



STCTX SERIES

Industrial Thermocouple Connector/Transmitter



INSTRUCTION
SHEET

M3935A/1112

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General Description

The OMEGA® STCTX Series is a medium performance, low cost, Industrial TC (Thermocouple) Connector/Transmitter. The STCTX features an encapsulated micro miniature signal conditioner built into a Universal Thermocouple Connector that converts the microvolt signal from a thermocouple sensor or probe across a dedicated temperature range to an industry standard 2-wire, 4 to 20mA analog output. This analog output can be sent hundreds of feet away from the location of your sensor (probe) to an indicating device, controller, PLC, computer, data logger or chart recorder. Your STCTX Connector/Transmitter has been factory calibrated to provide maximum performance and should require no field adjustments when received.

Note: Patents & Patents Pending

Unpacking

Remove the packing list and verify that you have received all of your OMEGA equipment. If you have any questions about the shipment, please call Customer Service at:

1-800-622-2378 or 203-359-1660. On the web you can find us at:

omega.com e-mail: **cservice@omega.com**

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor any damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

The following items are supplied in the box with your STCTX Connector/Transmitter.

- This User's Manual, # M3935A (1 ea.)
- Probe/Connector Locking Clips (2 ea.)



STCTX Series Industrial Thermocouple Connector/Transmitter

STCTX Series Thermocouple Connector/ Transmitter Models Available

Model No.	Description	Range
STCTX-J1	with Universal Connector	-18 to 121°C (0 to 250°F)
STCTX-J2	with Universal Connector	-18 to 538°C (0 to 1000°F)
STCTX-K1	with Universal Connector	-18 to 121°C (0 to 250°F)
STCTX-K2	with Universal Connector	-18 to 538°C (0 to 1000°F)
STCTX-K3	with Universal Connector	-18 to 1093°C (0 to 2000°F)
STCTX-T1	with Universal Connector	-18 to 121°C (0 to 250°F)
STCTX-T2	with Universal Connector	-18 to 399°C (0 to 750°F)

SPRTX Series RTD Connector/ Transmitter Models Available

Model No.	Description	Range
SPRTX-S1	with Standard Size Connector	-99 to 208°C (-146 to 406°F)
SPRTX-S2	with Standard Size Connector	2 to 569°C (36 to 1056°F)
SPRTX-M1	with Miniature Size Connector	-99 to 208°C (-146 to 406°F)
SPRTX-M2	with Miniature Size Connector	2 to 569°C (36 to 1056°F)

Recommended Accessories

Regulated Power Supply, OMEGA® Part No.: PSR-24L

Shielded 2-conductor cable (100 ft), OMEGA® Part No.: TX2-100



Introduction/Safety

Your STCTX Thermocouple Connector/Transmitter has been designed for ease of use and flexibility. It is important that you read this User's Manual completely and follow all safety precautions before operating your unit.

Precautions

1. FOLLOW ALL SAFETY PRECAUTIONS AND OPERATING INSTRUCTIONS OUTLINED IN THIS MANUAL.
2. INSURE PROBE/CONNECTOR SAFETY CLIPS ARE ALWAYS INSTALLED DURING USE.
3. ADD ADDITIONAL SAFE GUARDS TO YOUR SYSTEM IN CRITICAL APPLICATIONS WHERE DAMAGE OR INJURY MAY RESULT FROM PROBE/CONNECTOR SEPARATION OR FAILURE.
4. NEVER EXPOSE THE CONNECTOR/MODULE BODY TO AMBIENT TEMPERATURES ABOVE 85°C (185°F) OR BELOW -40°C (-40°F). DAMAGE MAY RESULT.
5. DO NOT OPERATE IN FLAMMABLE OR EXPLOSIVE ENVIRONMENTS.
6. DO NOT USE IN HUMAN, MEDICAL, OR NUCLEAR APPLICATIONS.
7. NEVER OPERATE WITH A POWER SOURCE OTHER THAN WHAT IS SPECIFIED IN THIS MANUAL.
8. REMOVE AND/OR DISCONNECT POWER SOURCE BEFORE ATTEMPTING INSTALLATION OR MAINTENANCE.
9. ALWAYS OPERATE YOUR UNIT WITH THE SHIELD WIRE CONNECTED TO EARTH GROUND.
10. INSTALLATION AND WIRING SHOULD BE DONE BY TRAINED PROFESSIONALS ONLY.
11. DO NOT OPEN OR DISASSEMBLE YOUR UNIT.

NOTE

There are no user serviceable parts inside your unit. Attempting to open, repair or service your unit will void your warranty.



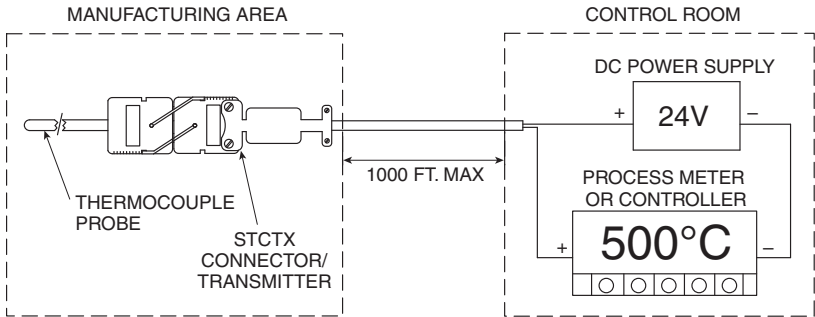
Theory of Operation

A 4 to 20 mA loop is a series loop in which a transmitter will vary the current flow depending on the input to the transmitter. With the STCTX the amount of current allowed to flow in the loop will vary depending on the microvolt change, due to changes in the temperature being measured by the thermocouple sensor (probe). Some advantages of a current output over a voltage output is that the signal measured is less susceptible to electrical noise interference and the loop can support more than one measuring instrument as long as the maximum loop resistance is not exceeded.

A typical application utilizing a current loop will normally consist of a power supply, the transmitter and a meter, recorder or controller to measure the current flow. The loop resistance is the sum of the measuring instruments and wire used. The maximum allowable loop resistance for the STCTX to function properly is found by using the following formula:

$$R_{max} = (\text{power supply voltage} - 9 \text{ volts}) / .02 \text{ amps}$$

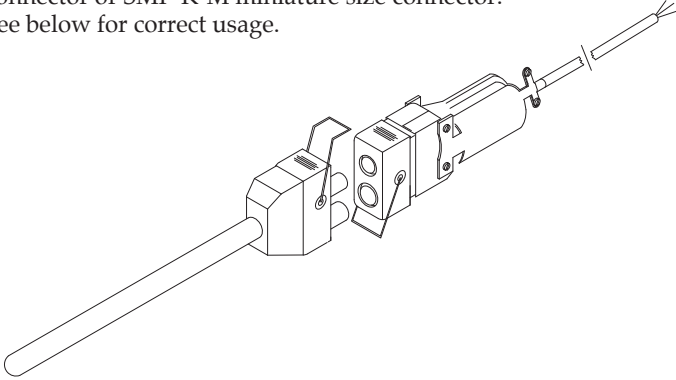
For applications that require a voltage output, the 4 to 20mA signal from the STCTX can be converted in the field by adding a 250 Ohm shunt resistor that will convert the transmitters output to a 1 to 5 Vdc signal when wired correctly. See "Transmitter Wiring Examples" in this manual.





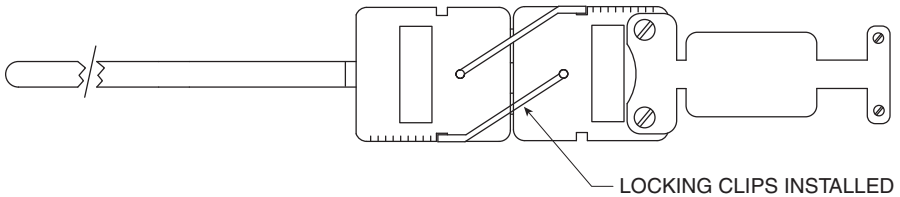
Mounting Your STCTX to Probes

The STCTX Series Connector/Transmitters are designed for quick connection to Thermocouple sensors and probes. The STCTX will connect to all industry Thermocouple probes that feature “Omega Style” standard or miniature male connectors such as Omega OST-K-M standard size connector or SMP-K-M miniature size connector. See below for correct usage.



Probe Locking Clips

Probe locking clips are also provided to help secure your probe to the STCTX Connector/Transmitter.



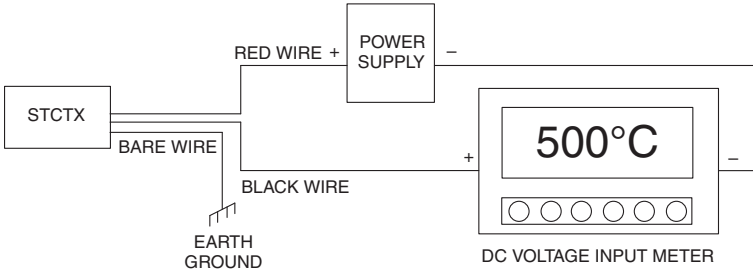
CAUTION

Although your STCTX Connector/Transmitter will work with any Thermocouple sensor or probe, It is recommended that you use only OMEGA® Thermocouple probes with you STCTX unit to insure proper installation and use of the probe locking clips. Probe locking clips are provided to offer added protection against the separation of your probe and connector/transmitter. In critical applications where separation of the Thermocouple probe from the connector/transmitter during normal operation could cause damage or harm, it is recommended that you install additional safety and locking devices to prevent the units from separating and/or shutting down your process.

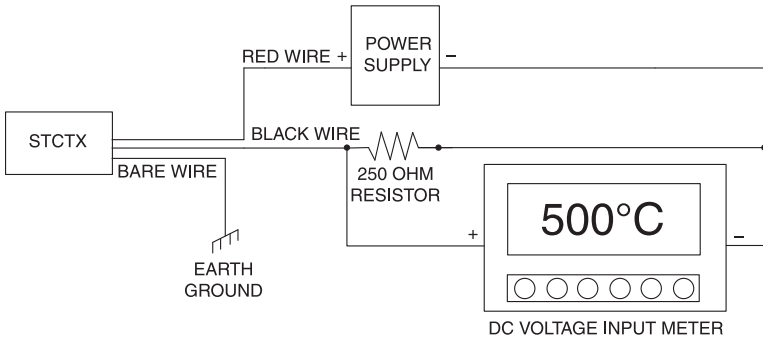


Transmitter Wiring Examples

4 to 20mA Output (2-wire)



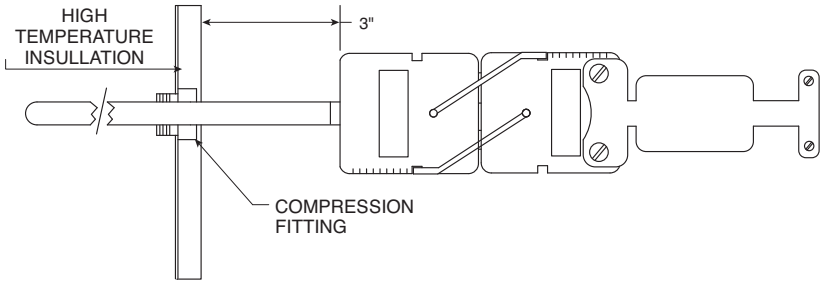
Converting from 4 to 20mA Output to 1 to 5Vdc Output (3-wire)





Protection from High Ambient Temperatures

Note: Your STCTX Connector/Transmitter Assembly can be damaged if exposed to ambient temperatures above 85°C (185°F). Some applications may require that you shield the STCTX unit from radiated heat as shown below. You should always use a probe where the length allows for a safe distance of 76 mm (3") or more between the body of the STCTX and your source of heat.





Calibration/Service

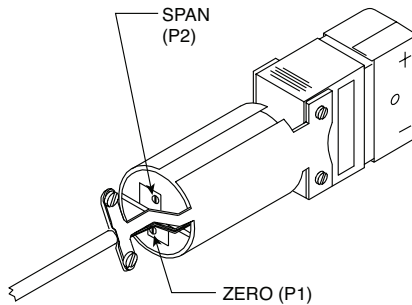
Your transmitter has been factory calibrated to meet or exceed the specifications outlined in this manual. No field adjustments should be needed. If your unit should become damaged or malfunction, please contact Omega Customer Service at:

1-800-622-2378 or 203-359-1660. On the web you can find us at:
omega.com e-mail: cservice@omega.com

Calibration Procedure

Equipment Required:

1. Regulated DC Power Supply, 12-24 Vdc @ 30 mA
 2. Digital DC Current Meter
 3. Thermometer Simulator (Omega Model CL23A)
 4. Test Leads
1. Connect the power supply, milli-amp meter and Thermometer simulator as shown on page 5 of this manual.
 2. Set the Thermocouple simulator to the correct calibration type for the units being tested.
 3. Set the Thermocouple simulator for the low end setting for the thermometer type you are testing.
 4. Adjust "P1" on the STCTX for 4.00 mA output.
 5. Set the Thermocouple simulator for the high end setting for the thermocouple type you are testing.
 6. Adjust "P2" on the STCTX for 20.00 mA output.
 7. Repeat steps 3, 4, 5, & 6 until correct readings are achieved.
 8. Calibration complete.



Specifications

Temperature Input Range by model

STCTX-J1, -K1, -T1	-18 to 121°C (0 to 250°F)
STCTX-J2, K2	-18 to 538°C (0 to 1000°F)
STCTX-T2	-18 to 399°C (0 to 750°F)
STCTX-K3	-18 to 1093°C (0 to 2000°F)



Accuracy: $\pm 0.5\%$ of full scale @ 23°C

NOTE

Thermocouple signals are non-linear. Your STCTX provides amplification, not linearization. You must take into account the non-linearity and inaccuracy of your thermocouple sensor to calculate your combined system accuracy.

Repeatability:	$\pm 0.25^{\circ}\text{C}$ (0.5°F)
Output Stability/ Temp Drift:	± 0.015 mA/°C
Max Ambient Temperature:	-40 to 85 °C (-40 to 185°F)
Output:	2-Wire, 4 to 20mA
Power Supply:	Regulated 9 to 24 Vdc @ 30mA max
Max Loop Resistance:	Ohms = (V supply – 9 V)/.02 A
Sensor Input Type:	Ungrounded Thermocouple (J, K, T)
Open Sensor Indication:	Output goes above 20mA
Connector Style/ Material:	
Universal	Omega Model UST (Glass Filled Nylon)
Dimensions	79 x 18 x 24 mm (3.12 L x 0.70 W x .96"
Weight	100 g (0.22 lb)
Response Time:	120ms (0-63% of full scale)

NOTE

- Cable shield wire must be connected to earth ground for "Open Sensor Indication" to function correctly.
- The STCTX Series is not designed for use in medical or nuclear applications, nor flammable or explosive environments.
- The published performance tolerance of this product may be derated by up to several percent if operated in the presence of strong radio frequency energy. This condition may occur if operation takes place within 1 or 2 Km of a commercial radio or TV station or when communication devices, such as walkie talkies, with signal strengths in the order of 1 watt or greater are used in the area of operation.
- Patents and Patents Pending



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It is the policy of OMEGA Engineering, Inc. 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 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, human 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's 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 malfunctions, 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 having been 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 in which wear is not warranted, include but are 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 the company 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. 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 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. Purchase Order 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. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the 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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