DRA-TCI-2D

DIN Rail 2-Wire Temperature Transmitter for Thermocouple Input

Operator's Manual

CONTENTS:

OPEN THE HOUSING PROCEDURE

Carefully insert a proper screwdriver tip into the side slots. By pressing inwards and rotating, the plastic locker will release.

Gently pull out the unit's front panel.

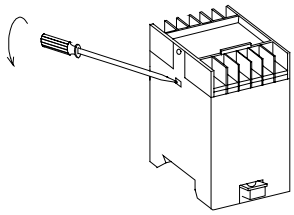

Fig 1

To close the unit, insert the printed circuit board in the proper side guiding slots and push it all the way until the front panel clicks with the body housing.

2. TRANSMITTER CALIBRATION

2.1 Switch Setting

Inside the enclosure are located six DIP-switches for coarse range, and two multi-turn potentiometers are located on the transmitter panel for fine-tuning.

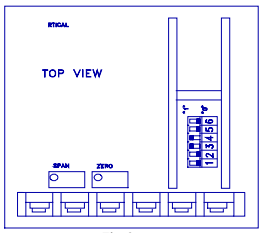

Fig. 2

Note: The DRA-TCI-2D is ordered for a specific T/C, and can not be altered.

Note: The following tables indicate coarse ranges. It might occur that the proper range can be obtained with adjacent switch combinations.

2.1.1. Define the desired range limits:

Tmin - the temperature at which the output current is 4mA.

Tmax - the temperature at which the output current is 20mA.

Tspan - the difference between Tmax and Tmin.

According to the following tables, set switches no. 4 to 6 for the Zero (Tmin), and set switches 1 to 3 for the Span (Tspan).

Note: "1" represent the switch "ON" state.

CALIBRATION TABLES

2.2.1 "Span" Table

SW.	T/C Type				
3 – 2 - 1	K (°C)	J (°C)	T (°C)	E (°C)	B, R, S (°C)
1 1 1		50...95		50...95	600...1100
1 1 0	90...180				1000..1700
1 0 0				90...175	
0 1 1	175...360	93...200	50...95		
0 1 0	250...440	140...248	60...115	160..280	
0 0 1	440...850	230...480	112...215	270...575	
0 0 0	850..1350	450...760	200...400	530...1100	

"Zero" Table

SW.	T/C Type					
4 – 5 - 6	K (°C)	J (°C)	T (°C)	E (°C)	B (°C)	R & S (°C)
1 1 1	0 ~ 25	0 ~ 42	-50 ~ -30	-100 ~ -52		
1 1 0	25 ~ 60	30 ~ 85	-45 ~ -15		100 ~ 465	0 ~ 180
1 0 1	45 ~ 90	70 ~ 125	-15 ~ 5	-52 ~ 56		120 ~ 280
1 0 0	80 ~ 120	110 ~ 175	5 ~ 40		460 ~ 870	240 ~ 380
0 1 1	115 ~ 160	165 ~ 215	30 ~ 58	56 ~ 162		340 ~ 480
0 1 0	150 ~ 190	200 ~ 265	50 ~ 74		865 ~ 1270	440 ~ 580
0 0 1	190 ~ 230	250 ~ 300	65 ~ 88	162 ~ 269		540 ~ 680
0 0 0	225 ~ 265	280 ~ 350	82 ~ 108	215 ~ 320	1270 ~ 1670	640 ~ 800

2.3 Calibration instrumentation:

2.3.1. 24Vdc Power Supply

2.3.2 T/C calibrator

2.3,3 High accuracy DVM

2.3.4 Small screwdriver

Connect the transmitter to be calibrated according to Fig #3.

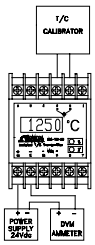

Fig 3

2.4 CALIBRATION STEPS

a. Set the calibrator to Tmin.

b. Adjust the Zero for 4mA.

c. Set the calibrator to Tmax.

d.Adjust the Span for 20mA.

Repeat steps a to d until satisfactory results are achieved.

2.4.1..... Calibration example:

Needed: T/C Type K ranged for: 200 to 500°C
Tmin: 200°C

Tspan: 500 – 200 = 300°C

1. Set the DIP switch to: 0,1,0,0,0,1 (sw1..sw6)

2. Set the calibrator for 200°C, calibrate "Z" to 4.000mA.

3. Set for 500°C and calibrate "S" to 20.000mA.

4. Repeat steps 2, 3 until satisfactory results are obtained.

3. DISPLAY CALIBRATION

The display calibration is performed by setting two jumpers and two trimmers (Zero and Span).

The display has 3½ digits, i.e it can display from -1999 to 1999. Three decimal positions can be obtained using one of the two jumpers.

Jumper position over pins #1 to #5 sets the decimal point.

No jumper - 1999

Pins #1-#2 - 199.9

Pins #3-#4 - 19.99

Pins #4-#5 - 1.999

Jumper over pins #11 to #13 sets the display range according to:

No jumper 1000 to 1999

Pins #12-#13 500 to 1000

Pins #11-#12 200 to 500

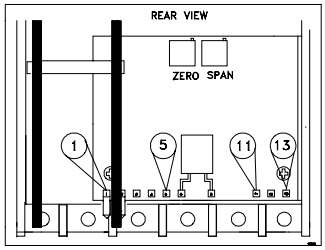

Fig. 4

3.1 CALIBRATION PROCEDURE

a. Set the transmitter to exactly 4-20mA.

b. Place the jumpers for desired range.

c. Adjust the display Zero trimmer for 000 at 4mA.

d. Adjust the display Span trimmer for desired span.

e. Adjust the display Zero trimmer for Tmin at 4mA.

Example:

required -100°C to +750°C. The span is 850°C.

Set the display (at -100°C) to 000 by the Zero potentiometer. Set the display (at +750°C) to 850 by the Span potentiometer. Set the display (at -100°C) to -100 by the Zero potentiometer

8

4. CONNECTION DIAGRAM

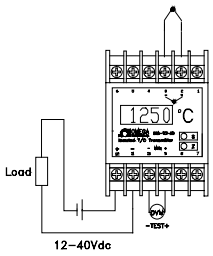

Fig. 5

MECHANICAL DIMENSIONS, mm (in)

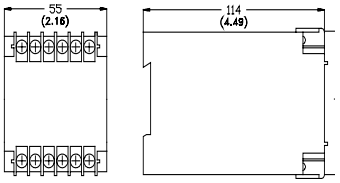

Fig. 6

9

6. SPECIFICATIONS

INPUT: Thermocouple type B, E, J, K, R, S T

BURNOUT PROTECTION: Upscale

MINIMUM INPUT SPAN: 4mV

OUTPUT: 4 - 20 mA, (25 mA limited)

LOOP RESISTANCE: Rmax(Ω) = (Vsupply-12)/.02

ISOLATION: 1500 Vdc or peak ac

RESPONSE TIME: 160 msec (0-98%)

CALIBRATION:

Span Calibration: Three DIP switches and "Span" potentiometer

Zero Calibration: Three DIP switches and "Zero" potentiometer

COLD JUNCTION COMPENSATION ERROR: Typical ±0.9°C for 0-60°C change (±3°C for B, R and S)

ACCURACY (linearity, hysteresis and repeatability):

± 0.1% of span for type K,

± 0.1% to ± 0.2% for other thermocouple types, typical

TEST TERMINALS: 40 to 200 mV represent 4-20 mA

SUPPLY VOLTAGE: 12 - 40 Vdc reverse polarity protected

SUPPLY AND LOAD VARIATION EFFECT: < ±0.03% of span for full change

CMR: 127db typical dc to 60 Hz

DISPLAY: 0.3" 3½ digit back-illuminated, LCD

LCD DISPLAY RANGE: -1999 to 1999.

DISPLAY CALIBRATION: Internal Zero & Span potentiometers.

TEMPERATURE STABILITY: ±0.01% of span /1°C

10

OPERATING TEMPERATURE: -20 to +70°C (-4 to 158°F)

STORAGE TEMPERATURE: -30 to +85°C (-22 to 185°F)

HUMIDITY: 5 - 95% relative humidity, non-condensing

HOUSING: Plastic polycarbonate

PROTECTION LEVEL:

Housing: According to IP-40

Terminals: According to IP-20

MOUNTING: Standard 35 mm DIN rail

WEIGHT: 200 grams (7 oz)

11