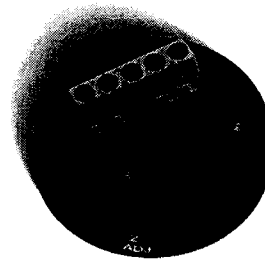


Ω TX95

Ω Voltage Input Two-Wire Transmitter



Operator's Manual

An OMEGA Technologies Company



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TX95
Voltage Input Two-Wire Transmitter

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Introduction

1.1 General Description

The OMEGA® TX95 Two-Wire Voltage Input 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.

1 Introduction

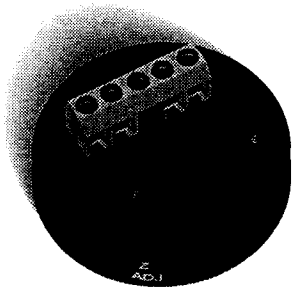


Figure 1-1 TX95 Transmitter

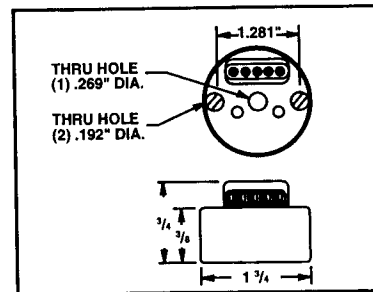


Figure 1-2 Dimensions (in inches)

The TX95 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. (There are various voltage ranges available for the TX95 transmitter. To order, refer to Section 1.3 for correct Model Numbers and Range Codes.)

1

Introduction

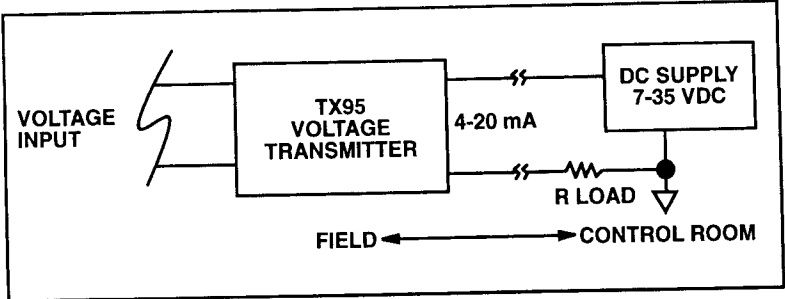


Figure 1-3 TX95 Voltage Transmitter

The TX95 two-wire transmitter works with voltage inputs and provides an output current of 4-20 mA proportional to the input. Two copper wires carry the 4-20 mA signal and dc voltage to operate the transmitter, thereby reducing possible noise pick-up errors. The TX95 does NOT provide isolation between its input and the 4-20 mA output.



Introduction

1.2 Features

- 4-20 mA output
- $\pm 0.1\%$ full-scale accuracy
- Upscale break protection
- Low Cost

1.3 Models Available

Table 1-1. Range Code

RANGE	INPUT TYPES	
	VOLTAGE	
0 TO 60 mV	V1	
0 TO 10 mV	V2	

Note: Other mV and voltage ranges available. Contact OMEGA.

1 Introduction

TX95 Models Available

Model Number	Description
TX95-(*)	Voltage input transmitter

*Insert range code from Table 1-1

2

Unpacking Instructions

Remove the Packing List and verify that you have received all equipment, including:

- TX95 Voltage Input Two-Wire Transmitter
- Operator's Manual

If you have any questions about the shipment, please call the Customer Service Department.

When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

3**Installation**

3.1 Mounting the TX95

The TX95 transmitter may be:

1. surface mounted,
2. mounted inside a protection head (refer to Figure 3-1), 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 3-2 shows the RT mounting track. Figure 3-3 shows the TX90-BR mounting bracket.

Figure 3-4 shows a typical installation using the bracket and mounting track. Figure 3-5 shows the TX90-DIN adapter.

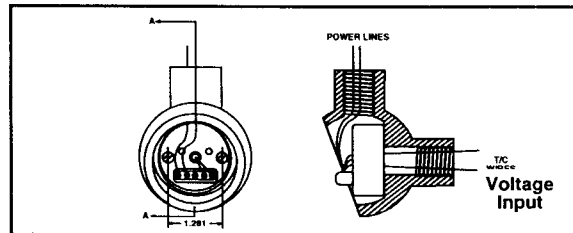
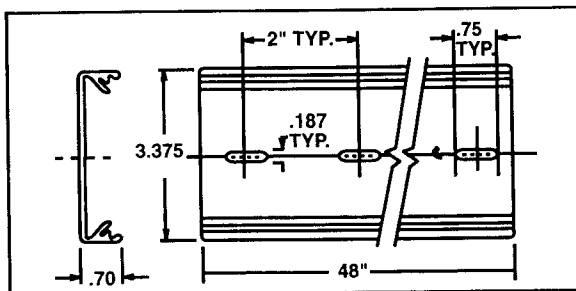


Figure 3-1 Assembly of the TX95 Voltage Input Transmitter inside an OMEGA NB1 Protection Head (in Inches)

3

Installation



CAUTION

Hand tighten transmitter mounting screws only. Do not overtighten.

Figure 3-2 RT Mounting Track (Dimensions in inches)

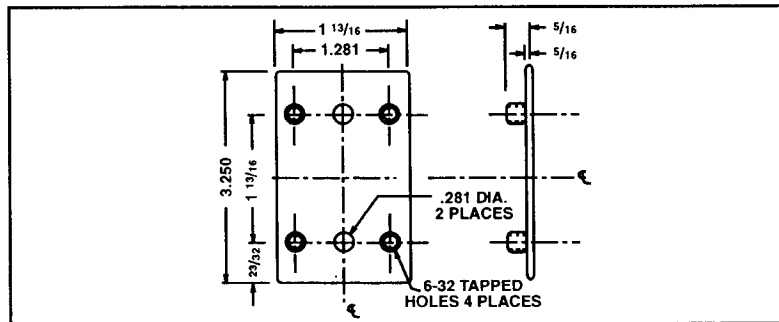


Figure 3-3 TX90-BR Mounting Bracket (Dimensions in inches)

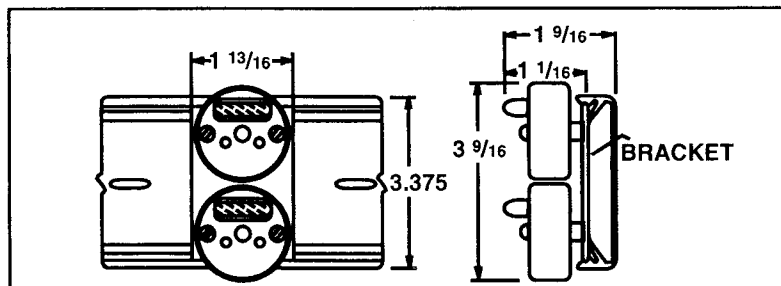
3**Installation**

Figure 3-4 Installation with the Bracket and Track (Dimensions in inches)

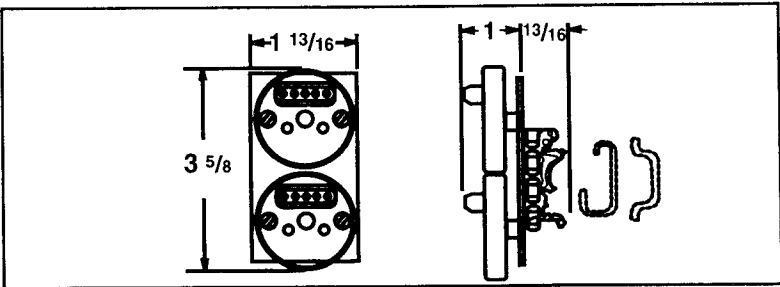


Figure 3-5 TX90-DIN DIN Rail Mounting Adapter (Dimensions in inches)

3.2 Wiring the TX95 (Refer to Figure 3-6)

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 voltage input to the input terminals as shown.

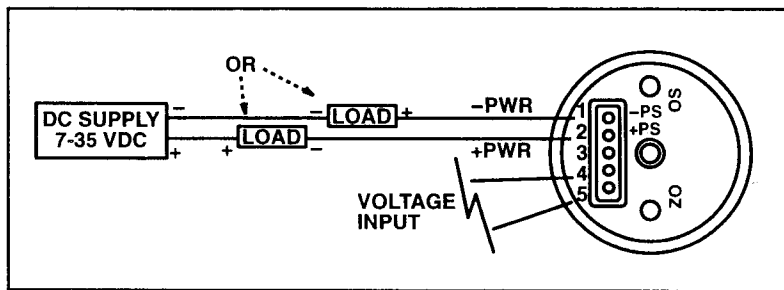


Figure 3-6 Wiring Diagram for the TX95

4**Calibration Instructions**

4.1 Equipment Required

- Precision Voltage Source, such as the OMEGA Model CL8301 dc Voltage and Current Calibrator
- Precision DMM capable of measuring mA, within 0.001 mA resolution and ± 0.002 mA accuracy

4.2 Calibration Procedures (Refer to Figure 4-1)

Connect the calibration equipment according to Figure 4-1. 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 4-1, the correct voltage values for the Z (zero) and S (span) adjustments that correspond to the Model Number. For example, for Model TX95-V1, the Z value is 0.000 mV, and the S value is 60.000 mV.

Calibration Instructions

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

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 readings are exactly 4.000 mA and 20.000 mA. This procedure is necessary since there is interaction between the two potentiometers.

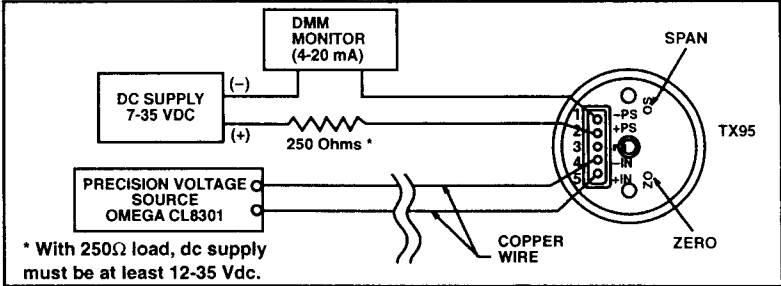


Figure 4-1 TX95 Voltage Calibration Set-Up

Table 4-1. Calibration Values for the TX95

Voltage Input Range Zero/Span	Model TX95	Voltage Input Input Zero/Span
-0/60 mV	V1	0.000/60.000 mV
0/10 V	V2	0.00/10.00 V

5**Troubleshooting Guide**

Malfunction or incorrect operation may be caused by:

1. Incorrect Readings:

Check the improper wiring (Refer to Figure 3-6)

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:
$$\text{Loop Resistance (maximum)} = \frac{V_{\text{supply}} - 7V}{0.020A}$$

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 TX95 transmitters being powered. For example, if the supply is powering 5 transmitter, the supply should be rated for at least 140 mA.

6**Accessories**

Model No.	Description
TX90-BR	Mounting Bracket
PSU-24B	Unregulated Power Supply, 24 Volts
TX82B	Process Loop-Powered Indicator
RT	48" Mounting Track
TX90-DIN	DIN Rail Mounting Adapter
RAIL-35-2	6.5' Section 35mm DIN Rail

7**Specifications**

General

Size:	1.75" dia. X 0.75" high (includes terminal strip)
Zero/Span Adjustment	
Range:	±20%
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 T/C)

Specifications**7**

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
Thermal Span Shift: <0.01%/°F of span
Weight: 1.0 oz (28g)

7**Specifications****Output**

Current Output Span:	4-20 mA dc
Current Output Limits:	3 to 28 mA, typical
Maximum Loop Resistance:	$(V_{\text{supply}} - 7V)/0.020A = \text{ohms}$
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
Input Resistance:	TX95-V1, 30 M Ω ; TX95-V2, 227 K Ω



WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **61 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **five (5) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

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