



Ω OMEGA™ User's Guide



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TX92A Miniature Temperature Transmitters



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SECTION 1 GETTING STARTED

1.1 Unpacking

Remove the packing list and verify that you have received all equipment. If you have any questions, contact the nearest Customer Service Department, as listed on the cover of this manual.

Upon receipt of shipment, inspect the container and equipment for any 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 any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing materials and carton in the event reshipment is necessary.

1.2 Safety and EMC Considerations

This instrument is a Class III device (8 to 50 Vdc). Always use a power supply, which complies with EN 60950 safety standard.

EMC Considerations

- Whenever EMC is an issue, always use shielded cables.
- Never run signal and power wires in the same conduit.
- Use signal wire connections with twisted-pair cables.
- Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

Failure to follow all instructions and warnings may result in injury!

1.3 General Description

The TX92A Series transmitter accepts platinum 100 ohm sensor type RTDs and will produce a standard 4-20 mA output signal proportional to that produced by its attached RTD input. The transmitter does NOT provide isolation between its input and the 4-20 mA output; therefore, an ungrounded RTD is suggested to prevent possible ground loops.

The transmitter provides amplification, common-mode rejection and controlling the current draw from an 8-to-50 Vdc source to produce the 4-to-20 mA output signal. As much as 800 ohms dropping resistance may be used in the power leads of the TX92A when the unit is energized from a 24 Vdc source because of the small compliance voltage needed by the unit.

1.4 Available Ranges

As specified in Table 1-1, the transmitter has 10 ranges. Depending upon the range, the transmitter can measure temperature span as narrow as 180°F or as wide as 1000°F. A multi-turn, top-accessible potentiometer provides fine span tuning. A second top-accessible, multi-turn potentiometer provides a zero adjustment which allows placement of the 4-mA output temperature within +/- 25% for Fahrenheit and +/- 10% for Celsius of nominal span (refer to Section 3.0, Calibrating the Transmitter, for more details). Models TX92A-***-L** are transmitters with the 4-20mA output linearized to temperature.

Table 1-1. Range/Models

Range	Model	
-40 to 140°F	TX92A-1	TX92A-1-L
0 to 200°F	TX92A-2	TX92A-2-L
0 to 300°F	TX92A-3	TX92A-3-L
0 to 500°F	TX92A-4	TX92A-4-L
0 to 750°F	TX92A-5	TX92A-5-L
0 to 1000°F	TX92A-6	TX92A-6-L
-0 to 100°C	TX92A-7	TX92A-7-L
-0 to 150°C	TX92A-8	TX92A-8-L
-0 to 250°C	TX92A-9	TX92A-9-L
-0 to 400°C	TX92A-10	TX92A-10-L

1.5 Ordering Guide

The model number describes the functionality of the transmitter.

	Model	Temperature Range
TX92A-	1	-40 to 140°F
	2	-0 to 200°F
	3	-0 to 300°F
	4	-0 to 500°F
	5	-0 to 750°F
	6	-0 to 1000°F
	7	-0 to 100°C
	8	-0 to 150°C
	9	-0 to 250°C
	10	-0 to 400°C
	-L	4-20mA output linearized to temperature
	FS	**Factory Scaling Option:

**Factory Scaling available for additional charge. Consult factory.

To order additional transmitters, specify TX92A followed by the model number. For example:

TX92A-2 = RTD Transmitter with a temperature range of -0 to 200°F.

or

TX92A-2-L = RTD Transmitter with the 4-20mA output linearized to temperature and a temperature range of -0 to 200°F.

1.6 Shock Resistance

Lightweight TX92A transmitter circuit boards are fabricated from rigid, shock resistant materials with the components soldered to the circuit board.

The TX92A transmitter's small size permits mounting into thermowells or wall mounting in confined areas.

2.0 CONNECTING POWER AND SIGNAL INPUTS

1. Verify that the transmitter is connected for the correct power voltage rating.
2. Connect the power supply to pin 4 and the resistance load to pin 5.
3. Connect the sensor to pins 1, 2 and 3.

The transmitter has no power on switch, so it will be in operation as soon as you apply power.

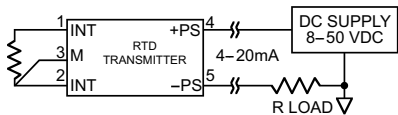


Figure 2-1 Power Input Setup

+PS and -PS screws accept 2mm (13 gauge) or lighter wire. Input range is 8-50 Vdc.

Table 2-1. Screw-Terminal Pin Assignment

1	RTD
2	RTD
3	M (Sense)
4	+Power/Signal Output
5	-Power/Signal Output

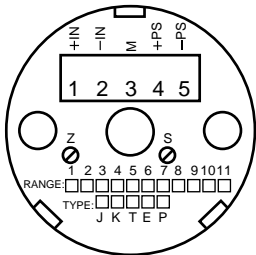


Figure 2-2 Pin Assignment

3.0 CALIBRATING THE TRANSMITTER

Calibration Setup:

1. Insert the reference RTD.
2. Connect RTD simulator.
3. Connect DMM monitor and power supply.

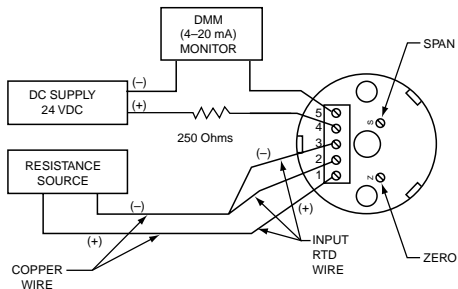


Figure 3-1. Calibration Setup (Resistance Source)

To calibrate the transmitter, follow these steps (refer to Figure 3-1):

1. Locate the model number in Table 3-1 or 3-2 and set the resistance source to the LO-IN value.
2. Adjust the Zero potentiometer until the milliammeter reads 4.00 mA.
3. Set the resistance source to the HI-IN value (in your appropriate table) and read the output current on the milliammeter.
4. Adjust the Span potentiometer to obtain the 20 mA on the milliammeter.
5. Set the resistance source to LO-IN resistance. If the output current is not 4.00 mA, repeat steps 2 through 7.
6. When calibration is complete, remove the transmitter from the setup.

3.0 CALIBRATING THE TRANSMITTER (Continued)

An RTD calibrator may be used in place of the resistance source - refer to Figure 3-2.

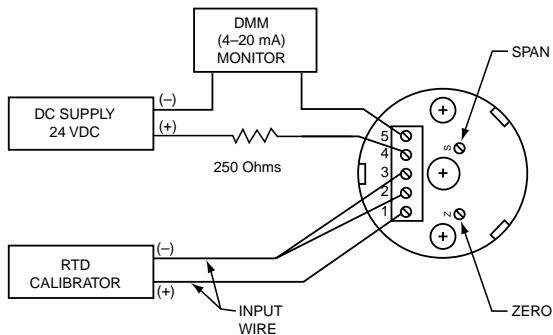


Figure 3-2. Calibration Setup (RTD Simulator)

Table 3-1. Fahrenheit Temperature to OHMS Conversion Chart

Value	Model Number/Range					
TX92A-	1	2	3	4	5	6
	(-40 to 140°F)	(0 to 200°F)	(0 to 300°F)	(0 to 500°F)	(0 to 750°F)	(0 to 1000°F)
LO IN	84.27 Ω	92.95 Ω	92.95 Ω	92.95 Ω	92.95 Ω	92.95 Ω
HI IN	123.24 Ω	135.85 Ω	156.96 Ω	197.71 Ω	246.74 Ω	293.56 Ω

Table 3-2. Celsius Temperature to OHMS Conversion Chart

Value	Model Number/Range			
TX92A-	7	8	9	10
	(0 to 100°C)	(0 to 150°C)	(0 to 250°C)	(0 to 400°C)
LO IN	100 Ω	100 Ω	100 Ω	100 Ω
HI IN	138.51 Ω	157.33 Ω	194.10 Ω	247.09 Ω

4.0 SPECIFICATIONS

INPUT

Configuration:	Non-isolated input
Transducer types:	Platinum RTD
Burnout indication:	Upscale over-range indication, 40 mA max.

OUTPUT

Linear range:	4 to 20 mA _{dc}
Current Output limits:	<2 to >40 mA (open RTD)
Compliance (supply-voltage):	8 to 50 V _{dc}
Reverse polarity protection:	350 V peak
Maximum loop resistance:	(Supply Voltage - 8V)/20 mA

ACCURACY

Hysteresis and repeatability:	Within $\pm 0.1\%$ of FS
Linearity with respect to input:	$\pm 0.1\%$ of FS
For -L models: linearity with respect to temperature:	$\pm 0.2\%$ of FS
Power supply effect:	Within $\pm 0.01\%/V$
Temperature effect:	Zero and Span: Within $\pm 0.1\%$ FS/ $^{\circ}F$

ENVIRONMENTAL

Operating temperature:	-40 to 185 $^{\circ}F$ (-40 to 85 $^{\circ}C$)
Storage temperature:	-50 to 250 $^{\circ}F$ (-45 to 121 $^{\circ}C$)
Humidity:	To 90% (non-condensing)

MECHANICAL

Weight:	less than 1.2 oz (34g)
Diameter:	1.75 in (44.34 mm)
Height (including barriers):	1.25 in (31.75 mm)

4.0 SPECIFICATIONS (Continued)

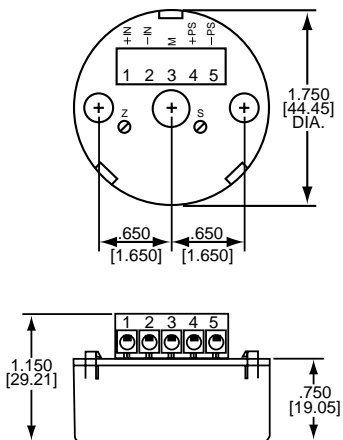


Figure 4-1. Case Dimensions

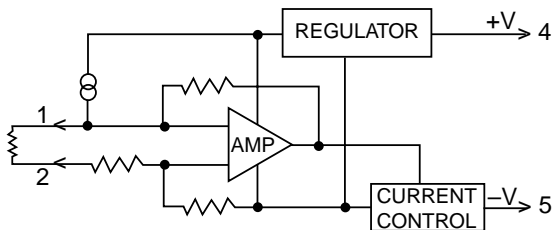


Figure 4-2. Transmitter Block Diagram

- NOTES -

- NOTES -

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **61 months** from date of purchase. OMEGA's 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 malfunctions, 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. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been 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 in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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