

SPECIFICATIONS

Inputs

Sensor Types: Pt100, Pt500, Pt1000 (0.00385Ω/Ω/°C); Cu10, Cu100; Ni120, NiFe604
Sensor Connection: 3-wire.
Input Ranges: see table 1.

Excitation Current (Maximum)

<2mA for Pt100, Pt500, Pt1000, Ni120, Cu100 or NiFe604
<10mA for Cu10, Cu25.

Leadwire Resistance

40% of base sensor resistance or 100Ω (whichever is less), maximum per lead.

Leadwire Effect

Less than 1% of selected span over entire leadwire resistance range.

Input Protection

Normal Mode: Withstands ±5VDC.
Common Mode (Input to Ground): 1800VDC, max.

LED Indicators

Input Range (Green)
>110% input: 8Hz flash
<0% input: 4Hz flash
Setpoint (Red)
Tripped: Solid red
Safe: Off

Limit Differentials (Deadbands)

1.0% 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

Line Voltage: ±0.01%/%, max.

Temperature: ±0.05% of full scale/°C, max.

Common Mode Rejection

DC to 60Hz: 120dB

>60Hz: 100dB

Isolation

1800VDC between contacts, input and power

EMC Compliance (CE Mark)

Emissions: EN50081-1

Immunity: EN50082-2

Safety: EN50178

Humidity (Non-Condensing)

Operating: 15 to 95% (@45°C)

Soak: 90% for 24 hours (@65°C)

Temperature Range

Operating: -15 to 55°C

(5 to 131°F)

Storage: -25 to 75°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: 10⁵ operations at rated load

Note: External relay contact

protection is required for use with

inductive loads (see Figures 2 & 3).

Mechanical Life: 10⁷ operations

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 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 RTD Input (+)

42 RTD Input (-)

43 RTD Return

51 N.O. Relay A

52 Com. Relay A

53 N.C. Relay A



DRG-AR-RTD

RTD Input, Field Configurable Limit Alarm

Instruction Sheet M2395/0796

DESCRIPTION

The DRG-AR-RTD is a DIN rail mount, RTD input limit alarm with dual setpoints and two contact closure outputs. The field configurable input and alarm functions offer flexible setpoint capability. There are up to eight temperature ranges available for each RTD type to ensure accuracy and maximize setpoint resolution.

The DRG-AR-RTD 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 (1.0 to 5% of full scale input) for each setpoint and a flexible DC power supply which accepts any voltage between 9 and 30VDC.

DIAGNOSTIC LEDS

The DRG-AR-RTD is equipped with three front panel LEDs. The first is a dual function LED labeled INPUT. This green LED indicates line 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 full scale, the LED will flash at 8 Hz. Below 0%, the flash rate is 4 Hz.

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

OUTPUT

The DRG-AR-RTD 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-RTD limit alarm setpoints can be configured for HI or LO, failsafe or

non-failsafe operation. Each of the setpoints has 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 LO 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-RTD prevents false trips by repeatedly sampling the input. The input must remain 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.

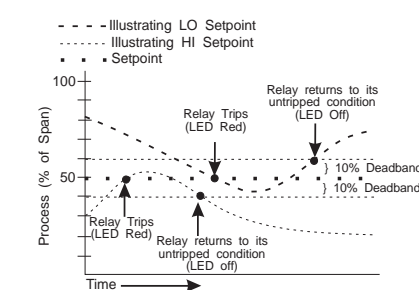


Figure 1: Limit alarm operation and effect of deadband(s).

CONFIGURATION

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

Input: Platinum (100W)
Range: 0 to 250°C
Output: Dual, SPDT
Trip: A:HI, B:LO
Failsafe: No
Deadband: A, B: 1.0%

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 Tables 1 through 3 and reconfigure switches SW1 and SW2 for the desired input type, range and function.

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

Input

1. With DC power off, position input switches 1 through 6 on "SW2" for RTD type (see Table 1).

2. Set position 1 through position 4 of input range switch "SW1" for the desired RTD type and input temperature range (Table 3).

3. Set position 5 and 6 of input range switch "SW1" to ON for a HI trip setpoint or OFF for a LO trip setpoint (Figure 4).

4. Set position 7 of input range switch "SW1" to ON for non-failsafe operation or OFF for failsafe operation (e.g. alarm trips upon power failure).



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If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion, or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

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WARNING: These product are not designed for use in, and should not be used for, patient connected applications.

CALIBRATION

1. After configuring the DIP switches, connect the input to a calibrated RTD source or a resistance decade box and apply power. (Figure 6).

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

2. Setpoint: set deadband at its minimum (fully counter clockwise) before adjusting the setpoint. With the desired trip RTD resistance input applied, adjust setpoint until the relay trips. For HI trip calibration, start with the setpoint above the desired trip (full clockwise). For LO trip calibration, start below the desired trip (full counter clockwise).

3. Deadband: Set deadband to its minimum (fully counter clockwise). Set the setpoint to desired trip. Adjust RTD resistance input until relay trips. Readjust deadband to 5% (fully clockwise). Set RTD resistance input to desired deadband position. Slowly adjust deadband until relay untrips

Table 3: Input Range switch settings (SW1-1 through 4)

| | SW1 | | | | Resistance |
|--|-----|---|---|---|-----------------------|
| | 1 | 2 | 3 | 4 | |
| Pt 100, 500, 1000 (α : .00385) | | | | | *Pt 100 (Ω) |
| 0 to 50°C (32 to 122°F) | ■ | ■ | ■ | ■ | 100 to 119.4 |
| -50 to 50°C (-58 to 122°F) | ■ | ■ | ■ | ■ | 80.3 to 119.4 |
| 0 to 100°C (32 to 212°F) | ■ | ■ | ■ | ■ | 100 to 138.5 |
| -100 to 100°C (-148 to 212°F) | ■ | ■ | ■ | ■ | 60.2 to 138.5 |
| 0 to 250°C (32 to 482°F) | ■ | ■ | ■ | ■ | 100 to 194.1 |
| -200 to 250°C (-328 to 482°F) | ■ | ■ | ■ | ■ | 18.5 to 194.1 |
| 0 to 550°C (32 to 1022°F) | ■ | ■ | ■ | ■ | 100 to 297.4 |
| 0 to 850°C (32 to 1562°F) | ■ | ■ | ■ | ■ | 100 to 390.3 |
| Cu10 | | | | | Cu 10 (Ω) |
| 25 to 70°C (77 to 158°F) | ■ | ■ | ■ | ■ | 10.0 to 11.74 |
| -30 to 70°C (-22 to 158°F) | ■ | ■ | ■ | ■ | 7.876 to 11.74 |
| 25 to 120°C (77 to 248°F) | ■ | ■ | ■ | ■ | 10.0 to 13.67 |
| -70 to 120°C (-94 to 248°F) | ■ | ■ | ■ | ■ | 6.318 to 13.67 |
| 25 to 260°C (77 to 500°F) | ■ | ■ | ■ | ■ | 10.0 to 19.116 |
| -200 to 260°C (-328 to 500°F) | ■ | ■ | ■ | ■ | 1.058 to 19.116 |
| Cu 100 | | | | | Cu 100 (Ω) |
| 25 to 75°C (77 to 167°F) | ■ | ■ | ■ | ■ | 100.0 to 115.5 |
| -25 to 75°C (-13 to 167°F) | ■ | ■ | ■ | ■ | 80.7 to 115.5 |
| 25 to 150°C (77 to 302°F) | ■ | ■ | ■ | ■ | 100 to 148.3 |
| -100 to 150°C (-148 to 302°F) | ■ | ■ | ■ | ■ | 51.3 to 148.3 |
| 25 to 260°C (77 to 500°F) | ■ | ■ | ■ | ■ | 100 to 191.2 |
| -200 to 260°C (-328 to 500°F) | ■ | ■ | ■ | ■ | 10.6 to 191.2 |
| Ni 120 | | | | | Ni 120 (Ω) |
| -30 to 30°C (-22 to 86°F) | ■ | ■ | ■ | ■ | 99.4 to 142.1 |
| -80 to 30°C (-112 to 86°F) | ■ | ■ | ■ | ■ | 66.6 to 142.1 |
| -30 to 100°C (-22 to 212°F) | ■ | ■ | ■ | ■ | 99.4 to 200.6 |
| -30 to 200°C (-22 to 392°F) | ■ | ■ | ■ | ■ | 99.4 to 303.5 |
| -30 to 320°C (-22 to 608°F) | ■ | ■ | ■ | ■ | 99.4 to 471.2 |
| NiFe 604 | | | | | NiFe 604 (Ω) |
| -40 to 0°C (-40 to 32°F) | ■ | ■ | ■ | ■ | 499.1 to 604.0 |
| -40 to 50°C (-40 to 122°F) | ■ | ■ | ■ | ■ | 499.1 to 751.8 |
| -200 to 50°C (-328 to 122°F) | ■ | ■ | ■ | ■ | 245.3 to 751.8 |
| -200 to 100°C (-328 to 212°F) | ■ | ■ | ■ | ■ | 245.3 to 917.3 |
| -200 to 240°C (-328 to 464°F) | ■ | ■ | ■ | ■ | 245.3 to 1475.6 |

*Note: Resistance values for Pt 500(Ω) and Pt 1000(Ω) are 5 and 10 times the resistance value of Pt100 (Ω), respectively.

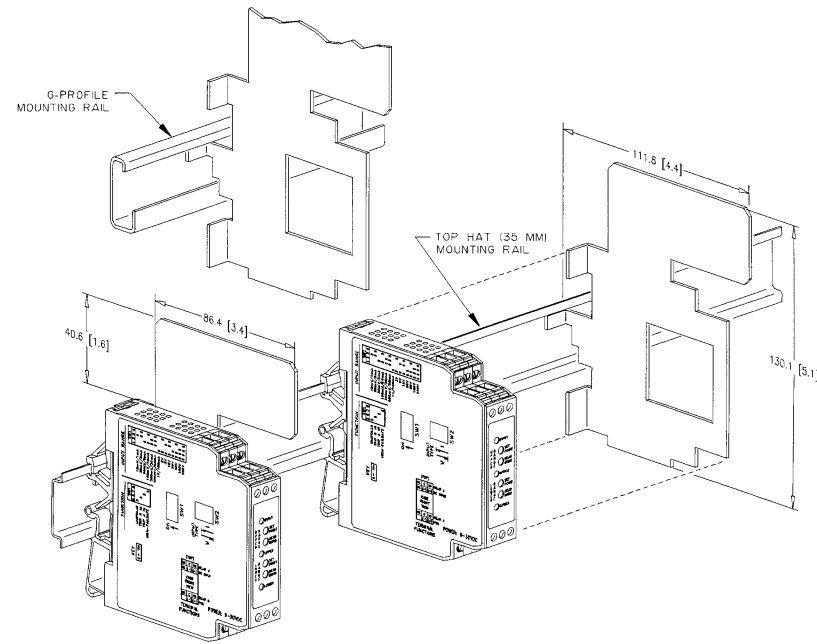
Table 1: RTD Input Type switch settings (SW2 - 1 through 6)

| | 1 | 2 | 3 | 4 | 5 | 6 |
|------------------|---|---|---|---|---|---|
| Cu 10 | ■ | ■ | ■ | ■ | ■ | ■ |
| Pt 100, Cu 100 | ■ | ■ | ■ | ■ | ■ | ■ |
| Pt 500, NiFe 604 | ■ | ■ | ■ | ■ | ■ | ■ |
| Pt 1000 | ■ | ■ | ■ | ■ | ■ | ■ |
| Ni 120 | ■ | ■ | ■ | ■ | ■ | ■ |

Table 2: Setpoint Function switch settings (SW1 - 5 through 8)

| | 5 | 6 | 7 | 8 |
|--------------|---|---|---|---|
| TRIP B HI | ■ | ■ | ■ | ■ |
| TRIP A HI | ■ | ■ | ■ | ■ |
| NON-FAILSAFE | ■ | ■ | ■ | ■ |

KEY ■ = ON



Note1: All DRG Series modules are designed and tested to operate in ambient temperatures from 0 to 55°C, when mounted on a horizontal DIN rail. When five or more modules are mounted on a vertical rail, circulating air or model DRG-HS01 Heat Sink is recommended.

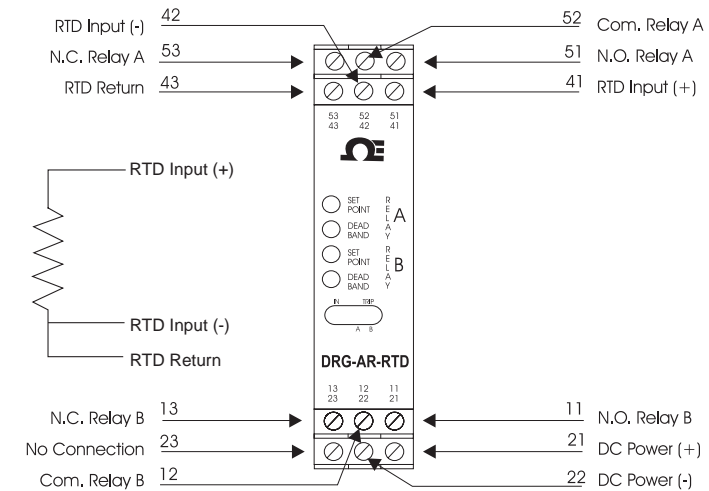


Figure 6: Wiring Diagram for DRG-AR-RTD

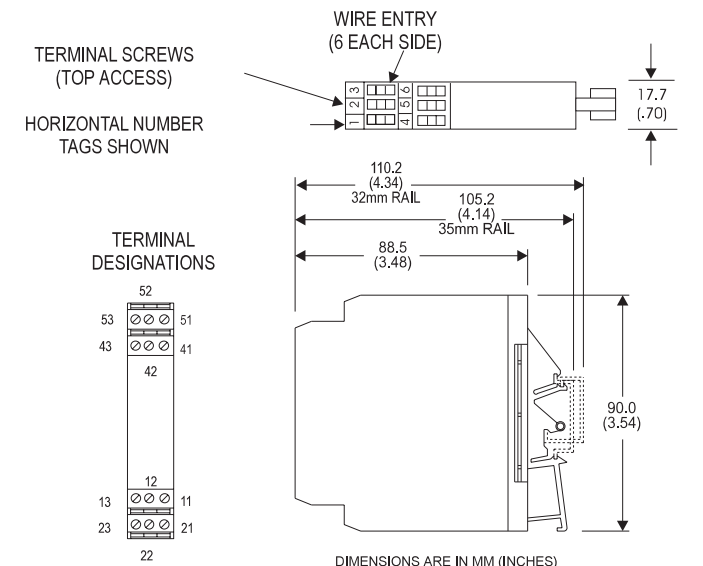


Figure 7: Mechanical Dimensions for DRG-AR-RTD

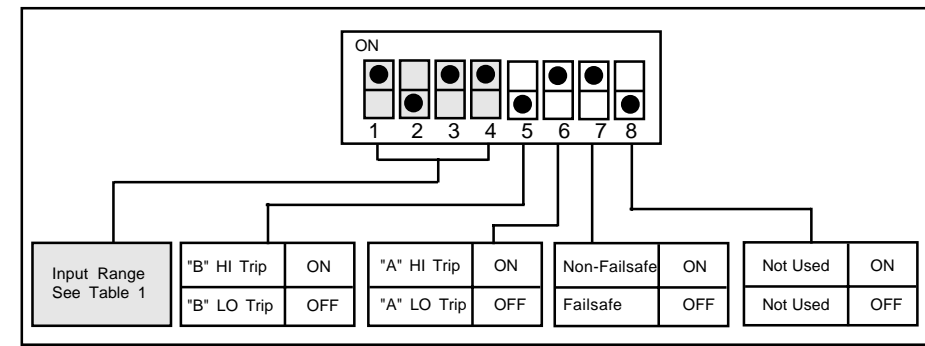


Figure 4: DRG-AR-RTD Input Range/Function Selection (SW1) Factory Default Settings

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 μ F pulse film capacitor (foil polypropylene recommended) of sufficient voltage, and a 47 Ω , 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).

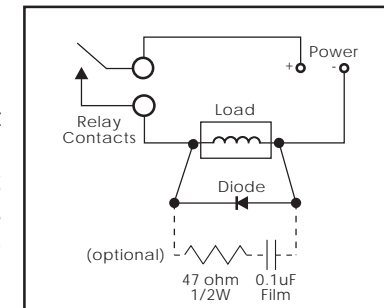


Figure 2: DC Inductive Loads

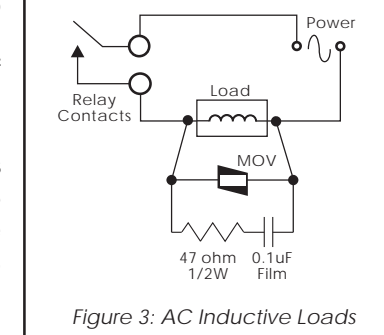


Figure 3: AC Inductive Loads

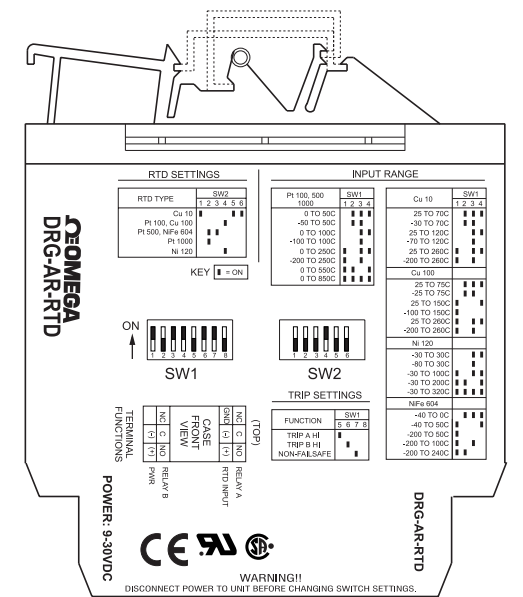


Figure 5: DRG-AR-RTD Factory Calibration; 0-250°C (Pt 100), A-HI/B-LO, Non-Failsafe

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