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Introduction

This is the user's manual for Moore Industries' TPZ Programmable PROFIBUS Temperature Transmitter. It contains all of the information needed to configure, install, operate and maintain the TPZ.

About this Manual

Pay particular attention wherever you see a "<u>Note</u>", "<u>Caution</u>" or "<u>WARNING</u>".

<u>Note</u> - Information that is helpful for a procedure, condition or operation of the unit.

<u>Caution</u>– Hazardous procedure or condition that could damage or destroy the unit.

<u>WARNING</u>-Hazardous procedure or condition that could injure the operator.

The TPZ

The TPZ is a 2-wire (loop-powered), user-configurable, PROFIBUS-based temperature transmitter. It allows you to network multiple transmitters on one link that utilitzes the PROFIBUS protocol. The TPZ configures to accept a direct input from sensors and a wide array of transmitters and instruments. It then converts the input to a two-way, all digital communication protocol that is ready for direct interface with an AMS, DCS and other computer-based SCADA systems.

The TPZ's size, accuracy and compatibility make it the ideal solution when measurements must be made in remote or otherwise difficult-to-access locations.

Note:

This document describes configuration of the TPZ using both a Device Description and Moore Industries' Intelligent PC Configuration Software. All configurable parameters may be set using either method. Please refer to the appropriate section for your configuration method.

Model and Serial Numbers

Moore Industries uses the model and serial numbers of our instruments to track information regarding each unit that we sell and service. If a problem occurs with your instrument, check for a tag affixed to the unit listing these numbers. Supply the Customer Support representative with this information when calling.



Specifications

Performance	Input Accuracy: Refer to	Performance	Power Supply Effect:	Display	Format: I wo rows of five
	Table 4	(Continued)	±0.002% of span per 1V	(Continued)	alphanumeric characters
	Overall Accuracy: The		change		Decimal Points: Auto-
	overall accuracy of the unit		Load Effect: N/A		matically adjusted decimal
	is the input accuracy. It		T/C Input Impedance:		point with a user selectable
	includes the combined		40Mohms, nominal		maximum up to four places
	effects of linearity, hyster-		Excitation Current:		Range: -99999 to 99999
	esis, repeatability and		RTD and Ohms,		Minimum Display Span:
	adjustment resolution. It		250 microamps, ±10%		1.00
	does not include ambient		RTD Lead Wire		
	temperature effect. For T/C		Resistance Maximum:	Ambient	Operating and Storage
	input, add the RJC error.		RTD resistance + 2X lead	Temperature	Range: -40°C to +85°C
	Reference Junction		wire resistance		(-40°F to +185°F)
	Compensation: ±0.45°C		<4000 ohms; Recom-		Relative Humidity:
	(±0.81°F)		mended lead wire		0-95%, non-condensing
	Stability: Refer to Table 1		resistance for three wire		Ambient Temperature
	Isolation: 500Vrms		connections: <35 ohms/		Effect: Refer to Table 2
	between input, output and		wire; 10 ohm copper		Effect on Reference
	case continuous, and will		sensor <5 ohms		Junction Compensa-
	withstand a 500Vrms		Sensor Lead Resis-		tion: ±0.005°C of input
	dielectric strength test for		tance Effect: 1.0 ohm in		span/°C change of ambient
	one minute (with no		reading/ohm of lead		temperature
	breakdown)		resistance for 2-wire		RFI/EMI Immunity:
	Step Response Time:		sensors; 1.0 ohm in		20V/m@80-1000MHz,
	500msec, maximum, from		reading/ohm of lead of		1kHz AM when tested
	the time an input is applied		unbalanced resistance		according to IEC 1000-4-
	until the time the corre-		for 3-wire sensors; no		3-1995 with 0.5% of span
	sponding floating point		effect on 4-wire sensors		or less
	processed variable is		Resolution: Input, 20-bit		Startup Time: Perfor-
	available to be read by other		Supply Range: 9-32V		mance falls within
	PROFIBUS devices				specification 8 seconds
	Over-voltage Protection:	Display	Type: Top Row, 10mm		after power is applied
	Input, ±5Vdc peak, maxi-		(0.4 in) high black digits		Noise Rejection:
	mum		on a reflective back-		Common mode,
	Digital Input Filter:		ground; Bottom Row,		100dB@50/60Hz; Normal
	50/60 Hz (user-selectable)		omm (0.225 in) high digits		Mode: Refer to Table 3
	Power Supply Require-		on a reflective back-	M	
	ment: 9-32Vdc, 12.07mA		grouna; I wo-digit	weight	235g (8.3 oz)
	maximum under normal		PROFIBUS address		
	operation; 18mA maximum		indicator		
	under fault conditions				

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Specifications and information subject to change without notice.

Table 1.Long-Term Stability Table

Stability (% of maximum	Input to PROFIBUS			
span)	1 yr	3 yrs	5 yrs	
T/C, mV	0.008	0.014	0.019	
RTD, Ohm, Potentiometer	0.047	0.081	0.104	

Table 2. Ambient Temperature Effects Table

Sensor Type	Digital Accuracy per 1°C (1.8°F) change in Ambient
RTD	0.003°C
T/C	0.003°C + 0.005% of reading
Millivolt	0.005mV + 0.005% of reading
Ohm	0.002 ohms + 0.005% of reading

Table 3. Normal Mode Rejection Ratio Table

Sensor Ty	vpe	Max. p-p Voltage Injection for 70dB at 50/60Hz
T/C: J, K, N,	, C, E	150mV
T/C: T, R, S	S, B	80mV
Pt RTD: 100, 200	, 300 ohms	250mV
Pt RTD: 400, 500,	1000 ohms	1V
Ni: 120 oh	ims	500mV
Cu: 9.03 ol	hms	100mV
Resistance	mV	
1-4kohms 250-1000		1V
0.25-1kohms 62.5-250		250mV
0.125-0.25kohms	31.25-62.5	100mV

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Table 4.Input and Accuracy Table

Input	Туре	α	Ohms	Conformance Range	Minimum Span	Input Accuracy	Maximum Range	Sensor-to- Transmitter	
			100					Up to ±0.014°C	
				200					(±0.025°F) system accuracy*.
		0.003850	300	-200 to 850°C			-240 to 960°C	*High-accuracy measurements are achieved	
		0.003850	400	-328 to 1562°F			-400 to 1760°F	by using a 4-wire, 1000 ohm platinum RTD with a span of 100°F (50°F minimum)	
			500					calibrated in our sensor- matching calibration bath.	
	Platinum		1000		10°C				
	Fiatilium		100		(10 P)	±0.1°C (±0.18°F)			
RTD			200						
		0.003902	400	-100 to 650°C -148 to 1202°F			-150 to 720°C -238 to 1328°F		
			500						
			1000						
		0.003916	100	-200 to 510°C -328 to 950°F			-240 to 580°C -400 to 1076°F		
	Nickel	0.00672	120	-80 to 320°C -112 to 608°F			-100 to 360°C -148 to 680°F		
	Copper	0.00427	9.035	-50 to 250°C -58 to 482°F		±0.85°C (±1.53°F)	-65 to 280°C -85 to 536°F		
Ohms	Direct Resistance	n/o	0-4000 ohms	0-4000 ohms	10 ohms	±0.4 ohms	0-4000 ohms		
011113	Potentiometer	n/a	4000 ohms	0-100%	10%	±0.1%	0-100%		
	J	n/a	n/a	-180 to 760°C -292 to 1400°F	35°C 63°F	±0.25°C (±0.45°F)	-210 to 770°C -346 to 1418°F		
	к	n/a	n/a	-150 to 1370°C -238 to 2498°F	40°C 72°F	±0.3°C (±0.54°F)	-270 to 1390°C -454 to 2534°F		
	Е	n/a	n/a	-170 to 1000°C -274 to 1832°F	35°C 63°F	±0.2°C (±0.36°F)	-270 to 1013°C -454 to 1855.4°F		
	т	n/a	n/a	-170 to 400°C -274 to 752°F	35°C 63°F	±0.25°C (±0.45°F)	-270 to 407°C -454 to 764.6°F		
T/C	R	n/a	n/a	0 to 1760°C 32 to 3200°F	50°C 90°F	±0.55°C (±0.99°F)	-50 to 1786°C -58 to 3246.8°F		
	s	n/a	n/a	0 to 1760°C 32 to 3200°F	50°C 90°F	±0.55°C (±0.99°F)	-50 to 1786°C -58 to 3246.8°F		
	В	n/a	n/a	400 to 1820°C 752 to 3308°F	75°C 135°F	±0.75°C (±1.35°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	±0.4°C (±0.72°F)	-270 to 1316°C -454 to 2400.8°F		
	С	n/a	n/a	0 to 2300°C 32 to 4172°F	100°C 180°F	±0.8°C (±1.44°F)	0 to 2338°C 32 to 4240.4°F		
Millivolts	DC	n/a	n/a	-50 to 1000mV	4mV	15 microvolts	-50 to 1000mV		





Figure 2. BH Housing Dimensions



TPZ Programmable PROFIBUS Temperature Transmitter

Figure 3. D-Box Housing Dimensions



Table 5. Necessary Equipment Table

Device	Specifications
Variable Input Simulator for Thermocouple, RTD, Millivolt, Potentiometer or Decade Resistance Box	Variable; Accurate to ±0.05% of unit span
PROFIBUS Bus Power	9-32Vdc
Personal Computer	Pentium-based PC, or equivalent with: CD Drive, 4Mb free RAM (8Mb recommended); 20Mb free disk space on hard drive (More RAM & hard disk space is required for Windows 98, NT, 2000,XP or Vista), Operating System: Microsoft Windows [®] 98, NT, 2000, XP or Vista, 1 (one) serial port
Siemens SIMATIC PDM (If using Device Description for configuration)	Version 5.1 or higher (may be purchased from Siemens.com or your local Siemens representative)
Moore Industries PC Configuration Software (If using Moore Industries' software for configuration)	Version 1.0 or higher, successfully installed onto the hard drive
Communication Cable	Part Number: 803-040-26





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Input

TPZ Configuration: Device Description

Note:

The following configuration and usage instructions are based on a TPZ operating in conjunction with Siemens SIMATIC PDM.

Once you have installed the TPZ in parallel within your PROFIBUS system and have installed the DD, you are ready to configure your device. All configurable parameters can be set using Siemens SIMATIC PDM.

The following section describes device installation into your system.

- 1. To include the TPZ into an existing project, skip to Step 6.
- 2. To create a new object, open *Simatic Manager*. Access the *File* dropdown menu and select *New*. In the *New* properties box, enter a name for the project to be created. Select *OK*.
- 3. Open the *View* dropdown menu and select *Process Device Network View*.
- 4. To include your PC into the network if it was not created automatically by the software, rightclick on the *Networks* icon within the *Process Device Network View* page and select *Insert new object* then select *PC*.

- 5. Next, to include a DP interface, right-click on the *Networks* icon within the *Process Device Network View* page and select *Insert new object* then select *PROFIBUS DP net*.
- 6. You will need to insert a new PROFIBUS PA device into the PROFIBUS DP network. Rightclick on the PROFIBUS DP net icon within the Process Device Network View page and select Insert new object; select PROFIBUS PA device. You will need to enter a device name, device address (valid addresses range from 0-125; Moore Industries' default address is 126) and select the number of like devices that should be created.
- 7. Right-click the *PROFIBUS PA* device icon in the right-hand pane of your view then select *Properties.* On the device tab click *New Selection.* Scroll down the list to *Sensors*, and expand the list. Scroll down to *Temperature* and expand the associated list. Select *Moore Industries*, then *TPZ.*
- 8. Double-click the *PROFIBUS PA* device icon and choose whether to sign in as a *Maintenance engineer* or *Specialist.* You are now ready to configure the TPZ.

Configuration Sections

Figure 5. Identification Configuration Section

The following sections describe the configuration parameters of your TPZ. They are broken down into subsections as viewed on the associated configuration sections.

Identification

Parameter	Value	Unit	Status
Moore TPZ Temperat	rure Meter		
» Identification			
» » Operation Unit	B	_	-
TAG	TPZ		Loaded
Descriptor			Loaded
Message			Loaded
» » Device			
Manufacturer	Moore Industries		Loaded
Product designation	TPZ/TPRG/10-30V		Loaded
Serial Number	D		Loaded
Software Revision	1-02-05		Loaded
Hardware Revision	1-03		Loaded
Installation Date	122	1	Loaded
Profile Revision	0x301		Loaded
PROFIBUS Ident Numb	er Profile specific		Loaded
» » » Static Revis	sion No.		
Physical Block	5		Loaded
Transducer Block	5		Loaded
Function Block	10		Loaded
» » Manufacturer	Specific Parameter		
Input Filter	60 Hz	1	Loaded
Filter Size	8		Loaded
LCD Address	hexadecimal		Loaded
LC-Display Selector	OUT		Loaded
CUSTOM EGU			
PV Precision	3 digits		Loaded
Total hours calibration	O	h	Loaded

Operation Unit

This section allows for identifying descriptors that you may assign to your device. These include a *TAG*, *Descriptor and Message*.

Device

The *Device* portion of the screen is primarily a readonly display of the following parameters: *Manufacturer, Product designation, Serial Number, Software Revision, Hardware Revision and Profile Revision.*

The following parameters are user-configurable:

Installation Date– The date on which the specific device was installed.

PROFIBUS Ident Number– Per EN50170, each PROFIBUS-DP device must have an indentifying number provided by the PROFIBUS User Orgnaization (PNO). Using the dropdown menu, you may select which version of this identification number–*Profile Spe*- *cific* (use standard GSD file PA139700.GSD) or *Manufacturer Specific* (use Moore Industries' GSD file MTP2069B.GSD)–that you choose to use.

Static Revision No.

Relating to the PROFIBUS-specific Physical, Transducer and Function Blocks, these values indicate the revision level of the static data associated with the block. The *Static Revision No.* is changed by the device each time data is written to a static parameter (i.e. configuration change).

Manufacturer Specific Parameter

The Manufacturer Specific Parameter section allows you to configure the Input Filter, Filter Size, LCD Address, LC-Display, CUSTOM EGU and PV Precision parameters. Below is a description of each parameter.

Input Filter– This is used to configure the input filter which helps reduce mains-induced noise. The value selected should match the frequency of the local AC supply (50Hz or 60Hz).

Filter Size– This function is utilized to filter the input signal. The TPZ provides this filter with a user-se-lected range between 1 and 16. Default is 8.

Note:

A higher filter setting provides smoother output transitions; however, reduces response time. Conversely, a lower setting provides a faster response time, but may reduce noise rejection.

LCD Address– This determines how the slave address is displayed. You may select between hexadecimal and decimal. In decimal, you may only view addresses up to 99.

LC-Display Selector– Allows you to select the numerical value shown on your TPZ's display. Select between PV (Process Variable), OUT (Output), PV + Custom EGU and OUT + Custom EGU.

CUSTOM EGU– Use this parameter to enter the custom label you wish viewed if selecting *Custom EGU* in the *LC-Display Selector* section.

PV Precision– This parameter allows you to select the precision of the value shown on the TPZ's display. Allowed values are 0, 1, 2, 3 digits or Auto.

Total hours calibration– Allows you to review the number of hours that have passed since the device was last calibrated.

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Input

Figure 6. Input Configuration Section

Parameter	Value	Unit	Status
» Input			
Input Sensor Type	Pt3850 100 Ohm		Loaded
Unit	°C		Loaded
Bias of channel 1	0.000	°C	Loaded
Connection Type	2 wires		Loaded
Line Compensation 1	0.000	ohm	Loaded
Broken Wire Detection	Disabled	line (Loaded
SENSOR TRIM MODE	Sensor Trim disabled(factory default)	-	Loaded
» » Characterization			
» » Output Limit Indica	tor.		
sensor value min 1	0		Loaded
sensor value max 1	0		Loaded
» » Measuring Limits			
Lower Value Min	-240	°C	Loaded
Upper Value Max	960	°C	Loaded
Input Lower Range	-240	°C	Loaded
Input Upper Range	960	°C	Loaded
» » Process Value Scal	e		
Lower Value	-240	°C	Loaded
Upper Value	960	°C	Loaded

The following section describes configuration of the TPZ's input parameters.

Input Sensor Type– Select your input sensor type and wiring connections from the assosciated dropdown menu.

Unit– Choose the temperature unit to be displayed–K, °C, °F or °R.

Bias of channel– This value is algebraically added to your PV reading, before any trimming or custom curve functions have been performed.

Connection Type– Via a dropdown menu, select a 2-, 3- or 4-wire connection to the sensor.

Line Compensation– This only applies to two wire resistance and two wire RTD measurements. Enter a value to compensate for line resistance when using a two wire input. This value is only displayed in ohms.

Broken Wire Detection– During operation, the TPZ sends random microamp pulses through the input wiring to check for broken wiring or a burned out sensor.

Enabling *Broken Wire Detection* allows for this feature. Factory default for thermocouples is *Disabled*; RTD default is *Enabled*. **SENSOR TRIM MODE**– This feature will show the status of sensor trim.

To perform sensor trimming, follow the steps below.

- 1. To set trim mode, select the *Device* dropdown menu, *Sensor Trim*, then *Select Trim Mode*. Choose from: *No action, Sensor Trim disabled* (*factory default*), *Select 1-point Trim Method* or *Select 2-point Trim Method*; click *OK*.
- 2. If 1-point or 2-point Trim Method are selected, you must perform an upload to PC Program to open the new sensor trimming options.
- 3. To enter a new trim point, select Set Trim Point from the Sensor Trim submenu, select Lower (or Upper) Trim Point, then enter a new value in the Input dialog box.

Note:

Setting a new trim point will reset trimming, and require all active trim points to be re-applied.

4. To apply a new value to a trim point, select *Apply new Trim Value* from the *Sensor Trim* submenu, and select *Lower* (or *Upper*) *Trim Point.* When prompted, ensure that the sensor trimming input is set to the lower (or upper) trim point. Click *OK* in order to apply trim values.

Sensor trim is reset whenever the trim mode, or a trim point are changed. After any change that leaves trimming enabled, new trim values will have to be applied to all active trim points in order for trimming to occur.

» Input		_	
Input Sensor Type	Custom Table (mV,Ohm)	1	Changed
Unit	Ohm		
Input Range and Mode	4000 Ohm		
Bias of channel 1	0.000	Ohm	
Connection Type	2 wires		Changed
Line Compensation 1	0.000	ohm	
Broken Wire Detection	Enabled		
» » Sensor Trim			
Sensor Trim Mode	Sensor Trim disabled(factory di	efault)	
» » Characterizati	on		
Min Number of Coordina	at 2		
Max Number of Coordin	at 128		
Number of Coordinates	2		
» » » Custom Cur	ve		
Set Number of Coordina	ate 10		Changed
×[0]	0	Ohm	
y[0]	5		
x[1]	10	Ohm	
y[1]	15		
×[2]	20	Ohm	
y[2]	25		
x[3]	30	Ohm	
y[3]	35		
x[4]	40	Ohm	
y[4]	45		
x[5]	50	Ohm	
y[5]	55		
x[6]	60	Ohm	
у[6]	65		
x[7]	70	Ohm	
y[7]	75		
×[8]	80	Ohm	
y[8]	85		
×[9]	90	Ohm	
y[9]	95		

Figure 7. Custom Curve Configuration Section

Characterization– If Custom Curve is enabled, *Characterization* becomes available. Here, you may set X and Y parameters which can also be viewed in graph format when *Characterization* is accessed from the *View* dropdown menu.

Custom Curve

This section will allow you to enter the X,Y coordinates of the custom table to be used for linearization. The Custom Curve feature lets you set up your own custom curve table. This allows you to tell the transmitter what it should output when it receives a certain input.

Custom Curve can only be used with ohm and millivolt input types.

To create a custom curve:

- 1. Select *Custom Table* from the *Input Sensor Type* submenu found in the *Input* menu. Next, select the required *Input* parameters.
- 2. In the *Number of Coordinates* box, located in the *Characterization* section, select the number of points (128 points maximum) that you will use.
- 3. Once in the *Custom Curve* section, type your individual values in the *x* data and *y* data rows. Source variables are inserted into the *x* row, while the corresponding data is inserted into the *y* row.

Output Limit Indicator

Use this parameter to reset *sensor value min* and *max*.

sensor value min– Saves the lowest measurement since the last configuration.

sensor value max– Saves the highest measurement since the last configuration.

Measuring Limits

Set values specific to your sensor's upper and lower ranges from this section of the configuration screen.

Lower Value Min / Upper Value Max– Read-only fields that display the absolute minimum and maximum usable measurement values (respectively) of the sensor.

Input Lower Range– Enter the value that you want to use as the lower end of your input sensor. If the PV drops below the selected value, this will result in an underflow fault status.

Input Upper Range– Enter the value that you want to use as the upper end of your input sensor. If the PV rises above the selected value, this will result in an overflow fault status.

Process Value Scale

This section allows you to scale the *Lower Value* (0%) and *Upper Value* (100%) ranges of the process value to a desired span.

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Output

Eiguro	0	Output	Configuration	Contion
rigure	о.	Output	Conngulation	Section

Parameter	Value	Unit	Status
» Output	5		
» » Output Scale			
Lower Value	-240	°C	Loaded
Upper Value	960	°C	Loaded
» » Öutput Signal			
Unit	°C		Loaded
Decimal Point	3		Loaded
Damping	0	S	Loaded
Fail Safe Mode	Last Out Value	1 C - 1	Loaded
Fail Safe Default Value	0	°C.	Loaded
» » Output Limits			
Lower Limit Alarm	-240	°C	Loaded
Lower Limit Warning	-200	°C	Loaded
Upper Limit Warning	850	°C	Loaded
Upper Limit Alarm	960	°C	Loaded
Limit Hysteresis	5.000	°C	Loaded

Use this section to configure your sensor's output parameters.

Output Scale

Use these parameters to scale the *Lower Value* (0%) and *Upper Value* (100%) of the output signal range to a desired span.

Output Signal

This section allows for configuration of the following parameters:

Unit– Use this dropdown menu to select the Engineering Unit (EGU) in which you wish the *Output Scale*, *Output Limits* and *Fail Safe Value* parameters displayed.

Decimal Point– Select the desired resolution of your output display by adjusting the number of digits to the right of the decimal point. Choose from 0, 1, 2, 3 digits and Auto.

Damping– Output damping allows you to introduce a delay into the response time of your device in order to keep short-lived spikes from appearing on the output.

The value entered in the *Damping* text box is the time constant for the rise time resulting in a value equal to 63% of the output. This rise in output results from a step change appearing on the input.

Damping values are time constants, thus always displayed in seconds. Allowed damping values are between 0 and 30sec (in steps of 1sec). The factory default setting is zero.

Fail Safe Mode– The setting in this section determines how the TPZ will react in response to a failure. Settings include:

Fail Safe Value which is a user-selected value entered in the *Fail Safe Default Value* field. The Status displayed is *Uncertain*.

Last Out Value (default setting) which, upon a failure, will display the last valid output before the failure's occurrence. The Status displayed is *Uncertain*.

Wrong Value which displays the wrong calculated value at the output and indicates Status as *Bad*.

Fail Safe Default Value– Set this parameter if you have selected *Fail Safe Value*, above. This would be the value displayed once a failure was detected.

Output Limits

This section allows you to set alarm parameters.

Lower Limit Alarm– Allows you to enter the lower alarm limit.

Lower Limit Warning– Allows you to enter the lower warning limit.

Upper Limit Warning– Allows you to enter the upper warning limit.

Upper Limit Alarm– Allows you to enter the upper alarm limit.

Limit Hysteresis– Allows you to enter a dead band value to clear alarms and warnings.

Human Interface

Figure 9. Human Interface Read-Only Section

Parameter	Value	Unit	Status
» Human Interface			
» » Simulation	and the second sec		
Simulation	Disabled	Loade	
Simulation Value	n Value 300		oaded
Quality Good		L	oaded
Status	OK	Ĺ	oaded

The *Human Interface* section is a read-only screen that displays information regarding *Simulation* activity.

Simulation

These fields display parameters set in the *Simulation* section. The *Simulation* feature is accessed via the *Device* dropdown menu located on the upper-left portion of the configuration screens.

Use this feature to simulate a desired *Measured Value* and *Output* (Analog Input Block) value.

Using the *Measured Value* tab allows you to display a desired value on the TPZ's LCD and also select the quality of the signal being sent.

Measured Value Simulation– Follow the steps below to utilize *Measured Value Simulation.*

- 1. Select *Enabled* from the *Simulation* dropdown menu.
- 2. Enter the desired value into the *Simulation Value* text box.
- 3. Next, choose both the desired *Quality* and *Status* of the signal sent by selecting from the associated dropdown menus.
- 4. Click *Transfer*. The value will be displayed on the TPZ. The AI block will calculate the output value and quality based on the simulated value.
- 5. To exit, select *Disabled* in the *Simulation* dropdown box and then click *Transfer*.

Al Output Simulation– The *Output* tab allows the simulation of the Analog Input (AI) Block output value. To use this feature, follow the instructions below.

- 1. Select *Manual* in the *Target Mode* dropdown box; click *Transfer.*
- 2. Enter the desired value into the *Simulation Value* text box.
- 3. Next, choose both the desired *Quality* and *Status* of the signal sent by selecting from the associated dropdown menus.
- 4. Click *Transfer.* The value will be displayed on the TPZ. The output value and quality will be sent on the bus.
- 5. To exit *Output* simulation, select *Auto* in the *Target Mode* dropdown box and then click *Transfer.*

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Certificates and Approvals

Figure 10. Certificates and Approvals Read-Only Section

Parameter	Value	Unit	Status
» Certificates and Approvals			
Device Certification			oaded.
levice Certification			oaded

This section will display any certifications and/or approvals that have been issued to the device.

Additional Status Windows

View Dropdown Menu

The *View* dropdown menu offers several specialized screens to accompany TPZ operation. Opening the menu displays the following:

Display– Comprised of two tabs–*Output* and *Measured Value*–these windows allow you to view the associated values and ranges. These windows also display several messages regarding the operations of the device.

Yt diagram– This graph allows you to monitor your variables in a temperature vs. time depiction. You may adjust the time and temperature ranges within the view by double-clicking anywhere within the graph view.

Characterization– This graph allows you to view trending of Custom Curve variables. By double-clicking anywhere within the graph, you are able to adjust the X and Y points and ranges as well as modifying trending views.

Alarm States- Utilizing this feature allows access to several alarm parameters. Based on settings made in the *Output Limits* section of the *Output* configuration screen, you are able to view messages and status regarding *Upper Limit Warning, Lower Limit Warning, Upper Limit Alarm* and *Lower Limit Alarm*. There is also an *Alarm Summary* window which displays messages regarding all alarm parameters. Use the *Messages* button for detailed Alarm status.

Device Status– The *General* tab displays information as configured and shown in the *Identification* configuration screen. The *Physical Block, Transducer Block* and *Function Block* tabs display information about the respective PROFIBUS-specific parameters.

Device Dropdown Menu

Among other features within the *Device* dropdown menu is an important safety capability known as *Write Locking*. This is outlined below.

Write Locking– Allows you to select the *Write Lock* between On and Off. Setting *Write Lock* to On prevents you from downloading any information to the TPZ. You may only monitor the present activity and configuration.

TPZConfiguration: PC Configuration Software

One of the benefits of theTPZ is that there are no internal or external controls to adjust or settings to change. All configurable parameters can be set using a PC and Moore Industries' Intelligent PC Configuration software.

In using the software program, settings are downloaded to the instrument in the form of a Configuration File and stored in the instrument's memory. You can save a backup copy of the file on your PC hard drive or external media. The TPZ communicates with the PC through an RS-232 connection to the PC's serial port.

Installing the Configuration Software

Refer to Table 3 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 *TPZ 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 onto your PC, the TPZ can be connected to equipment to simulate input and monitor processes. You can then change the operating parameters of the transmitter.

No Transmitter Needed

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

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

Connecting the TPZ to the PC

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

See Table 3 for information on the necessary equipment.

The TPZ *must* be connected to the PC in order to: trim input, assign a tag, set write locking, perform Simulation, receive (via download) a configuration file and save the configuration file (via upload) from the TPZ's memory.

PC Configuration Software Summary

Figure 11. TPZ PC Configuration Software Main Screen

Program Status 2 Monitoring	- Input Scaling Trimming Display	Alarms Simulation	Custom Curve	
1070	- Input Type	Sensor Rai	nge	
TF2 Status J	- Besistance 4 Wite	Sensor Lin	nits 0 to 4095 Ohms	
	I Provense inte	Missingung S	ipen 10 Ohme	
	4000 Ohms	· Wirnicham	ipan to onins	
Process Variables 4	Tennecaute - Filter	Lower Rar	nge 0	Capture
OUT 110.105 Ohms	G LINE C 50 Hz			
RJC 26,159 Deg C	C Deg F 🕞 60 Hz	Userbo	4000	Capture
PV 110.100 Ohms	C Kelvin	ohheiwat	ige 14000	
rogrammed Date Write Lock 5 Ad	dress Clag H			
) Aug 2006 No 🕶 12	26 UDT Engineering Units	- Line Comp	ensation	
ag 6	EGU Ohms _	Value	1	T Thurs
PZ1	Broken Wire Detection	1000	1	a series
escriptor		UUT Fail S	afe	
	I¥ Enabled	Туре	Last OUT Va	lue 💌
ACK 6A	- Running Average Filter Settings-	1 1/-10-2	-	
TPZ Device Info 7	Enabled 8	Veice.	ļ	u unms
Device ID 0		Sensor Lim	it Indicator	
HW Rev. 1.2 FW Rev. 1.02.16	PV Damping	. Minimum		0 Ohma
	Enabled 0 s • •	Immun	1	u unms
Progress	PV Bias	Maximum		0 Ohms
	Bias 0 Ohn	is l	1	
communications O				

Once the default configuration has been saved to your PC or external media, it is safe to program other parameters. The PC Software is made up of these sections:

1. Menu Bar/Tool Bar– Dropdown menus and corresponding icons allow you to perform various functions throughout the PC Configuration Program.

2. Program Status– This portion of the program displays the activity of the software. It will display such messages as: Idle, Monitoring, Uploading and Downloading.

3. TPZ Status– Indicates if there are problems or faults with the instrument.

4. Process Variable (OUT/RJC/PV)– Displays the present Process Variable readings.

The *OUT* box displays the output from the Analog Input Block.

The *RJC* section displays the ambient temperature.

The value read in the *PV* box represents the Transducer block output. **5.** Write Lock/Address– Allows you to toggle the *Write Lock* between Yes and No. Setting *Write Lock* to Yes prevents you from downloading any information to the TPZ. You may only monitor the present activity and configuration.

Use the *Address* box to enter the unit's address (valid addresses range from 0-125; Moore Industries' default address is 126).

6. Identification Parameters– Use this parameter to place an identifying *Tag* (32 alphanumeric characters, maximum), *Descriptor* (32 alphanumeric characters, maximum) or *Message* (32 alphanumeric characters, maximum) to the Physical Block.

7. TPZ Device Info– This read-only display indicates instrument configuration and device identification.

8. Communications– Notifies user of current PC connection/communications status.

9. Input/Scaling/Trimming/Display/Alarms/Simulation/Custom Curve Tabs—These tabs change the right side of the screen and allow you to set the appropriate part of the TPZ's configuration. See corresponding sections of this manual for additional information regarding these tabs.

Configuration Screens

Note:

Unless otherwise noted, ensure that the PC Configuration Program is idle before making any selections or configuration changes to the program. Also, when attempting to download or upload, monitoring must be stopped. To do this, click Stop in the Monitoring dropdown menu, or click the Stop Monitoring icon on the Tool Bar.

Input

Figure 12. Input Tab

nput Type	Sensor Range	e	
Resistance 2 Wire	Sensor Limits Minimum Spa	: 0 to 4095 Ohms an 10 Ohms	
4000 Dhms	Lower Range	• 0	Capture
Deg C C 50 Hz Deg F 60 Hz Kelvin Deg R	Upper Range	a [4000	Capture
DUT Engineering Units	Line Compensive Value	sation	0 Ohms
Broken Wire Detection	- OUT Fail Safe		
✓ Enabled	Type	Wrong Value	*
Running Average Filter Settings ✓ Enabled 4 4 1	Velue	-	0 Ohme
∜ Damping	- Sensor Limit I	ndicator	
Enabled 0 s + +	Minimum		0 Dhms
74 Dies	Maximum		0 Ohme

Input Type– Select your input type and the respective range of your input.

Temperature– Use this section to select the temperature unit you wish to view.

If mV, Resistance or Potentiometer are the selected *Input Type* then *Temperature* selection is disabled.

Filter– This setting is used to configure the input filter. The filter is designed to reduce the effects of mainsinduced noise. The input filter frequency value should be set to the frequency of the local AC supply–either 50Hz or 60Hz.

OUT Engineering Units– This setting allows you to select how the output is displayed.

Broken Wire Detection– During operation, the TPZ sends random microamp pulses through input wiring to check for broken wiring or a burned out sensor.

To utilize *Broken Wire Detection*, check the *Enabled* box. If a failure is detected, a message will appear in the *TPZ Status* box.

Running Average Filter Settings– This function is for filtering the input signal. The TPZ provides this filter with a user-selected range between 1 and 16. Factory default is 4.

Note:

A higher Running Average Filter setting provides smoother output transitions; however, reduces response time. Conversely, a lower setting provides a faster response time, but may seem more unstable.

PV Damping–PV Damping allows you to introduce a delay into the response of your unit in order to stop short-lived spikes from initiating faults and generating fault messages.

The configured damping period will determine the time response that the analog output will take to achieve a 66% change in output in response to a stepped input.

To enable PV Damping, select the *Enabled* button. Use the arrows to select a value between 1sec and 30sec.

PV Bias– This value is algebraically added to your PV reading, before any trimming or custom curve have been performed.

Sensor Range– Allows you to set your upper and lower range values within the range chosen in the *Input Type* section.

The desired Lower and Upper Range settings can be entered via your PC keyboard or captured. To capture an input, follow the steps below.

- 1. Apply the desired Lower Range input and press the corresponding *Capture* button.
- 2. Next, apply the desired Upper Range input and press the corresponding *Capture* button.

Line Compensation– This only applies to two wire resistance and two wire RTD measurements. Enter a value to compensate for line resistance when using a two wire input. This value is only displayed in ohms.

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OUT Fail Safe– In the case of an output failure, you have the ability to set a mode you choose to alert of the failure.

Fail Safe Value allows you to enter a preset value into the *Value* text box.

Last Value Out will display the last value present before the failure.

Wrong Value sends the output to an incorrect reading due to the failure.

Sensor Limit Indicator– Displays the minimum and maximum values read by the sensor until a change in input type.

Note:

Once you have configured all parameters, download to the unit by selecting Download in the Transfer dropdown menu located in the Menu Bar. Or, click the subtron in the Tool Bar.

Scaling

Figure 13. Scaling Tab

o coming	Zero	Full	
ensor Range	0	4000	Ohms
aled to	5	3500	Ohms
caling	Zero	Full	
caling ensor Range	Zero	Full 4000	Ohms

OUT Scaling– This allows you to customize the output display of the Analog Input Block.

To perform OUT Scaling follow the steps below:

- 1. The *Sensor Range* boxes will display the range selected in the *Input Type* section of the *Input* screen.
- 2. In the *Scaled to* text boxes, enter the values you wish displayed when your input is at its Zero and Full ranges.

Once downloaded, your unit will display the scaled values on its LCD.

PV Scaling– This allows you to customize the output display of the Transducer Block.

To perform *PV Scaling*, follow the steps described for *OUT Scaling* (above).

Note:

In the Display tab you can select to use a Custom Label for either the Analog Input Block Out Value (OUT) or Transducer Block Primary Variable (PV).

Note:

Once you have configured all parameters, download to the unit by selecting Download in the Transfer dropdown menu located in the Menu Bar. Or, click the subtron in the Tool Bar.

Trimming

Figure 14. Trimming Tab



Input Trimming– Trimming increases the measurement accuracy of your instrument by matching the reading of its actual input to either a calibrated source or the device to which it is connected. This verifies that the input to the transmitter is being interpreted correctly.

You may trim any point between 0% and 100% along the scale. Note that 1 Point trimming applies an offset to the sensor reading, while 2 Point trimming applies both an offset and a gain.

Follow the steps below in order to trim the sensor for the desired variables.

- 1. Select either *1 Point* (one-point trimming) or *2 Points* (two-point trimming) by clicking the appropriate button. Each pair consists of *Set Value* and *Trim* fields.
- 2. Enter the values that require trimming into the *Set Value* field; click *Set.*
- 3. Apply the targeted signal to the input, wait until it settles, and click *Trim* to capture the measured value. If you chose *2 Points*, repeat the step above for the second point.

Click *Disabled* if not using the trimming function.

Display

Figure 15. Display Tab

- Display Source	s I anneadon I	custom curve j	
Analog Input Block Out Value			
C Transducer Block Primary Variable			
- Custom Label			
-			
Use custom label			
Address Display Format			
Hexadecimal			
C Decimal			
Precision			
Decimal Places			
A 1			
▼ 3			

Display Source– Allows you to select which value is is displayed on the TPZ's LCD.

Analog Input Block Out Value– By selecting this feature, the OUT value (as viewed in the Process Variables section of the PC Configuration program) is displayed.

Transducer Block Primary Variable– Choosing this parameter displays the *PV* value (as viewed in the *Process Variables* section of the PC Configuration program).

Custom Label– The *Custom Label* is used to display any label you choose to attach to your reading. Clicking the *Use custom label* box causes the instrument to always display the custom label as Engineering Units (EGU).

- 1. Check the Use custom label box.
- 2. Enter the label you wish viewed into the text box. This value is limited to five characters.

Address Display Format– Allows you to select how your slave addresses are displayed. However, *Decimal* may only be used for addresses 0-99. *Hexadecimal* must be used for addresses 100-126.

Precision– Select the number of decimal places (up to three) shown on the TPZ's display.

Note:

Once you have configured all parameters, download to the unit by selecting Download in the Transfer dropdown menu located in the Menu Bar. Or, click the subtton in the Tool Bar.

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Alarms

Figure 16. Alarms Tab

Intical			
Lower Limit Alarm	10	Ohms	
Upper Limit Alarm	4085	Ohms	
Advisory			
Lower Limit Warning	50	Ohms	
Upper Limit Warning	4045	Ohms	
Hysteresis		_	_
Value	75	Ohms	
Alarm Summary			
Lower Limit Alarm	0	Ohms	0
Lower Limit Warning	92.3708	Ohms	0
Upper Limit Warning	0	Ohms	0
Upper Limit Alarm	0	Ohms	0

Critical– Allows you to set the values which will cause your transmitter to go into an alarm state. Use this parameter to set your lower and upper alarm values.

In the *Lower Limit Alarm* and *Upper Limit Alarm* boxes, enter the desired values you wish to use as your alarm values.

Advisory– This section allows you to set warning alarm values. These values will notify you that your process is approaching an alarm state.

In the *Lower Limit Warning* and *Upper Limit Warning* boxes, enter the desired values you wish to use as warning values.

Hysteresis– This is the range in which an relay remains in an alarm condition even after the monitored process variable input has returned to a safe level, at or below/above the trip point setting.

Alarm Summary–Displays alarm levels for the four alarm parameters previously configured.

Note:

Once you have configured all parameters, download to the unit by selecting Download in the Transfer dropdown menu located in the Menu Bar. Or, click the subtron in the Tool Bar.

Simulation

Figure	17.	Simulation	Tab
riguie		Onnulation	rab

C Disabled	Value		800 Ohms	
Enabled	Quality	GOOD: Act	ive Advisory A	
	Status	ОК	<u> </u>	
IT Simulation				1
Mode	Value	1	295 Dhos	
C Manuel	Quality	GODD As	hve Advison Al 🛨	
C Out or Service	Status	0K	+	

Simulation allows the transducer block input (PV) to be disconnected so that you may set the input value and status for test purposes.

You can only simulate one output at a time–either *PV Simulation or OUT Simulation*.

PV Simulation– Allows you to simulate Transducer Block output.

- 1. Select *Enabled* (selecting *Disabled* allows you to enable *OUT Simulation*).
- 2. Enter the desired test signal into the *Value* text box.
- 3. Next, choose both the desired *Quality* and *Status* of the signal sent by selecting from the associated dropdown menus.
- 4. Click the *Transfer* button at the bottom of the screen. The output value and quality will be calculated based on the simulated value and will be displayed on the TPZ and in the *PV* box of the *Process Variables* section.
- 5. To exit, select the *Disabled* button; click *Transfer.*

OUT Simulation– Allows simulation of the Analog Input Block output value. To use this feature, follow the instructions below.

For Manual Simulation:

- 1. Select Manual in the Mode section.
- 2. Enter the desired simulation value into the *Value* text box; click *Transfer*. Next, choose both the desired *Quality* and *Status* of the signal sent by selecting from the associated dropdown menus.

The output value and quality will be sent on the bus. The value will be displayed on the TPZ and in the *OUT* box of the *Process Variables* section.

3. To exit *OUT* simulation, select *Auto* in the *Mode* box and then click *Transfer*.

For *Out of Service* simulation:

- 1. Select *Out of Service* in the *Mode* section; click *Transfer.*
- 2. Enter a value into the *Value* text box to be displayed if the unit goes Out of Service (OOS); click *Transfer.*

The output value and quality will be sent on the bus.

3. To exit *Out of Service* simulation select *Auto* in the *Mode* box, then click *Transfer*.

While the TPZ is in *Simulation* mode, you can toggle, and change, simulation configurations. The transmitter will continue monitoring and update the unit to the changed simulation values once you click *Transfer*.

Refer to the *Additional Status Information* field in the *View* dropdown menu to view simulation details.

Custom Curve

Note:

The Custom Curve tab appears if the Input Type is configured for mV, Resistance or Potentiometer.

tom Lurve File Name			T
	Point	X data	Y data
Enabled	1	0	99
Of Data 17	2	100	200
Uroms In	3	300	400
	4	500	600
stom Curve (Y) Range	5	700	800
wer Bange 0	6	900	1000
	7	1100	1200
per Range 4000	8	1300	1400
	9	1500	1600
	10	1700	1800
	11	1900	2000
	12	2100	2200
	13	2300	2400
	14	2500	2600
	15	2700	2800
	16	2900	3000
	17	3100	3200

Custom Curve–The Custom Curve feature allows you to set up your own custom curve table. This allows you to tell the transmitter what it should output when it receives a certain input. This feature also allows you the ability to write a table in Microsoft[®] Excel, save it in a .csv format, and import it into the Configuration Software. This makes it simple to save the custom table for downloading to multiple units or for backup purposes.

To create a custom curve:

- 1. Click the *Enabled* box.
- 2. Select the number of points for your curve (128 points maximum) and enter it into the *No Of Points* text box.
- 3. In the *Custom Curve (Y) Range* text boxes, enter the values you wish displayed when your input is at its lower and upper ranges.
- 4. Type your individual values in the X and Y columns. Source variables are inserted into the X Column, while the corresponding data is inserted into the Y Column.

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5. After all of your data has been entered, you may use the *Custom Curve* dropdown menu in the Menu Bar to save your newly created custom table (*Save Custom Curve*) and to download it to your TPZ (*Download Custom Curve*) or simply click the up and down arrows found in the upper-right section of the *Custom Curve* screen.

Note:

Once you have configured all parameters, download to the unit by selecting Download in the Transfer dropdown menu located in the Menu Bar. Or, click the subtron in the Tool Bar.

Cyclic Data

The cyclic data telegram adheres to the structure shown in Table 6. The status byte is implemented according to the PROFIBUS PA profile for process control devices.

Table 6. Cyclic Data

Byte	Data	Access	Data Format
0-4	AI function block 1 (temperature)	r	Measured value (32-bit floating decimal point (IEEE-754)) index 0
			Quality byte index 4

Table 7. TPZ Quality Bytes

Quality (Binary)						/)			
	Q		QS L					Meaning of Quality	Usage
1	0	0	0	0	0	-	-	Good(non-cascade): OK	No error, Status ok
1	0	0	0	0	1	-	-	Good(nc): maintenance required	Does not apply to TPZ
1	0	0	0	1	0	-	-	Good(nc): update event	Does not apply to TPZ
1	0	0	0	1	1	-	-	Good(nc): active advisory alarm	Indicates high/low warning limit exceeded
1	0	0	1	0	0	-	-	Good(nc): active critical alarm	Indicates high/low alarm limit exceeed
1	0	0	1	0	1	-	-	Good(nc): unacknowledge update event	Does not apply to TPZ
1	0	0	1	1	0	-	-	Good(nc): unacknowledge advisory event	Does not apply to TPZ
1	0	1	0	0	0	-	-	Good(nc): unacknowledge critical event	Does not apply to TPZ
1	0	1	0	0	1	-	-	Good(nc): initiate fail safe	Does not apply to TPZ
0	1	0	0	0	0	-	-	Uncertain: non specific	Does not apply to TPZ
0	1	0	0	0	1	-	-	Uncertain: last usable value (LUV)	If failure occurs and "Fail Saf Mode" is set for
									"Last Out Value"
0	1	0	0	1	0	-	-	Uncertain: substitute value	If failure occurs and "Fail Saf Mode" is set for
									"Fail Safe Value"
0	1	0	0	1	1	-	-	Uncertain: initial value	At AI initialisation
0	1 0 1 0 0						-	Uncertain: sensor conversion not accurate	Input Saturation, or RJC out of range when broken wire
									detection on
0	1	0	1	0	1	-	-	Uncertain: engineering unit violation	PV exceeds sensor range limits
0	1	0	1	1	0	-	-	Uncertain: sub normal	Does not apply to TPZ
0	1	0	1	1	1	-	-	Uncertain: configuration error	EEPROM not programmable
0	1	1	0	0	0	-	-	Uncertain: sensor calibration	In calibration mode
0	1	1	0	0	1	-	-	Uncertain: simulated value	When in simulation mode
									(i.e. Al block actual mode is manual)
0	0	0	0	0	0	-	-	Bad: non specific	Custom linearization table not available
0	0	0	0	0	1	-	-	Bad: configuration error	Transducer configuration error
0	0	0	0	1	0	-	-	Bad: not connected	Does not apply to TPZ
0	0	0	0	1	1	-	-	Bad: sensor failure	Broken Wire (TB only), RTD/TC linearization error
									(out of table range)
0	0	0	1	0	0	-	-	Bad: device failure	RJC broken
0	0	0	1	0	1	-	-	Bad: no communication (LUV)	Does not apply to TPZ
0	0	0	1	1	0	-	-	Bad: no communication (no LUV)	Does not apply to TPZ
0	0	0	1	1	1	-	-	Bad: out of service	If block is in Out Of Service mode
1	1	0	0	0	0	-	-	Good (cascade): OK	Does not apply to TPZ
1	1	0	0	0	1	-	-	Good (c): initialization acknowledged	
1	1	0	0 1 0 - Good (c): initialization request			-	Good (c): initialization request		
1	1	0	0	1	1	-	-	Good (c): not invited	
1	1	0	1	0	1	-	-	Good (c): do not select	
1	1	0	1	1	0	-	-	Good (c): local override	
1	1	1	0	0	0	-	-	Good (c): initiate fail safe	

Table 8. Description of TPZ Limit Bits

	Qu	ali	ty (l	Bin	ary	()		
0	2		Q		l	-	Meaning of Limit Bits	
-	-	-	-	-	-	0	0	ОК
-	-	-	-	-	-	0	1	Low limited (under range)
-	-	-	-	-	-	1	0	High limited (over range)
-	-	-	-	-	-	1	1	Constant

Notes: Q represents Quality QS represents Quality Substatus L represents Limits

Installation

Installation consists of physically mounting the device in parallel within your existing PROFIBUS system and completing the electrical connections.

Mounting the TPZ

The TPZ HP (hockey-puck housing) can be mounted with rails, flanges or in one of our larger housings, such as a D-BOX or BH.

Making the Electrical Connections

In PROFIBUS systems, the PROFIBUS Master provides power to the connected devices. Refer to Figure 4 for a connection diagram of the TPZ into your system.

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 any other connections.

• All input signals to, and output signals from, Moore Industries' products should be wired using a shielded, twisted pair technique. Shields are to be connected to an earth or safety ground at the unit itself.

• The maximum length of unshielded input and output signal wiring should be 2 inches.

CE Conformity

Installation of any Moore Industries' products that carry CE certification (Commission Electrotechnique) *must* adhere to the guidelines in *Recommended Ground Wiring Practices* in order to meet the requirements set forth in applicable EMC (Electromagnetic Compatibility) directives 89/336/EEC, EN 61326. Consult the factory for the most current information on products that have been CE certified.

Operation

Once configured, installed, and supplied with the correct power, the TPZ Programmable PROFIBUS Temperature Transmitter begins to operate immediately. Depending upon environmental conditions, it can be expected to operate unattended for extended periods of time.

Maintenance

Moore Industries suggests a quick check for terminal tightness and general unit condition every 6-8 months. Always adhere to any site requirements for programmed maintenance.

Customer Support

If service assistance is ever required for an device in your application, refer to the back cover of this manual for the telephone numbers to Moore Industries' customer service department.

If possible, make a note of the model number of the unit before calling. For fastest assistance, have the following information available: serial number, the job number and purchase order number under which it was shipped.

Intrinsically-Safe Applications

This page contains information for the TPZ instrument when used within an intrinsically-safe system.

The diagrams on the following page must be used for units that are to operate in areas requiring intrinsicallysafe instrumentation.

Refer to the *Special Conditions* outlined below before proceeding with installation.

Special Conditions of Use

The following instructions must be adhered to when the TPZ is used in hazardous 'Classified' locations and potentially explosive atmospheres.

I. Intrinsically Safe (Ex ia) Applications (Zones 0 and 1)

1. The Model TPZ Temperature Transmitter shall be installed in a final enclosure rated for a minimum of IP20.

2. For Zone 0 installations, the final enclosure shall not contain more than 10% in total of aluminum, magnesium, titanium and zirconium, or 7.5% in total of magnesium, titanium and zirconium.

3. For Zone 1 installations, the final enclosure shall not contain 7.5% in total of magnesium.

4. Wiring must be rated for 85°C.

II. Type N (Ex n) Applications (Zone 2)

1. As Category 3 equipment, the Model TPZ Temperature Transmitter shall be installed in an enclosure which maintains an ingress protection of IP54 and meets the enclosure requirements of EN60079-0 and EN60079-15.

2. The Model TPZ Temperature Transmitter shall contain external transient protection to prevent the supply voltage from exceeding 46.2V including tolerance.

3. Wiring must be rated for 85°C.

Safety Concerns

For your safety, read the following information carefully before proceeding with installation.

WARNING: EXPLOSION HAZARD – FOR DIVISION 2 HAZARDOUS LOCATIONS. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE ATMOSPHERE IS PRESENT.

WARNING: SUBSTITUTION OF COMPONENTS IS NOT ALLOWED AS IT MAY IMPAIR THE INTRINSIC SAFETY (ZONES 0 & 1, DIVISION 1) OF THE UNIT AND/OR THE NON-INCENDIVE/ TYPE N (DIVISION 2, ZONE 2) CIRCUIT. DO NOT OPEN THE UNIT WHEN EITHER ENERGIZED OR WHEN AN EXPLOSIVE GAS/DUST ATMOSPHERE IS PRESENT. DISCONNECT POWER BEFORE SERVICING. READ AND UNDERSTAND THE MANUFACTURER'S INSTALLATION AND OPERATING PROCEDURES, AND ADHERE TO ALL APPLICABLE ELECTRICAL CODES, SAFETY INSTRUCTIONS AND REGULATIONS.

AVERTISSEMENT – RISQUE D'EXPLOSION. NE PAS DEBRANCHER TANT QUE LE CIRCUIT EST SOUS TENSION, A MOINS QU'IL NE S' AGISSE D'UN EMPLACEMENT NON DANGEREUX.

WARNING: END-USER MUST MARK EITHER CHECKER BOX ON THE INSTRUMENT ID LABEL WITH THE INTENDED APPLICATION – INTRINSICALLY SAFE OR TYPE N / NON-INCENDIVE.





DO NOT SCALE DRAWING CATEGORY CONTROL DRAWING DRAWING 100-100-72 (Page 3 of 3) B 100-100-72 (Page 3 of 3) B
MODRE UNLESS NOTED CURLESS NOTED CHECKED STATUTES NOTED CHECKED STATUS = \$17.254 CHECKED STATUS
INUUVIRIEV X = ±.03 /0.76 ENGINER XX = ±.0100.25 ENGURER XX = ±.0100.25 ENGURER HOLES=+.000.000 SCALE NONE For Hazardous 'Classified' Locations thin the written consent of an authorized officer of MI.
The FISCO Concept allows the interconnection of Intrinsically Safe apparatus to associated apparatus not specifically examined in such combination (refer to Page 2 of 3). The criterion for such interconnection is that the voltage (Vmax or Ui), the current (Imax or Ii), and the power (Pi), which Intrinsically Safe apparatus can receive and remain Intrinsically Safe, considering faults, must be equal or greater than the voltage (Uo, Voc, Vt), the current (lo, Isc, It) and the power (Po) which can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected residual capacitance (Ci) and inductance (Li) of each apparatus (other than the terminators) connected to the Fieldbus must be less than or equal to 5nF and 10µH, respectively.
In each I.S. Fieldbus segment only one active source, normally the associated apparatus, is allowed to provide the necessary power for the Fieldbus system. The allowed voltage (Uo, Voc, Vt) of the associated apparatus used to supply the bus must be limited to the range of 14Vdc to 24Vdc. All other equipment connected to the bus cable has to be passive, meaning that the apparatus is not allowed to provide energy to the system, except to a leakage current of 50 µA for each connected device. Separately-powered equipment needs a galvanic isolation to insure that the Intrinsically Safe Fieldbus circuit remains passive.
 The <u>cable</u> used to interconnect the devices needs to comply with the following parameters: Loop Resistance R' = 15 - 150 μ/km Capacitance per unit length C' = 80 - 200 nF/km Capacitance per unit length C' = 80 - 200 nF/km
 Or, 5- C' = C' Line/Line + C' Line/Screen (if the Screen is connected to one line) 6- Length of Spur Cable = 30 meters (maximum) 7- Length of Trunk Cable = 1 km 8- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 7- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 7- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 7- Length of Splice = 1 meter (maximum) 6- Length of Splice = 1 meter (maximum) 7- Length of Splice = 1 meter (maximum) 6- Length of Splice = 1 meter (maximum) 7- Length of Trunk Cable = 1 km 8- Length of Splice = 1 meter (maximum) 7- Length of Splice = 1 meter (maximum) 7- Length of Splice = 1 meter (maximum) 7- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 7- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 8- Length of Splice = 1 meter (maximum) 9- Terminators: At each end of the Trunk cable an Agency-Approved (FM, CSA, UL, ATEX, ANZEX, etc) line terminator with the following parameters is considered suitable: R = 90 - 100 & C = 0 - 2.2 µ F
Installation Notes for FISCO & Entity Concepts:
 a) No revisions can be made to this certified drawing prior to notifying FM Approvals (the certifying agency). b) Associated apparatus manufacturer's installation guidelines must be followed when installing and commissioning this equipment (TFZ & TPZ). c) The FISCO Associated Apparatus must be Agency-Approved (FM, CSA, UL, ATEX, ANZEX, etc). d) Control equipment connected to FISCO barrier must not use or generate more than 250 Vrms or Vdc. e) Resistance between FISCO Intrinsically Safe Ground and Earth Ground must be less than 1.0. f) Installation should be in accordance with ANS/ISA-RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous 'Classified' Locations'' and the National Electric Code (ANS/NFPA 70), and/or applicable CEC and IEC regualtions and requirements for installing and commissioning such devices. g) The FISCO Concept allows interconnection of Fieldbus Intrinsically Safe apparatus with FISCO associated apparatus when the following is true:
(Vmax or Ui) (Voc, Vt or Uo) (Imax or Ii) (Isc, It or Io) (Pmax or Pi) (Po)
Installation Notes for Non-Incendive & Type N Concepts:
For Non-Incendive (Class I, Division 2, Groups A, B, C & D), and for Class I//II, Divisions 1 & 2, Group E, F & G, and for Type N hazardous applications, install per the NEC/CEC/IEC using threaded metal conduit. Intrinsic Safety barrier is not required. The maximum supply voltage is 32 Vdc. A dust-tight seal must be used at the conduit entry when the device is used in Class II & III locations. <u>WARNING:</u> Explosion Hazard – Do not disconnect equipment unless power has been switched off or the area is known to be Non-Hazardous. Substitution of components is not allowed as it may affect the circuit design integrity and possibly impair suitability for hazardous locations.





EC Declaration of Conformity

Moore Industries-International, Inc. 16650 Schoenborn Street North Hills, CA 91343-6196 U.S.A. Date Issued: 21 Oct. 2013 No. 100-100-242 Rev. A Page 1 of 2

Equipment Description:

Programmable PROFIBUS PA Temperature Transmitter

Model TPZ / * / * / * / * / *

* Indicates any input, output, power, options and housing as stated in the product data sheet.

Directive:

2004/108/EC (EMC: Electromagnetic Compatibility)

Specifications Conformed To: EN 61326-1:2006 Electrical equipment for measurement, control and laboratory use - EMC requirements

Equipment Description:

Programmable PROFIBUS PA Temperature Transmitter

Model TPZ / * / PA / 9-30DC** / * / HP

* Indicates any input and options as stated in the product data sheet.

** 9-24DC for FISCO Applications

Directive:

94/9/EC (ATEX: Equipment and protective systems for potentially explosive atmospheres)

Provisions of the Directive Fulfilled by the Equipment: Group II Category 1G Ex ia IIC T4

Notified Body for EC-Type Examination:

FM Approvals Ltd. [Notified Body Number 1725] 1 Windsor Dials, Windsor, Berkshire, SL41RS, United Kingdom

EC-Type Examination Certificate: FM 07ATEX0007X

Technical Standards Referenced:

EN 60079-0:2006 Explosive atmospheres Part 0: Equipment - General requirements
 EN 60079-11:2007 Explosive atmospheres Part 11: Equipment protection by intrinsic safety "i"
 EN 60079-26:2004 Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

Equipment Description:

Programmable PROFIBUS PA Temperature Transmitter

Model TPZ / * / PA / 9-32DC / * / HP

* Indicates any input and option as stated in the product data sheet.

Directive:

94/9/EC (ATEX: Equipment and protective systems for potentially explosive atmospheres)

Provisions of the Directive Fulfilled by the Equipment: Group II Category 3G Ex nA IIC T4

Technical File No.: **TPZ-TF001**



EC Declaration of Conformity

Moore Industries-International, Inc. 16650 Schoenborn Street North Hills, CA 91343-6196 U.S.A. Date Issued: 21 Oct. 2013 No. 100-100-242 Rev. A Page 2 of 2

Conformity Assessment Procedure: Internal Control of Production - Annex VIII (Module A)

Technical Standards Referenced:

EN 60079-0:2006 Explosive atmospheres Part 0: Equipment - General requirements **EN 60079-15:2005** Explosive atmospheres Part 15: Equipment protection by type of protection "n"

Equipment Description:

Programmable PROFIBUS PA Temperature Transmitter in the BH or SB2 Enclosure Model TPZ / * / * / * / BH**E or SB2**E

* Indicates any input, output, power and options as stated in the product data sheet.

**Indicates any BH or SB2 Enclosure with the 'E' suffix.

Directive:

94/9/EC (ATEX: Equipment and protective systems for potentially explosive atmospheres)

Provisions of the Directive Fulfilled by the Equipment: Group II Category 2G Ex d IIC T6; Group II Category 2D Ex tD A21 IP66 T85°C

Notified Body for EC-Type Examination: **ISSeP** [Notified Body Number 0492] Zoning A. Schweitzer 7340 Colfontaine, Belguim

EC-Type Examination Certificate: ISSeP08ATEX033X

Technical Standards Referenced:

EN 60079-0:2006Explosive atmospheres Part 0: Equipment - General requirementsEN 60079-1:2007Explosive atmospheres Part 1: Equipment protection by flameproof enclosures "d"EN 61241-0:2006Electrical apparatus for use in the presence of combustible dust - Part 0: General requirementsEN 61241-1:2004Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD"

Notified Body for Quality Assurance: **SIRA** [Notified Body Number 0518] Rake Lane, Eccleston, Chester, Cheshire, CH4 9JN, England

On Behalf of Moore Industries-International, Inc., I declare that, on the date the equipment accompanied by this declaration is placed on the market, the equipment conforms with all technical and regulatory requirements of the above listed directives.

Signature: Space Antonia

Deanna Esterwold, Quality Manager

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 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.
- Ship the equipment to the Moore Industries location nearest you. 4

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 WARRAN-TIES (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY GOODS OR SER-VICES SOLD BY THE COMPANY. THE COMPANY DISCLAIMS ALL WARRAN-TIES ARISING FROM ANY COURSE OF DEALING OR TRADE USAGE, AND ANY BUYER OF GOODS OR SERVICES FROM THE COMPANY ACKNOWL-EDGES 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 IM-PLY 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 DE-FECT OR BREACH, AND NO ACTION FOR THE BREACH OF ANY WAR-RANTY 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 manu-factured 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 CONSE-QUENTIAL DAMAGES.



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