

# 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

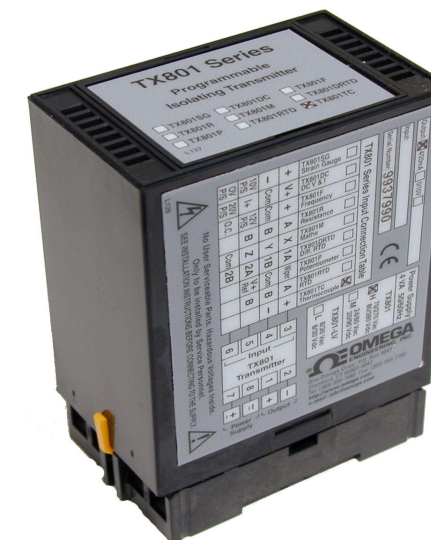
- Data Acquisition & Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Datalogging Systems
- Recorders, Printers & Plotters

## 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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# TX801F SERIES PROGRAMMABLE ISOLATING FREQUENCY TRANSMITTER



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**USA:** One Omega Drive, Box 4047  
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Tel: (31) 20 6418405 FAX: (31) 20 6434643  
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Tel: 420 (69) 6311627 FAX: 420 (69) 6311114  
e-mail: czech@omega.com

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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,  
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2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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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.

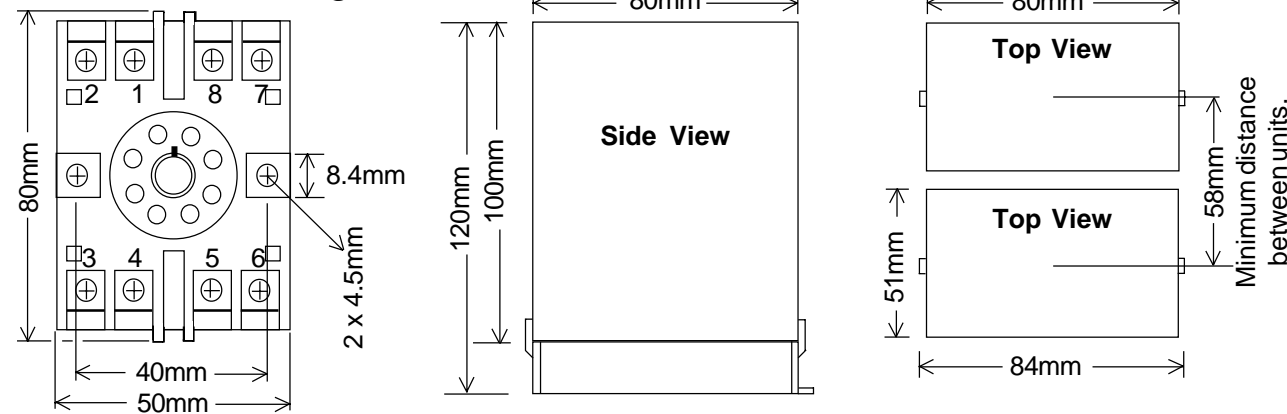
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# TX801F Programmable Isolating Frequency Transmitter.

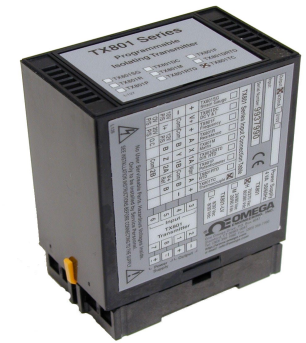
Programmable, Isolating  
Frequency Input to DC Current or  
DC Voltage Output Transmitter.

## Dimensions and Mounting.



## Features.

- Field Programmable Input and Output Ranges.
- Bi-Polar Output Ranges.
- Fast Response Time, Allowing Accurate Control.
- Impedance Matching on Input.
- Contact Closure Selection.
- Crystal Locked Period Measurement.
- Input to Output Isolation 1.0kV.
- High Accuracy 0.1%.
- Universal AC/DC Power Supply.
- Compact DIN Rail Mount Enclosure.
- Available Standard or Special Calibration.



## The Proper Installation & Maintenance of TX801F.

### 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 Directive the TX801F must be mounted in a fully enclosed metal, electrical cabinet, with appropriate input / output entry points, cabling, and filtering.

### WIRING.

- (1) A readily accessible disconnect device and overcurrent device must be incorporated in 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 3 wire transmitters 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 TX801F loop and allow five minutes for it to stabilize.
- (2) If the output of the transmitter is fluctuating, follow the procedures outlined in 'Input Programming; Contact Closure Selection', 'Voltage Input Range Selection', and 'Impedance Matching'.
- (3) Take a low (approx. 10%) and a high (approx. 90%) reading of the variable being measured by the transducer supplying the signal to the TX801F, and ensure that this agrees with the level being indicated by the PLC or indicator, etc. the TX801F is connected into. Adjust for any difference using the Zero and Span trimpots in the top of the TX801F enclosure with a small screw driver until the two levels agree. (Clockwise to increase the output reading and anti-clockwise to decrease the output reading.)

### MAINTENANCE.

- (1) Repeat (3) of COMMISSIONING.
- (2) Do it regularly - at least once every 12 months.

## PI-F Specifications.

Frequency Input	2 Wire Sine / Square / Pulse, Uni-polar / Bi-polar. (Signals < 2Vpp Bipolar Only.)
	Minimum Input Signal = 15mVpp.
	Maximum Input Signal = 100Vpp.
	Field Programmable Span From 0.4Hz to 40kHz. (60Hz Max. for Contact Input.)
	Adjustable Input Impedance From 100Ω to 100kΩ.
	Open Collector Output, Limited to 12Vdc @ 10mA.
	Time-out to 0% after: 200÷(Frequency X Prescale) sec.
	Cut-off Frequency at 0.5% FSO.
-Transmitter	P/S 12Vdc±5% Common to COM. (Terminal 4.)
	Max Load = 30mA.
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. (1.0kV Peak Limit.)
R.F. Immunity	<1% Effect FSO Typical.
Isolation Voltage	1.0kVac/dc Input to Output for 60sec.
Response Time	(1/(FREQUENCY x PRESCALE)) + 0.2sec. Typical. (Except Time-out to 0%.)
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.

### TX801F 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 Span DIP switch settings for gain.

$$\text{Span Gain} = \frac{1600}{\text{FREQUENCY} \times \text{PRESCALE}}$$

Enter the Span gain value into the appropriate Span DIP switch. DIP switches and trimpots are accessed by removing the small rectangular lid on the top of the TX801F enclosure

Gain Value	1	2	4	8	16	32	Gain Value	64	128	256	512	1024	2048
S3 Switch No.	1	2	3	4	5	6	S4 Switch No.	1	2	3	4	5	6

e.g. If a gain value of 280 is required, put DIP Switch S3 - No. 4 & No.5, and DIP switch S4 - No.3 ON, and all the other DIP switches OFF. (i.e. Gains of 8 + 16 + 256 = 280)

### S5-1 Contact Closure Selection.

For contact closure inputs such as reed switches and relay contacts, put S5-1 ON. This will limit the maximum input frequency to 60Hz. For particularly noisy contacts it might be necessary to place a 1µF non-polarised metal film capacitor directly across the contacts to suppress noise. Ensure the voltage rating of the capacitor is more than the voltage across the contacts. (Minimum of 16V.)

### S5-4 Voltage Input Range Selection.

Note: The low voltage option is only available for bipolar signals. For low voltage input signals < 2Vpp (eg. from a paddle wheel) S5-4 should be put in the ON position. For voltage input signals ≥ 2Vpp S5-4 should be put in the OFF position.

### Impedance Matching.

For noisy inputs use the trimpot marked 'I.M.' to tune the input impedance to equal the source impedance. To do this:  
 (i) install and commission transmitter as described on the following page;  
 (ii) slowly turn the trimpot anticlockwise, until the output becomes steady.

### PI-F Input Range Programming Table.

Notes: Switch Status 1 = ON, 0 = OFF.

INPUT FREQUENCY	S3-SPAN						S4-SPAN						S5-FUNCT	
	1	2	3	4	5	6	1	2	3	4	5	6	2	3
0~0.4Hz	0	0	0	0	0	1	0	1	1	1	1	1	0	0
0~0.5Hz	0	0	0	0	0	0	0	1	0	0	1	1	0	0
0~1Hz	0	0	0	0	0	0	1	0	0	1	1	0	0	0
0~2Hz	0	0	0	0	0	1	0	0	1	1	0	0	0	0
0~4Hz	0	0	0	0	1	0	0	1	1	0	0	0	0	0
0~5Hz	0	0	0	0	0	0	1	0	1	0	0	0	0	0
0~10Hz	0	0	0	0	0	1	0	1	0	0	0	0	0	0
0~20Hz	0	0	0	0	1	0	1	0	0	0	0	0	0	0
0~40Hz	0	0	0	1	0	1	0	0	0	0	0	0	0	0
0~50Hz	0	0	0	0	0	1	0	0	0	0	0	0	0	0
0~100Hz	0	0	0	0	1	0	0	0	0	0	0	0	0	0
0~200Hz	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0~400Hz	0	0	1	0	0	0	0	0	0	0	0	0	0	0
0~500Hz	0	0	0	0	0	1	0	0	0	0	0	1	0	0
0~1kHz	0	0	0	0	1	0	0	0	0	0	0	1	0	0
0~2kHz	0	0	0	1	0	0	0	0	0	0	0	1	0	0
0~4kHz	0	0	1	0	0	0	0	0	0	0	0	1	0	0
0~5kHz	0	0	0	0	0	1	0	0	0	0	0	0	1	0
0~10kHz	0	0	0	0	1	0	0	0	0	0	0	0	1	0
0~20kHz	0	0	0	1	0	0	0	0	0	0	0	0	0	1
0~40kHz	0	0	1	0	0	0	0	0	0	0	0	0	0	1

INPUT RANGE	S5-2	S5-3	PRESCALE
0.4Hz~400Hz	0	0	1
400Hz~4kHz	1	0	0.1
4kHz~40kHz	0	1	0.01

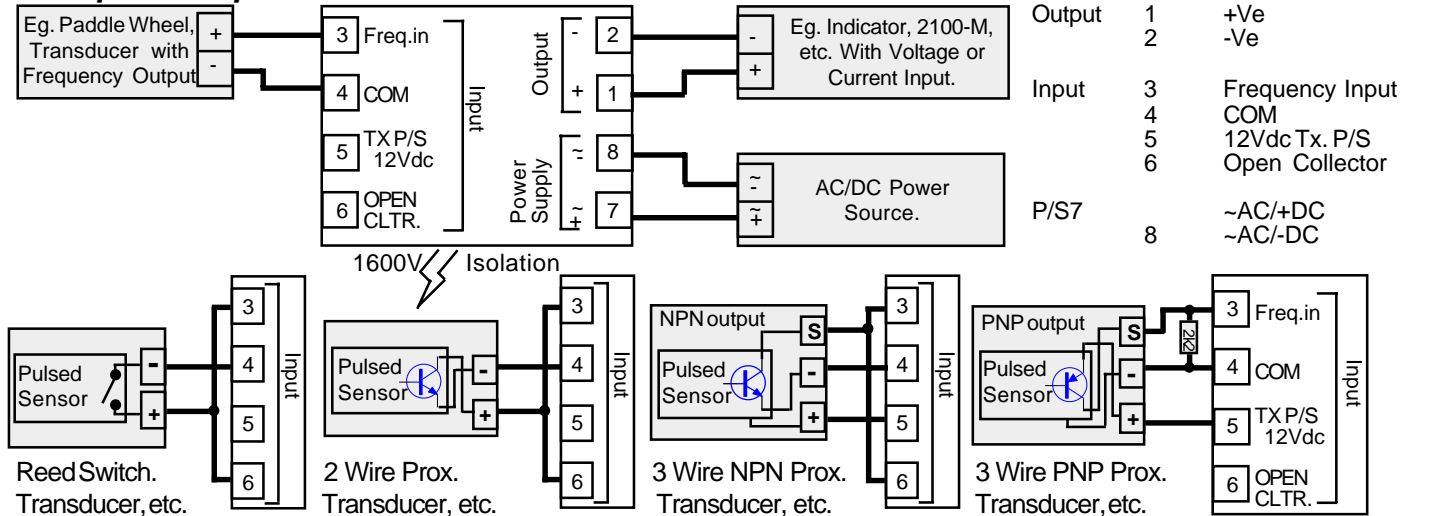
Note: Only one of S5-2 or S5-3 may be 'ON' at any one time.

### PI-F Output Range Programming Table.

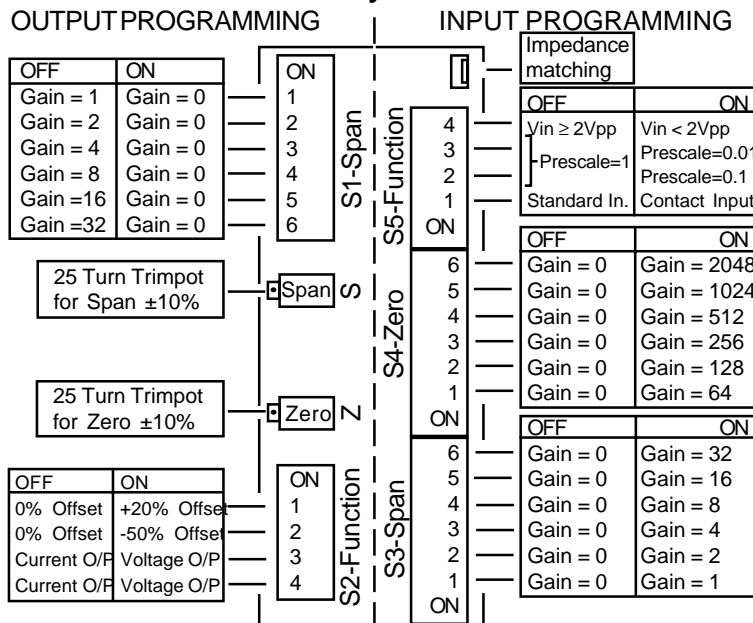
Notes: 1/ Switch status 1 = ON 0 = OFF.  
 2/ Output ranges with '\*' beside them reverse the polarity of the output connections.

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.



### Plan View of TX801F Adjustments.



### TX801F H1 Power Supply Link Settings.

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

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.

