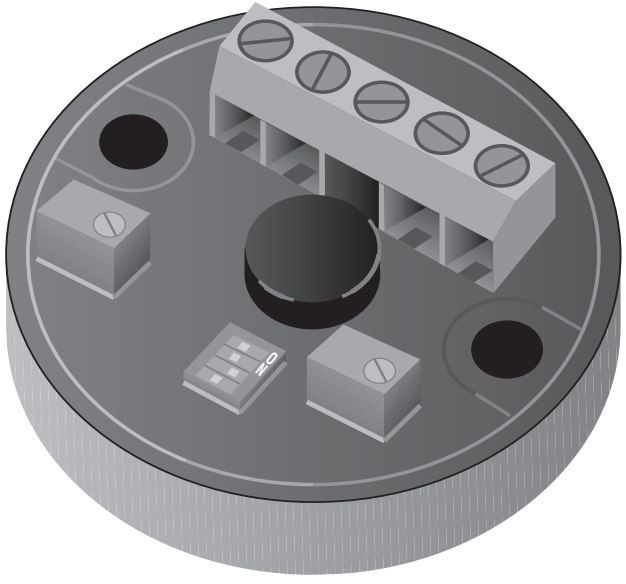
1 YEAR
WARRANTY



# User's Guide

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# TX905
# Field Rangeable Voltage Input Two-Wire Transmitter

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# TX905, TX906
# Voltage Input Two-Wire Transmitter

# 1 Introduction

## 1.1 General Description

The OMEGA® TX905 or TX906 Voltage Input Two-Wire Transmitter will produce a standard 4-20 mA output signal proportional to that produced by its Voltage Input. Transmission of the proportional current output may be accomplished by using inexpensive copper wire.

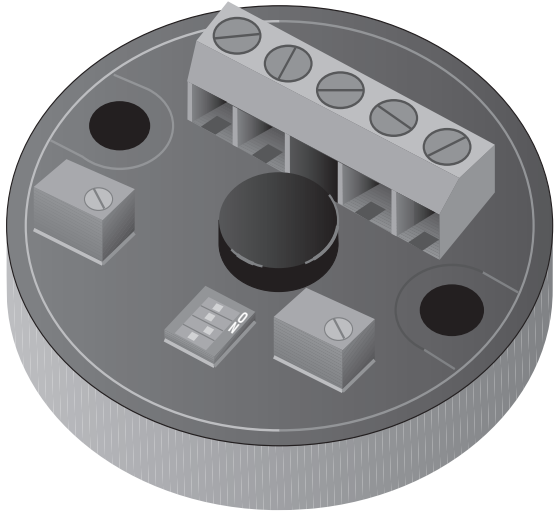


Figure 1-1 TX905, TX906 Transmitter

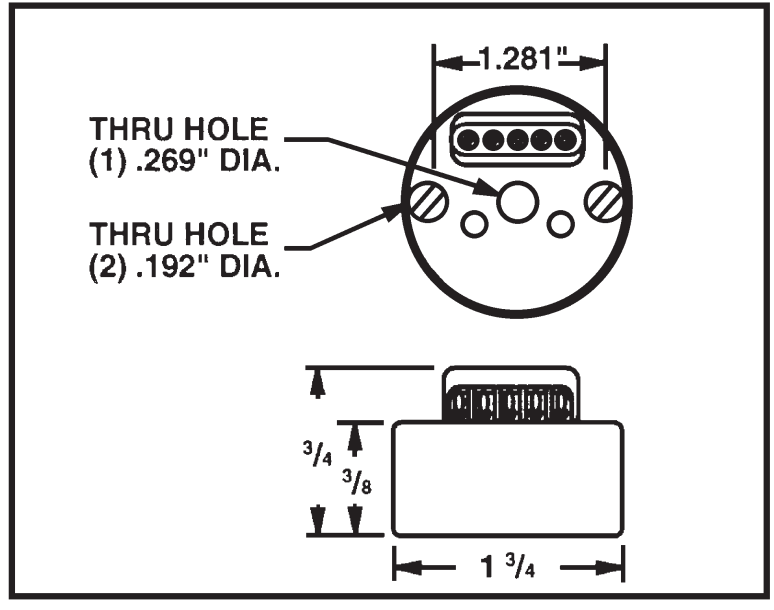



Figure 1-2 Dimensions (in inches)

The TX905 or TX906 transmitter is normally powered by an unregulated power supply as shown in Figure 1-3. The proportionally-transmitted signal begins at 4 mA, at the low end of its voltage range, and increases to 20 mA, at the high end of its voltage range.

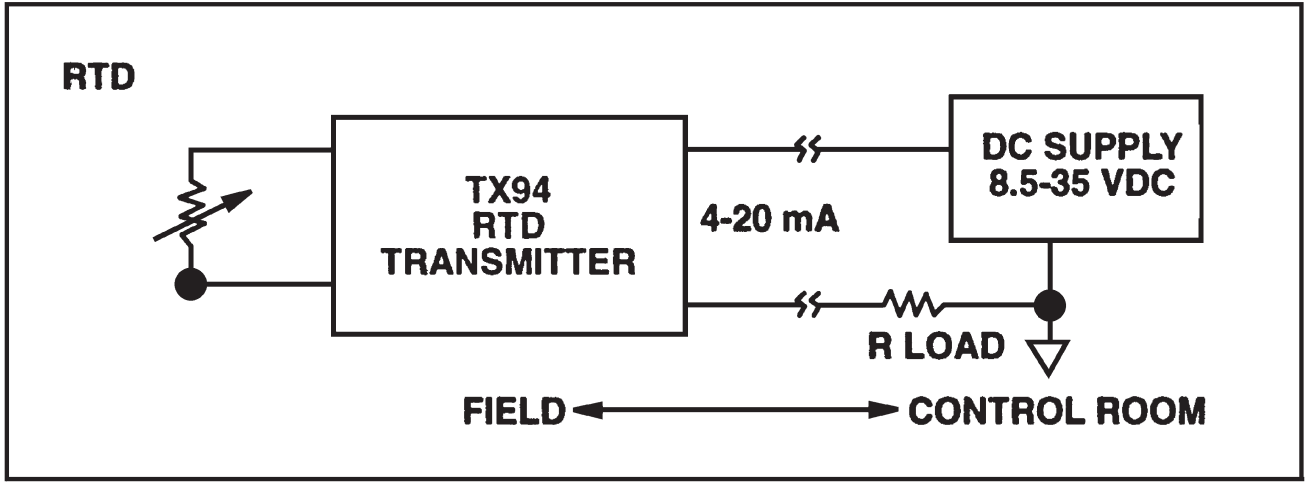



Figure 1-3 TX94 RTD Transmitter

The TX905 or TX906 two-wire transmitter works with voltage inputs and provides an output current of 4-20 mA proportional to the input. Two copper wires now carry the 4-20 mA output signal and dc voltage to operate the transmitter, thereby reducing possible noise pick-up errors. The TX905 or TX906 does NOT provide isolation between its input and the 4-20 mA output.

## 1.2 Features

- 4-20 mA output
- ±0.1% full-scale accuracy
- Upscale break protection
- Low Cost

## 1.3 TX905, TX906 Models Available

| Model Number | Description |
|---|---|
| TX905 | Field rangeable millivolt transmitter, 4 to 64 mV |
| TX906-V1 | Field rangeable millivolt transmitter, 0.04 to 0.64 mV |
| TX906-V2 | Field rangeable millivolt transmitter, 0.40 to 6.40 mV |
| TX906-V3 | Field rangeable millivolt transmitter, 4 to 64 mV |

# 2 Installation

## 2.1 Mounting the TX905 or TX06

The TX905 or TX906 transmitter may be:

1. surface mounted,
2. mounted inside a protection head (refer to Figure 2-1), or
3. installed into the OMEGA mounting track (part number RT) using an OMEGA mounting bracket (part number TX90-BR).
4. installed into standard 35mm DIN rail using an OMEGA DIN rail mounting adapter (part number TX-90-DIN).

Figure 2-2 shows the RT mounting track. Figure 2-3 shows the TX90-BR mounting bracket.

Figure 2-4 shows a typical installation of two transmitters using the bracket and mounting track. Figure 2-5 shows the TX90-DIN rail mounting adapter.

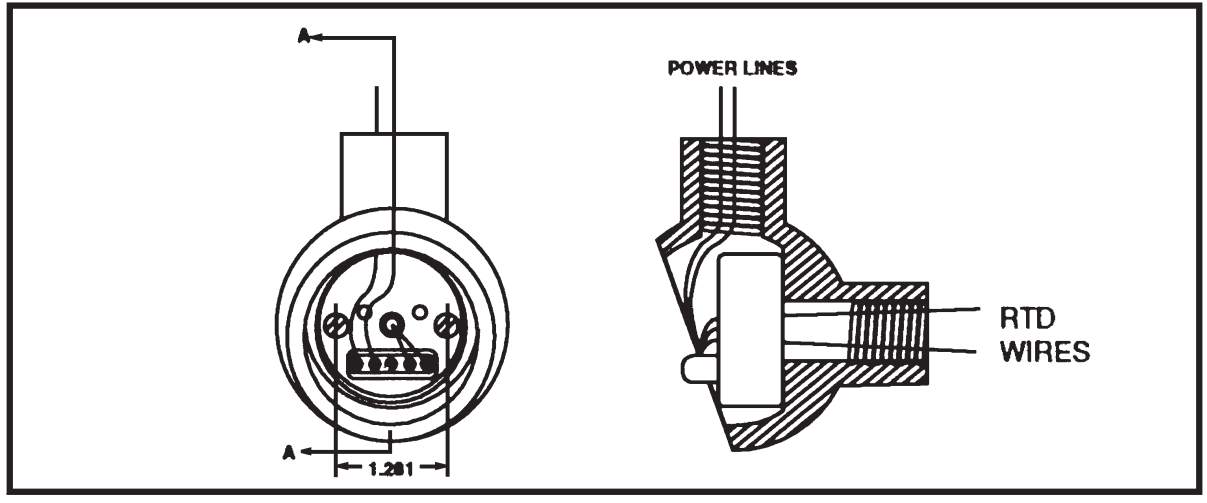
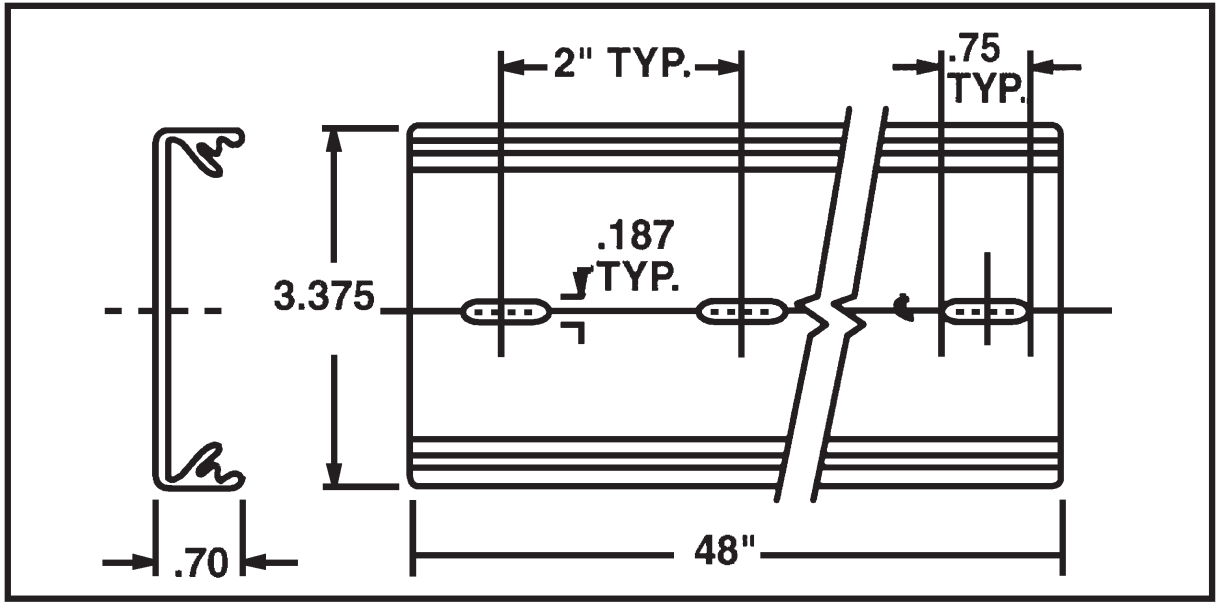



**Figure 3-1 Assembly of the Transmitter inside Protection Head**




**CAUTION**

Hand tighten transmitter mounting screws only. Do not overtighten.

**Figure 2-2 RT Mounting Track (Dimensions in inches)**

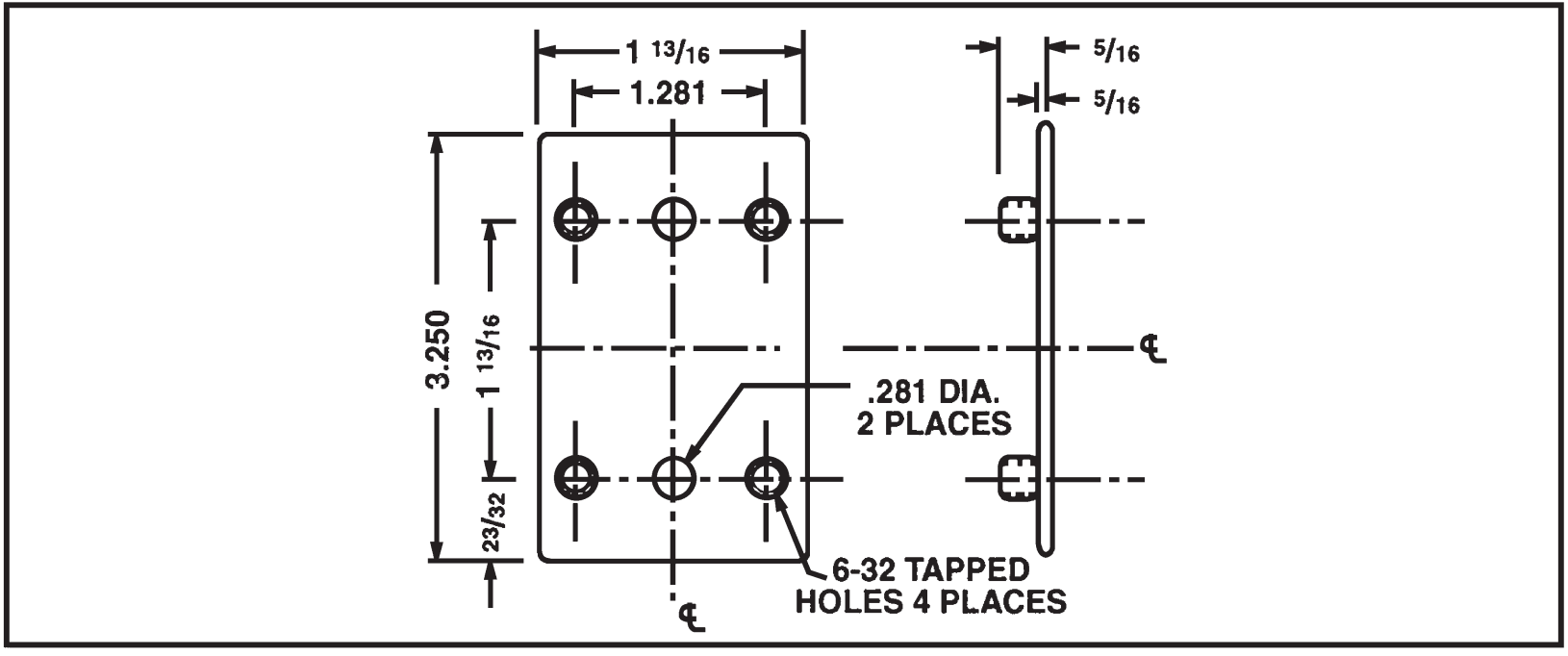



Figure 2-3 TX90-BR Mounting Bracket (Dimensions in inches)

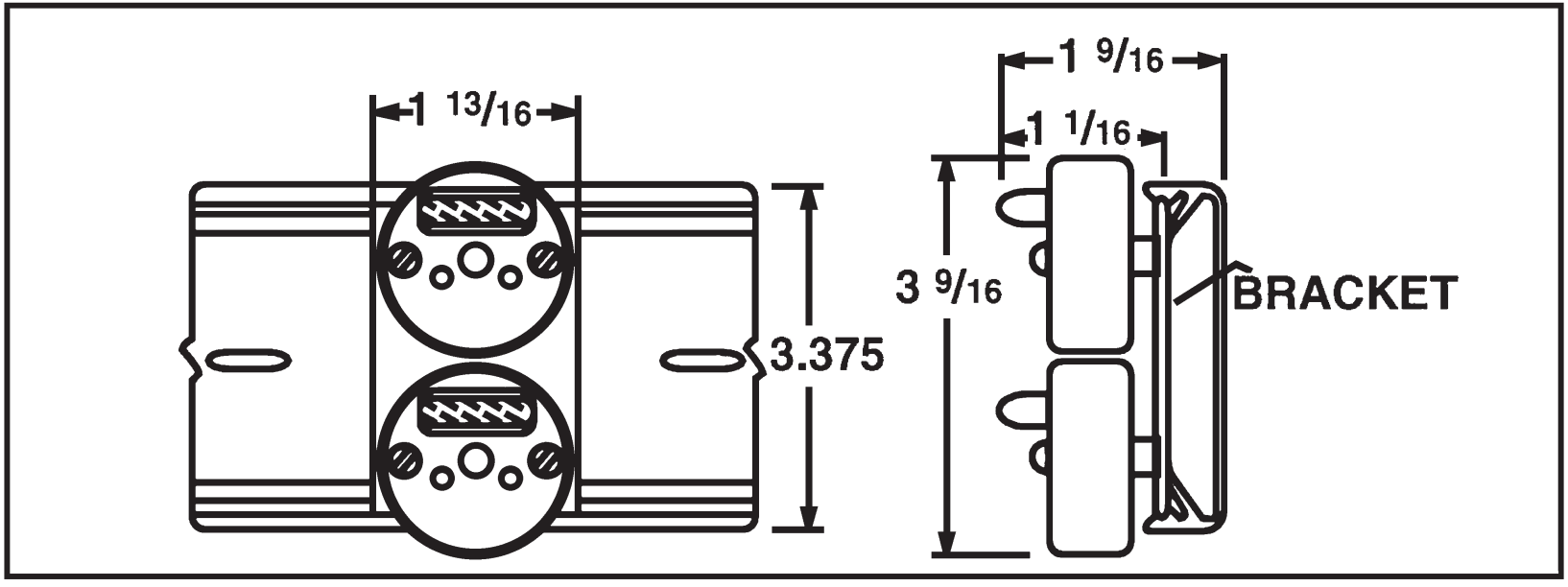



Figure 2-4 Installation with the Bracket and Track (Dimensions in inches)

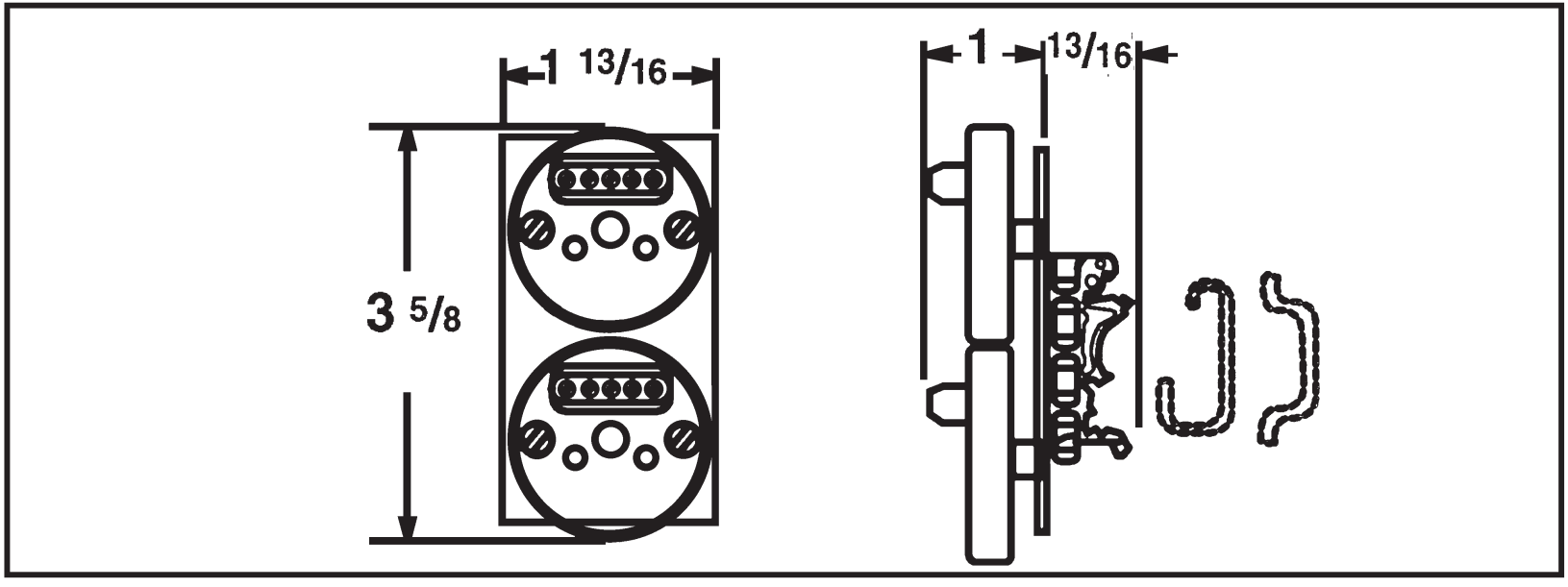



**Figure 2-5 TX 90-DIN DIN Rail Mounting Adapter (Dimensions in inches)**

## 2.2 Wiring the TX905 or TX906 (Refer to Figure 2-6)

1. Connect a dc power supply in series with the load to the (+PS) and (-PS) power terminals. Note that the load (usually a monitoring instrument) may be connected to either the (+) or (-) power lead.
2. Connect the RTD element to the input terminals as shown.

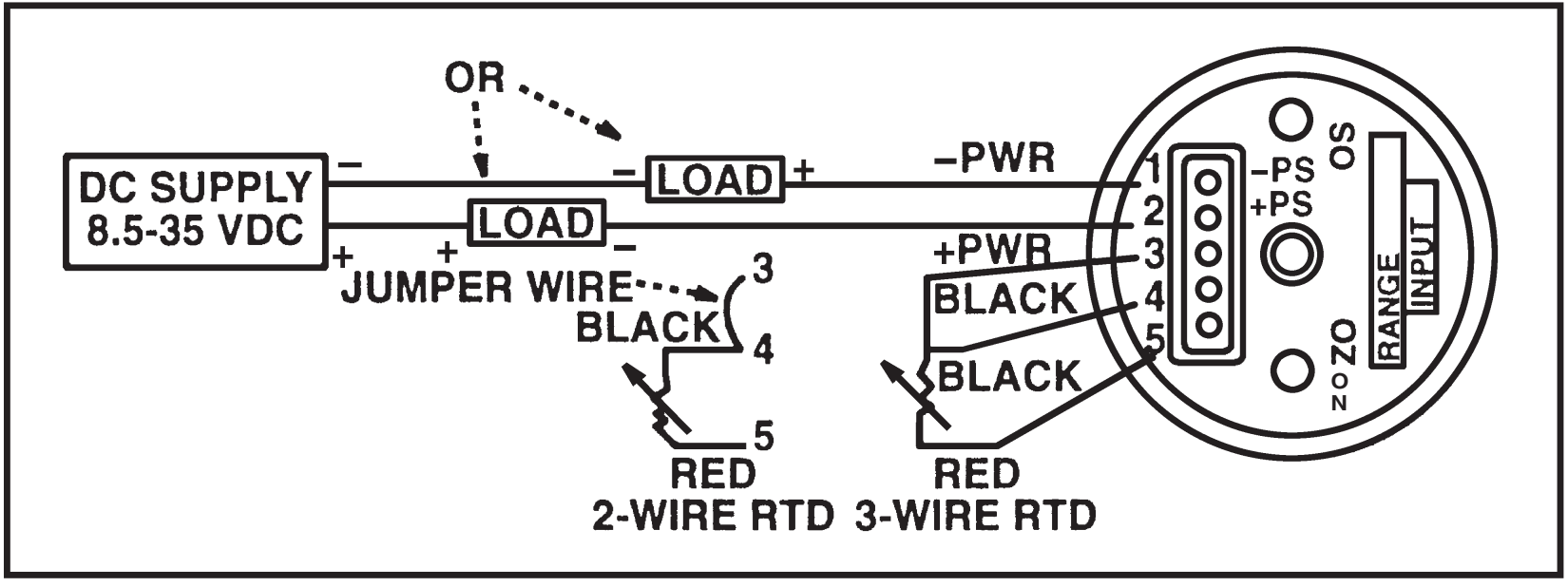



**Figure 2-5 Wiring Diagram for the TX905 or TX906**

# 3 Calibration Instructions

## 3.1 Equipment Required

- Precision voltage source, such as the OMEGA® CL8301 dc voltage and Current Calibrator
- Precision DMM capable of measuring mA, within 0.001 mA resolution and ±0.002 mA accuracy.

## 3.2 Calibration Procedures (Refer to Figure 3-1)

Connect the calibration equipment according to Figure 3-1. Standard copper test leads are used.

To check or adjust the calibration:

1. Locate the Z (zero) and S (span) potentiometers.
2. Select, from Table 3-1, the correct dip switch settings for your desired range for the TX905 or TX906.

If a Precision Voltage Simulator is used, such as the OMEGA® Model CL8301 Precision Calibrator, select the Voltage Input Z (zero) and S (span) values.

For example, if you selected an input range of 10 to 50 mV for the TX905, the Z input is 10.000 mV and the S input is 50.000 mV.

3. Set the calibrator to the selected Z (zero) voltage value. Adjust the Z potentiometer to read 4.000 mA on the monitoring instrument.

4. Set the calibrator to the selected S (span) voltage value. Adjust the S potentiometer to read 20.000 mA on the monitoring instrument.

5. Repeat steps 3 and 4, as required, until the readaings are exactly 4.000 mA and 20.000 mA. This procedure is necessary since there is interaction between the two potentiometers.

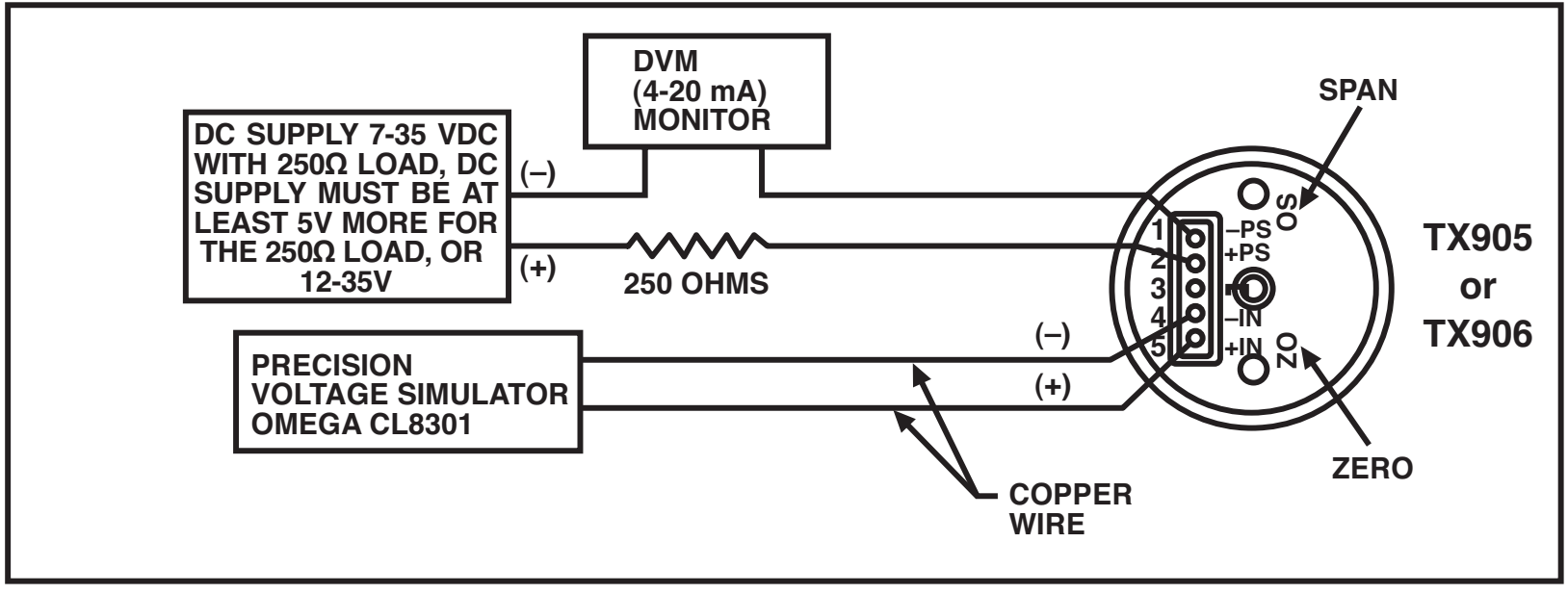



**Figure 3-1 TX905 or TX906 Voltage Calibration Set-Up**

## Table 4-1. Calibration Values for the TX905 AND TX906

| MODEL | INPUT SPAN | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TX906-V3 | 4/8V | 8/16V | 12/24V | 16/32V | 20/40V | 24/48V | 28/56V | 32/64V |
| TX906-V2 | .4/.8V | .8/1.6V | 1.2/2.4V | 1.6/3.2V | 2.0/4.0V | 2.4/4.8V | 2.8/5.6V | 3.2/6.4V |
| TX906-V1 | .04/.08V | .08/.16V | .12/.24V | .16/.32V | .20/.40V | .24/.48V | .28/.56V | .32/.64V |
| TX905 | 4/8V | 8/16V | 12/24V | 16/32V | 20/40V | 24/28V | 28/56V | 32/64V |
| SW4 | ON | OFF | ON | OFF | ON | OFF | ON | OFF |
| SW5 | ON | ON | OFF | OFF | ON | ON | OFF | OFF |
| SW6 | ON | ON | ON | ON | OFF | OFF | OFF | OFF |
| POSITION | SWITCH SETTING | | | | | | | |

# 4 Troubleshooting Guide

Malfunction or incorrect operation may be caused by:

1. Incorrect Readings:
   Check for improper wiring (Refer to Figure 2-5)
2. Loose or broken wires:
   Check each terminal connection for tightness. Move each wire-back and forth and note any changes in operation.
3. Too high a load resistance in the output current loop or too low a current rating on the power supply:
   a) Measure the total resistance of each device (excluding the transmitter and power supply) in the 20 mA loop, including the resistance of the lead wires.

b) Calculate maximum allowable loop resistance using the formula: Loop Resistance (maximum) = $\frac{V_{supply} - 7V}{0.020A}$

For example, a 24V power supply would give a maximum loop resistance of: 17V/0.020A = 850 ohms.

c) Make sure the power supply is rated for at least 28 mA times the number of TX905 or TX906 transmitters being powered. For example, if the supply is powering five transmitters, the supply should be rated for at least 140 mA.

# 5 Accessories

| Model No. | Description |
|---|---|
| TX90-BR | Mounting Bracket |
| PSU-24B | Unregulated Power Supply, 24 Volts |
| TX828 | Process Loop-Powered Indicator |
| RT | 48" Mounting Track |
| TX90-DIN | DIN Rail Mounting Adapter |
| RAIL -35-2 | 6.5' Section 35mm DIN Rail |

# 6 Specifications

## General

| | | | |
|---|---|---|---|
| Size: | 1.75" dia. X 1.25" high (includes terminal strip) | | |
| Span Adjustment | TX905 | 4 to 64 mV | switch selectable |
| | TX906-V1 | .04 to .64 | switch selectable |
| | TX906-V2 | .4 to 6.4 | switch selectable |
| | TX906-V3 | 4 to 64 | switch selectable |
| Zero Adjustment | ±25% of span | | |
| Power Supply Voltage | | | |
| Operating Range: | +7 Vdc to +35 Vdc, 28 mA max required per transmitter | | |

| | |
|---|---|
| Accuracy: | ±0.1% of full scale (includes effects of hysteresis, (repeatability and linearity proportional to the RTD input) |
| Frequency Response: | 3dB@ 3Hz |
| Ambient Temperature: | -13°F to 185°F (-25°C to 85°C) |
| Storage Temperature Range: | -85°F to 257°F (-65°C to 125°C) |
| Thermal Zero Shift: | <0.01%/°F of span (span >10 mV)<br><0.02%/°F of span (span = 5 to 10 mV) |
| Thermal Span Shift: | <0.01%/°F of span |
| Weight: | 1.0 oz (29g) |

## Output

| | |
|---|---|
| Current Output Span: | 4-20 mA dc |
| Current Output Limits: | 3 to 28 mA, typical |
| Maximum Loop Resistance: | $(V_{supply} - 7V)/0.020A$ = ohms |
| Load Resistance Effect: | 0.01% of span per 300 ohms change |
| Power Supply Effect: | 0.002% of output span per volt |

## Input

| | | |
|---|---|---|
| Sensor: | millivolt or voltage output transducer | |
| Source Current: | (TX905) | 4 nA TYP |
| Input Resistance: | (TX905) | >30 MEGOHMS |
| Input Resistence: | (TX905) | 226 K |


# Notes

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