

TDY *PC-Programmable Temperature Transmitter with Display*





 MOORE
INDUSTRIES

The Interface Solution Experts

www.miinet.com

Table of Contents

Introduction	1
The TDY	1
Specifications	2
Ordering Information	4
Everything You Need is Included	4
Configuring a TDY	5
What is First	5
What is Next	5
Installing the Software	6
Gathering the Equipment Needed	7
Keeping What You've Got Safe—Using the “Get Setup” Function	10
Selecting Input Type, Wiring, etc.	12
Scaling the Input (also: Setting Reverse Output)	14
Setting the Reverse Output	15
Setting the Display	16
Scaling the Output	17

Trimming the Input	18
Method 1	18
Method 2	18
Verifying Input Trim	22
Trimming the Output	23
Setting Miscellaneous Functions--Engineering Unit Readout, Input Filtering, Upscale or Downscale Drive, and Broken Wire Detection	25
Setting Engineering Unit Readout	25
Setting Input Filtering	25
Choosing Between Upscale and Downscale Drive	25
Disabling Broken Wire Detection	25
Working with a Millivolt Input	25
Working with a Thermocouple or RTD Input	25
Working with a Configuration File	25
Setting Output Damping	26
Using the Loop Test	26
Creating a Custom Linearization Table	27
Managing Configuration Files	29
Saving the Configuration Files to Disk	29
Retrieving a Configuration File from Disk	29
Retrieving a Configuration File from a Connected TDY	29
Installing and Connecting the TDY	30
Physical Dimensions	30
Connecting the TDY in an Application	30
Ground Wiring Recommendations	30
CE Conformity	30

Operating the TDY	32
Maintaining the TDY	32
Troubleshooting the TDY	32
Configuration Software Error Messages	32
“Zero or Full Scale Outside Conformance Range”	32
“Reverse Output”	32
“Table Data Invalid”	32
Contacting Customer Support	32
Appendix A--Turning Off Other Programs In Windows	33

Introduction

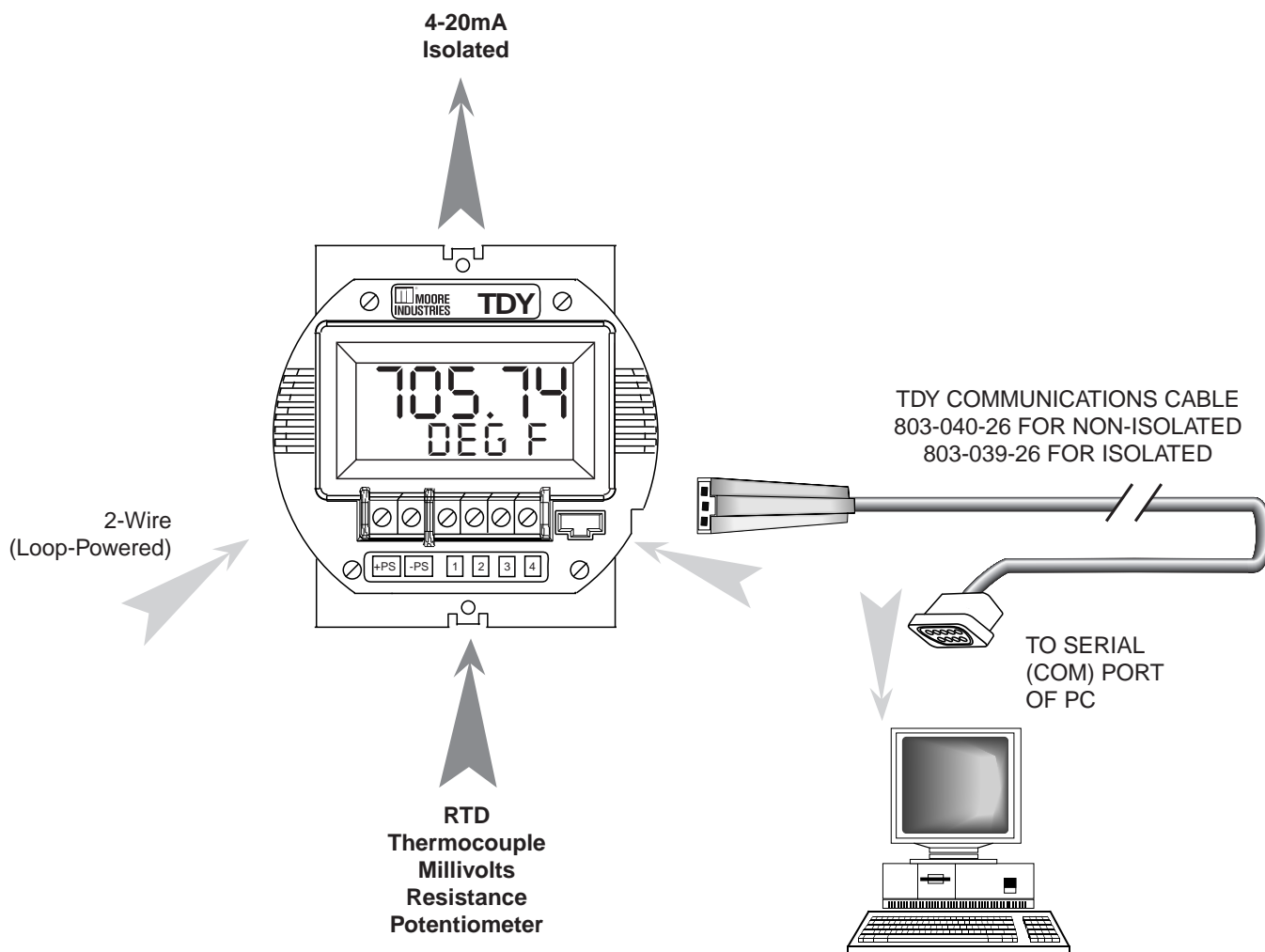
The TDY is a 2-wire (loop-powered) temperature transmitter with a digital display. It is configured using a personal computer (PC) and the software program provided by Moore Industries.

The TDY

The TDY transmits input from a thermocouple, RTD, direct resistance, millivolt source, or a potentiometer as a linearized, scaled and offset 4-20mA. The output signal is proportional (or, by user designation, inversely proportional) to the input. Refer to Figure 1.

The TDY provides 500Vrms isolation between input and output.

Figure 1. Use the PC-Programmable TDY as an interface between sensors and controllers



Specifications

<p>Performance</p> <p>Input Accuracy: Refer to Table 1</p> <p>Output Accuracy: ±0.03% of input span + input accuracy (For T/C Input, also add Reference Junction Compensation Accuracy)</p> <p>Reference Junction Compensation Accuracy: ±0.45°C</p> <p>Stability: T/C Inputs 0.13% of maximum span for 2 years; RTD inputs 0.14% of maximum span for 2 years</p> <p>Isolation: 500VAC/1000VDC input to output to case</p> <p>Measurement Cycle: Output updates at least 8 times per second</p> <p>Output Response: 256msec, typical, 300msec, max., for output to change from 10% to 90% of its scale for an input step change of 0% to 100%.</p> <p>Ripple: ≤10mV peak-to-peak, maximum.</p> <p>Power Supply and Load Effect: Negligible within power and load limits</p> <p>Over-Voltage Protection: 4V max., on Input; 48V max., on Output; 48V Reverse Polarity protection on output</p> <p>Output Current Limiting: 24mA for Input Overrange</p>	<p>Performance (Continued)</p> <p>Load Capability: 583Ω @ 24V, typical;</p> <p>$\Omega = \frac{\text{Supply Voltage} - 10V}{0.024A}$</p> <p>Burnout Protection: Total Sensor Diagnostics user-selected via Windows configuration software; Upscale to 24mA or Downscale to 3.3 mA.</p> <p>T/C Input Impedance: 40MΩ, nominal</p> <p>RTD Excitation: 250μA, ±10%</p> <p>RTD Lead Wire Resistance Maximum: RTD resistance + 2 times the lead wire resistance must be less than 4000Ω; Recommended <35Ω per wire for 3-wire inputs; <5Ω per wire for 10Ω Cu inputs</p> <p>Display Type: LCD; Top Row, 10.16mm (0.4 inch) high black digits on a reflective background; Bottom Row, 5.72mm (0.225 inch) high black digits on a reflective background</p> <p>Format: Two rows of five alphanumeric characters</p> <p>Decimal Points: Automatically adjusting decimal point with a two decimal place maximum (Analog output display is always two decimal places)</p> <p>Range: -99999 to 99999</p> <p>Minimum Display Span: 1.00</p>	<p>Ambient Operating and Storage Conditions Range: Transmitter, -40°C to 85°C (-40°F to 185°F); Display, -20°C to 65°C (-4°F to 149°F)</p> <p>Relative Humidity: 0-95%, non-condensing</p> <p>Effect of Ambient Temperature on Accuracy: ±0.015% of span per °C change, max (+ 0.001% of Ω reading for RTD inputs)</p> <p>Effect of Ambient Temperature on Reference Junction Compensation: ±0.015°C/°C change</p> <p>RF/EMI Immunity: 20V/m @ 20-1000MHz, 1K AM @ 80% when tested according to IEC 1000-4-3-1995 with less than 0.5% error of maximum span</p> <p>Common Mode Rejection: 100dB, min, @ 50/60Hz</p> <p>Normal Mode Rejection: 70dB, typical, @ 0.2V peak-to-peak, 50/60 Hz</p> <p>Adjustments All settings made using Windows-based configuration program, then stored in non-volatile memory</p> <p>Weight</p> <p>HP-style housing: 178g (6.3 oz)</p> <p>2LG housing: 1229g (2 lbs, 11.9 oz)</p> <p>D2LC housing: 688g (1 lb, 8.3 oz)</p>
--	---	--

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

Input	Type	α^*	Ω	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 100Ω inputs 10°C (18°F) for 200Ω inputs 7.5°C (13.5°F) for 500 and 1000Ω 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
Ω	Direct resistance or Potentiometer	n/a	n/a	0-4000Ω	30Ω	±0.4Ω		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
		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
		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
		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
		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
		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
		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/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
		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

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

**Accuracy ratings are expressed as a percent of the total conformance range, at spans larger than recommended minimums. (Accuracy ratings for RTD inputs apply at 25°C)

Ordering Information

Unit	Input	Output	Power	Options	Housings
TDY PC-Programmable Temperature Transmitter with Display	PRG Programmable with supplied Configuration Software (see Table 1 for de- scriptions of available input types; Factory Configuration available)	4-20 MA User scaleable with supplied software	10-42DC 10-30DC	none	2LG 2-Hub, low cover, glass window, explosion-proof enclosure D1LC 1-Hub, low base, clear cover, NEMA 4X (IP 66) enclosure D2LC 2-Hub, low base, clear cover, NEMA 4X (IP 66) enclosure HP Hockey puck housing and spring clips DN Snap-in mounting for HP case on TS-32 DIN rail FL Mounting flanges on HP suitable for relay track or screw mounting FLD Mounting flanges on HP suitable for 3½" relay track or screw mounting <small>P suffix indicates enclosure comes equipped with base plate and U-bolts for mounting on a 2-inch pipe (i.e. 2LGP)</small>

To order, specify: Unit / Input/ Output / Power [Housing]

Model Number Example: TDY / PRG / 4-20MA / 10-42DC [2LG]

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 TDY, 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.

Everything You Need is Included...

Each TDY order comes with one copy of our Configuration Software on a 3½-inch floppy disk (Windows® 3.1, '95, '98, and NT compatible).

To order additional copies of the Configuration Software, specify Moore Industries' part number **235-75120-01**.

A TDY Configuration Cable is also included with each order.

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.

Configuring a TDY

One of the benefits of the TDY transmitter is its easy-to-use PC program; there are no internal or external controls to adjust or settings 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 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 TDY:

- Installing the Software (page 6)
- Saving the Default Configuration (page 10) (Keeping What You’ve Got Safe)
- Selecting Input Type, Wiring Configuration, etc. (page 12)
- Scaling the Input/Setting Reverse Output (page 14)
- Setting the Display (page 16)
- Scaling the Output (page 17)
- Trimming the Input (page 18)
- Trimming the Output (page 23)
- 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 25)
- Setting Output Damping, Using the Loop Test (page 26)
- Creating Custom Linearization Tables (page 27)
- Managing Configuration Files (page 29)

What is First

First, it is necessary to install the TDY 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.

Note:

Before installing the software, it is important to close down all other programs that are running on your PC. This includes programs such as antivirus or fax software that run automatically when you start your PC. For more information, see Appendix A.

What is Next

Once the Configuration Program is installed on the PC, the TDY 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 TDY 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 TDY **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 10)

Installing the Software

Before the transmitter can be configured, the TRY_TRX_TDY_SIY V3.0 Setup program must be installed on a PC. To install the TDY Configuration Program, you will need the following:

- 80386-based PC, or 100% compatible
- 1.44Mb floppy diskette drive
- 2Mb of free Random Access Memory (RAM)
- 1Mb of free space on the PC hard disk drive (recommended)
- Microsoft Windows® 3.1, '95, '98, or NT

Note:

More RAM and a faster processor may be required for Windows® '95, '98, and NT. See Windows manuals for details

- One (1) available serial communications port (COM 1, 2, or 3), set to 4800 baud, no parity, 8 data bits, and 1 stop bit

To install the software:

1. Insert the floppy diskette labeled "Installation Disk" into the floppy drive of the PC.
2. Quit any applications that may be running in the background on the PC, including any virus detection software or other programs running in Terminate and Stay Resident (TSR) mode. Refer to the Appendix of this manual for help in shutting down other programs.
3. If running Windows 95, skip to step 6.
4. In Windows 3.1, open Program Manager (the desktop), and select "Run" from the "File" pull-down menu.
5. Enter "a:\setup.exe" in the space provided.

The TDY Configuration Program installation routine prompts for a source (typically a:\) and a destination directory on the hard drive, suggesting defaults in each case.

A status bar is displayed as the necessary files are expanded and copied to the designated destination on the PC. By default, the installation routine creates a directory on the PC hard drive called "TRX", and a program group called "TRX_TRY_TDY_SIY V3.0 Setup", which shows up in Windows' Program Manager (desktop) when complete:



When installation is complete, the program displays the message "TRX/TRY/TDY/SIY Version 3.0 Setup Installation is Complete!".

6. In Windows® '95, '98, or NT, go to the "Start" menu, and access "Settings", then "Control Panels", and finally "Add/Delete Programs".
7. Click on "Install" and follow the instructions.

A status bar is displayed as the necessary files are expanded and copied to the designated destination. By default, the installation routine creates a directory on the PC hard drive called "TRX", and a program group called "TRX_TRY_TDY_SIY V3.0 Setup" under "Programs" on Windows' Start menu.

When installation is complete, the program displays the message "TRX/TRY/TDY/SIY Version 3.0 Setup Installation is Complete!" and places its icon on the Start menu:



Gathering the Equipment Needed

It is possible to create a Configuration File for a TDY without ever connecting the transmitter to a PC. Most TDY 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 set up 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 put together the setup shown in Figure 2.

Table 2. Equipment Needed for Setting Up the TDY

Device	Specifications
Thermocouple, RTD, Millivolt, Potentiometer Simulator, or Decade Resistance Box	Accurate to $\pm 0.05\%$ of unit span
Power Supply	10-42Vdc, $\pm 10\%$
Precision Load Resistor (optional)	250 Ω , $\pm 0.01\%$
Multimeter	Accurate to $\pm 0.025\%$, e.g. Fluke Model 87
Thermocouple or RTD Temperature vs. Resistance Tables	ITS68 and ITS90, or equivalent
Personal Computer	See "Installing Software"
Moore Industries' TRX/TRY/TDY/SIY Configuration Program, TR_Setup.exe	Version 3.0 or greater, successfully installed on the hard disk of the specified PC
Moore Industries' Communication Cable	Non-isolating (PN 803-040-26) Isolating (PN 803-039-26)

Note:

Be sure to use calibrated test equipment when performing any trimming operations on the TDY. 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.

Figure 2. Use the PC Configuration Software to program the TDY

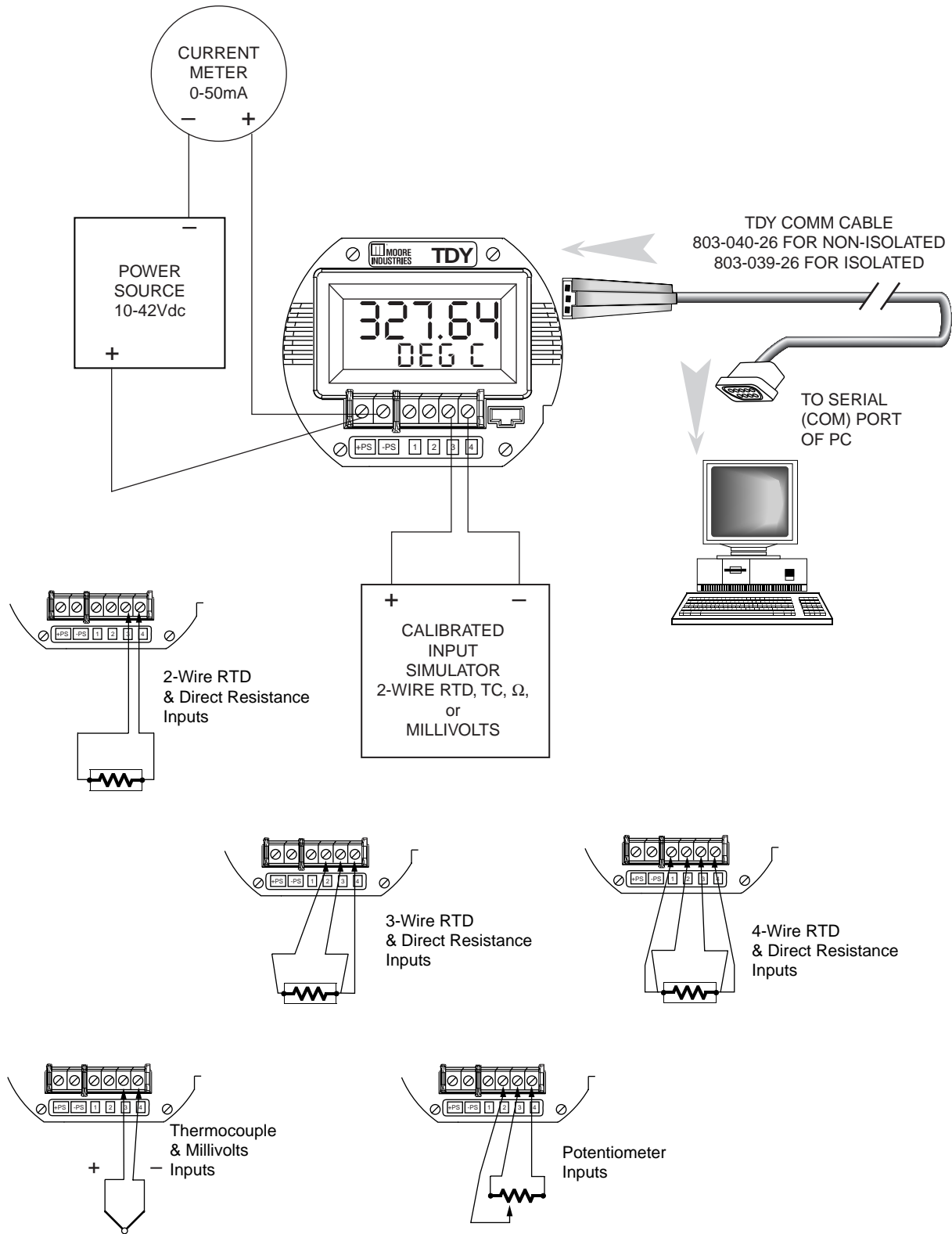
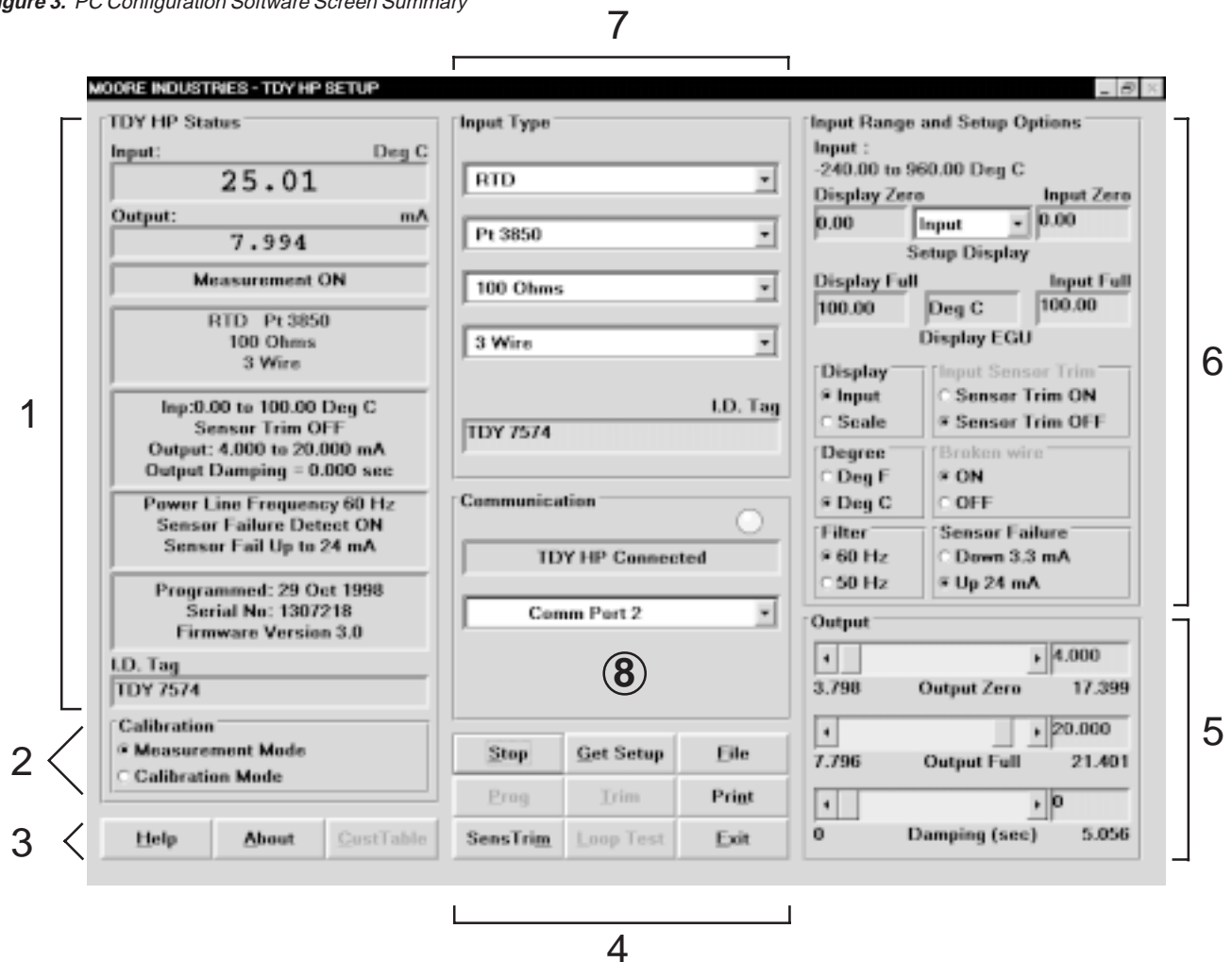


Figure 3. PC Configuration Software Screen Summary



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

2. Calibration Use these radio buttons to change from “Measurement Mode”, the mode that you will be doing all your work from the PC in, 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 TDY Configuration Software. The “CustTable” button allows you to set up a custom linearization table for your TDY.

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 output scaling and damping values of the TRZ. 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 TDY’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 TDY 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 TDY: 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 TDY is connected.

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

Every TDY 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 TDY 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 Configuration Program Main Screen.

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

1. Start the PC program “TRX_TRY_TDY_SIY V3.0 Setup.exe”.

If the transmitter is connected properly, the program will automatically select the correct unit type; TRY, TRX, SIY, or TDY, and after a brief display of a “splash” screen, show the Main Configuration Screen.

2. If the connected transmitter is not identified by the Configuration program, then Figure 4 will appear on your screen. If this occurs:
 - A. Exit the program.
 - B. Check the transmitter's communications cable to make sure it is firmly in place.
 - C. Check the power cable to see if the TDY is receiving power.
 - D. Restart the Configuration Program.

Figure 4. The Configuration Program's 'select unit type' function allows you to run the software even if you don't have a transmitter connected.

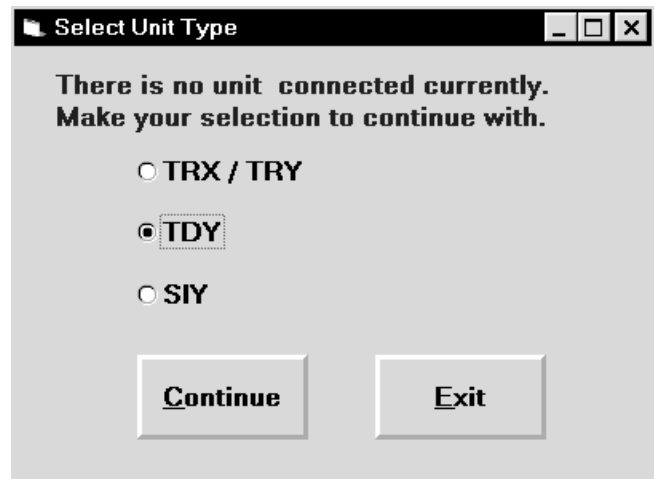


Figure 5. The Configuration Program Automatically Displays its own Default Operating Parameters upon Startup.

Input Type

RTD

Pt 3850

100 Ohms

3 Wire

I.D. Tag

3. Make sure the transmitter is communicating with the Configuration Program properly. Good PC-to-transmitter communication is indicated by the flashing yellow indicator on the Configuration Program screen, and by the message "TDY connected".
4. 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.
5. Click on the "File" button. This enables the File Management set of buttons at the bottom-center of the screen and brings up an Explorer-like set of windows on the left area of the screen.
6. Name the current Configuration File (the one already in the transmitter's memory), by clicking on the "Save" button.
7. Enter the name of the file in which to save the initial transmitter settings (Configuration File) on the PC disk.
Note:
File names must follow the DOS convention; Eight-character maximum, all lower case, no suffix. The Configuration Program adds a suffix to the file name automatically.
8. Use the Explorer-like interface to designate the location on the PC drive (or floppy) for the file to be saved.
9. Click on "Save File"
A message will ask if you want to save the file with that name.
10. 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 7. The "starting point" of the TDY Configuration Process is now saved on the PC disk. If you decide to abort the configuration, this file can always be downloaded back to the transmitter.
11. Click on "Quit" to return to the Main Configuration Screen.

Selecting Input Type, Wiring, etc.

This section explains how to choose the type and configuration of the input to the TDY. 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 10).

To configure the input to the TDY:

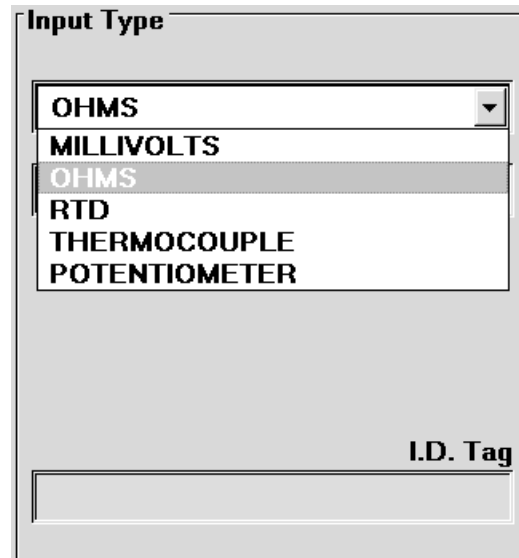
1. Start the PC program “TRX_TRY_TDY_SIY V3.0 Setup.exe”.
If the transmitter is connected properly, the program will automatically choose the correct type of Configuration File to open; TRY, TRX, SIY, or TDY, and after a brief display of a “splash” screen, will show the Main Configuration Screen (see Figure 3, page 9).

Note:

It is not necessary to connect a unit to the PC in order to select and configure the input type.

2. With the Configuration Program Main screen showing (Figure 3), click on the pull-down menu for “Input Type”, in the upper-center of the display.

Figure 6. Choosing the Input Type for the TDY .



Depending upon the type of input chosen, complimentary selections for wiring type, alpha values, etc., are enabled.

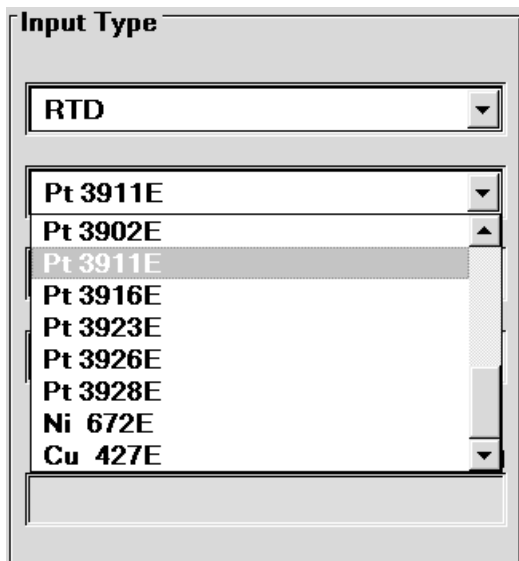
3. Use the other pull-down menus in the Input Type region of the screen to choose:
 - Linearization ON/OFF for Millivolts
 - Number of wires for Direct Ohms
 - Alpha value (α) for RTD
 - Ohms rating (100-1000) for RTD
 - Number of wires for RTD

Note:

The TDY 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 “E09” suffix use standard, 32-bit curves. See Figure 7. 128-bit curves are only available with a TDY hooked up.

Figure 7. Enable 128-bit linearization curves with the “E” designation on selected RTD’s.



IMPORTANT:

Settings on the Configuration Program Screen do not take effect in the unit until the Configuration File is downloaded. Skip to Step 6 for instructions on getting the settings programmed into TDY nonvolatile memory.

4. Select one of these options:
 - a. Download the current settings into the connected transmitter’s memory (Go to Step 6),
 - b. Continue creating a Configuration File by setting other parameters, or
 - c. Save the current settings into a file on disk for later downloading to a transmitter(s). Refer to “Keeping What You’ve Got Safe”, starting with Step 4 on page 11.

5. To start the Download Process, click on the “Stop” button at the bottom-center of the screen. This will enable the “Prog” button.
6. Click on the “Prog” button (Program), to download the settings (specifically, the input type and configuration) from the PC software into the memory of the connected transmitter.

CAUTION:

Any time a connected TDY 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. These previous parameters are unrecoverable. This includes things like tag name, calibration date, trim values, etc.

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 “boop” to indicate that the download was successful.

7. 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, and will show the trimmed values resident in memory.

Scaling the Input (also: Setting Reverse Output)

This parameter allows the user to set the TDY to scale its output in response to a portion of the total range of the selected input type. In a reverse output application, the TDY 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). 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 10).

To set the scaling for the Input to the TDY:

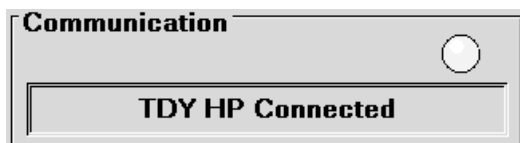
1. Start the PC program “TRX_TRY_TDY_SIY V3.0 Setup.exe”.
If the transmitter is connected properly, the program will automatically choose the correct unit type; TRY, TRX, SIY, or TDY, and after a brief display of a “splash” screen, show the Main Configuration Screen (see Figure 3, page 9).

Note:

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

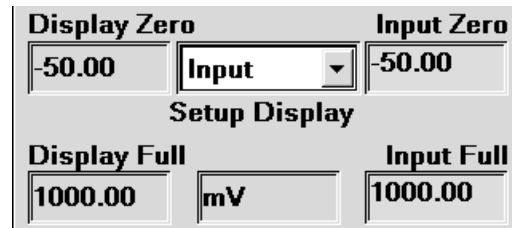
2. If using the Configuration Program without a transmitter connected in the setup, skip to step 4.
3. Make sure the transmitter is communicating with the Configuration Program properly. Good PC-to-transmitter communication is indicated by the flashing yellow indicator on the Configuration Program screen, and by the message “TDY connected”. See Figure 8.

Figure 8. The Communication Menu tells you the current status of the TDY.



4. With the Configuration Program Main Screen showing (Figure 3, page 9), select the “Input Zero” box in the upper right corner of the screen.

Figure 9. The Input Zero/Full menu.



5. Enter the value for the desired percentage Input Zero value from the application where the TDY is to be employed. Press Enter (return).
6. Access the “Input Full” box in the same fashion to set the desired 100% input value.

IMPORTANT:

Settings on the Configuration Program Screen do not take effect in the unit until the Configuration File is downloaded. Skip to Step 10 for instructions on getting the settings programmed into TDY nonvolatile memory.

7. Select one of these options:
 - a. Download the current settings into the connected transmitter’s memory (Go to Step 9), or
 - b. Continue creating a Configuration File by setting other parameters, or
 - c. Save the current settings into a file on disk for later downloading to a transmitter(s). Refer to “Keeping What You’ve Got Safe”, starting with Step 4 on page 11.
8. To start the Download Process, click on the “Stop” button at the bottom-center of the screen. This will enable the “Prog” button.
9. Click on the “Prog” button (Program), to download the settings (specifically, the input type and configuration) from the PC software into the memory of the connected transmitter.

CAUTION:

Any time a connected TDY 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**. These previous parameters are unrecoverable. This includes things like, tag name, calibration date, trim values, etc.

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 “boop” to indicate that the download was successful.

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

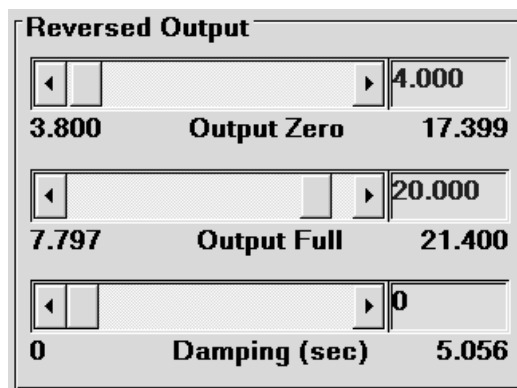
The status area of the Configuration Program screen will display the “Measurement ON” message, and will show the trimmed values resident in memory.

Setting Reverse Output

- a. Select the “Input Full” box (Figure 9).
- 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 10).

Figure 10. Set the Reversed Output using the bars in the bottom right of the Configuration Software Menu.



IMPORTANT:

Settings on the Configuration Program screen do not take effect in the unit until the Configuration File is downloaded. Go back to Step 8 for instructions on how to download a Configuration File to the attached transmitter.

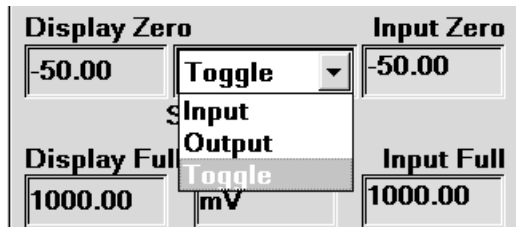
Setting the Display

The TDY has numerous settings for its display, all of which are controlled using the “Input Range and Setup Options” box. You can set the customizable display to display the input, output, or toggle between the two every two seconds. The display will even scale to display any type of engineering units you desire.

Input, Output, and Toggle

The pull-down menu shown below is used to adjust what the TDY displays. There are three settings: “Input”, which causes the TDY to display the input it is receiving, “Output”, which causes the TDY to display the 4-20mA output it is emitting, and “Toggle”, which causes the TDY to switch between displaying Input to Output every two seconds. To switch between these, simply click on the pull-down menu, select the appropriate function, and program the transmitter as described on page 11, starting with step 5.

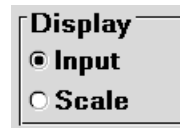
Figure 11. The pull-down menu lets you select what the TDY displays.



Display Zero & Display Full

The display zero and display full show what values will actually be displayed. If the pull-down menu in Figure 11 and the radio button on Figure 12 both have “Input” selected, then Display Zero will match Input Zero and Display Full will match Input Full. The Display columns then cannot be changed except by changing the display value.

Figure 12. Use the Display radio button to switch from standard input display to a scaleable display of any engineering unit type.



Scaling the Display

The TDY can scale its display. This feature is useful when you need to limit, expand, or manipulate the numbers the TDY displays. Doing this also gives you the option of changing the engineering units being displayed to any engineering unit type.

Scaling the input display is a simple procedure. First, click “Scale” on the radio button in Figure 12. (Note that if you have the pull-down menu in Figure 11 set to “Output”, the Display radio button will not be available.) You can then enter values into the “Display Zero”, “Display Full”, and “Display EGU” boxes. When you have entered the appropriate values, program the TDY with the new information by using the steps on page 11, starting with Step 5.

Scaling the Output

The TDY 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 10).

To set the output scaling for the Input to the TDY:

1. Start the PC program “TRX_TRY_TDY_SIY V3.0 Setup.exe”.

If the transmitter is connected properly, the program will automatically choose the correct type of Configuration File to open; TRY, TRX, SIY, or TDY, and after a brief display of a “splash” screen, show the Main Configuration Screen (see Figure 3, page 9).

Note:

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

2. If using the Configuration Program without a transmitter connected in the setup, skip to step 4.
3. Make sure the transmitter is communicating with the Configuration Program properly. Good PC-to-transmitter communication is indicated by the flashing indicator on the Configuration Program screen, and by the message “TDY connected”.
4. Enter the desired 0% output value (between 3.800mA and 17.400mA) in the “Zero Scale Output” box at the lower right corner of the screen (see Figure 9), or click and drag the slide bar, adjacent to the box, to adjust the value for 0% as desired.
5. Enter the desired 100% output value (between 7.800mA and 21.400mA) in the “Full Scale Output” 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. Skip to Step 8 for instructions on getting the settings programmed into TDY nonvolatile memory.

6. Choose from one of these options:
 - a. Download the current settings into the connected transmitter’s memory (Go to Step 7),
 - b. Continue creating a Configuration File by setting other parameters, or
 - c. Save the current settings to a file on disk for later downloading to a transmitter. Refer to “Keeping What You’ve Got Safe”, starting with Step 4 on page 11.
7. To start the Download Process, click on the “Stop” button at the bottom-center of the screen. This will enable the “Prog” button.
8. Click on the “Prog” button (Program), to download the settings (specifically, the input type and configuration) into the memory of the connected transmitter.

CAUTION:

*Any time a connected TDY 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.*

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 “boop” to indicate that the download was successful.

10. 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, and will show the trimmed values resident in memory.

Trimming the Input

Use this feature of the TDY to enhance the accuracy of the transmitter by precisely matching its actual reading of the input to its scaling of the 0% and 100% input settings.

The Configuration program affords two methods for trimming input.

Method 1

The recommended method is for the user to “capture” both zero and full scale input (presumably, using the actual sensor from the intended application).

Method 2

Alternatively, the user can capture *either* zero or full scale, and *enter* (type in) the complimentary value for zero and/or full scale directly into the Configuration File using the Zero and/or Full Scale entry boxes. This alternative method, while saving time and the effort of cycling the input between 0 and 100%, results in a slightly less accurate trim.

Note:

You must have a TDY connected and communicating with the Configuration Program, plus a source of input, to trim the TDY input.

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

Make sure that the transmitter being calibrated is connected in the setup as shown in Figure 2, that the setup has stabilized (about 10 minutes), then:

1. Start the PC program “TRX_TRY_TDY_SIY V3.0 Setup.exe”.

If the transmitter is connected properly, the program will automatically choose the correct type of Configuration File to open; TRY, TRX, SIY, or TDY, and after a brief display of a “splash” screen, show the Main Configuration Screen (see Figure 3, page 9).

2. Make sure the transmitter is communicating with the Configuration Program properly. Good PC-to-transmitter communication is indicated by the flashing yellow indicator on the Configuration Program screen, and by the message “TDY HP Connected”. See Figure 8 on page 14.

3. ***IMPORTANT:*** Make sure the Input Type and any scaling (input or output) showing in the “Input Status” section of the Configuration Screen matches the parameters showing on the rest of the screen.

If the parameters do not match, program (download the parameters currently showing on the Configuration Screen) the connected TDY with the correct input type and configuration **before attempting to trim the sensor input.**

During the Trimming process, the transmitter “reads” the input, assuming that it is coming from the configured input type. If this information is not valid, any trim values subsequently loaded into the transmitter’s memory could result in significant inaccuracies during operation.

If all the parameters match, skip to Step 5.

If the parameters showing in the “Input Status” section of the Configuration Screen do not match the rest of the screen, click on “Get Setup” to load the transmitter settings into the Configuration Program from the transmitter’s memory.

4. Click on the “Program” button.
5. When the information on the “Input Status” section of the screen matches the parameters shown on the rest of the screen, click on the “Start” button. This enables the TDY whose input is being trimmed to begin monitoring the sensor or sensor simulator.
6. With the connected transmitter monitoring the source of input, click on the “SensTrim” button on the bottom of the screen.
7. Begin trimming by clicking on the “Sensor Trim ON” radio button. The “Zero Trim” and “Full Trim” capture buttons will be enabled by this action.
8. To capture Zero Trim, go to Step 9. To capture Full Scale Trim go to Step 13.
9. Adjust the input (from the sensor or simulator) to the TDY to the 0% level for the intended application.

Note:

Make sure to monitor the input separately. Do not use the input reading shown on the Main Configuration Screen.

10. Allow the 0% input to stabilize (consult the manufacturer's documentation for the recommended stabilization period).
11. Click on the "Zero Trim" button to capture the reading. After a brief pause, the captured input trim value is shown in the "Zero Captured" box of the Configuration Screen.

Figure 13. Trim Capture Box

Zero captured -20.65	ZeroTrim	Input Zero -20.65
Full captured 65.15	FullTrim	Input Full 65.15

12. (OPTIONAL) Enter the Zero Scale Input value in the box shown in Figure 13. This is the offset value for the input in the transmitter's intended application. The user can choose from three courses of action at this point.

CHOICE A: Continue the Input Trimming process and capture the Full Scale Trim. Skip to Step 13.

This method takes time (since the input must be adjusted to the 100% level from the application), but produces the greatest accuracy. Moore Industries suggests using this method to achieve optimum TDY performance.

CHOICE B: Use the "Full Scale Input" setting as the "Full Scale Trim" value. Skip to Step 22, page 20.

This is a kind of "cheating" method, making it possible for the user to "trim" the full scale parameter for the 100% input without having to cycle the *actual* input to 100%. This method is not the preferred choice. It is inherently less accurate than capturing the actual 100% trim value (CHOICE A). It does, however, save time.

CHOICE C: Cancel the Input Trimming process altogether. Skip to Step 26.

13. **CHOICE A:** To continue trimming the input to the TDY using the readings taken from the sensor, adjust the actual input of the TDY to 100% of scale for the intended application.

Note:

Make sure to monitor the input separately. Do not use the input reading shown on the Main Configuration Screen.

14. Allow the 100% input to stabilize (consult the manufacturer's documentation for the recommended stabilization period).
15. Click on the "Full Trim" button to capture the reading. After a brief pause, the captured input trim value is shown in the "Full Captured" box.
16. (OPTIONAL) Enter the value for the Full Scale Trim value in the "Input Full" box.
17. Click on the "QuiSeTrim" button (Quit Sensor Trim).

The following message appears:

Figure 14. *Sensor Trim Changed Dialog Box*



This is a reminder that it is necessary to program the connected transmitter before any of the trim values actually begin to function.

IMPORTANT:

Settings on the Configuration Program Screen do not take effect in the unit until the Configuration File is downloaded. Skip to Step 19 for instructions on getting the settings programmed into the TDY nonvolatile memory.

18. Either:

- a. Download the current settings into the connected transmitter's memory (Go to Step 20),
- b. Continue creating a Configuration File by setting other parameters (Go to Step 22), or
- c. Save the current settings into a file on disk for later downloading to a transmitter(s). Refer to "How to Keep What You've Got Safe", starting with Step 4 on page 11.

19. To start the Download Process, click on the "Stop" button at the bottom-center of the screen. This will enable the "Prog" button.
20. Click on the "Prog" button (Program), to download the settings (specifically, the input type and configuration) into the memory of the connected transmitter.

CAUTION:

*Any time a connected TDY 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**. These parameters are unrecoverable.*

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

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 "boop" to indicate that the download was successful.

21. 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, and will show the trimmed values resident in memory.

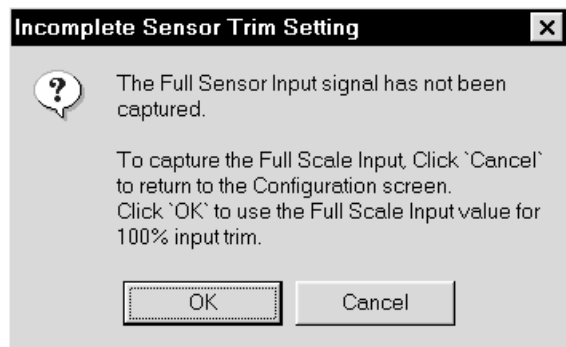
22. **CHOICE B:** Use the "Full Scale Input" setting as the "Full Scale Trim" value.

With the Zero Input Trimmed and Scaled, it is possible to enter a value in the "Full Scale Input" box, and to exit Input Trimming process now, using this entered value for the Full Scale Trim setting. This method, while less accurate, saves the time of having to cycle the input sensor from 0% to 100%.

Enter the desired 0% trim value in the "Full Scale Input" box.

23. Click on “QuitSeTrim” button. The following message appears:

Figure 15. Warning the User About Using the Full Scale Input for Trimming



24. To return to the Input Sensor Trimming Process or to Cancel all Input Sensor Trimming, skip to Step 26.

To quit the Input Sensor Trimming process with the captured Zero Trim intact and the Full Scale Trim taken from the entered Full Scale Input, click “OK”. The message from Figure 14 then appears.

This is a reminder that it is necessary to program the connected transmitter before any of the trim values actually begin to function.

IMPORTANT:

Settings on the Configuration Program Screen do not take effect in the unit until the Configuration File is downloaded. Skip back to Step 19 on page 200 for instructions on getting the settings programmed into TDY nonvolatile memory.

25. Either:
 - a. Download the current settings into the connected transmitter’s memory (Go back to Step 19 on page 20), or
 - b. Save the current settings into a file on disk for later downloading to a transmitter(s). Refer to “Keeping What You’ve Got Safe”, starting with Step 2 on page 10.
26. **CHOICE C:** To quit the Input Sensor Trim process without setting up any trim parameters, click on the “QuitSeTrim” button.

Note:

To return to the Input Trimming process, click “OK”, then re-enter the Input Trimming process (Step 7). Otherwise, continue with Step 27.

27. Click “Cancel”.
This returns the program to the Main Screen.
28. Click on the “Sensor Trim OFF” button:
29. Either:
 - a. Download the current settings into the connected transmitter’s memory (Go back to Step 19 on page 20), or
 - b. Save the current settings into a file on disk for later downloading to a transmitter(s). Refer to “Keeping What You’ve Got Safe”, starting with Step 2 on page 10.

Verifying Input Trim

Use this procedure to make sure that the TDY transmitter that was trimmed using the procedure starting on page 18 is functioning within rated specifications.

1. Make sure the transmitter being checked is connected to the equipment listed in Table 2 (page 7) as shown in Figure 2 (page 8).

Make sure that the setup has had time to stabilize (about 10 minutes), and that the transmitter and the PC being used are communicating properly.

2. Start the PC program "TRX_TRY_TDY_SIY V3.0 Setup.exe".

If the transmitter is connected properly, the program will automatically choose the correct type of Configuration File to open from the list: TRY/TRX, TDY, or SIY.

If the connected transmitter is mis-identified by the Configuration program, refer to the sub-procedure on page 10, starting with step "A", "Exit the program..."

3. Make sure the transmitter is communicating with the Configuration Program properly. Good PC-to-transmitter communication is indicated by the flashing indicator on the Configuration Program screen, and by the message "TDY connected". See Figure 8, page 14.

4. Click on the "Get Setup" button on the bottom of the Configuration Program screen.

This loads the parameters from the transmitter's memory. The settings for input trim and scaling shown on the right side of the Configuration Program screen should match those shown on the left side of the screen in the "Status" section.

5. Adjust the input to the TDY to the zero percent level of the selected range.
6. Note the TDY reading of the input shown in the "Input" box of the Configuration Program.

The reading should be within the rated accuracy specification for that range, as listed in Table 1 (page 3).

7. Calculate the 50% level for the selected range, and adjust the input to that point.
8. Repeat Step 6.
9. Adjust the input to the 100% level of the selected range.
10. Repeat Step 6.

If the readings shown in the "Status" box of the Configuration Program are not within the accuracy ratings listed in Table 1 (page 3), perform the Input Trimming procedure starting on page 18. If, after completing the procedure for trimming the input, the transmitter is still performing outside the listed accuracy parameters, consult the factory.

Trimming the Output

This facility of the TDY Configuration Program allows the user to provide an offset and scale for the transmitter to compensate for minor inaccuracies in monitoring equipment “downstream” in the instrumentation loop.

Note:

The TDY must be connected in the setup shown in Figure 3 in order to trim the output. It is not possible to trim the TDY output without having the transmitter connected and communicating with the Configuration Program, and without an external means of monitoring the transmitter’s output.

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 10).

Make sure that the transmitter being calibrated is connected in the setup as shown in Figure 3, that the setup has had time to stabilize (about 10 minutes), then:

1. Start the PC program “TRX_TRY_TDY_SIY V3.0 Setup.exe”.

If the transmitter is connected properly, the program will automatically choose the correct type of Configuration File to open; TRY, TRX, SIY, or TDY, and after a brief display of a “splash” screen, show the Main Configuration Screen (see Figure 3, page 9).

2. Make sure the transmitter is communicating with the Configuration Program properly. Good PC-to-transmitter communication is indicated by the flashing indicator on the Configuration Program screen, and by the message “TDY connected”.
3. **IMPORTANT:** *Make sure the Input Type and any scaling (input or output) showing in the “Input Status” section of the Configuration Screen matches the parameters showing on the rest of the screen.*

If the parameters do not match, make sure to program (download the parameters currently showing on the Configuration Screen) the connected TDY with the correct input type and configuration **before attempting to trim the sensor input**. During the Trimming process, the transmitter “reads” the input, assuming that it is coming from the configured input type. If this information is not valid, any trim values subsequently loaded into the transmitter’s memory could result in significant inaccuracies during operation.

If all the parameters match, skip to Step 5.

If the parameters showing in the “Input Status” section of the Configuration Screen do not match the rest of the screen, click on “Get Setup” to load the settings from the transmitter’s memory into the Configuration Program.

4. Click on the “Program” button.

CAUTION:

*Any time a connected TDY 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**. These old parameters are unrecoverable.*

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

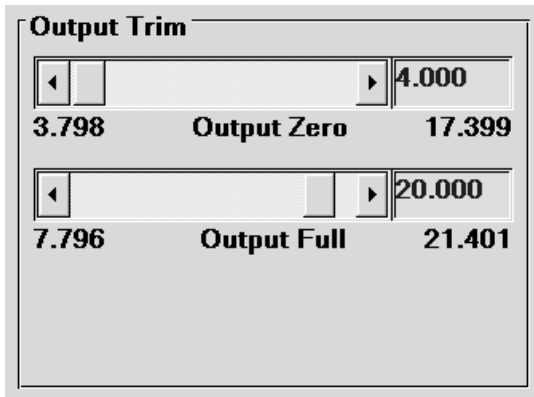
5. With the Configuration Program and the Transmitter communicating properly, and with the correct sensor configuration displayed on the screen, click the “Stop” button.

This stops the transmitter’s monitoring of the input, so that it’s output will remain stable during the trimming process.

6. Click on the “Trim” button.

This enables the Trim adjustments in the lower-right corner of the Configuration Program Main Screen.

Figure 15. The Output Trim box.



7. Monitor the TDY transmitter's output.
8. Select and enter (or use the slide bar to adjust) the desired value for the 0% output trim by clicking on the "Zero Scale Output" box.

Adjust the Zero Scale Output up or down until the TDY output at 0% of scale is within desired tolerances, based on the observed output on the external meter.

9. Repeat the process for the Full Scale Trim.

Notice that the field name for whichever output value is being adjusted changes color when selected.

Note:

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

10. When the output is adjusted as desired, click on the "Quit Trim" button.

The lower-right area of the Configuration screen will return to normal.

11. Click on the "Prog" (Program) button to download the output trim settings into the transmitter memory.

CAUTION:

*Any time a connected TDY 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**. These old parameters are unrecoverable.*

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

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

There are several “radio buttons” on the TDY 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 calculate 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 and from the display if the “Input” option in the “Display” section is selected.

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 TDY transmitter 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 TDY transmitter 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 TDY 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 “TDY 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 calibrators and input sources. To permanently disable this feature when the TDY is working in a millivolt input configuration, set the “Broken Wire” radio button in the center-right section of the Configuration Screen to OFF.

Working with a Thermocouple or RTD Input

Total Sensor Diagnostics can also cause problems with some types of temperature calibrators. It is not possible to disable the feature by setting the “Broken Wire” radio button to OFF, as with millivolt inputs.

Instead, 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.

Note:

It is not possible to set a TDY transmitter into Calibration Mode (Sensor Diagnostics OFF) permanently. The “Calibration Mode” setting remains in effect only until a Configuration File is downloaded to the transmitter.

Working with a Configuration File

Also, when working with a Configuration File, it may be necessary to turn off Total Sensor Diagnostics in order to complete the settings for one or another aspect of transmitter operation. To do this, click on the “Stop BW” (Stop Broken Wire Detection) button when it is active on the bottom of the screen.

Setting Output Damping

The Output Damping function of the TDY allows the user to introduce a delay into the response of the transmitter in order to minimize the effect of any input oscillations on the output. The higher the damping value (set in seconds), the longer the TDY 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. The maximum allowable damping value is 5.056 seconds.

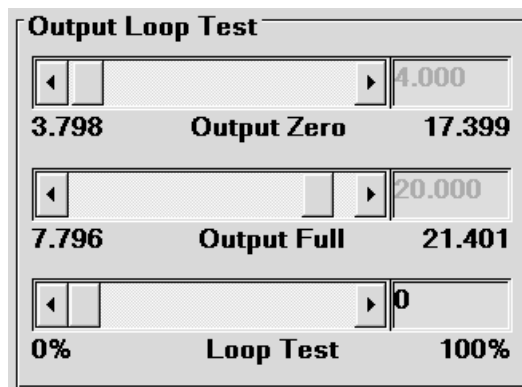
Using the Loop Test

The TDY 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 TDY 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 TDY 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 16. The Output Loop Test scroll bars.



Creating a Custom Linearization Table

The TDY supports user-defined linearization of millivolt inputs. Up to 85 input/output points can be defined, and the user can also specify the format and engineering units of the output.

This section explains how to create a Custom Linearization Table for downloading into TDY memory.

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 10).

Note:

The Custom Linearization Table feature of the TDY is available only when Millivolts input type is selected.

To create a Custom Linearization Table:

1. Start the PC program “TRX_TRY_TDY_SIY V3.0 Setup.exe”.
If the transmitter is connected properly, the program will automatically choose the correct type of Configuration File to open; TRY/TRX, TDY, or SIY, and after a brief display of a “splash” screen, show the Main Configuration Screen (see Figure 3, page 9).

Note:

It is necessary to connect a unit to the PC in order to create a Custom Linearization Table.

2. With the Configuration Program Main Screen showing (Figure 3), click on the pull-down menu for “Input Type”, in the upper-center of the display, and choose “Millivolts”.
3. Use the pull-down menu to set “Linearization ON”. This enables the “CustTabl” button in the lower-left area of the Configuration Main Screen.
4. Click on the “CustTabl” (Customize Linearization Table) button. This causes the Configuration Program to change its upper-right corner area to accommodate the table shown in Figure 17.

Figure 17. Example, The Custom Linearization Table

Point	Inp mV	Out EGU
1	-25.00	4.0
2	-10.00	4.8
3	5.00	5.6
4	20.00	6.4
5	35.00	7.2
6	50.00	8.0
7	65.00	8.8
8	80.00	9.6
9	95.00	10.2
10	110.00	11.0
11	125.00	11.8

mV/G: +/- 99999.9 EGU: Output Format: Points: 20

Restore Save Delete

5. 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.
6. Use the “Restore” button to reset the table.

Caution:

Restoring the mvolt.bin file erases any values in the table, overwriting them with whatever is currently being stored in mvolt.bin.

7. Use the “Save” button to save the table in a file called “mvolt.bin”. The file can be re-named later using Windows’ Explorer.
8. Use the “Delete” button to delete the file and all its values from the PC disk/memory.
7. Use the “EGU”, “Output Format”, and “Points” fields to set the Engineering units of the readout from the transmitter when connected to the Configuration Program.
8. Set the “Output Format” field to the desired resolution using the pull-down menu.
9. Enter the number of points to use to constitute the Linearization Table in the “Points” field.

The Rules for Custom Linearization:

- The values entered in either column must be sequential. That is, numbers CANNOT go “1” followed by “3” followed by “1.765” followed by “3.5” followed by “2”, etc.
- The difference between any consecutive values in the table (in either column) must be less than 50% of the entire configured range.
- One “Output EGU” value per “Input mV” value only.
- 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).

Note:

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

10. When the table is complete, click on the “Save” button to keep a copy of it on disk for future reference/download.

IMPORTANT:

To make the Linearization Table entered available for downloading to a connected TDY, the file **MUST** be saved before quitting the Custom Linearization process.

11. Click on “QuitTable” to stop adding Linearization Values.

IMPORTANT:

Quitting the Linearization process before saving the table **erases** any values entered.

The upper-right area of the Configuration Screen will return to “normal”.

12. Click on the “Prog” (Program) button to download the output trim settings into the transmitter memory.

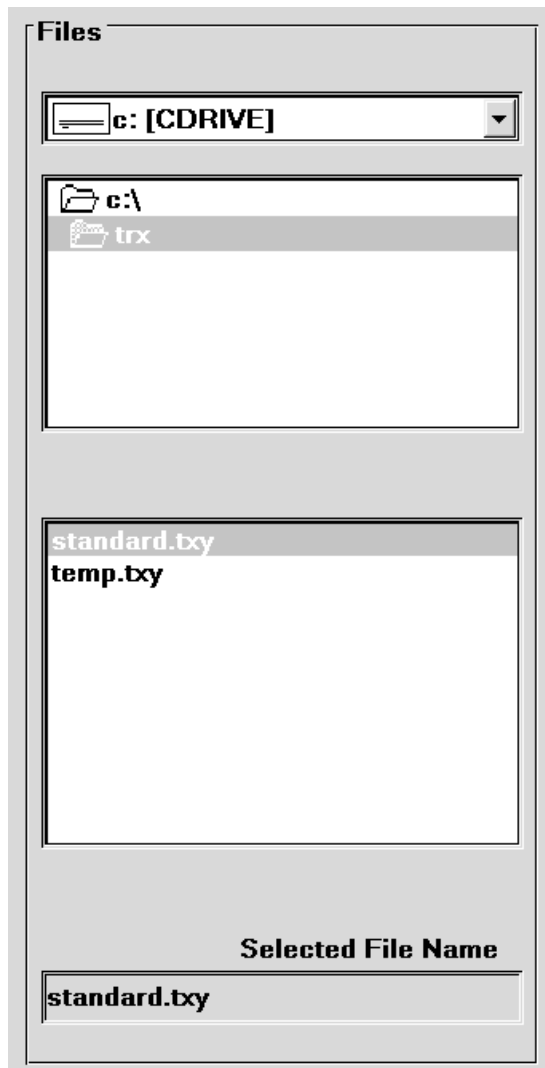
CAUTION:

Any time a connected TDY 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**. These old parameters, which includes things like tag name, calibration date, and trim values, are unrecoverable.

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 18. The File Menu.



Saving a Configuration File to Disk

1. Click on the “File” button. This enables the File Management set of buttons at the bottom-center of the screen and brings up an Explorer-like set of windows on the left area of the screen. (See Figure 18).
2. Name the current Configuration File (the one already in the transmitter’s memory), by clicking on the “Save” button.

3. Enter the name of the file in which to save the initial transmitter settings (Configuration File) on the PC disk.

Note:

File names must follow the DOS convention. Eight-character maximum, all lower case, no suffix. The Configuration Program adds a suffix to the file name automatically.

4. Use the Explorer-like interface to designate the location on the PC drive (or floppy) for the file to be saved.
5. Click on “Save File”.
6. 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 3 resident on disk.

Retrieving a Configuration File from Disk

1. From the Configuration Program Main Screen, click on the “File” button to bring up the File Management portion of the program.
2. Use the Explorer-like file display to locate the file to be retrieved.
3. Click on the “Load” button.

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 TDY.

Retrieving a Configuration File from the Connected TDY

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

The Configuration Program 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.

Installing and Connecting the TDY

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

The TDY is available only in the HP 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 housing that best suits your application.

Connecting the TDY in an Application

Moore Industries suggests installing the TDY 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.

Ground Wiring Recommendations

The following ground wiring practices must be followed to ensure proper performance of the TDY in any application.

- Any Moore Industries product in a metal case or housing must be grounded.
- All input signals to, and output signals from, Moore Industries' products should be connected using a shielded, twisted pair technique. Shields should be connected to an earth or safety ground at the unit itself.
- The maximum allowable length of any unshielded portion of the input and/or output connections is 2 inches (50.8 mm).

CE Conformity

Installation of any Moore Industries products that carry the CE certification (Commission Electrotechnique) **must** adhere to guidelines set forth in the applicable EMC (Electromagnetic Compatibility) directives EN55011, EN50082-1, and EN50082-2, etc.

Figure 18. The Dimensions of the HP housing for the TDY unit.

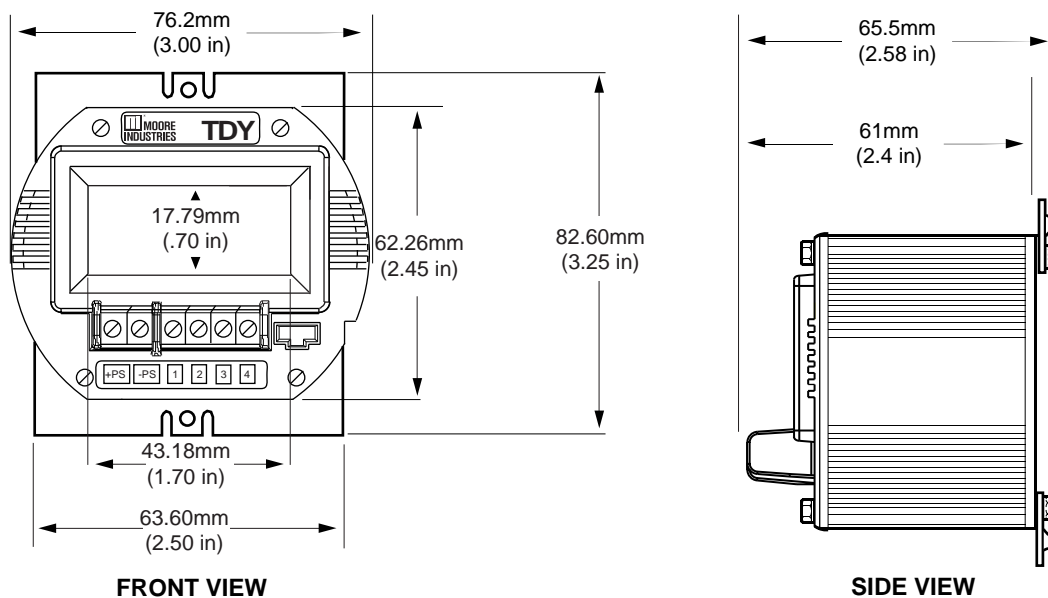


Figure 19. The Dimensions of the D-Box housing for the TDY unit.

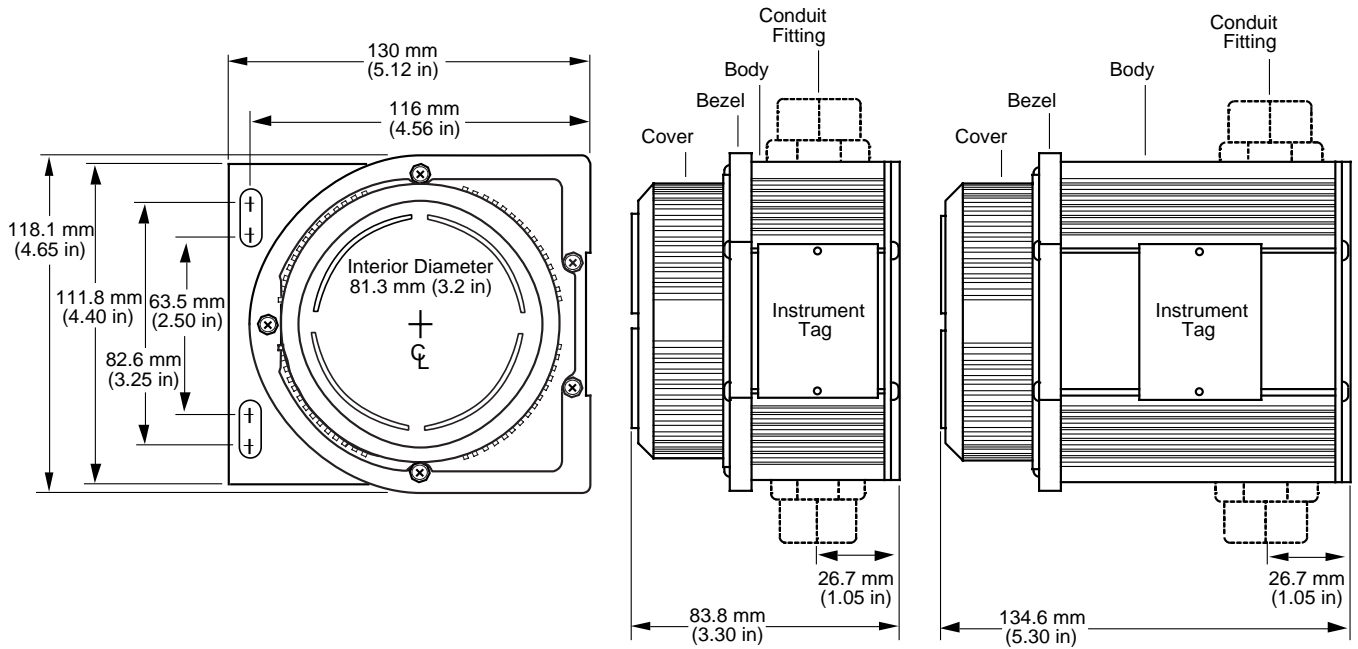
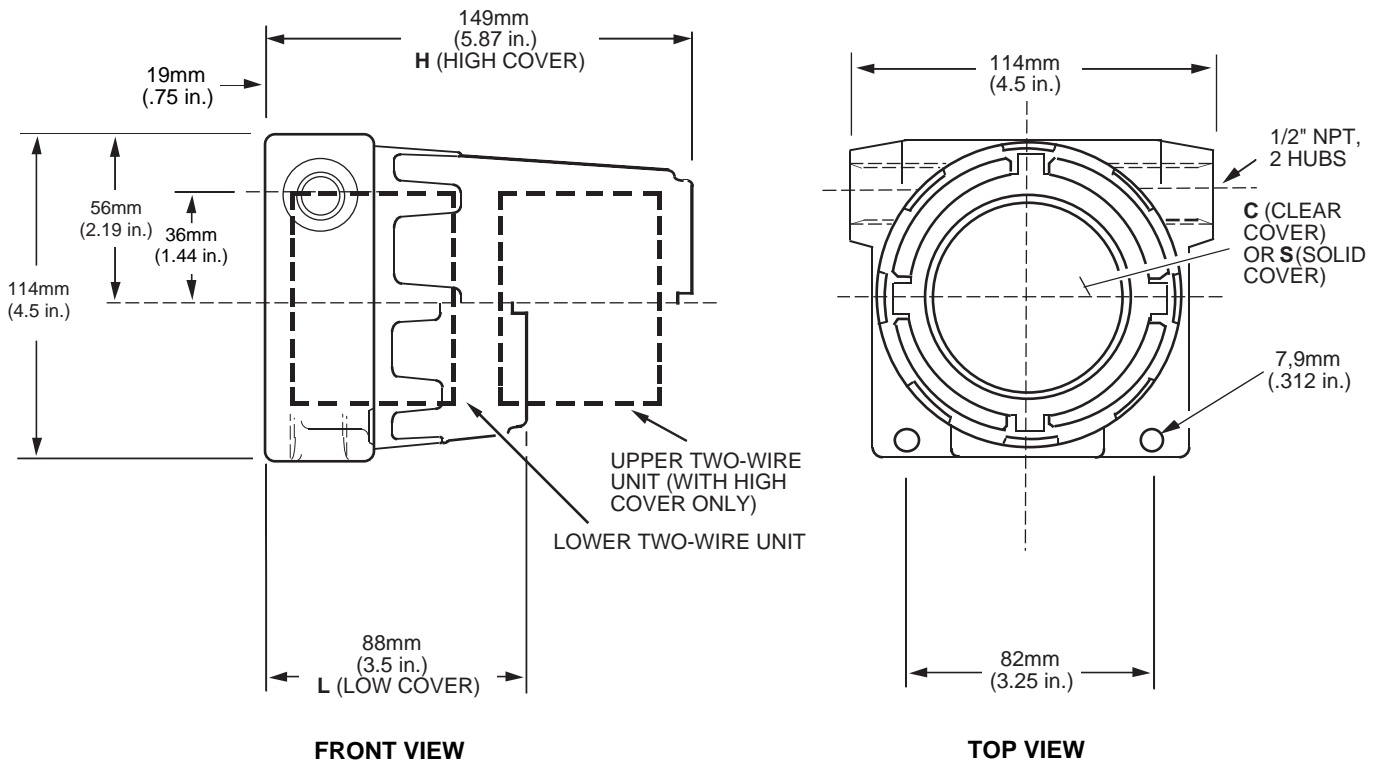


Figure 20. The Dimensions of the explosion-proof housing for the TDY unit.



Operating the TDY

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

Maintaining the TDY

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 TDY

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 TDY. 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 TDY, 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)
- The job number
- The purchase order or invoice under which the unit(s) was(were) ordered

Appendix A—Turning Off Other Programs in Windows

Before installing the TDY Configuration Program, Moore Industries strongly suggests temporarily “turning off” any terminate-and-stay-resident (TSR) programs already running in the Windows environment.

Reboot/Restart the PC after completing the software installation to reactivate TSR’s. (Common TSR’s include office suites, virus detection packages, and utility programs.)

The TDY software installation program uses certain Visual Basic Dynamic Link Libraries (DLL’s) that can, on occasion, conflict with the operation of these programs. In these cases, the installation software returns an error message and aborts.

Windows V3.1—Before running “setup.exe” from the floppy disk:

1. Open (double-click) the “startup” program group on the desktop.
2. Move (as opposed to copy) any icons or files in that program group to a temporary program group of your choice. Make a note of which temporary group you use, so that you can retrieve the programs after the TDY software installation is complete.
3. Restart Windows.
4. Install the TDY Configuration software. Refer to the instructions on page 6.
5. After the Configuration Program has been successfully installed, return to the desktop and restore the programs moved in Step 2 to their original location (in the Startup program group).
6. Restart Windows.

Windows ‘95, ‘98, and NT—Before running “setup.exe” from the floppy disk:

1. Click on the “Start” button/menu on the desktop.
2. Click on “Settings”.
3. Click on “Taskbar”.
4. Click on the “Start Menu Programs” tab.
5. Click on the “Advanced” button.
6. Click on the “+” (plus sign) next to the folder/program group named “Programs”.
7. Open the folder named “Startup”.
8. Move (as opposed to copy) any icons or files in that program group to a temporary program group of your choice. Make a note of which temporary group you use, so that you can retrieve the programs after the TDY software installation is complete.
9. Close all windows and/or dialog boxes.
10. Restart Windows.
11. Install the TDY Configuration software. Refer to the instructions on page 6.
12. After the Configuration Program has been successfully installed, return to the desktop and restore the programs moved in Step 8 to their original location (in the Startup program group).
13. Restart Windows.

CE Declaration of Conformity CE

EMC Directive 89/336/EEC

- **Manufacturer's Name:** Moore Industries-International, Inc.
- **Manufacturer's Address:** 16650 Schoenborn Street
Sepulveda, CA 91343-6196
USA

Declares that the product(s):

- **Product Name:** TDY

	<u>MODEL</u>	<u>/</u>	<u>INPUT</u>	<u>/</u>	<u>OUTPUT</u>	<u>/</u>	<u>POWER</u>	<u>/</u>	<u>OPTIONS</u>	<u>/</u>	<u>HOUSING</u>
• Model Number(s):	TDY		*		*		*		*		*

* Indicates any input, output, option, power and housing as stated on the product data sheet

- **Conforms to the following EMC specifications:**


EN 50081-2, 1993, Generic Emission Standard, Industrial Environment
EN 50082-2, 1995, Generic Immunity Standard, Industrial Environment

- **Supplementary Information:**

None

20 January 1999

Date



Richard Ojeda
Quality Assurance Manager



Robert Stockham
Moore Industries-Europe General Mgr.

RETURN PROCEDURES

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.

WARRANTY DISCLAIMER

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.



The Interface Solution Experts • www.miinet.com

United States
Tel: (818) 894-7111
FAX: (818) 891-2816

Australia
Tel: (02) 9525-9177
FAX: (02) 9525-7296

Belgium
Tel: 03/448.10.18
FAX: 03/440.17.97

The Netherlands
Tel: (0)344-617971
FAX: (0)344-615920

United Kingdom
Tel: 01293 514488
FAX: 01293 536852