



Temptation 2000  
T2X RTD Temperature Transmitter

# T2X

## User's Manual

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*Demand Moore Reliability*

## Customer Support

Moore Industries is recognized as the industry leader in delivering top quality to its customers in products and services. We perform a sequence of stringent quality assurance checks on every unit we ship. If any Moore Industries product fails to perform up to rated specifications, call us for help. Our highly skilled staff of trained technicians and engineers pride themselves on their ability to provide timely, accurate, and practical answers to your process instrumentation questions. Our headquarters and other facilities phone numbers are listed below.

There are several pieces of information that can be gathered before you call the factory that will help our staff get the answers you need in the shortest time possible. For fastest service, gather the complete model and serial number(s) of the problem unit(s) and the job number of the original sale.

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## Safety Messages

Please read this manual in its entirety. It should answer most of your questions. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product. Should you still have questions please visit our web site at [www.miinet.com](http://www.miinet.com) or contact any of our sales/support offices nearest you.

Your safety and the safety of others is very important. We have provided many important safety messages in this manual. Please read these messages carefully. These safety messages alert you to potential hazards that could hurt you or others or render damage to units.

All Moore Industries instrumentation should only be used for the purpose and in the manner described in this manual. If you use this product in a manner other than that for which it was intended, unpredictable behavior could ensue with possible hazardous consequences.

Each safety message is associated with a safety alert symbol. These symbols are found in the throughout the manual. The definition of these symbols is described below:

Pay particular attention wherever you see the following symbols:



**Note** – Information that is helpful for a procedure, condition or operation of the unit.



**Caution** – Hazardous procedure or condition that could damage or destroy the unit.



**Warning** – Hazardous procedure or condition that could injure the operator.

### Qualified Personnel

The Moore Industries' product/systems described in this manual may be operated only by personnel qualified for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these Moore Industries' products/systems.

### Proper use of Moore Industries products

Moore Industries' products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Moore Industries'. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

We have reviewed the contents of this publication to ensure consistency with the hardware and/or software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions. Specifications and information are subject to change without notice.

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## Introduction

The TEMPTATION 2000 RTD Temperature Transmitter (Model T2X) delivers long-term stability in a wide range of basic temperature sensing applications.

The PC programmable, microprocessor-based T2X accepts 2-, 3-, and 4-wire RTD inputs. It provides a proportional 4-20mA output that is linear with temperature, and ready for direct interface with a monitoring/control system.

## Setting Up the T2X

Configuring and programming the T2X is simple. Begin by gathering all the necessary equipment (as listed in Table 1 ), installing the T2X PC Configuration Program onto your computer, then connecting the T2X as shown in Figure 1. It is necessary to connect the T2X to the PC before creating a configuration file.

### Connecting the T2X for Configuration

Figure 1. Connecting the T2X to the PC for configuration.

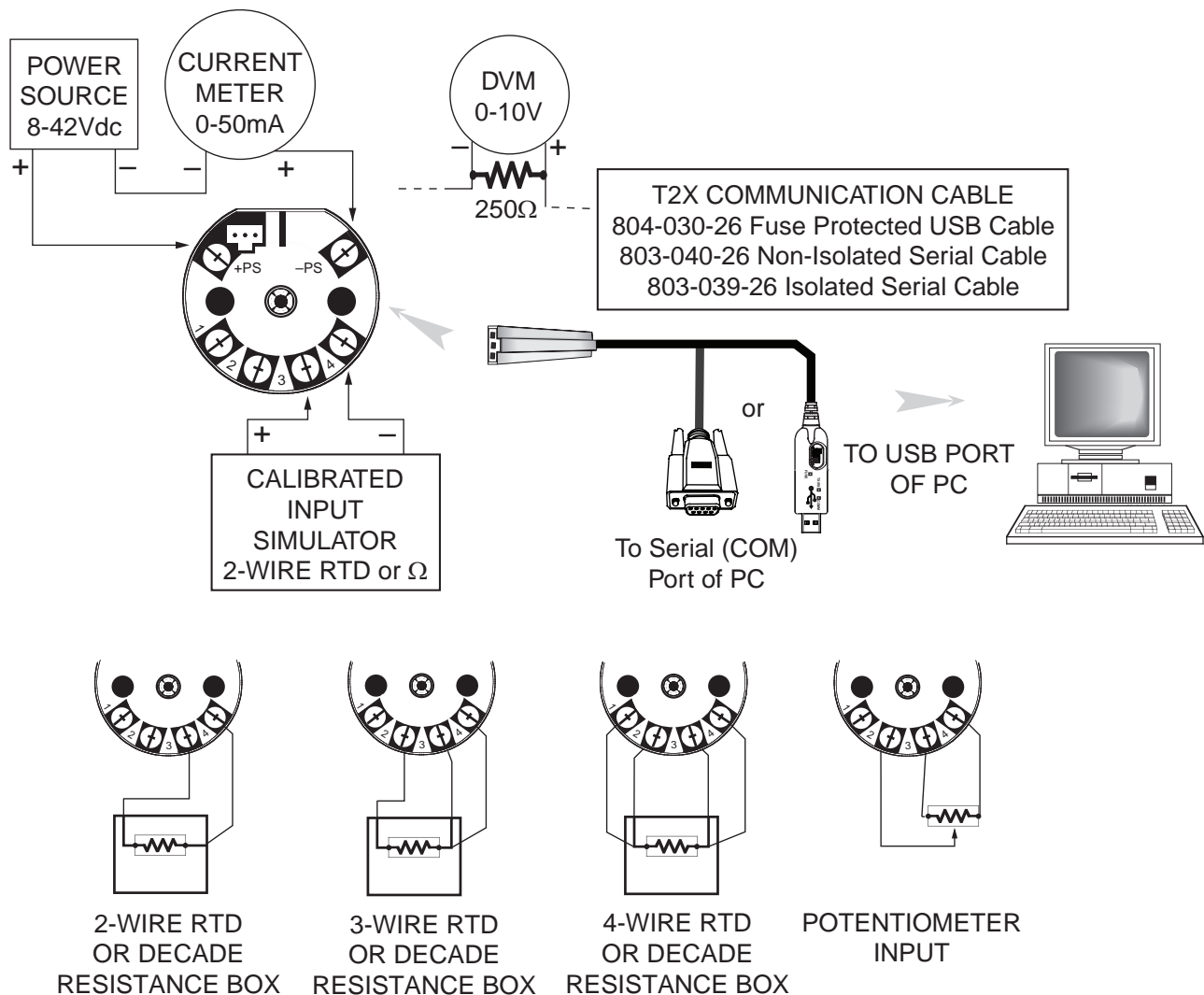


Table 1. Equipment needed for setting up the T2X.

Device	Input
Potentiometer, Simulator, or Decade Resistance Box	Accurate to $\pm 0.05\%$ of unit span
Power Supply	8-42Vdc, $\pm 10\%$
Precision Load Resistor (optional)	2500, $\pm 0.025\%$
Multimeter	Accurate to $\pm 0.025\%$ , e.g. Fluke Model 87
RTD Temperature vs. Resistance Tables	ITS68 and ITS90, or equivalent
Personal Computer	See "Installing Software"
Moore Industries' T2X Configuration Program	Successfully installed on the hard disk of the specified PC
Moore Industries' Communication Cable	Fuse Protected, Non-Isolated USB Communication Cable (required by ATEX for products installed in Intrinsically-Safe areas) (PN 804-030-26)

## Installing the Software

Before the transmitter can be configured, the T2X PC Configuration Program must be installed on a PC with the following:

- Microsoft Windows based PC;
- 16Mb free RAM;
- 20MB free disk space on hard drive
- Microsoft Windows® 7, 10



**Note:** One (1) available serial communications (COM 1, 2, 3 or 4) or USB port

## Configuring the T2X

The T2X is configured using an easy-to-use PC Configuration Program; there are no internal or external controls to adjust or settings to change. All operating parameters are set using the PC program, then downloaded to the nonvolatile memory of the T2X in the form of a configuration file

Pages 7-8 of the manual contains all of the instructions for configuring the T2X. Use Figure 2 to find the portion of the screen that you have a question about. The number by that area will correspond with the instructions.



### Managing Configuration Files

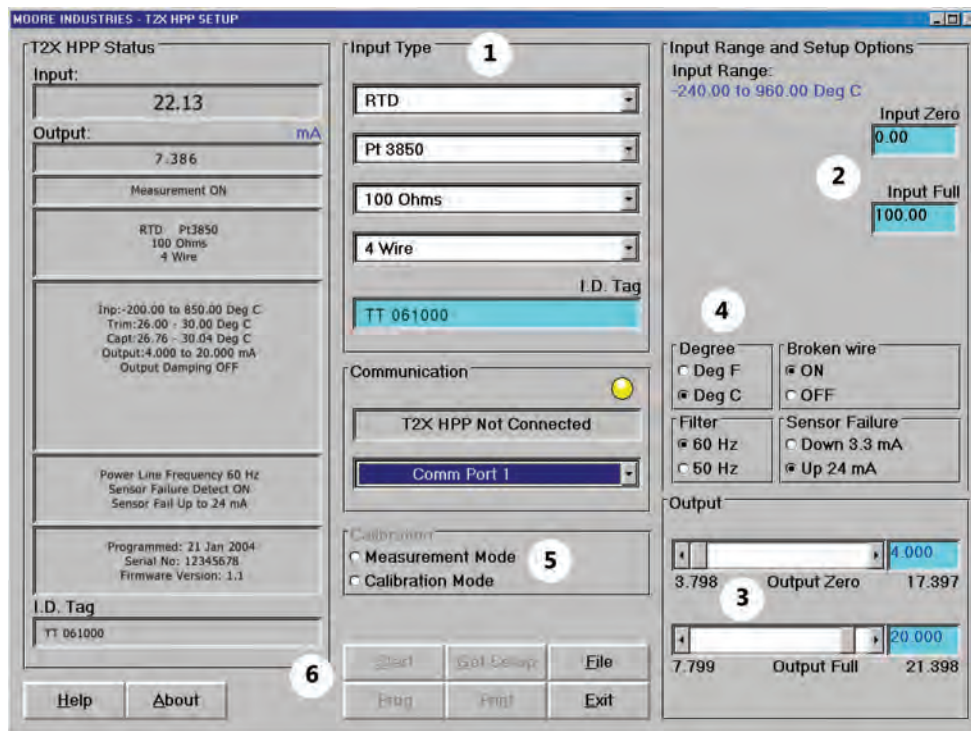
Once all the parameters for a transmitter are set, they can be saved to disk using the “File” menus and fields.

**Saving a Configuration File to Disk** - To save a configuration file to disk, click on the “File” button. This brings up an explorer-like window on the left side of the screen. Enter the name of the file you wish to save in the “Selected File Name” box. Select the location for the file to be saved and click “Save”. Answer “Yes” to the dialogue box that pops up to finish saving the file.

**Retrieving a Configuration File from Disk**-To retrieve a file, click on the “File” button. Use the display on the left to locate and click on the file to be retrieved. Click on the “Quit File” button. Answer “Yes” to the dialogue box that pops up to finish retrieving the file. The file can now be downloaded to a T2X.

**Retrieving a Configuration File from a Connected T2X**- To retrieve the configuration file from a connected T2X, simply click “Stop”, then “Get Setup”. The screen will reflect any changes. This file can now be saved or downloaded to a different T2X.

Figure 2. The Temptation 2000 PC Configuration Program provides an easy way to configure your T2X.



### 1. Selecting Input Type, Wiring, etc.

Use the selection tools in the “Input Type” box to choose the sensor type that the T2X will be reading. Select the appropriate “Input Type” values. Continue to change the remaining areas in “Input Type”, such as ohms and # wires, until the entire “Input Type” area matches the desired parameters for your transmitter.

### 2. Scaling the Input & Setting the Reverse Output

Scaling the input allows you to set the T2X to scale its output in response to a portion of the total range of the selected input type. In a reverse output application, the T2X output drops in proportion to a rise on input, and rises in proportion to a drop in the input.

*To scale the input:* To set the scaling, select the “Input Zero” box and enter the value for the desired Input Zero from the application where the T2X is to be employed. Select the “Input Full” box and enter the value for the desired Input Full.

*To set reverse output:* Follow the instructions to scale the input, but enter a value in the “Input Zero” box that is greater than the Input Full, and a value in the “Input Full” box that is less than the Input Zero.

### 3. Scaling the Output

The T2X can be configured to scale its 4-20mA output to offset the performance or calibration of other instruments in the process loop. To scale the output, enter the desired Output Zero value in the “Zero Scale Output” box, or use the slide bar to adjust the value. Select the “Full Scale Output” box and enter the desired Output Full value.

### 4. Setting Miscellaneous Functions

There are several radio buttons on the T2X Configuration Program Main Screen that control additional transmitter functions.

*Setting Engineering Unit Readout:* Use this setting to have the Configuration Program calculate the Centigrade or Fahrenheit temperature for readout in the “Status” area of the screen.

*Setting Input Filtering:* Use this radio button setting to filter out noise from the power to the transmitter.

*Choosing Between Upscale and Downscale Drive:* This button configures the transmitter to drive its output either up to 24mA or down to 3.3mA when a sensor or sensor wiring failure is detected.

### 5. Enabling/Disabling Broken Wire Detection

During operation, the T2X sends random micro-amp pulses through input wiring to check for broken wiring or a burned-out sensor. This can cause problems with temperature calibrators. To turn this feature off, set the “Calibration” radio button to “Calibration Mode”.

### 6. Downloading your new T2X Settings

To start the download process, click on the “Stop/Start” button at the bottom of the screen, then on the “Prog” button. This transfers the settings from the software to the memory of the connected transmitter.



### Specifications

<p><b>Performance</b></p> <p><b>Input Accuracy:</b> Platinum RTD, ±0.2°C (±0.36°F) Nickel RTD, ±0.16°C (±0.29°F) Copper RTD, ±1.2°C (±2.16°F) Ohms, ±0.4Ω</p> <p><b>Output Accuracy:</b> ±0.05% of span</p> <p><b>NOTE:</b> Overall accuracy is determined by combining input and output accuracy. It includes the combined effects of linearity, hysteresis, repeatability, and adjustment resolution. It does not include ambient temperature effect.</p> <p><b>Stability (max. span):</b> 1 year = ±0.12% 3 years = ±0.21% 5 years = ±0.27%</p> <p><b>Measurement Cycle:</b> Output updates at least 8 times per second</p> <p><b>Output Response Time:</b> 256msec typical, 300msec maximum, for the output to change from 10% to 90% for an input step change of 0% to 100%</p> <p><b>Ripple:</b> 10mV peak-to-peak measured across a 250ohm load resistor at frequencies up to 120Hz</p>	<p><b>Performance (continued)</b></p> <p><b>Over-Voltage Protection:</b> Input, 4Vdc peak, max.; Output, 48Vdc, max.</p> <p><b>Digital Input Filter:</b> User-selectable, 50/60Hz</p> <p><b>Power Supply and Load Effects:</b> Negligible within specified power limits</p> <p><b>Load Capability:</b> 670 ohms @ 24V</p> <p><math display="block">\Omega = \frac{(\text{Supply Voltage} - 8V)}{0.024A}</math></p> <p><b>Burnout Protection:</b> User-programmable, Upscale to 24mA; Downscale to 3.3mA</p> <p><b>Output Current Limiting:</b> 25mA maximum</p> <p><b>RTD &amp; Ohms Excitation:</b> 250µA, ±10%</p> <p><b>RTD Lead Wire Resistance Maximum:</b> RTD resistance + 2 times the lead wire resistance must be less than 2000 ohms; Recommended &lt;35 ohms per wire for three wire inputs; &lt;5 ohms per wire for 10 ohm Cu inputs</p> <p><b>Damping:</b> 0-5 seconds (user selectable)</p>	<p><b>Ambient Temperature</b></p> <p><b>Operating &amp; Storage Range:</b> -40°C to +85°C (-40°F to +185°F)</p> <p><b>Relative Humidity:</b> 0-95%, non-condensing</p> <p><b>Ambient Temperature Effect:</b> ±0.03% of span/°C</p> <p><b>RFI/EMI Immunity:</b> 20V/M@20-1000MHz, when tested according to SAMA standard 33.1. (10V/m@80-1000MHz, 1kHz AM, when tested according to IEC 1000-4-3-1995)</p> <p><b>Noise Rejection:</b> Common mode: 100dB @ 50/60Hz; Normal Mode: 70dB typical at 200mV peak-to-peak @ 50/60Hz</p> <p><b>Set Up</b> All settings are made using Moore Industries' Intelligent PC Configuration Software, and then stored in non-volatile memory</p> <p><b>Weight</b> HPP: 101 g (3.6 oz) HPP in LH1: 428 g (15.1 oz) HPP in LH2: 428 g (15.1 oz) HPP in CH6: 173 g (6.1 oz)</p>
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### Accessories

Each T2X order comes with one copy of our Intelligent PC Configuration Software (Windows® compatible). To order additional software or cables:

Part Number	Part
750-75E05-01	Intelligent PC Configuration Software
803-039-26	Isolated Serial Configuration Cable (9-pin Serial Port)
803-040-26	Non-Isolated Serial Configuration Cable (9-pin Serial Port)
804-030-26	Fuse Protected, Non-Isolated USB Communication Cable (required by ATEX for products installed in Intrinsically-Safe areas)

#### Don't See What You Need?

We offer a wide range of temperature assembly choices - this data sheet provides just a few examples. Whatever your temperature assembly needs are, our temperature interface solution experts are ready to help!

### Select one from each category to order: **Temperature Transmitter and Enclosure**

Unit	Input	Output	Power	Options	Housing
<b>T2X</b> TEMPTATION 2000, Non- Isolated PC- Programmable 2-Wire RTD Transmitter	<b>PRG</b> User selectable with PC Configuration Software	<b>4-20MA</b> User scaleable with PC Configuration Software	<b>8-30DC</b> for Intrinsically- Safe <b>8-42DC</b>	<b>-ISC</b> (Intrinsically- Safe, CSA)  <b>-ISE</b> (Intrinsically- Safe, ATEX/ LCIE)  <b>-ISF</b> (Intrinsically- Safe, FM Approvals)	<b>HPP</b> Hockey-puck housing for mounting in standard connection heads <b>LH1NS‡</b> Connection head (FM approved, NEMA 4X, IP66) with two entry ports: ½-inch NPT cable and process–black PBT polyester cover <b>LH1MS‡</b> Connection head (FM approved, NEMA 4X, IP66) with two entry ports: M20 cable and ½-inch NPT process–black PBT polyester cover NEMA 4X, IP66 connection head with one M20 entry port and one G½ (BSP) entry port (aluminum body with VALOX 357U cover) <b>LH1CS‡</b> Connection head with two entry ports: M20 cable and G½ (BSP) process–black PBT polyester cover <b>LH1NX</b> Connection head with ½-inch NPT entry and mounting plate for customer's air duct opening–black PBT polyester cover <b>LH2NS*</b> Explosion-proof connection head with two entry ports: ½-inch NPT cable and process–black metal cover <b>LH2MS*</b> Explosion-proof connection head with two entry ports: M20 cable and ½-inch NPT process–black metal cover  NOTE: *A suffix with LH2 indicates ANZEx/TestSafe (Ex d) Flameproof approval; 2" pipe-mount kit included (i.e., LH2MSA) *E suffix with LH2 denotes ATEX Flameproof enclosure; 2" pipe-mount kit included (i.e., LH2MSE) *‡P suffix indicates enclosure is equipped with 2" pipe-mount hardware kit (i.e., LH1NSP)

**Model Number Example:** T2X / PRG / 4-20MA / 8-42DC [HPP]

### Input Types and Ranges

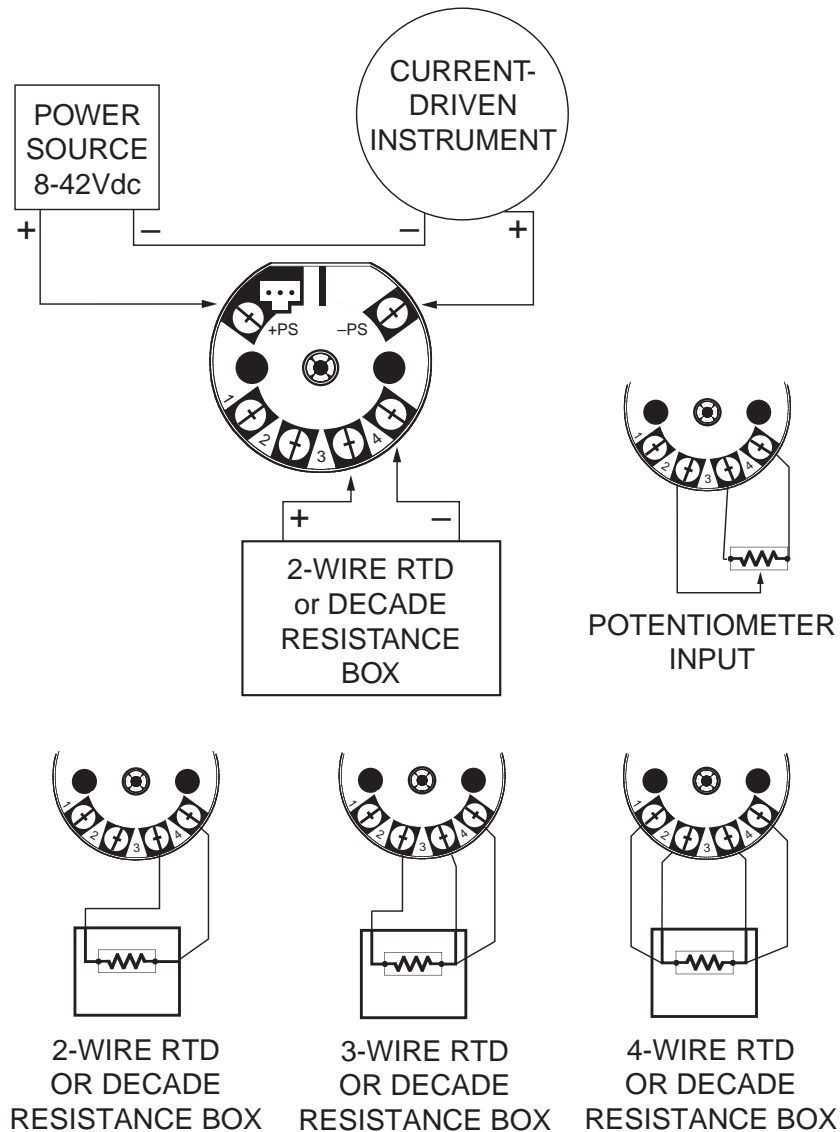
Input	Type	$\alpha$	$\Omega$	Conformance Range	Maximum Range*	Minimum Span
<b>RTD</b> 2-Wire 3-Wire 4-Wire	Platinum	0.003850	100, 200, 300, 400, 500	-200 to 850°C (-328 to 1562°F)	-240 to 960°C (-400 to 1760°F)	10°C (18°F)
			1000	-200 to 300°C (-328 to 572°F)	-240 to 300°C (-400 to 572°F)	
		0.003902	100, 200, 400, 500	-100 to 650°C (-148 to 1202°F)	-150 to 720°C (-238 to 1328°F)	
			1000	-100 to 300°C (-148 to 572°F)	-150 to 300°C (-238 to 572°F)	
	0.003916	100	-200 to 510°C (-328 to 950°F)	-240 to 580°C (-400 to 1076°F)		
	Nickel	0.00672	120	-80 to 320°C (-112 to 608°F)	-100 to 360°C (-148 to 680°F)	
Copper	0.00427	9.035	-50 to 250°C (-58 to 482°F)	-203.19 to 300.53°C (-333.74 to 572.95°F)	100°C(180°F)	
$\Omega$	Resistance Potentiometer	N/A	0-2200 $\Omega$	0-2200 $\Omega$	0-2200 $\Omega$	30 $\Omega$

\* Transmitter will measure ranges outside of the Conformance Range with some degradation to accuracy ratings. Consult the factory for details.

### Installing and Connecting the T2X

Now that the T2X has been programmed to your satisfaction, it is ready for installation. The T2X is available in an HPP housing style, but may be enclosed in any one of several types of certified or uncertified connection heads. Consult your local Moore Industries' Interface Solutions Expert for information on the type of enclosure that best suits your application.

Figure 3. Connecting your T2X to the loop.




### Connecting the T2X in an Application

Moore Industries suggests installing the T2X by first mounting the unit in its intended application, then making the electrical connections to input, output, and power. Before any installation, make sure that the unit has been bench checked to ensure that it is configured and calibrated properly for its intended application.

## Physical Instructions for Installing an Encapsulated Hockey-Puck (HPP) Instrument and LH2 Field-Mount Enclosure Apparatus

The Physical Instructions Supplement provides references and additional information for safely installing and commissioning a Moore Industries' Hockey-Puck instrument and LH2 Field-Mount Enclosure Apparatus.

**Instrument Labeling and Identification**—The fully assembled apparatus consists of a Moore Industries' Hockey-Puck unit securely mounted in an LH2 enclosure. Such an apparatus is intended for use in both indoor and outdoor Hazardous (Classified) Locations where a degree of protection from windblown dust and rain, splashing and hose-directed water, and protection from the formation of ice on the enclosure is required. A series of selected Moore Industries' 2-Wire hockey-puck style units mounted in the LH2 enclosure (consult factory for a list of the certified instruments) are certified as an Explosion-Proof and Dust Ignition-Proof apparatus in accordance with Factory Mutual Research '3600' standard (NEC-based) and as Flame-Proof in accordance with the CENELEC/ATEX Directive 2014/34/EU (IEC-based). For applications intended in North America and other related areas, the approval classifications are stated on the externally mounted metal ID Tag to be FM approved as Explosion-Proof for Class I, Division 1, Groups A, B, C and D; Dust Ignition-Proof for Class II/III, Division 1, Groups E, F and G; T6 @ 60°C Maximum Operating Ambient Temperature. In regards to protection from Environmental hazards/effects, the apparatus carries a NEMA Type 4X rating with an Ingress Protection Code of IP66 as per IEC-529. For applications intended in Europe and other related areas, the ID Tag clearly states that the apparatus is certified by ISSeP to be Flame-Proof and marked as such:

 II 2GD EEx d IIC; T6 @ Tamb. (-20°C ≤ Tamb. ≤ +60°C). The temperature marking for dust atmospheres is up to + 80°C. The maximum power parameters are: Vmax = 42 VDC, Imax = 110 mA and Pmax = 2W. Also, the tag clearly shows the CE marking denoting full compliance with the relevant European Community directives applicable to the Process Instrumentation Industry. For 2-wire transmitters certified and intended to be operated as either Intrinsically Safe, Non-Incendive (Class I, Div. 2) or Type N; the power parameters are clearly stated on both the Instrument ID Label and the Apparatus ID Tag. Also, the power parameters and cabling requirements are stated in the 'Intrinsically Safe Barrier and Field Installation Diagram' that is included in the relevant User's Manuals. This apparatus is designed in such a way that it: a) does not give rise to physical injury or other harm due to contact, b) does not produce excessive surface temperature, infra-red, electromagnetic, ionizing radiation and, c) have no non-electrical dangers.



**CAUTION:** Read, understand and adhere to the manufacturer's installation and operating procedures. Substitution of components may impair the instrument's Intrinsic Safety and/or Non-Incendivity. Keep cover tightly closed. Do not open unit when energized. Do not open unit when either an explosive gas or dust atmosphere is present. Cable entry temperature may exceed 70°C. Cabling to be suitable. Do not allow layers of dust to accumulate on the surfaces of the equipment. Disconnect power before servicing.

**Suitability for the Installation**—To determine if a unit's area classification approvals are appropriate for a particular installation, first inspect the classification labeling on the instrument and/or instrument enclosure and the "Control Drawing for Installation" found in the User's Manual (where applicable). Second, consult the installation criteria for the approval or electrical standard agencies governing your location to determine if the unit's approvals are suitable for the installation. If the instrument's labeling matches the agency criteria and/or electrical codes for the area, the unit is suitable for the installation. To determine if the unit's electrical and environmental specifications are appropriate for the installation, consult the "Specifications" table in the User's Manual for that instrument. If the instrument's electrical and environmental characteristics are within the expected ambient operating conditions for the installation, the instrument is suitable for the installation.

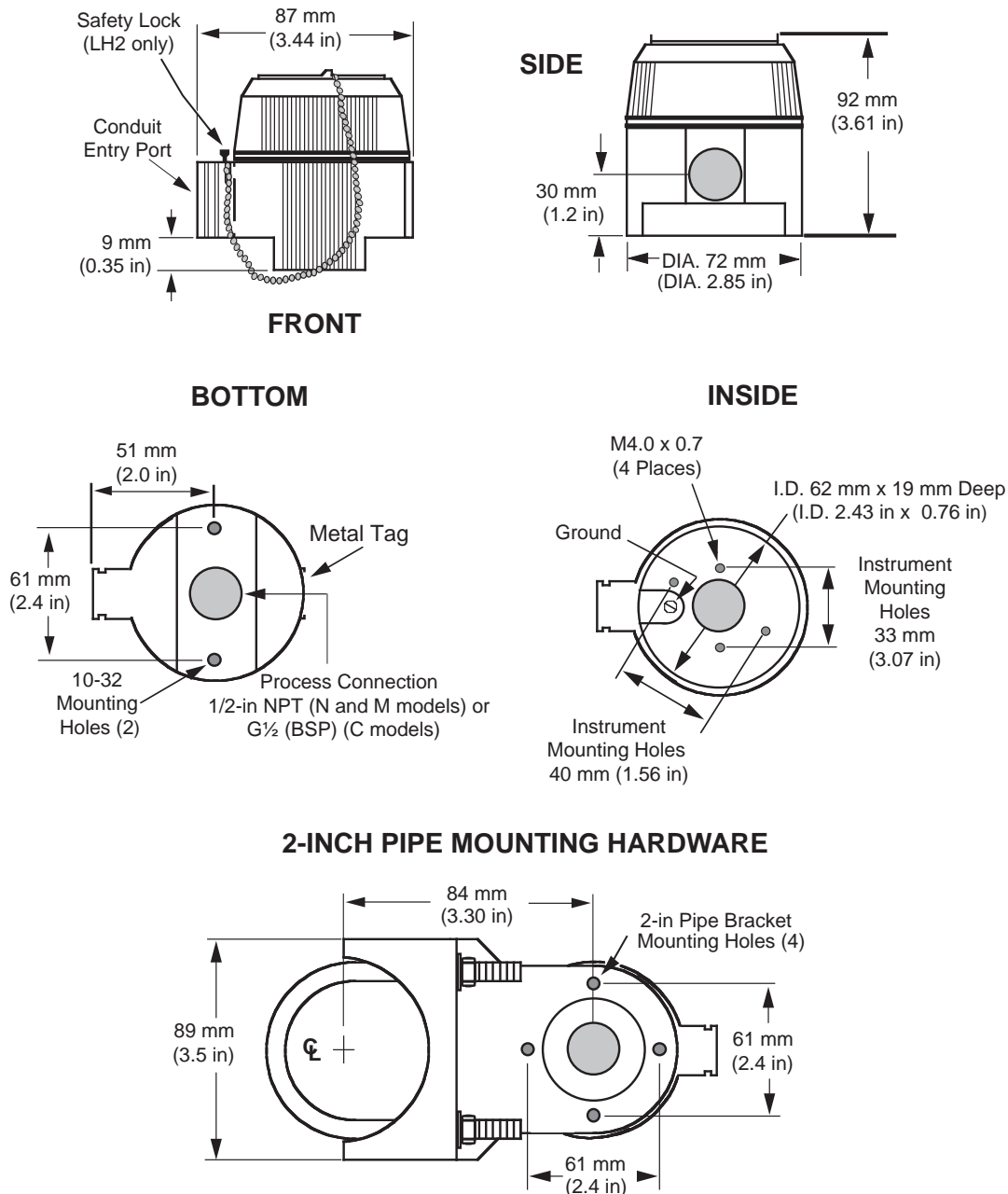


**CAUTION:** If for any reason you are uncertain as to whether the instrument's specifications or area classifications meet the operational or safety requirements for the installation, consult Moore Industries prior to installation.

## Installation of LH Enclosure Apparatus

1. Install the LH2 enclosure onto a surface, temperature thermowell, or onto a standard 2-inch pipe using the mounting hardware. Remove the cap from the LH2 by rotating the cap counter clockwise after unlocking by rotating the locking screw clockwise.
2. Connect input and output wiring in accordance with the connection information found in the User's Manual for that instrument.
3. Replace the cap to the LH2 by rotating the cap clockwise. Secure (lock) the cap by rotating the locking screw counterclockwise.
4. Connect a ground wire between the ground screw on the LH2 enclosure to an appropriate earth ground.

Figure 4. Installation dimensions for LH2 enclosure.



# T2X

T2X RTD Temperature Transmitter

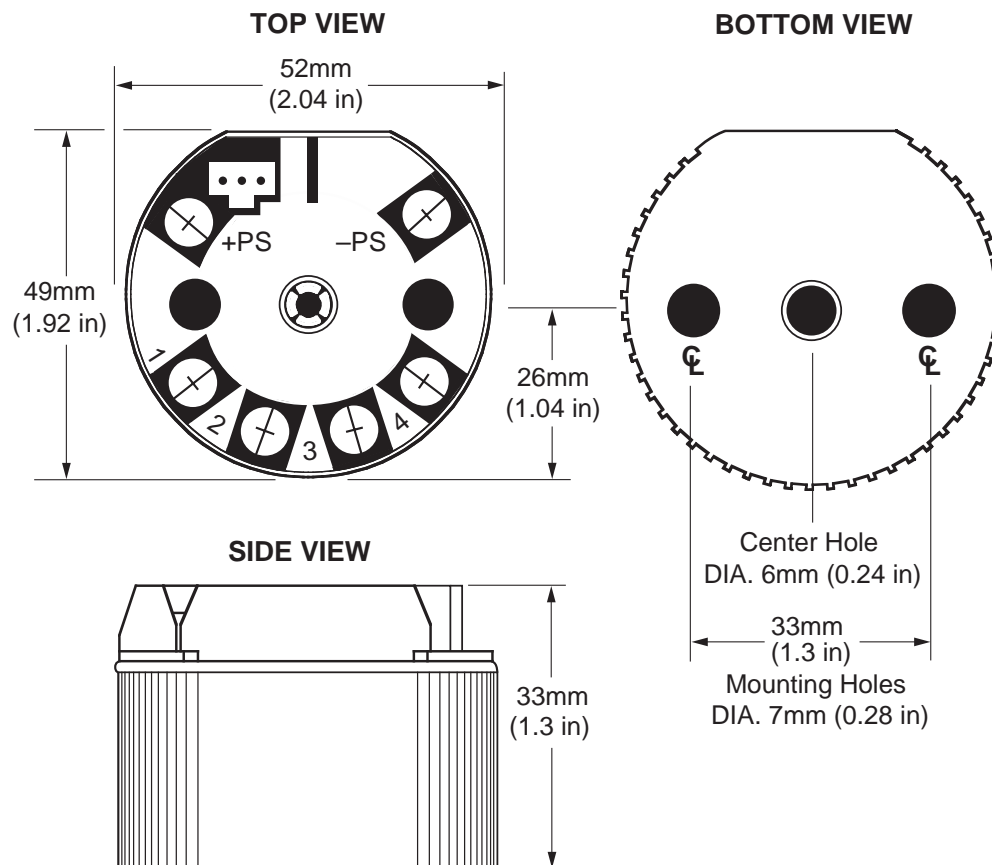
User's Manual  
235-781-00E  
August 2020

## Electrical Safety Information

Refer to the Electrical Safety Manual included at the end of this manual, also available as a separate document.

## Dimensions

Figure 5. Dimensions of the T2X.

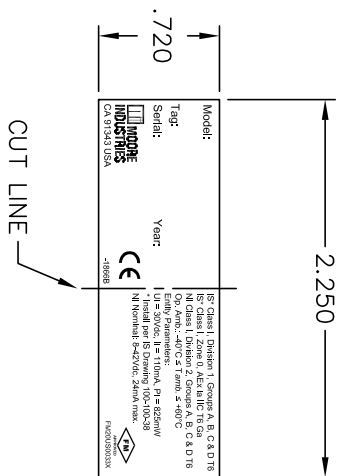


## Maintaining the T2X

Moore Industries suggests a quick check for terminal tightness and general unit condition every 6-8 months, depending upon the severity of conditions. Things such as ambient vibration, corrosive atmospheres, extreme heat or cold, etc., can play a role in shortening the service life of any piece of electronic equipment. Always adhere to any site requirements for programmed maintenance.



	<b>DO NOT SCALE DRAWING</b>		CATEGORY	DRAWING NUMBER	REVISION
	<b>TOLERANCES</b> (UNLESS NOTED) DECIMALS = ±h/100 mm X ±.1 / .254 .XXX ±.005/0.125 HOLES ±.003/0.080 ANGLES ±1/2°	DRAWN Gus H. Elias	09/00	<b>COMPUTERIZED LABEL</b>  <b>LABEL, I.D.,</b> <b>T2X [HPP]</b>  <b>Non-Isolated PC-Prog. Temp. X-mitters.</b> <b>-ISF Option, 10-30DC</b>	<b>200-251-1866</b>
CHECKED W. TLo	ENGINEER Gus H. Elias	09/00	TITLE LABEL, I.D., <b>T2X [HPP]</b>		
SCALE 1/1	09/00		<b>-ISF Option, 10-30DC</b>	BY T.G.	APPROVAL W.C.
<b>NOTICE RE PROPRIETARY INFORMATION:</b> This drawing and the information contained herein are the proprietary property of Moore Industries International, Inc. (MI) and should not be reproduced or disclosed to any third party without the written consent of an authorized officer of MI.					



### NOTES: UNLESS OTHERWISE SPECIFIED

1. TO PRINT THIS LABEL: JOB SPECIFIC MODEL, SERIAL NUMBER, TAG NUMBER, AND YEAR OF MANUFACTURE WILL BE DOWNLOADED FROM THE MENTOR DATA FILE AND PRINTED ALONG WITH THE FIXED TEXT GRAPHICS (SUPPLIED BY THE LEG1 93 DATA FILE) TO CREATE THE FINISHED LABEL.
2. THE FIXED TEXT AND GRAPHIC FIELDS FOR THIS LABEL ARE STORED UNDER NO. 200-251-1866 IN THE LEG1 93 LABEL MACHINE COMPUTER HARD DISK.
3. MATERIAL: .002 SILVER, IDENTIPATE (MI P/N 200-304-00) DIE CUT AS SHOWN ABOVE. REFER TO LABEL SPEC. DRAWING 200-304-00.

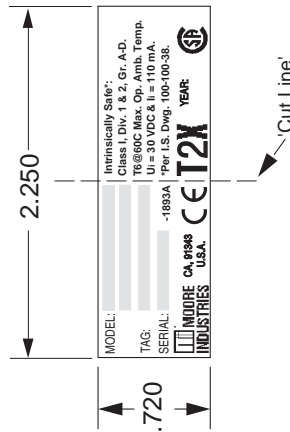
**Certified Product**

This is a controlled 'Related' or 'Schedule' drawing. No modifications are permitted without the notification and final approval of the Certification Engineer (related dwgs.) or the Certifying Agency (schedule dwgs.)

	<b>DO NOT SCALE DRAWING</b>		<b>CATEGORY</b> COMPUTERIZED LABEL		<b>DRAWING NUMBER</b> 200-251-1893		<b>REVISION</b> A	
	<b>TOLERANCES (UNLESS NOTED)</b> DECIMALS = ± .001 / 2.54 .X = ± .03 / 0.76 .XX = ± .0100 / 0.25 HOLES: ± .003 / 0.076 / 0.08 / 0.05 ANGLES: ± .30°	DRAWN: Gus H. Elias CHECKED: W. Ho ENGINEER: Gus H. Elias SCALE: 1/1	<b>TITLE</b> LABEL, I.D. T2X [HPP], Non-Isolated PC-Prog. RTD Transmitter -ISC Option: CSA, I.S.		REVISED BY: INITIAL RELEASE DATE: 10/00 BY: G.E. APPROVAL: CB	NOTICE RE PROPRIETARY INFORMATION: This drawing and the information contained herein are the proprietary property of Moore Industries-International, Inc. (MI) and should not be reproduced or disclosed to any third party without the written consent of an authorized officer of MI.		

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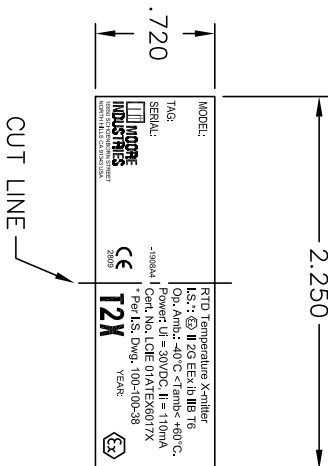
**Term Abbreviation Legend:**  
 CSA: Canadian Standards Association Intn'l.  
 Div.: Division  
 Gr.: Group  
 HPP: Encapsulated Hockey-Puck Style  
 I.S.: Intrinsically Safe



**NOTES:**

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		<b>DO NOT SCALE DRAWING</b>		CATEGORY		DRAWING NUMBER		REVISION					
		TOLERANCES (UNLESS NOTED) DECIMALS = ±inch/mm X            ±.1 / .254 .XX          ±.01 / .25 .XXX        ±.005 / .125 HOLES       ±.003 / 0.080 ANGLES      ±1/2°		DRAWN    Gus H. Elidas    04/01 CHECKED   W. Ho-        04/01 ENGINEER   Gus H. Elidas   04/01 SCALE       1 / 1		COMPUTERIZED LABEL LABEL, I.D., T2X [HPP]: -ISE Option PC-Prog. RTD Temp. Transmitter LCE/ATEX Intrinsically Safe (I.S.)		200-251-1908		A4			
				TITLE		REVISED BY		DATE		BY		APPROVAL	
				PC-Prog. RTD Temp. Transmitter LCE/ATEX Intrinsically Safe (I.S.)		ECO 18886		8/20		TG		WT	
				NOTICE RE PROPRIETARY INFORMATION: This drawing and the information contained herein are the proprietary property of Moore Industries International, Inc. (MI) and should not be reproduced or disclosed to any third party without the written consent of an authorized officer of MI.									



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4. ALL MATERIAL MUST BE ROHS COMPLIANT.
  3. MATERIAL: .002 SILVER, ULTRAPLATE (MIL P/N 200-304-00) ROLL STOCK. REFER TO LABEL SPEC. DRAWING 200-304-00. ADHESIVE BACKING IS UL/CSA APPROVED HIGH PERFORMANCE ACRYLIC. PRINTING IS WITH BLACK, UL/CSA, THERMAL TRANSFER RIBBON (801-003-96).
  2. THE FIXED TEXT AND GRAPHIC FIELDS FOR THIS LABEL ARE STORED UNDER NO. 200-251-1908 IN THE LEGI LABEL MACHINE COMPUTER HARD DISK.
  1. TO PRINT THIS LABEL: DOWNLOAD THE FIXED TEXT AND GRAPHICS (SUPPLIED BY THE LEGI DATA FILE) TO CREATE THE FINISHED LABEL.
- NOTES: UNLESS OTHERWISE SPECIFIED**

### Warranty Disclaimer

Moore Industries ("The Company") makes no express, implied or statutory warranties (including any warranty of merchantability or of fitness for a particular purpose) with respect to any goods or services sold by the company. The company disclaims all warranties arising from any course of dealing or trade usage, and any buyer of goods or services from the company acknowledges that there are no warranties implied by custom or usage in the trade of the buyer and of the company, and that any prior dealings of the buyer with the company do not imply that the company warrants the goods or services in any way.

Any buyer of goods or services from the company agrees with the company that the sole and exclusive remedies for breach of any warranty concerning the goods or services shall be for the company, at its option, to repair or replace the goods or services or refund the purchase price. The company shall in no event be liable for any consequential or incidental damages even if the company fails in any attempt to remedy defects in the goods or services, but in such case the buyer shall be entitled to no more than a refund of all monies paid to the company by the buyer for purchase of the goods or services.

Any cause of action for breach of any warranty by the company shall be barred unless the company receives from the buyer a written notice of the alleged defect or breach within ten days from the earliest date on which the buyer could reasonably have discovered the alleged defect or breach, and no action for the breach of any warranty shall be commenced by the buyer any later than twelve months from the earliest date on which the buyer could reasonably have discovered the alleged defect or breach.

### Return Policy

For a period of thirty-six (36) months from the date of shipment, and under normal conditions of use and service, Moore Industries ("The Company") will at its option replace, repair or refund the purchase price for any of its manufactured products found, upon return to the Company (transportation charges prepaid and otherwise in accordance with the return procedures established by The Company), to be defective in material or workmanship. This policy extends to the original Buyer only and not to Buyer's customers or the users of Buyer's products, unless Buyer is an engineering contractor in which case the policy shall extend to Buyer's immediate customer only. This policy shall not apply if the product has been subject to alteration, misuse, accident, neglect or improper application, installation, or operation. THE COMPANY SHALL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

### To return equipment to Moore Industries for repair, follow these four steps:

1. Call Moore Industries and request a Returned Material Authorization (RMA) number.

#### Warranty Repair –

If you are unsure if your unit is still under warranty, we can use the unit's serial number to verify the warranty status for you over the phone. Be sure to include the RMA number on all documentation.

#### Non-Warranty Repair –

If your unit is out of warranty, be prepared to give us a Purchase Order number when you call. In most cases, we will be able to quote you the repair costs at that time. The repair price you are quoted will be a "Not To Exceed" price, which means that the actual repair costs may be less than the quote. Be sure to include the RMA number on all documentation.

2. Provide us with the following documentation:
  - a) A note listing the symptoms that indicate the unit needs repair
  - b) Complete shipping information for return of the equipment after repair
  - c) The name and phone number of the person to contact if questions arise at the factory
3. Use sufficient packing material and carefully pack the equipment in a sturdy shipping container.
4. Ship the equipment to the Moore Industries location nearest you.

The returned equipment will be inspected and tested at the factory. A Moore Industries representative will contact the person designated on your documentation if more information is needed. The repaired equipment, or its replacement, will be returned to you in accordance with the shipping instructions furnished in your documentation.



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## Electrical Safety Manual

This document allows the user quick access to all electrical information for the purpose of safety installation in a specific area. The Electrical Safety Manual does not replace the full manual that is included with the unit; refer to the full manual for additional details on specification, unit configuration, customer service, warranty, and more.

## Safety Messages

All Moore Industries instrumentation should only be used for the purpose and in the manner described in both manuals. If you use this product in a manner other than that for which it was intended, unpredictable behavior could ensue with possible hazardous consequences.

## Qualified Personnel

The Moore Industries' product/systems described in the manuals may be operated only by personnel qualified for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these Moore Industries' products/systems.

## Proper Use of Moore Industries Products

Moore Industries' products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Moore Industries'. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

## World Headquarters

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## Installation and Wiring

Instructions in this section and others may require special precautions to ensure the safety of the personnel performing the operations. Notes, Cautions and Warnings that may cause potential safety issues are indicated throughout this guide.

**Note:** Make sure to calibrate and bench check the instruments prior to installation. Also, install all instruments in their intended application before making any electrical connections. For DIN rail mounted instruments, allow enough room for pivoting instruments vertically on the rail for removal in applications involving multiple banks of units. To remove the unit from the DIN rail you will need a simple tool such as a straight blade screwdriver. Insert the blade of the screwdriver into the cavity at the bottom of the locking mechanism and rotate it. This will release the locking mechanism from the DIN rail and allow you to remove the unit.

Moore Industries suggests installing by first mounting the unit in its intended application, then making the electrical connections to input, output, and power.

The HPP housing includes a metal mounting plate secured to the bottom. The case is designed to fit inside the popular 30-35 mm connection head. The DIN-style housing can be mounted on either 32 mm, G-type DIN rail (EN50035), or 35mm, Top Hat rail (EN50022). The DIN-housed unit is also equipped with removable terminal blocks.

## Electrical Connections

When installing any Moore Industries product, always follow all local regulations and standards for grounding, shielding, and safety. Use +90°C suitable wiring for all connections.

**WARNING:** Terminals on this unit may be connected to hazardous voltages. Before making ANY connections to this unit, always remove power from the loop or instrument power terminals.

**WARNING:** If this unit is used in a manner not specified by Moore Industries, the protection provided by the equipment may be impaired.

## Input/Output Wiring

The input/output connections can be made with 14 to 24 AWG (2.5mm<sup>2</sup> to 0.2mm<sup>2</sup>) wire. The end of each conductor should be stripped no more than 0.25in (7mm). Tighten the screws on the terminal block to 4.4 - 5.3 lbf/in<sup>2</sup> (0.5 - 0.6 N/m<sup>2</sup>).

## Power Supply Wiring

All power connections should be made with 14 or 16 AWG (2mm<sup>2</sup> or 1.3mm<sup>2</sup>) wire. The end of each conductor should be stripped no more than 0.25in (7mm). The end of the stripped wire should be tinned with solder, or inserted into a ferrule and crimped before being placed into a terminal block. Tighten the screws on the terminal block to 4.4 - 5.3 lbf/in<sup>2</sup> (0.5 - 0.6 N/m<sup>2</sup>).

## Recommended Ground Wiring Practices

Moore Industries recommends the following ground wiring practices:

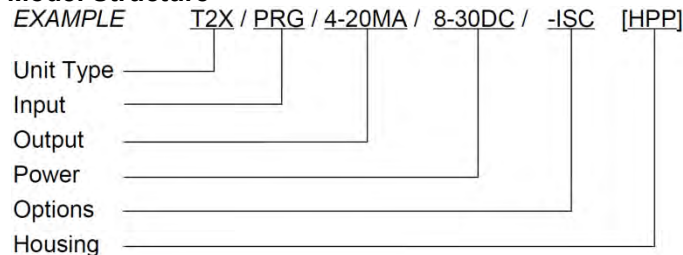
- Any Moore Industries product in a metal case or housing should be grounded.
- The protective earth conductor must be connected to a system safety earth ground before making other connections.
- All input signals to, and output signals from, Moore Industries' products should be wired using a shielded, twisted pair wiring technique. Shields should be connected to an earth or safety ground.
- For the best shielding, the shield should be run all the way from the signal source to the receiving device. (see Note below)
- The maximum length of un-shielded input and output signal wiring should be 2 inches.

**Note:** Some of Moore Industries' instruments can be classified as receivers (IPT2, IPX2, etc.) and some can be classified as transmitters (TRX, TRY, etc.) while some are both a receiver and a transmitter (SPA2, HIM, etc). Hence, your shield ground connections should be appropriate for the type of signal line being shielded. The shield should be grounded at the receiver and not at the signal source.

## CE Certification-related Guidelines

The grounding and wiring practices described above must be followed in order for the unit(s) to meet the requirements set forth in EMC standard EN 61326.

## Model Structure



## Specifications

### Supply Voltage:

#### Standard Nominal:

8-42Vdc, 24mA max.

#### Intrinsically Safe:

U<sub>i</sub> = 30Vdc, I<sub>i</sub> = 110mA, P<sub>i</sub> = 825mW

**Terminals:** Rated CAT I

### Operating & Storage Range:

-40°C to +85°C (-40°F to +185°F)

## Installation in Hazardous Locations

This section contains important information regarding installation of T2X in Hazardous Area Locations.

**WARNING:** Do not separate power connector when energized.

**WARNING:** Substitution of components is not allowed, as it may impair the intrinsic safety.

**AVERTISSEMENT:** La substitution de composants peut compromettre la sécurité intrinsèque.

**WARNING:** To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

**AVERTISSEMENT:** Risque d'explosion. Avant de déconnecter l'équipement, couper le courant ou s'assurer que débrancher tant que l'emplacement est désigné non dangereux.

**WARNING:** Explosion Hazard. Do not disconnect equipment when a flammable or combustible atmosphere is present.

**AVERTISSEMENT:** Risque d'explosion. Ne pas débrancher tant que le circuit est sous tension, à moins qu'il ne s'agisse d'un emplacement non dangereux.

**WARNING:** Explosion Hazard. Substitution of components may impair suitability for Class I, Division 2.

**AVERTISSEMENT:** Risque d'explosion. La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, Division 2

Maximum operating parameters of the "COM" port for use in Non-Hazardous areas shall not exceed 3.0V, 300µA and 240µW.

## Specific Conditions of Use

The following instructions must be adhered to when the T2X are used in hazardous locations and potentially explosive atmospheres.

### FM Installations

#### Intrinsically Safe Applications

Class I, Division 1, Groups A, B, C & D T6

Class I, Zone 0, AEX ia IIC T6 Ga

#### Nonincendive Applications

Class I, Division 2, Groups A, B, C & D T6

Operating Ambient Temperature Range:

-40°C ≤ T<sub>amb</sub> ≤ +60°C

When installed as Division 1 or Zone 0 equipment, install per I.S. Control Drawing 100-100-38.

The T2X shall be mounted within a tool-secured enclosure which meets the requirements of ANSI/UL 61010-1 and is capable of accepting applicable wiring methods per the NEC\*. The enclosure shall have a minimum type of protection IP20, but shall have a suitable degree of protection against deterioration of the equipment that would adversely affect its suitability for use in Class I, Division 1, Zone 0 or Division 2 locations.

No connections shall be made to the communications "COM" port in Hazardous (Classified) Locations.

Programming through the communication port shall only be done in the unclassified location using the Moore Industries USB cable, Part No. 804-030-26.

### European Union Installations

(ATEX 2014/34/EU)

Intrinsically Safe Applications – Category 2G

II 2 G EEx ib IIB T6

The apparatus is intrinsically safe. It can be used in potentially explosive atmospheres. The equipment must only be associated with certified intrinsically safe associated apparatus and these combinations must be compatible as regards to intrinsic safety.

The electrical parameters of the certified associated intrinsically safe apparatus must not exceed any of the following values: (terminals, +ps, -ps) U<sub>o</sub> ≤ 30V; I<sub>o</sub> ≤ 110mA; P<sub>o</sub> ≤ 0.82W.

The "COM" port must not be used in hazardous areas.

Operating ambient temperature: -40°C to +60°C

The specific parameters of the mode(s) of protection can be found in Control Drawing 100-100-38.

### CSA Installations

Intrinsically Safe Applications

Class I, Division 1, Groups A-D T6 Ta = 60°C

The model T2X is of open type unit Certified as a component for use only in other equipment where the suitability of the combination is to be determined by the authority having jurisdiction.

The T2X is intrinsically safe when installed per drawing number 100-100-38.

Entity Parameters can be found in Control Drawing 100-100-38

### Nonincendive Applications

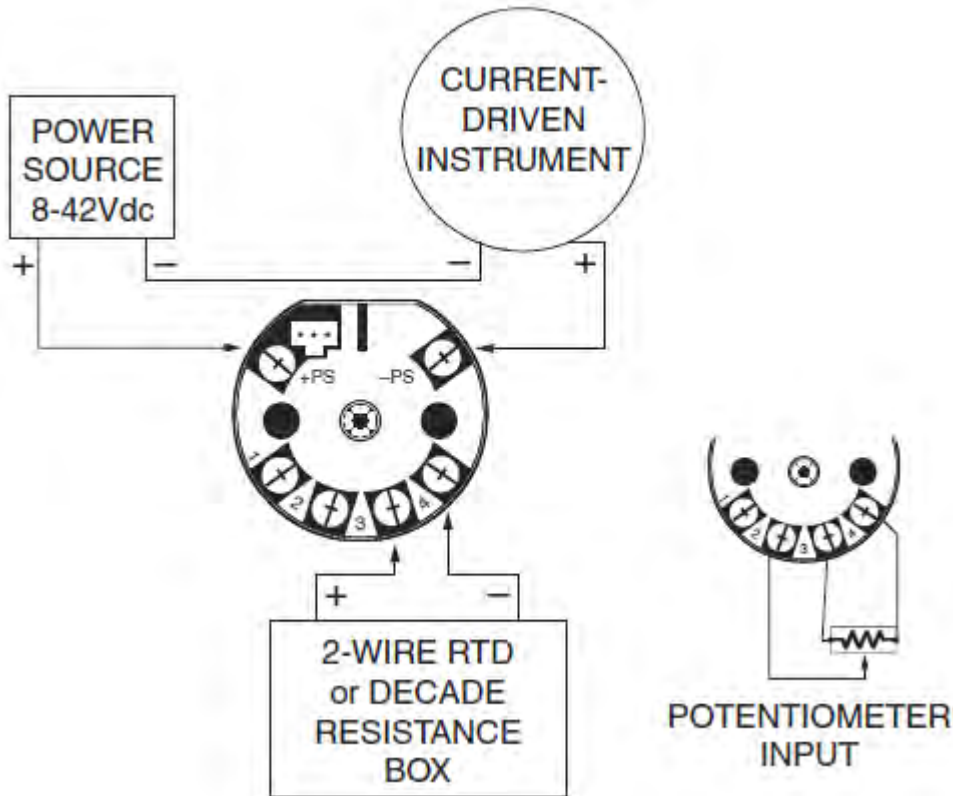
Class I, Division 2, Groups A-D T6 Ta = 60°C

The models T2X are of open type unit Certified as a component for use only in other equipment where the suitability of the combination is to be determined by the authority having jurisdiction.

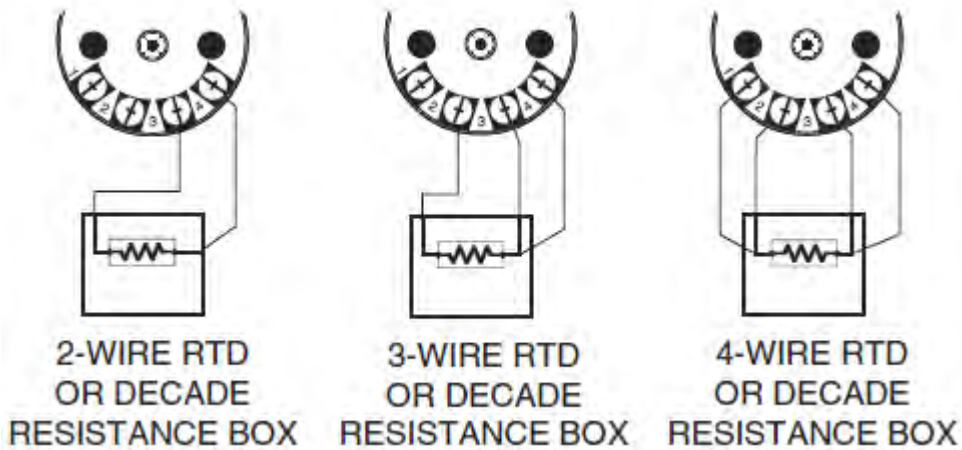


## Connection Diagrams

Connecting the T2X to the loop



Input hookups



## DO NOT SCALE DRAWING

TOLERANCES (UNLESS NOTED) DECIMALS = digit/mm X .1 12.54 XX .03 0.76 XXX .00125 HOLES ±.005/+.13 ANGLES ±.30°	DRAWN	Gus H. Elias	09/00
	CHECKED	W. Ho	02/03
	ENGINEER	Gus H. Elias	09/00
	SCALE	NONE	

## CATEGORY CONTROL DRAWING

TITLE	Field Installation Diagram: <b>TRX &amp; TX2 [HPP]</b> Non-Isolated PC-Prog. Temp. Xmitters. Intrinsically Safe System For Hazardous "Classified" Locations
-------	---

## DRAWING NUMBER

100-100-38

## REVISION

E

### REVISED BY

ECO 18886

### DATE

07/20

### BY

T.G.

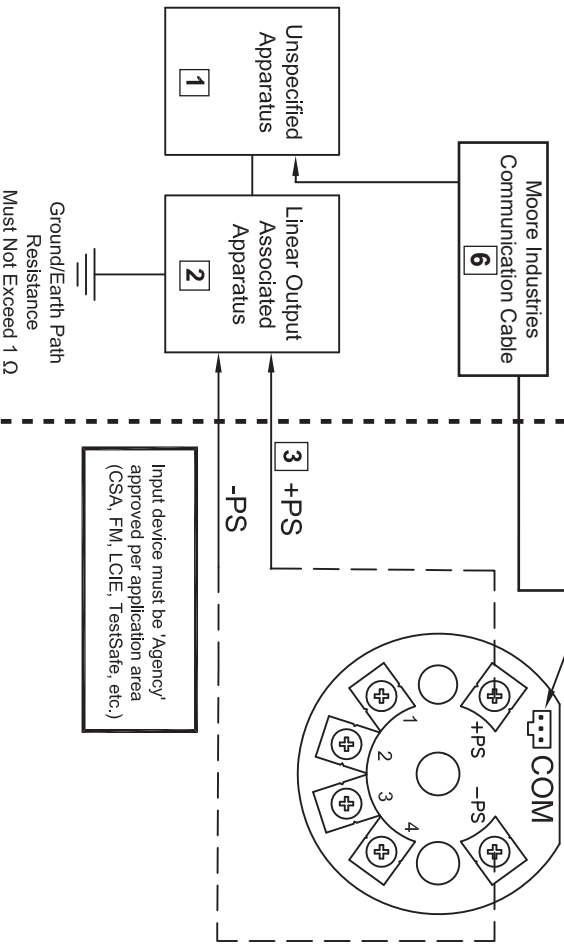
### APPROVAL

W.T.

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### Non-Hazardous (Safe) Area



### Installation Notes:

- Associated apparatus which is unspecified except that it **must not** be supplied from, or contain under normal or abnormal conditions a source of potential with respect to earth in excess of 250 Vrms or 250 Vdc which is considered to be the Safe Area's maximum voltage.
  - The Barrier or other Associated Apparatus **must** be approved by the "specific" (CSA/FM/LCIE, etc.) certifying agency for I.S. connections in: "Class I, Division 1, Groups A, B, C & D" locations. The output voltage **6.2 Vdc 5 (Voc, V<sub>L</sub> or U<sub>0</sub>) 5 30 Vdc** & the output current (**I<sub>sc</sub>, I<sub>t</sub> or I<sub>0</sub>) must not exceed 110 mA**. Also, it **must** be installed per the manufacturer's guidelines. *A Shunt Zener Barrier is NOT required for Non-Incendive (or Class I, Division 2 or Type N) installations.*
  - The combined Capacitance and Inductance of the inter-connecting cables and the PC Prog. Transmitters **must not** exceed the values indicated on the Associated Apparatus.
  - For FM applications, installation **must** be in accordance to "ANSI/ISA-RP12.06.01" (Installation of I.S. Systems for Hazardous "Classified" Locations) and the National Electric Code "ANSI/NFPA 70". For CSA applications, adhere to the "Canadian Electric Code C22-1" most current publication on I.S. installation guidelines. For ATEX applications, adhere to "EN 60079-14:1997" or any equivalent, most current and pertaining publication on I.S. installation guidelines.
  - Warning!** Substitution of components may impair the Intrinsic Safety of the unit. DO NOT open or service the unit when either energized or if an explosive gas/dust atmosphere is present. Disconnect power servicing. Also read, understand and adhere to the manufacturer's installation and operating procedures.
- The maximum power parameters of the COM port (to be used only in safe/non-hazardous areas) are: Vmax = 3.0 Vdc, Imax = 300uA, Pmax = 240uW. No connections shall be made to the communications "COM" port in Hazardous (Classified) Locations. Programming through the communication port shall only be done in the unclassified location using the Moore Industries USB cable, Part No. 804-030-26.

ANZEX [TRX only]	ATEX LCIE	FM	CSA
Terminals +PS -PS	Terminals +PS -PS	Terminals +PS -PS	Terminals +PS -PS
UI = 30V II = 110mA PI = 0.825W CI = 5.2nF LI = 0mH	UI ≤ 30V II ≤ 110mA PI ≤ 0.82W CI ≤ 317nF LI = 0mH	Vmax or UI = 30V Imax or II = 110mA PI = 0.825W CI = 4.7nF LI = 0mH	Vmax or UI = 30Vdc Imax or II = 110mA PI = 0.825W CI = 12nF LI = 0mH
Terminals 1, 2, 3, 4 RTD & T/C	Terminals 1, 2, 3, 4 RTD & T/C [TX2-RTD ONLY]	Terminals 1, 2, 3, 4 RTD & T/C [TX2-RTD ONLY]	Terminals 1, 2, 3, 4 RTD & T/C [TX2-RTD ONLY]
U <sub>0</sub> = 6.51V I <sub>0</sub> = 110mA P <sub>0</sub> = 532mW C <sub>0</sub> ≤ 2.262uF L <sub>0</sub> ≤ 1.4mH	U <sub>0</sub> ≤ 6.5V I <sub>0</sub> ≤ 110mA P <sub>0</sub> ≤ 0.82W C <sub>0</sub> ≤ 2.96uF L <sub>0</sub> ≤ 2.9mH	V <sub>t</sub> or V <sub>oc</sub> = 6.51V I <sub>t</sub> or I <sub>0</sub> = 110mA P <sub>0</sub> = 0.716W C <sub>a</sub> or C <sub>0</sub> = 2.32uF L <sub>a</sub> or L <sub>0</sub> = 3mH	See Note 3

### AREA CLASSIFICATION

FM US & CSA International	FM (US NEC 500)	LCIE/ATEX	ANZEX	T Rating
Intrinsically Safe: Class I, Division 1, Groups A, B, C & D	Intrinsically Safe: Class I, Division 2, Groups A, B, C & D	Intrinsically Safe: Class I, Zone 0, AEX ia IIC	Intrinsically Safe (TRX only): EX ia IIC	T5 @ +85°C
T. Code: T6 @ 60°C Maximum Operating Ambient Temperature Range: -40°C ≤ Tamb. ≤ +60°C				