

# 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

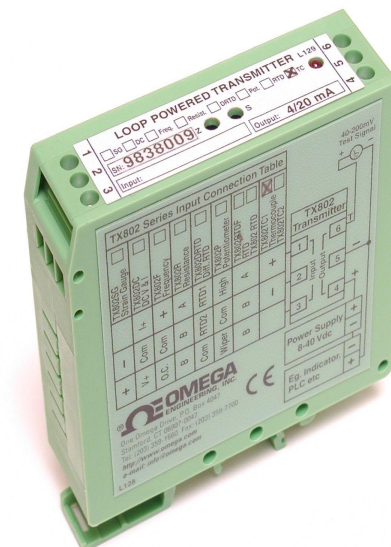
## HEATERS

- 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



<http://www.omega.com>  
e-mail: [info@omega.com](mailto:info@omega.com)

**TX802DCSERIES  
2 WIRE TRANSMITTER**

OMEGAnet <sup>SM</sup> On-Line Service http://www.omega.com	Internet e-mail info@omega.com
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**Servicing North America:**

**USA:** One Omega Drive, Box 4047  
ISO 9001 Certified Stamford, CT 06907-0047  
 Tel: (203) 359-1660 FAX: (203) 359-7700  
 e-mail: info@omega.com

**Canada:** 976 Bergar  
 Laval (Quebec) H7L 5A1  
 Tel: (514) 856-6928 FAX: (514) 856-6886  
 e-mail: canada@omega.com

**For immediate technical or application assistance:**

**USA and Canada:** Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA<sup>SM</sup>  
 Customer Service: 1-800-622-2378 / 1-800-622-BEST<sup>SM</sup>  
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 TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA

**Mexico and Latin America:** Tel: (95) 800-TC-OMEGA<sup>SM</sup> FAX: (95) 203-359-7807  
 En Espanol: (203) 359-7803 e-mail: espanol@omega.com

**Servicing Europe:**

**Benelux:** Postbus 8034, 1180 LA Amstelveen, The Netherlands  
 Tel: (31) 20 6418405 FAX: (31) 20 6434643  
 Toll Free in Benelux: 06 0993344  
 e-mail: nl@omega.com

**Czech Republic:** ul. Rude armady 1868, 733 01 Karvina-Hranice, Czech Republic  
 Tel: 420 (69) 6311627 FAX: 420 (69) 6311114  
 e-mail: czech@omega.com

**France:** 9, rue Denis Papin, 78190 Trappes  
 Tel: (33) 130-621-400 FAX: (33) 130-699-120  
 Toll Free in France: 0800-4-06342  
 e-mail: france@omega.com

**Germany/Austria:** Daimlerstrasse 26, D-75392 Deckenpfronn, Germany  
 Tel: 49 (07056) 3017 FAX: 49 (07056) 8540  
 Toll Free in Germany: 0130 11 21 66  
 e-mail: germany@omega.com

**United Kingdom:** 25 Swannington Road, P.O. Box 7, Omega Drive,  
ISO 9001 Certified Broughton Astley, Leicestershire, Irlam, Manchester,  
 LE9 6TU, England M44 5EX, England  
 Tel: 44 (1455) 285520 Tel: 44 (161) 777-6611  
 FAX: 44 (1455) 283912 FAX: 44 (161) 777-6622  
 Toll Free in England: 0800-488-488  
 e-mail: uk@omega.com

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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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## The Proper Installation & Maintenance

### MOUNTING

- (1) Mount in a clean environment in an electrical cabinet on DIN or EN 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 TX802TC2 is to be mounted in a fully enclosed steel cabinet. The cabinet must be properly earthed, with appropriate input/output entry points and cabling.

### WIRING

- (1) All cables should be good quality overall screened INSTRUMENTATION CABLE with the screen earthed at one end only.
- (2) Signal cables should be laid a minimum distance of 300mm from any power cable.
- (3) For 2 wire current loops Austral Standard Cables B5102ES is recommended.
- (4) It is recommended that you do not ground current loops and use power supplies with ungrounded outputs.
- (5) Lightning arresters should be used when there is a danger from this source.
- (6) Refer to diagrams for connection information.

### THERMOCOUPLES.

- (1) Avoid locating the thermocouple where it will be in a direct flame.
- (2) Never insert a porcelain or refractory tube suddenly in a hot area. Pre-heat gradually while installing.
- (3) Locate it where the average temperature will be measured. It should be representative of the mass. If necessary use several thermocouples to obtain the average temperature.
- (4) Immerse the thermocouple far enough so that the measuring junction 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 junction causes an error in reading.
- (5) If the thermocouple is mounted horizontally and the temperature is above the softening point of the tube, a support should be provided to prevent the tube sagging. Otherwise install the tube vertically.
- (6) Keep the junction head and cold junction in the approximation of the ambient temperature. Especially in the Noble Metal Class.

### EXTENSION WIRE.

- (1) Use the correct thermocouple extension or compensation cable. i.e. Thermocouple type, insulation type, correct colour coding.
- (2) If possible install extension or compensation cable in a grounded conduit by themselves. Never run electrical wires in the same conduit.
- (3) All wires that must be spliced should be soldered, or a proper thermocouple termination block used.
- (4) Lightning arrestors should be used where there is a danger from this source.

### COMMISSIONING

- (1) Once all the above conditions have been carried out and the wiring checked apply power to the TX802DC2 loop and allow five minutes for it to stabilize.
- (2) Due to the limits of error in a standard thermocouple probe, and standard extension wire and compensating wire, an error can occur. For example in a type K thermocouple installation an error of 2.2C or 0.75% FSO (whichever is greater) can occur. To check the variable being measured use a calibration standard thermocouple at the same immersion depth.

### MAINTENANCE

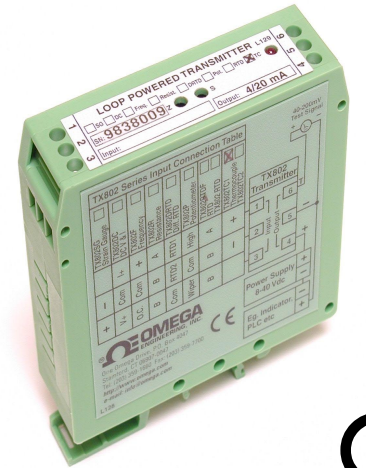
- (1) Check thermocouples in place with a calibration thermocouple at the same immersion depth.
- (2) Do it regularly - at least once a month.
- (3) Replace defective protection tubes - even if they look good they may not be air or gas tight.
- (4) Check out extension cable circuits.

# TX802DC Transmitter.

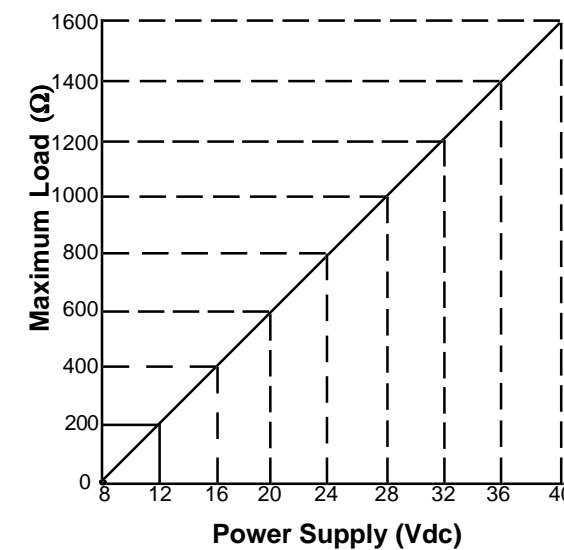
Isolating DC Signal Input  
to 4~20mA Output  
Loop Powered Transmitter.

### Features.

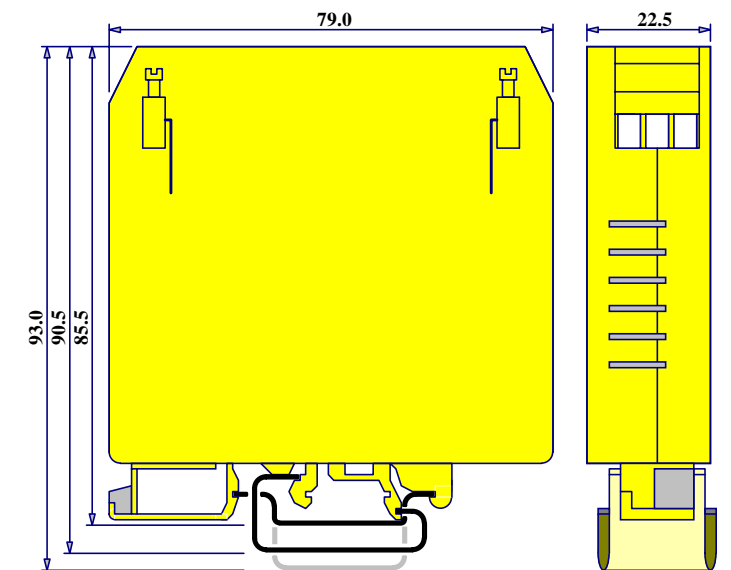
- Field Programmable Bi-Polar Input Ranges.
- Isolated Input to Output 2.0kV.
- High Accuracy.
- 40~200mV Output Test Signal.
- LED Indication of Loop Current.
- Low Cost.
- Easy to Install.
- Compact DIN Rail Mount Enclosure.
- Available Standard or Special Calibration.
- Reverse Polarity Protection.
- Corrosion Proofed Circuit Board & Components by Isonel 642. (Except Terminals & DIP Switches)



Graph Of Maximum Load  
Versus Power Supply.



Enclosure Dimensions.



### Quality Assurance Programme.

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

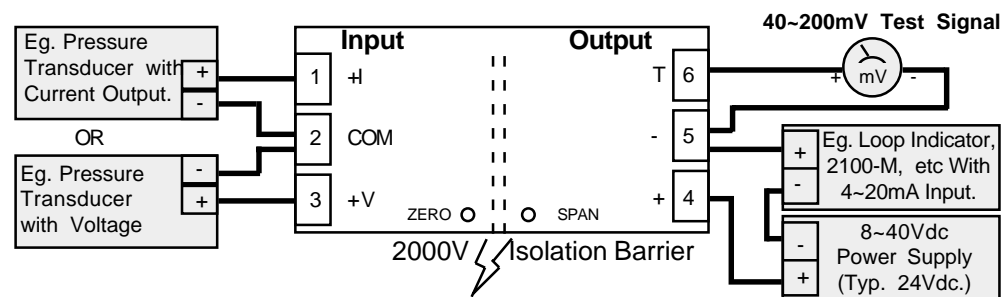


### TX802DC Specifications.

Input	-Voltage	10mVdc to 150Vdc and Bipolar. (LPI-D-P is Field Programmable.) Minimum Input Resistance = 200kΩ. Maximum Over-range = 170Vdc Continuous.
	-Current	200μAdc to 50mAdc and Bipolar. (LPI-D-P is Field Programmable.) Input Resistance = 25Ω. Maximum Overrange = 70mAdc Continuous.
Output	-mA	2 Wire 4~20mA. (Loop Powered.)
	-mV	40~200mV ∞ 4~20mA. (Indicative Test Signal Only.) Other Output Voltages Available. eg 1~5V.
Power Supply		8~40Vdc.
Supply Voltage Sensitivity		<±0.005%/V FSO.
Output Load Resistance		800Ω @ 24Vdc. (50Ω/V Above 8Vdc.)
Maximum Output Current		Limited to <28mA.
Accurate to		<±0.1% FSO Typical.
Linearity & Repeatability		<±0.1% FSO Typical.
Ambient Drift		<±0.02%/C FSO Typical.
Noise Immunity		125dB CMRR Average. (2.0kVac RMS Limit.)
R.F. Immunity		<1% Effect FSO Typical.
Isolation Voltage		2.0kVAC/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		6.6 Polyamide Thermoplastic Rail Mount Enclosure.

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.

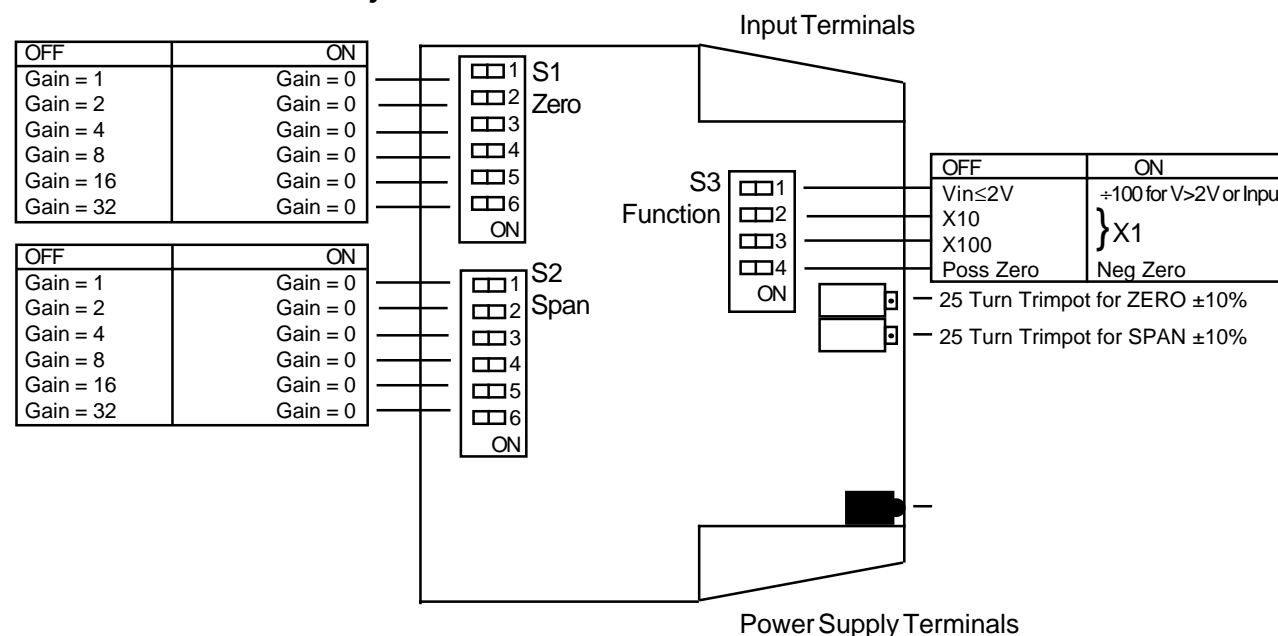
### Examples of Input Connection.



### Terminations.

Input	1	+I
	2	COM
	3	+V
Output	4	+mA
	5	-mA
	6	mV TEST

### Plan View of TX802DC Adjustments.



## TX802DC ONLY

### TX802DC Input Programming.

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.

$$\text{Span Gain} = \frac{24}{\text{Pregain} \times (\text{Signal High} - \text{Signal Low})}$$

Zero Gain = 10 x Pregain x Signal Low.  
 If Zero is 1/ Positive, put S3-4 OFF.  
 2/ Negative, put S3-4 ON.

- Notes: (a) Enter ranges with their exponential value. Eg. Enter 20mA as 20 x 10<sup>-3</sup>. Enter 100mV as 100 x 10<sup>-3</sup>.  
 (b) Use the same pregain value in both the Span and Zero gain formulae.  
 (c) Enter the Zero or Span gain value into the appropriate Zero or Span DIP switch. If your GAIN ZERO exceeds 63, then your input range will need to be factory calibrated.

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 (ie, gains of 4 + 8 + 16 = 28) OFF and all the other DIP switches ON. Dip switches are accessed by separating the two halves of the TX802DC enclosure.

### TX802DC Input Range Programming Table.

- Notes: 1/ Switch status 1 = ON, 0 = OFF, X = DON'T CARE.  
 2/ Input ranges with '\*' beside them reverse the polarity of the input connections.  
 3/ Input ranges with '#' beside them require more adjustment with the Zero and Span trimpots.

Input Range	S1-ZERO						S2-SPAN						S3-FUNCTION			
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4
0~10mV	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	x
0~20mV	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	x
0~50mV	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	x
0~100mV	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	x
0~200mV	1	1	1	1	1	1	1	1	0	0	1	1	0	0	1	x
0~500mV	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	x
0~1V	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	x
0~2V	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	x
0~4V	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	x
0~5V	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	x
0~10V	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	x
0~20V	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	x
0~50V	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	x
0~100V	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	x
0~150V	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	x
1~5V	1	0	1	1	1	1	1	1	0	0	0	0	1	0	1	0
2~10V	1	1	0	1	1	1	1	0	0	0	0	1	1	0	1	0
-1~1V	1	1	0	1	0	1	1	1	0	0	1	1	1	0	1	1
-5~5V	1	0	1	0	1	1	1	1	1	0	0	1	1	0	1	1
-10~10V	1	1	0	1	0	1	1	1	0	0	1	1	1	0	1	1
0~200μA	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	x
0~500μA#	1	1	1	1	1	1	1	1	0	1	0	1	1	0	0	x
0~1mA	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	x
0~2mA	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	x
0~5mA#	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	x
0~10mA	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	x
0~20mA	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	x
0~40mA	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	x
0~50mA#	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	x
1~5mA	0	1	0	1	1	1	1	1	1	0	0	1	1	0	1	0
2~10mA	1	0	1	0	1	1	1	1	0	0	1	1	1	0	1	0
4~20mA	1	0	1	1	1	1	1	1	0	0	0	0	1	1	1	0
10~50mA	0	1	0	1	1	1	1	1	1	0	0	1	1	1	1	0
-1~1mA	0	1	0	1	1	1	1	1	1	1	0	0	1	0	1	1
-10~10mA	0	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1
-20~20mA	1	0	1	0	1	1	1	1	1	0	0	1	1	1	1	1
* 20~4mA	1	0	1	0	1	1	1	1	0	0	0	0	1	1	1	1
* 50~10mA	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1