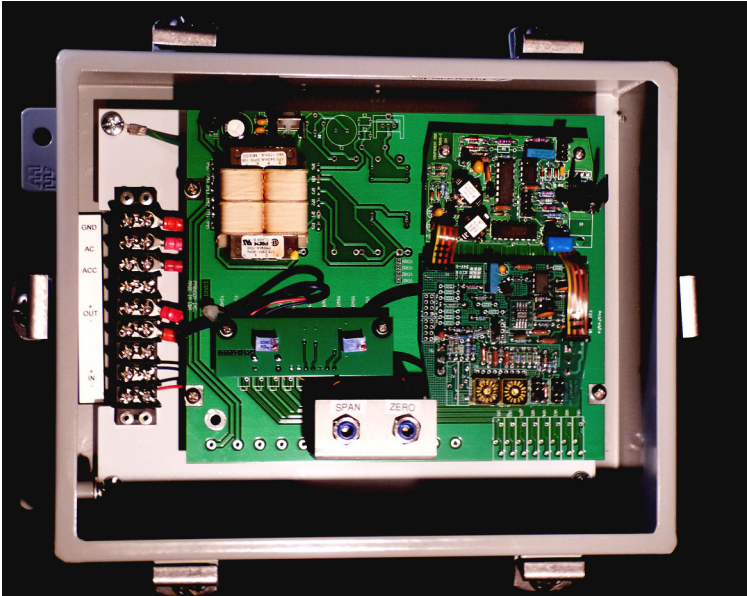




95 Mt. Read Blvd # 149  
Rochester, New York 14611 USA  
Phone: 1.800.688.6551  
1.585.697.0444  
Fax: 1.585.697.0445  
www.pyragon.com

# 610TN-27-99 Thermocouple Transmitter



The manual, as are the electronics, is derived from a standard manufacturing design. As such certain sections have been deleted as they are not applicable.

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Base Electronic Instructions.....	1
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## 1.0 INTRODUCTION

NOT APPLICABLE

## 2.0 GENERAL DESCRIPTION

NOT APPLICABLE

## 3.0 INSTALLATION

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

### Electrical Connections

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

A 6-32 screw terminal block is provided for the I/O and power connections.

### Controls

Instrument controls consist of the following:

- Two 16 position switches for **COARSE ZERO** and **COARSE SPAN** control
- One 4 position jumper for selection of major range
- One 2-position jumper for 20 mv elevation
- One 4-position jumper for TC-type
- Two multiturn potentiometers; **FINE ZERO** and **SPAN** controls

The FINE ZERO and SPAN controls are accessible through the front of the instrument.

## 4.0 MAINTENANCE

NOT APPLICABLE

## 5.0 CONNECTIONS

See Page 6

## 6.0 CONFIGURATION

All Pyragon 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. If recalibration to the same range is required, follow section 6.1.

For new range:

A. Open the case to gain access to the unit's pc boards. The larger pc board is the input pcb and the smaller pc board is the output/power.

B. To determine the MAJOR RANGE setting calculate:

1. Input Span (mV) = millivolts full scale - millivolts zero scale.
2. Input Zero (mV) = millivolts zero scale.
3. The Major range is the number from Table 1 that is just larger (in magnitude) of the two calculations above. Set the jumper in Table 1 to the major range determined.

C. If the input range includes readings below 0°C (32°F) you must set the Input Zero Control for 20 mV elevation, otherwise set it to 0mV elevation. See Table 2 for the jumper setting.

D. Select the TC burnout action from Table 3.

E. Select the TC type from Table 4.

F. Select the output range from tables 5 & 6

## 6.1 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 must be adjustable from 0 to 100% in steps of 10% or at least 25%. The source should be either precalibrated or an accurate meter must be used to monitor the input. The input signal needs to conform to an acceptable method of simulating a thermocouple signal.

C. The output may be monitored as a current or as a voltage across a resistor shunt, e.g. 1-5 vdc across 250 ohms.

D. Set J1 - positions A through D - to the desired thermocouple setting (see Section 8). Set the desired burnout action (J5 - to A or B) and the major range (J1 - positions A to D). If you are measuring negative temperatures, you may need to set J3 - position A or B elevate the signal by 20 mv.

E. Apply an input corresponding to the zero input temperature. Rotate the **FINE ZERO** control fully counterclockwise. Rotate the **COARSE ZERO** switch (SW1) to a position where the zero level just goes above 4.00 ma output. Rotate the **COARSE ZERO** switch back one number less than the previous position (but not less than zero).

F. With the input set at zero input, adjust the fine ZERO control for 4.00 ma to the desired accuracy.

G. Apply an input corresponding to the full scale input temperature. Turn the **FINE SPAN** control fully counterclockwise. Turn the **COARSE SPAN** switch (SW2) to a position where the output just exceeds 20.00 ma output. Turn the switch back one number less (but not less than 0).

H. With the input set to full scale input, adjust the fine span control for 20.00 ma to the desired accuracy.

I. Repeat steps F and H until the readings remain within to desired calibration accuracy.

J. Check the instrument at the 25-50-75% input settings minimum.

## 7.0 FIELD TROUBLE SHOOTING GUIDE

NOT APPLICABLE

### TYPICAL TEST CONNECTION

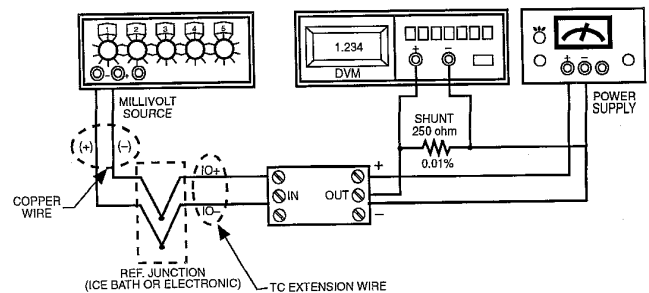


TABLE 5

Output Type		
Output	J1	J2
4-20mA	A	A
0-20mA	A	A
0-10mA	A	B
0-1mA	A	C
1-5V	B	A
0-5V	B	A
0-10V	C	A
10-50mA	A	D

TABLE 6

Output Zero	
Elevated 20 %	J6-A
Zero Based	J6-B

8.0 TABLES

TABLE 3

TC BURNOUT ACTION

Up Scale	J5-A
Down Scale	J5-B

Note: Jumper on larger pcb

Table 1  
MAJOR RANGE

10mV	J2-B
30mV	J2-A
100mV	J2-D
Reserved	J2-C

Note: Jumper on larger pcb

TABLE 4

TC TYPE

E	J1-A
J	J1-B
T,K	J1-C
R,S	J1-D
B	J1-Out

Note: Jumper on larger pcb.

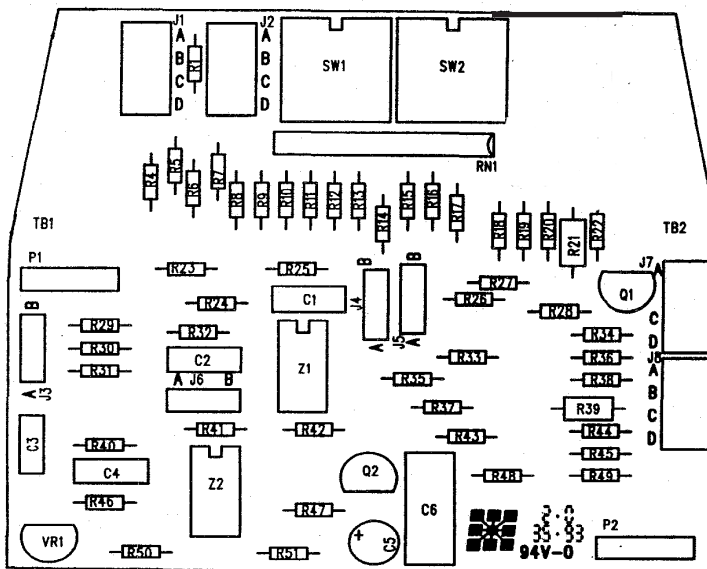
Table 2  
INPUT ZERO  
ELEVATION CONTROL

20mV	J3-A
0mV	J3-B

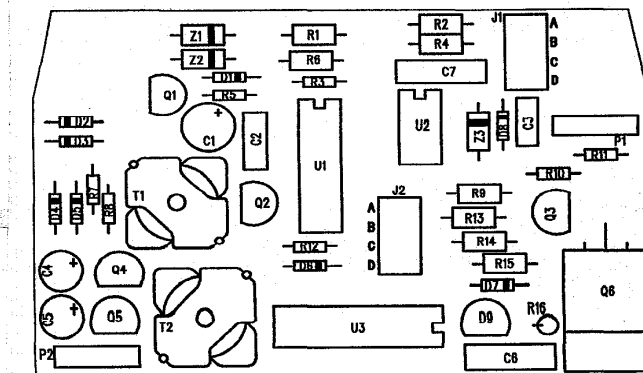
Note: Jumper on larger pcb

Note: See Tables 5 & 6 on Page 2

8.1 PCB LAYOUT



Fine Zero & Fine Span Pots are located on bracket. See Photo on page 7



Note: All components shown may not be required by this model

## 9.0 SPECIFICATIONS

### INPUT/ OUTPUT

#### INPUT SIGNALS

- a. Thermocouple and mv, all standard ISA Calibration (B, E, J, K, R, S, T), -20 mv to 100 mv spans (Z in greater than 1 megohm)
- b. Zero Suppression: up to 100% of the major range selected in 16 divisions of the coarse zero adjustment switch.
- c. Span: from 0.5mv to 100 mv full scale - switch selectable. The coarse span switch adds 16 divisions to each major range.
- d. Upscale/Downscale Burnout Protection: standard  
Burnout current: 0.1 micro amperes-nominal

#### OUTPUT SIGNALS

4-20 ma dc, 0-20 ma dc, 0-10 ma dc, 0-1 ma dc, 1-5 vdc, 0-5 vdc, 0-10 vdc, 10-50 ma dc

#### OUTPUT LOOP DRIVE CAPABILITY

$$R(\text{ohm}) = \left[ \frac{(V \text{ supply} - 5) 1000}{I \text{ out max. ma}} \right]$$

I out	0-20 ma or 4-20 ma			
V supply	15	24	36	42
R (ohm)	500	950	1550	1850

#### PERFORMANCE

- a. **Calibrated Accuracy:**  $\pm 0.1\%$  ( of mv input)

- b. Independent Linearity:  $\pm 0.01\%$  maximum,  $\pm 0.006\%$  typical (14 bit digital linearity)
  - c. Repeatability:  $\pm 0.005\%$  maximum,  $\pm 0.002\%$  typical
  - d. Zero TC :  $\pm \left( \frac{.025}{\text{input span (MV)}} + 0.007 \right) \% \text{ of span max } / ^\circ\text{C}$
  - e. Span TC:  $\pm 0.008\%$  of span max/  $^\circ\text{C}$
  - f. Load Effect:  $\pm 0.005\%$  zero to full load
  - g. Output Ripple: 10 mv P/P maximum
  - h. Response Time: 110 milliseconds (10 to 90% step response)
  - i. Bandwidth: ( -3 db ) : 3.2 Hz
  - j. Temperature Range:  $-25^\circ$  to  $185^\circ\text{F}$  ( $-31^\circ$  to  $85^\circ\text{C}$ ) operating  
 $-40^\circ$  to  $200^\circ\text{F}$  ( $-40^\circ$  to  $93^\circ\text{C}$ ) storage
  - k. Power Supply Effect:  $\pm 0.005\%$  over operating range
  - m. Isolation: Input/output/case: 1000 vdc or 600 vac
  - n. Cold Junction Compensation Error:  $1.5^\circ\text{C}$  max ( $0^\circ$  to  $50^\circ\text{C}$ )
  - o. Burnout Current: 0.1 micro amperes- nominal
- Note: All accuracies are given as a percentage of span.

#### POWER

- a. 117 VAC 50/60 Hz

#### MECHANICAL

- a. Electrical Classification: General Purpose
- b. Connection: Screw, compression type, accepts up to 14 AWG
- c. Controls: Refer to page 2
- d. Mounting: NEMA 4 / 12
- e. Weight: Net Unit: 10 lbs

10.0 OUTLINE AND MOUNTING

DWG No.	100055-000	REV.	B
DWG SIZE	A	NEXT ASSY	
SHEET	1 OF 1	USED ON	
UNLESS OTHERWISE SPECIFIED			
DIMENSIONS ARE IN INCHES			
TOLERANCES ON			
XX DEC.	XXX DEC.	ANGLES	
+ -	+ -	+ -	
SCALE	NONE	REF.	MAT.
CHANGES			
REV.	DATE	APP	DCN
A	14 APR 08	DWC	
B	24 MAR 11	DWC	

DR. DWC	14 APR 2008		
CHK.			
ENG.			
REF.			

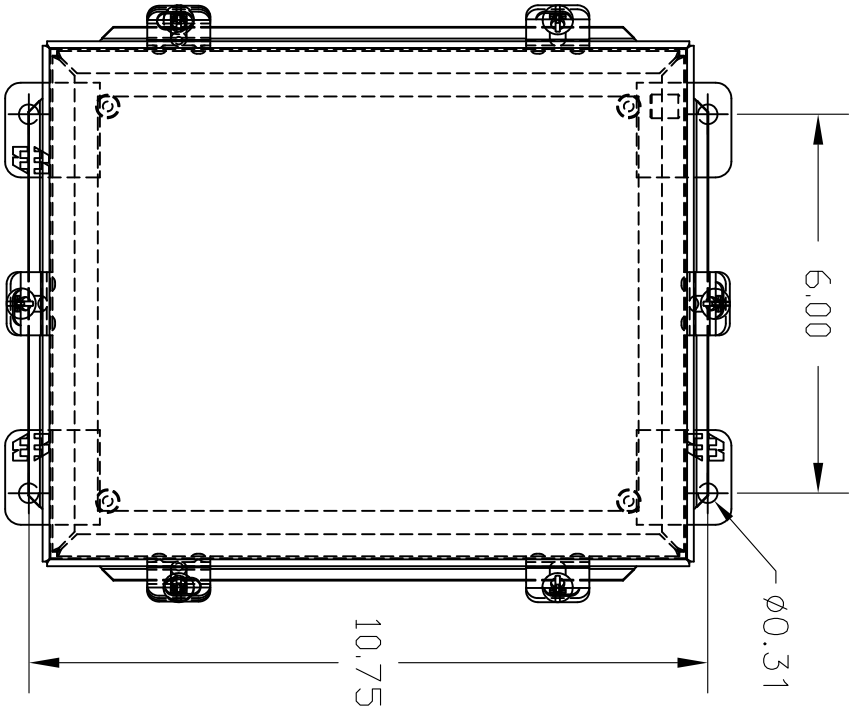
**PYRAGON, INC.**  
 95 Mt Read Blvd, Rochester, NY 14611

**MOUNTING AND DIMENSIONS,  
 HOUSING, 8" X 10" X 4"  
 NEMA 4 RATED**

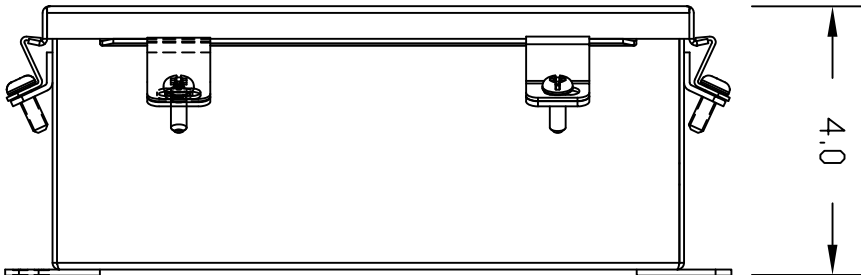
REDRAWN 14 APR 2008

HAMMOND MFG. 1414N4I

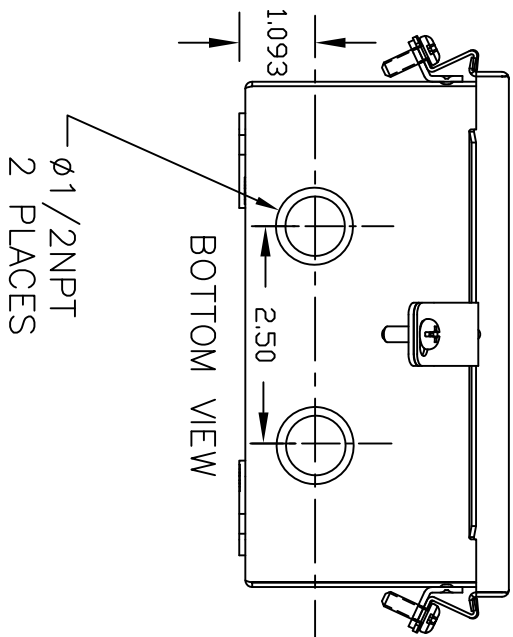
PAINTED



FRONT VIEW



RIGHT SIDE VIEW



BOTTOM VIEW

NOTE:  
 OVERALL BOX DIMENSIONS ARE  
 10" X 8" X 4", OUTSIDE

NOTE:  
 ACTUAL INSIDE HEIGHT = 3.7"

DWG No. 100055-000  
 DWG SIZE A

REV. B

REV.	DATE	APP	DCN

SHEET 3 OF 3  
 UNLESS OTHERWISE SPECIFIED  
 DIMENSIONS ARE IN INCHES  
 TOLERANCES DN  
 XX DEC. XXX DEC. ANGLES  
 ± - ± - ± -

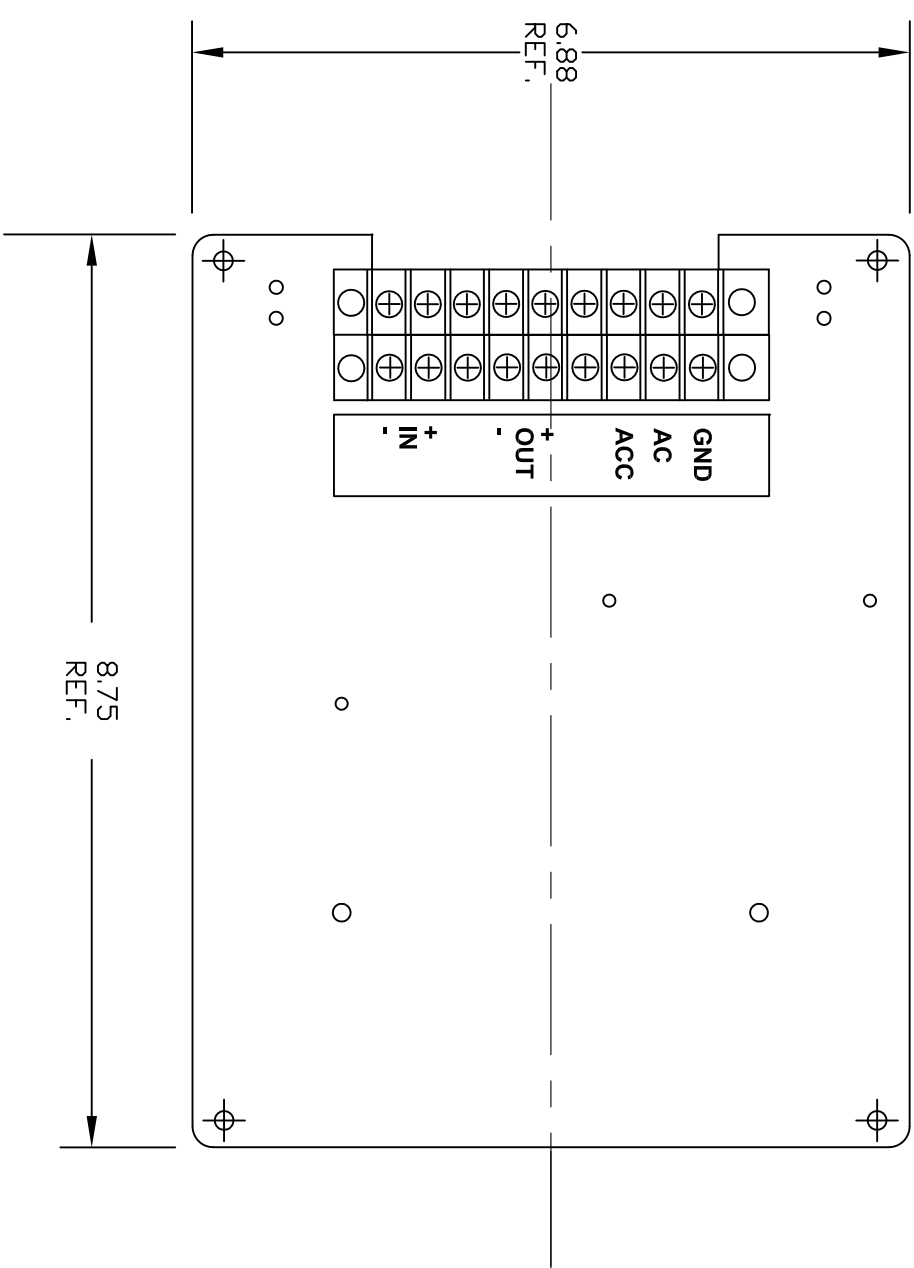
SCALE  
 CHANGES

REV.	DATE	APP	DCN

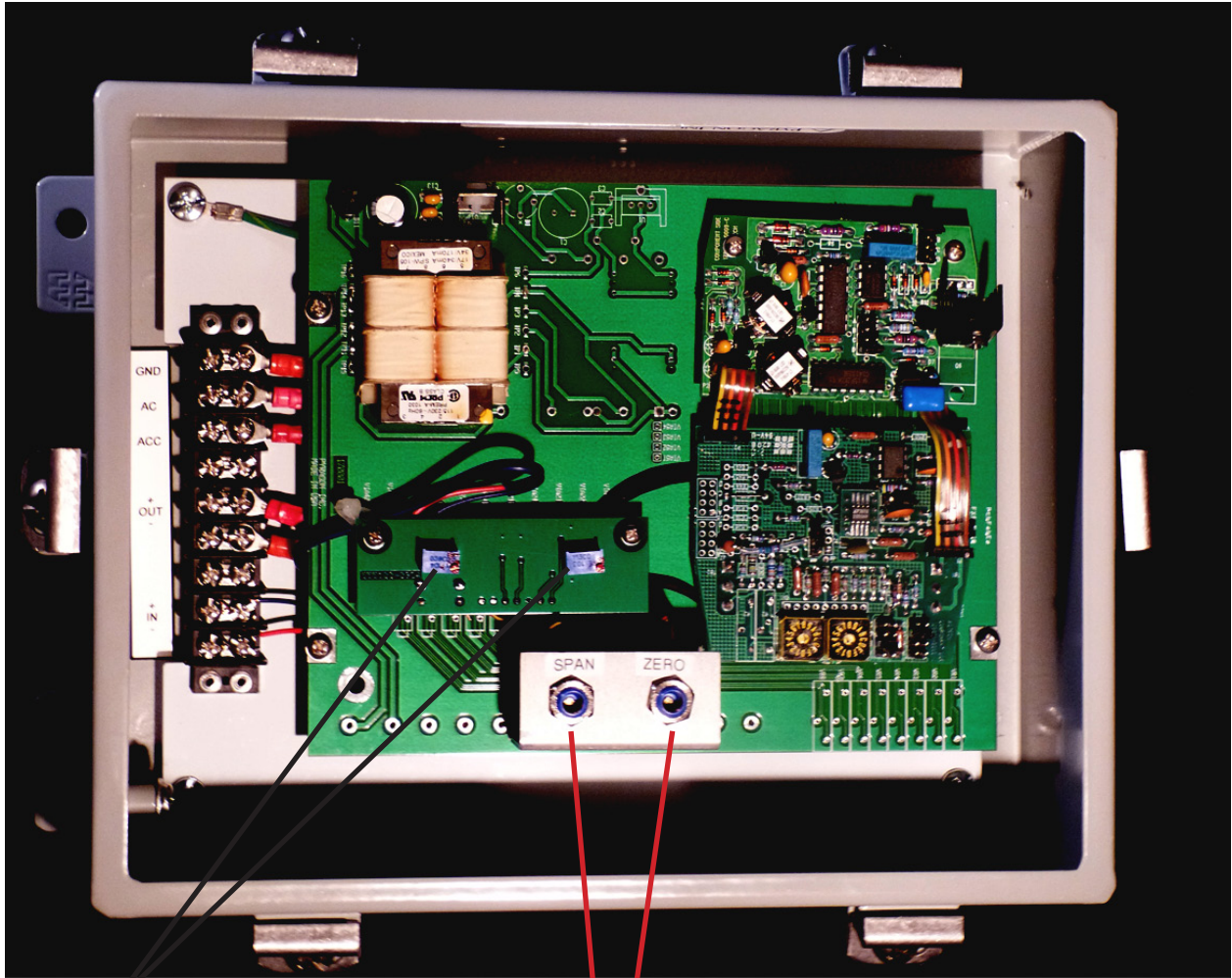
DR.	CHK.	ENG.	REF.	MAT.	NEXT ASSY	USED DN

**PRAGON, INC.**  
 95 Mt. Read Blvd, Rochester, NY 14611  
 CONNECTION DIAGRAM  
 610TN-27-99  
 FIN.

PANEL  
 SUPPLIED BY MFG.



## 11.0 PICTURE OF ASSEMBLY



Factory Adjustment Only  
DO NOT TOUCH  
Cold Junction Compensation PCB

**Customer Span and Zero Adjustments**