

SPECIFICATIONS

Minimum Span

t/c: 20°C if zero offset ≤ 650°C
50°C if zero offset > 650°C
125°C if zero offset > 1250°C
(type C only)

RTD: 12°C if zero offset ≤ 75°C
20°C if zero offset ≤ 275°C
50°C if zero offset > 275°C

mV: 1mV if zero offset ≤ 25mV
5mV if zero offset ≤ 150mV
10mV if zero offset > 150mV

mA: 1mA if zero offset ≤ 15mA
3mA if zero offset > 15mA

Volts: 0.3V if zero offset ≤ 5V
0.5V if zero offset > 5V

Input Impedance

Volts: 200kΩ
Millivolts: 10mΩ
Milliamperes: 5Ω

t/c Burnout Function

Programmable: upscale or
downscale

t/c Burnout Detection Current

<0.2μA

RTD Excitation Current

0.3mA (nominal)

Long Term Stability

Better than 0.1% of span in 12
months

Temperature Stability

<0.01% of span per °C

Isolation

1000VDC input to output

Minimum Output Current

3.85mA

Maximum Output Current

22.5mA

Loop Voltage Drop

≤ 9VDC at 20mA

Supply Voltage Range

9 - 36 VDC

Maximum Effect of Change in Supply Voltage

<0.002% of span per Volt

Effect of Ambient Temperature Change on Cold Junction Compensation

0.02°C/°C

CJC Accuracy

0.5°C

Update Time

>3 Conversions per second

Turn On Time

< 4 Seconds

Filter Band

Programmable from 0 to 120%

Damping

Programmable from 0.0 to 32.0
seconds

Common Mode Rejection

120dB

Operating Temperature Range

-20 to 70°C

Dimensions mm(inches)

H 55.3 (2.10) X W 77.7 (3.06)

X D 61.0 (2.40)

Weight

0.56lbs

Warranty

3 years



TX787, TX788

Programmable, Isolating Two-Wire Temperature Transmitters

Instruction Sheet M-2919

APPLICATION

Model TX787 and TX788 is an extremely versatile two-wire transmitter that may be used in any application requiring an isolated 4-20mA current loop proportional to a thermocouple, RTD, millivolt, milliamp, voltage, resistance or potentiometer input. Typical applications include providing accurate, stable signals to distributed control systems (DCS), supervisory control and data acquisition systems (SCADA), environmental monitoring and control systems (EMCS), data acquisition and control systems (DACS) and custody transfer/pipeline systems. The output of the TX787 and TX788 may also be used by an analog or digital display device.

DESCRIPTION

The TX787 is a programmable two-wire transmitter that is configured to provide an isolated 4-20mA signal in proportion to the desired range of its input signal. The TX787 accepts thermocouple, 2-, 3-, or 4 wire RTD, potentiometer, and millivolt inputs. The TX788 accepts millivolt, voltage, and milliamp inputs.

Configuration is performed by connecting the transmitter to a standard PC serial port (9-pin RS232C) using an isolated interface adapter and running a user-friendly, Windows-based program. Unique *PC-Only* technology in the TX787 allows all configuration information to be defined and modified with only a PC, the interface adapter, and the transmitter. No loop supply, input simulation, or meter on the output is required! The fully isolated adapter reduces the risk of expensive damage to the PC which can be caused

by spikes and surges on field wiring entering the computer via its unprotected serial port.

The TX787 utilize state of the art microprocessor technology and yields higher accuracy and long-term stability with lower power consumption than prior generation transmitters. The device automatically performs frequent self-testing and auto-calibration while in service, resulting in very stable long-term performance - stability greater than 0.1% of span over 12 months.

To maximize traceability, each unit may be assigned a tagID, a job or a project number, the purchase order and date on which it was procured, and a message in addition to its serial number. This data, along with the selected input type and range, last calibration date, and serial number are stored in the transmitter.

OPERATION

Every TX788 is factory calibrated and may be simply configured to perform the desired function using the Device Configuration screen (figure 1) and the Sensor Selection screen (figure 2) shown. Just fasten the DB-9 connector to the computer's serial port and the keyed 5-pin connector to the port under the access cover on the top or the transmitter. There is no need to provide an external power supply and load to the TX787's output to configure the transmitter.

Units previously placed in service may have their configuration "uploaded" to the PC. Their operating parameters may be reviewed and if necessary revised and downloaded again. All configuration parameters

may be stored in a "configuration file" on the PC for future use.

After configuration, and at periodic intervals, the calibration may be verified by simulating and varying the input signal over the defined range and comparing the output signal to the ideal. If calibration is necessary, the PC software is used to adjust the transmitter's digital references. Because of the self-calibrating technology utilized in the TX787, the calibration verification interval may be significantly longer than for earlier technology transmitters.

The Calibration and Configuration Software, Isolated RS232/TX787 Communications Adapter and User's Guide are included in the model TX780-SOFT.



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WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of manufacturing defects for the life of the 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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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. Should any Product(s) be used in or with any nuclear installation or activity, medical application, 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 REQUEST/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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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.

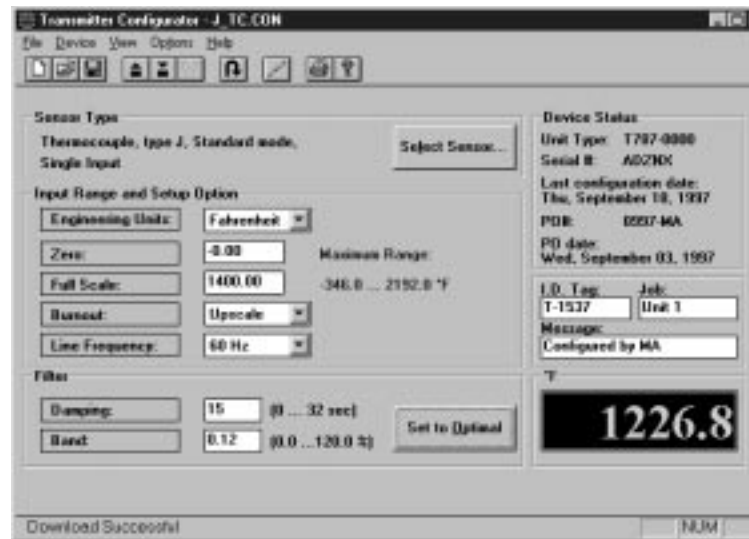


Figure 1
Device Configuration

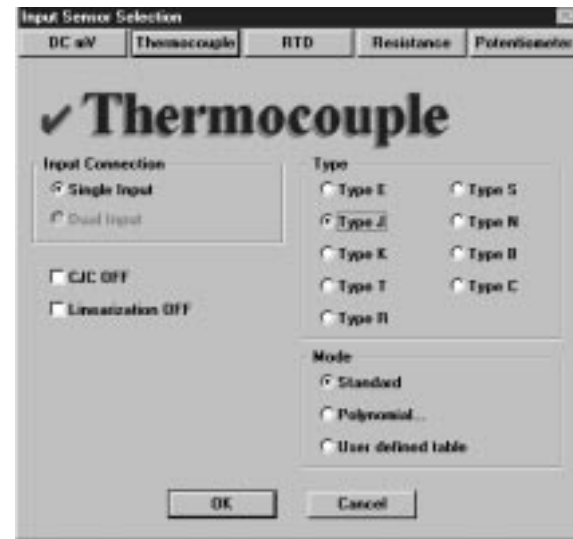


Figure 2
Sensor Selection

	Input Type	Conformance Range	End to End Accuracy (1)	Full Scale Input
T H E R M O C O U P L E	Type B	400 to 1820°C	±2.5°C	0 to 1820°C 32 to 3308°F
	Type C	400 to 1820°C	±1.1°C	0 to 2320°C 32 to 4172°F
	Type E	0 to 870°C	±0.55°C	-270 to 1000°C -454 to 1832°F
	Type J	-100 to 870°C	±0.55°C	-210 to 1200°C -346 to 2192°F
	Type K	-100 to 1370°C	±0.65°C	-270 to 1370°C -454 to 2498°F
	Type N	-100 to 1300°C	±0.70°C	-270 to 1300°C -454 to 2372°F
	Type R	200 to 1300°C	±1.60°C	-50 to 1770°C -46 to 3218°F
	Type S	200 to 1760°C	±1.60°C	-50 to 1760°C -46 to 3200°F
	Type T	0 to 400°C	±0.55°C	-270 to 400°C -454 to 752°F
R T D (2)	Pt-100 (3)	-210 to 850°C	±0.30°C	-210 to 850°C -346 to 1562°F
	Ni-110	-110 to 310°C	±0.25°C	-110 to 310°C -166 to 590°F
	Cu-10	-80 to 160°C	±1.50°C	-80 to 160°C -112 to 320°F

Table 1

Input Type	Full Scale Range	Minimum Span	Accuracy (4)
Ohms	0 to 390Ω	10Ω	0.1%
Potentiometer	100 to 10kΩ	n/a	0.1%
DC mV	-10 to 120mV (-0000)	10 mV	0.1%
	-30 to 300mV (-0001)		
DC Volts	-1 to 10V	300 mV	0.1%
DC mA	-5 to 50mA	2mA	0.1%

Table 2

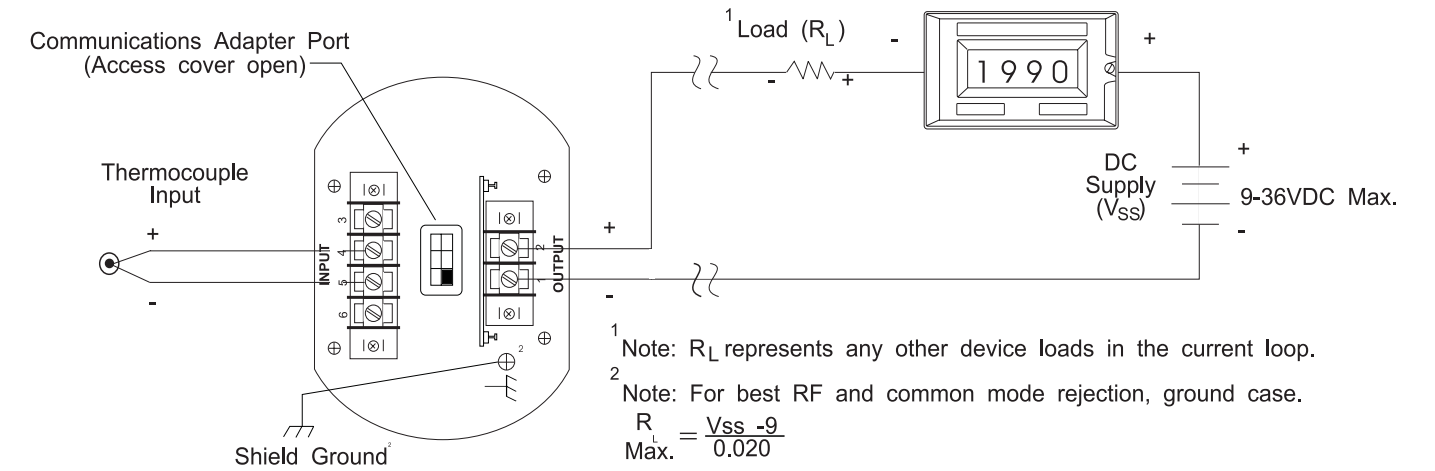
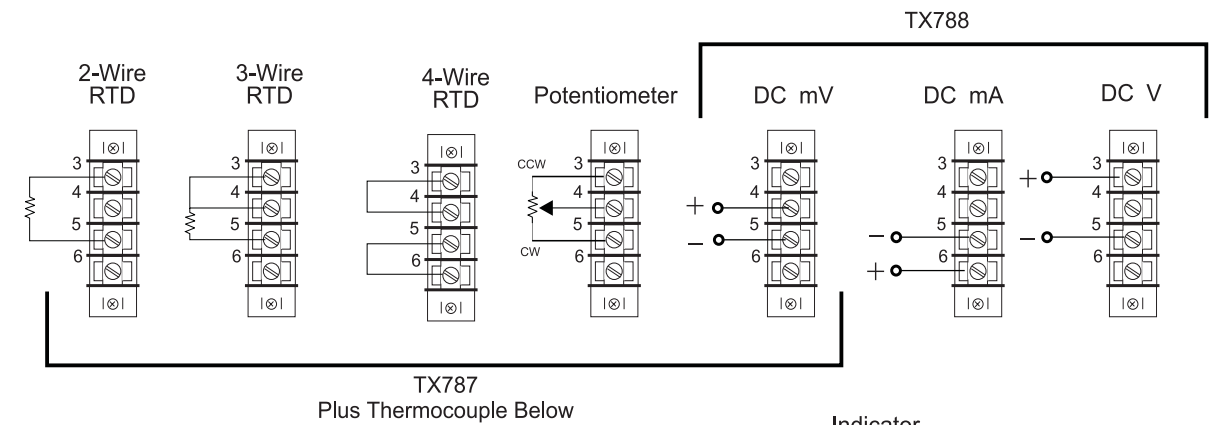
(1) Accuracy includes input accuracy, output accuracy, and linearity for any 250°C span within the conformance range at a stable 25°C ambient temperature; minimum accuracy over entire conformance range is ±0.1% of full conformance span.

(2) For other RTD Types, consult Factory

(3) α = .00385 and .003916

(4) Percent of full scale range

INPUT CONNECTIONS



1 Note: R_L represents any other device loads in the current loop.
 2 Note: For best RF and common mode rejection, ground case.

$$R_L = \frac{V_{SS} - 9}{0.020}$$
 Max.

FIELD MOUNTING

The TX787 is designed for installation in industrial field environments. A sealed, die-cast aluminum housing protects against corrosion, moisture, dust and electrical noise such as radio frequency (RFI) and electromagnetic (EMI) interference. All circuit boards are urethane coated for environmental protection.