



# ADTECH

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## SGT 90

### Strain Gage 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 Model SGT 90 Strain Gage Transmitter accepts primary element strain gage bridges as the input and converts the bridge output signal into a DC signal such as 4-20 ma dc. The output is linearly proportional to the bridge output.

Excitation power for the bridge is provided by SGT 90 transmitter and may be precisely controlled by use of remote sensing at the bridge terminals. The excitation supply is adjustable from 4-10 vdc and can supply up to 100 ma dc (max).

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

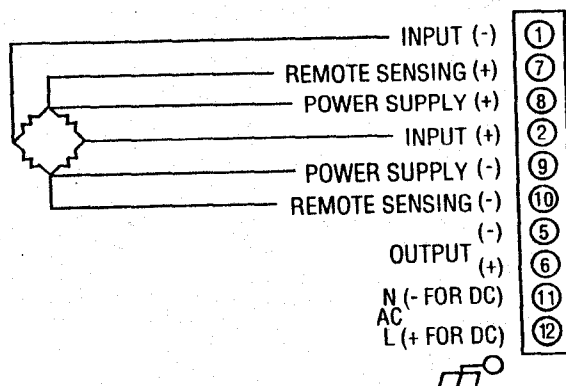
Multiturn ZERO, SPAN, EXCITATION and optionally LINEARITY CORRECTION controls are provided to calibrate the instrument. The multiturn controls are accessible through the instrument front panel and are clearly marked for ease of use.

#### 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.



NOTE: Voltage Excitation connections are shown. For current excitation remotes use lead connection to terminals 7 & 10 are not required.

## 6.0 CALIBRATION (see Notes)

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. Using the bridge sensitivity constant (millivolt/volt) given, calculate the zero and full scale millivolt output of the bridge.
- C. **To set excitation voltage:** Strap terminals 7 to 8 and 9 to 10. Set the bridge excitation voltage by adjusting the multiturn potentiometer marked EXCITATION (EXC) to the desired value as read across terminals 8 (+) and 9 (-).
- D. 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).
- E. 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.
- F. 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.
- G. 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  $\pm$  0.01 ma dc.
- H. Repeat steps F and G until readings are within calibration.
- I. The instrument should now be checked at 25-50-75% of span minimum.
- J. This completes the calibration.

### NOTE:

1. If the instrument is tested without an actual bridge input, the following must be performed. A resistor series string of two 1,000 W, 1% resistors, MUST be conneted across the Bridge Excitation terminals 8 and 10. The junction of the two resistors must then be connected to Terminal #1. This effectively simulates a bridge input and allows bench calibration.
2. If recalibration to a different input and/or output signal is required, proceed to the tables listed under Section 8.0.

## 7.0 FIELD TROUBLE SHOOTING GUIDE

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

<b>SYMPTOM</b>	<b>CORRECTIVE ACTION</b>
No output	<ol style="list-style-type: none"><li>1. Check the input and output connections carefully.</li><li>2. Check that the power supply polarity is correct and that power is present on the instrument terminals.</li><li>3. Check that the input source(s) is correct and that it changes magnitude between zero and full scale values when so adjusted.</li><li>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.</li></ol>

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.

<b>CHECKPOINT/ COMPONENT</b>	<b>VOLTAGE/ RANGE</b>
(across) C7	12. $\pm$ 0.6 VDC
(across) C8	26 $\pm$ 4 VDC
(across) C25	0.2 - 1 VDC
(across) VR1	6.9 $\pm$ 0.35 VDC
(across) R25	0.2 - 1.0 VDC

## 6.1 LINEARITY CORRECTION CALIBRATION

If the SGT 90 has been supplied with the optional LINEARITY CORRECTION (LIN) multiturn potentiometer; adjust that control full CCW when performing a re-calibration A through I Section 6.0 above.

- A. Apply a TRUE 50% input load (signal) and adjust the LINEARITY (LIN) control CW until the output is at 50%.
- B. Repeat steps F, G and H in Section 6.0 and then recheck 6.1 A.

## 8.0 TABLES, PCB LAYOUT

**INPUT SPAN TABLE**

SPAN (MV)	R33	R34	R35
5 - 10	X	X	-
10 - 20	X	-	-
20 - 50	-	-	-
*50 - 100	-	-	-

\*For this range change R32 to 6.04 kΩ

$$(\text{SPAN MV} + \text{SUPPRESSION MV} = \text{MV/V} \times \text{VEXCITATION})$$

**ZERO OFFSET TABLE**

N	R15	R17	R18	R19
0.0 - 1.0	-	-	-	-
1.0 - 2.0	X	-	-	-
2.0 - 3.0	X	X	-	-
3.0 - 4.0	X	X	X	-
4.0 - 5.0	X	X	X	X

$$N = \frac{\text{SUPPRESSION (MV)} \times 66}{\text{VEXCITATION} \times \text{MAX. F.SPAN RANGE}}$$

See Note 5.

**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.

**NOTES:**

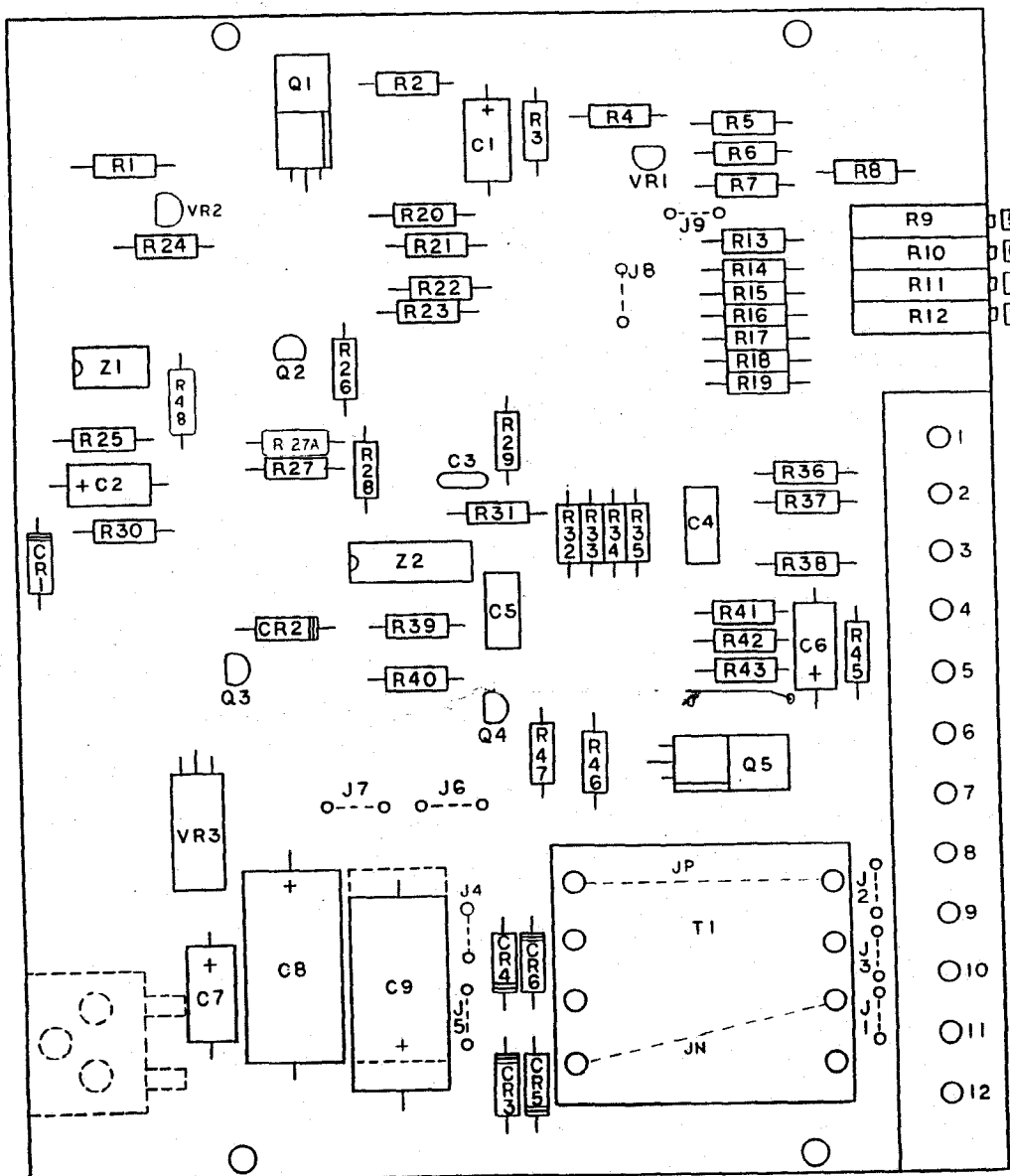
1. For all tables X = present; - = absent
2. For Excitation voltage from 4 - 7.5V delete R6
3. Full Scale Millivolts = (mv/v) x Excitation Voltage
4. For zero based outputs delete R48.
5. Max. F span range is the near span in the range selected.

**EXCITATION TABLE**

Exc. Volts	R5	R6	R7
4 - 7	X	-	-
7 - 12	X	X	-
12 - 18	X	X	X

\*Change R44 to Jumper.

SGT 90      RL = R3      RF = RI



## 9.0 - SPECIFICATIONS

### INPUT/OUTPUT

#### INPUT SIGNALS

- 120 ohm or 350 ohm bridges: standard
- Bridge excitation:
  - Voltage excitation: 4-15 vdc, 100 ma dc max.
  - Current excitation: 1-100 ma dc max.
- Bridge output: 1 mv/v - 100 mv/v (5 mv dc - 1 00 mv dc)
- Up to 10K ohm bridges: optional
- Zero Suppression: -10 to +50% of span

#### 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:**  $\pm 0.01\%$  / $^{\circ}$ F maximum,  $\pm 0.004\%$  / $^{\circ}$ 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 $^{\circ}$  to 140 $^{\circ}$ F (-18 $^{\circ}$  to 60 $^{\circ}$ C) operating  
-40 $^{\circ}$  to 185 $^{\circ}$ F (-40 $^{\circ}$  to 85 $^{\circ}$ C) storage
- Power Supply Effect:**  $\pm 0.05\%$  for a  $\pm 10\%$  power variation

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

