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TCT 26 Isolated Thermocouple Transmitter Instruction Manual

1.0 INTRODUCTION

These instructions refer to the above model. Supplementary sheets are attached if the unit has special options or features. For detailed specifications, see page 4 or refer to the Data Bulletin. All ADTECH instruments are factory calibrated and supplied with a label detailing the calibration. Adjustments are normally not necessary. A simple check should be performed to verify calibration before installation to ensure that it matches the field requirement.

2.0 GENERAL DESCRIPTION

The ADTECH TCT 26 is an Isolated Thermocouple Transmitter that accepts an input signal of any T/C type and range converting it into any of the standard control signal outputs such as 4-20 ma dc.

The input is electrically isolated from the output and the power supply by 600 volts ac or 1000 vdc peak on AC powered and isolated DC powered units. Power option P-1 Non-Isolated 24 vdc provides negative output signal and negative DC power common rail connection.

The output is a true current source and provides process signals such as 4-20 ma, 0-1 ma, 0-10 ma, 1-5 ma and 10-50 ma dc or alternatively, a voltage signal of 5 vdc full scale. Other current and voltage **Inputs/Outputs (I/O)** are available as specified on the Data Bulletin.

3.0 INSTALLATION

The instrument is supplied in a general purpose enclosure as standard. NEMA 4, 7 or 12 and plug in chassis enclosures are optionally available. Installation area/location must agree with the supplied instruments including operating temperature and ambient conditions.

Mounting

Refer to the appropriate outline drawing for mounting and clearance dimensions. The instrument is surface mounted with two #10-32 screws on 8.00 inch centers.

Electrical Connections

The wire used to connect the instrument to the control system I/O should be a twisted pair(s) and sized according to normal practice. Shielded cable is not normally necessary (if used, the shield must be grounded at the input negative of the ADTECH instrument and left floating at the sensor).

A 12 position barrier terminal block with #6-32 screws and 3/8" spacing is provided for I/O and power connection. A housing ground terminal marked G is also provided.

Controls

Multiturn ZERO, SPAN and Internal COLD JUNCTION COMPENSATION controls are provided to calibrate the instrument. With Option I 15, Five Segment Linearization controls are also provided. The multiturn controls are accessible

through the instrument front panel and are clearly marked for ease of use.

4.0 MAINTENANCE

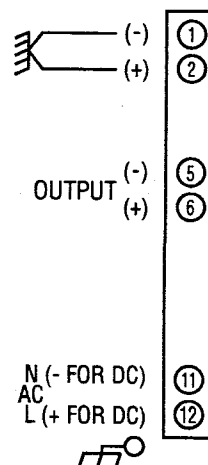
These instruments are electronic and require no maintenance except periodic cleaning and calibration verification. If the unit appears to be mis-operating it should be checked as installed per section 6.0 or removed for a bench check per sections 6.0-7.0. MOST problems are traced to field wiring and/or associated circuits. If the problem appears to be with the instrument, proceed to sections 6.0 and 7.0.

5.0 CONNECTIONS

Standard connections are shown below and on the instrument face plate, Data Bulletin or on attached supplementary sheets.

CAUTION: NO customer connection to Terminal No. 3

CAUTION: DO NOT remove or reverse the factory installed Cold Junction Compensation network at Terminals No. 1 and 3



NOTES:

1. If the instrument has been supplied with Option I 15 linearized output, disregard Section 6.0 and use Section 6.2 in Supplemental Sheet Instructions.
2. If recalibration to a different input and/or output signal is required, proceed to the tables listed under Section 8.0.
3. If T/C type must be changed or a check must be performed on the T/C compensation—proceed to Section 6.1, before performing Section 6.0 or 6.2 calibration. Otherwise Section 6.1 may be skipped.

6.0 CALIBRATION

To perform a calibration check or re-calibration of the instrument follow this procedure.

- A. Make sure the unit I/O wiring is properly connected and that the correct power source per the label is also connected. The instrument must be at normal power for a minimum of 2 minutes before proceeding to B.
- B. The input signal source(s) must be adjustable from 0 to 100% in steps of 10% or at least 25%. The source(s) should be either precalibrated or an accurate meter must be used to monitor the input(s).
- C. The output may be monitored either as a direct voltage for a voltage output signal or as a current that can be represented as a voltage across a resistor shunt for a current output signal.
- D. Set the input source to minimum input value and adjust the multiturn potentiometer marked ZERO to provide the minimum calibrated output (e.g.) 4.00 ma \pm 0.01 ma dc.
- E. Set the input source to maximum value and adjust the multiturn potentiometer marked SPAN to provide the maximum calibrated output (e.g.) 20.00 ma \pm 0.12 ma dc.
- F. Repeat steps D and E until readings are within calibration.
- G. The instrument should now be checked at 25-50-75% of span minimum.
- H. This completes the calibration.

6.1 T/C TYPE CHANGE/CALIBRATION

To perform a T/C compensation check or change to a different T/C type follow this procedure.

- A. Remove the unit from its housing to gain access to the compensation potentiometer R67.
- B. Connect all the I/O-power wiring taking normal safety and equipment precautions.
- C. Connect a temporary jumper across resistor R86.
- D. Power the unit for a minimum of 2 minutes; then measure the dc millivolt value from Terminal #1(-) to Terminal #3(+). Note this value and label it Mc. (e.g.) Mc = 590 mv.
- E. Connect a millivolt meter from Terminal #1(-) to TP A(+) and adjust potentiometer R67 to obtain the proper value per the Table.
- F. Remove the temporary jumper. This completes the T/C Type change.
- G. Refer to Section 6.0 or 6.2 to recalibrate the instrument.

7.0 FIELD TROUBLE SHOOTING GUIDE

This section offers a simple, first level trouble-shooting aid for an apparent instrument malfunction.

SYMPTOM CORRECTIVE ACTION

- | | |
|-----------|---|
| No output | <ol style="list-style-type: none"> 1. Check the input and output connections carefully. 2. Check that the power supply polarity is correct and that power is present on the instrument terminals. 3. Check that the input source(s) is correct and that it changes magnitude between zero and full scale values when so adjusted. 4. If the output is a current signal (4-20 ma, etc.), make sure the output loop is complete and that the correct meter range is selected. |
|-----------|---|

All external checks are complete. Problem seems to be internal.

The following information is provided for a qualified technician or serviceman as check points for use in internal troubleshooting.

<u>CHECKPOINT/ COMPONENT</u>	<u>VOLTAGE/ RANGE</u>
(across) C9	10.5 \pm 0.5 vdc
(across) C11	10.5 \pm 0.5 vdc
(across) C16	12 \pm 0.6 vdc
(across) C18	26 \pm 4 vdc
(from 0 V) +VR	+ 6.9 \pm 0.35 vdc
(across) R100	0.2 to 1.0 vdc
(from 0 V) J12	6.9 V p-p rect. pulse wave form

T/C COMP. TABLE

T/C Type	Millivolt Setting Across Test Point A to Term. #1
E	Mc x 0.595
J	Mc x 0.505
K & T	Mc x 0.396
R & S	Mc x 0.058
B	Mc x 0.00
N	Mc x 0.26

8.0 TABLES, PCB LAYOUT

SPAN TABLE

SPAN (MV)	R31	R30	R29	R28
3 - 7	X	X	X	X
8 - 22	-	X	X	X
22 - 64	-	-	X	X
60 - 164	-	-	-	X
160 - 400	-	-	-	-

(X) = Present (-) = Absent

ZERO SELECTION: For zero resistor selection make sure R82, 83, 88-91 are soldered in place. Set the ZERO control approximately in the middle (i.e., 8 turns from one end.) With instrument power on and zero input applied, start cutting one side of R91 down to R82 (do not cut R84 to R87) until an output signal shows a reading. Now calibrate per the calibration procedure.

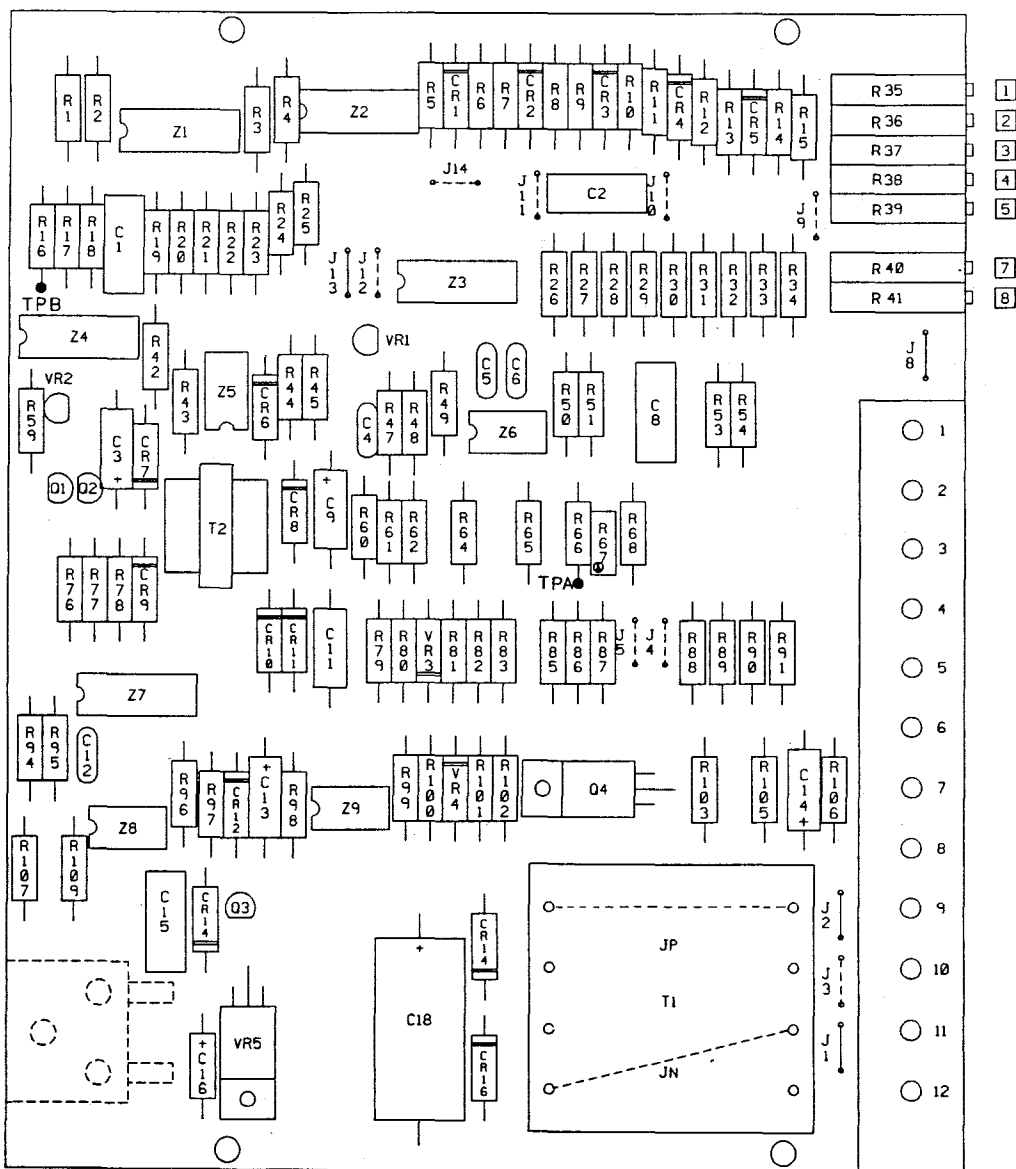
OUTPUT TABLE

OUTPUT SIGNAL FULL SCALE	OUTPUT SHUNT RL	FEEDBACK RES RF
50 ma dc	NONE	20 ohm
20 ma dc	NONE	49.9 ohm
10 ma dc	NONE	100 ohm
1 ma dc	NONE	1K ohm
10 vdc	604 ohm, 1/4 W	49.9 ohm
5 vdc	250 ohm, 1/2 W	49.9 ohm

All selected resistors are 1%, M.F., 1/4 W, 50 PPM, unless otherwise noted.

NOTE A: Components as shown may or may not be present on the p.c. board due to design updates or options.

TCT 26 RL = R106



9.0 SPECIFICATIONS

INPUT/OUTPUT

INPUT SIGNALS

- Thermocouple, all standard ISA Calibration (B, E, J, K, R, S, T)
10 mv to 80 mv spans
- 3.00 mv to 9.99 mv spans: optional
- Zero suppression: -10 mv to +80 mv
- Upscale/Downscale Burnout Detection:
standard (100 na nominal)
Upscale provided unless otherwise specified.

OUTPUT SIGNALS/OUTPUT DRIVE

- | | AC Power | DC Power |
|----------------|--------------------|--------------------|
| a. 4-20 ma dc | 0-1000 ohms max. | 0-900 ohms max. |
| b. 10-50 ma dc | 0-400 ohms max. | 0-350 ohms max. |
| c. 0-1 ma dc | 0-20,000 ohms max. | 0-18,000 ohms max. |
| d. 1-5 vdc | 250 ohms Z out | 250 ohms Z out |
| e. 0-10 vdc | 500 ohms Z out | 500 ohms Z out |
- Or zero based in the same ranges. Other voltage and currents optional.

PERFORMANCE

- Calibrated Accuracy:** $\pm 0.1\%$
- Linearity:** $\pm 0.1\%$ maximum, $\pm 0.04\%$ typical
- Repeatability:** $\pm 0.05\%$ maximum
- Temperature Stability:** $\pm 0.01\%/^{\circ}\text{F}$ maximum,
 $\pm 0.004\%/^{\circ}\text{F}$ typical
- Load Effect:** $\pm 0.01\%$ zero to full load
- Output Ripple:** 10 mv P/P maximum
- Response Time:** 150 milliseconds
- Temperature Range:** 0° to 140°F (-18° to 60°C) operating
 -40° to 185°F (-40° to 85°C) storage
- Power Supply Effect:** $\pm 0.05\%$ for a $\pm 10\%$ power variation
- Common Mode Rejection:** 140 db @ 60 Hz
- Isolation:** Input/output/power 600 vac, 50/60 Hz, 1000 vdc for
AC and isolated DC powered units
- Cold Junction Compensation Error:** 1°F maximum

Note: All accuracies are given as a percentage of span

POWER

- 115 vac: $\pm 10\%$, 50/60 Hz, 3 watts, 0.7 Pf (standard)
- 24 vdc: $\pm 10\%$ non-isolated, 3 watts (Option P1)
- 24 vdc: $\pm 10\%$ isolated, 3 watts (Option P2)
- 48 vdc: $\pm 10\%$ isolated, 3 watts (Option P3)
- 125 vdc: Nominal (105-140 vdc) isolated, 3 watts (Option P4)
- 230 vac: $\pm 10\%$, 50/60 Hz, 3 watts, 0.7 PF (Option P5)

10.0 OUTLINE & MOUNTING

