



CONAX TECHNOLOGIES
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INSTALLATION AND MAINTENANCE MANUAL

FOR

CONAX

PC PROGRAMMABLE THERMISTOR TRANSMITTERS

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DATE 12/02/02

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DATE 1/2/03

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DATE 1/2/03



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THERMISTOR TRANSMITTERS**



TABLE OF CONTENTS

| <u>SECTION</u> | <u>DESCRIPTION</u> | <u>PAGE</u> |
|------------------------|---|--------------------|
| 1.0 | SCOPE | 3 |
| 2.0 | APPLICABLE DOCUMENTS | 3 |
| 3.0 | GENERAL DESCRIPTION AND STANDARD FEATURES | 3 |
| 4.0 | SPECIFICATIONS | 4 |
| 5.0 | INSTALLATION | 5 |
| 6.0 | CALIBRATION AND OPERATION | 5 |
| 7.0 | SOFTWARE INSTALLATION AND CONFIGURATION | 5 |
| 8.0 | SIMULATION FUNCTION | 22 |
| 9.0 | TROUBLESHOOTING | 23 |
| <u>APPENDIX</u> | | |
| A | PDT-440/444 DIMENSIONS | 24 |
| B | PDT-440/444 TERMINAL ASSIGNMENTS & WIRING SCHEMATICS | 25 |
| C | PROGRAMMING SOFTWARE | 26 |

1.0 **SCOPE**

This manual provides instructions on setup and use of Conax PC Programmable Transmitters, Models PDT-440 and PDT-444.

2.0 **APPLICABLE DOCUMENTS**

- 2.1 CT Part Number 318996-001, Just-PC™ Programmable Software for PC Programmable Transmitters.
- 2.2 CT Part Number 318997-001, Programmable Adaptor Cable, Model No. PA-400 (RS-232).
- 2.3 CT Part Number 318997-002, Programmable Adaptor Cable, Model No. PA-400 (USB).
- 2.4 CT Drawing No. 10-0454; Transmitter, Model No. PDT-440/444.

3.0 **GENERAL DESCRIPTION AND STANDARD FEATURES**

The PDT-440 and PDT-444 are state-of-the-art micro-processor based, smart, 2-wire (PDT-440) and 4-wire (PDT-444) transmitters. Both models can be fully configured using the user-friendly configuration software. This combination eliminates the need for jumpers, calibrators, screw drivers, hand-held programmers or power supplies for calibration.

Conax PC-Programmable transmitters are fully software driven. All input types and range parameters are easily configurable using both the user-friendly software the PA-400 programming adaptor under most Windows® operating systems through the PC's RS-232 serial port or USB port.

4.0 SPECIFICATIONS

4.1 SENSOR INPUT TYPES

THERMISTORS: Most standard types and makes, and all special types defined by either user-defined tables or user-entered Steinhart-Hart coefficients.

| | |
|------------------------|--|
| RESISTANCE RANGE: | PDT-440, from 10 to 4000K ohms PDT-444 (Low-R), from 10 to 25K ohms PDT-444 (High-R), from 500 to 4000K ohms |
| OUTPUTS: | 4-20 mA, isolated loop powered. |
| RANGE OF SPAN: | 5°C to 150°C |
| SUPPLY VOLTAGE: | 9-40 VDC (no load). Reverse polarity protected. |
| MAXIMUM LOAD: | $R_{max} = (V_{supply} - 9) / 20mA$ |
| OPERATION TEMPERATURE: | -40 to 85°C. |
| STORAGE TEMPERATURE: | -55 to 125°C. |
| HUMIDITY: | 0-95% RH, non-condensing. |
| RESPONSE TIME: | 0.3 seconds to 90% of input (>3 updates per second). |
| OUTPUT DAMPING: | Programmable 0.0 to 64.0 seconds, or 0–120% of input range, using software interface. |
| LONG TERM STABILITY: | Better than $\pm 0.1\%$ of span for 12 months. |
| I/O ISOLATION: | 2000 VDC or peak AC. |
| RFI PROTECTION: | < 1% effect of span at 20–1000 Hz and at a field strength of 20 V/m. CE marked. |

4.2 PERFORMANCE SPECIFICATIONS

| | |
|-------------------------|--|
| OUTPUT RESOLUTION: | 0.0138% of span (approx. 2.5 micro-amps). |
| OUTPUT (D/A) LINEARITY: | Better than 0.02% of output span. |
| SENSOR LINEARIZATION: | Better than 0.1°C (≥ 140 points, not equally spaced) |
| TEMPERATURE STABILITY: | 0.01% / °C combined Zero and Span. |
| SUPPLY VOLTAGE EFFECTS: | $< \pm 0.002\%$ per Volt. |

5.0 INSTALLATION

The PDT-440/444 is designed to be mounted directly to a standard 3.5 mm DIN rail. Dimensional information and wiring schematics are provided in Appendices A & B.

6.0 CALIBRATION AND OPERATION

Calibration is automatic. The unit includes all of the calibration parameters. It performs periodic "Zero", "Span" and self tests to complete self/auto calibration.

REQUIREMENTS:

- (1) Just-PC™ Program Software Media (See Appendix C)
CT P/N 318996-001
- (2) PA-400 Programming Adapter
CT P/N 318997-001 (RS-232 Interface)
CT P/N 318997-002 (USB Interface)

7.0 SOFTWARE INSTALLATION AND CONFIGURATION (Just-PC™)

7.1 SOFTWARE INSTALLATION

CAUTION

BEFORE INSTALLING THE NEW CONFIGURATION SOFTWARE, IT IS ALWAYS ADVISABLE TO CLOSE ALL OTHER APPLICATIONS INCLUDING VIRUS SCANNERS AND OFFICE SUITES. FAILURE TO DO SO MAY RESULT IN THE CORRUPTION OF CERTAIN COMMON FILES.

The Configuration software may be installed on Windows 95, 98, 98SE, NT, 2000, and XP systems. To install, insert the software media into the proper drive on your computer and run "install.exe". Follow the onscreen instructions for complete installation.

If required, identify the port number on the PC that the adapter is connected to. From the Just-PC menu bar, select the "Options" menu, click on "Communication" sub-item. On the form that appears, select the corresponding COM port designation from the pull-down menu (See Figures 1 and 2). Click "OK" to complete the selection. The port will immediately be polled for an available transmitter. If available, the transmitter's programming will be downloaded and displayed. If the transmitter is unavailable, a message box will be displayed notifying that a transmitter has not been found. Ignore this error if one is not connected. If the transmitter is connected try changing COM ports (physically or software setting) and/or exiting and re-entering the program to re-attempt communication with the transmitter.

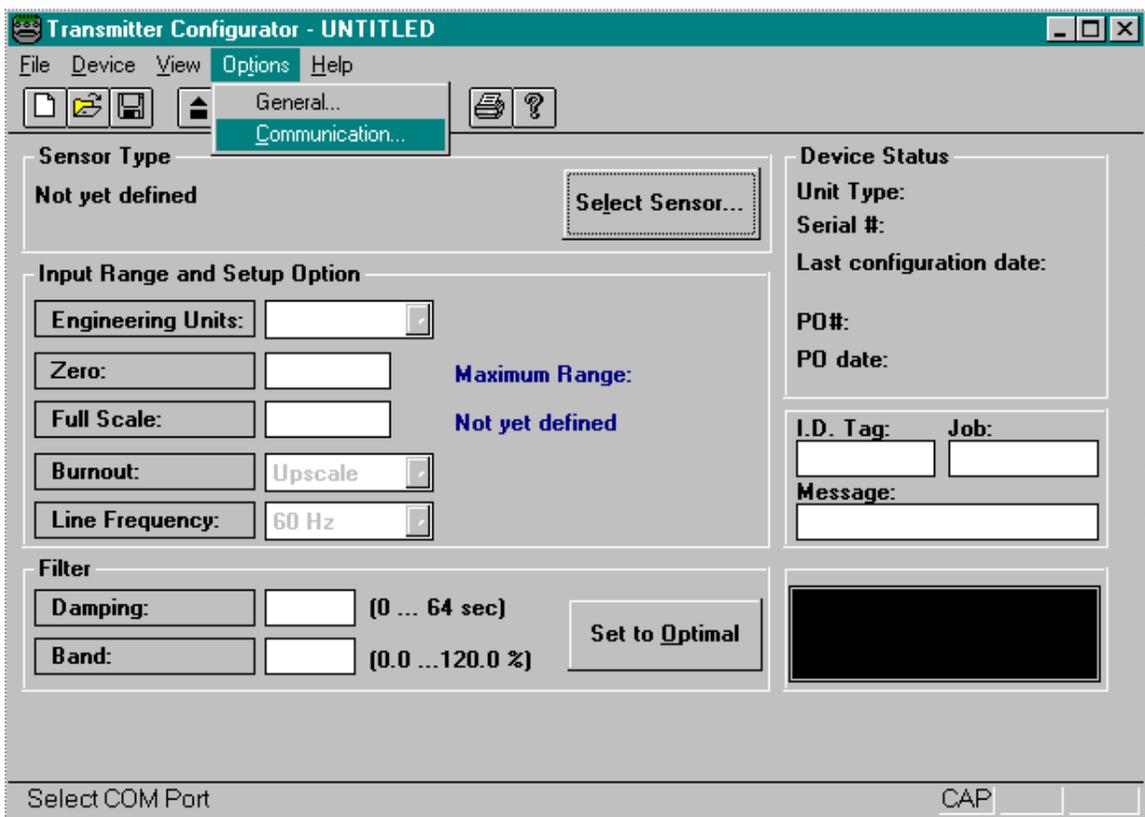
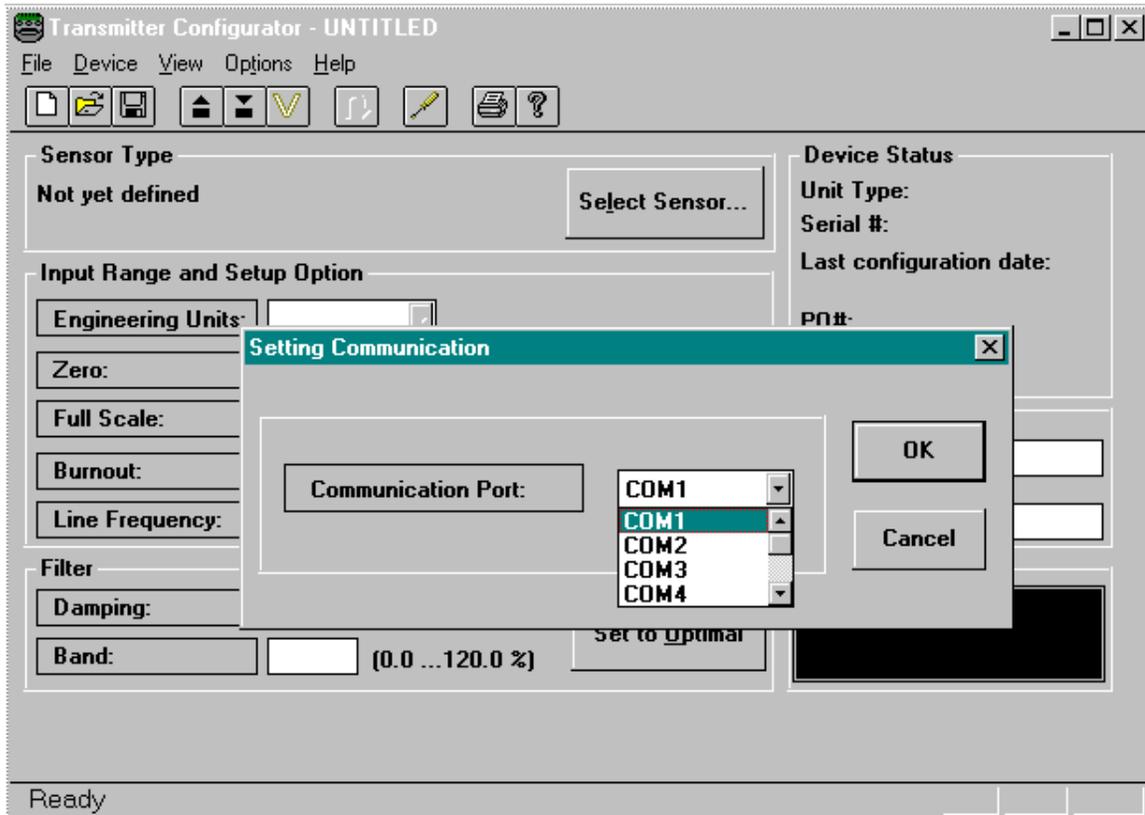


FIGURE 1

**FIGURE 2**

7.2 CONFIGURATION

- 7.2.1 Connect the PA-400 programming adapter into the appropriate port on the PC.
- 7.2.2 Execute the software by double-clicking the Configuration  icon to start and wait momentarily while the program loads. Click "**Continue**" to bypass the "splash" (startup) screen.
- 7.2.3 Connect the plug on the transmitter side of the PA-400 cable to the 6-pin programming port on the transmitter.
- 7.2.4 When the connection is made and the program recognizes that a transmitter is connected, the toolbar icons will become highlighted and the software automatically uploads the current settings from the connected transmitter. If it doesn't upload automatically, click on the "**UPLOAD**" icon . This will begin the communication process between the transmitter and your PC. Once completed, the transmitter's calibration and configuration settings will be loaded into your PC. See Figure 3. Adjust communication port settings if necessary under the "Options" menu.

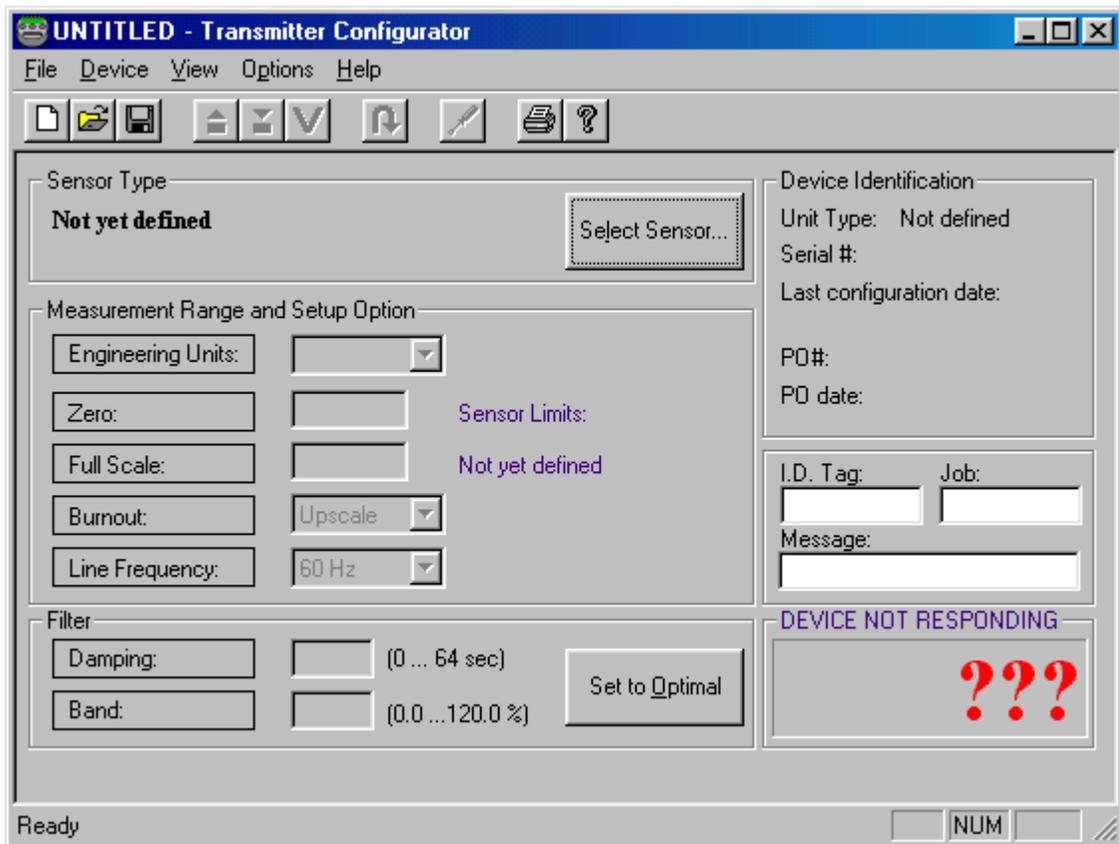


FIGURE 3

(Figure 3 is an example of the screen that will be displayed when the user opens the program. From this point you must plug-in the transmitter to the computer for the next screen, Figure 4, to appear.)

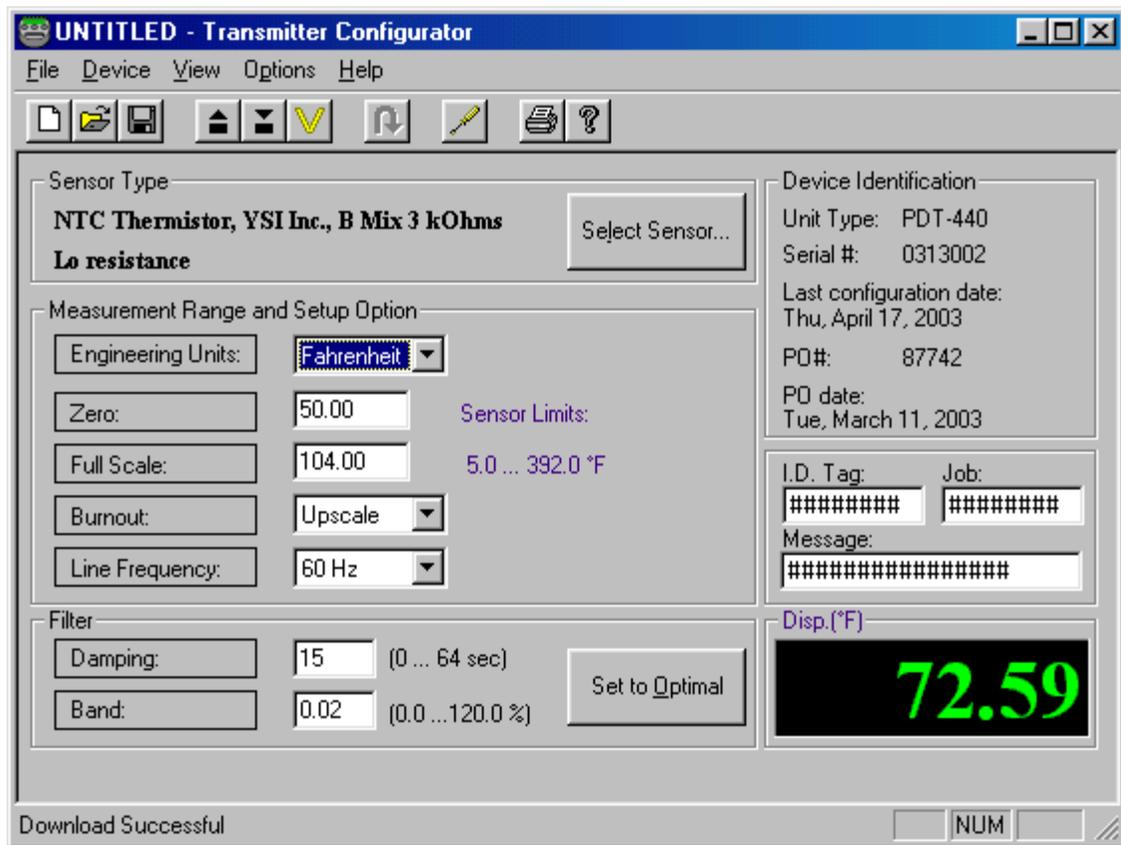


FIGURE 4

7.2.5 Select the input sensor type by clicking on the “**Select Sensor**” button. An input form requiring sensor definition will now be displayed. See Figure 5A. If you do not have the transmitter attached to the serial port at this time, you will be asked to select the transmitter model number from our suite of Just-PC™ programmable transmitters before defining the sensor.

Input Sensor Selection

✓ NTC Thermistor

Input Connection

Lo OHMS

Hi OHMS

Type

Brand: YSI Inc.

Type: B Mix 3 kOhms

Mode

Standard

Steinhart-Hart coefficients...

A:

B:

C: Find coef.

OK Cancel

FIGURE 5A

(Figure 5A is an example of the screen that will be displayed after selecting the "Select Sensor" button and a PDT-440/444 transmitter is plugged into the computer's serial port.)

- 7.2.5 Click on the various selection boxes which best define your sensor's parameters. For a PDT-440 transmitter, you must select either "**Lo OHMS**" or "**Hi OHMS**" to define the input terminals that the thermistor will be connected that correctly define the input thermistor. "Lo OHMS" should be selected when the thermistor is below 25K Ω , and "Hi OHMS" when the thermistor is above 25K and below 4M Ω . A thermistor should be further defined by one of the four following methods;
- 7.2.5.1 Standard Mode. Mark the "**Standard**" option in the Mode area of the form. Select both a Brand (manufacture) and a Type (mixture, model number, etc.) from the drop-down boxes in the Type area of the Input Sensor Selection form.

7.2.5.2 Known Steinhart-Hart Coefficients. Mark the "**Steinhart-Hart coefficients...**" option in the Mode area of the Sensor Input Selection form. Enter known A, B and C as defined by the Steinhart-Hart formula given below. The N=2 (squared) term and terms N >= 4 have been dropped from the Nth-Term polynomial, due to their normally insignificant impact to the final answer. Note that temperature (T_K) is degrees Kelvin where °K = 273.15 + °C.

$$1/T_K = A + B/T + C/(T_K^3)$$

7.2.5.3 Calculated Steinhart-Hart Coefficients. Mark the "**Steinhart-Hart coefficients...**" option in the Mode area of the form. Click the "**Find coef.**" button in the same area of the form. A dialog box appears asking for three, known data points along the thermistor's calibrated R vs. T curve. For optimum performance, select T2 as the mid-point of the desired span, select T1 and T3 such that they are minus (T1) and plus (T3) 10-50°C from T2 **REGARDLESS** to whether they fall inside or outside the desired span. The entered information is utilized for calculation of the coefficients only. Press "**OK**" to directly apply them to the "Input Sensor Selection" (previous) screen, or press "**Apply**" to see the results in the A, B and C boxes before applying them on the previous screen. Press "**OK**", if not done already, to close and apply to the previous screen or "**Cancel**" to escape the calculation completely. See Figure 5B below.

Find Steinhart Hart Coefficients [X]

3 points properties

T 1: R 1:

T 2: R 2:

T 3: R 3:

OK

Apply

Hint

Cancel

Steinhart - Hart coefficients

A: B: C:

To calculate the Steinhart-Hart coefficients enter the Temperature and Resistance values for three points in the T and R dialog boxes. If the coefficients are know, enter them in dialog boxes A, B and C.

For optimum performance: -40 °C < T1, T2, T3 < +150 °
 10 °C < |T2 - T1| < 50 °
 10 °C < |T3 - T2| < 50 °

FIGURE 5B

- 7.2.5.4 User Table. Mark the "**User table**" option in the Mode area of the form. The table is a user-generated text file that contains temperature versus resistance information (two columns, space delimited) and comments. See paragraph 7.5 for more details.
- 7.2.6 Once your sensor has been defined, Click the "**OK**" button to return to the main screen. On the main screen next to the "**Select Sensor**" button, the selected sensor type will be displayed. See Figure 6 below. This confirms the selection made by the user or downloaded from the transmitter.

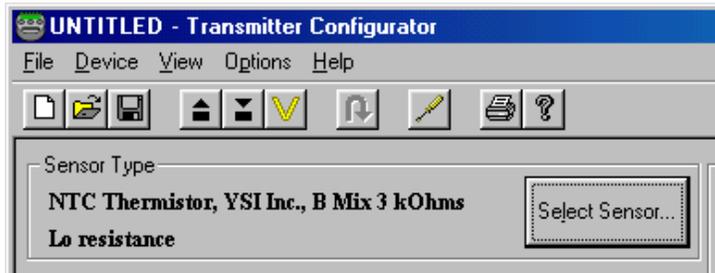


FIGURE 6

- 7.2.7 Select the "**Engineering Units**" when appropriate from a pull-down menu. Available choices are °F, °C or °K. See Figure 7 below.

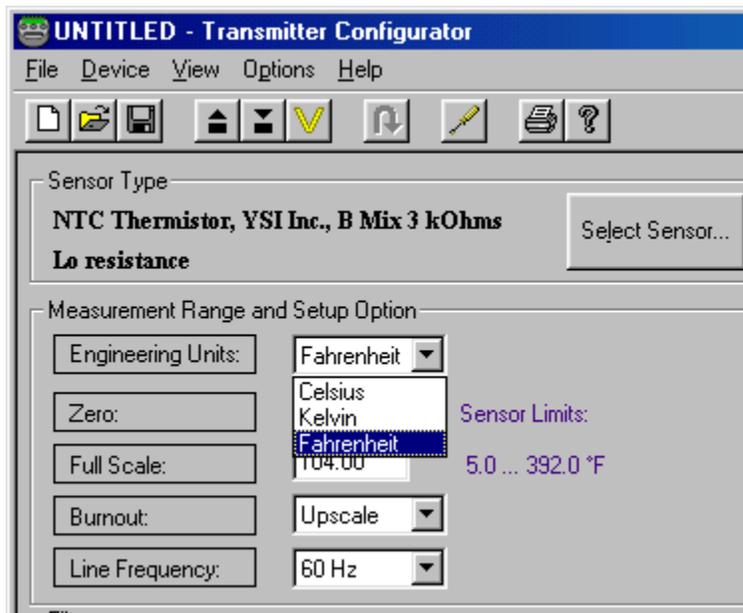
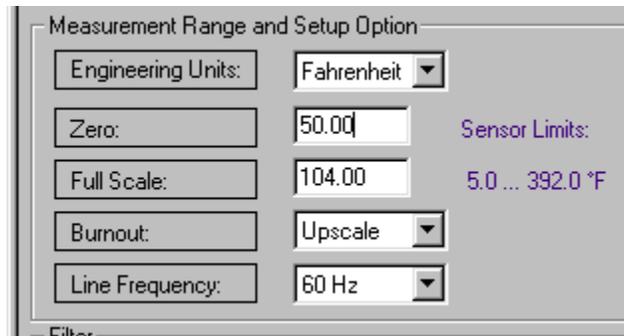


FIGURE 7

- 7.2.8 TAB down to the next box which defines “**Zero**”. Just to the right of the “**Zero**” box in highlighted type is the maximum allowable measurement range for the selected sensor. Enter a “**Zero**” value that defines the lowest, desired transmitted temperature (4mA). See Figure 8 below.
- 7.2.9 TAB down to “**Full Scale**”. Enter the “**Full Scale**” value that defines the highest, desired transmitted temperature (20mA). See Figure 8 below.



Measurement Range and Setup Option

Engineering Units: Fahrenheit

Zero: 50.00 Sensor Limits: 5.0 ... 392.0 °F

Full Scale: 104.00

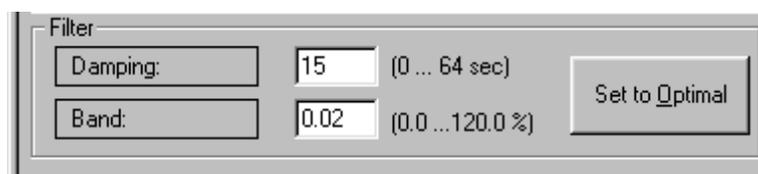
Burnout: Upscale

Line Frequency: 60 Hz

Filter:

FIGURE 8

- 7.2.10 TAB to the “**Burnout**” field. From the drop-down list, select either **Upscale** or **Downscale**. Burnout determines what value (3.5 mA = downscale or 23mA = upscale) to send on the analog side when an error occurs at the sensor. See Figure 8 above. In this fashion, a heater can be turned off (for example) in a control scheme if a sensor opens or shorts.
- 7.2.11 TAB to the “**Line Frequency**” field and select either 50Hz or 60Hz from the drop-down list as appropriate for the transmitter's area of work. See Figure 8 above. The transmitter doesn't utilize AC power, but provides filtering of noise based on this frequency.
- 7.2.12 Click on the “**Set to Optimal**” button to enable the program to calculate and select optimal values for both the damping time and the band percentage. **See Paragraph 7.4 for more information on this function** and Figure 9 below.



Filter

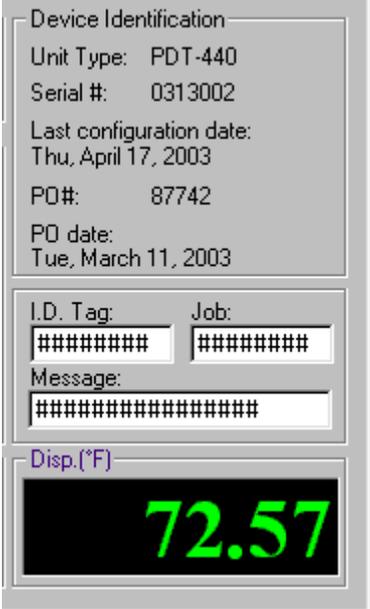
Damping: 15 (0 ... 64 sec)

Band: 0.02 (0.0 ... 120.0 %)

Set to Optimal

FIGURE 9

- 7.2.13 Optional. TAB to the "**I.D. Tag**" field and type up to an 8 alpha-numeric entry for a description to be saved in the transmitter's memory. You may do the same for the "**Job**" and "**Message**" fields. The Message field contains up to 16 characters. See Figure 10 below and paragraph 7.3 for more details.



The screenshot shows a configuration window with the following fields:

- Device Identification**
 - Unit Type: PDT-440
 - Serial #: 0313002
 - Last configuration date: Thu, April 17, 2003
 - PD#: 87742
 - PD date: Tue, March 11, 2003
- I.D. Tag:** [#####]
- Job:** [#####]
- Message:** [#####]
- Disp.(°F):** 72.57

FIGURE 10

- 7.2.14 Configuration of the transmitter parameters is complete. Click the "**DOWNLOAD**" icon  near the top of the screen. This will instruct the PC to calculate the new configuration parameters and download them into the transmitter.

7.3 OPTIONAL FEATURES

7.3.1 User Identification Fields

The transmitters contain three user fields which may be used for unit identification, tracking or anything specific to the unit that one may want to record locally. They can be recalled simply by uploading the transmitter's configuration into the Just-PC™ program. They can be modified and downloaded back into the transmitter. Ensure that you have either uploaded or re-entered all the other transmitter settings before downloading to retain the desired functionality of the transmitter. These fields are stored only in the transmitter, and are NOT saved as part of a locally-stored configuration file (see paragraph 7.3.2). The available user fields include:

I.D. Tag: Up to 8 alphanumeric characters
Job: Up to 8 alphanumeric characters
Message: Up to 16 alphanumeric characters

7.3.2 Saving Configuration Information

Each transmitter's configuration may be saved into a file and stored anywhere that the programming computer has access to. This information can be used for future reference, re-loading, archiving, statistical comparative analysis and record keeping. The configuration file includes transmitter model, sensor description, measurement range, setup options and filter settings. It does not include user identification fields, nor does opening a user file overwrite the currently entered or uploaded user identification fields. These fields are part of the printed configuration and calibration information (see paragraph 7.3.3).

NOTE: To preserve the current user information stored in the transmitter, ensure that you have uploaded the current configuration from the transmitter. This may be done automatically when you plug into the transmitter if the General Option "Enable Auto Upload" is selected.

To **SAVE** the configuration to a file (*.con), click on the "**Software Media**"  icon in the tool bar and specify a filename and directory location to which the file should be saved.

7.3.3 Printing Configuration and Calibration Information

Click on the "**PRINTER**"  icon on the tool bar to initiate printing of the transmitter's configuration and calibration information. The report includes device and sensor information, input ranging, setup options, filtering parameters, calibration references and dates, program identification and date/time report was printed. This printed information can provide invaluable data in the system's performance research, error corrections and "before" and "after" analysis. See Table 1 for an example printout.

TABLE 1

(Example 1 is an example printout of transmitter programming information)

Configuration and Calibration Information

Device Status

| | |
|---------------------------------|---------------------------|
| Unit Type: | PDT-440 |
| Serial Number: | 0313002 |
| Tag: | 970911 |
| Message: | Product Intake |
| Job: | Chiller |
| PO Number: | 971210MES |
| PO Date: | Tue, April 1, 2003 |
| Last Configuration Date: | Fri, April 4, 2003 |

Sensor Type

**NTC Thermistor, YSI Inc., B Mix 3
kOhms, Lo Resistance**

Input Range and Setup Option

| | |
|---------------------------|-------------------|
| Engineering Units: | Fahrenheit |
| Zero: | 50.00 |
| Full Scale: | 104.00 |
| Burnout: | Upscale |
| Line Frequency: | 60 Hz |

Filter

| | |
|-----------------|----------------|
| Damping: | 15 sec. |
| Band: | 0.02% |

Calibration References

| | |
|------------------------|-------------------|
| Output 4mA: | 1838 |
| Output 20mA: | 9225 |
| Input Lo Ohms: | 4982.393 |
| Input Hi Ohms: | 249642.203 |
| CJ Temperature: | 296.700 |

| | |
|-------------------------------|----------------------------|
| Last Calibration Date: | Tue, March 25, 2003 |
| Device Program I.D. : | 3309.26 |

Printed on: Thursday, April 17, 2003, 15:39:26

7.4 INPUT FILTERING

Input filtering is of great importance in a measurement application with a low level or slow changing signal. The effect of low pass filtering is to average out small transients of the input parameter resulting from process and sensor noise, as well as externally generated electrical noises. To overcome the sluggish response, associated with long filter settings, the transmitter can also apply a **Selective Filtering** technique. This technique allows the transmitter to achieve an extremely fast response for significant variations, yet to provide a stable, smooth and noise free output. Filtering is disabled if the Damping Factor is set to zero.

7.4.1 Damping Factor

The damping factor provides the number of seconds over which the input signal will be averaged. The greater the damping factor, the smoother the output and the slower the output responds to changes on the input. **Selective Filtering** implies that damping is only applied over a limited zone of input levels where noise is most likely to be found. This zone is known as the **Filter Band** (see paragraph 7.4.2).

7.4.2 Damping Filter Band

The **Filter Band** defines the amount of change in % of the input span (full scale value – zero value) over which the **Damping Factor** (averaging) is applied. Changes less than or equal to $(SPAN * Filter\ Band\ \%)$ will be averaged according to the damping factor. Changes greater than that are immediately transmitted. For example, a 0.1% filter band for a transmitter with an input span of 500°C means that averaging will apply to input variations of 0.5°C or less. However, changes in the input of greater than 0.5°C will be directly reflected in the transmitter's output without delay. Any change to either the Zero or Full Scale values necessitate a change in the Filter Band to maintain original performance. This value should be set to something greater than zero. Set damping factor to zero if no filtering is desired (see paragraph 7.4.1).

7.4.3 Optimal Filtering

The configuration software provides for calculation of optimal filter settings suitable for the majority of applications using the specified transmitter model, sensor description, Line Frequency, Zero and Full Scale values. To apply this function, simply click on the **“Set to Optimal”** button in the filter section of the main configuration screen. Resulting values will be displayed in the input boxes of both the Damping Factor and Filter Band variables.

7.5 USER DEFINED TABLES

User defined tables provide a convenient way to describe a sensor's resistance versus temperature curve directly without providing or calculating Steinhart-Hart coefficients. It is also well suited for techniques that do not provide adequate accuracy using standard techniques (i.e. don't precisely follow a standard Steinhart-Hart, 3-coefficient curve) or for sensors that are best described using multiple formulas to describe regions of sensor activity.

7.5.1 GENERAL FILE FORMATTING

The tables must be saved as simple text (ASCII) files. These text files may be written in, or transferred to, any standard text editor. We recommend storing these files with a *.TBL extension to discriminate the files from other sorts of data files. Lines containing notes, memos, comments and or text of any sort must be start (first character of the line) with an asterisk (*). These lines will be ignored during conversion of the table into the configuration software. See Table 2 for an example file listing.

The data portion of the ASCII table should be formatted as two columns of numerical values only. No letters, symbols or other non-numeric characters are allowed within the data. The first column should list temperature values (in °C) in ascending (increasing) order with each subsequent temperature larger than the previous by the same amount (consistent increment value). The second column should be separated by a at least one space or TAB ("white space" delimited) and should list the corresponding sensor resistance values (in Ohms).

It is recommended to apply the simulator function (Reference Para. 8.0) in order to verify that the input and output parameters correspond to the required values.

TABLE 2

*User defined table for
*Bill's Thermistor, Conax SPEC60
*Minimum range 15 degrees Celsius
*Maximum range 25 degrees Celsius
*First column degrees Celsius
*Second Column R (ohms)
*Use with Thermistor Sensor Type, User defined table
*Created by 123-4567-890, 03.03.03

| | |
|-------|------|
| 15.00 | 0.44 |
| 16.00 | 0.55 |
| 17.00 | 0.66 |
| 18.00 | 0.77 |
| 19.00 | 0.88 |
| 20.00 | 0.99 |
| 21.00 | 1.11 |
| 22.00 | 1.22 |
| 23.00 | 1.33 |
| 24.00 | 1.44 |
| 25.00 | 1.55 |
| 26.00 | 1.66 |
| 27.00 | 1.77 |
| 28.00 | 1.88 |
| 29.00 | 1.99 |
| 30.00 | 2.11 |

7.5.2 CREATING A TABLE FROM A MATH FUNCTION

If your sensor's transfer function can be described by a mathematical equation (polynomial, trigonometric, logarithmic, etc.), it is an easy task to convert it into a table. Use any commercial spreadsheet software program, under Windows such as Excel or Lotus, in order to generate a table as above. Use the "Save As" feature within the software to save in a "Tab Delimited" or "Text" format. Use "**COPY**" and "**PASTE**" commands to transfer the table section to any text editor such as "Notepad".

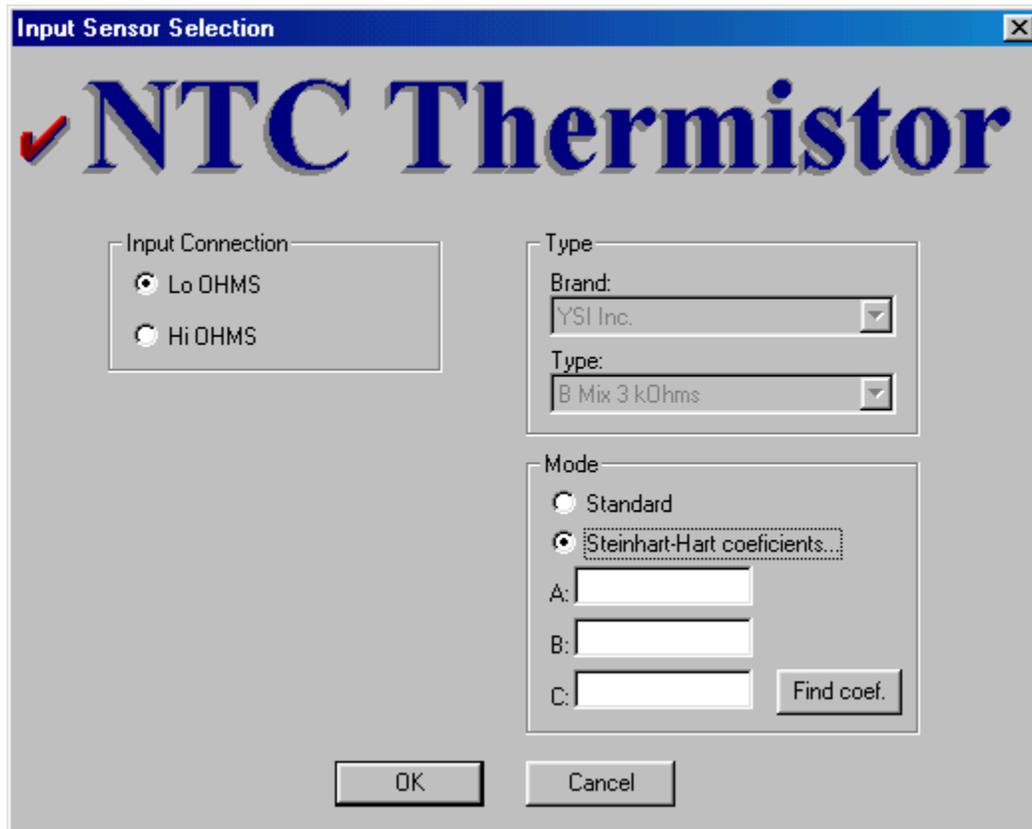
Test the output file by opening the generated file in a basic text editor such as Windows Notepad (usually accessed by running "C:\Windows\Notepad.Exe" or executing the "Notepad" shortcut normally found under Start, Program Files & Accessories) before attempting to import the table into the configuration program to ensure that it follows all the guidelines stated previously.

7.5.3 APPLYING THE "USER DEFINED TABLE" FUNCTION

1. Click on the "**Select Sensor...**" button on the main screen. If already at the "Input Sensor Selection" screen, skip to Step 3.
2. Select the transmitter model if one is not connected or automatically detected.
3. Select the "**User Defined Table**" mode. This will bring up another dialog box.
4. Enter the table's complete path and file name or select "Browse" to help locate the file in a Windows Explorer fashion.
5. Select the "**OK**" button to complete the file operation.
6. Click "**OK**" on the "Input Sensor Selection" form to complete the application of the user-defined table.

7.6 STEINHART-HART APPLICATIONS

The Steinhart-Hart formula provides constants for a 3rd-order logarithmic equation that approximates the actual thermistor's resistance versus temperature to a high degree of precision. Of course, the specific thermistor needs to be precisely characterized by exact temperature testing (i.e calibration). See Figure 11.

**FIGURE 11**

7.6.1 A, B and C coefficients are given by the mathematical equation:

$$1/T = A + B*(\ln(R_{TH})) + C*(\ln(R_{TH}))^3$$

Where,

T = temperature in degrees Kelvin (0°C = 273.15°K)

R_{TH} = Resistance of the thermistor in Ohms

7.6.2 Please note that the Steinhart-Hart formula is a never ending formula of the form:

$$1/T = A_0 + A_1*(\ln(R_{TH})) + A_2*(\ln(R_{TH}))^2 + \dots + A_N*(\ln(R_{TH}))^N$$

The squared term and terms beyond A₃ (N>=4) are normally left off, due to their insignificance to the final answer. These dropped terms usually accumulate less than .01°C and normally considered negligible. It is suggested that the user generate a table based on the calculations above to see whether or not the approximations are acceptable. If they are not, user generated tables should be utilized in lieu of Steinhart-Hart coefficients (see Paragraph 7.5). Simulation can also be of assistance in this area (see Paragraph 8).

8.0 SIMULATION FUNCTION

The simulation function allows the user to check the relationship between the transmitter's configured input given in basic electrical units, such as Ohms, to the scaled, engineering units (such as °F or °C) and the analog output given in mA and percentage. See Figure 12.

The simulation function also is useful for testing a "Sensor vs. Output" transfer function when using nonstandard sensor transformations, such as Steinhart-Hart or any other User Defined Table.

The simulation function can be accessed by selecting "**Simulation**" from the "**Device**" menu on the main screen. Simulation may be accomplished either off or on line.

If no transmitter is connected to the PC or communication is disabled, the simulation mode is automatically placed in off-line mode and online features are grayed out. Else, online features are available to the user. Enter any one of the four values in the simulation dialog box and the other three will automatically be calculated. If online with the transmitter, click "**APPLY**" and the transmitter's output will be driven to the indicated value. For a continuous dynamic update of the output, the "**DYNAMIC LINK**" box should be checked.

The scroll bar may be used to increase or decrease the transmitter's output by fixed amounts. Clicking on the arrows at the ends of the scroll bar changes the output by 1%. Clicking inside the scroll bar changes the output by 10%.

Note: Allow up to 3 seconds for a change in the percent output value to be reflected at the actual output of the transmitter in the online mode.

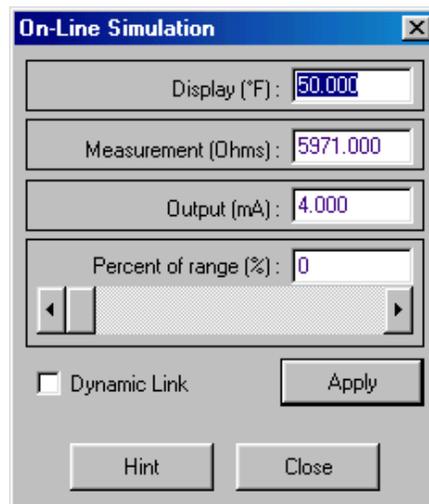


FIGURE 12

9.0 TROUBLESHOOTING

I am unable to communicate to my transmitter from my PC?

- From the menu bar, select the “**Options**” menu, click on “**Communication**” and enter the correct COM port designation from the pull-down menu.
- After selecting another COM port, click “**OK**” to complete. The new COM port will be polled for a connected transmitter. A message box will appear if a transmitter was not found on the selected port.
- It may be necessary in certain Windows setups to exit and re-enter the program to implement changes to the communication settings.

How do I print the Calibration and Configuration reports to a file?

- Install a printer with “**FILE: (creates a file on disk)**” as the selection under “Print to the following port”. See Figure 13 below for an example taken from Windows 98SE.

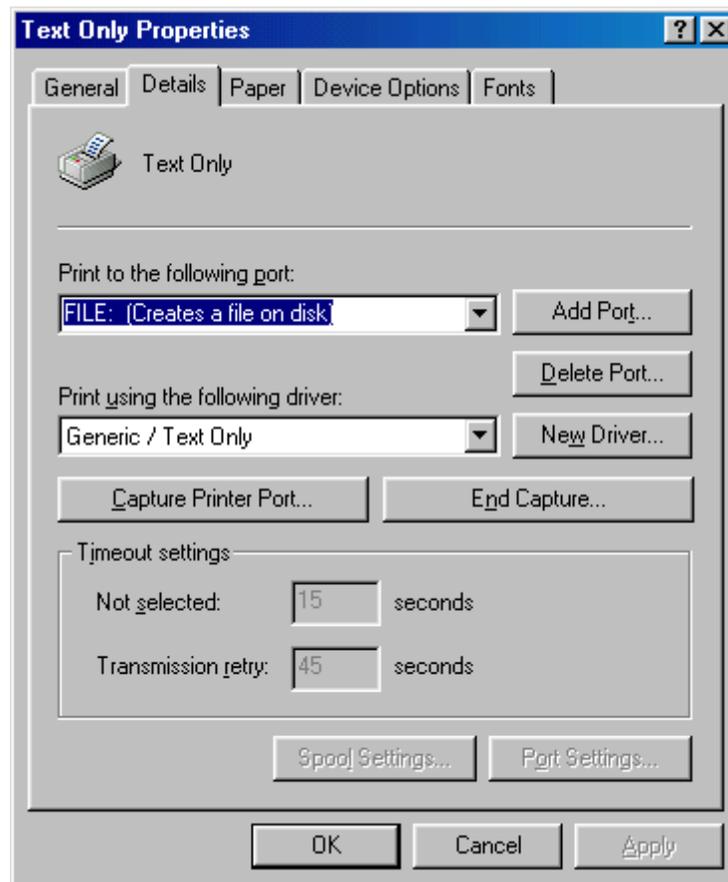


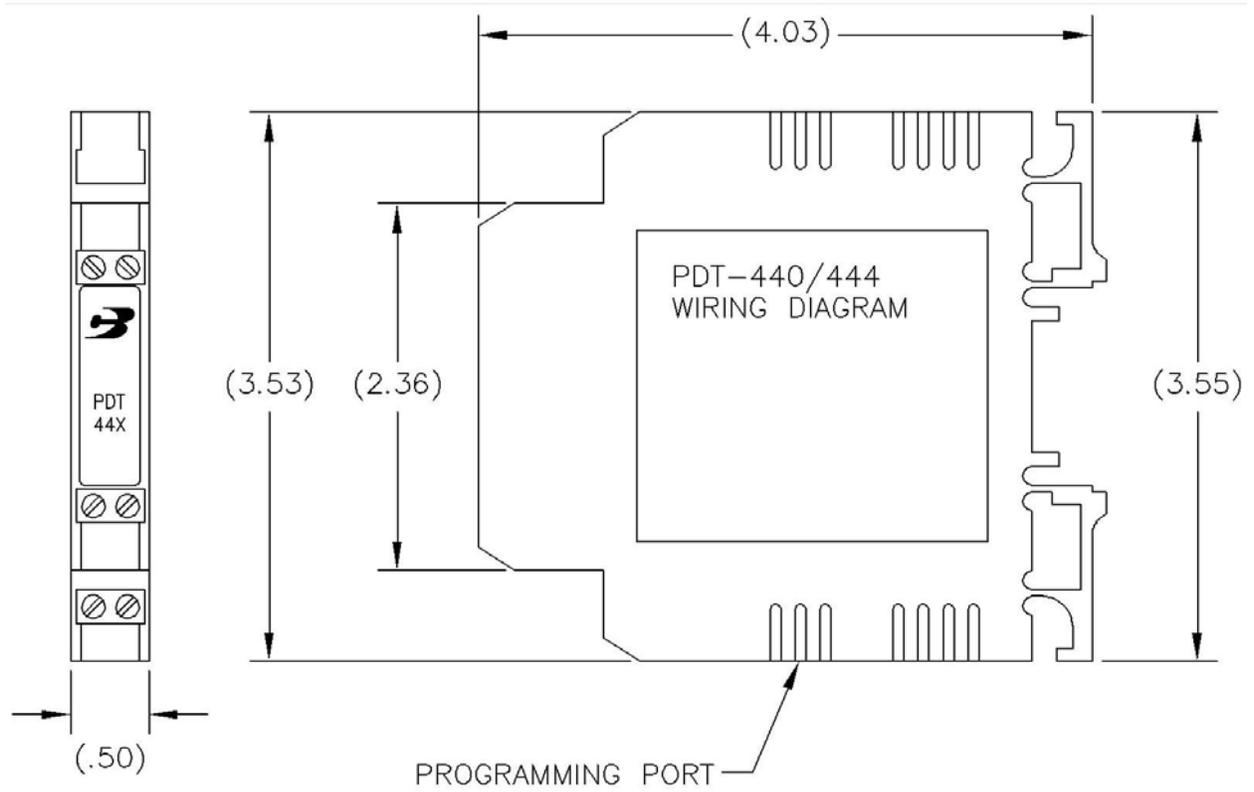
FIGURE 13

I measure a constant current on the output of the transmitter even with fluctuating sensor temperatures. How can I get the transmitter back transmitting "normally"?

- When in Simulation, Trimming or Calibration, the transmitter is placed into a special mode where the output is commanded by the Just-PC™ software. You may have inadvertently unplugged the transmitter while in one of these modes before exiting the associated screen. This can be corrected by reconnecting the Just-PC™ software to the transmitter and uploading the configuration (if not done so automatically). The Just-PC™ software should prompt to "Recover" the transmitter back into normal operating mode.
- Your sensor may be sensing a temperature outside the transmitter's programmed range. Compare the programmed range versus the temperature being sensed (measure ohms of the sensor and calculate/look up equivalent temperature, other local thermometry near the wired sensor, etc.).
- Check that your sensor and cabling to the sensor has not failed or become disconnected or shorted. Any of these conditions will cause the transmitter to constantly transmit the user-programmed "Burnout" mode.
- The transmitter is reset every time the configuration is downloaded to the transmitter or after disconnecting and reconnecting power (or "brown out") to the transmitter. This will ensure that the transmitter is in the proper mode.

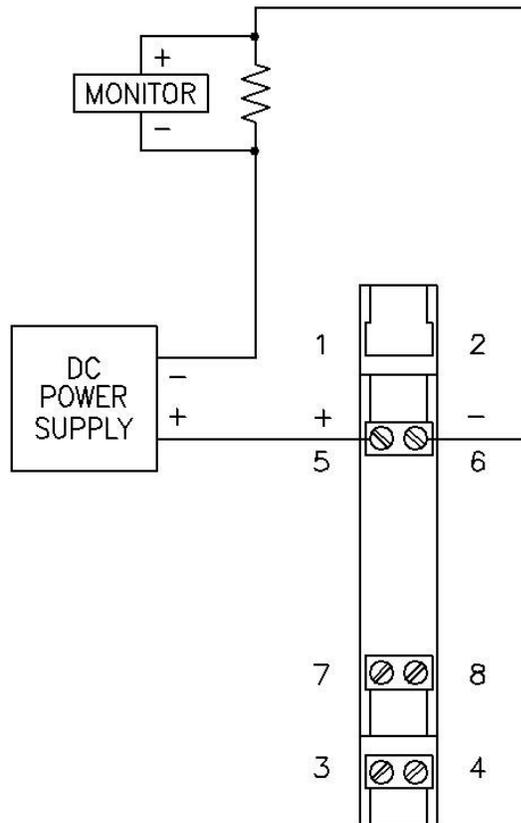
APPENDIX A

PDT-440/444 DIMENSIONS



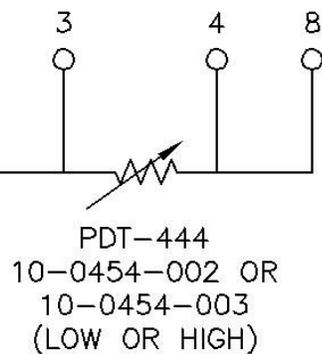
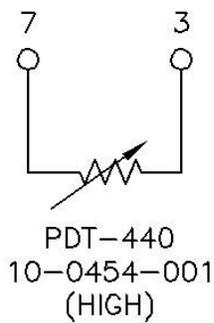
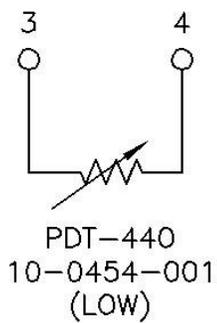
APPENDIX B

PDT-440/444 TERMINAL ASSIGNMENTS & WIRING SCHEMATICS



SAMPLE CURRENT
 LOOP SHOWING
 THE PDT-440/444

WIRING



APPENDIX C

PROGRAMMING SOFTWARE

Software Media placed in pouch here

END OF DOCUMENT