Inputs
Voltage Input
Range: 10mV to ±200V
Impedance: >100KΩ
Overvoltage: 200V rms, max.
Current Input
Range: 1mA to ±100mA
Impedance: 20Ω, typical
Overcurrent: 170mA rms, max.
Overvoltage: 60VDC
(protected by self resetting fuse)
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)
>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.):
>50mV/5mA: 0.1% of full scale
<50mV/5mA: 0.2% of full scale

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

Excitation Voltage
24VDC, 20mA, maximum

Common Mode Rejection
DC to 60Hz: 120dB

Isolation
1800VDC between contacts, input and power

EMC Compliance (CE Mark)
Emmissions: EN50081-1
Immunity: EN50082-2
Safety: EN50178

Humidity (Non-Condensing)
Operating: 15 to 95% (@45°C)
Soak: 90% for 24hours (@65°C)

Temperature Range[1]
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: 10^5 operations at rated load
Note: External relay contact protection is required for use with inductive loads (see Figures 2 & 3).
Mechanical Life: 10^7 operations

Wire Terminations
Screw terminations for 12-22 AWG

Agency Approvals
CSA certified per standard C22.2, No. 0-M91 and 142-M198 (File No.LR42272) **UL** recognized per standard per standard UL508 (File No.E99775). **CE** conformance per EMC directive 89/336/EEC and Low Voltage 73/23/EEC (Input≤75VDC, only).

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 Analog Input (+)
42 Analog Input (-)
43 (+) 24VDC Excitation

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The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

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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DRG-AR-DC
DC Input, Field Configurable Limit Alarm
Instruction Sheet M2399/0796

DESCRIPTION
The DRG-AR-DC is a DIN rail mount, DC 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 10mV to 200V and input current spans from 1mA to 100mA can be field configured. Bipolar inputs are also accepted.

The DRG-AR-DC 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, a 24VDC voltage source (isolated from line power) for transducer excitation, and a flexible DC power supply which accepts any voltage between 9 and 30VDC.

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

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

OUTPUT
The DRG-AR-DC 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-DC 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 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.

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

DYNAMIC DEADBAND
LSI circuitry in the DRG-AR-DC 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.

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

Input:	Current
Range:	0-20mA
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. Reconfigure switche SW1 for the desired input type, range and function.

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

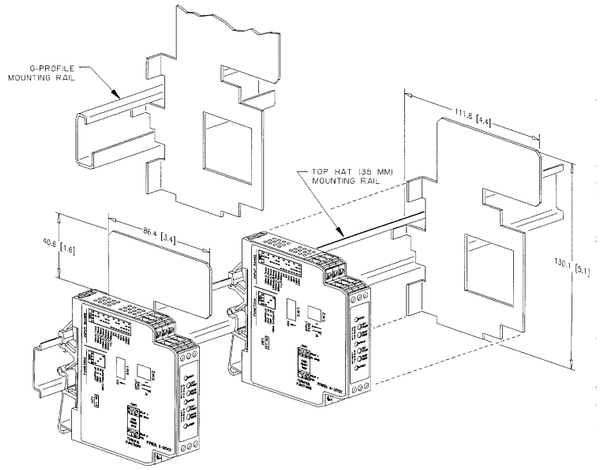
1. With DC power off, set positions 9 and 10 of switch "SW1" for current or voltage.

2. Set position 1 through position 4 of input range switch "SW1" for the desired input range (see Table 1).

3. Set position 5 of input range switch "SW1" to ON for unipolar (e.g. zero based, 0-20mA) range or OFF for bipolar (e.g. -100% offset, -20 to 20mA) range (see Figure 4).

4. Set position 6 and 7 of input range switch "SW1" to ON for a HI trip setpoint or OFF for a LO trip setpoint (see Figure 4).

5. Set position 8 of input range switch "SW1" to ON for non-failsafe operation or OFF for failsafe operation (e.g. alarm trips upon power failure).



Note1: All DRG Series modues 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.

CALIBRATION

1. After configuring the DIP switches, connect the input to a calibrated DC source and apply power. Refer to the terminal wiring (Figure 7).

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 voltage or current 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 voltage/current input until relay trips. Readjust deadband to 5% (fully clockwise). Set voltage/current input signal to desired deadband position. Slowly adjust deadband until relay untrips.

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 0.1µF pulse film capacitor (foil polypropylene recommended) of sufficient voltage, and a 47Ω, 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).

Table 1: DRG-AR-DC Input Range switch settings (SW1 through 4)

KEY ▌ = ON

Voltage	Current	Input Range Selector (SW1) 1	2	3	4
10mV	1mA			▌	
20mV	2mA			▌	▌
50mV	5mA		▌		
100mV	10mA		▌		▌
200mV	20mA		▌	▌	
500mV	50mA		▌	▌	▌
1V	100mA	▌			
2V		▌			▌
5V		▌		▌	
10V		▌		▌	▌
20V		▌	▌		
50V		▌	▌		▌
100V		▌	▌	▌	
200V		▌	▌	▌	▌

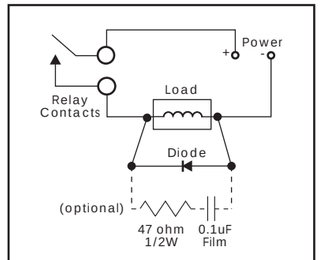


Figure 2: DC Inductive Loads

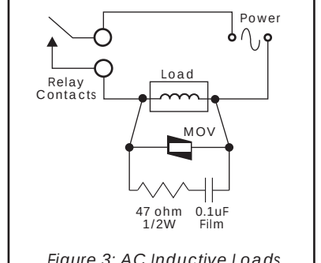


Figure 3: AC Inductive Loads

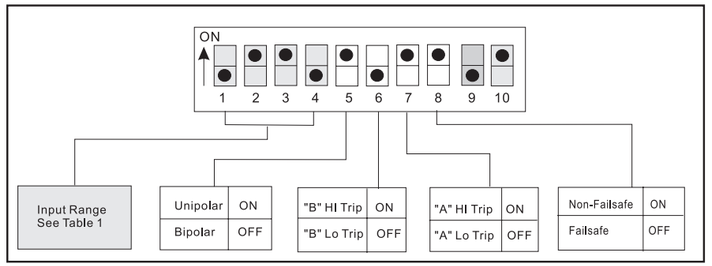


Figure 4: DRG-AR-DC Input Range/Function Selection (SW1) Factory Default Settings

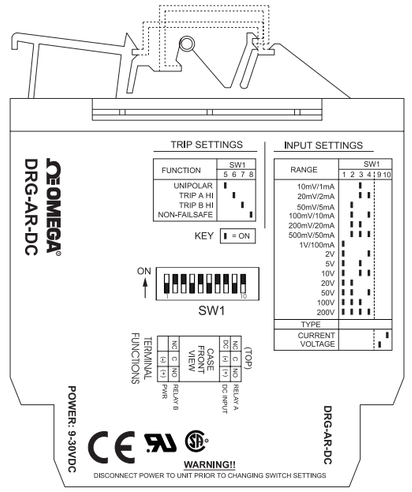


Figure 5: DRG-AR-DC Factory Calibration; 0-20mA, A-HI/B-LO, Non-Failsafe

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

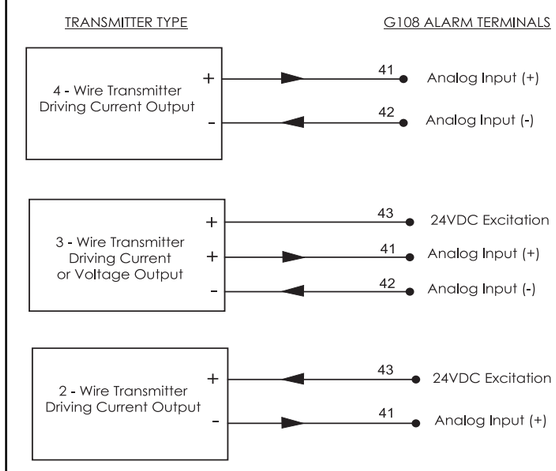


Figure 6: Typical connections of voltage or current inputs for DRG-AR-DC

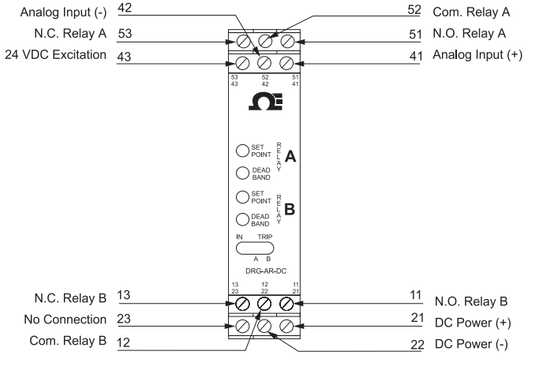


Figure 7: Terminal Wiring Diagram for DRG-AR-DC

DIMENSIONS

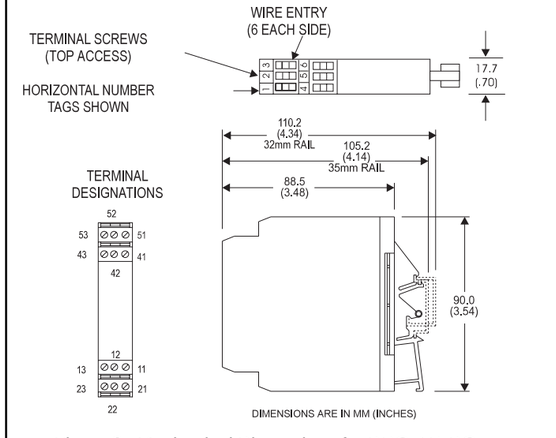


Figure 8: Mechanical Dimensions for DRG-AR-DC