

# TRY & TRX

Isolated (TRY) & Non-Isolated (TRX)  
PC-Programmable Temperature Transmitters



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*Isolated & Non-Isolated  
PC-Programmable Temperature Transmitters*



## Quick-Start

Most users familiar with a PC and Windows will not have a need for the information in this manual. Moore Industries suggests that if you do need to refer to the information here, rely heavily on the Table of Contents that follow this Quick-Start Guide.

The majority of configuration work with these transmitters can be carried out from the Main Configuration Screen of the PC Configuration Program (see Figure 3, page 8). The menus and screen prompts are in “plain english”, and the help system should guide most users through most of the configuration procedures without any problems.

In general, the use of the TRY or TRX transmitter follows this path:

1. Installing the Configuration Software (page 10)
2. Connecting the TRY/TRX to the PC (page 10)
3. Input Connection Hookups (page 11)
4. Scale the Input (page 15)
5. Scale the Output (page 16)
6. Trim the Input (page 17)
7. Trim the Output (page 17)
8. Download the Configuration File (press PROG button)
9. Save the Configuration File to disk for future reference or use with another unit (page 22)
10. Install the unit (page 23)

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## Introduction

The TRY and TRX are 2-wire (loop-powered) temperature transmitters. They are configured using a personal computer (PC) and the software program provided by Moore Industries.

## About this Manual

Wherever you see a “**Note**”, “**Caution**”, or “**WARNING**” pay particular attention.

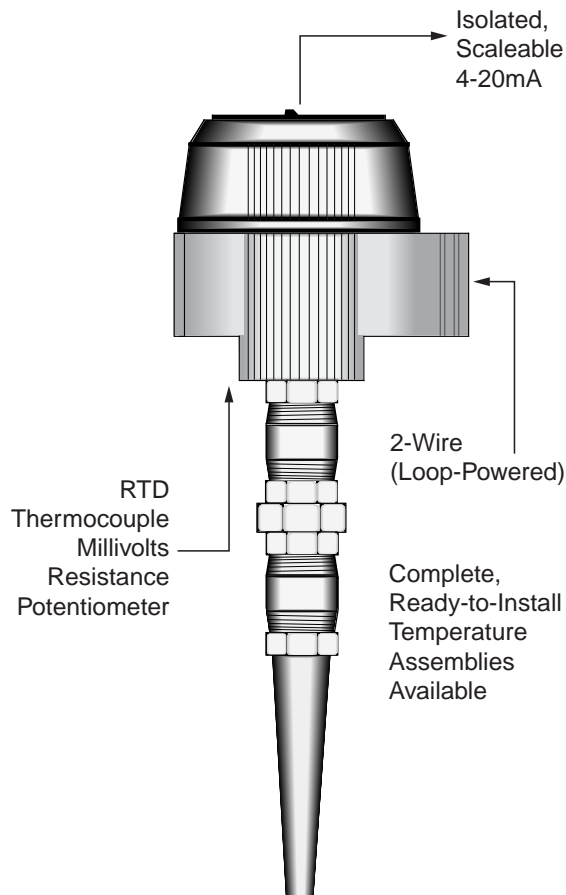
- A “**Note**” provides information to help you avoid minor inconveniences during calibration, installation, or operation of the TRY and TRX.
- A “**Caution**” provides information on steps to take in avoiding procedures and practices that could risk damage to the TRY and TRX or other equipment.
- A “**WARNING**” provides information on steps to take in avoiding procedures and practices that could pose safety risks to personnel.

## The TRY & TRX

Both the TRY and the TRX transmit input from a thermocouple, or an RTD, a direct resistance or millivolt source, or a potentiometer as a linearized, scaled and offset 4-20 milliamps (mA). Their output signal is proportional (or, by user designation inversely proportional) to the input. Refer to Figure 1.

The TRY provides 1500Vrms isolation between input and output (500Vrms isolation for the DIN-style version). The TRX is a non-isolating transmitter.

**Figure 1.** Use the PC-Programmable TRY or TRX as an interface between temperature sensors and control systems such as a DCS, PLC or PC-based control system.



# TRY & TRX

## Specifications

<div>Performance</div> <div>Input Accuracy: Refer to Table 1</div> <div>Output Accuracy: 4.8µA (±0.03% of 4-20mA span)</div> <div>Overall Accuracy: The overall accuracy of the unit is the combined input and output accuracy. It includes the combined effects of linearity, hysteresis, repeatability and adjustment resolution. It does not include ambient temperature effect. For T/C input only, add the Reference Junction Compensation error</div> <div>Reference Junction Compensation Accuracy: ±0.45°C</div> <div>Stability: Error is in Maximum Conformance Range</div> <table><tr><td>Stability</td><td colspan="3">Input to Output</td></tr><tr><td></td><td>1yr</td><td>3yrs</td><td>5yrs</td></tr><tr><td>T/C, mV</td><td>0.11</td><td>0.18</td><td>0.24</td></tr><tr><td>RTD Ohm Pot.</td><td>0.13</td><td>0.22</td><td>0.28</td></tr></table> <div>Isolation: For TRY in HPP housing, 1500Vrms input to output; For TRY in DIN housing, 500Vrms input to output to case</div> <div>Measurement Cycle: Output updates 8 times per second</div> <div>Response Time: 256msec typical for the output to change from 10% to 90% for an input step change of 0% to 100%</div>	Stability	Input to Output				1yr	3yrs	5yrs	T/C, mV	0.11	0.18	0.24	RTD Ohm Pot.	0.13	0.22	0.28	<div>Performance (Continued)</div> <div>Step Response Time: 500msec typical from the time an input is applied until the output reaches 90% of its final value.</div> <div>Ripple: 10mV peak-to-peak, max.</div> <div>Power Supply and Load Effect: Negligible within power and load limits</div> <div>Over-Voltage Protection: 4V, max, on input; 48V, max, on output; 48V reverse polarity</div> <div>Load Capability: 500 ohms @ 24V, typical; (Supply Voltage – 10V) / 0.024A for TRY; (Supply Voltage – 8V) / 0.024A for TRX;</div> <div>Burnout Protection: Total Sensor Diagnostics user-selected via Windows configuration software; Upscale to 24mA or downscale to 3.3mA</div> <div>Output Current Limiting: 21.4mA for input overrange; 23.6mA for sensor failure or broken wire</div> <div>T/C Input Impedance: 40M ohms, nominal</div> <div>RTD Excitation: 250µA, ±10%</div> <div>RTD Lead Wire Resistance Maximum: RTD resistance + 2 times the lead wire resistance must be less than 4000 ohms; Recommend &lt;35 ohms per wire for 3-wire RTD inputs; &lt;5 ohms per wire for 10 ohms Cu inputs</div>	<div>Ambient Conditions</div> <div>Operating &amp; Storage Range: –40°C to +85°C (–40°F to +185°F)</div> <div>Relative Humidity: 0-95%, non-condensing</div> <div>Effect of Ambient Temperature on Accuracy: ±0.015% of span/°C change, max. (+0.001% of ohms reading for RTD inputs)</div> <div>Effect of Ambient Temperature on Reference Junction Compensation: ±0.015°C/°C change</div> <div>RFI/EMI Immunity: 20V/m @ 20-1000MHz, when tested according to SAMA standard 33.1. (10V/m @ 80-1000MHz, 1K AM, when tested according to IEC 1000-4-3-1995)</div> <div>Common Mode Rejection: 100dB, min., @ 50/60Hz</div> <div>Normal Mode Rejection: 100dB, typical, @ 1V peak-to-peak, 50/60Hz</div> <div>Adjustments All settings made using Windows-based configuration program, then stored in non-volatile memory</div> <div>Weight HPP-style housing: 65g (2.3 oz) DIN-style housing: 184g (6.5 oz) LH housing styles: 549 g (19.4 oz)</div>
Stability	Input to Output																	
	1yr	3yrs	5yrs															
T/C, mV	0.11	0.18	0.24															
RTD Ohm Pot.	0.13	0.22	0.28															

Specifications and Information subject to change without notice

### Default Factory Configuration for TRX

**Input:** RTD 4W Pt3850 100Ohms 0-100degC  
**Filter:** 60Hz  
**Broken Wire:** ON  
**Input Trim:** OFF  
**Output:** 4-20mA  
**Sensor Failure:** Up 24mA  
**Damping:** 0s

### Default Factory Configuration for TRY

**Input:** 4W 3850-100Ohm RTD, 0-100degC  
**Filter:** 60Hz  
**Broken Wire:** ON  
**Input Trim:** OFF  
**AO:** 4-20mA  
**Sensor Failure:** Up 24mA  
**Damping:** 0s

**Table 1.** Input Types, Ranges, Minimum Span and Maximum Range Specifications, and Accuracy of the TRY and TRX

Input	Type	$\alpha^*$	Ohms	Conformance Range	Minimum Span	Input Accuracy		Maximum Range
RTD	Platinum	0.003750	1000	-50 to 500°C -58 to 932°F	15°C (27°F) for 100 ohm inputs 10°C (18°F) for 200 ohm inputs 7.5°C (13.5°F) for 500 and 1000 ohm inputs	±0.11°C	±0.2°F	-100 to 560°C -148 to 1040°F
		0.003850	100, 200, 300, 400, 500, 1000	-200 to 850°C -328 to 1562°F		±0.21°C	±0.38°F	-240 to 960°C -400 to 1760°F
		0.003902	100, 200, 400 500, 1000	-100 to 650°C -148 to 1202°F		±0.15°C	±0.27°F	-150 to 720°C -238 to 1328°F
		0.003911	100, 500	-200 to 630°C -328 to 1166°F		±0.17°C	±0.31°F	-235 to 710°C -391 to 1310°F
		0.003916	100	-200 to 510°C -328 to 950°F		±0.14°C	±0.25°F	-240 to 580°C -400 to 1076°F
		0.003923	98.129	-200 to 600°C -328 to 1112°F		±0.16°C	±0.29°F	-235 to 680°C -391 to 1256°F
		0.003926	100, 470, 500	-200 to 630°C -328 to 1166°F		±0.17°C	±0.31°F	-235 to 710°C -391 to 1310°F
		0.003928	100	-200 to 850°C -328 to 1562°F		±0.21°C	±0.38°F	-260 to 962°C -436 to 1763.6°F
	Nickel	0.000672	120	-80 to 320°C -112 to 608°F	10°C (18°F)	±0.16°C	±0.29°F	-100 to 360°C -148 to 680°F
	Copper	0.000427	9.035	-50 to 250°C -58 to 482°F	100°C (180°F)	±1.2°C	±2.16°F	-65 to 280°C -85 to 536°F
Ohms	Direct resistance or Potentiometer	n/a	n/a	0-4000 ohms	30 ohms	±0.4 ohms		n/a
T/C	J	n/a	n/a	-180 to 770°C -292 to 1418°F	35°C 63°F	±0.28°C	±0.5°F	-210 to 770°C -346 to 1418°F
	K	n/a	n/a	-150 to 1372°C -238 to 2501.6°F	40°C 72°F	±0.3°C	±0.54°F	-270 to 1390°C -454 to 2534°F
	E	n/a	n/a	-170 to 1000°C -274 to 1832°F	35°C 63°F	±0.26°C	±0.47°F	-270 to 1013°C -454 to 1855.4°F
	T	n/a	n/a	-200 to 400°C -328 to 752°F	20°C 36°F	±0.24°C	±0.43°F	-270 to 407°C -454 to 764.6°F
	R	n/a	n/a	0 to 1768°C 32 to 3214.4°F	50°C 90°F	±0.71°C	±1.28°F	-50 to 1786°C -58 to 3246.8°F
	S	n/a	n/a	0 to 1768°C 32 to 3214.4°F	50°C 90°F	±0.71°C	±1.28°F	-50 to 1786°C -58 to 3246.8°F
	B	n/a	n/a	400 to 1820°C 752 to 3308°F	75°C 135°F	±0.43°C	±0.77°F	200 to 1836°C 392 to 3336.8°F
	N	n/a	n/a	-130 to 1300°C -202 to 2372°F	45°C 81°F	±1.33°C	±2.39°F	-270 to 1316°C -454 to 2400.8°F
	C	n/a	n/a	0 to 2315°C 32 to 4199°F	100°C 180°F	±1.16°C	±2.09°F	0 to 2338°C 32 to 4240.4°F
Millivolts	DC	n/a	n/a	-50 to 1000mV	4mV	±0.04mV		-50 to 1000mV

\*  $\alpha$  values with both 32 and 128-point linearization curves are available. (lower resolution values provided for compatibility with older units.)

# TRY & TRX

## Ordering Information

Unit	Input	Output	Power	Options	Housing
<b>TRY</b> Isolated, PC-Program-mable Temperature Transmitter	<b>PRG</b> Program-mable with supplied Configuration Software (see Table 1 for descriptions of available input types; Factory Configuration available)	<b>4-20MA</b> User scaleable with supplied software	<b>TRY</b> <b>10-42DC</b> <b>10-30DC</b> Required for -ISA, -ISC, -ISE and -ISF options	<b>-ISA</b> TestSafe approved IS (ANZEx) <b>-ISC</b> CSA approved IS and NI (HPP) <b>-ISE</b> ATEX approved IS (HPP) <b>-ISF</b> FM approved IS and NI (HPP) <b>-FMEDA</b> Unit comes with Failure Modes, Effects and Diagnostic Analysis (FMEDA) data for evaluating the instrument for suitability of use in a safety-related application	<b>DIN</b> DIN-style aluminum housing mounts on 32mm G-type (EN50035) and 35mm Top Hat (EN50022) rails <b>HPP</b> Hockey-puck housing for mounting in standard connection heads <b>LH1NS‡</b> Connection head with two entry ports: ½-inch NPT cable and process—black PBT polyester cover <b>LH1MS‡</b> Connection head with two entry ports: M20 cable and ½-inch NPT process—black PBT polyester 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> or <b>(‡)</b> Explosion-proof connection head with two entry ports: ½-inch NPT cable and process—black metal cover <b>LH2MS(*)</b> or <b>(‡)</b> Explosion-proof connection head with two entry ports: M20 cable and ½-inch NPT process—black metal cover
<b>TRX</b> Non-Isolated, PC-Program-mable Temperature Transmitter			<b>TRX</b> <b>8-42DC</b> <b>8-30DC</b> Required for -ISA, -ISC, -ISE, and -ISF options		

**When Ordering, specify:** Unit/Input/Output/Power/Option(s) [Housing]  
**Model number example:** TRY/PRG/4-20MA/10-30DC/-ISF [LH2MSP]

**Model and Serial Numbers** Moore Industries uses a system of model and serial numbers to keep track of all of the information on every unit it sells and services. If a problem occurs with a TRY or TRX, check for a tag affixed to the unit listing these numbers. Supply the Customer Support representative with this information when calling.

If additional units are needed, use the information printed in bold text in the table above to “build” a model number for the type of transmitter required.

Each TRY or TRX order comes with one copy of our Configuration Software (Windows 2000, XP, Vista, and 7 compatible).

To order additional or replacement cables, specify Moore Industries’ part number **803-040-26**, or **803-039-26** for the special cable equipped with its own, self-powered input-to-output isolation circuit for operation in areas of high ground potentials.

\* Either **A** or **E** suffix  
**A** suffix indicates ANZEx/TestSafe (Ex d) Flame-Proof approvals (i.e. LH2NSA)  
**E** suffix indicates ATEX (Ex d and tD) Flame-Proof approvals (i.e. LH2NSE)  
**‡** **P** suffix indicates enclosure comes equipped with base plate and U-bolts for mounting on a 2-inch pipe (i.e. LH1NSP)



## Configuring a TRY/TRX

One of the benefits of the TRY and TRX transmitters is their easy-to-use PC Configuration Program; there are no internal or external controls to adjust or jumpers to change. All operating parameters are set using the PC program included with each shipment. These settings are downloaded in the form of a Configuration File into nonvolatile unit memory (EEPROM) over a connection between the PC's serial (COM) port and a COM port on the transmitter.

This section of the manual contains instructions for configuring the TRY or TRX:

- Installing the Software (page 6)
- Saving the Default Configuration (page 9) (Keeping What You've Got Safe)
- Selecting Input Type, Wiring Configuration, etc. (page 10)
- Scaling the Input/Setting Reverse Output (page 11)
- Scaling the Output (page 12)
- Trimming the Input (page 13)
- Trimming the Output (page 13)
- Setting Miscellaneous Parameters, including Readout Engineering Units in °F or °C, Input Filtering, Upscale or Downscale Drive on Sensor Failure, and Broken Input Wire Detection (page 14)
- Setting Output Damping, Using the Loop Test (page 15)
- Creating Custom Linearization Tables (page 16)
- Managing Configuration Files (page 18)

## What is First

First, it is necessary to install the Configuration Program on a PC. Once the program is loaded and running, nearly all of the operating parameters for the connected transmitter are shown on a single screen (see Figure 3). This makes it easy to determine which aspects of transmitter operation need to be changed to suit the application requirements.

## What is Next

Once the Configuration Program is installed on the PC, the TRY or TRX can be connected to equipment to simulate input and monitor output, and with the PC program, the user can view and/or change its operating parameters.

## No Transmitter Needed

It is not necessary to connect the TRY or TRX to a PC to create configuration files. The Configuration Program can be run without connecting a transmitter, and **most** operating parameters can be set without benefit of input from a sensor or from a transmitter.

This makes it easy to create a set of operating parameters, save them to disk, and download them to one or more transmitters at a later time.

Note, however, that **not all parameters can be set** without a transmitter. In some cases, a source of input is also required.

The transmitter **must** be connected to the PC in order to:

- Trim Input
- Trim Output
- Assign a Tag
- Perform a Loop Test
- Receive (via download) a Configuration File

And, perhaps most importantly...

- SAVE THE CONFIGURATION FILE ALREADY IN THE TRANSMITTER'S MEMORY (refer to "Keeping What You've Got Safe—Using 'Get Setup'", on page 9)

# TRY & TRX

## Installing the Configuration Software

Refer to Table below for the equipment needed.

1. Insert the Moore Industries Interface Solution PC Configuration Software CD into the CD drive of the PC. Access the CD and open the “SDY SIY TDY TRX TRY PC Configuration Software” folder.
2. Double-click the installation program located in the folder. Follow the prompts to correctly install the program.

Once the Configuration Program is installed on the PC, the SIY can be connected to equipment to simulate input and monitor output. This makes it easy to create a set of operating parameters, save them to disk, and download them to one or more instruments at a later time.

## Gathering the Equipment Needed

It is possible to create a Configuration File for a transmitter without ever connecting the transmitter to a PC. Most TRY or TRX operating parameters can be set up, saved in a Configuration File, and stored on disk entirely within the Configuration Program—without ever communicating with a transmitter.

It is not possible to trim the transmitter input or output without a transmitter, a source of input, and a meter (for output trimming). Likewise, it is not possible to use the Loop Test function of the transmitter unless everything is setup as shown in Figure 2, and it is not possible to store a tag name in the memory of a transmitter without connecting that transmitter to the Configuration Program.

Table 2 lists the things needed to setup the TRY or TRX as shown in Figure 2.

**Note:**

*Be sure to use calibrated test equipment when performing any trimming operations on the TRY or TRX. Moore Industries uses equipment rated 5:1 over the rated accuracy of the unit under test. We recommend the use of equipment rated at least 3:1.*

## Connecting the TRY or TRX to the PC

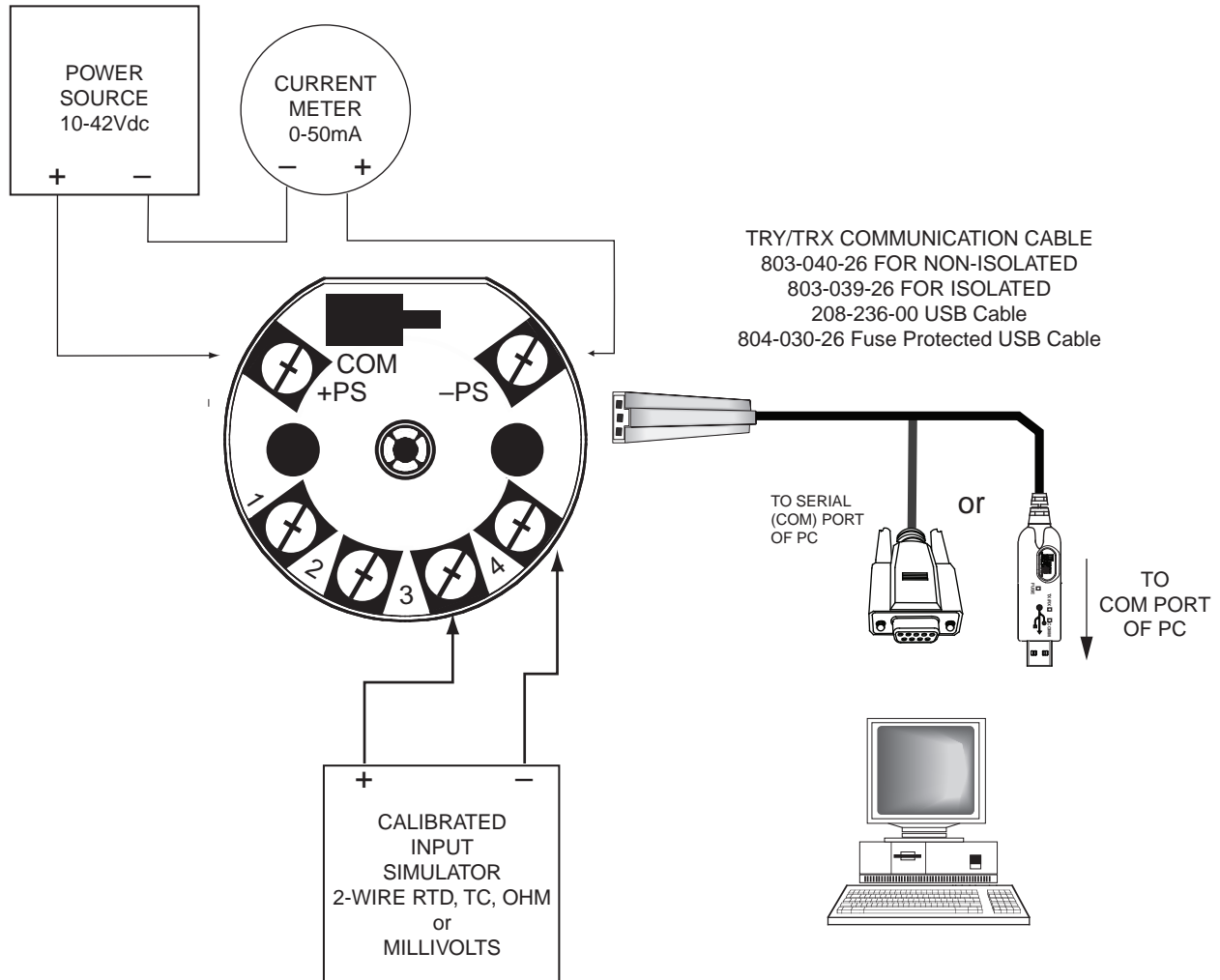
Connect the RS-232 end of the cable to the PC's COM port.

See Table below for information on the necessary equipment.

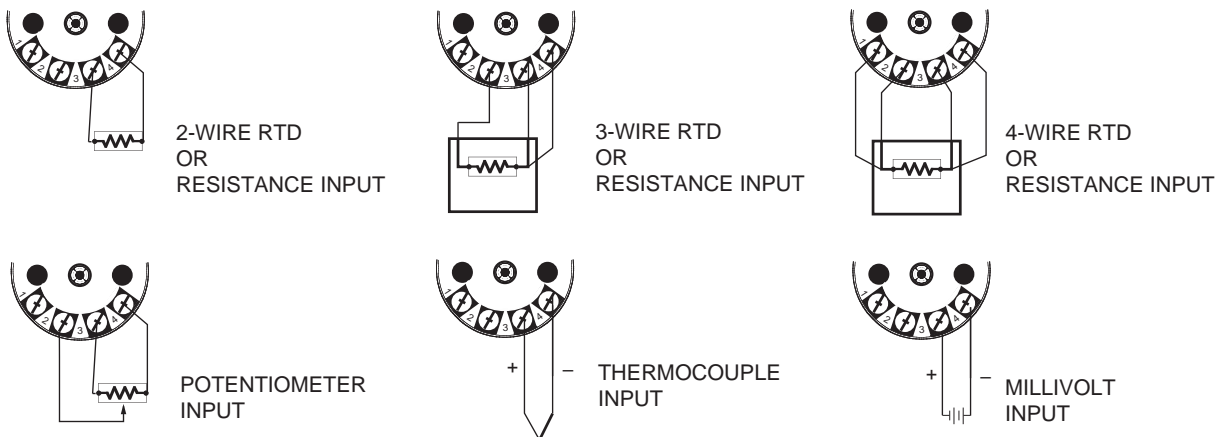
**Table 1.** Assembling the equipment needed to configure the SIY

Device	Specifications
Current or Voltage Source	Accurate to 0.05% of span for the intended application
Power Supply	10-42Vdc, ±10%
Multimeter (optional)	Accurate to ±0.025%; e.g., Fluke Model 87
Precision Load Resistor (optional)	Accurate to ±0.025%; e.g., HP Model 3478A
Personal Computer	Microsoft Windows based PC; 16Mb free RAM; 20MB free disk space on hard drive Microsoft Windows XP, Vista or 7 and 1 (one) serial port or one available USB port
Moore Industries PC Configuration Software	Version 1.0 or greater, successfully installed to the hard drive
Communication Cable	Non-Isolating 803-040-26, Isolating 803-039-26, USB Cable (PN 208-236-00), or Fuse Protected USB Cable (PN 804-030-26)

**Figure 2.** Use the PC Configuration Software to program the TRY or TRX.



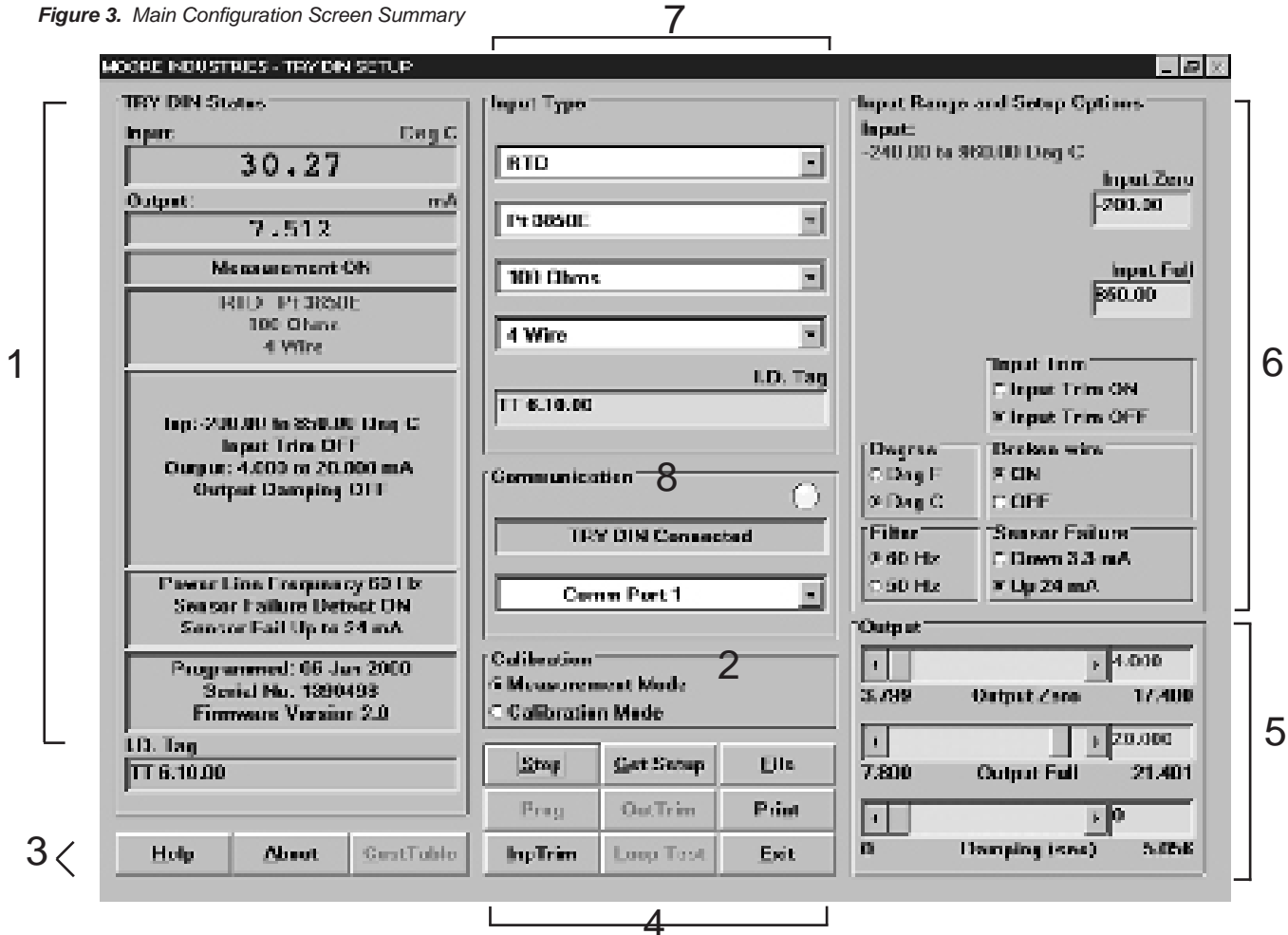
## Input Connection Hookups



# TRY & TRX

## PC Configuration Software Summary

Figure 3. Main Configuration Screen Summary



**1. TRY/TRX Status** The left column of the screen displays the input, output, and settings of the TRY or TRX. This column will change to reflect the values on the rest of the screen when you program the TRY or TRX with its new values.

**2. Calibration** Use these radio buttons to change from "Measurement Mode", the mode that you will be working in from your PC, and "Calibration Mode", the mode that you will select when using a handheld calibrator to simulate input to the unit.

**3. "Help" Buttons** The "Help" and "About" buttons both provide information on the TRY or TRX Configuration Software. The "CustTable" button allows you to set up a custom linearization table for your unit.

**4. File Management Buttons** This set of nine buttons are essential to all the functions of the Configuration Software, and will be used often. The names and functions of the individual command buttons may change when you press a button.

**5. Output** These scroll bars control the scaling and damping values of the TRY or TRX. When certain options are selected, these scroll bars are renamed to adjust the reverse output and the loop test.

**6. Input Range and Setup Options** Use this section to configure the transmitter's range of input and parameters of its display options.

**7. Input Type** The top pull-down menu of this section selects the type of input that the TRY or TRX will accept: Millivolt, Ohms, RTD, Thermocouple, or Potentiometer. The pull-down menus below it change to provide only the options for the input type you have selected.

**8. Communication** The communication menu displays the status of the TRY or TRX: if it is connected, and to which COM port it's connected to. The yellow light in the upper right corner of this section will flash if the transmitter is connected.

## Keeping What You've Got Safe— Using “Get Setup”

Every TRY or TRX is shipped from the factory with a Configuration File already installed in its memory. This file is comprised of either the factory default set of operating parameters, or of the set of parameters specified by the customer at the time of order.

### **CAUTION:**

*Any time a connected TRY or TRX is “programmed” by downloading a Configuration File into memory, **ALL** of the configuration parameters resident in the transmitter memory at the time of the download are **OVERWRITTEN** with whatever parameters are showing on the Configuration Program Screen. All previous parameters are then unrecoverable.*

*This includes things like, input type, tag name, calibration date, input and/or output trim values, etc.*

### **IMPORTANT:**

*To safeguard against the accidental loss of a Configuration File, always use the “Get Setup” button and the File Management facilities under the “File” button, located at the bottom-center of the Main Configuration Screen.*

To save the Configuration File already resident in the transmitter's memory:

1. Start the PC Configuration Program, making sure that the transmitter is connected as shown in Figure 2.

2. Click on the “Get Setup” button at the bottom-center of the Configuration Program Main Screen (see Figure 3).

The screen will flicker once, and the settings shown on the left area of the screen will match those showing on the right.

3. Click on the “File” button. This brings up an Explorer-like set of windows on the left area of the screen.
4. Enter a name for the current Configuration File (the one already in the transmitter's memory), and click on the “Save” button.

### **Note:**

*File names must follow the DOS convention; Eight-character maximum and no suffix.*

*The Configuration Program adds a suffix to the file name automatically.*

5. Answer “Yes” to save the named file to disk. The left side of the screen will now show the name of the file entered in Step 4. The “starting point” of the TRY or TRX Configuration Process is now saved on the PC disk. If you decide to edit the configuration, this file can always be downloaded back to the transmitter.
6. Click on “QuitFile” to return to the Main Configuration Screen.

# TRY & TRX

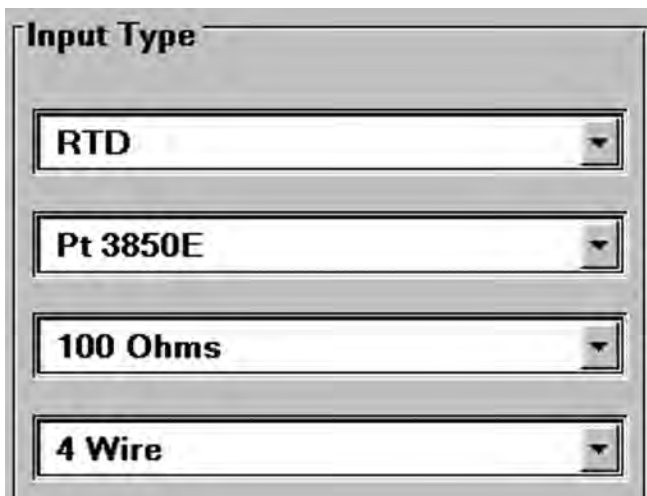
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## Selecting Input Type, Wiring, etc.

Use the selection tools in the *Input Type* box to choose the sensor type that the TRY or TRX will be reading. Moore Industries suggests saving the initial settings resident in the transmitter before making any changes (refer to “Keeping What You’ve Got Safe”, page 9).

After saving, select the appropriate *Input Type* values as shown in Figure 4. Continue to change the remaining areas in *Input Type* (such as ohms, linearization, custom table, or # wires, depending on your sensor type).

**Figure 4.** Choosing the Input Type for the TRY or TR



The screenshot shows a window titled "Input Type" with four vertically stacked dropdown menus. The first menu is set to "RTD", the second to "Pt 3850E", the third to "100 Ohms", and the fourth to "4 Wire". Each menu has a small downward-pointing arrow on its right side.

### **Note:**

*The Custom Input Linearization Table facility is available only with the “Millivolts” input selection.*

*RTD input selections distinguished by the “E” suffixed alpha value selections use 128-bit linearization curves. RTD selections without the “E” suffix use standard, 32-bit curves. For RTD and TC applications all curves are stored in the installation directory as files.*

### **IMPORTANT:**

*Settings on the Main Configuration Screen do not take effect in the unit until the Configuration File is downloaded.*

### **Note:**

*Once you have completed all parameters you wish to configure, please refer to “Applying Configuration Settings to your Transmitter” (page 12).*

## Scaling the Input

This parameter allows the user to set the TRY or TRX to scale its output in response to a portion of the total range of the selected input type. In a reverse output application, the TRY or TRX output drops in proportion to a rise on the input, and rises in proportion to a drop on the input.

The instructions assume that the Configuration Program has been loaded successfully (page 6).

To set the scaling for the Input to the TRY or TRX:

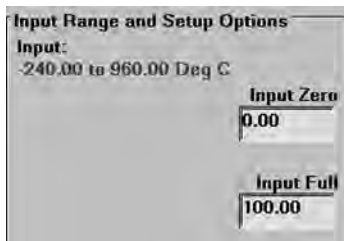
1. Start the PC Configuration program and connect a transmitter. Press the "Get Setup" button to display the transmitter's current configuration.

### **Note:**

*It is not necessary to connect a unit to the PC in order to scale the input.*

2. With the Configuration Program Main Screen showing (Figure 3, page 8), select the "Input Zero" box in the upper right corner of the screen.

**Figure 5.** The Input Zero/Full menu



3. Enter the desired 0% input value into the "Input Zero" value box.
4. Repeat the above step to set the desired 100% input value in the "Input Full" box.

Any value which falls within the range of the selected measurement type may be used for "Input Zero" and "Input Full" percentages

### **IMPORTANT:**

*Settings on the Main Configuration Screen do not take effect in the unit until the Configuration File is downloaded.*

### **Note:**

*Once you have completed all parameters you wish to configure, please refer to "Applying Configuration Settings to your Transmitter" (page 12).*

## Setting Reverse Output

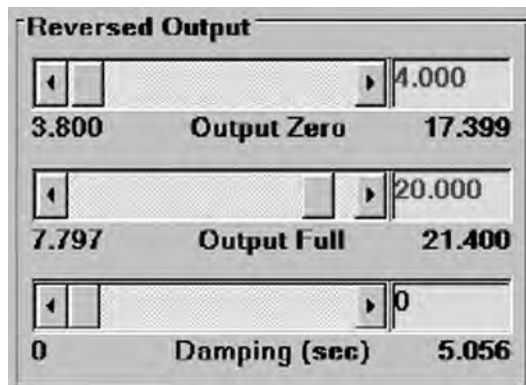
- a. Select the "Input Zero" box (Figure 5).
- b. Enter a value *GREATER THAN THE INTENDED FULL SCALE INPUT*.
- c. Select the "Input Full" box.
- d. Enter a value *LESS THAN THE ZERO SCALE INPUT* entered in Step b.

The Configuration Program will display a message in the output section of the screen to indicate that a Reverse Output situation exists (see Figure 6).



# TRY & TRX

**Figure 6.** Scale the output or set the Reversed Output using the bars in the bottom right of the Main Configuration Screen.



## Scaling the Output

The TRY or TRX can be configured to scale its 4-20mA output to offset the performance or calibration of other instruments in the process loop.

The instructions assume that the Configuration Program has been loaded successfully (page 6). Moore Industries also suggests saving the initial settings resident in the transmitter before making any changes (refer to “Keeping What You’ve Got Safe”, page 9).

To set the output of the TRY or TRX:

1. Start the PC Configuration program and connect a TRY or TRX as shown in Figure 2. Press the “Get Setup” button to display the transmitter’s current configuration.

### **Note:**

*It is not necessary to connect a unit to the PC in order to scale the output.*

2. Enter the desired 0% output value (between 3.800mA and 17.400mA) in the “Output Zero” box at the lower right corner of the screen (see Figure 6), or click and drag the slide bar, adjacent to the box, to adjust the value for 0% as desired.
3. Enter the desired 100% output value (between 7.800mA and 21.400mA) in the “Output Full” box, or click and drag the slide bar to adjust the value.

### **Note:**

*The minimum difference between 0% output and 100% output is 4.000mA.*

### **IMPORTANT:**

*Settings on the Configuration Program Screen do not take effect in the unit until the Configuration File is downloaded.*

## Applying Configuration Settings to Your Transmitter

1. Select one of these options:
  - a. Create a Configuration File by setting different parameters.
  - b. Save the current settings into a file on disk as a back-up or to download later. Refer to “Keeping What You’ve Got Safe”, starting with Step 3 on page 9.
  - c. Download the current settings into memory
2. To enable the Download Process, click on the “Stop” button at the bottom-center of the screen, then on the “Prog” button. This transfers the settings from the screen to the memory of the connected transmitter.

The Status Bar in the upper-left corner of the Configuration Program screen will display the progress of the download of the Configuration File to the connected transmitter.

When the download is complete, the Configuration Program will emit a faint, yet distinctly audible “beep” to indicate that the download was successful and will show the configuration setting resident in memory towards the left side of the screen.

3. Click on the “Start” button to re-enable the Configuration Program’s monitoring of the connected transmitter.

The status area of the Configuration Program screen will display the “Measurement ON” message.



**CAUTION:**

*Any time a connected TRY or TRX is “programmed” by downloading a Configuration File into memory, ALL of the configuration parameters resident in the transmitter memory at the time of the download are **OVERWRITTEN**.*

*This includes things like, tag name, calibration date, trim values, etc.*

## Trimming the Input

Use this feature to enhance the accuracy of the transmitter by precisely matching its actual reading of the input to its scaling of the either one or two input points. Trim the input by following the directions below:

**Note:**

*The “Input Trim” procedure may require several hours for completion. Please determine whether or not your process requires this function before proceeding.*

1. Connect the transmitter to your PC using the setup shown in Figure 2. Press the “Get Setup” button to display the transmitter’s current configuration.
2. Click “Start”, then “InpTrim”.
3. Click the radio button labeled “Input Trim On”.
4. Select whether you will trim two points (upper and lower) or just one point by clicking on the appropriate radio button in the “Trim Pnts” section.
5. In the “Trim Lower” and “Trim Upper” boxes, type in the sensor’s value that you are trimming.
6. Attach the sensor that you wish to trim to the transmitter and place the sensor in a calibration bath. Adjust the bath until its temperature settles. Click “Trim Lower” and wait for it to capture the value (about 10 seconds).
7. Attach the sensor that you wish to trim to the transmitter and place the sensor in a calibration bath. Adjust the bath until its temperature settles. Click “Trim Upper” and wait for it to capture the value (about 10 seconds).
8. Click on the button labeled “QuitTrim”, then the “Stop” button, and finally the “Prog” button to send the trim values to the transmitter.
9. Click on the “Start” button to re-enable the Configuration Program’s monitoring of the connected transmitter.

**Caution:**

*If planning on beginning a new task, ensure that you have saved your lower trim value of your Input Trim before proceeding to Steps 8 and 9.*

**Figure 9.** Trim Capture Box

Input Range and Setup Options	
Table Output Range in EGU: 750 to 2750 mm	
Captured Lower 750	Trim Lower 750
Captured Upper 2741	Trim Upper 2750

## Trimming the Output

Trimming is the function that allows precise control over the transmitter’s output. Note that to activate this function, a unit must be connected as shown in Figure 2.

To trim TRY or TRX output:

1. Set all unit parameters on the TRY or TRX Configuration Screen as required for your intended application.  
  
When the Configuration File shown on the screen has been modified for your application, click “Stop” to stop measurement.
2. Click “OutTrim”. Monitor the output with a calibrated current meter or with a voltmeter measuring the drop across a precision 250 Ohm resistor (see Figure 2).

# TRY & TRX

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3. While monitoring your meter, select and move the “Zero Scale Output” or the “Full Scale Output” slide bar to adjust the TRY or TRX output .
4. When both zero and full scale have been adjusted to satisfaction, press “QuitTrim”, then “Prog” to program the transmitter with the new trim values.

The “TRY or TRX Status” area of the Configuration Screen will reflect the new output settings.

## Setting Miscellaneous Functions—Engineering Unit Readout, Input Filtering, Upscale or Downscale Drive, and Broken Wire Detection

There are several “radio buttons” on the PC Configuration Program Main Screen that control ancillary transmitter functions. It is not necessary to have a transmitter hooked up to the PC in order to set these parameters and save them in a Configuration File.

### Setting Engineering Unit Readout

When a temperature sensor is designated as the input to the transmitter, the radio buttons for “Degree” are enabled.

Use this setting to have the Configuration Program display the Centigrade or Fahrenheit temperature for readout in the “Status” area of the screen whenever the PC is being used to monitor the input from the connected sensor.

### Setting Input Filtering

Use this radio button setting to filter out noise on the power to the transmitter.

### Choosing Between Upscale and Downscale Drive

The TRY and TRX transmitters can be configured to provide a special warning, using its output, of a breakdown in its connected sensor or sensor wiring. Use this radio button setting to configure the transmitter to drive its output either up to 24mA or down to 3.3mA when a sensor or sensor wiring failure is detected.

### **Note:**

*There is a difference between the available Full Scale output setting and the Upscale Drive, and between the available zero scale output setting and the Downscale Drive:*

*The TRY or TRX will only output 24mA or 3.3mA (as configured) in the event of a sensor or sensor wiring failure (upscale/downscale drive). If sensor input drops below the rated range, output drops to a minimum of 3.8mA. If sensor input rises above the rated range, output rises to 21.4mA.*

*This allows the user to distinguish between an input failure and an input over or under-range condition.*

## Disabling Broken Wire Detection

One of the premier features of many of Moore Industries’ temperature transmitters is our Total Sensor Diagnostics® system. During operation, the TRY or TRX sends random micro-amp pulses through input wiring to check for broken wiring or a burned out sensor.

### Working with a Millivolt Input

When the transmitter is connected to a PC, the “TRY/TRX Status” section of the Main Configuration screen displays the message “Broken Wire” whenever problems are detected on the input, and the transmitter itself drives its output upscale or downscale.

This can cause problems for some types of millivolt input sources. To temporarily disable this feature when the TRY or TRX is working in a millivolt input configuration, select the “Broken Wire Off” radio button.

### Working with a Thermocouple or RTD Input

Total Sensor Diagnostics can also cause problems with some types of temperature calibrators.

When working with thermocouple or RTD inputs, set the “Calibration” radio button in the lower-left area of the Configuration Screen to “Calibration Mode”. This temporarily disables Total Sensor Diagnostics.

## Setting Output Damping

The Output Damping function allows the user to introduce a delay into the response of the transmitter in order to minimize the effect of step output changes. The higher the damping value (set in seconds), the longer the TRY or TRX will take to respond to trends on the input.

**Note:**

*It is not necessary to connect an input device to the PC in order to select and configure the Damping Value.*

To set the damping value, either adjust the position of the slider bar in the lower-right area of the Configuration Program Main Screen, or enter a value directly into the space provided.

The default damping value is 0 seconds in which damping is off. The maximum allowable damping value is 5.056 seconds.

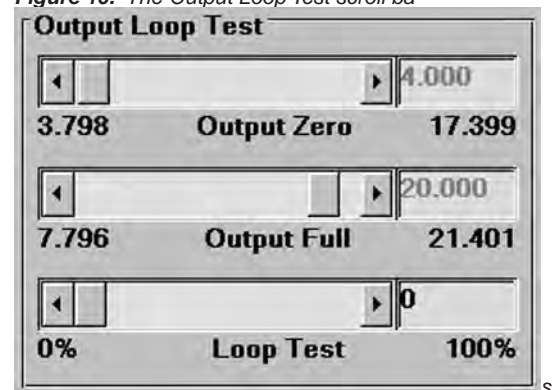
## Using the Loop Test

The Loop Test feature allows the user to employ the transmitter's output to "trim" other instruments in the loop.

To use the Loop Test feature, the connected TRY or TRX must stop measuring input.

1. Click on the "Stop" button.
2. Click on the "Loop Test" button.  
This enables a slide bar in the lower-right area of the Configuration Screen.
3. Use the slide bar to adjust the output of the connected TRY or TRX to a percentage of the configured scale. Monitor the effect of this on other instruments in the loop, and adjust accordingly.
4. Click on "Quit Loop" to stop using the Loop Test feature.

Figure 10. The Output Loop Test scroll ba



# TRY & TRX

## Creating a Custom Linearization Table

The TRY or TRX support user-defined linearization of mV inputs. Up to 85 input/output points can be defined, and the user can also specify the format and engineering units of the output (viewable with the Configuration Program). A Custom Linearization Curve is used for mV inputs only.

This section explains how to create a Custom Linearization Table for downloading into TRY or TRX memory.

The instructions assume that the Configuration Program has been loaded successfully. Moore Industries also suggests saving the initial settings resident in the transmitter before making any changes.

To create a Custom Linearization Table:

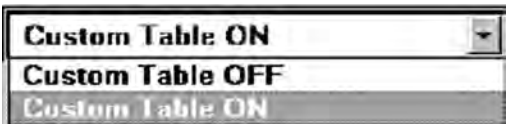
1. Attach the equipment listed in Table 1 as shown in Figure 2 and start the PC Configuration Program.

**Note:**

Connect the unit to a PC in order to create a Custom Linearization Table. You may work On or Off-Line.

2. Use the pull-down menu to set "Linearization ON". Then click the "CustTabl" button in the lower-left area of the Main Configuration Screen.

**Figure 11.** Linearization Must be set to ON to Create a Custom Table.



3. Click on the "CustTabl" (Customize Linearization Table) button. This causes the Configuration Program to change its upper-right corner area to accommodate the table.

**Figure 12.** Creating a Custom Linearization Table.

A screenshot of a software window titled 'Custom Tables'. It contains a table with 11 rows and 3 columns: 'Point', 'Inp mV', and 'Out EGU'. The table is populated with values for points 1 through 11. Below the table, there are three fields: 'mm' (labeled 'EGU'), a pull-down menu showing '+/- 999999' (labeled 'Output Format'), and a text field containing '12' (labeled 'Points'). A 'Restore' button is located at the bottom of the window.

Point	Inp mV	Out EGU
1	4.000	750
2	6.000	900
3	8.000	1100
4	10.000	1375
5	12.000	1650
6	14.000	1835
7	16.000	2100
8	18.500	2355
9	19.000	2400
10	19.250	2560
11	19.758	2700

mm    +/- 999999    12  
EGU    Output Format    Points

Restore

4. Use the table fields to set values for input and output from the transmitter's intended application.

Use the Up, Down, Left, and Right arrow keys on the PC keyboard to move the cursor among the cells in the table.

5. Use the "Restore" button to reset the table to the table stored in the TRY OR TRX's memory.

**CAUTION:**

Restoring the configuration file erases any values in the table, overwriting them with whatever is stored in the most recent file.

6. Use the "EGU" field to set the Engineering units of the readout from the transmitter when connected to the Configuration Program.
7. Set the "Output Format" field to the desired resolution using the pull-down menu.
8. Enter the number of points to use to constitute the Linearization Table in the "Points" field.

## The Rules for Custom Linearization:

- The difference between any consecutive values in the table (in either column) must be less than 50% of the entire configured range.

### **Note:**

*Values in the “Inp mV” column must be in ascending order and must fall within a range of -50 to 1000 mV.*

- One “Output EGU” value per “Input mV” value only.

### **Note:**

*Values in the “Out EGU” column must fall within a range of  $\pm 999999$ . The output must be scaled to your “Output EGU” Table range.*

- It is not necessary to use all 85 available points, but the first and last points in the curve always default to the 0% and 100% input scale (input range).
- If you decide not to use all 85 points, you must change the number of points in the “Points” field to the number you wish to use.

### **Note:**

*Moore Industries suggests filling in the EGU (Engineering Units), then the number of points, and finally the values in the table.*

9. When the table is complete, click on the “Quit-Tabl” button and answer “Yes” on the pop-up dialog box. You may save the configuration to a file whether you are On or Off-Line.
10. Click on the “Prog” (Program) button to download the output trim settings into the transmitter memory.

### **CAUTION:**

*Any time a connected TRY or TRX is “programmed” by downloading a Configuration File into memory, ALL of the configuration parameters resident in the transmitter memory at the time of the download are OVERWRITTEN.*

*This includes things like: tag name, calibration date, trim values, etc.*

*Once a transmitter’s memory is “erased” in this fashion, the old operating parameters are unrecoverable, and will have to be regenerated from scratch if needed again.*

# TRY & TRX

## Managing Configuration Files

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

Figure 13. The File Menu.



u.

## Saving a Configuration File to Disk

1. Click on the “File” button. This brings up an Explorer-like window on the left area of the screen.
2. Enter the file name that you wish to save in the “Selected File Name” box.

**Note:**

*File names must follow the DOS convention.  
Eight-character maximum and no suffix.*

*The Configuration Program adds  
a suffix to the file name automatically.*

3. Use the Explorer-like interface to designate the location on the PC drive (or floppy) for the file to be saved.
4. Click on “Save”
5. Click “Yes” to save the named file to disk.

The left side of the screen will now show the name of the file entered in Step 2 resident on disk.

## Retrieving a Configuration File from Disk

1. From the Main Configuration Screen, click on the “File” button to bring up the File Management portion of the program.
2. Use the Explorer-like file display (see Figure 13) to locate the file to be retrieved, and click on the file to highlight it. Once you’ve clicked on the file it is read and the screen is updated.
3. Click on the “Quit File” button.

You may also edit the screen configuration and save it to another file. However, once you click the “Quit File” button you will be asked whether you want to keep the current file configuration or restore the previous version before saving.

The Configuration Screen will change to show the parameters entered into the retrieved file. The parameters can now be edited and/or downloaded into the memory of a connected TRY or TRX.

## Retrieving a Configuration File from the Connected TRY or TRX

Make sure a transmitter is connected and communicating properly with the Configuration Program, then simply click on the “GetSetup” button.

The Main Configuration Screen changes to show the parameters resident in the memory of the connected transmitter. The parameters can now be edited, saved to disk, and/or edited and re-downloaded into memory.

**Note:**

*Connection to another device will not change the Configuration Screen. This is beneficial when you must configure several devices with the same configuration. In this case you would simply configure the unit and click the “Stop” button and then the “Prog” button. If no sensor is connected during configuration download, click the “Stop BW” button and then the “Prog” button.*



## Printing Saved Configurations

1. Click on the "File" button. This brings up an Explorer-like window on the left area of the screen.
2. Navigate to the save file you want to print and click on it.
3. Click on the "Print" button.

### **Note:**

*Printing saved configurations must be done when the Explorer-like file window is up.*

The TRY and TRX are available in both DIN and HPP housing styles, and are available with a number of enclosure options. Consult your local Moore Industries' Interface Solutions Expert for information on the type of enclosure that best suits your application.

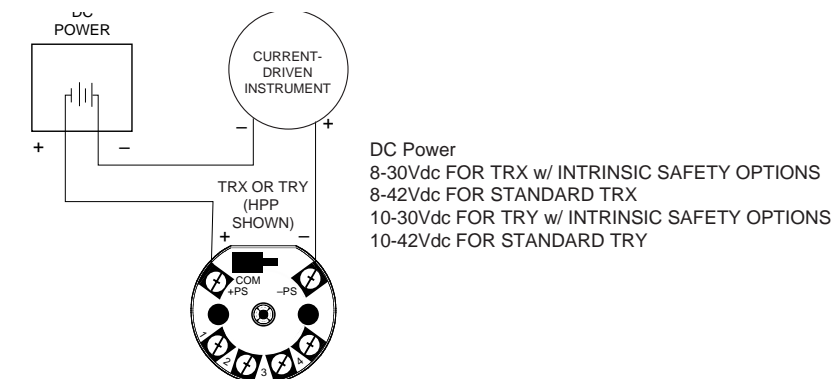
## Connecting the TRY or TRX in an Application

Moore Industries suggests installing the TRY or TRX 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.

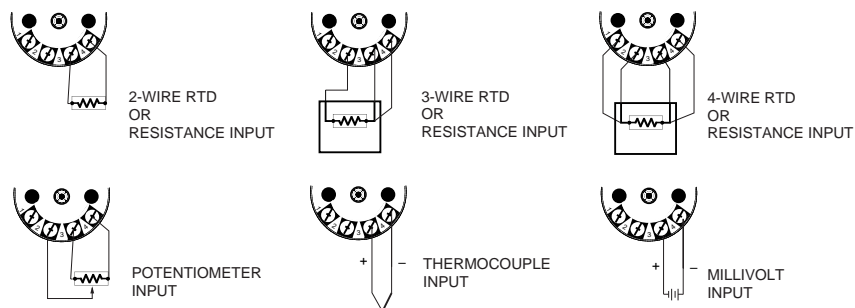
## Installing and Connecting the TRY or TRX

Now that the TRY or TRX has been programmed to your satisfaction, it is ready for installation.

**Figure 14.** Connecting the TRX or TRY to the loop.



### Input Connection Hookups



# TRY & TRX

Figure 15. The Dimensions of the DIN housing for the TRY or TRX unit.

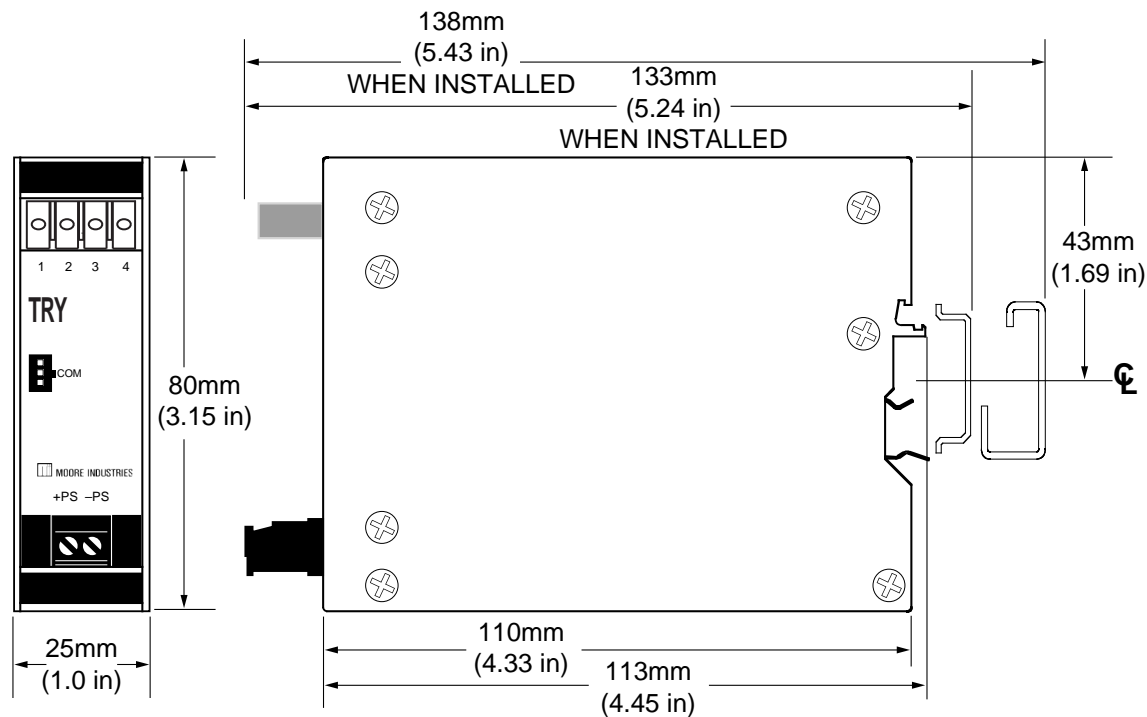
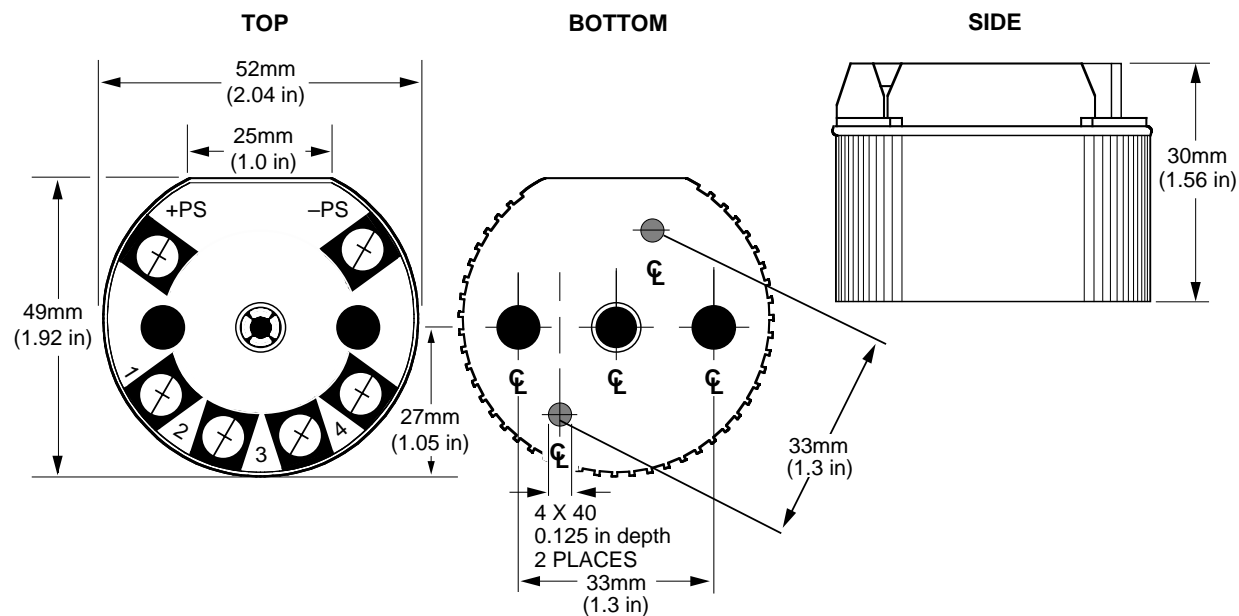


Figure 16. The Dimensions of the TRY or TRX HPP housing.





## 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 unshielded input and output signal wiring should be 2 inches.

### **Note:**

*Some of Moore Industries' instruments can be classified as receivers (IPT<sup>2</sup>, IPX<sup>2</sup>, etc.) and some can be classified as transmitters (TRX, TRY, etc.)*

*while some are both a receiver and a transmitter (SPA<sup>2</sup>, 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.*

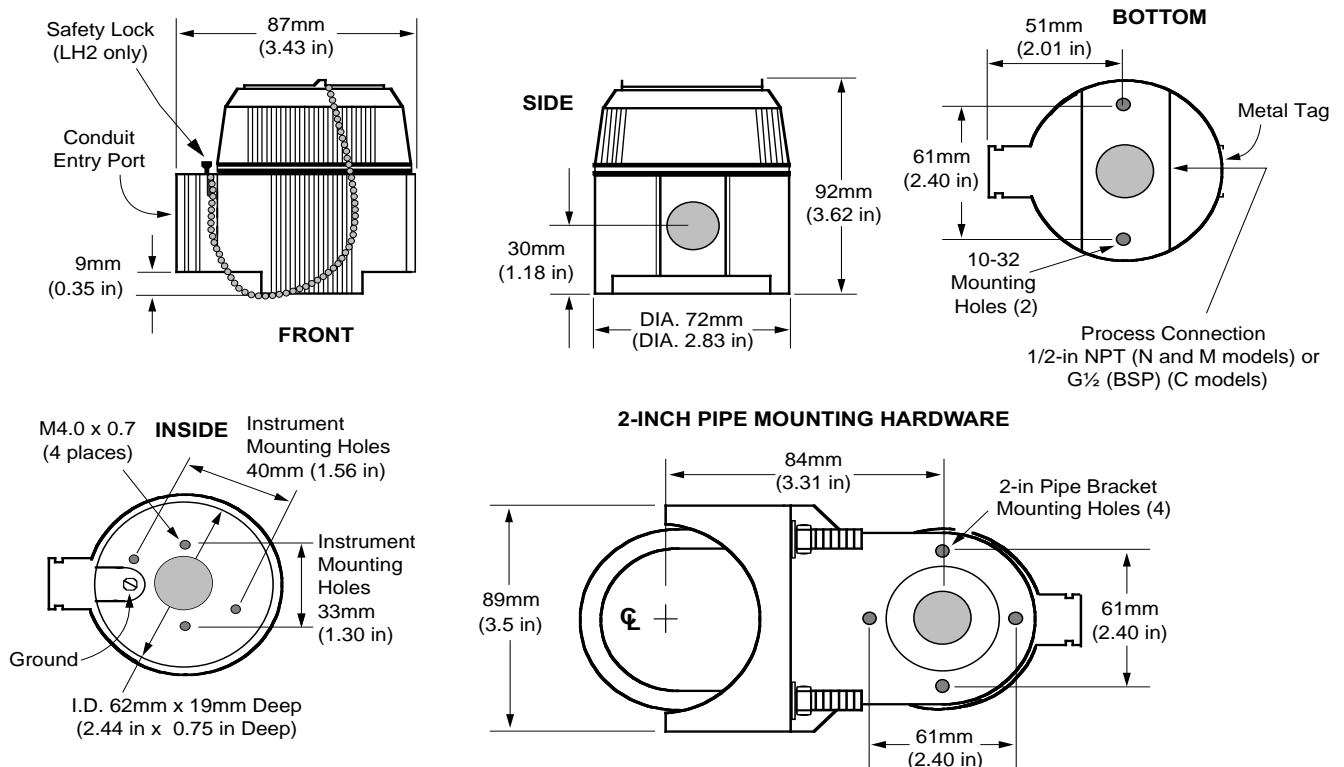
## CE Conformity

Installation of any Moore Industries' products that carry the CE marking must adhere to the guidelines in the Recommended Ground Wiring Practices section in order to meet the EN 61326 requirements set forth in the applicable EMC directive.

## Operating the TRY/TRX

Once configured, installed, and supplied with the correct power, the TRY or TRX transmitter begins to operate immediately. Depending upon environmental conditions, it can be expected to continue to operate unattended indefinitely.

**Figure 17.** The Dimensions of the explosion-proof housing for the TRY or TRX unit.



# TRY & TRX

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## Maintaining the TRY/TRX

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.

### **IMPORTANT:**

*Always adhere to any site requirements for programmed maintenance.*

## Troubleshooting the TRY/TRX

If a transmitter's performance begins to deteriorate and a physical check of the installation uncovers no adverse conditions or damage, remove the offending unit from service and reperform the Configuration Procedures from earlier in this manual.

## Configuration Software Error Messages

Data fields on the Configuration Main Screen can change color or appearance in some way to indicate that an attempt is being made to create a nonstandard or ill-advised condition in the Configuration File.

### **“Zero or Full Scale Outside Conformance Range”**

Setting thermocouple input parameters to zero or full scale values that fall outside the published ISA thermocouple tables will cause this error message to appear on screen.

This condition is “downloadable” to a TRY or TRX. It is intended to provide the user with the ability to monitor general trends on the input, functioning within the rated accuracy whenever input is within the conformance range, but inherently less accurate outside the range.

### **“Reverse Output”**

Setting the parameter for “Input Zero” numerically above the parameter for “Input Full Scale” causes this message in the “Output” section of the Configuration Screen. This condition is downloadable to the unit, and causes transmitter output to rise proportionally in response to a drop on the input, and to fall proportionally as the input rises.

### **“Table Data Invalid”**

If there is a broken or loose communication wire, ambient electronic noise, or a problem with the memory chip inside the transmitter, this message may appear.

To fix the condition, make sure that the desired operating parameters are displayed on the Configuration Screen, and click on the “Prog” (Program) button. This should override the corrupt configuration information in unit memory and reset the parameters correctly.

## Contacting Customer Support

Moore Industries is recognized as the industry leader in delivering top quality to its customers in products and services. We perform a battery 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.

Factory phone numbers are listed on the back cover of this manual.

If problems involve a particular TRY or TRX, there are several pieces of information that can be gathered from the installation **before the factory is called** that will help our staff get the necessary answers **in the shortest time possible**. For the fastest service, gather:

- The complete model number(s) of the problem unit(s)
- The complete serial number(s) of the problem unit(s)

## Appendix A: Intrinsic Safety

This page contains the installation diagram for the TRY or TRX carrying the intrinsically safe option. It also includes guidelines for setting up zener barriers necessary in these types of applications.

These diagrams must be used to augment the installation instructions earlier in this manual for units that are to operate in areas requiring intrinsically safe instrumentation.

<b>DO NOT SCALE DRAWING</b>		<b>CONTROL DRAWING</b>		DRAWING NUMBER <b>100-100-38</b>	REVISION <b>C</b>
DRAWN Gus H. Elias CHECKED W. Ho ENGINEER Gus H. Elias SCALE NONE		TITLE Field Installation Diagram: TRY, TRX-R & TX [HPP] Non-Isolated PC Prog. Temp. Xmitters. Intrinsically Safe System For Hazardous 'Classified' Locations.		REVISED BY <b>ECO 13262</b>	DATE BY APPROVAL <b>G.E. 02/01 CB</b>
<b>MOORE INDUSTRIES</b> <small>TOLERANCES (UNLESS NOTED) DECIMALS = .001/.002/.005 XXX = ±.03 / .025 HOLESES = .003 / .002 / .005 ANGLES = ±.30°</small>		NOTICE RE PROPRIETARY INFORMATION: This drawing and the information contained herein are the proprietary property of Moore Industries International, Inc. (MII) and should not be reproduced or disclosed to any third party without the written consent of an authorized officer of MII.			

**CERTIFIED PRODUCT**

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

**Notes:**

- 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/IEC/UL/CE/SA/SIRA/TUV, etc.) certifying agency for I.S. connections in: Class III, Division 1, Groups A-G. The output voltage (Voc, Vi or Vo) must not exceed 30 VDC & the output current (Isc, It or Io) 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.
- For FM applications, installation must be in accordance to 'ANSI/P12.6' (Installation of I.S. Systems for Hazardous 'Classified' Locations) and the National Electric Code 'ANSI/NFPA 70'. Also, a dust-tight conduit seal must be used when installed in Class II and Class III environments. For CSA applications, adhere to the 'Canadian Electric Code C22.1' most current publication on I.S. installation guidelines. For CENELEC/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 the unit when either energized or if an explosive gas/dust atmosphere is present. Disconnect power before 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 = 300 µA, Pmax = 240 µW.

(Caution: The 'COM' Port Must Not Be Used In Hazardous 'Classified' Locations.)

**Entity Parameters**  
(Power/Loop, +PS & -PS):  
Vmax or Ui = 30 VDC  
Imax or Ii = 110 mA  
Pmax or Pi = 0.825 W  
Ci = 317 nF  
Li = 0 µH  
Ca or Co = 3 Ci + Ccable  
La or Lo = 3 Li + Lcable  
Vmax or Ui = 3 Voc or Vi  
Imax or Ii = 3 Isc or It

**TRY [HPP]**  
Non-Isolated PC-Programmable Temperature Transmitter

**TX & TRX-R [HPP]**  
Non-Isolated PC-Programmable Temperature Transmitter

**Hazardous (Classified) Locations/Areas:**  
CSA International  
Intrinsically Safe: Class I, Div. 1, Groups A-D.  
Suitable for use in: Class I, Div. 2, Groups A-D.  
KEMA/CENELEC I.S. (TRY only): EEx ia IIC T4/T5  
LCIE/ATEX I.S. (TX/TRY-R): II 2G EEx ib IIB T6

**Hazardous (Classified) Locations - FM (US NEC 500):**  
Intrinsically Safe: Class I, II, III; Div. 1; Groups A-G.  
Non-Incendive: Class I, Div. 2, Groups A-D.  
Class II, Div. 2, Groups F & G and Class III, Div. 2.  
US NEC 505 (TX & TRX-R only): Class I, Zone 0, AEX ia IIC  
T: Code: T6 @ 60°C Maximum Operating Ambient.  
Temperature Range: -40°C to +60°C

**RTD & T/C:**  
Ca or Co = 2.96 µF  
La or Lo = 2.9 mH  
Voc or Vi = 6.51 VDC  
Isc or It = 110 mA  
Po = 0.825 W  
[TX: RTD only]

