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

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- ☑ 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
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- ☑ pH Electrodes, Testers & Accessories
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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

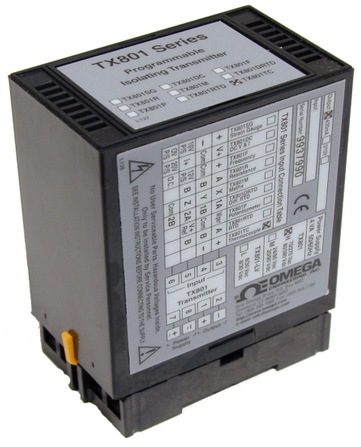
M3470/0302

CE

User's Guide

OMEGA® ENGINEERING, INC.

An OMEGA Technologies Company



http://www.omega.com
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TX801R SERIES PROGRAMMABLE ISOLATING RESISTANCE TRANSMITTER

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ΩOMEGA

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It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.
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.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

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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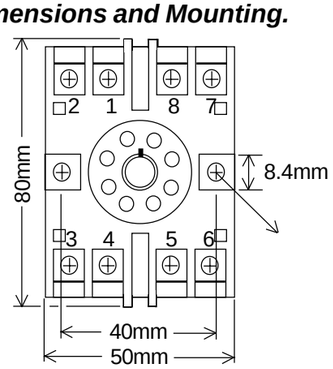
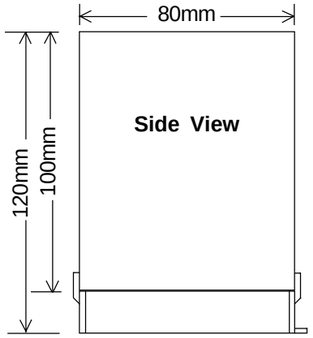
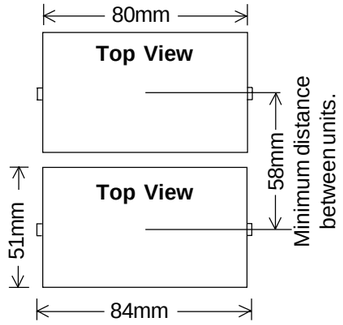
Dimensions and Mounting.



8PFA Octal Termination Base





2 x 4.5mm

The Proper Installation & Maintenance of TX801R

MOUNTING.

(1) Mount in a clean environment in an electrical cabinet on 35mm, symetrical, 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 TX801R is to 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, 2 wire voltage signals or 2 wire current signals, Austral Standard Cables B5102ES is recommended. For three wire transmitters, RTD's, and Resistance Sensors, 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.

COMMISSIONING.

(1) Once all the above conditions have been carried out and the wiring checked apply power to the PI-K loop and allow five minutes for it to stabilize.
(2) Due to differences in cable resistance in the resistance sensor legs or errors within the resistance sensor itself a small error may occur (usually less than 1%). To remove this error take a low (approx 10%) and a high (approx 90%) reading of the variable being measured by the transducer supplying the signal to the TX801R, and ensure that this agrees with the level being indicated by the PLC or indicator, etc. that the PI-K is connected into. Adjust for any difference using the Zero and Span trimpots in the top of the PI-K 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) Repeat (2) of the commisioning instructions.
(2) Do it regularly - at least once every 12 months.

TX801R Programmable Programmable Isolating Resistance Transmiter

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

Features.

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

TX801R Specifications.

Resistance Input		3 Wire Resistance.
		Lead Wire Resistance = 10Ω/Wire Max.
		Field Programmable Zero From 5Ω to 20kΩ.
		Field Programmable Span From 10Ω to 20kΩ.
		Suitable for 2 Wire Connection. (Offset Calibration Needed.)
	- Excitation	0.8mA for Input < 2kΩ. 0.08mA for Input >= 2kΩ.
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.

TX801R 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.

Span Gain = $\frac{600 \times \text{Pregain}}{\text{Resist High - Resist Low}}$.

Zero Gain = $\frac{\text{Resist Low}}{5 \times \text{Pregain}}$

EFFECTIVE INPUT RANGE (ie Resist High - Resist Low)	S5-1	S5-2	S5-3	S5-4	PREGAIN
10Ω <= Range < 200Ω	0	0	1	1	1
200Ω <= Range < 2kΩ	0	0	0	0	10
2kΩ <= Range <= 20kΩ	1	0	0	0	100

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 trimpots are accessed by removing the small rectangular lid on the top of the PI-K enclosure

Note: (a) Enter Ranges with their exponential value. Eg. Enter 2kΩ as 2 x 10^3.
(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.

TX801R 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 Zero & Span trimpot.

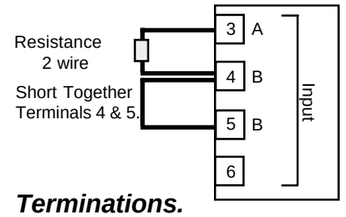
Input Range Resist (Ω)	S3-Span						S4-Zero						S5-Function			
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4
0~10Ω	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	1
0~20Ω	1	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1
0~22Ω *	0	0	1	0	0	1	1	1	1	1	1	1	0	0	1	1
0~25Ω	1	1	1	0	0	1	1	1	1	1	1	1	0	0	1	1
0~47Ω *	0	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1
0~50Ω	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1
0~75Ω	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1
0~100Ω	1	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1
0~200Ω	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0
0~220Ω *	0	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0
0~250Ω	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0
0~470Ω *	0	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
0~500Ω	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
0~750Ω	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0
0~1kΩ	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
0~2kΩ	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0
0~2.2kΩ *	0	0	1	0	0	1	1	1	1	1	1	1	1	0	0	0
0~2.5kΩ	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0
0~4.7kΩ *	0	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0
0~5kΩ	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0
0~7.5kΩ	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0
0~10kΩ	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
0~20kΩ	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
10~50Ω	0	0	0	0	1	1	1	0	1	1	1	1	0	0	1	1
25~75Ω	1	1	0	0	1	1	0	1	0	1	1	1	0	0	1	1
50~100Ω	1	1	0	0	1	1	1	0	1	0	1	1	0	0	1	1
75~225Ω	1	1	0	1	1	1	0	0	0	0	1	1	0	0	1	1
150~250Ω	1	0	0	1	1	1	1	0	0	0	0	1	0	0	1	1
250~500Ω	1	1	1	0	0	1	0	1	0	1	1	1	0	0	0	0
500Ω~1000Ω	1	1	0	0	1	1	1	0	1	0	1	1	0	0	0	0
1~1.5kΩ	1	1	0	0	1	1	1	1	0	1	0	1	0	0	0	0
2k~4k	1	0	0	0	0	1	1	1	0	1	1	1	1	0	0	0
4k~10k	1	0	1	0	1	1	1	1	1	0	1	1	1	0	0	0
5k~15k	1	0	0	1	1	1	1	0	1	0	1	1	1	0	0	0
10k~20k	1	0	0	1	1	1	1	1	0	1	0	1	1	0	0	0
15k~20k	1	1	0	0	1	1	1	0	0	0	0	1	1	0	0	0

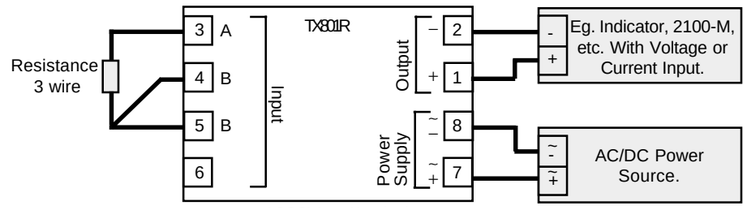
TX801R Output Range Programming Table.

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	0	1	1	1	-10~10mA	1	1	0	1	0	1	0	1	0	0
-2~2V	1	1	1	0	1	1	0	1	1	1	-20~20mA	1	1	1	0	1	0	0	1	0	0
-5~5V	1	1	0	1	0	1	0	1	1	1	0~-10mA *	1	0	1	0	1	1	0	0	0	0
-10~10V	1	1	1	0	1	0	0	1	1	1	0~-20mA *	1	1	0	1	0	1	0	0	0	0
-12~12V	1	1	1	1	0	0	0	1	1	1											
0~-5V *	1	0	1	0	1	1	0	0	1	1											
0~-10V *	1	1	0	1	0	1	0	0	1	1											

Examples of Input Connection.



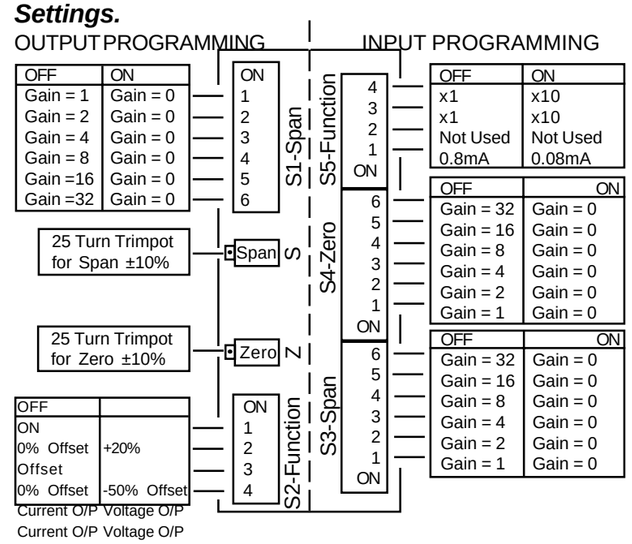


Terminations.

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

1600V Isolation

Plan View of TX801R Adjustments. Settings.



TX801R H1 Power Supply Link

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.