



**ADTECH**  
 Analog-Digital Technology, Inc.  
 95 MT. READ BLVD  
 ROCHESTER, NY 14611  
 PHONE: 585-698-1845  
 EMAIL : INFO@ADTECH-INST.COM

# TCT-327-MOD

## Hi-Speed type S TC Isolated 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 must be performed to verify calibration before installation to ensure that it matches the field requirement.

### 2.0 GENERAL DESCRIPTION

The TCT-327-MOD transmitter accepts a type S thermocouple input and provides a linearized and isolated output representing temperature at a rate of 500 samples per second (130 Hz bandwidth). Calibration is extremely easy with Adtech's **Smart Touch®** technology. Simply input your zero value, touch a button, input your span value and touch another button, and the unit is calibrated.

The isolated output resolution is 12 bits and provides 0-5 Vdc. Other voltage or current output signals are available (see table 1 page 3) Isolation is 600 volts ac or 1000 volts dc from the input to the output / power supply. Power requirements are 15 to 42 Vdc at 40 ma maximum.

The primary features are:

- Wide range - covers the full range of the ISA standard type S thermocouple.
- Output setup is via plug in jumpers.
- High accuracy, input resolution of  $0.6\mu v$  for  $0.1^{\circ}C$  resolution.
- High speed (500 samples per second) linearized conversion.
- RFI resistant.
- NO INTERACTION of zero and span controls.
- Adtech Smart Touch® calibration.
- Small size – DIN mounting package (1" w x 3.1" h x 3.6" d).
- Options for NEMA 4 and NEMA 7 housings, SNAP TRAK and surface mounting.

### 3.0 INSTALLATION

#### 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).

Six position compression terminal blocks are provided for I/O and power connection. A housing ground terminal is not required due to non-metallic housing.

#### Controls

Instrument controls consist of the following:

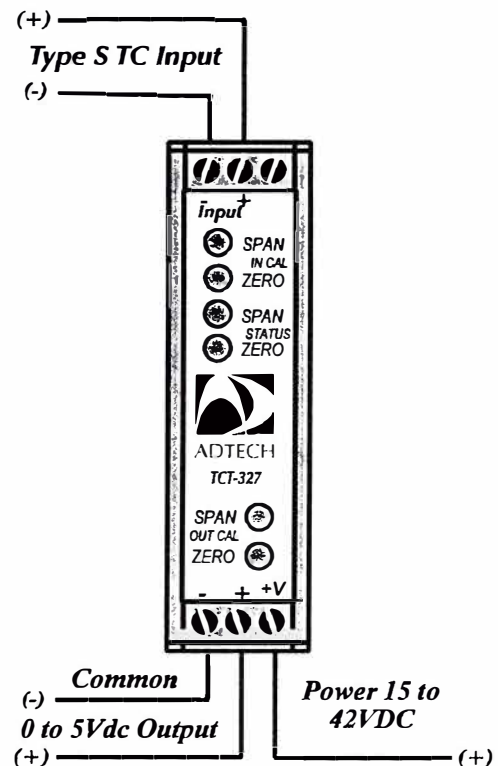
- 8 position switch for input configuration and calibration options.
- Jumper for zero based / elevated output.
- Output zero and span pots.
- Input zero and span push buttons (Adtech **Smart Touch®**)

### 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 per sections 6.0 and 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.



## 6.0 CONFIGURATION

All ADTECH units are factory calibrated per P.O. instructions. Usually, a complete recalibration is not required unless you want to change input type, output type, or the range of the unit. A calibration sticker located on the unit identifies the model, calibration and options present.

NOTE: For recalibration to the existing range proceed to section 6.1; for new input or output range proceed as follows.

- A. Remove the right cover to expose the 8 position switch and Jumper J1 on the input PCB (just above the potentiometers).
- B. Set output configuration jumpers per table 1 in section 8.0.
- C. Set switch 3 position 1 for upscale or downscale burnout. Set switch 3 position 2 to Linearized or non-linearized per table 2, section 8.0.
- D. Set switch 3 position 3 to the on position and adjust the output zero potentiometer for the proper output.
- E. Set switch 3 position 3 to off and position 4 to on. Adjust the output span potentiometer for full scale output. Repeat steps D and E until you reach the desired accuracy. (Note: you can check the midscale value by depressing switch 3 positions 3 and 4 simultaneously.)
- F. Return switch 3 positions 3 and 4 to the off position, and proceed with section 6.1 below to finish the calibration.

## 6.1 CALIBRATION

- A. Apply the zero input value at the input terminals of the unit. Depress and hold the Zero input calibration push button switch until the Zero status led flashes. You have just set the input zero, and the output should be at your zero value after a short time delay.
- B. Apply the full scale input value at the input terminals. Depress and hold the Span input calibration push button switch until the Span status led flashes. You have just set the full scale value and the output should be at full scale after a short delay.
- C. Calibration is complete. Check the calibration with various input values and verify the output values.

## 7.0 FIELD TROUBLE SHOOTING GUIDE

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

### SYMPTOM

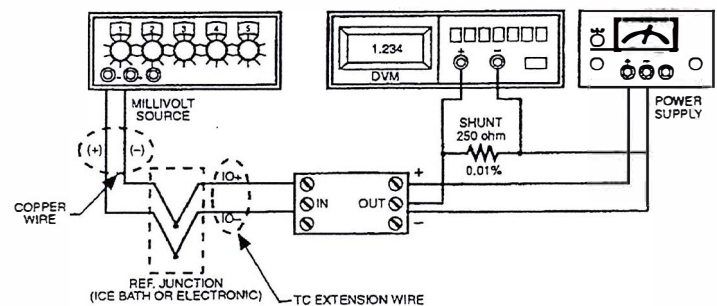
No Output

### CORRECTIVE ACTION

1. Check the input and output connections carefully.
2. Check that the power supply polarity is correct and that the output loop power is present on the indicated 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. 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 instrument is made of small components. Troubleshooting beyond the above may be difficult with out special equipment. We do not recommend attempting repair of the unit in the field. ADTECH offers a very responsive repair policy. Contact the ADTECH factory for information on repair and return at 716-383-8280 or 716-383-8386(FAX).



Typical Test Connection

## 8.0 TABLES

### Output Configuration Jumpers

Output	Output PCB (Small Board)		Input PCB (Large Board)
	J1	J2	J1
4-20mA	A	A	A
0-20mA	A	A	B
0-10mA	A	B	B
0-1mA	A	C	B
1-5V	B	A	A
0-5V	B	A	B
0-10V	C	A	B

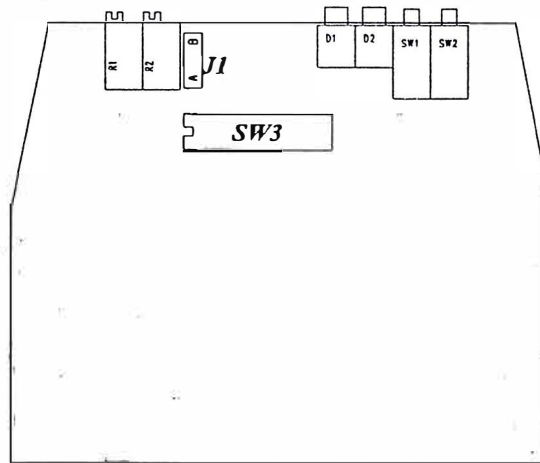
Table 1

### Configuration Switch SW3

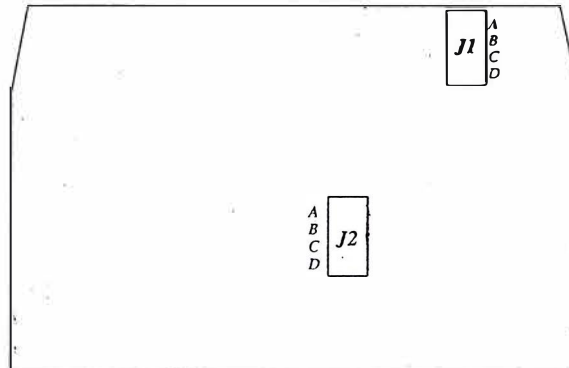
Switch Position	Function	
	1	Off
On		Upscale burnout
2	Off	No Linearization
	On	Linearized
3	Off	Normal Operation
	On	Output the zero Value
4	Off	Normal Operation
	On	Output the span Value
5,6,7,8	Reserved	

Table 2

## 8.1 PCB LAYOUT



Input PCB



Output PCB

## 9.0 SPECIFICATIONS

### INPUT/OUTPUT

#### INPUT SIGNAL

- Type S thermocouple, standard ISA calibration from -50 to 1768 °C (Z in greater than 22 megohm).
- Conversion - 0.6µV input resolution linearized to 0.1 °C conformance - (rms measured noise at 500 Hz conversion rate is 25 µV maximum). Conversion is filtered to 130 Hz bandwidth.

#### OUTPUT SIGNALS

4-20 mA DC, 0-20 mA DC, 0-10 mA DC, 0-1 mA DC, 0-5 V DC, 1-5 V DC, 0-10 V DC

$$R(\text{ohm}) = \frac{(V_{\text{supply}} - 9)1000}{I_{\text{out max. mA}}}$$

#### OUTPUT LOOP DRIVE CAPABILITY

I out	0-20 mA or 4-20 mA (22 mA maximum)			
V supply	15	24	36	42
R (ohm)	273	682	1227	1500

#### PERFORMANCE

- Calibrated Accuracy:** ± 0.1% of mv input
- Independent Linearity:** ± 0.05% maximum; ± 0.02% typical
- Repeatability:** ± 0.01% maximum; ± 0.004% typical
- Zero TC:** ±0.15 µV/°C
- Span TC:** ± 30 ppm of span max/°C
- Load Effect:** ± 0.005% zero to full load
- Output Ripple:** 10 mV (p-p) maximum
- Response Time:** 2.7 milliseconds (10 to 90% step response)
- Bandwidth (-3 db):** 130 Hz

- Temperature Range:** -25° to 185°F (-31° to 85°C) operating; -40° to 200°F (-40° to 93°C) storage
  - Power Supply Effect:** ± 0.005% over operating range
  - Isolation:** Input/output/case: 600 VAC, 1000 VDC
  - Cold Junction Compensation Error:** 1.5°C max (0° to 50°C)
  - Burnout current:** 0.1 µa - nominal
- Note: All accuracies are given as a percentage of span

#### POWER

- 15 to 42 VDC - standard, 28 mA typical, 33 mA max

#### MECHANICAL

- Electrical Classification:** general purpose
- Connection:** Screw, compression type, accepts up to 14 AWG
- Controls:** 8 position switch, input zero and span push button switch and status led's, output span and zero pots
- Mounting:** DIN Surface, Snap-Track, or NEMA 4,7
- Weight: Net Unit:** 4 oz (115 grams)  
Shipping: 7 oz (200 grams)

#### OPTIONS

Option	Description
H-15D	Explosion Proof, Class 1, Group C&D
H-25	Snap Track Mounting (specify)
H-26	Surface Mounting (Specify)
H-27	NEMA 4 Enclosure
H-28	T35 DIN T rail 2 ft. long

OPTIONAL Mountings - see separate drawings provided or request from the factory.

## 10.0 OUTLINE MOUNTING

