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MVT 306 Non-Isolated Millivolt Transmitter

MVT 326 Isolated Millivolt 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 MVT 306 and MVT 326 are millivolt transmitters that accept 0.5 to 100 mv dc input and provide many of the standard signal outputs such as 4-20 mA dc.

The MVT 326 provides 600 vac or 1000 vdc isolation of the input from the output and dc power supply. The MVT 306 provides no isolation between input, output or dc power.

Both models are powered by dc power 15-42 vdc in such a way that the output negative connection is common with the power supply. This is why it is called the three wire transmitter.

The output is a true current source and provides process signals such as 4-20 ma, 0-20 ma dc, 0-1 ma, 0-10 ma, 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 and on page 4 inside.

3.0 INSTALLATION

The instrument is supplied in a general purpose compact plastic enclosure as standard. NEMA 4 and 7 enclosure 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 **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 terminals are provided for **I/O** and power connections. A housing ground terminal is not required due to non-metallic housing.

Controls

Instrument controls consists of the following:

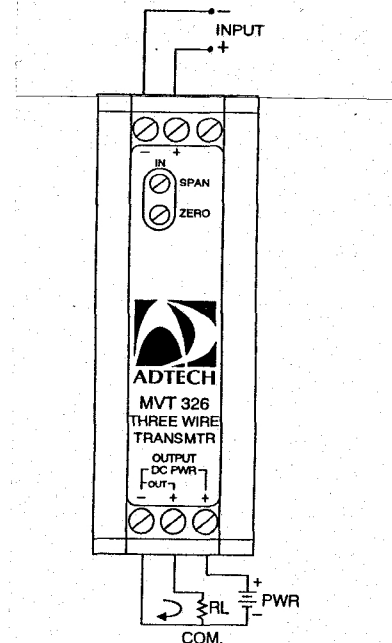
- One four position jumper for input major range selection.
- One two position jumper for input zero elevation.
- A pair of four position jumpers for output range selection.
- A two position jumper for output zero selection.
- Two multiturn fine Zero and Span adjustment potentiometers.

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: MVT306 and 326 Connections are identical.

6.0 CONFIGURATION OF INPUT AND OUTPUT

All ADTECH units are factory calibrated per your P.O. 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.

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

- 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 pcb. Jumpers found in the Input Tables are located on the input pcb. Jumpers listed in the output tables are located on the output/power pcb.
- B. The MVT 306 and MVT 326 are capable of both zero based and 20% elevated output zeroes. Follow Output Table 2 for the correct Output Zero Jumper. For example, a 1 to 5 volt output would be considered a 20% elevated output, while a 0 to 5 volt output would be a zero based output.
- C. To select the desired output type, follow Output Table 1. The jumpers for output are located on the smaller pc board.
- D. 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 Input Table 1 that is just larger (in magnitude of the two calculations above. Set the jumper to the major range determined.
- E. Follow Input Table 2 to set the input zero type. An elevated setting is used when a zero input is less than 0 millivolts.

6.1 CALIBRATION

- A. Make sure the unit I/O wiring is properly connected and that the correct power source per label is connected. The unit must be powered for a minimum of 2 minutes prior to proceeding to step B.
- B. The input source must be adjustable from 0 to 100% in steps of 10% or at least 25%. The source should either be precalibrated or an accurate meter must be used to monitor the input.
- C. The output may be monitored as voltage or as a current that can be represented as a voltage across a resistor shunt.
- *D. The **COARSE ZERO** switch (SW1) is located on the input pcb furthest from the fine potentiometer controls. The **COARSE SPAN** switch (SW2) is located to the right of the Coarse Zero Switch.

- *E. Apply an input corresponding to the zero input. Adjust the fine ZERO control fully counterclockwise. Adjust the **COARSE ZERO** switch to a position where the output level just goes below the zero output level (4.00 mA). Turn **COARSE Zero** Switch back one number less than the previous position (but not less than zero).
- F. With the input set to the zero input, adjust the fine ZERO control for zero output (4.00 mA) and the desired accuracy.
- *G. Apply an input corresponding to the full scale input. Adjust the fine SPAN control fully counterclockwise. Set the **COARSE SPAN** switch to a position where the output level just exceeds the full scale output level (20 mA). Set the **COARSE SPAN** switch back one number less than the previous position (but not less than 0).
- H. With a 100% input signal applied to input, adjust the fine SPAN control for the full scale input (20mA) and the desired accuracy.
- I. Repeat steps F and G until the readings remain within the desired calibration accuracy.
- J. Check the instrument at the 25-50-75% input settings.
- K. Close the case.

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 instrument is made of small components. Troubleshooting beyond the above may be difficult without 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).

*Note: Steps D, G, & E are applicable when the unit is opened for re-ranging to different Zero or Span.

8.0 TABLES

INPUT TABLE 1

| Major Range | |
|-------------|------|
| 10mV | J2-B |
| 30mV | J2-A |
| 100mV | J2-D |
| Reserved | J2-C |

INPUT TABLE 2

| Zero Elevation | |
|----------------|------|
| 0mV | J3-B |
| 20mV | J3-A |

Note: All input jumpers located on larger pcb.

OUTPUT TABLE 1

| 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 |

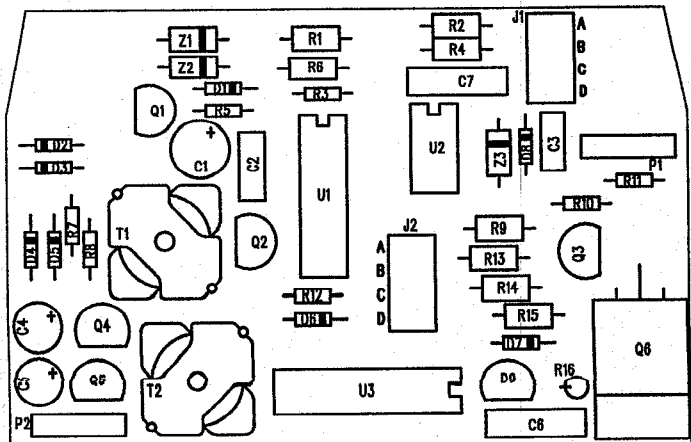
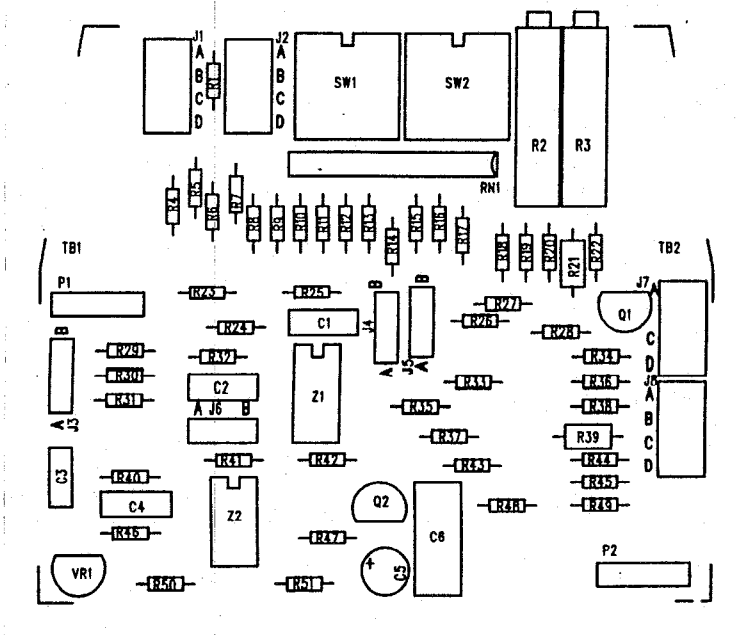
Note: Jumpers located on smaller pcb.

OUTPUT TABLE 2

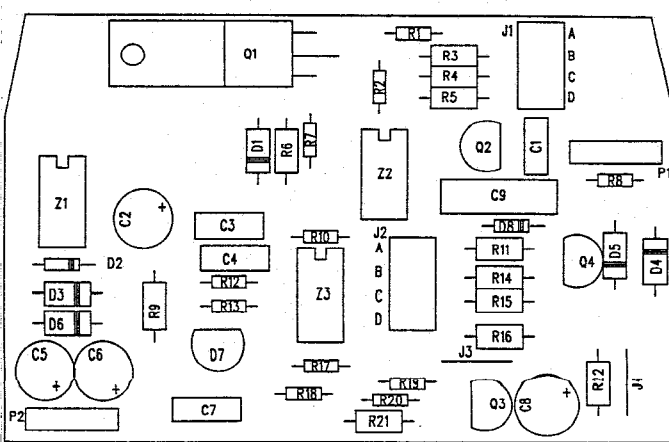
| Output Zero Type | |
|------------------|------|
| Elevated 20% | J6-A |
| Zero based | J6-B |

Note: J6 is on the larger pcb.

8.1 PCB LAYOUT



MVT 326 Isolated Millivolt



MVT 306 Non-Isolated Millivolt

NOTE: All components shown may not be required by this model.

9.0 SPECIFICATIONS

INPUT/OUTPUT

INPUT SIGNALS

- 0.5 mv to 100 mv span (Z in greater than 10 megohm)
- Zero Suppression: up to 100% of the major range selected in 16 divisions of the coarse zero adjustment switch.
- Span: from 0.5 mv to 100 mv full scale—switch selectable. The coarse span switch adds 16 divisions to each major range.
- Upscale/Downscale protection optional.

OUTPUT SIGNALS

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

OUTPUT LOOP DRIVE CAPABILITY

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

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

PERFORMANCE

- Calibrated Accuracy:** $\pm 0.1\%$
- Independent Linearity:** $\pm 0.01\%$ maximum, $\pm 0.006\%$ typical (14 bit digital linearity)
- Repeatability:** $\pm 0.005\%$ maximum, $\pm 0.002\%$ typical
- Zero TC:** $\pm \left(\frac{0.025}{\text{input span (MV)}} + 0.005 \right)$ % of span max/°C

- Span TC:** $\pm 0.008\%$ of span max/°C
- Load Effect:** $\pm 0.005\%$ zero to full load
- Output Ripple:** 10 mv P/P maximum
- Response Time:** 110 milliseconds (10 to 90% step response)
- Bandwidth:** (-3 db): 3.2 Hz
- Temperature Range:** -25° to 185°F (-31° to 85°C) operating
-40° to 200°F (-40° to 93°C) storage
- Power Supply Effect:** $\pm 0.005\%$ over operating range
- Isolation:** (MVT 326 only) Input/Output 600 vac
1000 vdc

Note: All accuracies are given as a percentage of span

POWER

- 15 to 42 vdc—standard 28mA typical, 33mA Max.

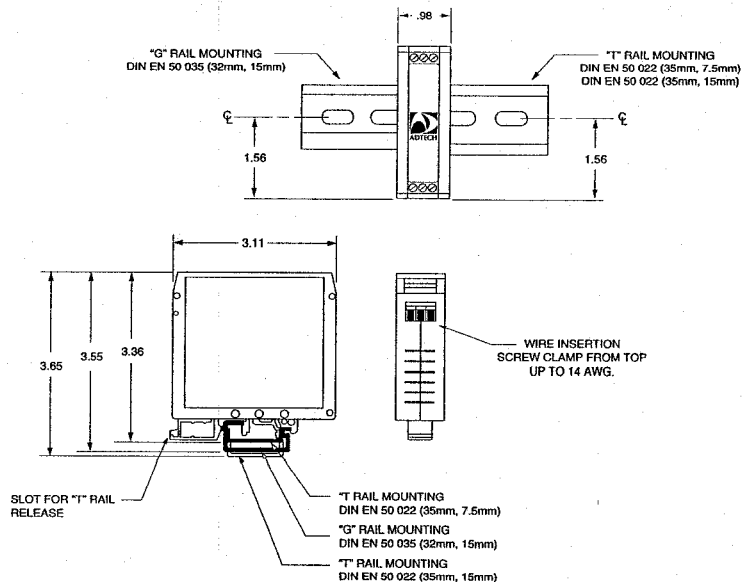
MECHANICAL

- Electrical Classification:** general purpose
- Connection:** Screw, compression type, accepts up to 14 AWG
- Controls:** One 4 position jumper for major range
Two 16 position rotary switches for **COARSE ZERO** and **SPAN** control
Two multiturn potentiometers for **FINE ZERO** and **SPAN** control
- Mounting:** DIN, Surface, Snap-Track, or NEMA 4 & 7
- Weight:** Net Unit: 4 oz. (115 grams)
Shipping: Nominal 7 oz. (200 grams)

OPTIONS

| Option Number | Description |
|-------------------|------------------------|
| H 13 through H 27 | Mounting |
| I 14 | Voltage/Current Inputs |

10. OUTLINE MOUNTING



OPTIONAL MOUNTINGS – see separate drawings provided or request from the factory

- | | | |
|--------|-------|--|
| Option | H-15D | Explosion Proof, Class 1, Group B, C & D |
| Option | H-25 | Snap Track Mounting (N/C (Specify)) |
| Option | H-26 | Surface Mounting N/C (Specify) |
| Option | H-27 | NEMA 4 Enclosure |
| Option | H-28 | T35 DIN T rail 2 Ft. Long |
| Option | H-28 | T32 DIN G rail 2 Ft. Long |