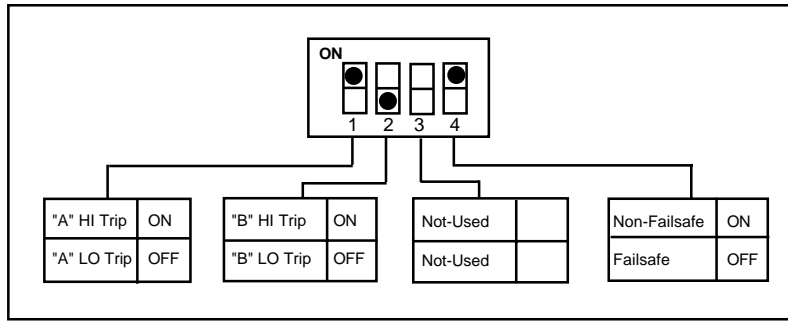


Figure 4: DRG-AR-AC Function Selection Switch-Settings (SW2) Factory Default Settings

## RELAY PROTECTION AND EMI SUPPRESSION

When switching inductive loads, maximum relay life and transient EMI suppression is achieved using external protection (see Figures 2 and 3). 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 0.1 $\mu$ F pulse film capacitor (foil polypropylene recommended) of sufficient voltage, and a 47 $\Omega$ , 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).

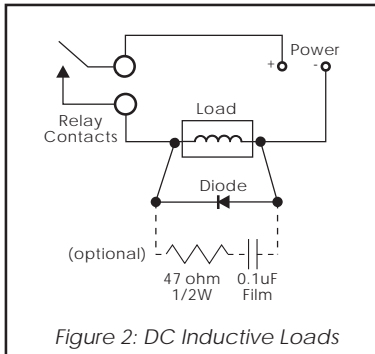


Figure 2: DC Inductive Loads

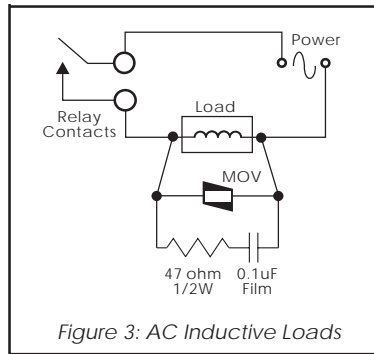


Figure 3: AC Inductive Loads

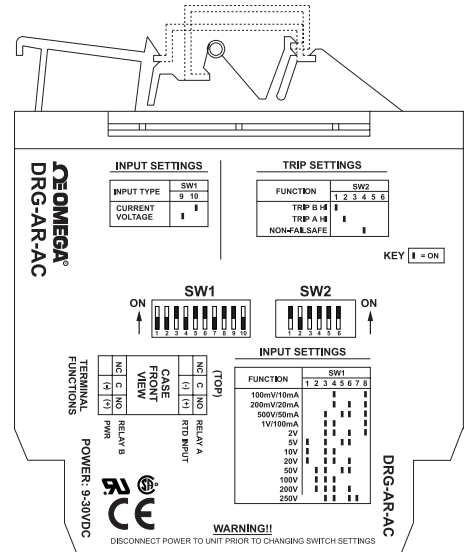


Figure 5: DRG-AR-AC Factory Calibration; 0-500mV, A-HI/B-LO, Non-Failsafe

**Warning:** Do not attempt to change any switch settings with power applied. Severe damage may occur!

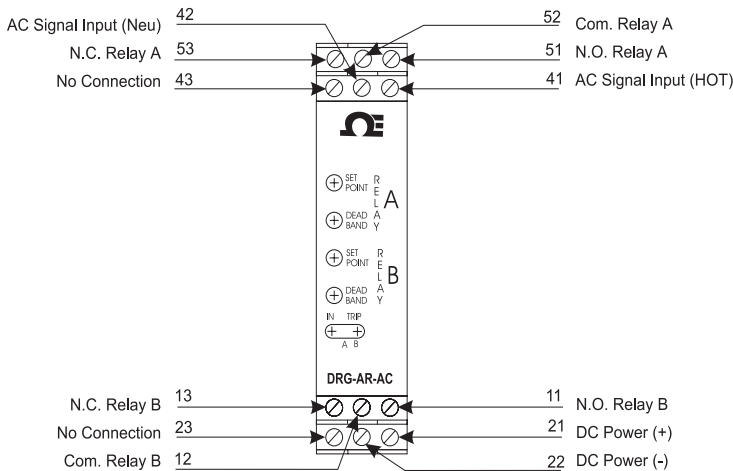


Figure 6: Wiring Diagram for DRG-AR-AC

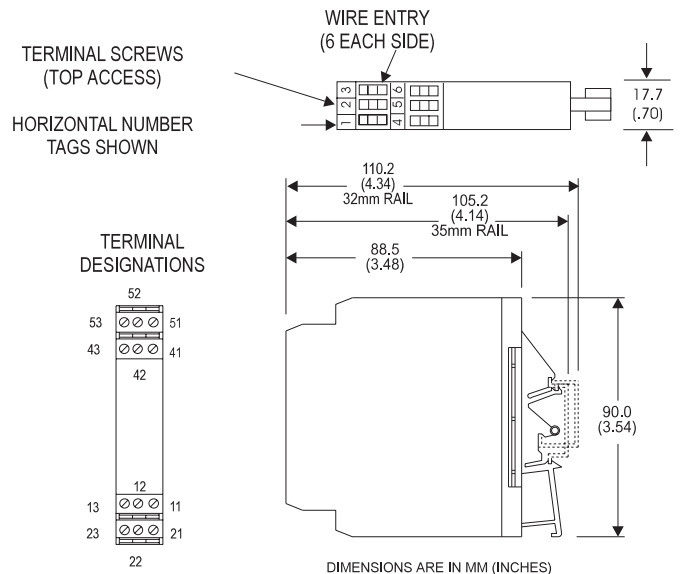


Figure 7: Mechanical Dimensions for DRG-AR-AC

## SPECIFICATIONS

### Inputs

#### Voltage Input

Range: 100mV to 200VAC

Impedance: >100KΩ

Overvoltage: 300VAC, max.

#### Current Input

Range: 10mA to 100mAAC

Impedance: 20Ω, typical

Overcurrent: 200mAAC, max.

Overvoltage: 60V peak (protected by self resetting fuse)

Frequency Range: 40 to 400Hz

Common Mode (Input to Ground):

1800VDC, max.

### LED Indicators

Input Range (Green)

>110% input: 8Hz flash

Setpoint (Red)

Tripped: Solid red

Safe: Off

### Limit Differentials (Deadbands)

>50mV/5mA: 0.25% to 5% of span

<50mV/5mA: 1% to 5% of span

### Response Time

Dynamic Deadband: Relay status will change when proper setpoint/process condition exists for 100msec.

Normal Mode (analog filtering):

<250mSec, (10-90%)

### Setpoints

Effectivity: Setpoints are adjustable over 100% of the selected input span

Repeatability (constant temp.):

0.2% of full scale

### Stability

Temperature: ±0.025% of full scale/°C, max.

### Common Mode Rejection

DC to 60Hz: 120dB

### Isolation

1800VDC between contacts, input and power

### EMC Compliance (CE Mark)

Emissions: EN50081-1

Immunity: EN500-82-2

Safety: EN50178

### Humidity (Non-Condensing)

Operating: 15 to 95% (@45°C)

Soak: 90% for 24hours (@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.

Supply Range: 9 to 30VDC, inverter isolated

In-rush Current: 300mA, max.

### Relay Contacts

2 SPDT (2 form C) Relays

1 Relay per setpoint

Current Rating (resistive)

120VAC: 5A

240VAC: 2A

28VDC: 5A

Material: Silver-Cadmium Oxide

Electrical Life: 10<sup>5</sup> operations at rated load

Note: External relay contact

protection is required for use with inductive loads (see Figures 2 & 3).

Mechanical Life: 10<sup>7</sup> operations

### Wire Terminations

Screw terminals for 12-22 AWG

### Agency Approvals

CSA certified per standard C22.2, N o . 0-M91 and 142-M1987 (File No. LR42272). UL recognized per standard UL508 (File No.E99775). CE Compliance per EMC directive 89/336/EEC and low voltage 73/23/EEC.

### Mounting

32mm and 35mm DIN rail

### PIN CONNECTIONS

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 Signal Input (HOT)

42 AC Signal Input (Neu)

43 No Connection

51 N.O. Relay A

52 Com. Relay A

53 N.C. Relay A



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