

PD310 & PD312 Explosion-Proof SMART TEMPERATURE TRANSMITTERS



EXsense
series

- Smart Temperature Transmitters with HART® Protocol
- Universal Input: RTD, TC, Ohm & mV
- Program with PC or HART Communicator
- Order Configured at the Factory Ready to Install
- Explosion-Proof, IP68, NEMA 4X Enclosure
- 330° Rotatable Backlit LCD
- Model PD312 with Pt100 RTD Sensor
- Display PV, Input Type, Eng Units & Bargraph
- Operating Temperature: -40 to 75°C

PRECISION DIGITAL CORPORATION

89 October Hill Road • Holliston MA 01746 USA
Tel (800) 343-1001 • Fax (508) 655-8990

**PRECISION
DIGITAL +**

www.predig.com

Disclaimer

The information contained in this document is subject to change without notice. Precision Digital makes no representations or warranties with respect to the contents hereof; and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.



CAUTION: Read complete instructions prior to installation and operation of the temperature transmitter.



WARNING: Risk of electric shock or personal injury.



Warning

This product is not recommended for life support applications or applications where malfunctioning could result in personal injury or property loss. Anyone using this product for such applications does so at his/her own risk. Precision Digital Corporation shall not be held liable for damages resulting from such improper use.

Limited Warranty

Precision Digital Corporation warrants this product against defects in material or workmanship for the specified period under "Specifications" from the date of shipment from the factory. Precision Digital's liability under this limited warranty shall not exceed the purchase value, repair, or replacement of the defective unit.

Registered Trademarks

HART® is a registered trademark of the HART Communication Foundation. All other trademarks mentioned in this document are the property of their respective owners.

© 2010 Precision Digital Corporation. All rights reserved.

www.predig.com

INTRODUCTION

The ExSense T Series is a line of smart temperature transmitters with HART[®] communication capabilities. They can be configured using a HART modem and a PC running the free HART software provided or using a handheld HART communicator. The PD310 model does not include a sensor, while the PD312 model can be ordered with a Pt100 RTD or other temperature sensors; see the Ordering Information for model numbers.

The backlit LCD provides the user with valuable information such as the process variable, input type, engineering units, and bargraph. The display can be programmed to show the PV, mA output, or %.

The loop-powered backlight is standard on all models and lets the user see the display under any lighting condition. The PD310 & PD312 are housed in a sleek & rugged exp-proof NEMA 4X enclosure with two ½" NPT conduit holes and one ½" NPT process sensor connection port. For remote mounting applications the PD310 may be ordered without the process sensor connection port.

ORDERING INFORMATION

The following are a few examples of models that can be ordered. Use the online ExSense Builder to create a model to satisfy a particular application; choose other sensor types, lengths, and thermowells.

Model	Description
PD310-A2-C1	Explosion-Proof HART Temperature Transmitter with Display
PD310-G2-C1	HART Temperature Transmitter with Display, Safe Area
PD312-A2-C1-P11R06	Explosion-Proof HART Temp Transmitter with Display & 6" Pt100 Probe
PD312-G2-C1-P11R06	HART Temp Transmitter with Display & 6" Pt100 Probe, Safe Area
PD312-A2-C1-P11S06-T106	Explosion-Proof HART Temp Transmitter with Display, 6" Pt100 Probe & Thermowell
PD312-G2-C1-P11S06-T106	HART Temp Transmitter with 6" Pt100 Probe & Thermowell, Safe Area
PDA8302	HART to USB Modem

Note: The HART Transmitters must be configured using the HTTemp PC software and PDA8302 HART modem. The input Type and Units cannot be changed with HART Communicators.

C0 = Factory default

C1 = Custom configuration

C2 = Custom configuration with Certificate of Calibration

A 2= Exp-proof aluminum enclosure, 1/2" NPT x 2 conduit & 1/2" NPT process connection

G2 = General purpose aluminum, 1/2" NPT x 2 conduit & 1/2" NPT process connection

P11 = 100 Pt RTD with 6" leads

R06 = 6" Rigid probe

S06 = Spring-loaded 6" probe to use with thermowell

T106 = Type 1 thermowell to match spring-loaded 6" probe

Go to www.predig.com/ExSenseBuilder to build a complete model number and to specify the transmitter's configuration setup.

Note: Standard RTD is 1/4" in diameter. For other sizes, contact factory.

Table of Contents

INTRODUCTION	3
ORDERING INFORMATION	4
SPECIFICATIONS	7
General	7
Accuracy & Ranges	10
Enclosure Ratings & Approvals	12
SAFETY INFORMATION	13
INSTALLATION	14
Unpacking	14
Pre-Installed Conduit Plug	15
Mounting	15
Connections	17
Sensor & 4-20 mA Output Connections	18
HART Connections to PC & Communicator	19
SETUP AND PROGRAMMING	20
HART Temperature Transmitter Software	21
PDA8302 HART Modem USB Driver Installation	22
Determining the COM Port Number	22
4-20 mA Loop Current Setup	24
Parameter Setup	25
HART Information	27
HART Information	27
Calibration	28
Graph Monitor	29
APPLICATION	30
PD312 HART Transmitter & Remote Display	30
MOUNTING DIMENSIONS	31
TEMPERATURE PROBES	32

THERMOWELLS-----	33
Thermowell Model Configuration-----	34
TROUBLESHOOTING-----	35

Table of Figures

Figure 1. Sensor & Loop Connectors	18
Figure 2. Sensor & 4-20 mA Connections.....	18
Figure 3. Connections to PC & HART Communicator.....	19
Figure 4. Enclosure Dimensions – Front View	31
Figure 5. Enclosure Dimensions – Side Cross Section View	31

SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

General

INPUT	Universal RTD, TC, Resistance, or Voltage
OUTPUT	Two-wire 4-20 mA scalable
ACCURACY & INPUT RANGES	±0.08% of span typical, see table on page 10 for details
TEMPERATURE DRIFT	RTD: ±0.004°C/°C TC: ±0.03°C/°C
DISPLAY	PV: 0.3" (8 mm) 5-digit LCD, Input & Units: 0.2" (5 mm)
BARGRAPH	52 segments with 2% resolution
DECIMAL POINT	PV: 1 or none mA, %: Up to 3 decimals
BACKLIGHT	Loop-powered, always on
PROGRAMMING METHOD	PDA8302 HART modem and PC software or field handheld HART communicator
UNDERRANGE	3.8 mA
OVERRANGE	20.5 mA
SENSOR BREAK	Selectable ≤ 3.6 mA Low Alarm or ≥ 22 mA High Alarm
RESPONSE TIME	1 second
LONG TERM STABILITY	Better than 0.05% per year
START UP TIME	Less than 5 seconds

PD310 & PD312 Smart Temp Transmitters **Instruction Manual**

NOISE FILTER	Programmable 0 to 85 μ A
DAMPING TIME	Programmable 0 to 30 sec
OUTPUT RESOLUTION	0.3 μ A
NON-VOLATILE MEMORY	All programmed settings are stored in non-volatile memory for a minimum of ten years
POWER SUPPLY	10.5 to 45 VDC, reverse polarity protected
LOAD IMPEDANCE	650 Ω @ 24 VDC max or ((V supply - 10.5 V)/0.0208 A) Ω
NORMAL MODE REJECTION	64 dB at 50/60 Hz
ISOLATION	2 kV input-to-output
SHOCK & VIBRATION RESISTANCE	4g/2 to 150 Hz as per IEC 60 068-26
EMC	Immunity & emission interference according to GB/T17626.2-1998), compliance with IEC 61000-4-3: 1995
ENVIRONMENTAL	Operating temperature range: -40 to 75°C Storage temperature range: -40 to 100°C Relative humidity: 0 to 90% non-condensing
CONNECTIONS	Screw terminals accept 12 to 22 AWG

PD310 & PD312 Smart Temp Transmitters Instruction Manual

ENCLOSURE	Explosion-proof or general purpose die-cast aluminum with glass window, 0.3% max copper content, corrosion resistant powder coating, color: blue. NEMA 4X, 7, & 9, IP68. Two ½" NPT conduit openings, one ½" NPT process connection. One ½" NPT nickel plated brass conduit plug with 10 mm hex key fitting installed.
MOUNTING	The PD310 & PD312 with explosion-proof or safe area NEMA 4 housings can be mounted using four different methods, those are: Wall mounting, Pipe mounting, Conduit Mounting, or Direct mounting. Two mounting holes provide for 1.5" pipe or wall mounting. See Mounting Dimensions on page 31.
TIGHTENING TORQUE	Screw terminal connectors: 4.5 lb-in (0.5 Nm)
WEIGHT	2.42 lb (1.10 kg)
OVERALL DIMENSIONS	4.30" x 4.27" x 3.62" (109.2 x 108.4 x 92.0) (W x H x D), probe & thermowell not included
WARRANTY	1 year parts & labor

Accuracy & Ranges

Input	Type	Input Range	Accuracy (% of span)	Min Span (4-20 mA)
RTD	Pt100	-200 to 850°C (-328 to 1562°F)	±0.2°C or 0.08%	10°C (18°F)
	Pt500	-200 to 250°C (-328 to 482°F)	±0.5°C or 0.20%	10°C (18°F)
	Pt1000	-200 to 250°C (-328 to 482°F)	±0.3°C or 0.12%	10°C (18°F)
	Cu50	-50 to 150°C (-58 to 302°F)	±0.2°C or 0.08%	10°C (18°F)
	Cu100	-50 to 150°C (-58 to 302°F)	±0.3°C or 0.12%	10°C (18°F)
	Ni100	-60 to 180°C (-76 to 356°F)	±0.2°C or 0.08%	10°C (18°F)
	Ni500	-60 to 180°C (-76 to 356°F)	±0.5°C or 0.20%	10°C (18°F)
	Ni1000	-60 to 150°C (-76 to 302°F)	±0.3°C or 0.12%	10°C (18°F)
Potentiometer	Ohms	0 to 400 Ω	±0.1 Ω or 0.08%	10 Ω
		0 to 2,000 Ω	±1.5 Ω or 0.12%	100 Ω

Accuracy & Ranges (Continued)

Input	Type	Input Range	Accuracy (% of span)	Min Span (4-20 mA)
TC	B	0 to 1820°C (32 to 3308°F)	±2.0°C or 0.08%	500°C (900°F)
	E	-270 to 1000°C (-454 to 1832°F)	±0.5°C or 0.08%	50°C (90°F)
	J	-210 to 1200°C (-346 to 2192°F)	±0.5°C or 0.08%	50°C (90°F)
	K	-270 to 1372°C (-454 to 2501°F)	±0.5°C or 0.08%	50°C (90°F)
	N	-270 to 1300°C (-454 to 2372°F)	±1.0°C or 0.08%	50°C (90°F)
	R	-50 to 1768°C (-58 to 3214.4°F)	±2.0°C or 0.08%	500°C (900°F)
	S	-50 to 1768°C (-58 to 3214.4°F)	±2.0°C or 0.08%	500°C (900°F)
	T	-270 to 400°C (-454 to 752°F)	±0.5°C or 0.08%	50°C (90°F)
	C	0 to 2320 °C (32 to 4208 °F)	±0.5°C or 0.08%	50°C (90°F)
	D	0 to 2320 °C (32 to 4208 °F)	±0.5°C or 0.08%	50°C (90°F)
Voltage	mV	-10 to 75 mV	±20µV or 0.08%	5 mV
		-100 to 100 mV	±20µV or 0.08%	5 mV
		-100 to 500 mV	±30µV or 0.08%	6 mV
		-100 to 2000 mV	±50µV or 0.08%	20 mV

Enclosure Ratings & Approvals

FM & CSA

FM Approved & CSA Certified:

Explosion-proof for use in Class I, Division 1, Groups B, C, and D; dust-ignition-proof for Class II, Division 1, Groups E, F, and G, Class III; hazardous (classified) locations,

USA: Indoor and outdoor (Type 4X and IP66);

Ta = -40°F to +185°F

FM Certificate: 3028184


Canada: Indoor and outdoor (Type 4X);

Ta = -40°C to +85°C

CSA Certificate: 1726044

ATEX & IECEx

ATEX Certified: Group 2, Category 1 (Zone 1),
Gases, Vapors, Mists, or Dusts:

 II 2 G D

Ex d IIC

Ex tD A21 IP68

Ta = -40°C to +85°C

ATEX Certificate: Sira 07ATEX1331U

IECEx Certified: Flameproof, Gas Group IIC

Ex d IIC

Ex A21 tD IP68

Ta = -40°C to +85°C

IECEx Certificate: IECEx SIR 07.0111U

Year of Construction

This information is printed on the enclosure label.

SAFETY INFORMATION



CAUTION: Read complete instructions prior to installation and operation of the temperature transmitter.

Installation and service should be performed only by trained service personnel. Service requiring replacement of internal components must be performed at the factory.

INSTALLATION

For hazardous area applications, the installer is responsible for following all the appropriate hazardous area installation requirements.

For Installation in USA: The Smart Temperature Transmitter must be installed in accordance with the National Electrical Code (NEC) NFPA 70.

For Installation in Canada: The Smart Temperature Transmitter must be installed in accordance with the Canadian Electrical Code CSA 22.1.

For European Community: The Smart Temperature Transmitter must be installed in accordance with the ATEX directive 94/9/EC, the product certificates ATEX Certificate: Sira 07ATEX1331U, IECEx Certificate: IECEx SIR 07.0111U.



CAUTION: Disconnect from supply before opening enclosure. Keep cover tight while circuits are alive. Conduit seals must be installed within 18" of the enclosure.

All wiring connectors are accessed by opening the enclosure, removing the two screws holding the transmitter and removing the temperature transmitter assembly. All configuration and programming is performed through the HART communication interface.

Unpacking

Remove the temperature transmitter from box. Inspect the packaging and contents for damage. Report damages, if any, to the carrier.

If any part is missing or the temperature transmitter malfunctions, please contact your supplier or the factory for assistance.

Pre-Installed Conduit Plug

The Smart Temperature Transmitter is supplied with one pre-installed optional conduit plug for installations that do not require the use of both conduit entries. The conduit plug includes an internal hexagonal socket recess for removal. The pre-installed plug is part of all hazardous area approvals for the explosion-proof enclosure. A conduit plug must be installed on any unused conduit entry.



CAUTION: Installations of the supplied conduit plug require the application of non-setting (solvent free) thread sealant. If the pre-installed conduit plug is removed or replaced all relevant hazardous area guidelines must be followed for its installation or replacement conduit.

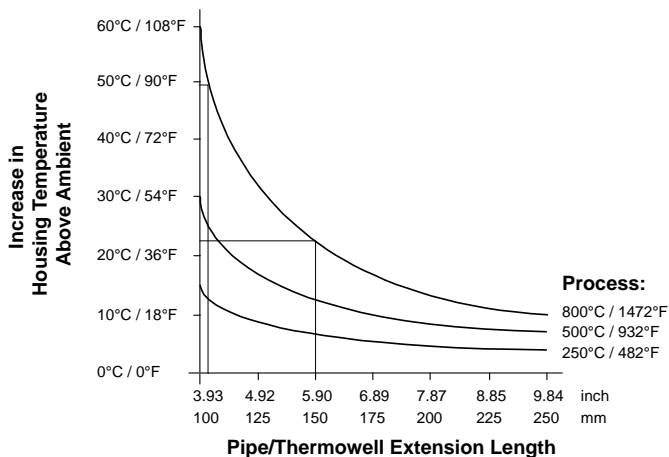
Mounting

The PD310 & PD312 with explosion-proof or safe area NEMA 4 housings can be mounted using four different methods, those are: wall mounting, pipe mounting, conduit mounting, or direct mounting. Two mounting holes are provided for 1.5" pipe or wall mounting, for 2" pipe mounting use the PDA6845 pipe mount kit. Refer to *Mounting Dimensions*, page 31 for details on wall or panel space requirements.

(continued next page)

In those cases where the preferred installation of the ExSense transmitter is directly mounted to a probe or thermowell, care should be exercised to assure that the maximum temperature specification of the transmitter is not exceeded due to heat transfer from the process. High temperature applications require the use of a pipe/thermowell extension and union of the appropriate length, or to mount the transmitter in a remote location.

Please refer to the graph below. The graph will provide an approximation of the temperature rise of the ExSense enclosure above ambient with different pipe/thermowell extension lengths and process temperatures. One should allow for some safety margin, as there are a number of variables that effect this information that cannot be easily accounted for. The maximum operating temperature of the PD310 & PD312 ExSense transmitter is 75°C.



Connections

To access the connectors, remove the enclosure cover and unscrew the two screws holding the display module. Lift the display module from the enclosure to gain access to the screw terminal connectors. If necessary, the display module can be disconnected by removing the two plug-in connectors on the input board.

The input sensor and 4-20 mA output loop connections are made to the screw terminal connectors located on the bottom of the enclosure. The terminals are clearly marked on the board indicating how to connect TC and RTD sensors as well as how to connect the 4-20 mA output loop.

- 1: + Loop output (4-20 mA)
- 2: - Loop output (4-20 mA)
- 3: RTD 3-wire connection (odd color lead)
- 4: TC+, mV+, or RTD 4-wire connection
- 5: RTD 3-wire connection (same color lead)
- 6: TC-, mV-, or RTD 3-wire connection (same color lead)

Note: mV signals are connected to terminals 4(+) and 6(-).

Refer to Figure 1 for terminal positions on the board located at the bottom of the enclosure.



Observe all safety regulations. Electrical wiring should be performed in accordance with all agency requirements and applicable national, state, and local codes to prevent damage to the temperature transmitter and ensure personnel safety.

Grounding connections are made to the two ground screws provided on the base of the enclosure – one internal and one external.

Note: The 4-20 mA signal may be grounded at one point only, usually at the negative of the power supply or it may be left ungrounded.

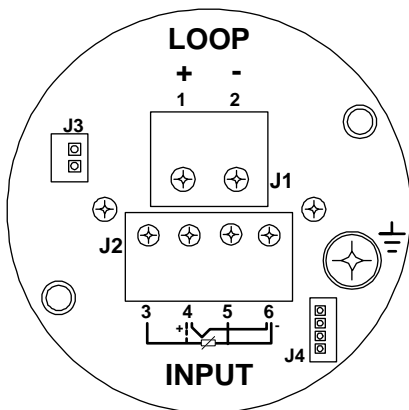


Figure 1. Sensor & Loop Connectors

Sensor & 4-20 mA Output Connections

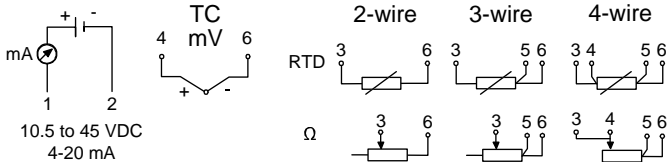


Figure 2. Sensor & 4-20 mA Connections

HART Connections to PC & Communicator

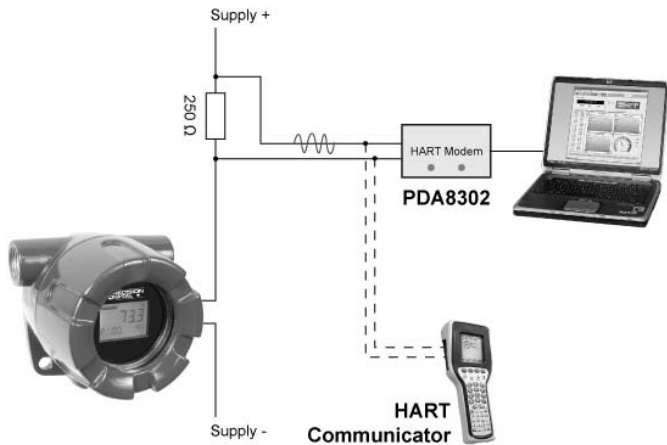


Figure 3. Connections to PC & HART Communicator

SETUP AND PROGRAMMING

HART communication requires a minimum of 250 Ω in the 4-20 mA loop. See Load Impedance specification to calculate the maximum load based on the power supply voltage (e.g. 650 Ω @ 24 VDC).

The HART signal can be accessed using a HART communicator or a HART modem anywhere in the loop.

Overview

There are no jumpers, switches, or potentiometers involved in the setup process of the temperature transmitter.

All setup and programming is done using a HART modem and a PC running the free software provided or using a HART Communicator (not all parameters are available with a HART Communicator).

Note: Input Type and Units cannot be changed with a HART Communicator.

It is recommended to commission the Smart Temperature Transmitter prior to installation in a hazardous area.

After all connections have been completed and verified, apply power to the temperature transmitter.

HART Temperature Transmitter Software

The HART Temperature Transmitter Software (HTTemp) can be downloaded free from **www.predig.com**. This is a simple user-friendly application to be used with the ExSense T Series only.

The software allows the user to setup all the transmitter parameters available through the HART communication interface.

Follow these steps to download and run the software:

1. Download the software from **www.predig.com** and save.
2. Unzip the file to a selected folder location.
3. Create a shortcut for the **HTTemp_.exe** program file on the desktop.
4. Connect the HART modem PDA8302 across the 250 Ω resistor and to the USB port on the PC. See the instructions below to install the USB driver for the HART modem.
5. Once the HART modem driver has been successfully installed double-click on the HTTemp program shortcut to run the software.
6. Click on “Environment – Serial Port” and select the COM port at the bottom of the list (e.g. COM3). This is a Virtual COM port created by the USB driver. If there are no other COM ports in use, then only one port will be shown.
7. Click on the “Get” button of the “Current Value” window. The process value registered by the input sensor should be displayed in this window.
8. If the communication was not successful, a “Communication Failure!” message will be displayed.
9. Close the program and repeat steps 5-7 above. If the problem still persists, follow the instructions for the HART modem driver installation provided.

PDA8302 HART Modem USB Driver Installation

1. Connect the HART modem to the USB port and follow the on-screen instructions.
2. When prompted for the driver location, browse to the folder where the downloaded software was unzipped. If connected to the Internet, allow the program to search for the driver.
3. The driver installation program requires the process to be repeated twice. Please do not cancel and repeat the process again. After the second time the driver installation is completed and a message is displayed indicating that the new hardware is ready to be used.

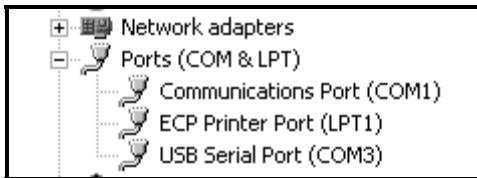
Determining the COM Port Number

To determine the COM port number associated with the new USB device installed:

1. Click on “Start” – “Control Panel” – “System”



2. Click on “Hardware” – “Device Manager” – “Ports”



3. Here is the USB Serial Port associated with the new USB device (e.g. COM3).
4. If there are more USB Serial ports enabled, disconnect the HART modem from the USB port and notice which COM port disappears from the above screen. Connect the HART modem to the USB port again and notice which port is enabled. This is the COM port to be selected – in the HTTemp program.

4-20 mA Loop Current Setup

The Current Setup window is used to trim the analog output to match the device reading the 4-20 mA current.

1. Click on Read next to the 4.000 mA box and type the actual mA reading corresponding to the 4 mA output (e.g. 3.998).
2. Click on Read next to the 20.000 mA box and type the actual mA reading corresponding to the 20 mA output (e.g. 20.002).
3. Click on Update to upload the new values to the transmitter.

Test the loop by selecting a Fix Loop value and clicking Send. When the Fix Loop is used, the loop is put in manual mode.

Click on Exit to finish testing the loop and return the loop to automatic control mode.



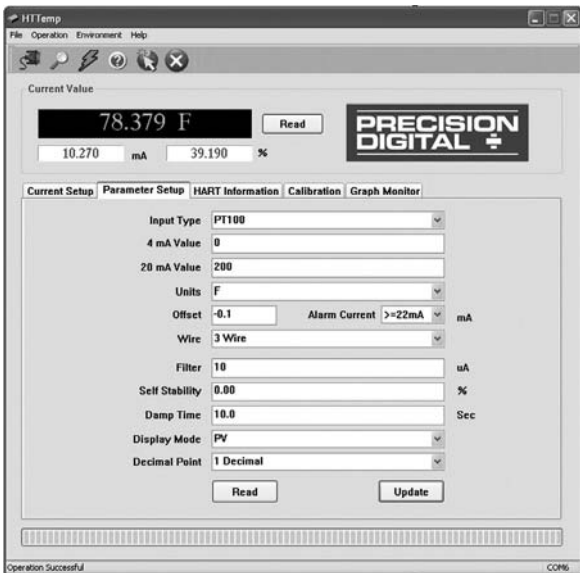
Parameter Setup

The Parameter Setup window is used to set up the input type, range for the 4-20 mA, temperature units, and other settings related to the sensor and analog output. The Display Mode allows the selection of PV, mA, or % for the display.

The 4.000 mA and 20.000 mA settings correspond to the display values at which the 4-20 mA output is generated.

Use the Offset parameter to make minor adjustments to the 4 mA value.

The ExSense T transmitters support 2, 3, and 4-wire RTDs. The selection must match the actual RTD wiring.



Minimum Input Span

The minimum input span is the minimum difference between the Zero value and the Full value signals required to generate the 4-20 mA output signal on the temperature transmitter (e.g. 18°F for RTDs). Refer to table on page 10 for the minimum span specifications.

Decimal Point

One decimal or no decimal point may be selected for the PV display. Selecting other decimal points results in one decimal.

Up to three decimal digits may be selected for Current or Percent display.

Alarm Current

An open thermocouple or RTD generates an alarm current condition, which can be either ≤ 3.6 mA or ≥ 22 mA. If the input signal exceeds the transmitter range significantly, the output will go to the alarm current value. Under the alarm condition the display shows the message Er-06.

Underrange and Overage

An underrange condition generates a 3.8 mA output and an overrange condition generates a 20.5 mA output. The display shows the messages Er-07 and Er-08 respectively.

Error Messages

An error message indicates that the signal is out of the programmed range for the transmitter.

Er-06: Open sensor – Output alarm (≤ 3.6 or ≥ 22 mA)

Er-07: Underrange – (3.8 mA)

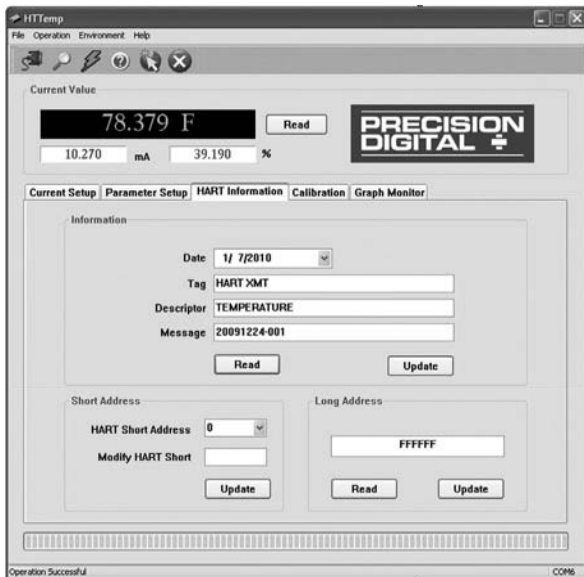
Er-08: Overage – (20.5 mA)

HART Information

The HART Information window allows the user to program or read the transmitter information and to modify the HART address for multi-drop applications.

The Short address is 0 for standalone applications and 1-15 for multi-drop applications. In multi-drop applications the analog output current is forced to 4 mA.

The Long Address is 6-digit long and should be set to any unique number, but it should be different than the Short Address number.



Calibration

For most applications it should not be necessary to calibrate the 4-20 mA output. Instead of Calibration use the Parameter Setup to set the 4-20 mA output values.

If a precise calibration is needed for a specific input type and range, follow the steps below:

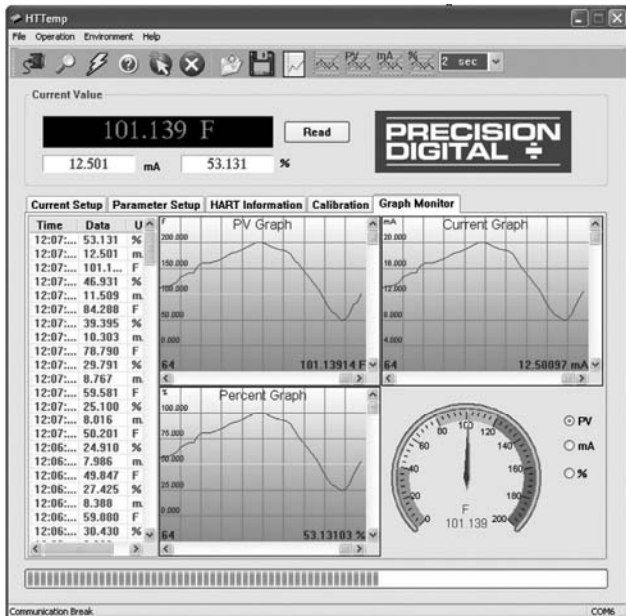
1. Connect a calibrated signal source to the input.
2. Apply the low value signal at which 4 mA will be generated.
3. Click on Calibration to 4 mA.
4. Apply the high value signal at which 20 mA will be generated.
5. Click on Calibration to 20 mA.



Graph Monitor

The Graph Monitor window is used to monitor the PV, mA, and %. Monitor the three variables at once or just one of the variables.

A log data file can be saved for later viewing; it contains the time, data value, and units. The screen update rate is selectable between 2 sec and 30 min.

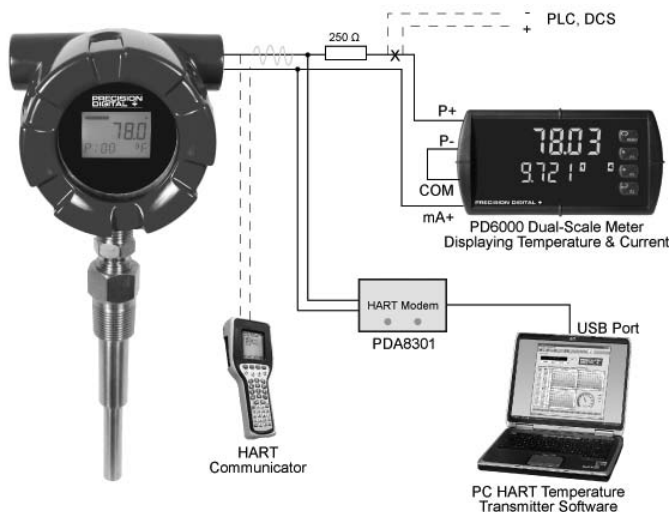


Note: There is no provision to export the log file to other applications. The saved file may be viewed only with the HTTemp software.

APPLICATION

PD312 HART Transmitter & Remote Display

In this application the Smart HART Explosion-Proof Temperature Transmitter is being powered by the PD6000 dual-scale meter; the meter displays the temperature on the top display and the mA current on the bottom display. A PLC, DCS, or other devices could be connected in the loop as shown. The 250 ohm resistor is the minimum loop resistance needed for HART communication with a HART modem or a HART communicator.



MOUNTING DIMENSIONS

All units: inches [mm]

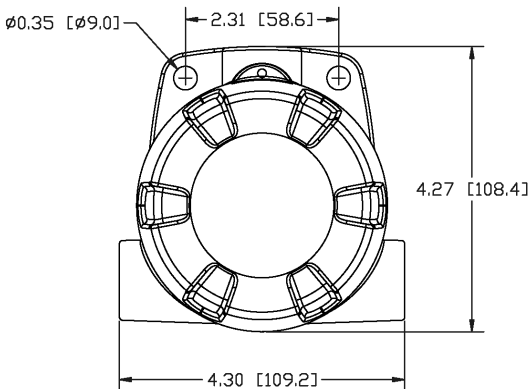


Figure 4. Enclosure Dimensions – Front View

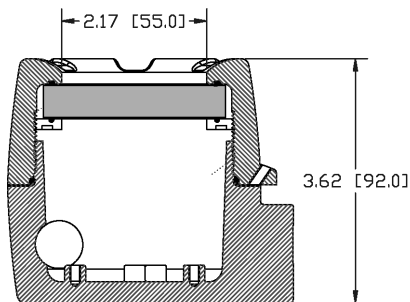


Figure 5. Enclosure Dimensions – Side Cross Section View

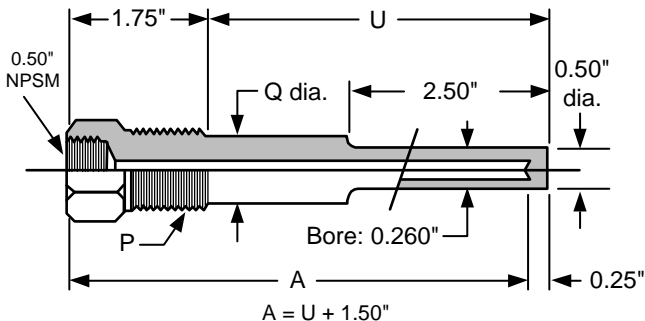
TEMPERATURE PROBES

RTD and TC probes may be specified and order separately using the following Model Configuration chart.

ERP Field Location	1	2	3	4	5	6	7	8	9	10
Model Number	P	D	A	P	1	2	-	R	0	6
Sensor Type					↑					
P1 = Pt100 RTD TJ = Type J TC TK = Type K TC TT = Type T TC										
Sensor Lead Length					↑					
1 = 6" Note: Lead length must be appropriate for the extension length, if used. 2 = 12" 3 = 18" 4 = 24" X = 5-9 for other lengths										
Probe Type								↑		
R = Rigid probe S = Spring-loaded probe										
Probe Length								↑		↑
06 = 6" Probe 09 = 9" Probe 12 = 12" Probe XX = Length in inches										

THERMOWELLS

Thermowells may be ordered separately using the following sample drawing and the Model Configuration chart.



Thermowell Model Configuration

Model	Description			
PDAT1	Thermowell, Stepped Stem, Threaded			
	CODE	"P" Process Thread	Shank Dia. Q	"H" HEX(A/F)
	P1	1/2" NPT	5/8"	1 1/8"
	P2	3/4" NPT	3/4"	1 1/8"
	P3	1" NPT	7/8"	1 3/8"
	CODE	Material Of Construction		
	S1	SS304		
	S2	SS316		
	CODE	"U" Immersion Length		
	000	Specify in Inches		
		Example 025 = 2.5"		
PDAT106 =	P2	S2	045	A = 06 (045 + 015)
PDAT109 =	P2	S2	075	A = 09 (075 + 015)
PDAT112 =	P2	S2	105	A = 12 (105 + 015)

Thermowell Type

T1 = Thermowell, stepped stem, threaded with 1/2" NPSM sensor connection, 3/4" NPT process connection, SS316.

TX: Where X = 2-9 to be determined.

Note: Other thermowell types and sizes are available upon request.

TROUBLESHOOTING

If the Smart Temperature Transmitter is not working as expected, refer to the recommendations below.

Symptom	Check/Action
No display	<ul style="list-style-type: none">• Check power supply
No communication	<ul style="list-style-type: none">• Voltage too low• Check loop impedance, 250Ω min
Fault or alarm current (≤ 3.6 mA or ≥ 22.0 mA)	<ul style="list-style-type: none">• Defective or open sensor• Incorrect programmed range
4-20 mA output is not correct (Display value is correct)	<ul style="list-style-type: none">• Check voltage across transmitter• Reduce loop impedance
Output is fixed at 4 mA	<ul style="list-style-type: none">• Transmitter configured for multi-drop mode• Change HART address to zero
Temperature reading is not correct	<ul style="list-style-type: none">• Wrong or defective sensor• Check scaling• Check offset value
Error message Er-06	<ul style="list-style-type: none">• Check input sensor connections and check for open sensor condition.
Error message Er-07	<ul style="list-style-type: none">• Sensor signal is less than the lower range value (LRV)
Error message Er-08	<ul style="list-style-type: none">• Sensor signal is greater than the upper range value (URV)
Other symptoms not described above	<ul style="list-style-type: none">• Call Technical Support for assistance.

How to Contact Precision Digital

- For Technical Support:
Call: (800) 610-5239 or (508) 655-7300
Fax: (508) 655-8990
Email: support@predig.com
- For Sales Support:
Call: (800) 343-1001 or (508) 655-7300
Fax: (508) 655-8990
Email: sales@predig.com
- For the latest version of this manual please visit:
www.predig.com

