

Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!



User's Guide

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- Transducers & Strain Gauges
- Load Cells & Pressure Gauges
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL

- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine / Paddlesheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY

- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION

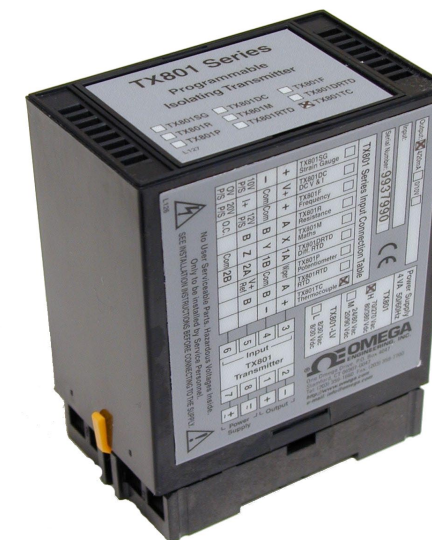
- Data Acquisition & Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Datalogging Systems
- Recorders, Printers & Plotters

HEATERS

- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments



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TX801RTD SERIES 3 WIRE ISOLATING RTD TRANSMITTER



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WARNING: These products are not designed for use in, and should not be used for, patient connected applications.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **one (1) 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. 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 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 are not warranted, including but 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. P.O. 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. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

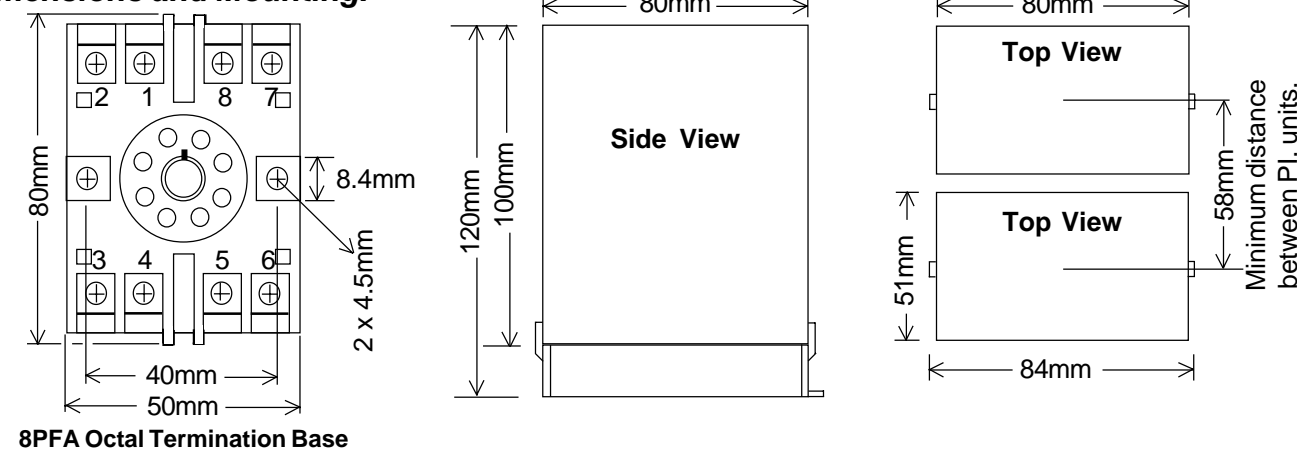
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TX801RTD Programmable Isolating RTD Transmitter.

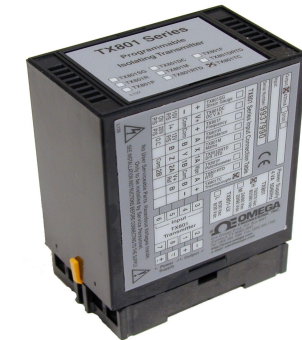
Programmable, Isolating, 3 Wire RTD Input to DC Current or DC Voltage Output Transmitter.

Dimensions and Mounting.



Features.

- Field Programmable Input and Output Ranges.
- Bi-Polar Input and Output Ranges.
- Isolated Input to Output 1.6kV.
- High Accuracy & Linearity 0.1%.
- Linear With Temperature.
- Universal AC/DC Power Supply.
- Compact DIN Rail Mount Enclosure.
- Available Standard or Special Calibration.



The Proper Installation & Maintenance of TX801RTD.

MOUNTING.

- (1) Mount in a clean environment in an electrical cabinet on 35mm, symmetrical, mounting rail.
- (2) Do not subject to vibration or excess temperature or humidity variations.
- (3) Avoid mounting in cabinets with power control equipment.
- (4) To maintain compliance with the EMC Directives the TX801RTD must be mounted in a fully enclosed steel cabinet. The cabinet must be properly earthed, with appropriate input / output entry points, filtering, and cabling.

WIRING.

- (1) A readily accessible disconnect device and overcurrent device must be incorporated in the the power supply wiring.
- (2) All cables should be good quality overall screened INSTRUMENTATION CABLE with the screen earthed at one end only.
- (3) Signal cables should be laid a minimum distance of 300mm from any power cables.
- (4) For 2 wire current loops Austral Standard Cables B5102ES is recommended. For three wire transmitters and RTD's Austral Standard Cables B5103ES is recommended.
- (5) It is recommended that you do not ground current loops and use power supplies with ungrounded outputs.
- (6) Lightning arrestors should be used when there is a danger from this source.
- (7) Refer to diagrams for connection information.

RTD'S.

- (1) Avoid locating the RTD where it will be in a direct flame.
- (2) Locate it where the average temperature will be measured. It should be representative of the mass.
- (3) Immerse the RTD far enough so that the measuring point is entirely in the temperature to be measured; nine to ten times the diameter of the protection tube is recommended. Heat that is conducted away from the measuring point causes an error in reading.

COMMISSIONING.

- (1) Once all the above conditions have been carried out and the wiring checked apply power to the TX801RTD loop and allow five minutes for it to stabilize.
- (2) Due to differences in cable resistance in the RTD legs or errors within the RTD itself a small Zero error may occur (usually less than 0.5C). To remove this error use a calibration standard RTD at the same immersion depth and adjust the Zero trimpot in the top of the TX801RTD enclosure with a small screwdriver, until the two levels agree. (Clockwise to increase the output reading and anti-clockwise to decrease the output reading.)

MAINTENANCE.

- (1) Check RTD's in place - with a calibration RTD at the same immersion depth.
- (2) Do it regularly - at least once every 6 months.
- (3) Replace defective protection tubes - even if they look good they may not be air or gas tight.
- (4) Check cables entering the RTD sensor head.

TX801RTD Specifications.

RTD Input		Pt100 DIN (3 Wire Type) Standard. Sensor Current = 0.8mA Typical. Lead Wire Resistance = 10Ω/Wire Max. Field Programmable Zero From -200C(-400F) to 200C(400F).
		Field Programmable Span From 20C(40F) to 600C(1200F). Suitable for 2 Wire Connection. (Offset Calibration Needed.) Other Types of RTD Available. JIS Pt100, Pt250, Pt500, Pt1000, CU10, CU100, Ni100 or Specify.
Output	- Voltage	Field Programmable From 500mVdc to ±12Vdc. Maximum Output Drive = 10mA.
	- Current	Field Programmable From 1mAdc to ±20mAdc. Maximum Output Drive = 10Vdc. (500Ω @ 20mA.)
Universal P/S	-Standard High (H)	70~270Vac and 80~380Vdc; 50/60Hz; 4VA.
	-Standard Mid (M)	24~80Vac and 20~90Vdc; 50/60Hz; 4VA.
	-Low Voltage (L)	8~30Vac and 8~30Vdc; 50/60Hz; 4VA.
	-Circuit Sensitivity	<±0.001%/V FSO Typical.
Accurate to		<±0.1% FSO Typical.
Linearity & Repeatability		<±0.1% FSO Typical.
Ambient Drift		<±0.01%/C FSO Typical.
Noise Immunity		125dB CMRR Average. (1.6kV Peak Limit.)
R.F. Immunity		<1% Effect FSO Typical.
Isolation Voltage		1.6kVac/dc Input to Output for 60sec.
Response Time		200msec Typical. (10 to 90% 50msec Typical.)
Operating Temperature		0~70C.
Storage Temperature		-20~80C.
Operating Humidity		90% RH Max. Non-Condensing.
Construction		Socket Plug-In Type With Barrier Terminals.

Note 1. Specifications based on Standard Calibration Unit, unless otherwise specified.

Note 2. Due to ongoing research and development designs, specifications, and documentation are subject to change without notification. No liability will be accepted for errors, omissions or amendments to this specification.

Quality Assurance Programme.

The modern technology and strict procedures of the ISO9001 Quality Assurance Programme applied during design, development, production and final inspection grant long term reliability of the instrument.

TX801RTD Input Programming.

Always set **OUTPUT** range first, then **INPUT** range.

If the input range is not listed in the programming table, use the following formulae to work out the Zero and Span DIP switch settings for gain.

$$\text{deg C Span Gain} = \frac{1200}{\text{deg C High} - \text{deg C Low}}$$

$$\text{deg F Span Gain} = \frac{2400}{\text{deg F High} - \text{deg F Low}}$$

$$\text{deg C Zero Gain} = \frac{\text{deg C Low}}{5}$$

$$\text{deg F Zero Gain} = \frac{\text{deg F Low}}{10}$$

If Zero is: 1/ Positive, put S5-1 OFF. 2/ Negative, put S5-1 ON.

Gain Value	1	2	4	8	16	32
DIP Switch No.	1	2	3	4	5	6

So if a gain value of 28 is required, put DIP switch No's 3, 4, 5 OFF, (ie, gains of 4 + 8 + 16 = 28) and all the other DIP switches ON.
DIP switches and trim pots are accessed by removing the small rectangular lid on the top of the TX801RTD enclosure

Note: (a) Enter the Zero or Span gain value into the appropriate Zero or Span DIP switch.
(b) If the **ZERO GAIN** exceeds **63**, then the input range must be factory calibrated.

TX801RTD Input Range Programming Table.

Notes: 1/ Switch status 1 = ON, 0 = OFF, X = DON'T CARE.
2/ Input ranges with '*' beside them require more adjustment by the Span trimpot.

Input Range C (Put S5-2 OFF)	Input Range F (Put S5-2 ON)	S3-Span						S4-Zero						S5-Function					
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4		
0~20C	0~40F	1	1	0	0	0	0	1	1	1	1	1	1	1	X				
0~25C	0~50F	1	1	1	1	0	0	1	1	1	1	1	1	1	X				
0~30C	0~60F	1	1	1	0	1	0	1	1	1	1	1	1	1	X				
0~40C	0~80F	1	0	0	0	0	1	1	1	1	1	1	1	1	X				
0~50C	0~100F	1	1	1	0	0	1	1	1	1	1	1	1	1	X				
0~60C	0~120F	1	1	0	1	0	1	1	1	1	1	1	1	1	X				
0~70C*	0~140F*	0	1	1	1	0	1	1	1	1	1	1	1	1	X				
0~75C	0~150F	1	1	1	1	0	1	1	1	1	1	1	1	1	X				
0~80C	0~160F	0	0	0	0	1	1	1	1	1	1	1	1	1	X				
0~90C*	0~180F*	0	1	0	0	1	1	1	1	1	1	1	1	1	X				
0~100C	0~200F	1	1	0	0	1	1	1	1	1	1	1	1	1	X				
0~110C	0~220F	0	0	1	0	1	1	1	1	1	1	1	1	1	X				
0~120C	0~240F	1	0	1	0	1	1	1	1	1	1	1	1	1	X				
0~125C*	0~250F*	1	0	1	0	1	1	1	1	1	1	1	1	1	X				
0~150C	0~300F	1	1	1	0	1	1	1	1	1	1	1	1	1	X				
0~200C	0~400F	1	0	0	1	1	1	1	1	1	1	1	1	1	X				
0~250C*	0~500F*	0	1	0	1	1	1	1	1	1	1	1	1	1	X				
0~300C	0~600F	1	1	0	1	1	1	1	1	1	1	1	1	1	X				
0~400C	0~800F	0	0	1	1	1	1	1	1	1	1	1	1	1	X				
0~600C	0~1200F	1	0	1	1	1	1	1	1	1	1	1	1	1	X				
-10~10C	-20~20F	1	1	0	0	0	0	1	1	0	1	1	1	1	1				
-10~20C	-20~40F	1	1	1	0	1	0	1	1	1	1	1	1	1	1				
-10~40C	-20~80F	1	1	1	0	0	1	1	1	1	0	1	1	1	1				
-20~20C	-40~40F	1	0	0	0	0	1	1	1	1	0	1	1	1	1				
-20~30C	-40~60F	1	1	1	0	0	1	1	1	1	0	1	1	1	1				
-25~25C	-50~50F	1	1	1	0	0	1	0	1	0	1	1	1	1	1				
-25~50C	-50~100F	1	1	1	1	0	1	0	1	0	1	1	1	1	1				
-30~20C	-60~40F	1	1	1	0	0	1	1	1	0	0	1	1	1	1				
-50~50C	-100~100F	1	1	0	0	1	1	1	1	0	1	0	1	1	1				
-50~100C	-100~200F	1	1	1	0	1	1	1	1	0	1	0	1	1	1				
-50~150C	-100~300F	1	0	0	1	1	1	1	1	0	1	0	1	1	1				
-100~100C	-200~200F	1	0	0	1	1	1	1	1	1	0	1	0	1	1				
-100~200C	-200~400F	1	1	0	1	1	1	1	1	1	0	1	0	1	1				
-200~200C	-400~400F	0	0	1	1	1	1	1	1	1	1	0	1	0	1				
-200~400C	-400~800F	1	0	1	1	1	1	1	1	1	1	0	1	0	1				
20~40C	40~80F	1	1	0	0	0	0	1	1	1	0	1	1	1	0				
50~100C	100~200F	1	1	1	0	0	1	1	1	0	1	0	1	1	0				
50~150C	100~300F	1	1	0	0	1	1	1	1	0	1	0	1	1	0				
100~200C	200~400F	1	1	0	0	1	1	1	1	1	0	1	0	1	0				
100~500C	200~1000F	0	0	1	1	1	1	1	1	1	0	1	0	1	0				

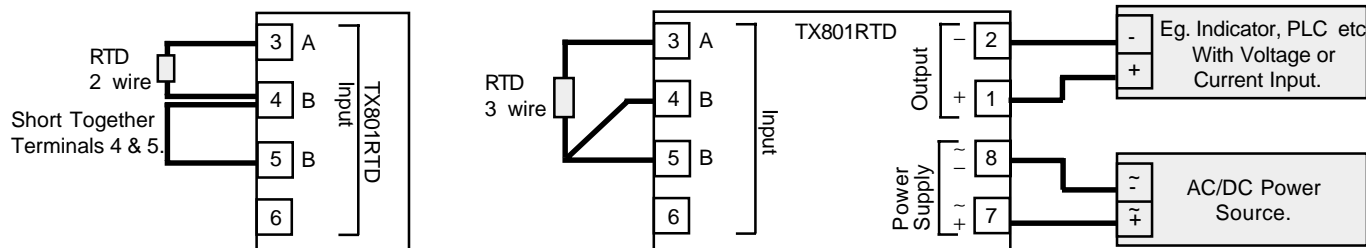
SET TO '1' FOR FAHRENHEIT.
SET TO '0' FOR CELSIUS. SET TO '1' FOR DOWNSCALE Sensor Break.
Set to '0' for UPSCALE Sensor Break. Set to '1' for DOWNSCALE Sensor Break.
Set to '0' for UPSCALE Sensor Break. Set to '1' for DOWNSCALE Sensor Break.

Output Range Programming Table.

Notes: 1/ Switch status 1 = ON 0 = OFF
2/ Output ranges with '*' beside them reverse the polarity of the output connections.

Output Range (V)	S1-SPAN						S2-Function				Output Range (I)	S1-SPAN						S2-Function			
	1	2	3	4	5	6	1	2	3	4		1	2	3	4	5	6	1	2	3	4
0~500mV	0	1	1	1	1	1	0	0	1	1	0~1mA	0	1	1	1	1	1	0	0	0	0
0~1V	1	0	1	1	1	1	0	0	1	1	0~2mA	1	0	1	1	1	1	0	0	0	0
0~2V	1	1	0	1	1	1	0	0	1	1	0~5mA	0	1	0	1	1	1	0	0	0	0
0~3V	1	0	0	1	1	1	0	0	1	1	0~10mA	1	0	1	0	1	1	0	0	0	0
0~4V	1	1	1	0	1	1	0	0	1	1	0~16mA	1	1	1	1	0	1	0	0	0	0
0~5V	1	0	1	0	1	1	0	0	1	1	0~20mA	1	1	0	1	0	1	0	0	0	0
0~6V	1	1	0	0	1	1	0	0	1	1	1~5mA	1	1	0	1	1	1	1	0	0	0
0~8V	1	1	1	1	0	1	0	0	1	1	2~10mA	1	1	1	0	1	1	1	0	0	0
0~10V	1	1	0	1	0	1	0	0	1	1	4~20mA	1	1	1	1	0	1	1	0	0	0
0~12V	1	1	1	0	0	1	0	0	1	1	-1~1mA	1	0	1	1	1	1	0	1	0	0
1~5V	1	1	1	0	1	1	1	0	1	1	-2~2mA	1	1	0	1	1	1	0	1	0	0
2~10V	1	1	1	1	0	1	1	0	1	1	-5~5mA	1	0	1	0	1	1	0	1	0	0
-1~1V	1	1	0	1	1	1	1	0	1	1	-10~10mA	1	1	0	1	0	1	0	1	0	0
-2~2V	1	1	1	0	1	1	1	0	1	1	-20~20mA	1	1	1	0	1	0	0	1	0	0
-5~5V	1	1	0	1	0	1	1	0	1	1	0~-10mA *	1	0	1	0	1	1	0	0	0	0
-10~10V	1	1	1	0	1	0	1	0	1	1	0~-20mA *	1	1	0	1	0	1	0	0	0	0
0~-5V *	1	0	1	0	1	1	1	0	1	1											
0~-10V *	1	1	0	1	0	1	1	0	1	1											

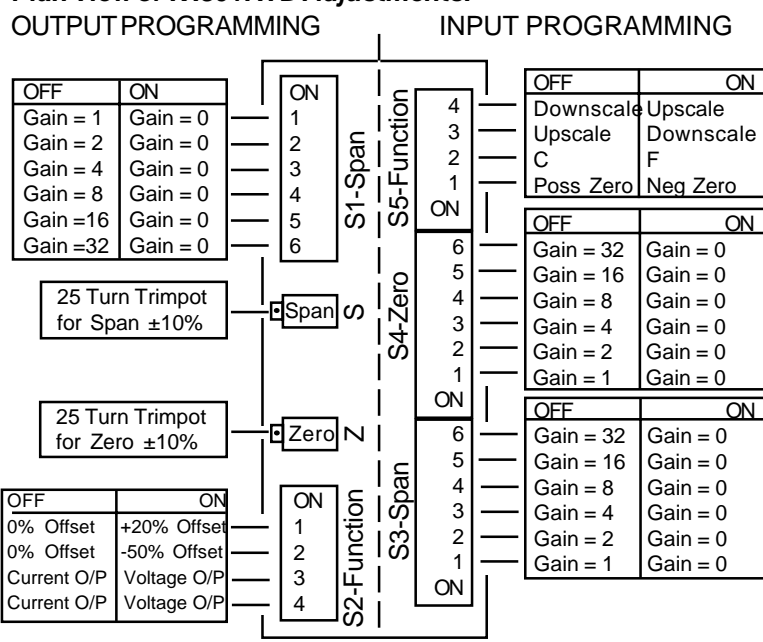
Examples of Input Connection.



Terminations.

Output 1	+Ve	Input 3	A
2	-Ve	4	B
P/S 7	~AC/+DC	5	B
8	~AC/-DC	6	NOT USED

Plan View of TX801RTD Adjustments.



TX801RTD H1 Power Supply Link Settings.

WARNING: High Voltages Maybe Present. Only adjust link with power disconnected.

Power Supply Link Settings	
H1	Power Supply Voltage Range
H	Link for High: 70~270Vac / 80~380Vdc
M	Link for Mid: 24~80Vac / 20~90Vdc

Notes:
1/ H1 is approx 4cm (1½") behind the 'S' trimpot.
2/ Exceeding voltage ranges may damage the unit.
3/ Ensure the enclosure label is correctly labelled for the link position.
4/ Adjust H1 jumper with a pair of needle nose pliers.
5/ Low Voltage Power Supply version is fixed, and has no link. This must be ordered separately.