

SPECIFICATIONS

Inputs

Range: See Table 1
 Impedance: >1 Megaohm
 Input Bias Current (burnout detection): <1.5 microamp
 Overvoltage: ±10V differential
 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)

0.25% 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%)

Setpoint

Effectivity: Setpoint(s) are adjustable over 100% of the selected input span
 Repeatability (constant temp.):
 0.2% for temp > 0°C
 0.3% for temp < 0°C

Stability

Temperature: ±0.05% 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: EN50082-2
 Safety: EN50178

Humidity (Non-Condensing)

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

Temperature Range

Operating: 0 to 55°C (32 to 131°F)
 Storage: -15 to 70°C (5 to 158°F)

Power

Consumption: 1.5W typical, 2.5W max.
 Supply Range: 9 to 30 VDC, 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 relay protection Figures 2 & 3).

Mechanical Life: 10⁷ operations

Wire Termination

Screw terminations for 12-22 AWG

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 Conformance 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 T/C Input (+)
 42 T/C Input (-)
 43 No Connection
 51 N.O. Relay A
 52 Com. Relay A
 53 N.C. Relay A



DRG-AR-TC

Field Configurable Limit Alarm

Instruction Sheet M2398/0796

DESCRIPTION

The DRG-AR-TC is a DIN rail mount, thermocouple 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 six temperature ranges available for each thermocouple type to ensure accuracy and maximize setpoint resolution. A bipolar input switch is provided for temperature ranges below 0°C.

The DRG-AR-TC is configurable as a single or dual setpoint alarm, with HI or LO trips, upscale or downscale thermocouple burnout detection 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-TC 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 line 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 LED's indicate the relay state for each setpoint. An illuminated red LED indicates the tripped condition.

OUTPUT

The DRG-AR-TC 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 set point and deadband.

OPERATION

The field configurable DRG-AR-TC 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.

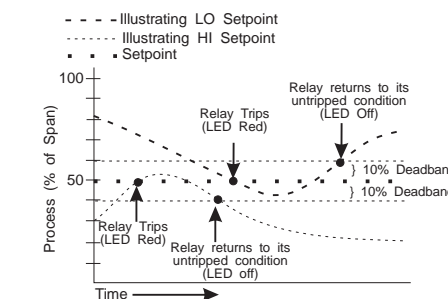


Figure 1: Limit alarm operation and effect of deadband(s).

DYNAMIC DEADBAND

LSI circuitry in the DRG-AR-TC 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 Model DRG-AR-TC as follows:

Input: J Type
 Range: 0 to 350°C
 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 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!

1. With DC power off, position switch SW1-1, 2, 3 and SW2-1 through 6 for the desired input range (Table 1).

2. Set positions 4 and 5 of function switch "SW1" to ON for a HI trip setpoint or OFF for a LO trip setpoint (Figure 4).

3. Set position 6 of function switch "SW1" to ON for non-failsafe operation or OFF for failsafe operation (e.g. alarm trips upon power failure).

4. Set positions 7 and 8 of function switch "SW1" to upscale or downscale burn-out.



OMEGANet SM On-Line Service http://www.omega.com	Internet e-mail info@omega.com
--	-----------------------------------

Servicing North America:

USA: One Omega Drive, Box 4047
 Stamford, CT 06907-0047
 Telephone: (203) 359-1660
 e-mail: info@omega.com
 Fax: (203) 359-7700

Canada: 976 Bergar
 Laval (Quebec) HTL 5A1
 Telephone: (514) 856-6928
 e-mail: canada@omega.com
 Fax: (514) 856-6886

For immediate technical service or application assistance:

USA and Canada: Sales Service: 1-800-826-6342 / 1-800-TC-OMEGASM
 Customer Service: 1-800-622-2378 / 1-800-622-BESTSM
 Engineering Service: 1-800-872-9436 / 1-800-USA-WHENSM
 TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA

Mexico and Latin America: Tel: (95) 800-TC-OMEGASM
 En Espanol: (203) 359-1660 ext. 2203
 Fax: (95) 203-359-7807
 e-mail: espanol@omega.com

Servicing Europe:

Benelux: Postbus 8034, 1180 LA Amstelveen, The Netherlands
 Tel: (31) 20 6418405
 Toll Free in Benelux: 06 0993344
 e-mail: nl@omega.com
 Fax: (31) 20 6434643

Czech Republic: Ostravska 767, 733 01 Karvina
 Tel: 42 (69) 6311899
 e-mail: czech@omega.com
 Fax: 42 (69) 6311114

France: 9, rue Denis Papin, 78190 Trappes
 Tel: 33 01 30 621 400
 Toll Free in France: 05 4 06342
 e-mail: france@omega.com
 Fax: 33 01 30 699 120

Germany/Austria: Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
 Tel: 49 (07056) 3017
 Toll Free in Germany: 01 30 11 21 66
 e-mail: germany@omega.com
 Fax: 49 (07056) 8540

United Kingdom: 25 Swannington Road,
 Broughton Astley, Leicestershire,
 LE9 6TU, England
 Tel: 44 (1455) 285520
 Fax: 44 (1455) 283912
 P.O. Box 7, Omega Drive
 Irlam, Manchester,
 M44 5EX, England
 Tel: 44 (161) 777-6611
 Fax: 44 (161) 777-6622

Toll Free in England: 0800-488-488
 e-mail: uk@omega.com



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of manufacturing defects for the life of the product. 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.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUEST/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence. 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, and
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.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.
 © Copyright 1996 OMEGA ENGINEERING, INC. All rights reserved. This documentation may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of OMEGA ENGINEERING, INC.

It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification. The information contained in this document is believed to be correct but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice. WARNING: These products 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 TC source and apply power. Refer to the terminal wiring (Figure 5).

NOTE: to maximize thermal stability, final calibration should be performed in the operation 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 thermocouple millivolt 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).

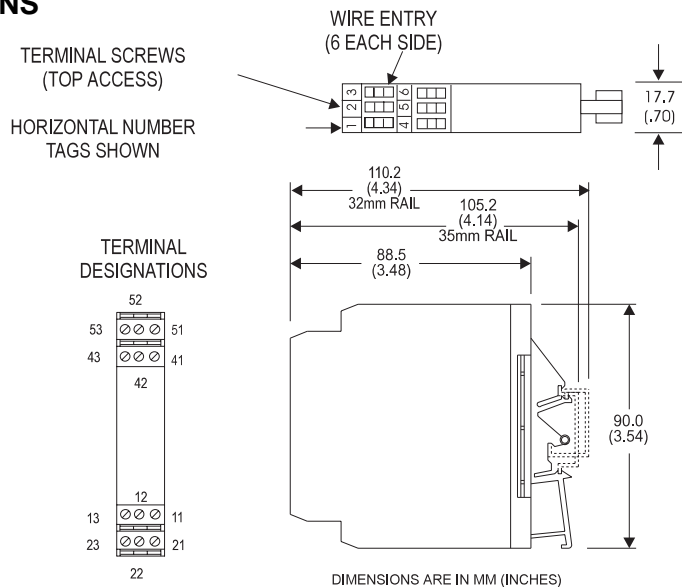
3. Deadband: Set deadband to its minimum (fully counter clockwise). Set the setpoint to desired trip. Adjust thermocouple millivolt input until relay trips. Readjust deadband to 5% (fully clockwise). Set voltage/current input to desired deadband position. Slowly adjust deadband until relay untrips

Table 1: DRG-AR-TC Input Range Selector -Switch Settings

KEY: ■ = ON

TC TYPE	TEMP RANGE	SW1			SW2							
		1	2	3	1	2	3	4	5	6		
B	0 to 1490°C 32 to 2714°F	■			■							
B	0 to 1820°C 32 to 3308°F	■			■							
E	0 to 150°C 32 to 302°F		■			■						
E	0 to 290°C 32 to 554°F		■			■						
E	0 to 660°C 32 to 1220°F	■				■						
E	0 to 1000°C 32 to 1832°F	■				■						
E	-270 to 150°C -454 to 302°F		■			■						
E	-270 to 290°C -454 to 554°F		■			■						
J	0 to 190°C 32 to 374°F			■					■	■		
J	0 to 350°C 32 to 662°F			■					■	■		
J	0 to 760°C 32 to 1400°F	■									■	■
J	-210 to 190°C -346 to 374°F			■								■
J	-210 to 350°C -346 to 662°F			■								■
K	0 to 250°C 32 to 482°F				■						■	■
K	0 to 480°C 32 to 896°F				■						■	■
K	0 to 1280°C 32 to 2336°F	■										■
K	0 to 1372°C 32 to 2502°F	■										■
K	-270 to 250°C -454 to 482°F			■								■
K	-270 to 480°C -454 to 896°F			■								■
R	0 to 970°C 32 to 1778°F				■						■	■
R	0 to 1690°C 32 to 3000°F				■						■	■
R	0 to 1760°C 32 to 3200°F	■										■
S	0 to 1050°C 32 to 1922°F			■							■	■
S	0 to 1750°C 32 to 3182°F			■							■	■
T	0 to 210°C 32 to 410°F			■								■
T	0 to 390°C 32 to 734°F			■								■
T	-270 to 210°C -454 to 410°F			■								■
T	-270 to 390°C -454 to 734°F			■								■

DIMENSIONS



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).

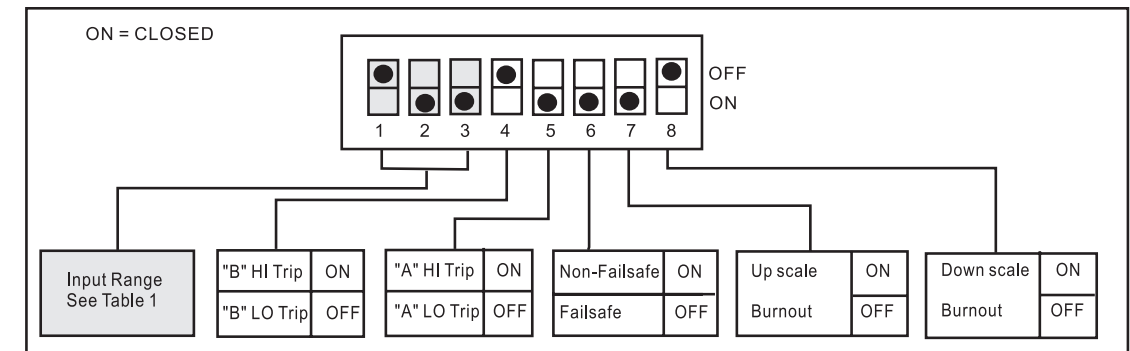
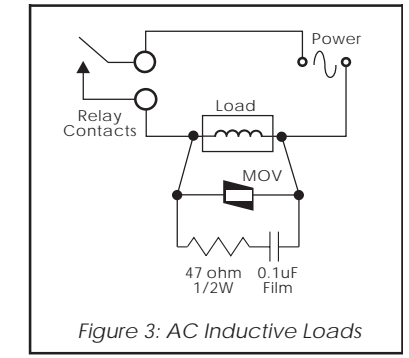
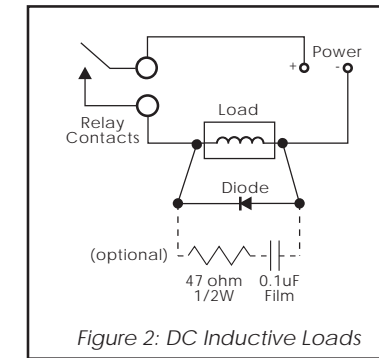


Figure 4: Input Range/Function Selection (SW1) Factory Default Settings

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

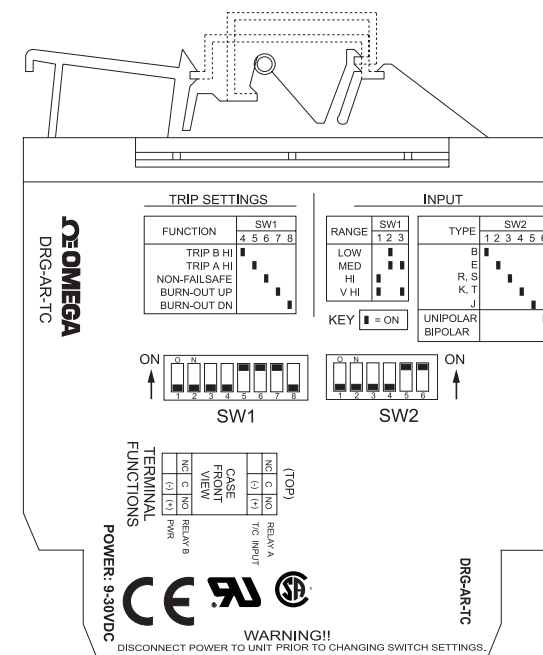


Figure 5: DRG-AR-TC Factory Calibration: J-Type, 0 to 350°C, A-HI/B-LO, non-failsafe

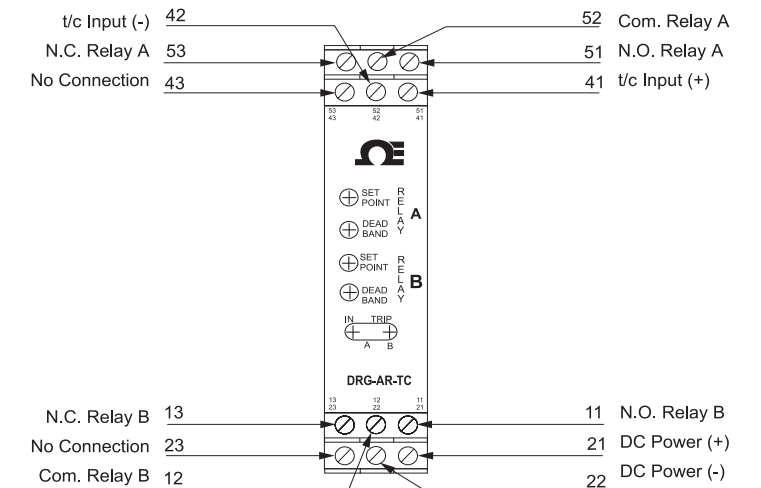


Figure 6: Wiring Diagram for DRG-AR-TC