SPECIFICATIONS

Inputs

Sensor Types: J, K, T, R, S, E, B Input Ranges: see table 6. Impedance: >1M Ω Bias Current (burnout detection): <1.5microamp Overvoltage: ±10V differential Common Mode (Input to Ground): 1800VDC, max. Zero and Span Adjustability 50% of any selected range Output

Voltage Output Output: 0-5V, 0-10V Source Impedance: <10 Ω Drive: 10mA, max. Current Output Output: 0-1mA, 0-20mA, 4-20mA Source Impedance: >100K Ω Compliance: 0-1mA; 7.5V, max.(7.5KΩ)

0-20mA; 12V, max.(600Ω) 4-20mA; 12V, max.(600Ω)

Accuracy (Including Linearity,

Hysteresis) see Table 5 Stability

USA:

ISO 9001 Certified

USA and Canada:

Mexico and

Benelux

Latin America

Czech Republic:

+0.04% of the maximum full scale range per °C change in ambient temperature, maximum.

(omega.com™

Response Time (10 to 90%) 500mSec., typical.

Common Mode Rejection DC to 60Hz: 120dB

Isolation

1800VDC between input, output and power. **EMC** Compliance

Emissions: EN50081-1 Immunity: EN50082-2 Safety: EN50178

LED Indication

TROUBLE LED: Yellow, off during normal device operation. INPUT LED: Green, continuously on if input is within selected range. flashes otherwise CAL OK LED: Yellow. continuously on in normal device operation

Thermocouple Burnout Detect

Field configurable upscale, downscale, or disabled

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: -25 to 70°C (-13 to 158°F)

Power

Consumption: 1.5W typical, 2.5W max. Range: 9 to 30VDC

USA

Terminations and Wire

Screw terminals for 12-22 AWG. Use twisted pair for output and power connections.

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 or 35mm DIN rail

PIN CONNECTIONS

DC Power(+) 11

- 12 DC Power (-)
- No Connection 13
- 41 T/C Input(+) 42
 - T/C Input (-)
- No Connection 43 21
 - DC Power (+)
 - DC Power(-)
- 23 No Connection Output (+)
- 51 52 Output (-)

22

53 No Connection

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 MEAS at 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 more than a statement of the unit shows evidence of having more than a statement of the unit shows evidence of having more than a statement of the unit shows evidence of having more statement of the unit shows evidence of having more statement of the unit shows evidence of the unit shows evidence of having more statement of the statement of the statement of the statement of the unit shows evidence of having more statement of the statement of the statement of the statement of the unit shows evidence of the unit shows been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specifica tion; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not

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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 <u>WARRANTY</u> 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-SC-TC

Thermocouple Input, Field Configurable Isolator

Instruction Sheet M2397/0796

DESCRIPTION

The DRG-SC-TC is a DIN rail mount, thermocouple input signal conditioner with 1800VDC isolation between input, output and power. The field configurable input and output offer flexible, wide ranging capability for J, K, T, R, S, E and B type thermocouples.

The input of the DRG-SC-TC can be configured for over 60 different thermocouple temperature ranges (see Table 6). The output is linear to temperature and can be set for either 0-5V. 0-10V. 0-1mA. 0-20mA or

Wide ranging, precision zero and span pots allow 50% adjustablity of offset and span turn-down within each of the ranges. For example, the 0-1000°C range could be offset and turned down to provide a 4-20mA signal representing 500-1000°C. Similarly, adjustment can be referenced to the output range. The example from above could be used to provide a 12-20mA signal from a 750 to 1000°C temperature input.

APPLICATION

The DRG-SC-TC field configurable thermocouple input isolator is useful in eliminating ground loops and interfacing thermocouple sensors to data acquisition and control systems.

Three way isolation completely eliminates ground loops from any source. Isolation protects expensive SCADA systems from ground faults and allows the noise reduction benefits of grounded thermocouples to be realized.

The DRG-SC-TC employs the latest in advanced analog signal processing technology. In addition to its

takes place. **INPUT LED**

CAL OK LED

at 0.5Hz.

- limited to contact points, fuses, and triacs Fax: (203) 359-7700 Fax: (514) 856-6886 Fax: (95) 203-359-7807 Fax: (31) 20 6434643
- 9, rue Denis Papin, 78190 Trappes Frances
- e-mail: france@omega.com Daimlerstrasse 26, D-75392 Deckenpf Tel:49 (07056) 3017
- e-mail: germany@omega.cor United Kingdom: 25 Swannington Road. Irlam, Manchester, M44 5EX, England Tel: 44 (161) 777-6611 Broughton Astely, Leicestershire LE9 6TU, England ISO 9002 Certified Tel: 44 (1455) 285520 Fax: 44 (1455) 283912 Fax: 44 (161) 777-6622

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4-20mA.

multiple microprocessors, a special ASIC* chip is used for high accuracy and reliability. The DRG-SC-TC is also equipped with cold junction compensation (CJC) circuitry to provide ice-point reference. Upscale or downscale thermocouple burnout detection is switch selectable.

High density DIN rail mounting offers an extremely compact solution to save valuable panel space.

DIAGNOSTIC LEDS

The DRG-SC-TC is equipped with front panel LEDs for INPUT (green). TROUBLE (yellow) and CALOK (yellow). At start-up, both the INPUT and the CAL OK LEDs flash alternately for 10 seconds while start-up

This green LED is lit continuously when the input is within the specified range. In the full temperature range setting, for the over range condition the LED flashes at 8Hz, whereas for the under range condition it flashes at 4Hz. In a sub-range temperature setting, for the over range condition the LED flashes at 1Hz, whereas for the under range condition it flashes

This yellow LED is continuously on when the device is calibrated.

TROUBLE LED

This vellow LED is off during the normal operation of the device. Consult factory if this LED is on, indicating a microprocessor malfunction.

CONFIGURATION

An advantage of the DRG-SC-TC is its wide ranging capabilities and ease of configuration. The DRG-SC-TC enables 50% input zero and span adjustablity DRG-SC-TC within each of the full-scale input ranges.

Unless otherwise specified, the factory presets the Model DRG-SC-TC as follows:

Input:	J-type
Range:	0 to 500°C
Output:	4 to 20mA
Burn Out:	Upscale

The DC power input accepts any DC source between 9 and 30V; typically a 12V or 24VDC source is used (see Accessories).

For other I/O ranges refer to Tables 1 through 6 and reconfigure switches SW1 and SW2 for the desired input type range and output.

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

1. Choose the desired temperature range from table 6, then use table 1 and 2 to configure the switches, as described in the following steps, for thermocouple type and range.

2. With DC power off, position input switches 1 and 2 on "SW2" for the desired burnout detection mode.

3. Set positions 4 through 10 on "SW2" for the desired thermocouple range and type.

4. Set positions 1 through 8 of output range switch "SW1" for the desired output signal. (Table 4)

CALIBRATION

1. After configuring the dip switches, connect the input to a calibrated thermocouple source. Connect the output to the actual device load (or a load approximately equivalent to the actual device load value) and apply power.

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. Set the calibrator to the desired minimum input and adjust the zero potentiometer for the desired minimum output.

3. Set the calibrator to the desired maximum input and adjust the span potentiometer for the desired maximum output.

4. Repeat steps 2 and 3, if necessary for best accuracy.



TABLE 1: Thermocouple type





Т

Range switch settings used in conjunction with Table 6 (SW2, positions 4, 5, 6, and 7)





TABLE 3: Thermocouple burnout
detection switch settings
(SW2, position 1, 2)
Note: SW2 position 3 is not used.

BURN OUT	1	2
NOT ALLOWED		
UPSCALE		
DOWNSCALE		
NONE		

TABLE 4 Output switch settings (SW1, position 1-8)

	1	2	3	4	5	6	7	8
0-5V								
0-5V 0-10V 0-1mA								
0-1mA								
4-20mA								
0-20mA								

TABLE 5: Accuracy

TC Type	Temp. Range °C (°F)	Accuracy
J	-200 to 750°C (-328 to 1382°F)	±2.0 °C (±3.6°F)
к	-200 to -140°C (-328 to -220°F)	±5.0 °C (±9.0°F)
к	-140 to 1250°C (-220 to 2282°F)	±2.0 °C (±3.6°F)
К	1250 to 1370°C (2282 to 2498°F)	±4.0 ° (±7.2°F)
E	-150 to 1000°C (-238 to 1832°F)	±2.5 °C (±4.5°F)
т	-150 to 400°C (-238 to 752°F)	±3.0 °C (±5.4°F)
R	50 to 1760°C (122 to 3200°F)	±6.0 °C (±10.8°F)
s	50 to 1760°C (122 to 3200°F)	±6.0 °C (±10.8°F)
В	500 to 1820°C (932 to 3308°F)	±5.0 °C (±9.0°F)

Note1: All 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.

Table 6:	Thermocou	ple Range	Settinas

			1
ТС ТҮРЕ		TEMPERATURE RANGE	
	6	500°C to 1820°C (932 to 3308°F)	
_	7	1000°C to 1820°C(1832 to 3308°F)	
В	8	500°C to 1000°C (932 to 1832°F)	
	11	1500°C to 1820°C (2732 to 3308°F)	
	12	750°C to 1000°C (1382 to 1832°F)	
	2	-18°C to 1000°C (0 to 1832°F)	
	3	-18°C to 500°C (0 to 932°F)	
	4	-18°C to 250°C (0 to 482°F)	
	5	-18°C to 125°C (0 to 257°F)	
	8	500°C to 1000°C (932 to 1832°F)	
E	9	250°C to 500°C (482 to 932°F)	
	10	125°C to 250°C (257 to 482°F)	
	12	750°C to 1000°C (1382 to 1832°F)	
	13	375°C to 500°C (707 to 932°F)	
	14	-150°C to 750°C (-238 to 1382°F)	
	15	-150°C to 250°C (-238 to 482°F)	
	16	-150°C to 0°C (-238 to 32°F)	
	2	-18°C to 750°C (0 to 1382°F)	
	3	-18°C to 500°C (0 to 932°F)	Figure 1: D
	4	-18°C to 250°C (0 to 482°F)	
	5	-18°C to 125°C (0 to 257°F)	
	8	500°C to 750°C (932 to 1382°F)	
J	9	250°C to 500°C (482 to 932°F)	
	10	125°C to 250°C (257 to 482°F)	(
	13	375°C to 500°C (707 to 932°F)	HOR
	14	-200°C to 750°C (-328 to 1382°F)	-
	15	-200°C to 250°C (-328 to 482°F)	
	16	-200°C to 0°C (-328 to 32°F)	
	1	-18°C to 1370°C (0 to 2498°F)	
	2	-18°C to 1000°C (0 to 1832°F)	
	3	-18°C to 500°C (0 to 932°F)	
	4	-18°C to 250°C (0 to 482°F)	
	5	-18°C to 125°C(0 to 257°F)	
	7	1000°C to 1370°C (1832 to 2498°F)	
	8	500°C to 1000°C (932 to 1832°F)	
Κ	9	250°C to 500°C (482 to 932°F)	
	10	125°C to 250°C (257 to 482°F)	
	12	750°C to 1000°C (1382 to 1832°F)	
	13	375°C to 500°C (707 to 932°F)	
	14	-200°C to 750°C (-328 to 1382°F)	
	15	-200°C to 250°C (-328 to 482°F)	
	16	-200°C to 0°C (-328 to 32°F)	·
	1	50°C to 1760°C (122 to 3200°F)	
	2	50°C to 1000°C (122 to 1832°F)	No C
	3	50°C to 500°C (122 to 932°F)	No C
	4	50°C to 250°C (122 to 482°F)	
	7	1000°C to 1760°C (1832 to 3200°F)	
	8	500°C to 1000°C (932 to 1832°F)	
R,S	9	250°C to 500°C (482 to 932°F)	
	10	125°C to 250°C (257 to 482°F)	
	11	1500°C to 1760°C (2732 to 3200°F)	
	12	750°C to 1000°C (1382 to 1832°F)	
	13	375°C to 500°C (707 to 932°F)	
	3	-18°C to 400°C (0 to 752°F)	
	4	-18°C to 250°C (0 to 482°F)	
	4 5		1
		-18°C to 125°C (0 to 257°F)	No C
т	9	250°C to 400°C (482 to 752°F)	No C
	10	125°C to 250°C (257 to 482°F)	
•	13	375°C to 400°C (707 to 752°F)	
l		45000 to 40000 (000 to 75005)	1
·	14	-150°C to 400°C (-238 to 752°F)	
·		-150°C to 400°C (-238 to 752°F) -150°C to 250°C (-238 to 482°F) -150°C to 0°C (-238 to 32°F)	



RG-SC-TC Factory Calibration: J-Type, 0-500°C, 4-20mA, Upscale



Figure 2: Mechanical dimensions for DRG-SC-TC



Figure 3: Wiring Diagram for DRG-SC-TC