Instruction

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PC50 Intelligent Field Device Tool

Operation Using FoxCom™ Communication Protocol

Foxboro®

by Schneider Electric

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Preface

This manual explains how to operate, calibrate, and configure devices having a FoxCom™ communication protocol with the PC50 Field Device Tool software package.

Chapter 1 provides information that is common to using the PC50 Field Device Tool with various transmitters with FoxCom communication protocol. This is followed by chapters on each Foxboro Intelligent Device. These chapters show an example of the device's data screen, gives an explanation of the device's status/diagnostic error messages with recommended actions, and explains how to calibrate and configure the device.

Therefore, to use this manual, refer to Chapter 1, "Common Information" for information that is common to all devices and to the appropriate chapter shown in the table below for procedures on how to communicate with your specific Foxboro Intelligent Device.

Device	Chapter
I/A Series® Pressure Transmitters	2
RTT20 (TI20) Temperature Transmitters	3
IMT25/IMT25L Magnetic Flow Transmitters	4
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SRD991, SRD960, SRD970, and NAF LinkIT Intelligent Positioners	10

1. Common Information

This chapter provides information that is common to using the PC50 Field Device Tool (FDT) with various transmitters with FoxCom™ communication protocol.

Right Click Menus

In addition to accessing functions by left-clicking on drop-down menus, many functions can be also accessed by conventional right-click techniques.

Diagnosis

The Diagnosis function interrogates the connected device and displays Pass-Fail status messages on the Primary and Secondary Status Fields and an alphanumeric indication of any diagnostic errors. The function is accessed via the `Device > Diagnosis` menu. While the content of the screens differ from product to product, they are basically the same. A sample Diagnosis screen is shown in Figure 1. Explanation of and recommended action for status error messages for each product is given in the chapter specific to that product.

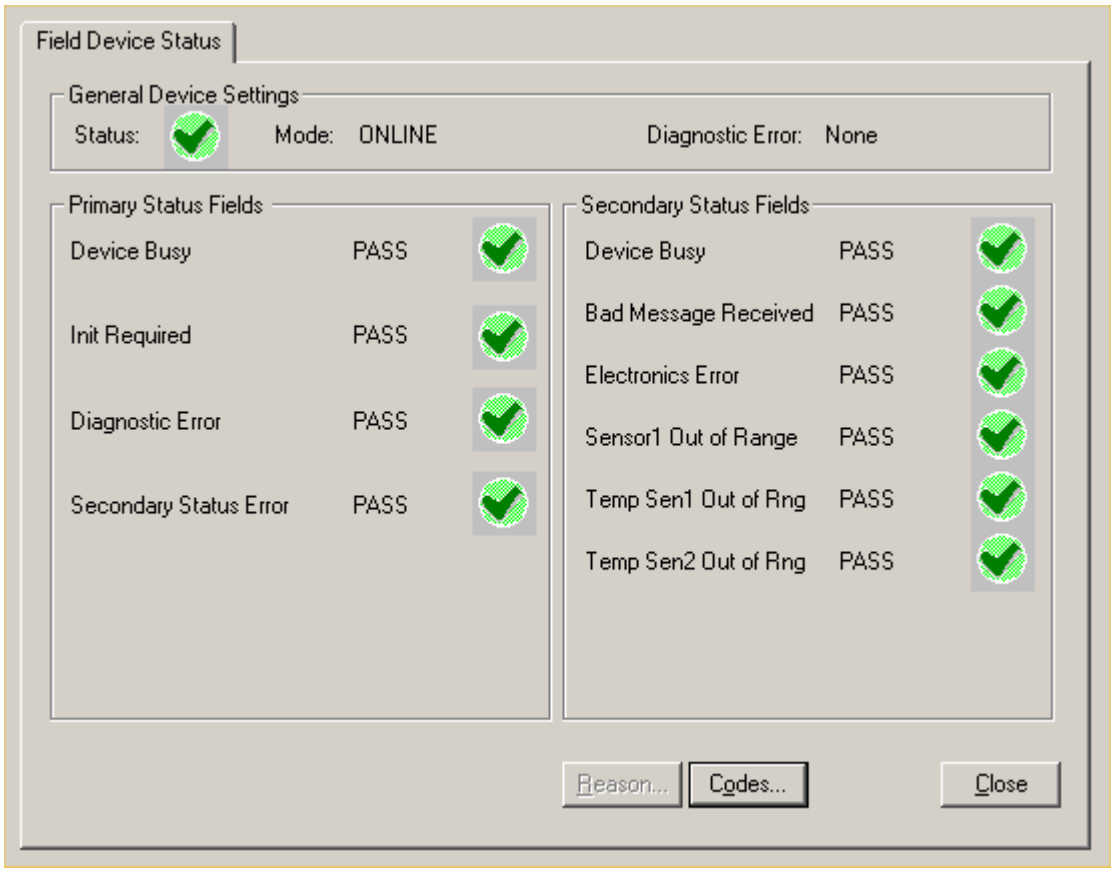

Figure 1. Sample Diagnosis Screen

Selecting the `Codes` button at the bottom of the display causes the various diagnostic codes to be displayed in decimal and hex form with no text translation. A sample Diagnostic Codes screen is shown in Figure 2. Selecting the `Reason` button gives the reason in text (not just code). Explanation of and recommended action for diagnostic error messages for each product is given in the chapter specific to that product.

— NOTE

Not all device DTMs have Codes and/or Reason Buttons.

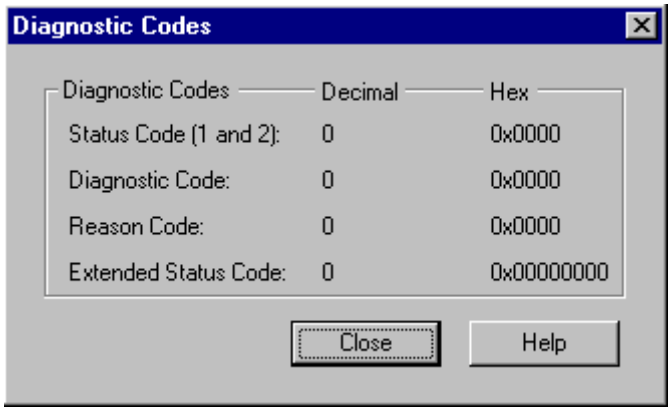

Figure 2. Sample Diagnostic Codes Screen

Trend Viewer

The Trend viewer screen displays the measurement over time. The measurement data is dynamically retrieved from the device and displayed. The trend viewer function is accessed as follows: `Device > Measured value`. The scales can be manipulated by using the dialog box which appears when double clicking on a scale.

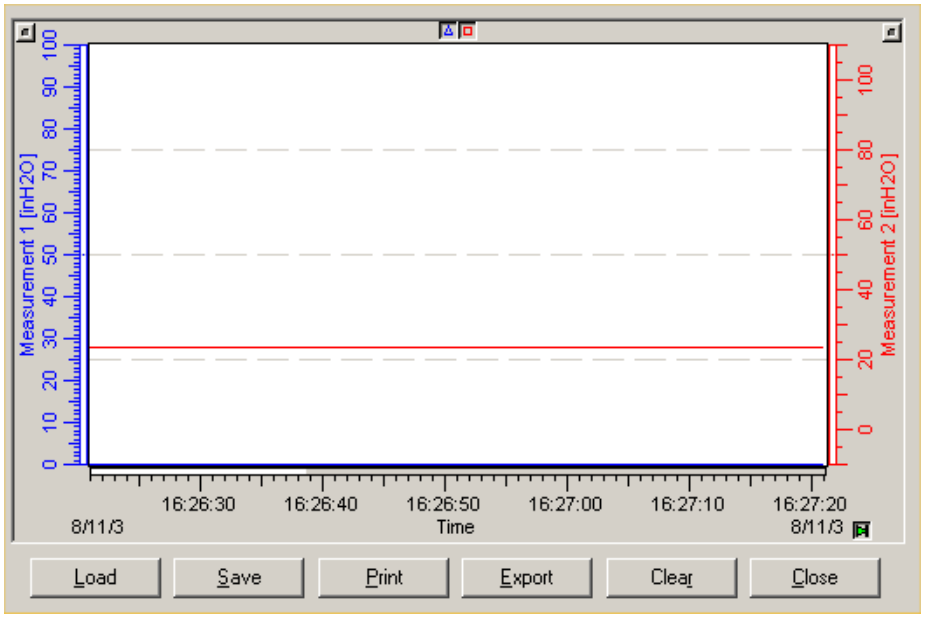

Figure 3. Sample Trend Viewer Screen

Load

The `Load` button is used to retrieve the stored trending database. You are asked for the path and filename to retrieve the old trending data. The file must be written using the `Save` button.

Save

The `Save` button is used to store the measured trending data collected since the trend function was displayed. You are asked for the path and filename to store the trending database. This file could be displayed at later time by using the `Load` button.

Print

The `Print` button is used to print the displayed portion of the trending view. Before this step, it is possible to choose the portion of the trend data which you want to display and print by using the functions to Manipulate the Scales or to Manipulate the Trend as explained in "Trend Viewer" on page 18.

Export

The `Export` button is used to store the measured trending data collected since the Trend function was displayed. You are asked for the path and filename to store the trending database. The default filename is composed of the Tag Number + _TRD.txt. However, you can choose any other name.

The trend file has a header part and the trend data part with the curve values. The header part contains information such as the tagname, number of curves as well as ranges and descriptions of the curves. The trend data part lists in each line the measured values for each curve. Each measurement shows the sequence number, date (Month/Day/Year) and time (Hour:Minutes:Seconds.Milliseconds) of measurement and the values for each curve. To import the trend data into other programs, select the appropriate ASCII import function within the other program.

Example for Microsoft Excel

In Microsoft Excel, choose `File > Open`. For the file type, select `Text Files` to list all files and select the desired file with the ending `_TRD.txt`. The Excel Import Assistant will guide you through the definition of the import format:

Start the import with the headings for the curves (line number 13).

The fields are separated by tabs.

Select `General` for all columns.

Import the file.

It is now possible to use the Excel functions and store this file in the Excel format.

The imported information will be displayed in several columns. For each measurement you have a row. The first column contains the measurement number followed by the date and time. Beginning with the fourth column the measured curve values are displayed.

Example for Microsoft Access

In Microsoft Access, open your database. Choose `File > External Data > Import`. For the file type, select `Text File` and select the desired file with the ending `_TRD.txt`. The Access Import Assistant guides you through the definition of the import format:

The fields are separated by tabs.

Import the file.

The imported information is displayed in several columns. For each measurement you have a row. The first column contains the measurement number followed by the date and time. Beginning with the fourth column, the measured curve values are displayed.

Clear

The `Clear` button is used to delete all the collected trending data until this point and start trending with new data. The previously collected trending data is lost unless it is stored for later use by using the `Save` button.

Set mA Function

When Output is configured 4-20 mA, certain devices can be set to output a mA value to test or adjust other devices in the loop. The Set mA function is accessed via `Device > Simulation`. To set the mA output, first select the measurement type and then enter the desired output value. The Set mA screen (Figure 4) shows the allowable output range and units.

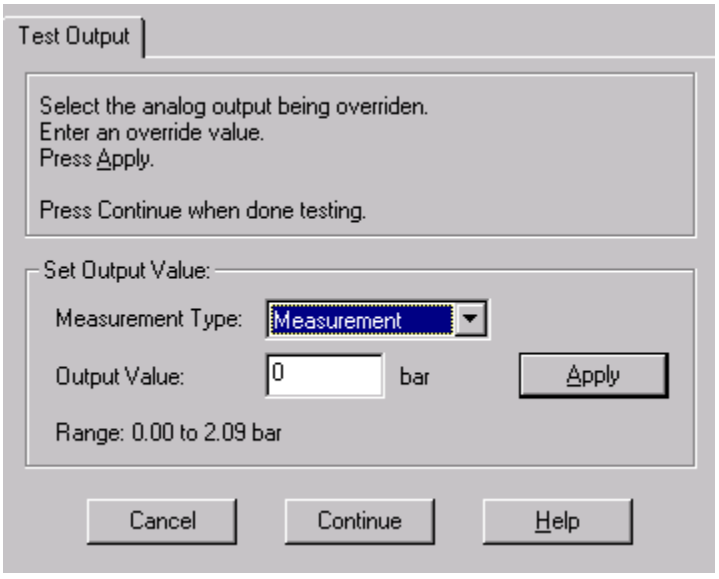

Figure 4. Sample Set mA or Set Digital Output Screen

Set Digital Output Function

When a device is configured for FoxCom Digital Output, certain devices can be set to output a digital value to test I/A Series system wiring and displays. (I/A Series Version 4.0 or later is required.) Both Measurement #1 and Measurement #2 outputs can be set. The Set Digital Output function is accessed via `Device > Simulation`. First, select the measurement type and then enter the desired output value. A sample Set Digital Output screen is shown in Figure 4.

Mode Change Function

The mode change function allows you to change to any one of the following modes:

- Offline - Enables you to force the device DTM offline
- Online - Enables you to force the device DTM online

The mode change function is accessible via `Device > Additional functions > Commands`.

Display Raw Input Function

This function reads the raw inputs for certain devices. The Display Raw Input function is accessed via `Device > Additional Functions > Commands`. The inputs displayed for various devices are shown in Table 1.

Table 1. Raw Inputs Displayed for Various Devices

Device Type	Display
I/A Series Pressure	mV Input 1 (pressure input) mV Input 3 (temperature input)
83	Shedding Frequency Upper Range Frequency
IMT25	Electrode Voltage (Positive) Electrode Voltage (Negative) Coil Current (Positive) Coil Current (Negative)
IMT96	FlowB ADC counts compensated for offsets Voltage reference in ADC counts for offsets Actual gain calculation Zero flow offset

Configuration Function

Saving Configuration Changes

When you connect to a device, the data presented is that in the local database of your computer, not necessarily that in your device. Therefore, if you want to make changes to your device database, first upload the data from your device to your computer (`Load from Device`). After making changes, if you `Save`, you are saving the new data in your local database only. If you `Save and Download`, you are saving the data both to your local database and your device.

⚠ CAUTION

Use of the `Save and Download` command before `Load from Device` command downloads a database that may be completely different than that in the device, potentially causing a process upset.

Therefore, when changing the configuration of a device, perform the following steps:

1. Connect to the device (`Device > Connect`).
2. Upload data from the device by using the `Device > Load from Device` command or the Load from Device icon.
3. Make your changes.
4. Save your changes and download them to your device by:
   a. Clicking on the `Save and Download` button on one of the configuration screens or
   b. Using `File > Save` (or `Save As`) and then `Device > Store to Device` (or the Store to Device icon).

Entering Tag Numbers

The tag number is the means of identifying a particular instrument. When entering a tag number, do **not** use special characters such as >, <, -, +, :, ;, or *.

Print

Various reports can be printed. To select the report, follow the path `Device > Additional functions > Print` and then select the report from the choices presented. Then click on the `Print` button to send this report to a printer.

— NOTE

When not connected to a device, the printout is the offline parameterization database.

2. I/A Series Pressure Transmitters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with I/A Series Pressure Transmitters with FoxCom™ communication protocol. Additional information about the transmitters and FoxCom communication is contained in documents listed in Table 2.

Table 2. Reference Documents

Document	Description
FoxCom Communication	
B0193XX	Checklist for FoxCom Measurement Integration
Transmitter Information	
MI IDP10-D	IDP10-D Differential Pressure Transmitters
MI IAP10-D/IGP10-D	IAP10-D Absolute Pressure Transmitters and IGP10-D Gauge Pressure Transmitters
MI IAP20-D/IGP20-D	IAP20-D Absolute Pressure Transmitters and IGP20-D Gauge Pressure Transmitters
MI IDP25-D/IDP50-D	IDP25-D and IDP50-D Differential Pressure Transmitters
MI IGP25-D/IGP50-D	IGP25-D and IGP50-D Gauge Pressure Transmitters

Measure Screen

The Measure screen contains identification information and live measurements. A sample screen is shown in Figure 5.

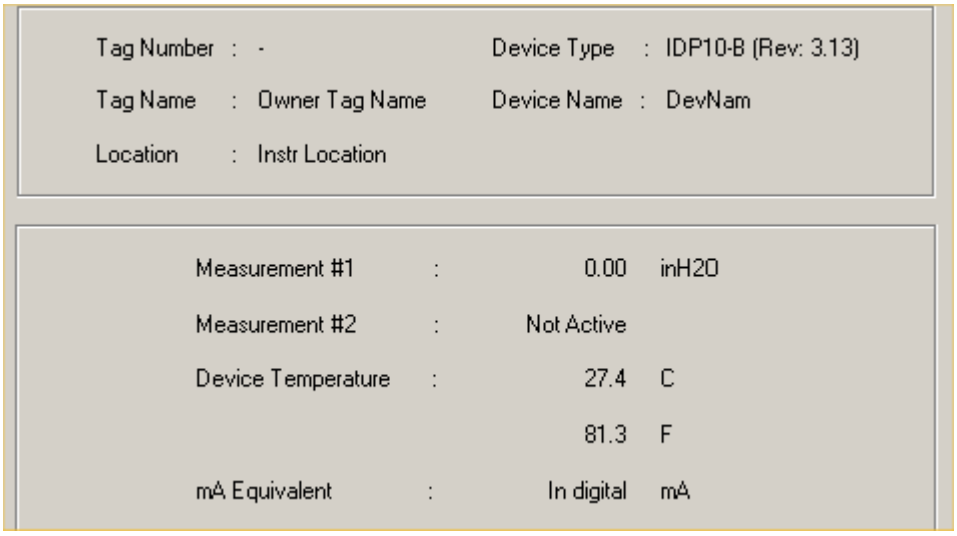

Figure 5. Sample I/A Series Pressure Transmitter Measure Screen

Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 3 and of diagnostic error messages in Table 4.

Status Error Messages

Table 3. Transmitter Status Error Messages

Message	Explanation	Recommended Action
Primary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Init Required	Transmitter is re-initializing on reset.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Diagnostic Error	Indicates an active diagnostic error.	See Secondary Status Fields and Diagnostic Error Messages to determine problem and corrective action.
Secondary Status Error	Indicates an error in secondary status.	The secondary status error is shown in Column 2 of the screen display.
Secondary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Bad Message Received	Transmitter received a bad message.	Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Sensor1 Out of Rng	Sensor input out of range.	Message disappears when input returns to within acceptable limits.
Temp Sen1 Out of Rng	Transmitter temperature out of range.	Transmitter can be configured to continue operating and use a default temperature for measurement compensation. Message disappears when temperature returns to within acceptable limits.
Temp Sen2 Out of Rng	Transmitter temperature out of range.	Transmitter can be configured to continue operating and use a default temperature for measurement compensation. Message disappears when temperature returns to within acceptable limits.

Diagnostic Error Messages

NOTE

Before following the recommended actions listed below, try to clear the error message by turning off and reapplying power to the transmitter.

Table 4. Transmitter Diagnostic Error Messages

Code	Error Message	Recommended Action
01	CPU Instruct Error	Replace module.
02	ROM Checksum Error	Replace module.
03	EEPROM Chksum Err	Make a change to the transmitter database and download to the transmitter. If this does not clear the problem, replace module.
04	RAM Error	Replace module.
05	Power Supply Fail	Replace module.
06	Battery Failure	Replace module.
07	Input Range Error	See status to indicate which input is out of range and make necessary correction.
08	Output I/O Error	Replace module.
09	Communication Err	Replace module.
0A	Math Error	Check transmitter database and correct any problems. If problem persists, replace module.
0B	RealTime Clock Err	Replace module.
0C	Input 1 = 0	Sensor input bad; check sensor.
0D	Wrong MCU	Replace module.
0E	Device Failure	Replace module.
20	Input 1 > Up Limit	Sensor input too high, check sensor.(a)
2F	Offline Cfg w/Err	Replace module.

(a) Error message disappears when cause of error returns to within acceptable limits.

Calibration

You can perform the following calibration procedures on an I/A Series Pressure Transmitter using the PC50 Field Device Tool:

- Point Calibration
- Re-Range
- Re-Zero
- mA Calibration
- Restore Default.

The Re-Zero and Point Calibration procedures adjust the transmitter output. The Re-Zero procedure zeros the transmitter at the Lower Range Value (LRV). The 1-Point Calibration procedure allows you to establish a calibration point that may or may not be the Lower Range Value (LRV). The 2-Point Calibration procedure allows you to specify lower and upper calibration points that may or may not be the Lower Range (LRV) and Upper Range Value (URV).

Each transmitter is calibrated at the factory to a specified range. If the new range is the same as the factory range, you should perform only a Re-Zero or a 1-Point Calibration procedure. If the new range changes the span by less than a 2-to-1 ratio, you should perform a Re-Range. If you make a large change in range (turndown ratio greater than 2), you may need to perform a 2-Point Calibration to obtain optimum accuracy.

For all calibration procedures, calibration points are read from the transmitter at the start of the procedure. Also note that if the transmitter is configured for a square root output, the PC50 Field Device Tool places it in linear mode during calibration and resets it to Square Root mode at the end of the procedure.

NOTE

Transmitters must be calibrated using forward action (increasing input increases output). If your transmitter has reverse output action (increasing input decreases output), calibrate it so that calibrated LRV = desired URV and calibrated URV = desired LRV. Then, after calibration, change the LRV and URV back to the correct values.

The calibration procedures are accessed as follows:

```
Device > Additional functions > Adjust set value
```

Re-Zero

This function enables you to rezero and rerange your device at the Lower Range Value (LRV). The procedure follows:

1. Select `Re-Zero` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. If your device is configured for Square Root mode, select `Continue` to change to Linear mode for Calibration. The configuration is automatically placed back in Square Root mode when leaving Calibration. If your device is configured for Linear mode, ignore this step.
4. If your LRV was not zero, you are prompted to change the value if you wish and then `Continue`. If your LRV was zero, ignore this step.
5. When the displayed measurement is stable, select `Continue`. The average of the last five readings is shown. Select `Continue` again to accept this value.
6. Enter the operator's initials and select `Continue`. The current calibration date is automatically displayed. See Figure 6.
7. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

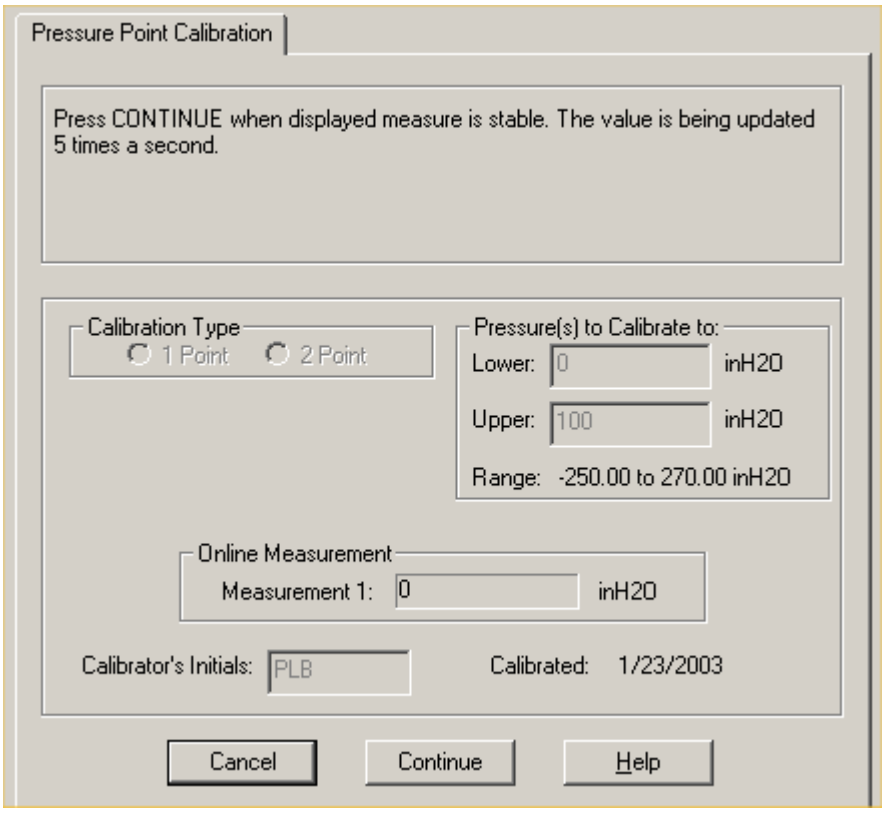

Figure 6. Sample I/A Series Pressure Transmitter Re-Zero or Point Calibration Screen

Point Calibration

This function enables you set the Lower Range Value and Upper Range Value and to calibrate the device using points that may or may not be these values. The procedure follows:

1. Select `Point` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. If your device is configured for Square Root mode, select `Continue` to change to Linear mode for Calibration. The configuration is automatically placed back in Square Root mode when leaving Calibration. If your device is configured for Linear mode, ignore this step.
4. Referring to Figure 6, select `1-Point` or `2-Point` Calibration and `Continue`.
5. Enter your desired Lower Calibration Point, apply the lower calibration point pressure to the device, and select `Continue`.
6. When the displayed measurement is stable, select `Continue`. The average of the last five readings is shown. Select `Continue` again to accept this value.
7. If you selected a 2-Point Calibration, enter your desired Upper Calibration Point, apply the upper calibration point pressure to the device, and select `Continue`.
8. When the displayed measurement is stable, select `Continue`. The average of the last five readings is shown. Select `Continue` again to accept this value.

9. Enter the calibrator's initials and select `Continue`. The current calibration date is automatically displayed.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Re-Range

This function enables you to rerange your device without applying calibration pressure. The procedure follows:

1. Select `Re-Range` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Enter your desired `Lower Range Value` (LRV) and `Upper Range Value` (URV) in either units shown and select `Continue`.
4. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

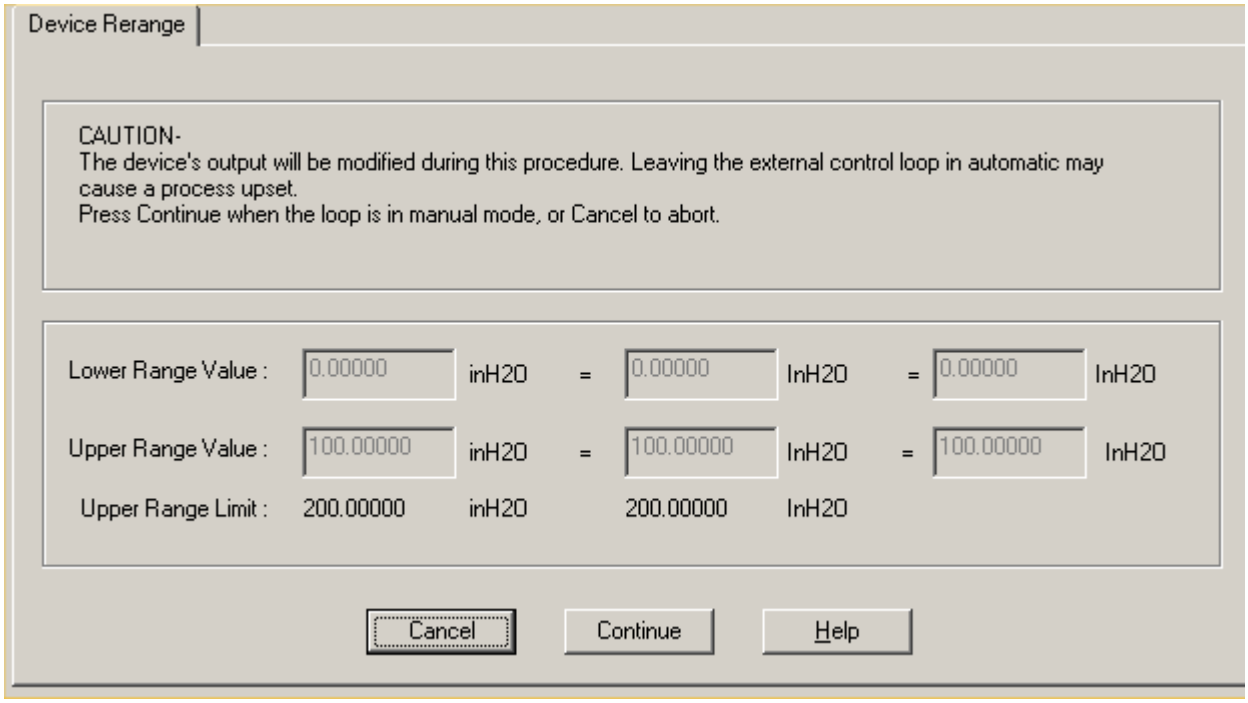

Figure 7. Sample I/A Series Pressure Transmitter Re-Range Screen

Restore Default

This function enables you to restore all calibration parameters to their factory default settings.

1. Select `Restore Default` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. To reconfirm that you want to restore all calibration parameters to their default settings, select `Continue`.
4. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements

mA Calibration

As your device was accurately calibrated at the factory, this function is not normally required. This procedure should only be performed if the mA value displayed on the Device Data screen does not agree with the value measured by an accurate mA meter installed in the loop wiring.

— NOTE —

Before performing a mA Calibration, perform the Point Calibration procedure described on page 27. A mA calibration may no longer be necessary.

1. Insert an accurate mA meter (or digital voltmeter and precision resistor) in the loop wiring.
2. Select `mA` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Select `4 mA Output`.

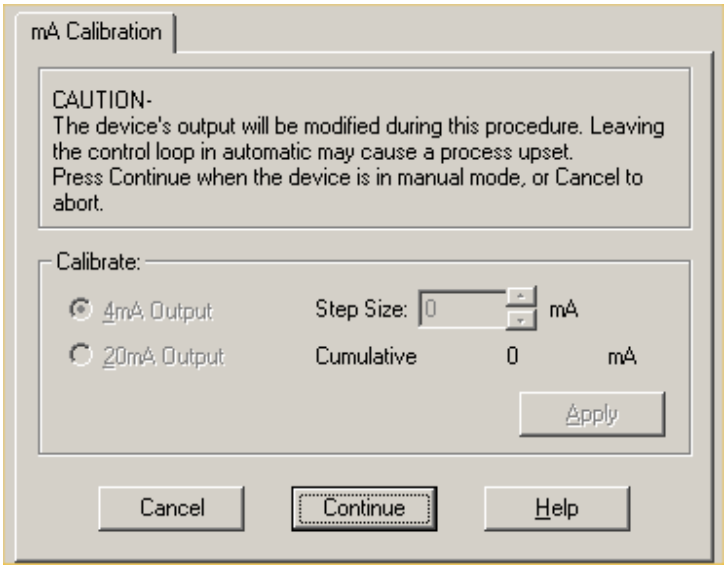

Figure 8. Sample I/A Series Pressure Transmitter mA Calibration Screen

5. Set the `Step Size` from the menu (`-0.5`, `-0.05`, `-0.005`, `0.005`, `0.05`, `0.5`) and select `Apply`.
6. Repeat Step 5 until you are satisfied with the output on the meter. The cumulative change is shown on the screen display.
7. Select `20 mA Output`.
8. Repeat Steps 5 and 6. When finished, select `Continue`.
9. The screen then displays the adjustments. To accept this change and save the calibration to the transmitter, select `Continue`.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Configuration

Identifier Tab Screen

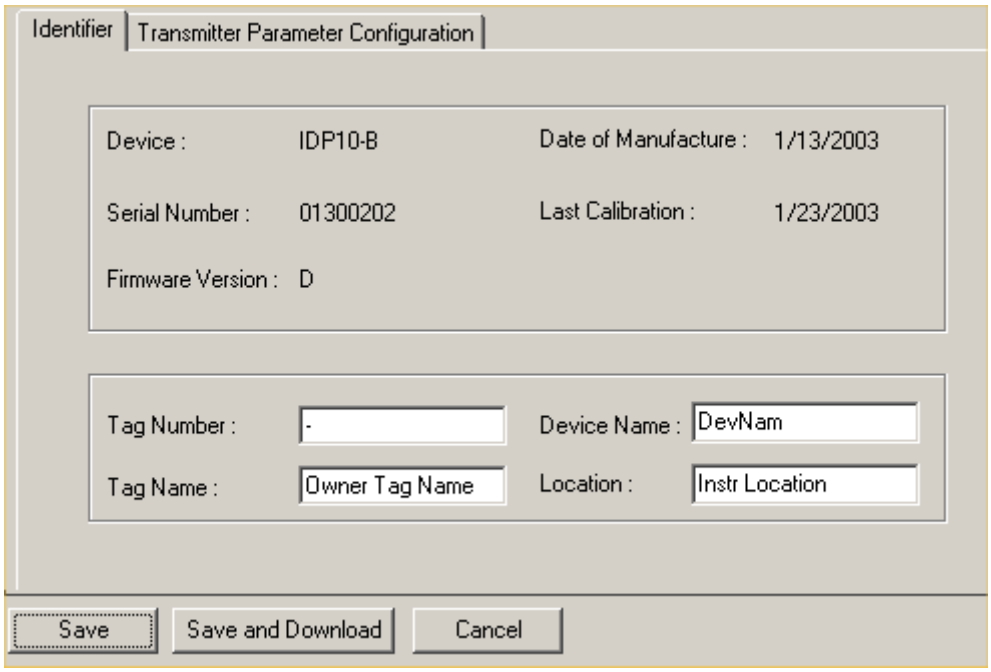

Figure 9. Sample I/A Series Pressure Transmitter Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the database filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter `DevNam`.
Location	Enter maximum of 14 characters. Optional, used for reference only.

Transmitter Parameter Configuration Tab Screen

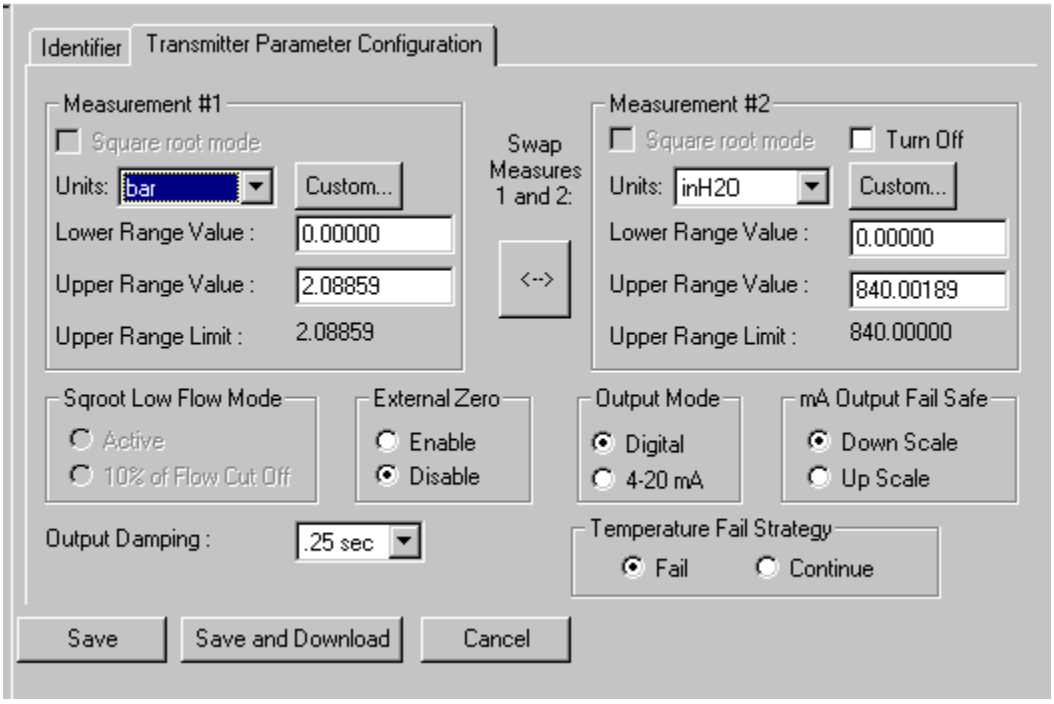

Figure 10. Sample I/A Series Pressure Transmitter Parameter Configuration Tab Screen

Field	Entry
Measurement #1	
Square Root Mode	√ = Square Root; Blank = Linear.
Units	Select from menu of pressure units or select `Custom` to enter user-configured units.
Lower Range Value	Enter value at which transmitter outputs 4 mA. Must be 0 if M1 or M2 is in Square Root mode.
Upper Range Value	Enter value at which transmitter outputs 20 mA.
Upper Range Limit	Shows value of Upper Range Limit of transmitter.
Measurement #2	Similar to Measurement #1.
Turn off	Enable or Disable Measurement #2.
Sqroot Low Flow Mode	Select `Active` or `10% of Flow Cut Off.`
External Zero	Select `Enable` or `Disable`.
Output Mode	Select `Digital` or `4-20 mA.`
mA Output Fail Safe	Select `Down Scale` or `Up Scale.`
Output Damping	Select one of nine choices from `No Damping` to `32` seconds.
Temperature Fail Strategy	Select `Fail` or `Continue.`

3. RTT20/TI20 Temperature Transmitters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with RTT20 and TI20 Temperature Transmitters with FoxCom communication protocol. Additional information about the transmitters and FoxCom communication is contained in the following documents.

- B0193XX Checklist for FoxCom Measurement Integration
- MI 020-453 Installation, Configuration, Operation, Calibration, and Maintenance.

NOTE

The RTT20 and the TI20 transmitters are identical with respect to the FoxCom protocol. All references to RTT20 also apply to the TI20 transmitter.

Measure Screen

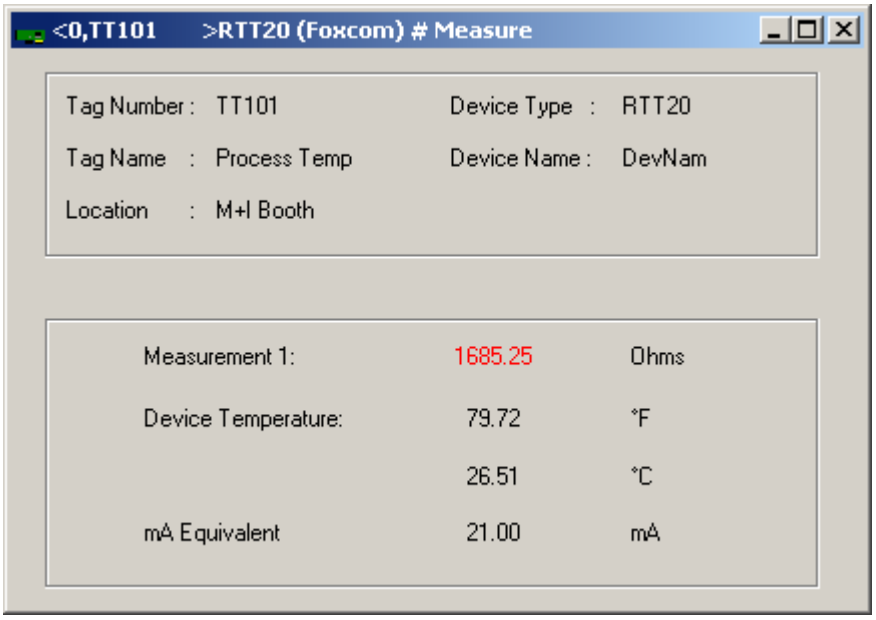

Figure 11. Sample RTT20 Measure Screen

Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 5.

Table 5. Transmitter Status Error Messages

Message	Explanation	Recommended Action
Primary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Init Required	Transmitter is re-initializing on reset.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Diagnostic Error	Indicates an active diagnostic error.	See Secondary Status Fields and Diagnostic Codes to determine problem and corrective action
Secondary Status Error	Indicates an error in secondary status.	The secondary status error is shown in Column 2 of the screen display.
Secondary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Bad Message Sent	Transmitter sent a bad message.	Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Bad Message Received	Transmitter received a bad message.	Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Sensor #1 Failed	Sensor #1 malfunction.	Check and/or replace Sensor #1 and associated sensor wiring.
Sensor #2 Failed	Sensor #2 malfunction.	Check and/or replace Sensor #2 and associated sensor wiring.
Electronics Fail	Internal RTT20 tests have failed.	Replace electronics.

Calibration

You can perform the following calibration procedures on an RTT20 Transmitter using the PC50 Field Device Tool:

- N-Point Calibration
- Custom Input Curve
- ReRange
- mA Calibration
- Restore Factory

The calibration procedures are accessed as follows:

```
Device > Additional functions > Adjust set value
```

Except the path for Restore Factory is:

```
Device > Additional functions > Commands
```

N-Point Calibration

This function enables you to perform a 1-, 2-, 3-, or 5-Point Calibration. The differences are explained below.

1-Point Calibration

The RTT20 permits you to select any temperature within the configured range that is of particular interest to you. You are not required to use the LRV as the calibration point. The net effect is that a constant offset is utilized over the entire sensor curve. To view or change the value entered, see the note in “Custom Input Curve” on page 37.

2-Point Calibration

The RTT20 permits you to select any two temperatures in the region of interest within the configured range of the transmitter. You are not required to use the LRV and URV as the calibration points. The temperatures must be increasing in value. The resulting offsets are then straightline calculated to the LRV and URV. Picture an offset line defining the correction to the standard, starting from the LRV, passing through the two calibration points, and continuing to the URV. To view or change any value entered, see the note in “Custom Input Curve” on page 37.

3- and 5- Point Calibration

The RTT20 permits you to select any three (or five) temperatures in the region of interest within the configured range of the transmitter. The temperature must be increasing in value. The resulting offsets are then straightline calculated to the LRV and URV. Picture an offset line defining the correction to the standard, starting from the LRV, passing through the three (or five) calibration points, and continuing to the URV. To view or change any values entered, see note in “Custom Input Curve” on page 37.

N-Point Calibration Procedure

1. Select `N-Point Calibration` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Select `1-`, `2-`, `3-`, or `5-Point` Calibration. Enter the desired reading you want to see reported for each calibration point, enter the calibrator's initials, and select `Continue`.

NOTE

On 3-point and 5-point calibrations, the end points are fixed. Therefore, you only need to enter the mid point values.

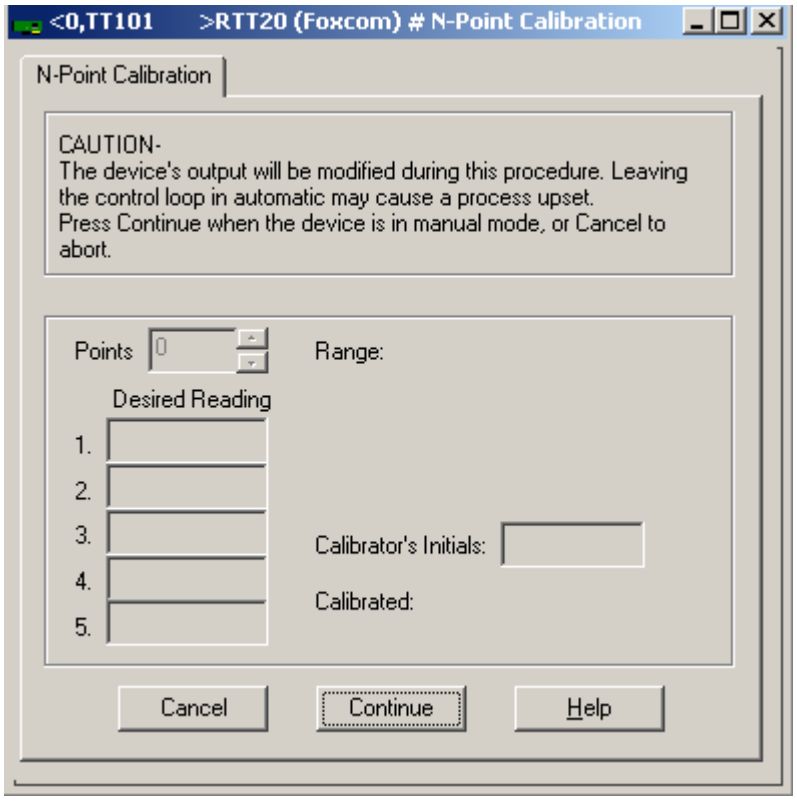

Figure 12. Sample RTT20 N-Point Calibration Screen

4. Select `Continue` when you are ready to set input for Calibration Point 1.
5. Select `Continue` again when ready to set input to desired reading.
6. When the displayed measurement is stable for Calibration Point 1, select `Continue` again.
7. Repeat Steps 4 through 6 for each point.
8. Select `Continue` to save the calibration to the transmitter. The current calibration date is automatically displayed.
9. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Custom Input Curve

The Custom Input Curve screen functions a little differently. If the `Points` field is 0, then the transmitter is using the factory installed calibration. If the number of points is 2 to 22, the transmitter uses the calibration data entered into the custom curve table.

NOTE

Since it is not possible to leave the input calibration values in memory when performing a Custom Input Curve calibration, it is **strongly recommended** that the transmitter database be stored to a file prior to making drastic changes in the calibration data.

The procedure to input a custom curve is as follows:

1. Select `Custom Input Curve` from `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Select the number of points you want in your custom curve (2 - 22).

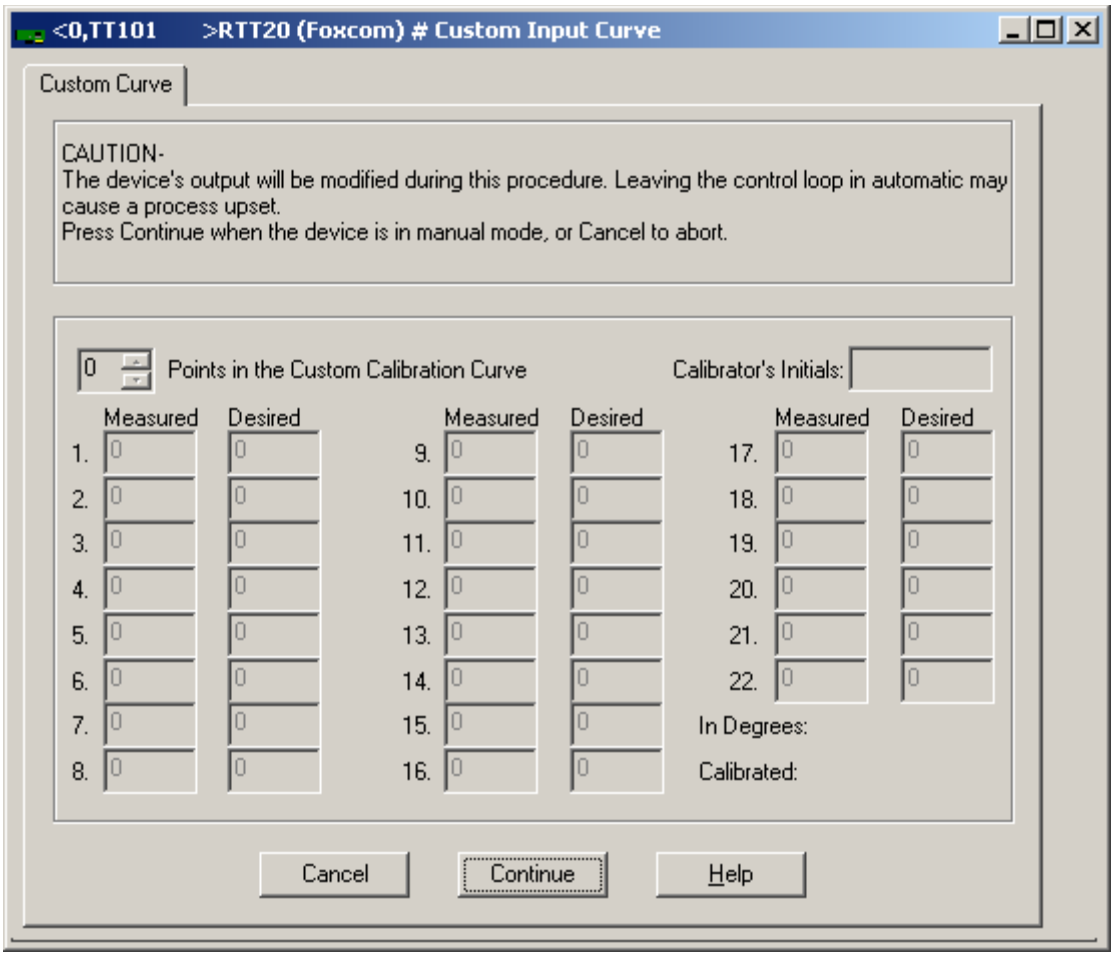

Figure 13. Sample RTT20 Custom Input Curve Screen

⚠ CAUTION

If all the Measured/Desired fields are "0", then the number of points must be "0" prior to exiting the Custom Input Curve screen. If the number of points is not zero (2-22) and no measured/desired data is entered into the fields on the Custom Input Curve screen, the transmitter drives its output to whatever "0" means for that sensor. The transmitter does not respond to any change in input in this condition.

NOTE

The calibration data from any of the above calibration options is stored in the custom curve memory locations. Therefore, if you wish to view or change a specific data point, you can enter the custom curve selection and view, edit, or clear all values.

4. In the `Measured` column, enter the values the RTT20 displays now; in the `Desired` column, enter the values you want displayed. For example, if a `Measured` value was 100.00 but you wanted 100.25, enter 100.00 as the `Measured` number and 100.25 as the `Desired` number.
5. Enter the calibrator's initials and select `Continue`. The current calibration date is automatically displayed.
6. Select `Continue` to save the custom curve to the RTT20 transmitter.
7. Follow the prompt to put the device back into Automatic mode. Press `Continue` to resume dynamic measurements.

ReRange

This function enables you to rerange your device without applying inputs representing temperatures. The procedure to do this is as follows:

1. Select `ReRange` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Enter your desired `Lower Range Value` (LRV) and `Upper Range Value` (URV) and select `Continue`.

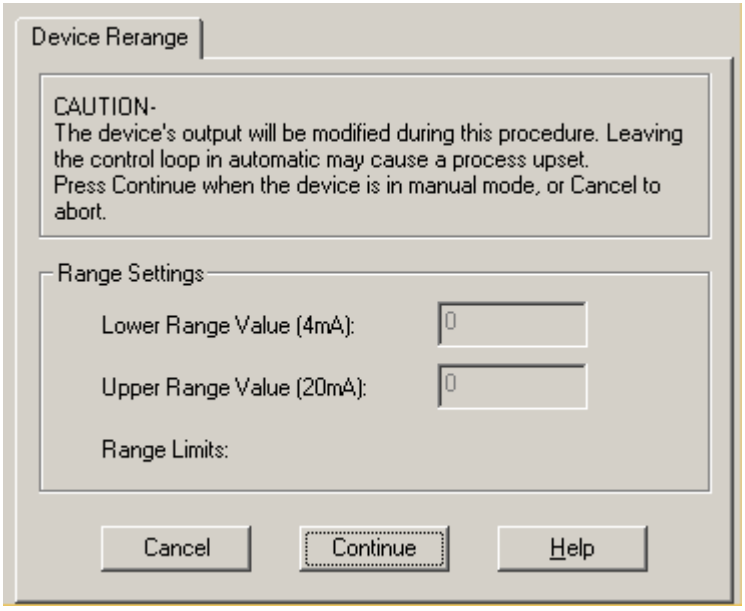

Figure 14. Sample RTT20 ReRange Screen

4. Select `Continue` to save the new custom curve to the RTT20 transmitter.
5. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Restore Factory

This function restores the mA calibration factory settings. The procedure to do this is as follows:

1. Select `Restore Factory` from the `Commands` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. To reconfirm that you want to restore the mA calibration factory settings, select `Continue`. The Factory Calibration is restored and the calibration date automatically changes.

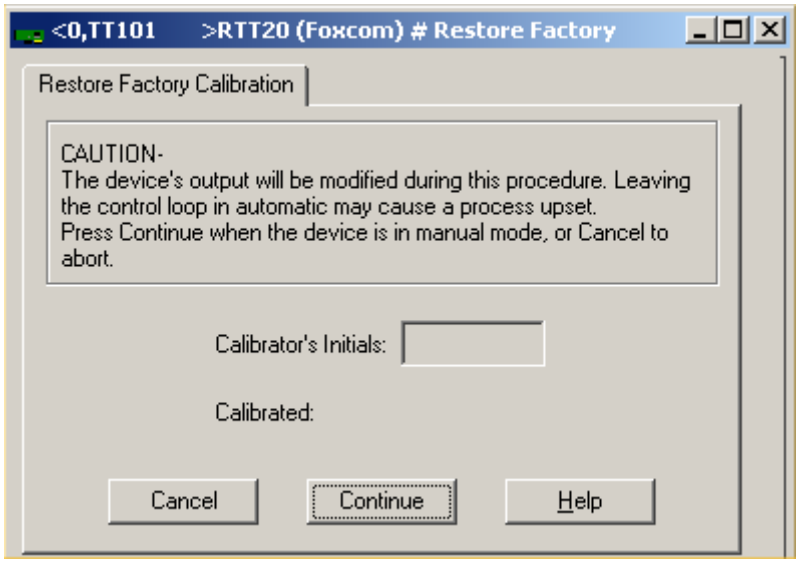

Figure 15. Sample RTT20 Restore Factory Calibration Screen

4. Enter the calibrator's initials and select `Continue`.
5. Follow the prompt to put the transmitter back into Automatic mode. Select `Continue` to resume dynamic measurements.

mA Calibration

As your device was accurately calibrated at the factory, this function is not normally required. This procedure should only be performed if the mA value displayed on the Measure screen does not agree with the value measured by an accurate mA meter installed in the loop wiring.

NOTE

Before performing a mA Calibration, perform the N-Point Calibration procedure described on page 35. A mA calibration may no longer be necessary.

The procedure to perform a mA Calibration is as follows:

1. Insert an accurate mA meter (or digital voltmeter and precision resistor) in the loop wiring.
2. Select `mA Calibration` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Select `4 mA Output`.

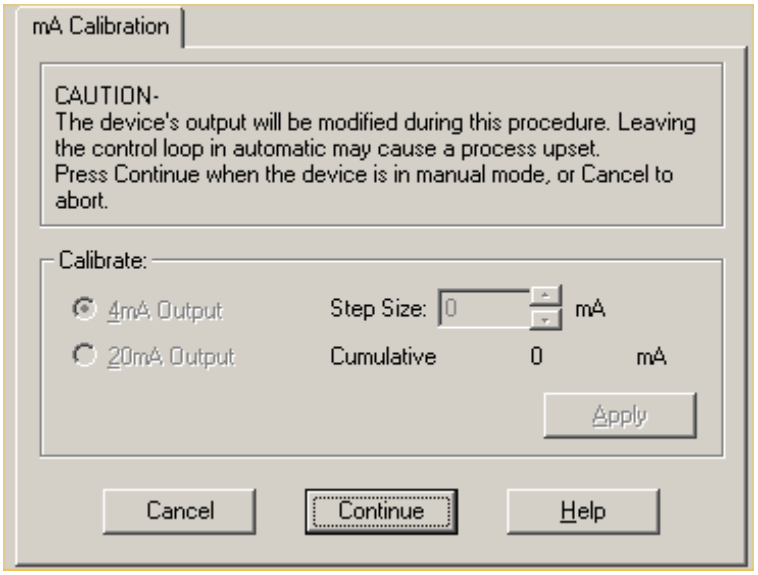

Figure 16. Sample RTT20 mA Calibration Screen (FoxCom Device)

5. Set `Step Size` from menu (`-0.5`, `-0.05`, `-0.005`, `0.005`, `0.05`, `0.5`), and select `Apply`.
6. Repeat Step 4 until you are satisfied with the output. The cumulative change is shown on the screen.
7. Select `20 mA Output`.
8. Repeat Steps 4 and 5. When finished, select `Continue`.
9. The screen then displays the adjustments. To accept this change, select `Continue`.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Configuration

Identifier Tab Screen

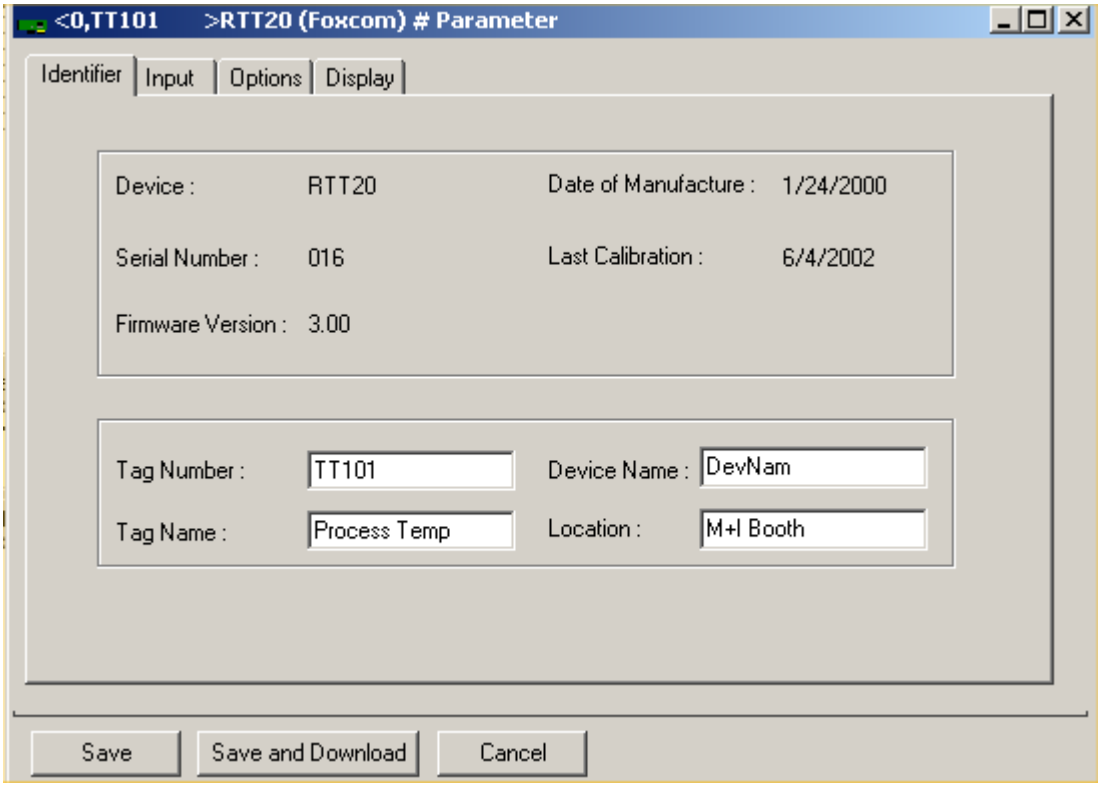

Figure 17. Sample RTT20 Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the default transmitter filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter `DevNam`.
Location	Enter maximum of 14 characters. Optional, used for reference only.

Input Tab Screen

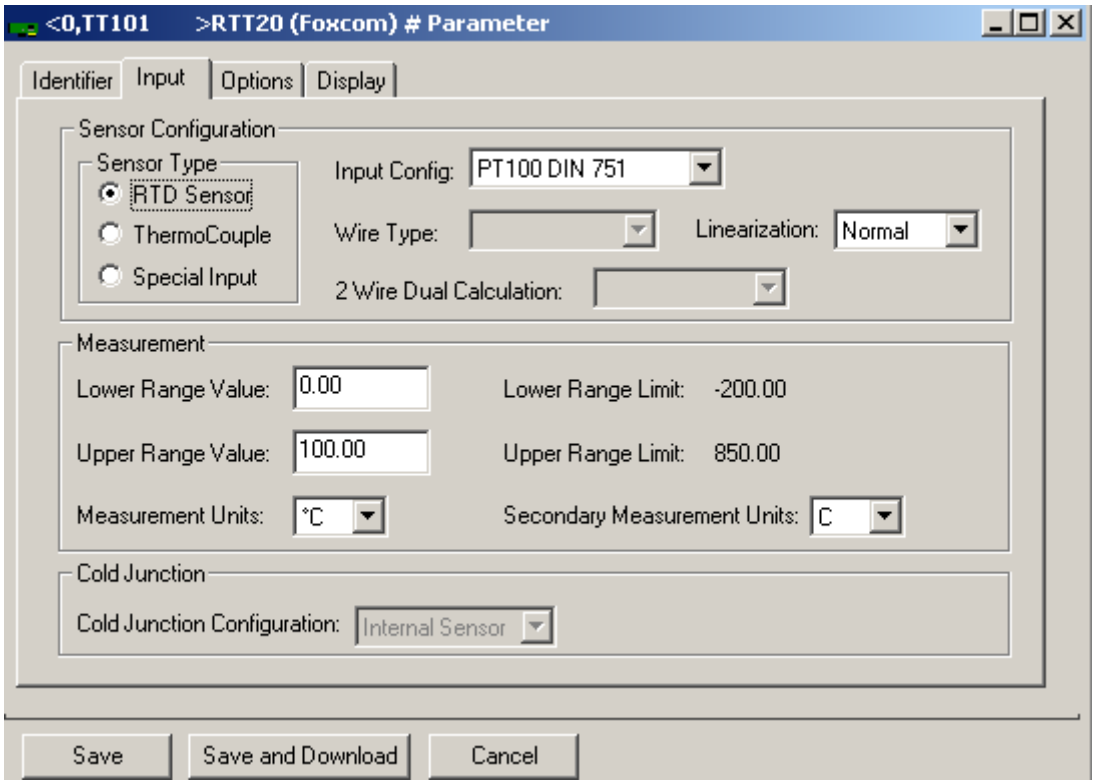

Figure 18. Sample RTT20 Input Tab Screen

Field	Entry
Sensor Type	Select `RTD Sensor`, `ThermoCouple`, or `Special Input`.
Input Config.	Select from menu of input types.
Wire Type	For RTDs, select from menu of wire types.
Linearization	Select `Normal` or `Dewpoint`.
2-Wire Dual Calculation	For 2-Wire Dual RTD, select `Redundant`, `Average`, or `Difference`.
Measurement	
Lower Range Limit	Shows value of Lower Range Limit of transmitter.
Upper Range Limit	Shows value of Upper Range Limit of transmitter.
Lower Range Value	Enter value at which transmitter outputs 4 mA.
Upper Range Value	Enter value at which transmitter outputs 20 mA.
Measurement Units	Select from menu of units.
Secondary Measurement Units	Select from menu of units.
Cold Junction	
Cold Junction Configuration	For thermocouples, select `Internal Sensor`, `External Sensor`, `Fixed Value`, or `Disabled`.

Options Tab Screen

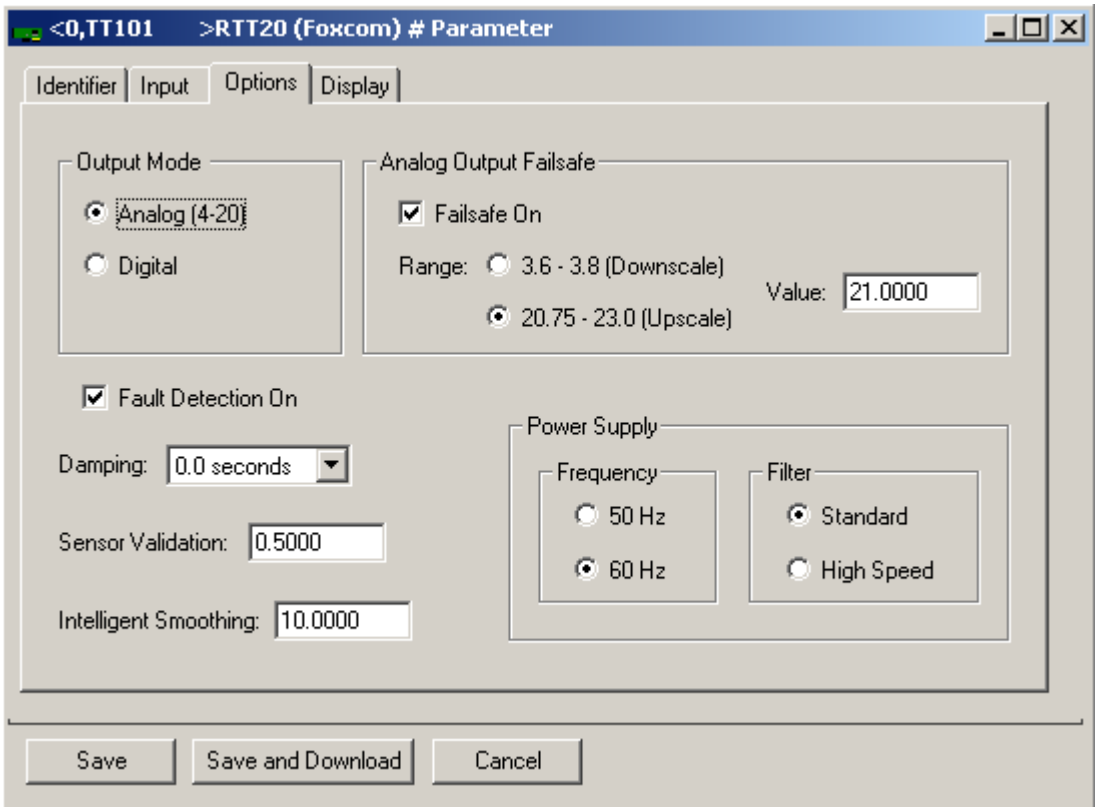

Figure 19. Sample RTT20 Options Tab Screen

Field	Entry
Output Mode	Select `Analog (4 - 20 mA)` or `Digital`.
Fault Detection On	√ = On; Blank = Off.
Analog Output Failsafe	
Failsafe On	√ = Failsafe On; Blank = Failsafe Off.
Range	If Failsafe is On, select `3.6-3.8 (Downscale)` or `20.75-23.0 (Upscale)`.
Value	Enter value within range selected.
Damping	Select one of nine choices from `No Damping` to `32` seconds.
Sensor Validation	Enter value between 0.25 and 10 seconds.
Intelligent Smoothing	Enter value between 0 and 30 seconds.
Power Supply	
Frequency	Select `50` or `60 Hz`.
Filter	Select `Standard` or `High Speed`.

Display Tab Screen

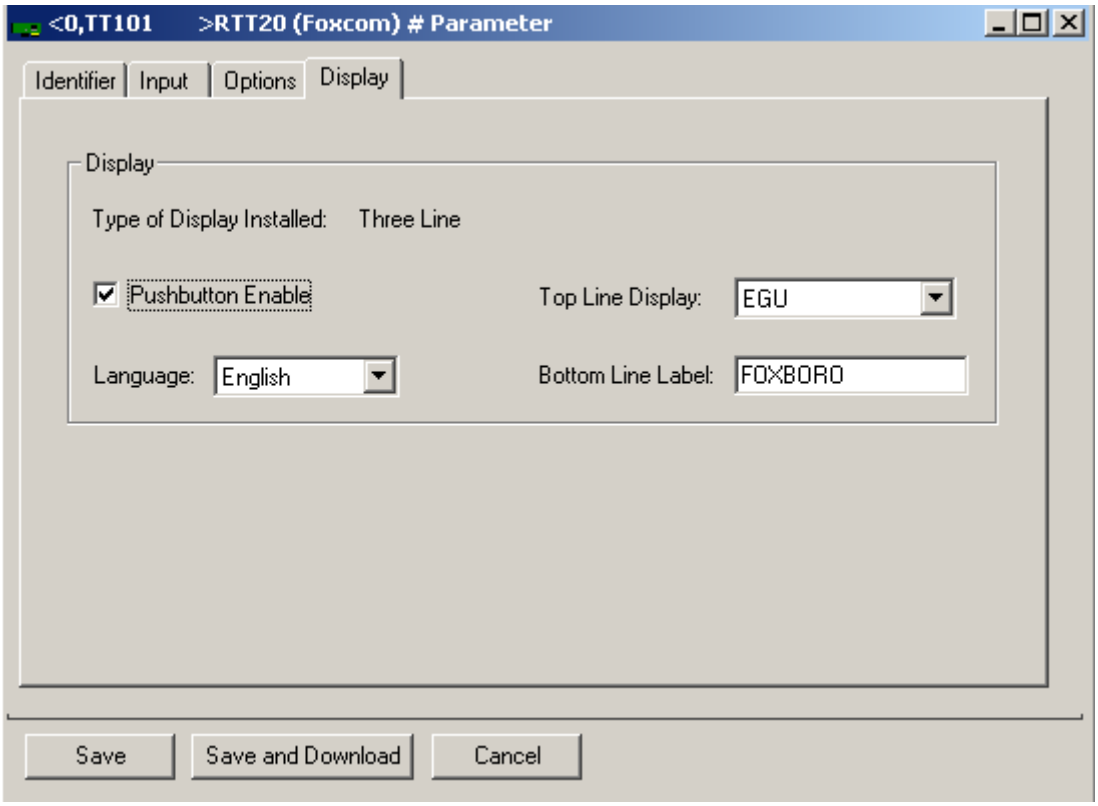

Figure 20. Sample RTT20 Display Tab Screen

Field	Entry
Type of Display Installed	Shows `None`, `One Line` or `Three Line` indicator installed.
Pushbutton Enable	√ = Enabled; Blank = Disabled.
Language	Select `English`, `French`, `German`, or `Spanish`.
Top Line Display	Select from menu (`EGU`, `Percent of Range`, `mA`, `EGU and Percent`, or `EGU and mA`).
Bottom Line Label	If three-line display, enter maximum of seven characters.

4. IMT25 and IMT25L Magnetic Flow Transmitters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with IMT25 Magnetic Flow Transmitters with FoxCom communication protocol. Additional information about these transmitters and FoxCom communication is contained in the following documents.

- B0193XXChecklist for FoxCom Measurement Integration
- MI 021-390Operation, Calibration, and Configuration

Measure Screen

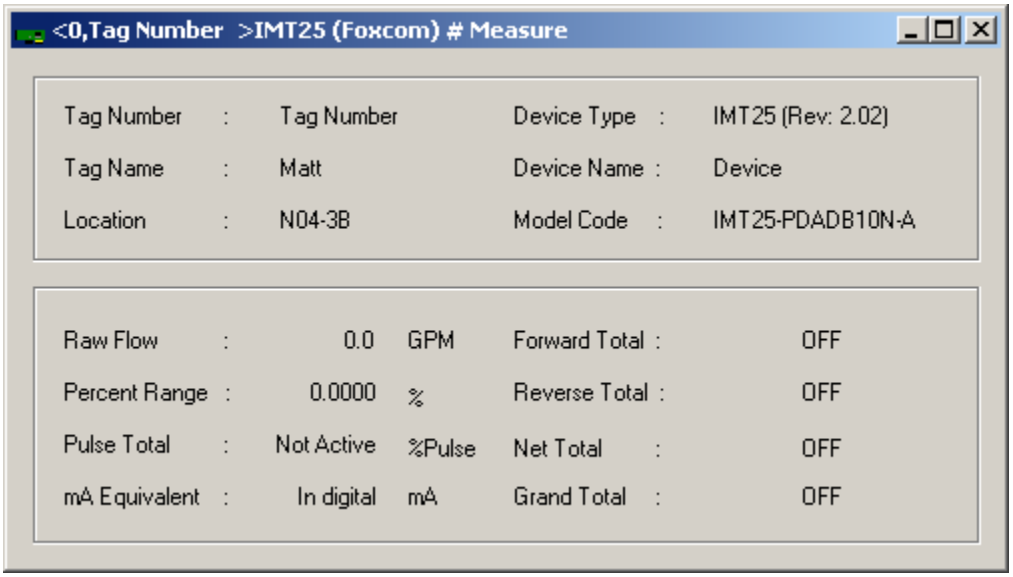

Figure 21. Sample IMT25 Measure Screen

Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 6.

Table 6. Transmitter Status Error Messages

Message	Explanation	Recommended Action
Primary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Init Required	Initializing is required.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Diagnostic Error	Indicates an active diagnostic error.	See Secondary Status Fields and Diagnostic Codes to determine problem and corrective action.
Secondary Status Error	Indicates an error in secondary status.	The secondary status error is shown in Column 2 of the screen display.
Secondary Status Fields		
Signal Lock Off	External contact is off.	Set by user; no action required.
Error in Startup	Transmitter cannot exit its boot code.	Cycle power. If the problem persists, service is required.
Empty Tube Error	Pipe is empty.	See “Empty Pipe Detection” in MI 021-390.
Electrode Error	Unreliable measurement of electrode voltage.	See Extended Status - Hardware below.
Coil Error	Unreliable measurement of coil current.	See Extended Status - Hardware below.
Extended Status - Hardware		
Coils		
Coil Low	Transmitter unable to generate a reliable measurement of coil current.	Check coil wiring at flowtube and transmitter.
Coil High		Service is required.
Coil Unstable		Cycle power. If the problem persists, service is required.
Positive Coil Needed		Check wiring and flowtube coil.
Negative Coil Needed		
Empty Pipe		
Unable to Calibrate	Unable to calibrate.	Verify that piping is full. Check flowtube and transmitter wiring.
EPD Calibration Failed	Error during calibration.	Verify that EPD parameter is turned on.
Electrodes		
Electrode Low	Transmitter unable to generate a reliable measurement of electrode voltage.	Check signal wiring between flowtube and transmitter. Also see MI 021-391.
Electrode High		
Electrode Unstable		
Positive Electrode Needed		
Negative Electrode Needed		
Setup		
MultiRange Setup	Setup needed.	Check that Configuration and Contact Inputs 1 and 2 are set up properly.

Table 6. Transmitter Status Error Messages (Continued)

Message	Explanation	Recommended Action
Extended Status - Process		
Process Problems		
Signal Lock	Signal lock is on.	Check that Contact Inputs 1 and 2 are activated by an external set of contacts or switch.
Pulses Lag Total	Totalizer putting out pulses at the maximum rate but falling behind the actual total.	Reconfigure totalizer display so that each pulse represents a larger volume.
Total Rollover	Total exceeds limit of configured format.	Reconfigure total format if necessary and reset totals.
A to D Calibration Failed	Electronics problem.	Service is required.
Alarms		
High Flow	Flow above configured high flow rate.	Make process change or reconfigure alarm setpoint.
Low Flow	Flow below configured low flow rate.	
High Forward Total 1	Total above configured High Fwd Tot 1.	Make process change or reconfigure Tot Alm Setpt and reset totals.
High Forward Total 2	Total above configured High Fwd Tot 2.	
Empty Pipe	Transmitter thinks pipe is insufficiently full to make measurements.	Make process change or, if not empty, check wiring and recalibrate.

Calibration

You can perform the following calibration procedures on an IMT25 transmitter using the PC50 Field Device Tool:

- mA Output
- Reset Totals
- Empty Pipe.

The calibration procedures are accessed as follows:

```
Device > Additional functions > Adjust set value
```

Empty Pipe

The empty pipe detector can be used to force the transmitter outputs to stay at zero when the flowtube is empty. The empty pipe circuit must be calibrated to the fluid in the flowtube. The flowtube must be full of process fluid (flowing or still) to use this calibration procedure. The calibration procedure leaves the empty pipe detector in the ON condition. The detector can be turned off in the Configuration menu.

1. Select `Empty Pipe` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.

3. Fill the flowtube and then select `Continue` to start the Empty Pipe Calibration process.
4. Wait while the device is calibrating.
5. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

mA Output

As your device was accurately calibrated at the factory, this function is not normally required. However, the mA output can be trimmed with this procedure if it is necessary to match the output to the output of a specific receiving device.

The procedure to perform a mA Output Calibration on a FoxCom device is:

1. Insert an accurate mA meter (or digital voltmeter and precision resistor) in the loop wiring.
2. Select `mA Output` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Select `4 mA Output`.
5. Set the `Step Size` (`-0.5`, `-0.05`, `-0.005`, `0.005`, `0.05`, `0.5`), and select `Apply`.
6. Repeat Step 4 until you are satisfied with the output. The cumulative change is shown on the screen display.
7. Select `20 mA Output`.
8. Repeat Steps 4 and 5. When finished, select `Continue`.
9. The screen then displays the adjustments. To accept this change, select `Continue`.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurement.

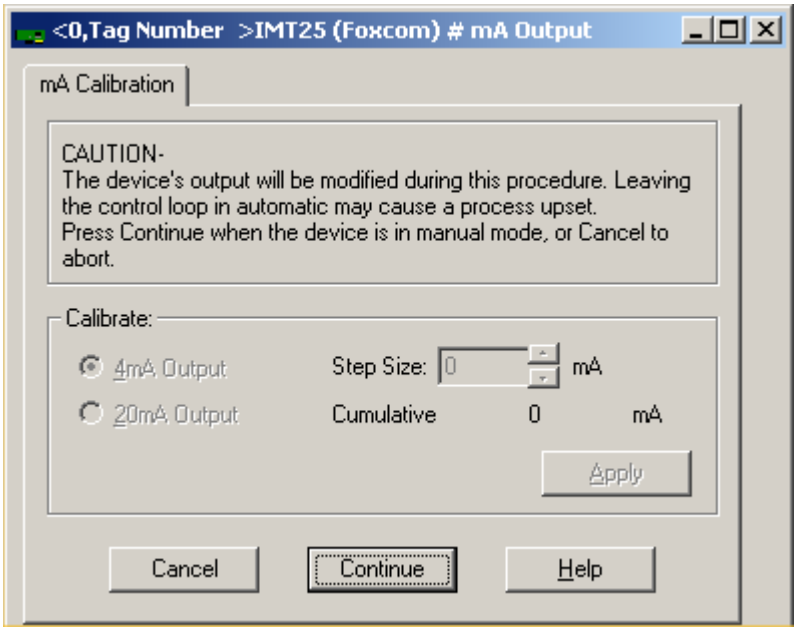

Figure 22. Sample IMT25 mA Calibration Screen

Reset Totals

This procedure resets the transmitter totals. The `Net, Forward and Reverse Totals` are reset as a group. The `Grand Total` is individually reset.

1. Select `Reset Totals` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Select the device total(s) to reset to zero. You can select `Net, Forward, and Reverse Totals` or `Grand Total`. Then select `Continue`.

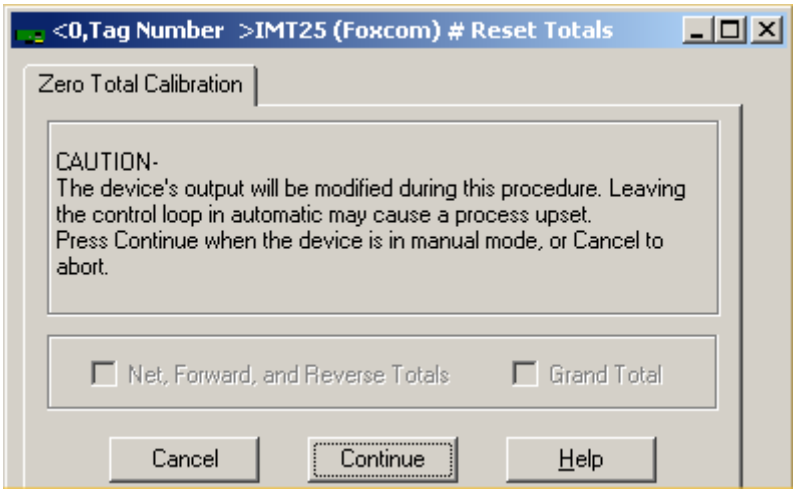

Figure 23. Sample IMT25 Reset Totals Screen

4. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Configuration

NOTE

For IMT25L devices, some configuration parameters do not apply.

Identifier Tab Screen

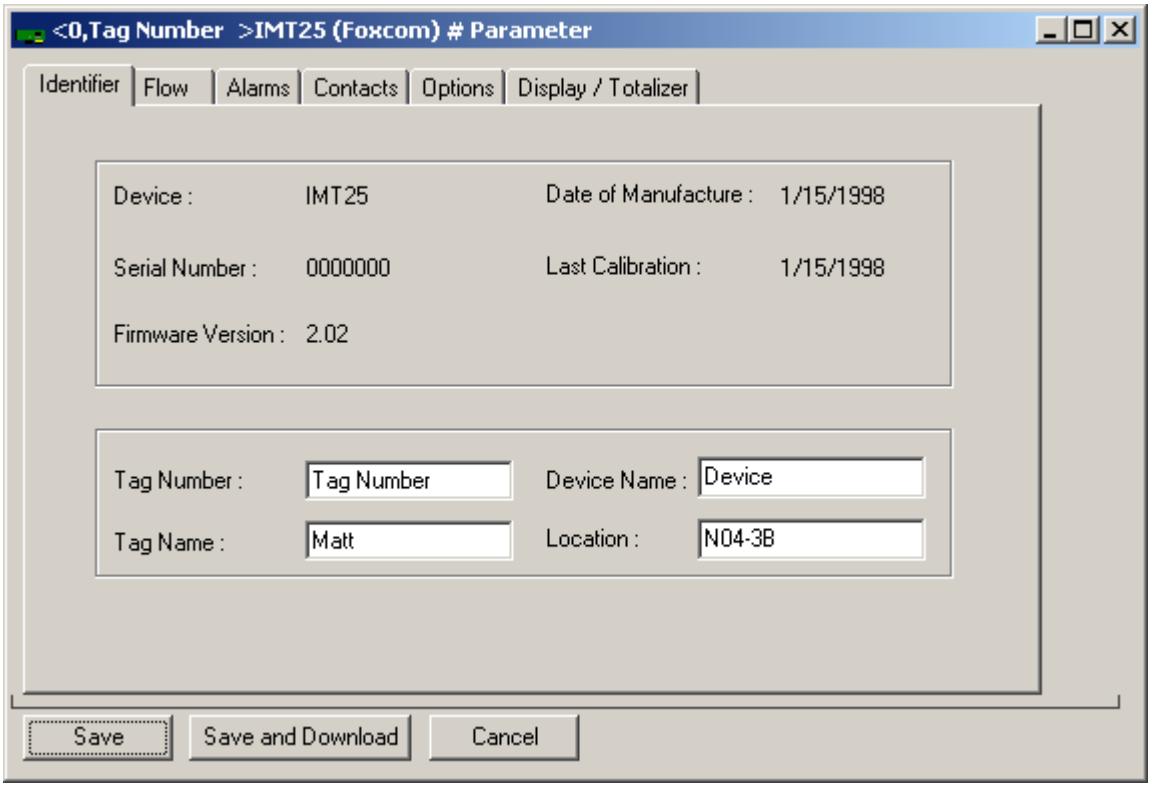

Figure 24. Sample IMT25 Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the transmitter filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter DevNam.
Location	Enter maximum of 14 characters. Optional, used for reference only.

Flow Tab Screen

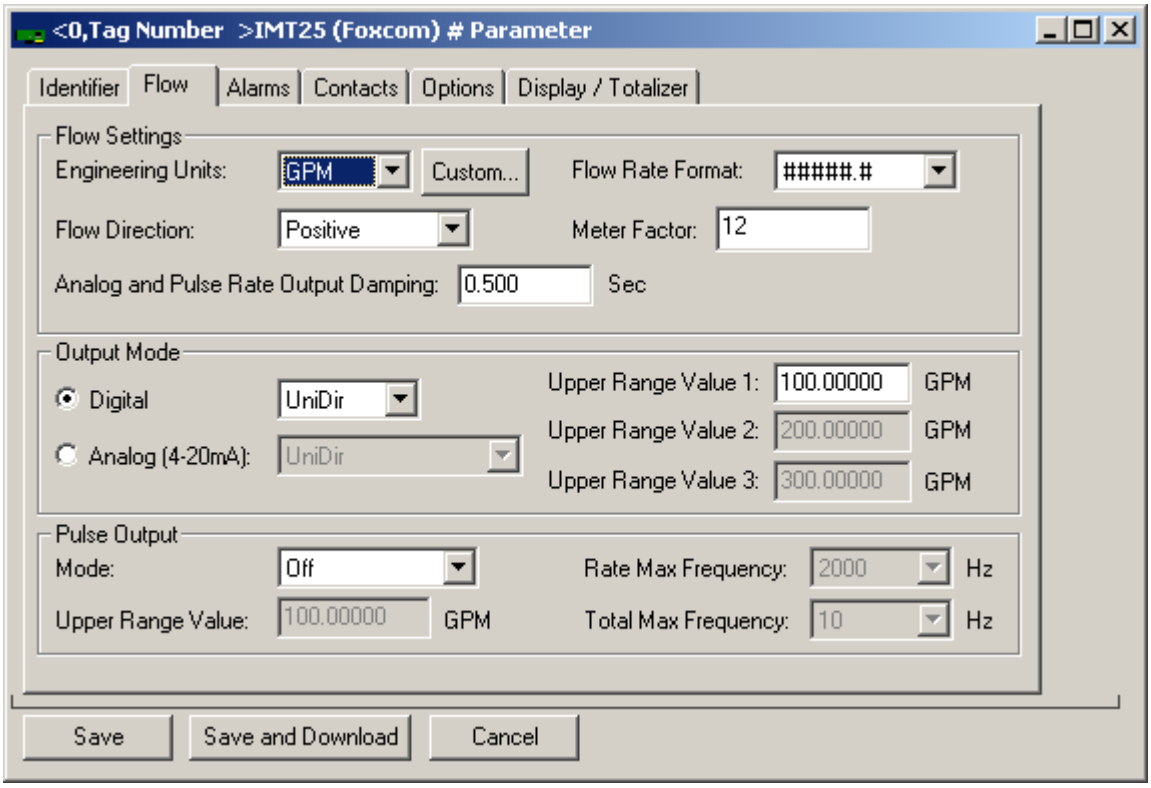

Figure 25. Sample IMT25 Flow Tab Screen

Field	Entry
Flow Settings	
Engineering Units	Select from menu of choices or `Custom`.
Flow Direction	Select `Positive`, `Reverse`, `BiDir Positive`, or `BiDir Reverse`.
Analog and Pulse Rate Output Damp	Enter damping response time from 0.0 to 99.9 seconds.
Flow Rate Format	Select from menu of eight choices.
Meter Factor	Enter “IMT25 Cal Fact” or “Cal Fact*” factor. See MI 021-390.
Output Mode	
Digital	Select `UniDirectional` or `BiDirectional` flow.
Analog	Select `UniDirectional`, `Unidirectional Multi-Range`, `BiDirectional Dual Range`, or `BiDirectional Split Range`.
Upper Range Values	Enter Upper Range Values in units shown.
Pulse Output	
Mode	Select `Off`, `Pulse Rate`, or `Pulse Total`.
Upper Range Value	If Pulse Rate mode, enter Pulse Out URV between minimum and maximum URV of the flowtube (not greater than 999999).
Rate Max Frequency	If Pulse Rate mode, select `Rate Max Frequency` of `1000`, `2000`, `5000`, or `10000` Hz.
Total Max Frequency	If Pulse Total mode, select `Total Max Frequency` of `10` or `100` Hz.

Alarms Tab Screen

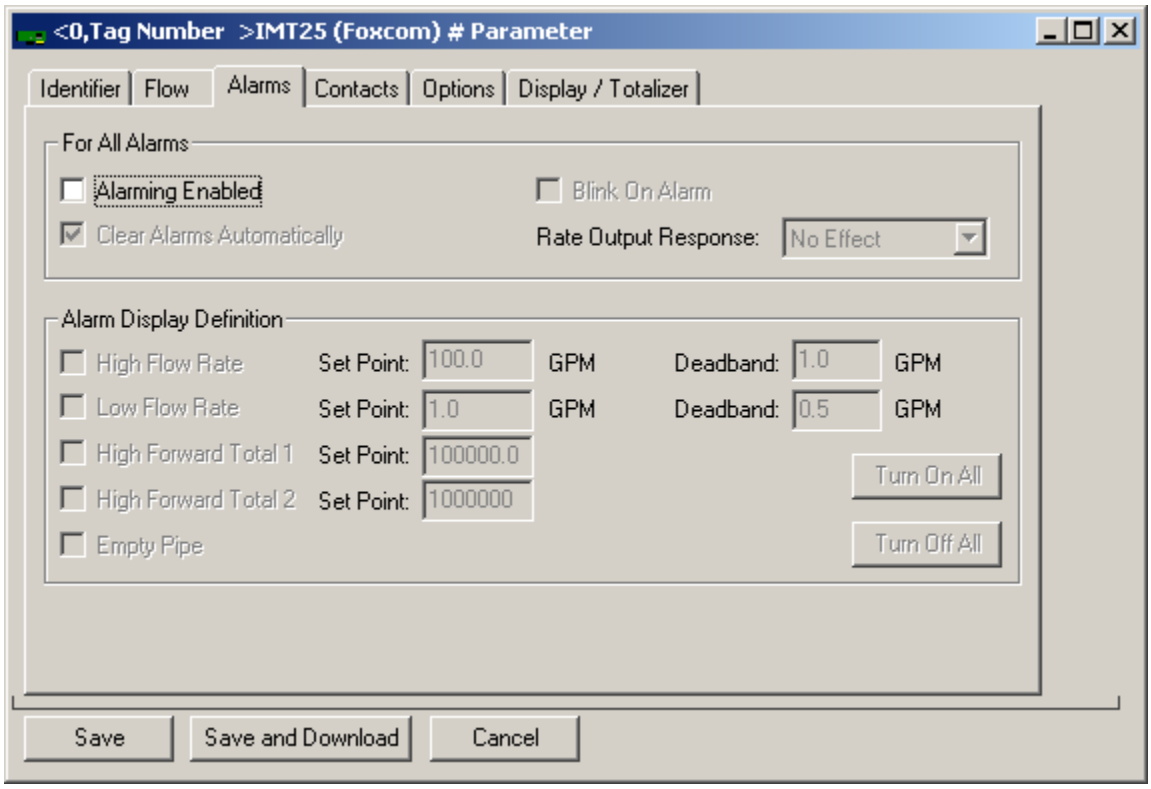

Figure 26. Sample IMT25 Alarms Tab Screen

Field	Entry
For All Alarms	
Alarming Enabled	√ = On; Blank = Off.
Clear Alarms Automatically	√ = Auto; Blank = Manual.
Blink On Alarm	√ = Blink; Blank = Don't Blink.
Rate Output Response	Select `No effect`, `Go Downscale`, or `Go Upscale`.
Alarm Display Definition	
High Flow Rate	√ = On; Blank = Off. If On, enter Set Point and Deadband.
Low Flow Rate	√ = On; Blank = Off. If On, enter Set Point and Deadband.
High Forward Total 1	√ = On; Blank = Off. If On, enter Set Point.
High Forward Total 2	√ = On; Blank = Off. If On, enter Set Point.
Empty Pipe	√ = On; Blank = Off.
Turn On All	Turns all alarms on.
Turn Off All	Turns all alarms off.

Contacts Tab Screen

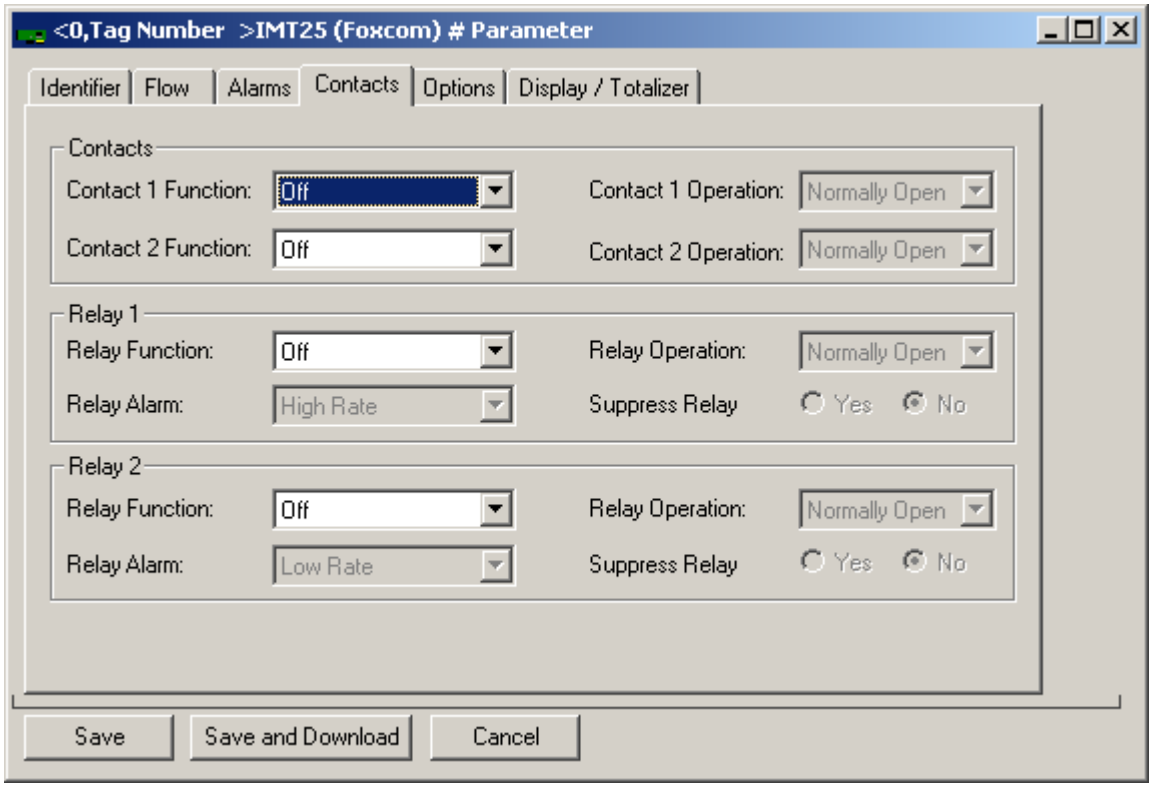

Figure 27. Sample IMT25 Contacts Tab Screen

Field	Entry
Contacts	
Contact 1 Function	Select `Off`, `Ack Alarm`, `Reset Net Total`, `Reset Gr Total`, `Reset All Total`, `Multi-range`, or `Signal Lock`.
Contact 1 Operation	If `Contact 1 Function` is not `Off`, select `Normally Open` or `Normally Closed`.
Contact 2 Function	Similar to Contact 1 Function.
Contact 2 Operation	Similar to Contact 1 Operation.
Relay 1	
Relay Function	Select `Off`, `Alarm`, `Alarm & Diag`, `Diagnostics`, `Flow Direction`, or `Test Mode`.
Relay Alarm	If `Relay Function` is not `Off`, select `High Rate`, `Low Rate`, `High Forward Total 1`, `High Forward Total 2`, `Empty Pipe`, or `Any Alarm`.
Relay Operation	If `Relay Function` is not `Off`, select `Normally Open` or `Normally Closed`.
Suppress Relay	If `Relay Function` is not `Off`, select `Yes` to suppress reactivation of an alarm or `No` for no suppression.
Relay 2 (Similar to Relay 1)	

Options Tab Screen

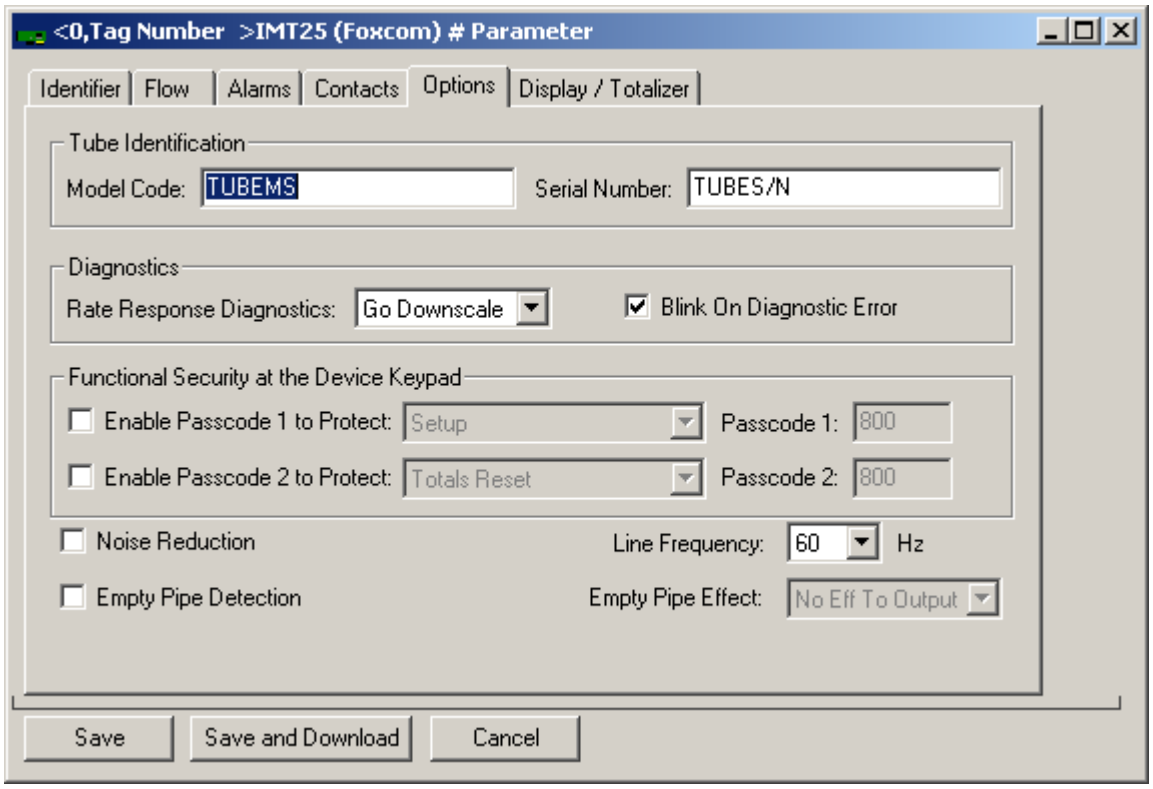

Figure 28. Sample IMT25 Options Tab Screen

Field	Entry
Tube Identification	
Model Code	Enter model code of flowtube.
Serial Number	Enter serial number of flowtube.
Diagnostics	
Rate Response Diagnostics	Select `Go Downscale` or `Go Upscale`.
Blink On Diagnostic Error	√ = Blink; Blank = Don't Blink.
Functional Security at the IMT25 Keypad (not applicable to HART device)	
Enable Passcode 1	√ = Enable; Blank = Disable. If enabled, select `Setup`, `Totals Reset`, `Setup & Totals`, `Test Mode`, `Test Mode & Setup`, `Test Mode and Totals`, or `Test Mode, Setup & Totals`. Then enter 4 digit passcode.
Enable Passcode 2	Similar to Enable Passcode 1.
Noise Reduction	√ = On; Blank = Off.
Empty Pipe Detection	√ = On; Blank = Off.
Line Frequency	Select `50 Hz` or `60 Hz`.
Empty Pipe Effect	Select `No Effect` or `Auto Signal Lock`.

Display/Totalizer Tab Screen

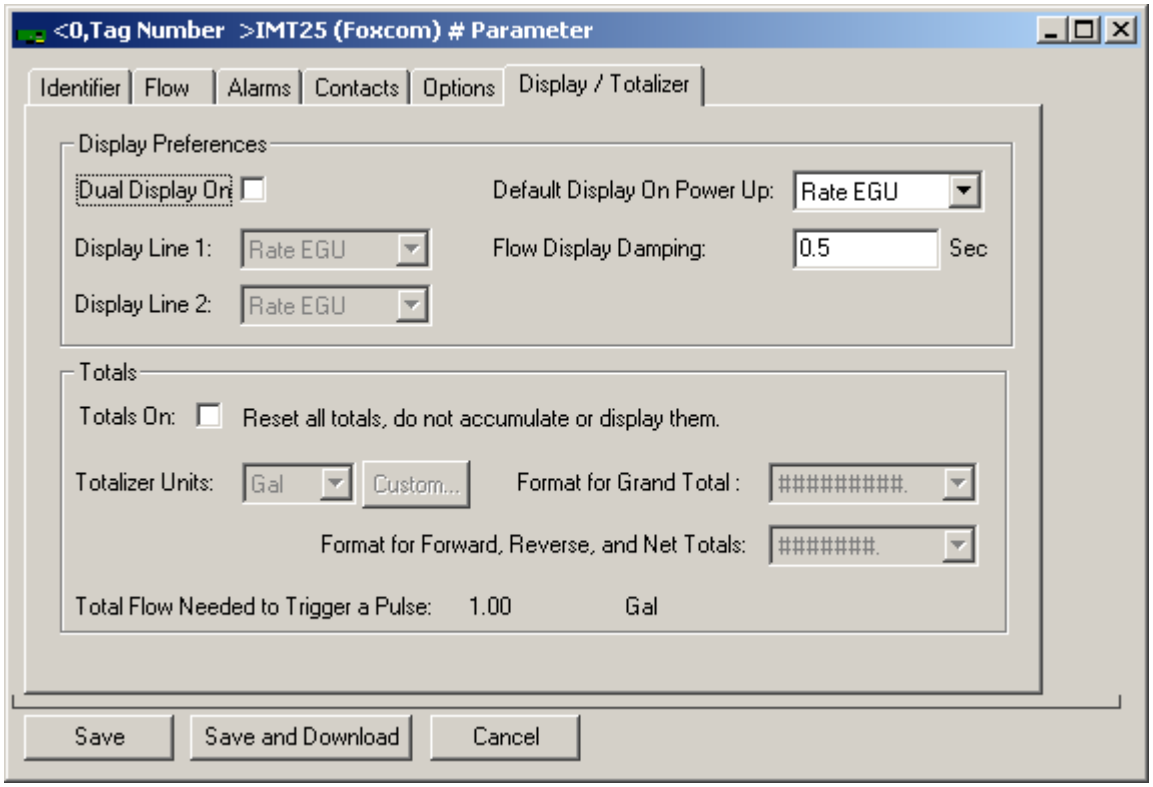

Figure 29. Sample IMT25 Display/Totalizer Tab Screen

Field	Entry
Display Preferences	
Dual Display On	√ = On; Blank = Off.
Display Line 1	If `Dual Display On` is checked (√), select from menu of six choices.
Display Line 2	If `Dual Display On` is checked (√), select from menu of six choices.
Default Display	Select from menu of seven choices.
Flow Display Damping	Enter damping response time for local display between 0.00 and 99.9 seconds.
Totals	
Total On	√ = On; Blank = Off.
Totalizer Units	If `Totalizer On` is checked (√), select `Gal`, `Lit`, or `Custom`.
Format for Grand Total	If `Totalizer On` is checked (√), select from menu of eight choices.
Format for Forward, Reverse, and Net Totals	If `Totalizer On` is checked (√), select from menu of eight choices.

5. IMT96 Magnetic Flow Transmitters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with IMT96 Magnetic Flow Transmitters with FoxCom communication protocol. Additional information about these transmitters and FoxCom communication is contained in the following documents.

- B0193XXChecklist for FoxCom Measurement Integration
- MI 021-403Operation, Calibration, and Configuration.

Measure Screen

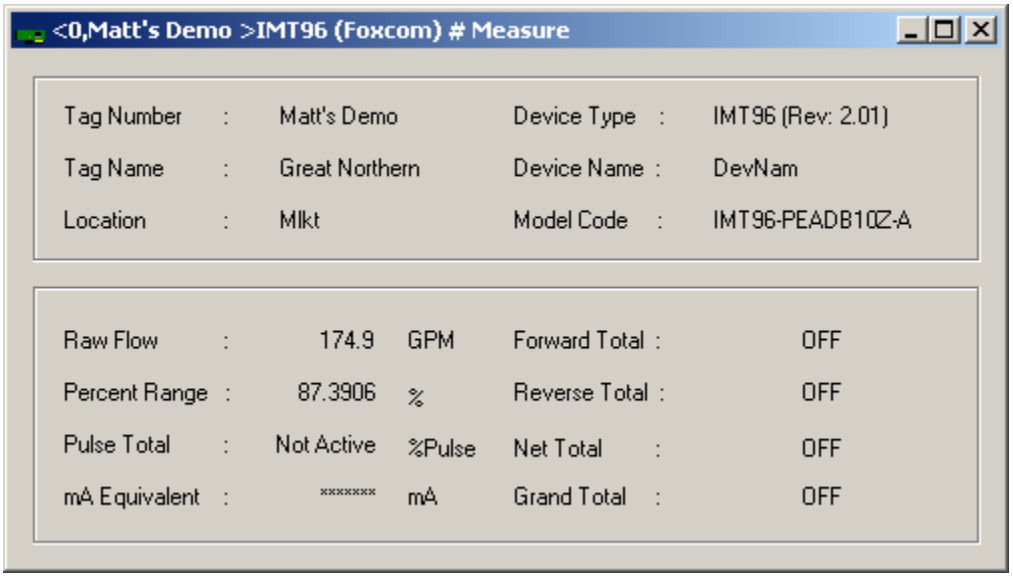

Figure 30. Sample IMT96 Measure Screen

Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 7.

Table 7. Transmitter Status Error Messages

Message	Explanation	Recommended Action
Primary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Init Required	Initializing is required.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Diagnostic Error	Indicates an active diagnostic error.	See Secondary Status Fields and Diagnostic Codes to determine problem and corrective action.
Secondary Status Error	Indicates an error in secondary status.	The secondary status error is shown in Column 2 of the screen display.
Secondary Status Fields		
Signal Lock Off	External contact is off.	Set by user; no action required.
Startup Test	Transmitter cannot exit its boot code.	Cycle power. If the problem persists, service is required.
Electrode Test	Unreliable measurement of electrode voltage.	See Extended Status - Hardware below.
Coil Test	Unreliable measurement of coil current.	See Extended Status - Hardware below.
Extended Status - Hardware		
Coils		
Low Coil Current Test	Transmitter unable to generate a reliable measurement of coil current.	Check coil wiring at flowtube and transmitter.
High Coil Current Test		Service is required.
Positive Coil Test		Check wiring and flowtube coil.
Negative Coil Test		
Electrodes		
Electrode in Range Test	Transmitter unable to generate a reliable measurement of electrode voltage.	Check signal wiring between flowtube and transmitter. Also see MI 020-391.
Positive Electrode Test		
Negative Electrode Test		
Setup		
MultiRange Setup	Setup needed.	Check that Configuration and Contact Inputs 1 and 2 are set up properly.
Extended Status - Process		
Process Problems		
Signal Lock Test	Signal lock is on.	Check that Contact Inputs 1 and 2 are activated by an external set of contacts or switch.

Table 7. Transmitter Status Error Messages (Continued)

Message	Explanation	Recommended Action
Pulses Lag Total Test	Totalizer putting out pulses at the maximum rate but falling behind the actual total.	Reconfigure totalizer display so that each pulse represents a larger volume.
Total Rollover Test	Total exceeds limit of configured format.	Reconfigure total format if necessary and reset totals.
A to D Calibration Test	Electronics problem.	Service is required.
Alarms		
High Flow	Flow above configured high flow rate.	Make process change or reconfigure alarm setpoint.
Low Flow	Flow below configured low flow rate.	
High Forward Total 1	Total above configured High Fwd Tot 1.	Make process change or reconfigure Tot Alm Setpt and reset totals.
High Forward Total 2	Total above configured High Fwd Tot 2.	

Calibration

You can perform the following calibration procedures on an IMT96 transmitter using the PC50 Field Device Tool:

- Zero Flow Calibration
- Restore Zero Flow Default.
- Reset Totals
- mA Output

The calibration procedures are accessed as follows:

`Device > Additional functions > Adjust set value`

Zero Flow Calibration

This procedure causes the device to rezero the measurement when zero flow is in the flowtube.

1. Select `Zero Flow Calibration` from the `Adjust set value` menu or the Zero Flow icon from the device toolbar.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Select `Continue` when zero flow is present in the flowtube.
4. Wait while the device is zeroing.
5. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Restore Zero Flow Default

This procedure restores the factory zero setting.

1. Select `Restore Zero Flow Default` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Wait while the factory zero setting is restored.
4. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Reset Totals

This procedure resets the transmitter totals. The Net, Forward and Reverse Totals are reset as a group. The Grand Total is individually reset.

1. Select `Reset Totals` from the `Adjust set value` menu or the Reset Totals icon from the device toolbar.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Select the device total(s) to reset to zero. You can select `Net, Forward, and Reverse Totals` or `Grand Total`. Then select `Continue`.

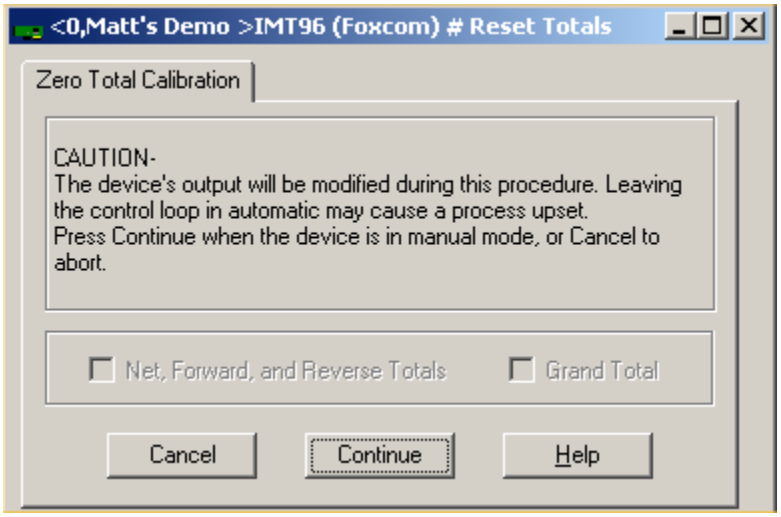

Figure 31. Sample IMT96 Reset Totals Screen

4. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

mA Output

As your device was accurately calibrated at the factory, this function is not normally required. However, the mA output can be trimmed with this procedure if it is necessary to match the output to the output of a specific receiving device.

The procedure to perform a mA Output Calibration is:

1. Insert an accurate mA meter (or digital voltmeter and precision resistor) in the loop wiring.
2. Select `mA Output` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Select `4 mA Output`.
5. Set the `Step Size` (`-0.5`, `-0.05`, `-0.005`, `0.005`, `0.05`, `0.5`), and select `Apply`.
6. Repeat Step 4 until you are satisfied with the output. The cumulative change is shown on the screen display.
7. Select `20 mA Output`.
8. Repeat Steps 4 and 5. When finished, select `Continue`.
9. The screen then displays the adjustments. To accept this change, select `Continue`.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurement.

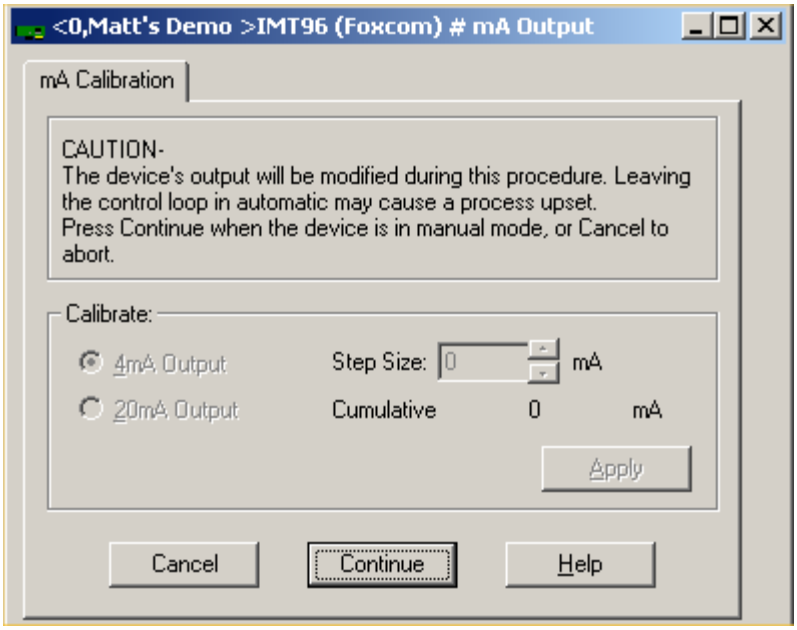

Figure 32. Sample IMT96 mA Calibration Screen

Configuration

Identifier Tab Screen

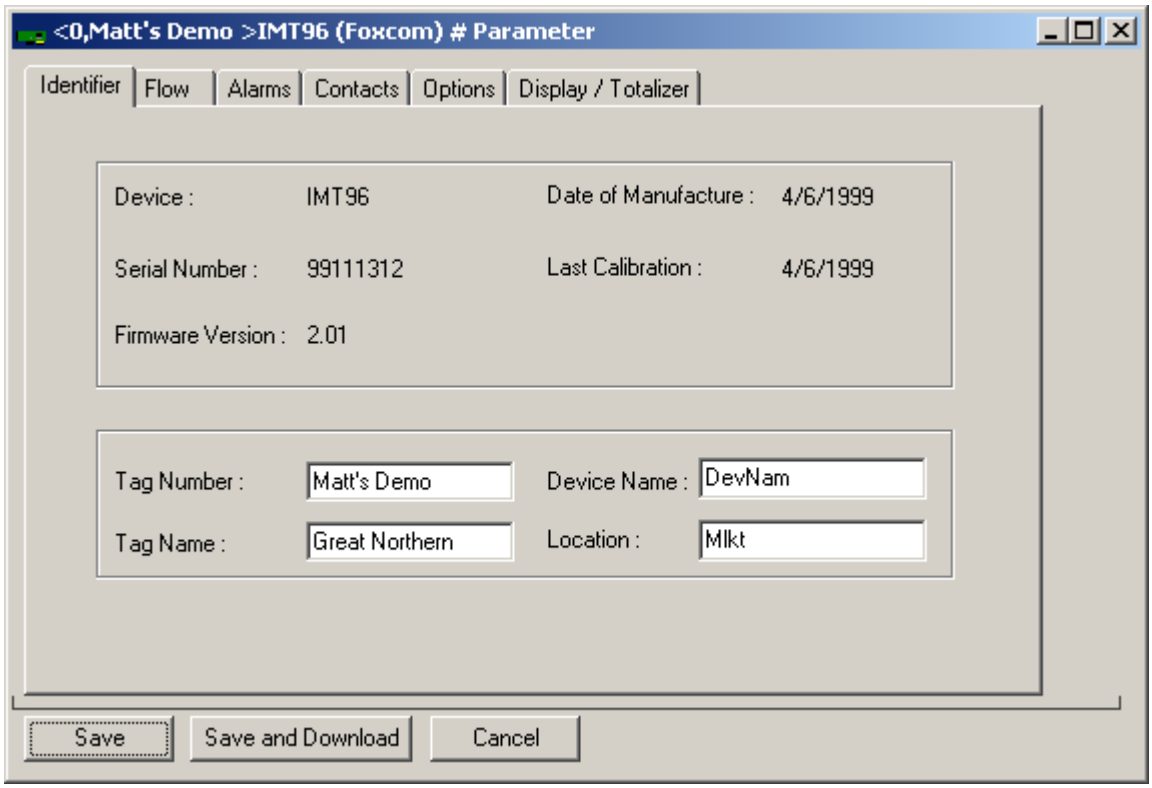

Figure 33. Sample IMT96 Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the transmitter filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter `DevNam`.
Location	Enter maximum of 14 characters. Optional, used for reference only.

Flow Tab Screen

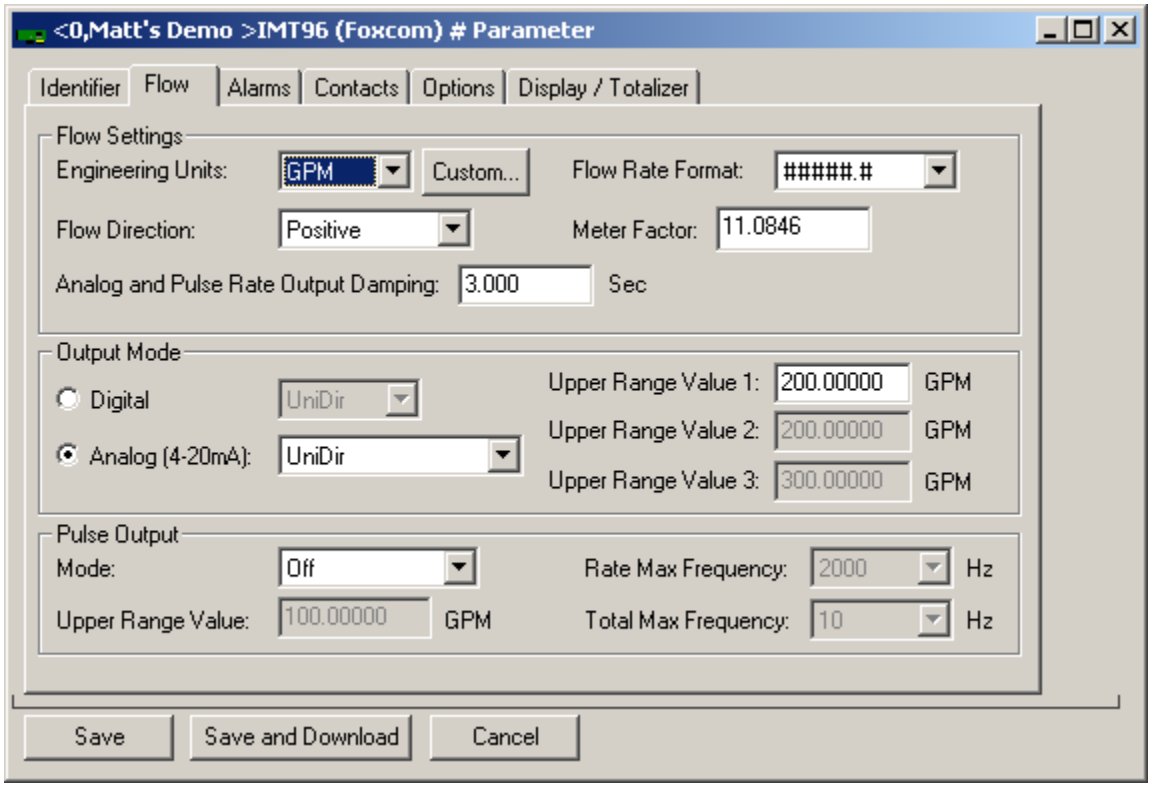

Figure 34. Sample IMT96 Flow Tab Screen

Field	Entry
Flow Settings	
Engineering Units	Select from menu of choices or `Custom`.
Flow Direction	Select `Positive`, `Reverse`, `BiDir Positive`, or `BiDir Reverse`.
Analog and Pulse Rate Output Damp.	Enter damping response time from 0.0 to 99.9 seconds.
Flow Rate Format	Select from menu of eight choices.
Meter Factor	Enter the "IMT96 Cal Fact" factor or see MI 021-412.
Output Mode	
Digital	Select `UniDirectional` or `BiDirectional` flow.
Analog	Select `UniDirectional`, `Unidirectional Multi-Range`, `BiDirectional Dual Range`, or `BiDirectional Split Range`.
Upper Range Values	Enter Upper Range Values in units shown.
Pulse Output	
Mode	Select `Off`, `Pulse Rate`, or `Pulse Total`.
Upper Range Value	If Pulse Rate Mode, enter Pulse Out URV between minimum and maximum URV of the flowtube (not greater than 999999).
Rate Max Frequency	If Pulse Rate Mode, select `Rate Max Frequency` of `1000`, `2000`, `5000`, or `10000` Hz.
Total Max Frequency	If Pulse Total Mode, select `Total Max Frequency` of `10` or `100` Hz.

Alarms Tab Screen

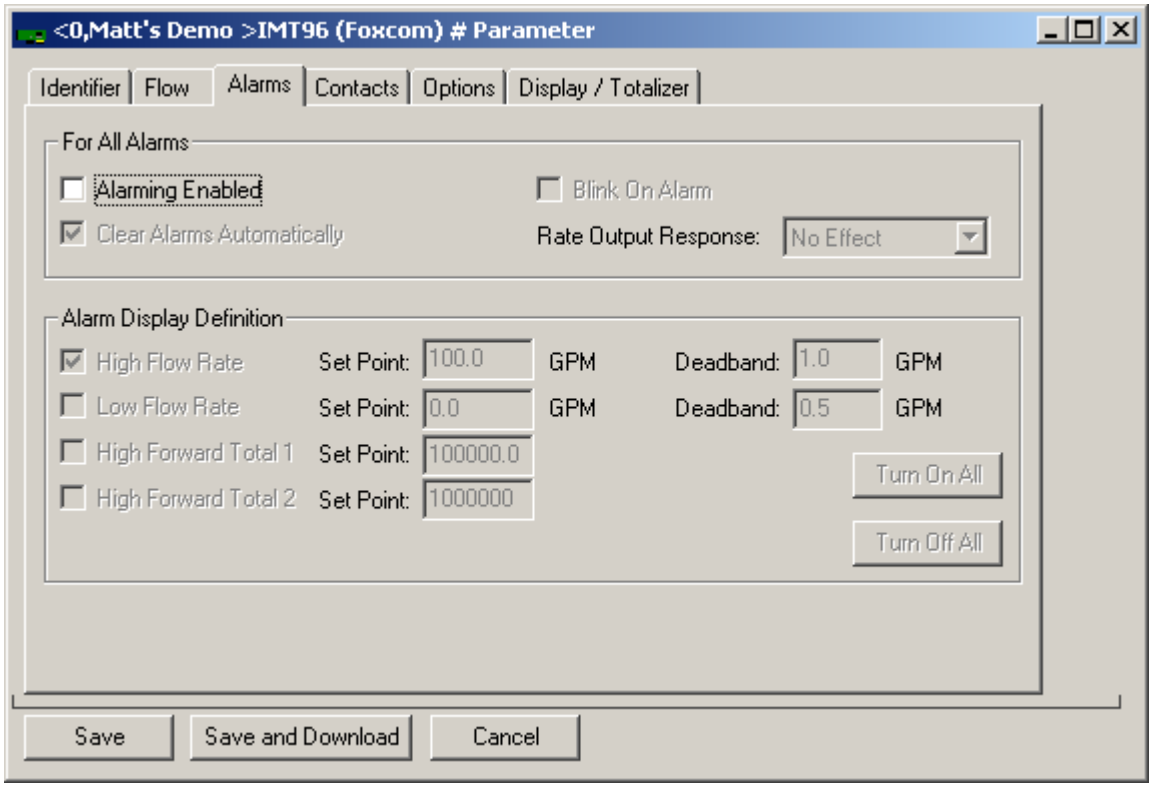

Figure 35. Sample IMT96 Alarms Tab Screen

Field	Entry
For All Alarms	
Alarming Enabled	√ = On; Blank = Off.
Clear Alarms Automatically	√ = Auto; Blank = Manual.
Blink On Alarm	√ = Blink; Blank = Don't Blink.
Rate Output Response	Select `No effect`, `Go Downscale`, or `Go Upscale`.
Alarm Display Definition	
High Flow Rate	√ = On; Blank = Off. If On, enter Set Point and Deadband.
Low Flow Rate	√ = On; Blank = Off. If On, enter Set Point and Deadband.
High Forward Total 1	√ = On; Blank = Off. If On, enter Set Point.
High Forward Total 2	√ = On; Blank = Off. If On, enter Set Point.
Turn On All	Turns all alarms on.
Turn Off All	Turns all alarms off.

Contacts Tab Screen

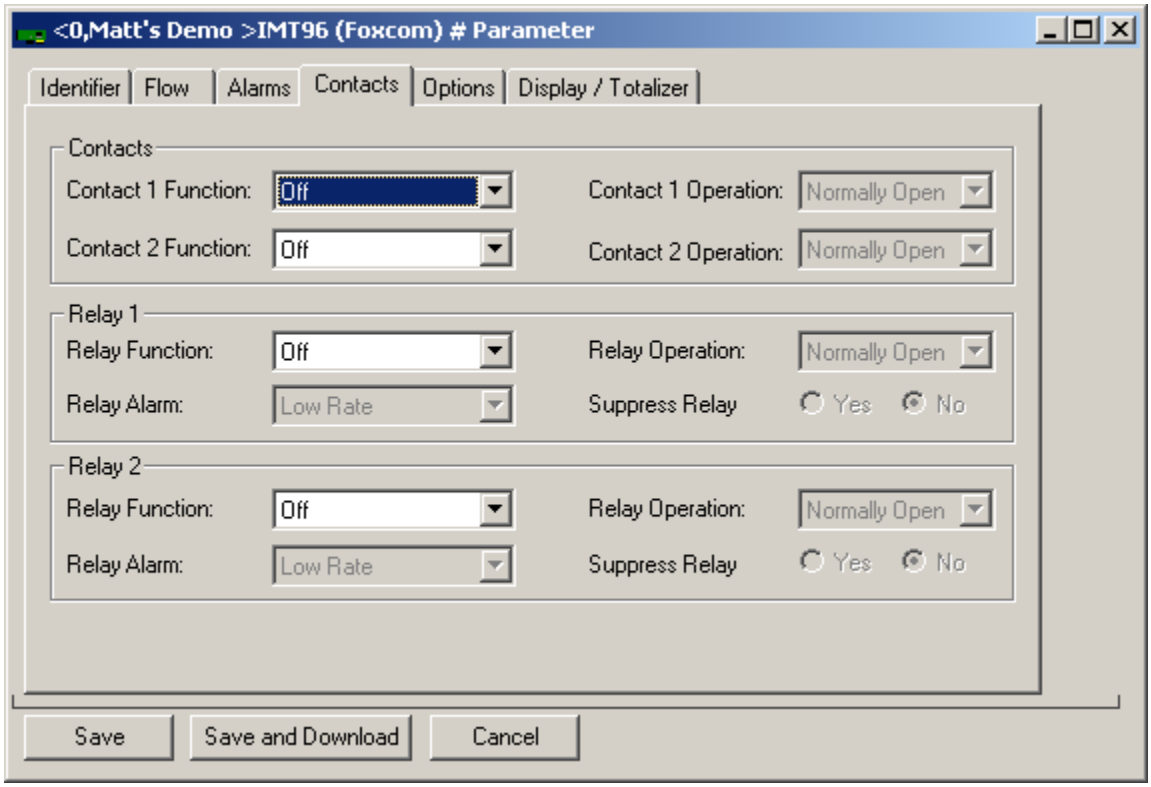

Figure 36. Sample IMT96 Contacts Tab Screen

Field	Entry
Contacts	
Contact 1 Function	Select `Off`, `Ack Alarm`, `Reset Net Total`, `Reset Gr Total`, `Reset All Total`, `Multi-range`, or `Signal Lock`.
Contact 1 Operation	If Contact 1 Function is not off, select `Normally Open` or `Normally Closed`.
Contact 2 Function	Similar to Contact 1 Function.
Contact 2 Operation	Similar to Contact 1 Operation
Relay 1	
Relay Function	Select `Off`, `Alarm`, `Alarm & Diag`, `Diagnostics`, `Flow Direction`, or `Test Mode`.
Relay Alarm	If Relay Function is not off, select `High Rate`, `Low Rate`, `High Forward Total 1`, `High Forward Total 2`, or `Any Alarm`.
Relay Operation	If Relay Function is not off, select `Normally Open` or `Normally Closed`.
Suppress Relay	If Relay Function is not off, select `Yes` to suppress reactivation of an alarm or `No` for no suppression.
Relay 2 (Similar to Relay 1)	

Options Tab Screen

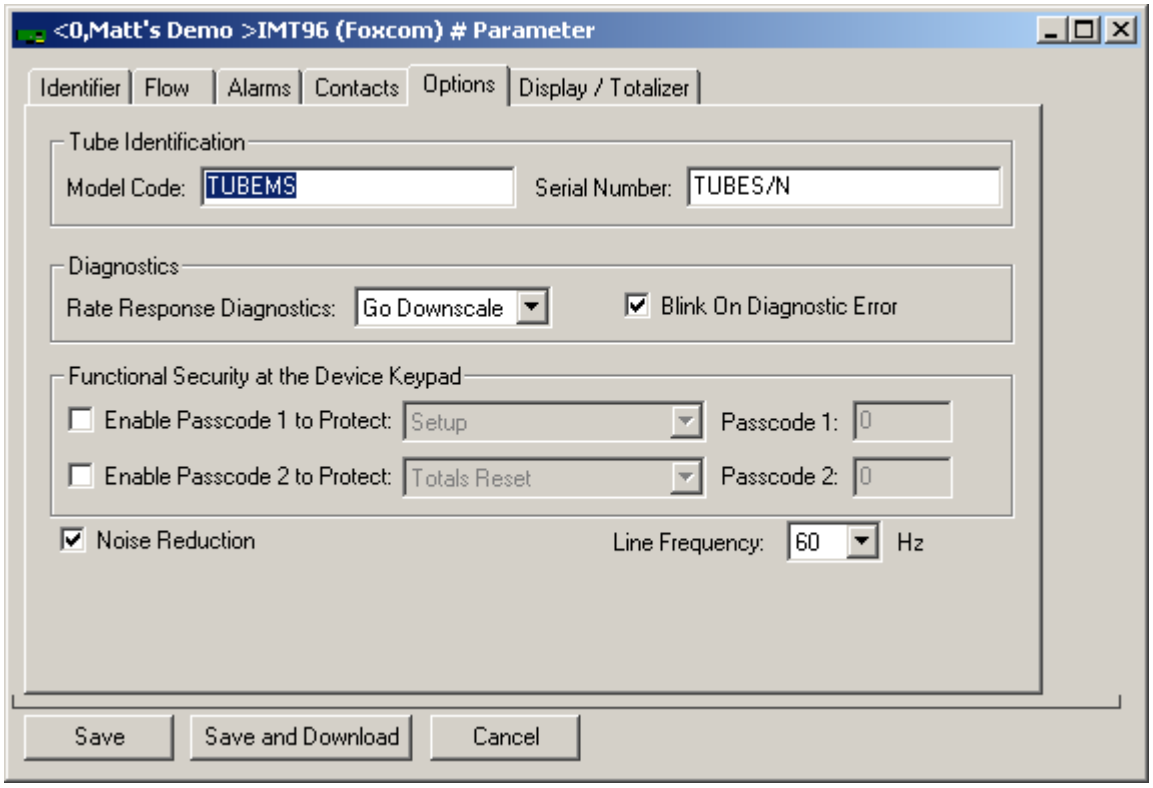

Figure 37. Sample IMT96 Options Tab Screen

Field	Entry
Tube Identification	
Model Code	Enter model code of flowtube.
Serial Number	Enter serial number of flowtube.
Diagnostics	
Rate Response Diagnostics	Select `Go Downscale` or `Go Upscale`.
Blink On Diagnostic Error	√ = Blink; Blank = Don't Blink.
Functional Security at the IMT96 Keypad	
Enable Passcode 1	√ = Enable; Blank = Disable. If Enabled, select `Setup`, `Totals Reset`, `Setup & Totals`, `Test Mode`, `Test Mode & Setup`, `Test Mode and Totals`, or `Test Mode, Setup & Totals`. Then enter 4 digit passcode.
Enable Passcode 2	Similar to Enable Passcode 1.
Noise Reduction	√ = On; Blank = Off.
Line Frequency	Select `50 Hz` or `60 Hz`.

Display/Totalizer Tab Screen

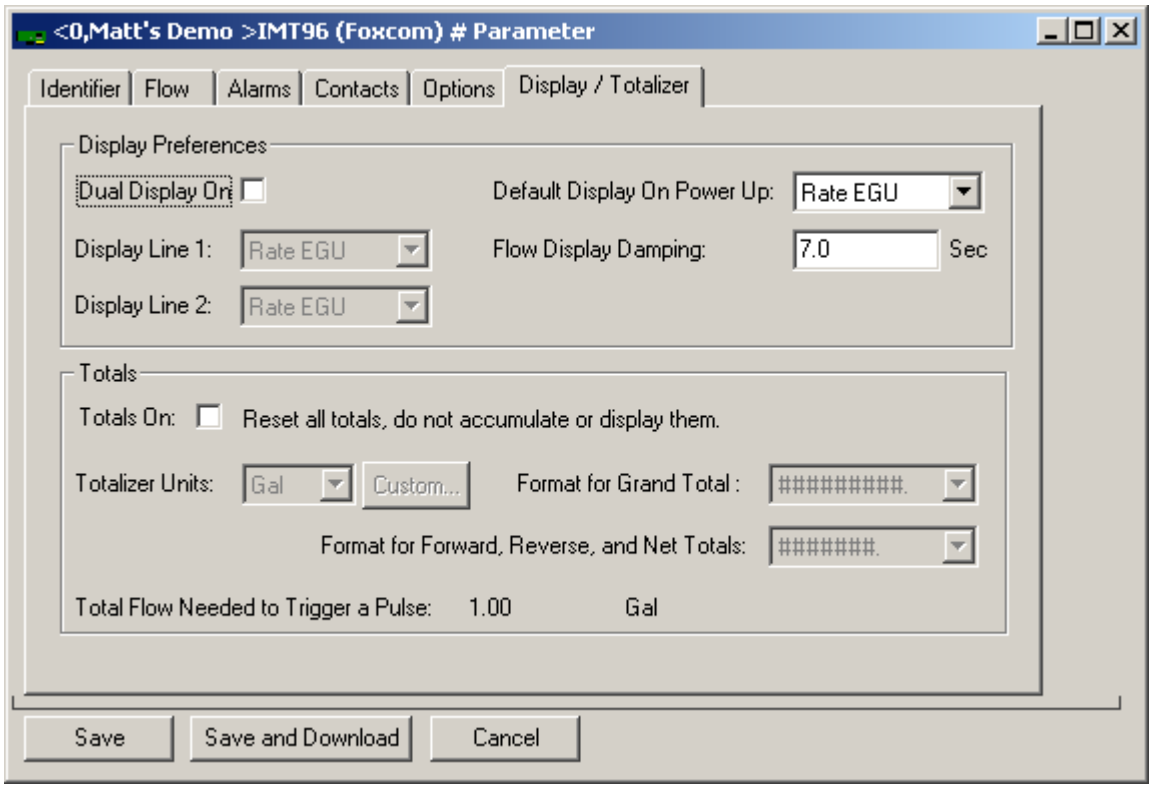

Figure 38. Sample IMT96 Display/Totalizer Tab Screen

Field	Entry
Display Preferences	
Dual Display On	√ = On; Blank = Off.
Display Line 1	If `Dual Display On` is checked (√), select from menu of six choices.
Display Line 2	If `Dual Display On` is checked (√), select from menu of six choices.
Default Display	Select from menu of seven choices.
Flow Display Damping	Enter damping response time for local display between 0.00 and 99.9 seconds.
Totals	
Total On	√ = On; Blank = Off.
Totalizer Units	If Totalizer On is checked (√), select `Gal`, `Lit`, or `Custom`.
Format for Grand Total	If Totalizer On is checked (√), select from menu of eight choices.
Format for Forward, Reverse, and Net Totals	If Totalizer On is checked (√), select from menu of eight choices.

6. 83 Series Vortex Flowmeters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with 83 Series Vortex Flowmeters with FoxCom communication protocol. Additional information about these transmitters and FoxCom communication is contained in the following documents.

- B0193XXChecklist for FoxCom Measurement Integration
- MI 019-19483F and 83W Installation, Configuration, Troubleshooting and Maintenance.
- MI 019-19583S Installation, Configuration, Troubleshooting and Maintenance.

Measure Screen

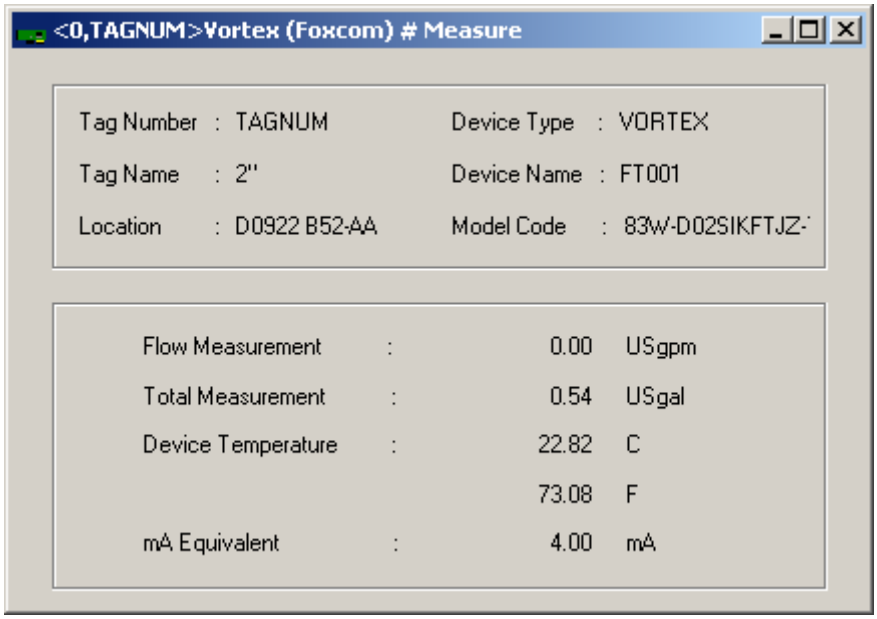

Figure 39. Sample Vortex Measure Screen

Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 8 and of diagnostic error messages in Table 9.

Status Error Messages

Table 8. Status Error Messages

Message	Explanation	Recommended Action
Primary Status Fields		
Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, cycle power and if necessary replace the electronic module.
Init Required	Transmitter is re-initializing on reset.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, cycle power and if necessary replace the electronic module.
Diagnostic Error	Indicates an active diagnostic error.	See Secondary Status Fields and Diagnostic Error Messages to determine problem and corrective action.
Secondary Status Error	Indicates an error in secondary status.	The secondary status error is shown in Column 2 of the screen display.
Secondary Status Fields		
Device Busy	Set if EEPROM write is in progress and pending.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, cycle power and if necessary replace the electronic module.
Bad Message Received	Transmitter received a bad message.	Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, cycle power and if necessary replace the electronic module.
Electronics Error	Electronics cannot calculate correct flow.	Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, cycle power and if necessary replace the electronic module.
Sensor Output High		
Temp Out of Range	Transmitter temperature is less than -40°C or higher than 80°C.	Check ambient and process temperature.

Diagnostic Error Messages

Table 9. Diagnostic Error Messages

Code	Error Message	Recommended Action
02	ROM Checksum Error	Replace electronic module.
03	EEPROM Chksum Err	If this does not clear problem, replace electronic module.
04	RAM Error	Replace electronic module.
0A	Flowrate Math Error	Check transmitter database and correct any problems. If problem persists, replace electronic module.
0C	Sensor Elec Failure	Cycle power. If problem persists, replace electronic module.
0E	Core Failure	Cycle power. If problem persists, replace electronic module.
2F	Offline Cfg Write Error	Take transmitter off-line, modify a parameter or mode, change parameter or mode back to previous value and place transmitter on-line.
10	Core Failure	Cycle power. If problem persists, replace electronic module.
28	Xmtr Temp Low	Check process temperature.
29	Xmtr Temp High	Check process temperature.

Calibration

You can perform the following calibration procedures on a Vortex Flowmeter using the PC50 Field Device Tool:

- Set Low Flow Cut-In
- Re-Range
- Zero Total
- mA Calibration.

The calibration procedures are accessed as follows:

```
Device > Additional functions > Adjust set value
```

Set Low Flow Cut-In

This function permits you to set the low flow cut-in level for the transmitter. You can also set a manual low flow cut-in level. To execute the operation, use the following procedure:

1. Select `Low Flow Cut-In` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual control mode and select `Continue`.
3. For a FoxCom device, select the desired `Low Flow Cut-In` value or select `Automatic` to set low flow cut-in to lowest setting with no false signal detected under **no flow** conditions. Select `Continue` when done.
   For a HART device, select `Increment` or `Decrement` to obtain the desired `Low Flow Cut-In` value or select `Automatic` to set low flow cut-in to lowest setting with no false signal detected under **no flow** conditions. Select `Continue` when done.

NOTE

Before selecting Automatic, it is important that flow be stopped.

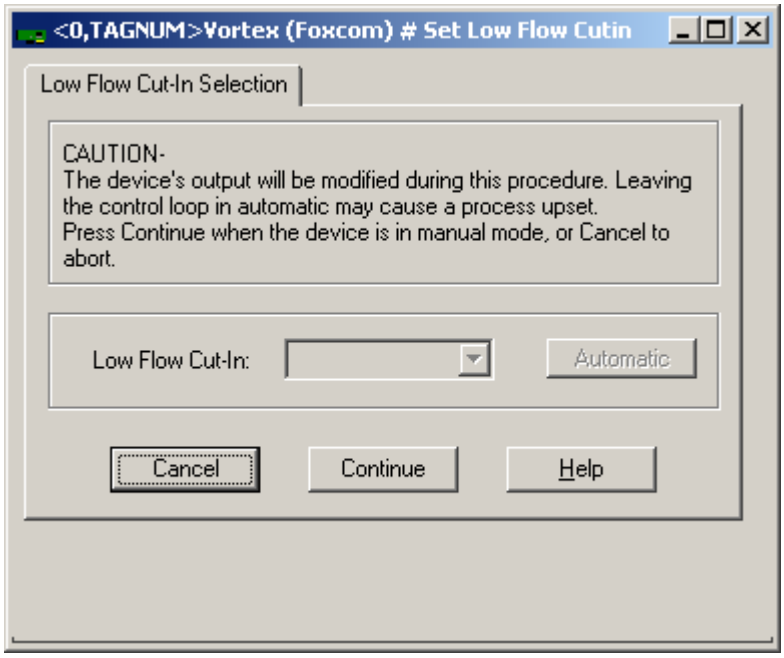

Figure 40. Sample Vortex Low Flow Cut-In Screen

4. Wait while the new `Low Flow Cut-In` value is set.
5. Follow the prompt to put the device back into Automatic control mode. Select `Continue` to resume dynamic measurements.

Re-Range

This function permits you to change the Flow Upper Range Value (URV).

1. Select `ReRange` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual control mode and select `Continue`.
3. To re-range to another input span, enter the desired upper range value and select `Continue`.
4. Select `Continue` again to save the new range to the device.
5. Follow the prompt to put the device back into Automatic control mode. Select `Continue` to resume dynamic measurements.

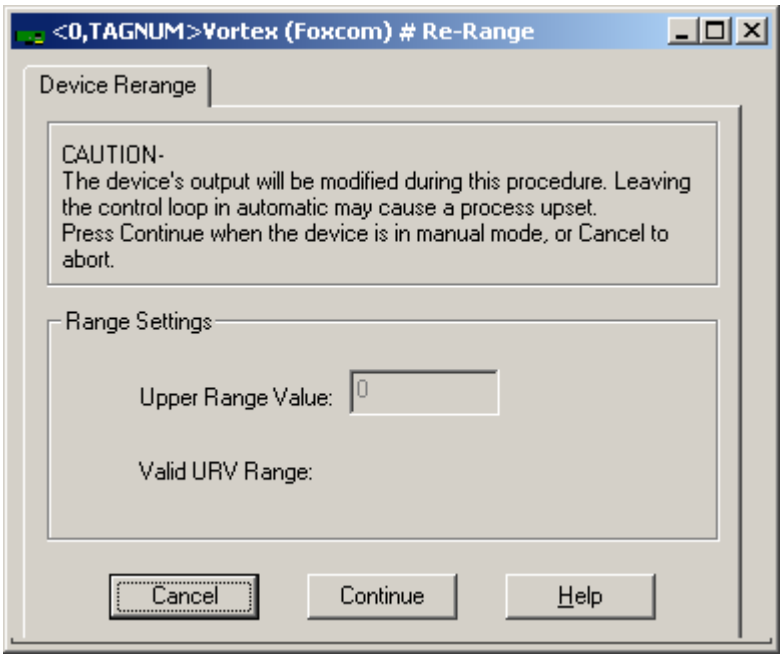

Figure 41. Sample Vortex Re-Range Screen

Zero Total

This function permits you to reset the transmitter total to zero. The procedure follows:

1. Select `Zero Total` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual control mode and select `Continue`.
3. Select `Continue` again to reset the transmitter total measurement to zero.
4. Follow the prompt to put the device back into Automatic control mode. Select `Continue` to resume dynamic measurements.

mA Calibration

As your device was accurately calibrated at the factory, this function is not normally required. However, the mA output can be trimmed with this procedure if it is necessary to match the output to the output of a specific receiving device.

The procedure to perform a mA Calibration is:

1. Insert an accurate mA meter (or digital voltmeter and precision resistor) in the loop wiring.
1. Select `mA Calibration` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual control mode and select `Continue`.
3. Select `4 mA Output`.
4. Set the `Step Size` from the menu (`-0.5`, `-0.05`, `-0.005`, `0.005`, `0.05`, `0.5`), and select `Apply`.
5. Repeat Step 4 until you are satisfied with the output. The cumulative change is shown on the screen display.
6. Select `20 mA Output`.
7. Repeat Steps 4 and 5. When finished, select `Continue`.
8. The screen then displays the adjustment. To accept this change, select `Continue`.
9. Follow the prompt to put the device back into Automatic control mode. Select `Continue` to resume dynamic measurement.

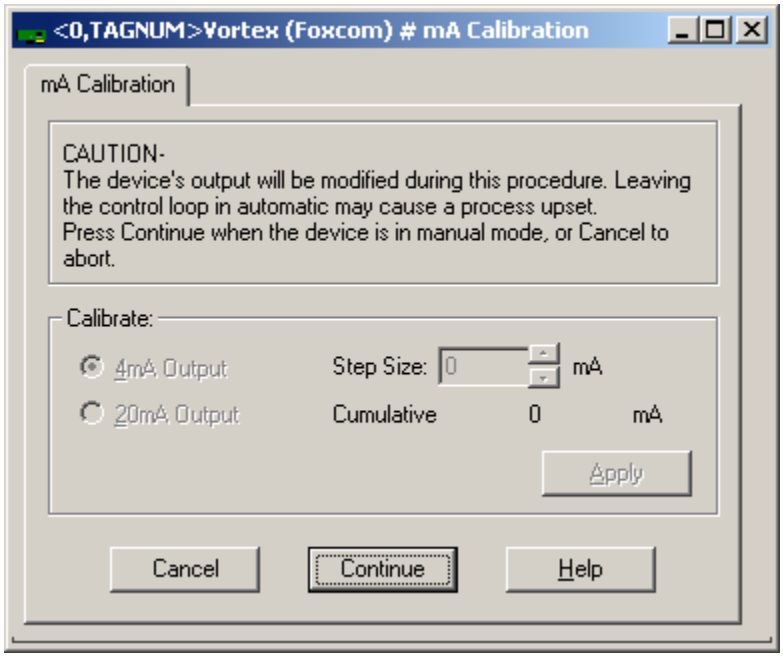

Figure 42. Sample Vortex mA Calibration Screen

Configuration

Identifier Tab Screen

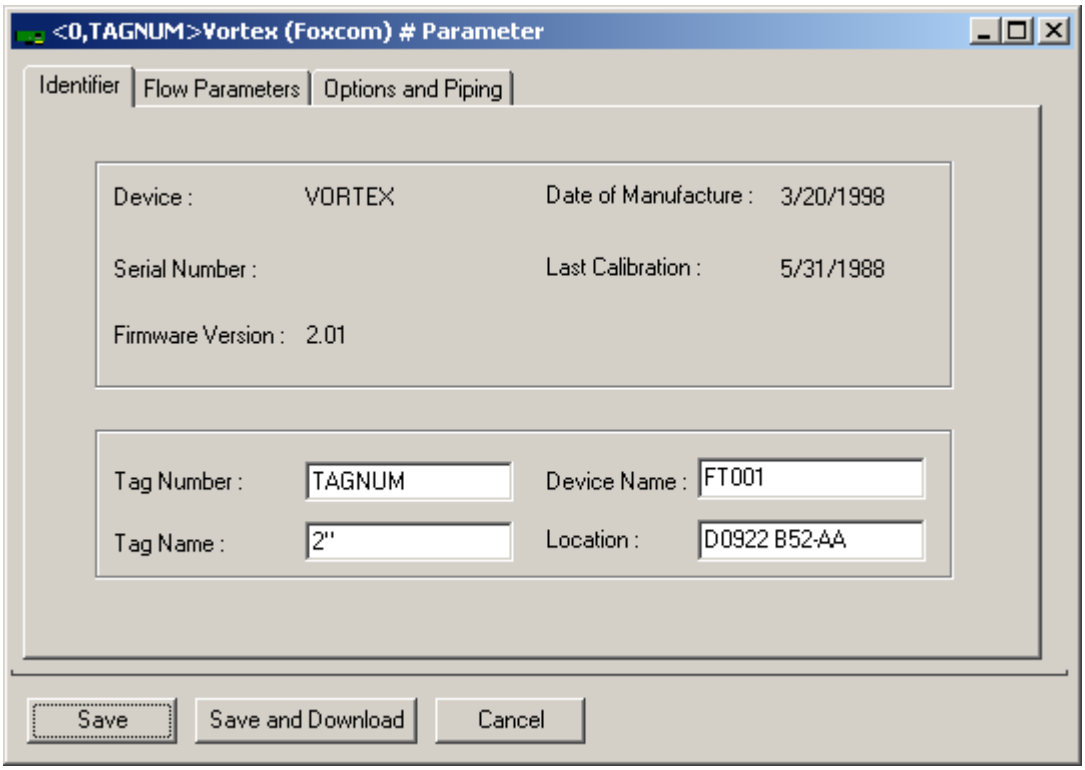

Figure 43. Sample Vortex Flowmeter Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the transmitter filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters with a FoxCom device. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter DevNam.
Location	Enter maximum of 14 characters. Optional, used for reference only with FoxCom device.

Flow Parameters Tab Screen

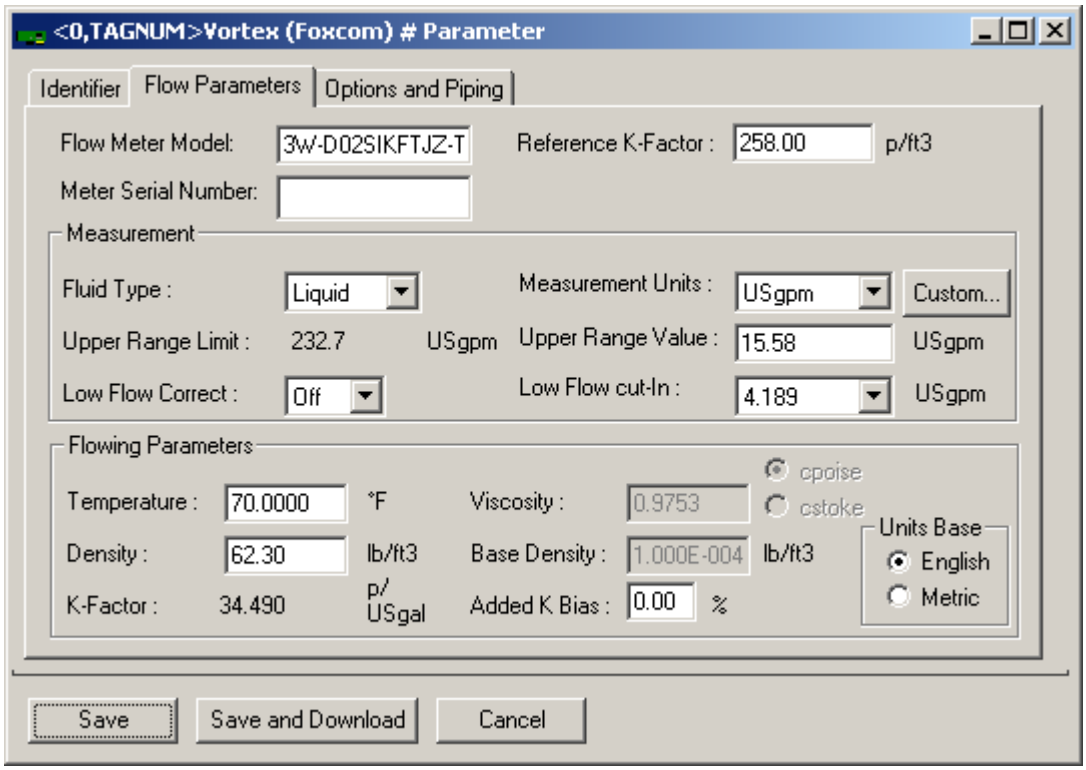

Figure 44. Sample Vortex Flow Parameters Tab Screen

Field	Entry
Flow Meter (Sensor) Model	Enter Model Number.
Reference K-Factor	Enter Reference K-Factor.
Meter Serial Number	Shows Serial Number (if HART device).
Measurement	
Fluid Type	Select `Liquid`, `Gas`, or `Steam`.
Upper Range Limit	Shows value of Upper Range Limit of the flowmeter.
Low Flow Correct	Specify `On` or `Off`.
Measurement Units	Select from menu of flow units or select `Custom` to enter user-configured units.
Upper Range Value	Enter Upper Range Value in measurement units shown.
Low Flow Cut-In	Select from menu of values.
Flowing Parameters	
Temperature	Enter temperature in units shown.
Density	Enter density in units shown. Defaults are Liquid: 62.30, Gas: 0.5858, and Steam: 0.2992 lb/ft^3.
K-Factor	Shows K-Factor in units shown.
Viscosity	If liquid, enter viscosity.
Base Density	If gas, enter value in same units as Density (above).
Added K Bias	Enter value in percent.
Units Base	Select `English` or `Metric`.

Options and Piping Tab Screen

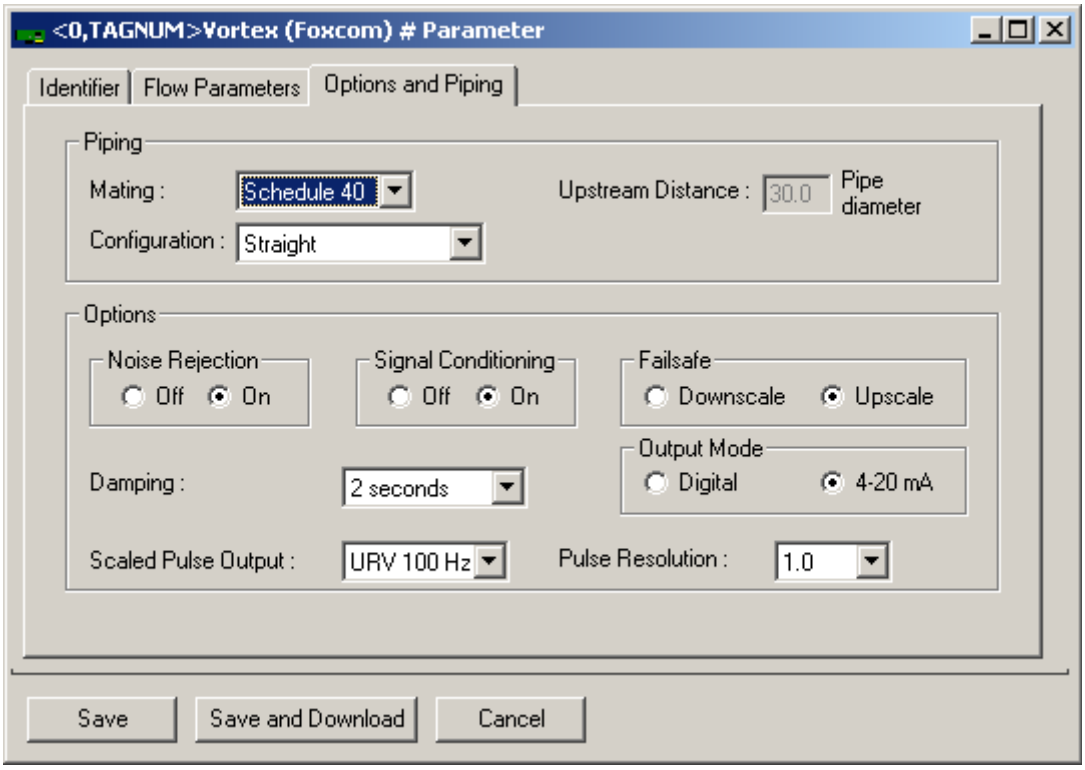

Figure 45. Sample Vortex Options and Piping Tab Screen

Field	Entry
Piping	
Mating	Select `Schedule 10`, `Schedule 40`, `Schedule 80`, `PN16`, `PN40`, `PN64`, or `PN100`.
Configuration	Select from menu of piping configurations.
Upstream Distance	If `Configuration` is not `Straight`, enter distance in pipe diameters.
Options	
Noise Rejection	Select `On` or `Off`.
Signal Conditioning	Select `On` or `Off`.
Failsafe	If `Output Mode` is `Analog`, select `Downscale` or `Upscale`.
Damping	Select one of nine choices from `No Damping` through `32` seconds.
Scaled Pulse Output	Select `Off` or `URV 100 Hz`.
Output Mode (FoxCom)	Select `Digital` or `4-20 mA`.
Output Mode (HART)	Select `Analog (4-20 mA)` or `Multidrop.`
Polling Address	If `Multidrop`, select number from `0` through `15`.
Pulse Resolution	Select `0.01`, `0.1`, `1.0`, `10.0`, `100.0`, or `1000.0`.

7. 870ITEC Transmitters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with 870ITEC Electrochemical Transmitters with FoxCom communication protocol. Additional information about these transmitters and FoxCom communication is contained in the following documents.

- B0193XXChecklist for FoxCom Measurement Integration
- MI 611-212Installation, Operation, Configuration, and Maintenance.

Measure Screen

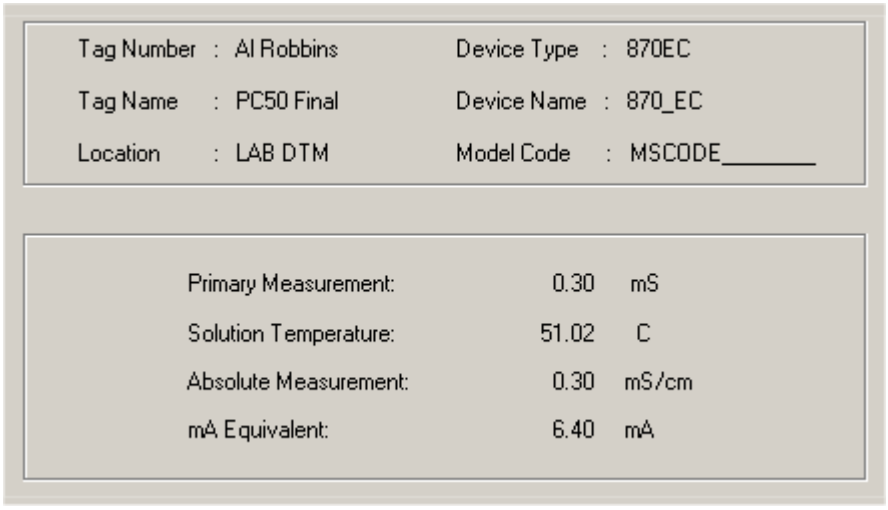

Figure 46. Sample 870ITEC Measure Screen

Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 10

Table 10. Transmitter Status Error Messages

Message	Explanation	Recommended Action
Primary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Init Required	Transmitter is re-initializing on reset.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Diagnostic Error	Indicates an active diagnostic error.	See diagnostic error message to determine problem and corrective action.
Secondary Status Error	Indicates an error in secondary status.	The secondary status error is shown in Column 2 of the screen display.
Secondary Status Fields		
Measurement Error	Unstable process measurement.	Check sensor connection. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Bad Message Received	Transmitter received a bad message.	Select `TDevice > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Stability Error	Raw measurement has been unstable.	Check wiring. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Probe Error	Problem with the sensor.	Replace sensor.
Temp Comp Error	Problem in temperature measurement.	Check ATC connection. Verify process temperature. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Amplifier Error	Not Applicable	Not Applicable
Extended Status - Hardware [(a)]		
ATC Open	Resistance of temperature compensation is greater or less than expected resistance of device configured.	Replace temperature compensator.
ATC Short		
Leak Error	Solution leakage into sensor.	Replace sensor.
App1 Cal Req	Application 1 calibration required.	Calibrate.
App2 Cal Req	Application 2 calibration required.	Calibrate.
App3 Cal Req	Application 3 calibration required.	Calibrate.
Cal Comp Error	Indicates a problem in the previous calibration.	Recalibrate the transmitter. If problem persists, contact Global Customer Support.
Cal Slope Error	Not Applicable.	Not Applicable.

Table 10. Transmitter Status Error Messages (Continued)

Message	Explanation	Recommended Action
RTD Cal Tolerance	RTD calibration is not within tolerance.	Recalibrate the RTD. If problem persists, contact Global Customer Support.
Therm Cal Tolerance	Thermistor calibration is not within tolerance.	Recalibrate the thermistor. If problem persists, contact Global Customer Support.
Tune Stability	Calibration measurement not stabilized.	Check stability configuration or replace sensor.
Amp Failure	Not Applicable.	Not Applicable.
Extended Status - Process (a)		
mA Under Range	Measurement under or over configured range.	Reconfigure range or correct process error.
mA Over Range		
Comp Under Range	Measurement under or over compensation range.	Reconfigure compensation or correct process error.
Comp Over Range		
Disp Under Range	Primary measurement is too low or too high.	Check sensor connection. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Disp Over Range		
Unstable Temp	Unstable temperature measurement.	Check ATC connection. Verify process temperature. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Unstable Meas	Unstable process measurement.	Check measurement sensor connection. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.

(a) Static Display

Calibration

You can perform the following calibration procedures on an 870ITEC Transmitter using the PC50 Field Device Tool:

- Bench Calibration
- Solution 1-Point Offset
- Solution 1-Point Span
- Solution 2-Point
- Temperature Sensor
- mA Calibration.

The calibration procedures are accessed as follows:

```
Device > Additional functions > Adjust set value
```

Bench Calibration

1. Select the application to be calibrated from the Sensor screen in the Configuration function. See page 91.
2. Select `Bench Calibration` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

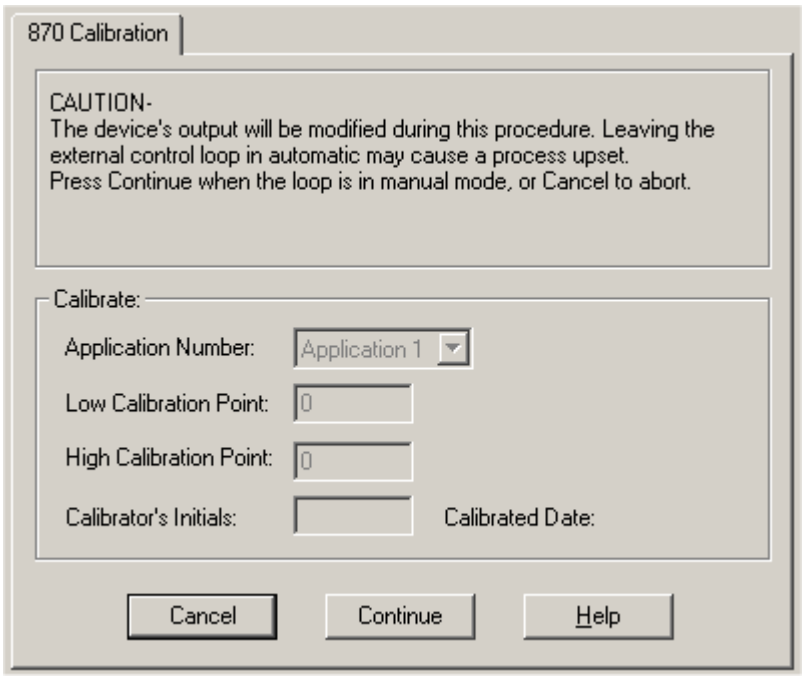

Figure 47. Sample 870ITEC Bench Calibration Screen

4. Enter the high and low solution values and the calibrator's initials, and select `Continue`.
5. Place the clean dry sensor in air and select `Continue`.
6. Wait while the device is calibrating.
7. Run a wire through the sensor bore and connect to a decade resistance box. Adjust the box to a resistance equal to the high calibration point (see MI 611-212 for calculation of this resistance) and select `Continue`.
8. Wait while the device is calibrating. The current calibration date is automatically updated.
9. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Solution 1-Point Offset

This option permits you to set a 1-point offset for up to three applications and is normally used to correct for zero shift. This should be used only if you have previously performed a 2-point calibration.

1. Select the application to be calibrated from the Sensor screen in the Configuration function. See page 91.
2. Select `Solution 1-Point Offset` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

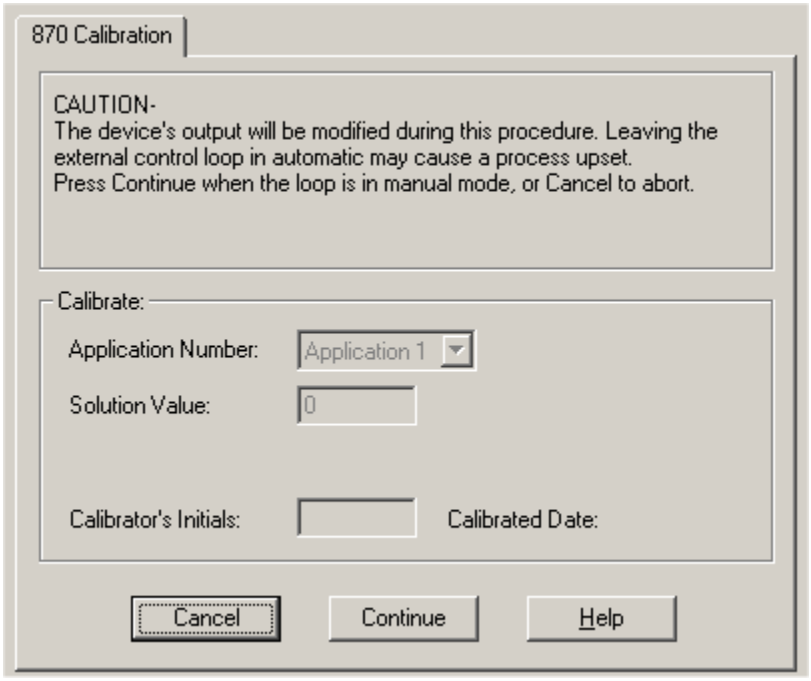

Figure 48. Sample 870ITEC Solution 1-Point Offset Screen

4. Enter the solution value and the calibrator's initials, and select `Continue`.
5. Immerse the sensor in the solution and select `Continue`.
6. Wait while the device is calibrating (this can take a while). The current calibration date is automatically updated.
7. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Solution 1-Point Span

This option permits you to set a calibration point (1-point span) for up to three applications. This is usually done to correct for a cell factor change due to installation. It should be used only if you have previously performed a 2-point calibration.

1. Select the application to be calibrated from the Sensor screen in the Configuration function. See page 91.
2. Select `Solution 1-Point Span` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

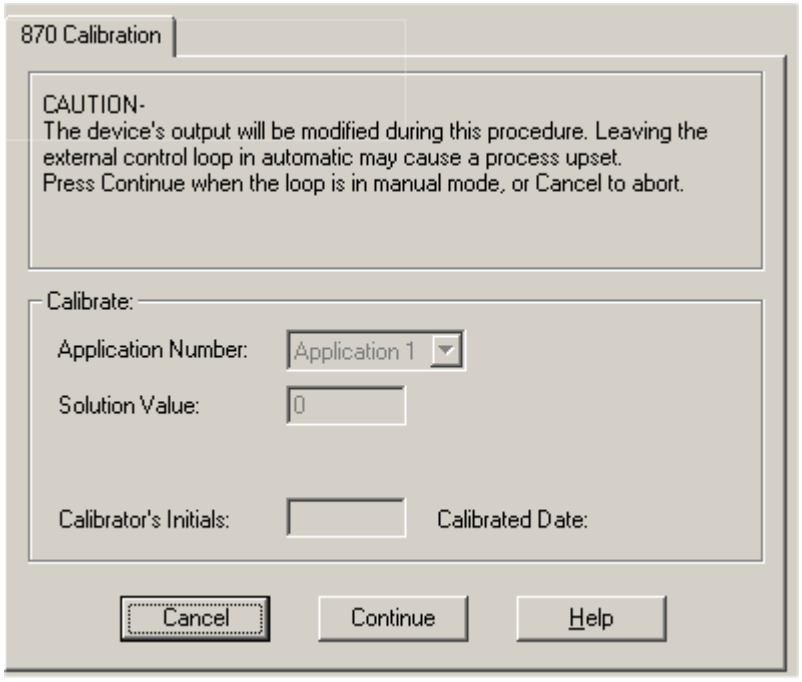

Figure 49. Sample 870ITEC Solution 1-Point Span Screen

4. Enter the solution value and the calibrator's initials, and select `Continue`.
5. Immerse the sensor in the solution and select `Continue`.
6. Wait while the device is calibrating (this can take a while). The current calibration date is automatically updated.
7. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Solution 2-Point

This option permits you to perform a 2-point calibration for up to three applications.

1. Select the application to be calibrated from the Sensor screen in the Configuration function. See page 91.
2. Select `Solution 2-Point` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

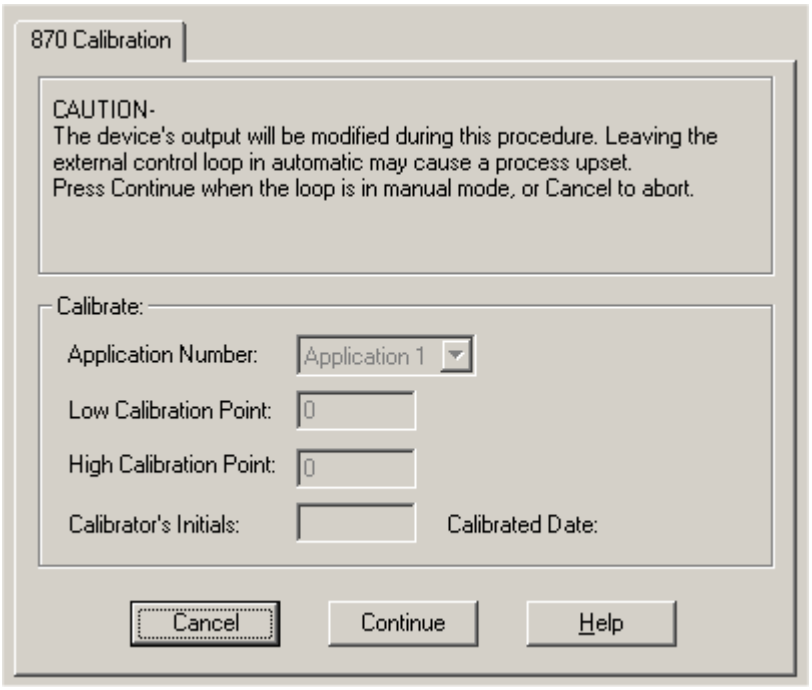

Figure 50. Sample 870ITEC Solution 2-Point Calibration Screen

4. Enter the low and high solution values and the calibrator's initials, and select `Continue`.
5. Immerse the sensor in the low calibration solution and select `Continue`.
6. Wait while the device is calibrating (this can take a while).
7. Immerse the sensor in the high calibration solution and select `Continue`.
8. Wait while the device is calibrating (this can take a while). The current calibration date is automatically updated.
9. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Temperature Sensor Calibration

This option permits you to calibrate the temperature sensor to the known temperature of a solution.

1. Select the application to be calibrated from the Sensor screen in the Configuration function. See page 91.
2. Select `Temperature Sensor` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

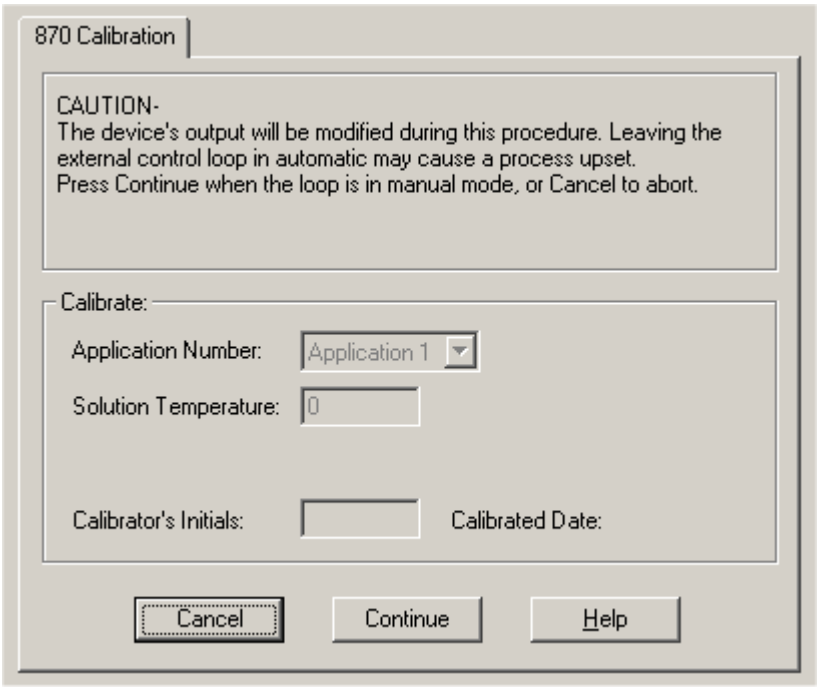

Figure 51. Sample 870ITEC Temperature Calibration

4. Enter the solution temperature and the calibrator's initials, and select `Continue`.
5. Immerse the sensor in the solution and select `Continue`.
6. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

mA Calibration

As your device was accurately calibrated at the factory, this function is not normally required. This procedure should only be performed if the mA value displayed on the Device Data screen does not agree with the value measured by an accurate mA meter installed in the loop wiring.

The procedure to perform a mA Calibration is:

1. Insert an accurate mA meter (or digital voltmeter and precision resistor) in the loop wiring.
2. Select `mA Calibration` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Select `4 mA Output`.

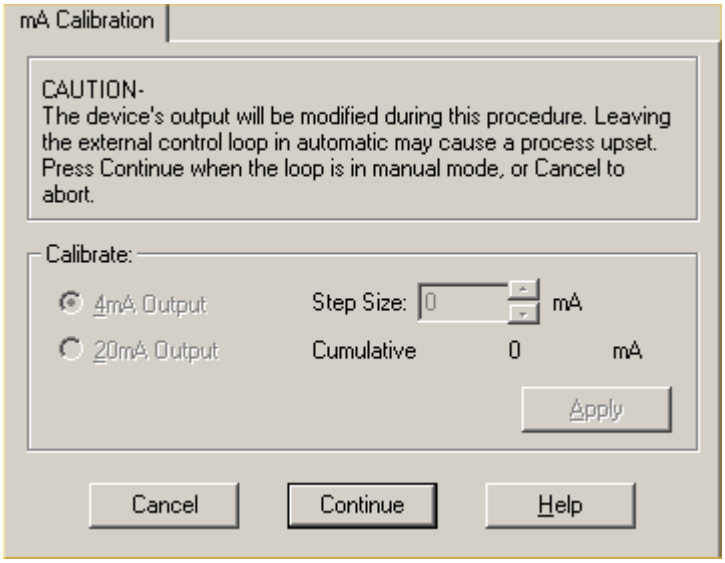

Figure 52. Sample 870ITEC mA Calibration Screen

5. Set the `Step Size` from the menu (`-0.5`, `-0.05`, `-0.005`, `0.005`, `0.05`, `0.5`), and select `Apply`.
6. Repeat Step 4 until you are satisfied with the output. The cumulative change is shown in the screen.
7. Select `20 mA Output`.
8. Repeat Steps 4 and 5.
9. The screen then displays the adjustments. To accept this change, select `Continue`.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Configuration

Identifier Tab Screen

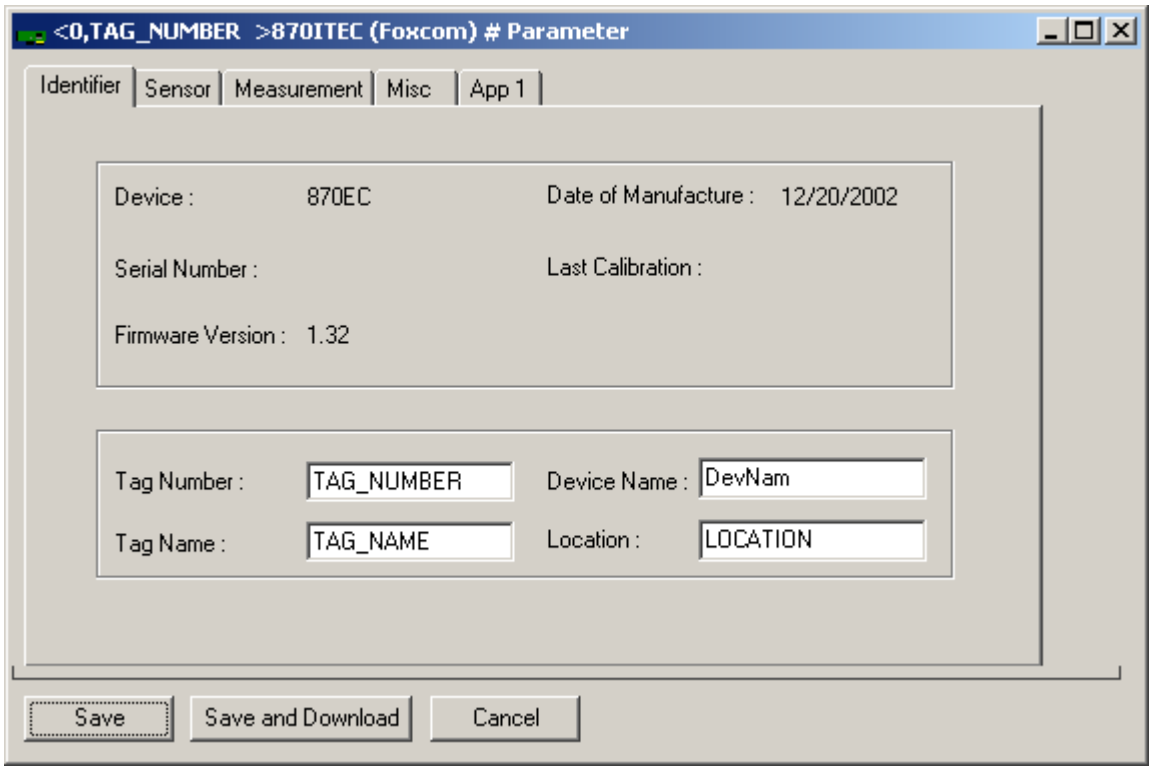

Figure 53. Sample 870ITEC Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the transmitter filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter `DevNam`.
Location	Enter maximum of 14 characters. Optional, used for reference only.

Sensor Tab Screen

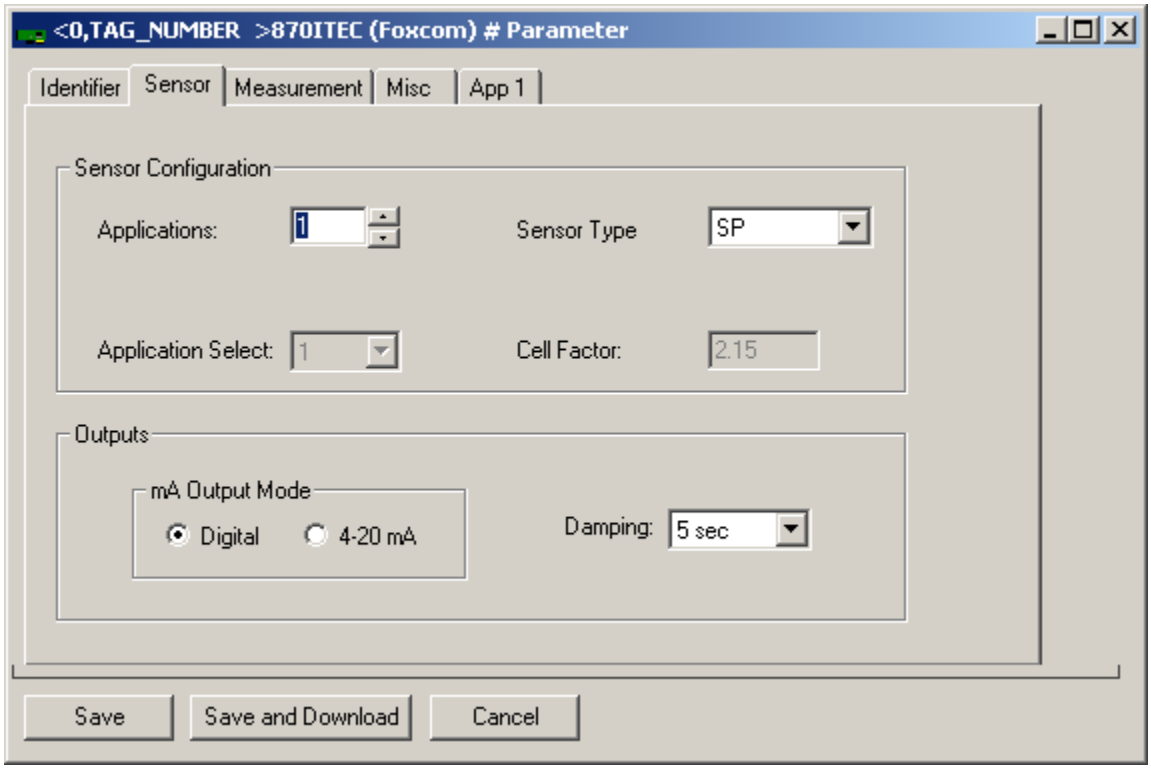

Figure 54. Sample 870ITEC Sensor Tab Screen

Field	Entry
Sensor Configuration	
Applications	Number of applications to be configured. Select 1, 2, or 3 applications.
Application Select	Select 1, 2, 3 or AUTO.
Sensor Type	Select type of sensor from menu of choices.
Cell Factor	If sensor type is OTHER, specify cell factor between 00.00 and 99.99.
Outputs	
mA Output Mode	Select `Digital` or `4-20 mA`.
Damping	Select damping response time of 1, 5, 10, 20, 40, or `120 seconds`.

Measurement Tab Screen

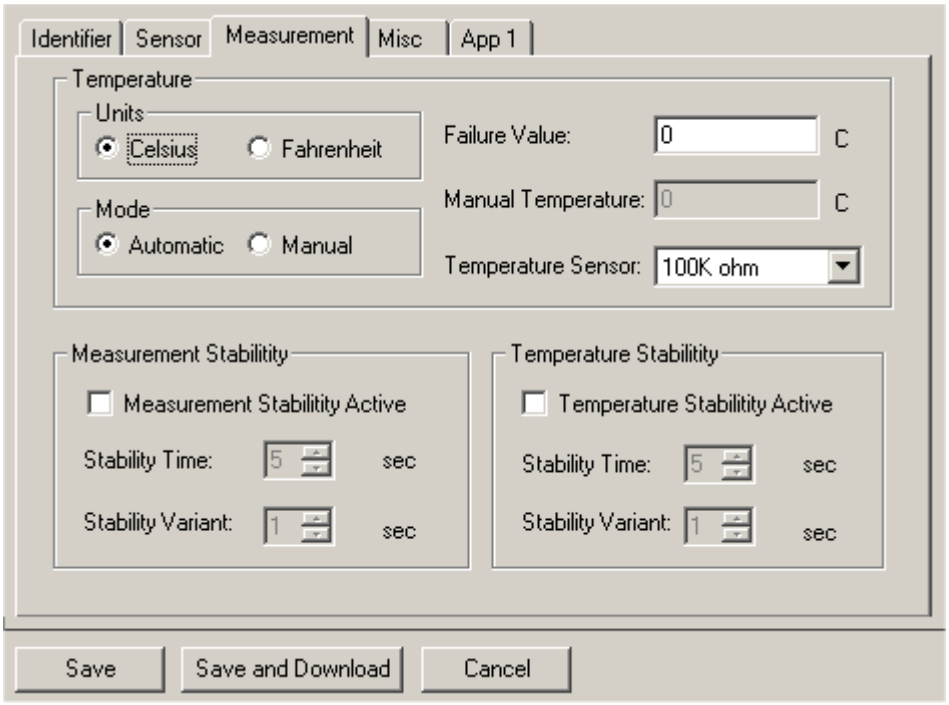

Figure 55. Sample 870ITEC Measurement Tab Screen

Field	Entry
Temperature	
Units	Select `Celsius` or `Fahrenheit.`
Mode	Select `Automatic` (follows RTD) or `Manual` (fixed point).
Failure Value	If Mode is Automatic, enter temperature in case RTD fails.
Manual Temperature	If Mode is Manual, enter temperature.
Temperature Sensor	Select `2-wire 100 Ω`, `2-wire 1000 Ω`, `3-wire 100 Ω`, or `3-wire 1000 Ω RTD`, or `100 kΩ`. thermistor.
Measurement Stability	
Measurement Stability Active	√ = Instrument Stability Measurement Feature On; Blank = Instrument Stability Measurement Feature Off.
Stability Time	If on, enter time between 5 and 60 seconds in 5-second increments.
Stability Variant	If on, enter variant between 1 and 9.
Temperature Stability	
Temperature Stability Active	√ = Instrument Stability Temperature Feature On; Blank = Instrument Stability Temperature Feature Off.
Stability Time	If on, enter time between 5 and 60 seconds in 5-second increments.
Stability Variant	If on, enter variant between 1 and 9.

Misc Tab Screen

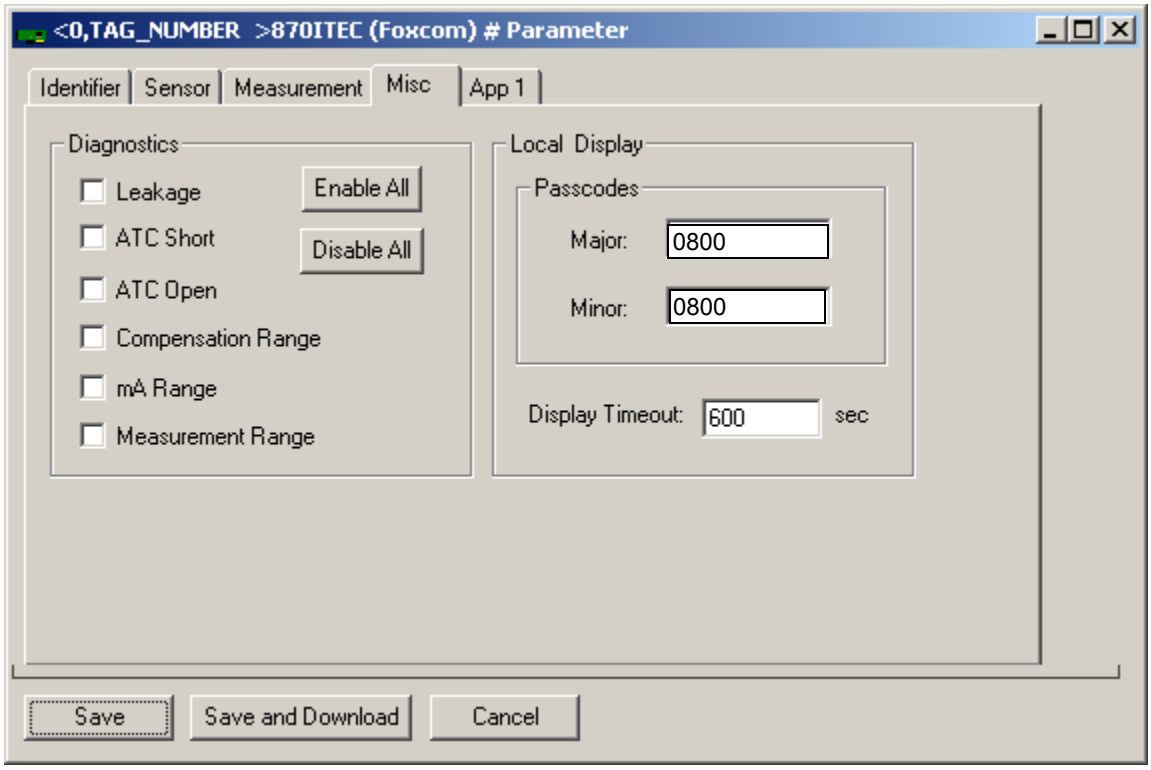

Figure 56. Sample 870ITEC Misc Tab Screen

Field	Entry
Diagnostics	
Leakage	√ = Enable error messages; Blank = Disable error messages.
ATC Short	
ATC Open	
Compensation Range	
mA Range	
Measurement Range	
Enable All	Enables all messages listed above.
Disable All	Disables all messages listed above.
Local Display	
Major Passcode	Enter 4-digit passcode.
Minor Passcode	Enter 4-digit passcode.
Display Timeout	Enter timeout between 0 and 999 seconds.

Application Tab Screen

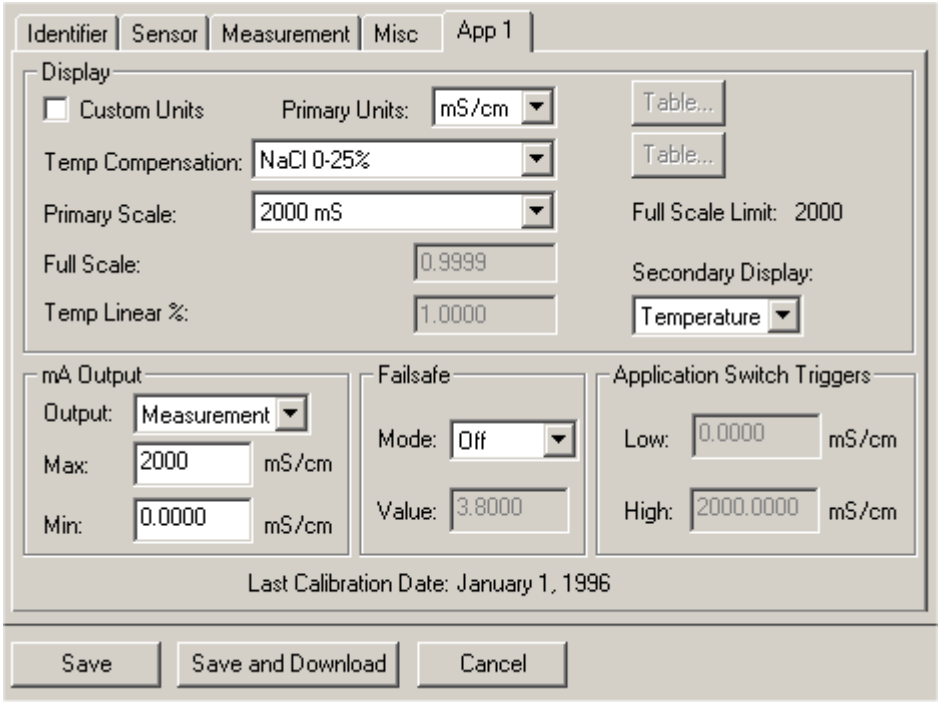

Figure 57. Sample 870ITEC App1 Tab Screen

Field	Entry
Display	
Custom Units	√ = Custom; Blank = Not Custom
Primary Units	If not Custom, select µS/cm, mS/cm, or %. If Custom, select %, g/l, ppm, oz/gal, ppt, S/m, or NONE and see Figure 58.
Temp Compensation	Select from menu of choices. If Custom, see Figure 59.
Primary Scale	Select from menu of choices.
Full Scale	Enter value up to full scale limit.
Temp Linear %	Enter value from 0 to 100,
Secondary Display	Select Temp, Absolute, or mA.
mA Output	
Output	If Analog Output Mode on sensor screen, specify Absolute, Measurement, or Temperature.
Max.	Enter 20 mA range value.
Min.	Enter 4 mA range value.
Failsafe	
Mode	Specify OFF, ON, or PULSE
Value	If on, enter dc mA output between 3.8 and 20.5 mA.
Application Switch Triggers	Enter value of Low and High triggers.

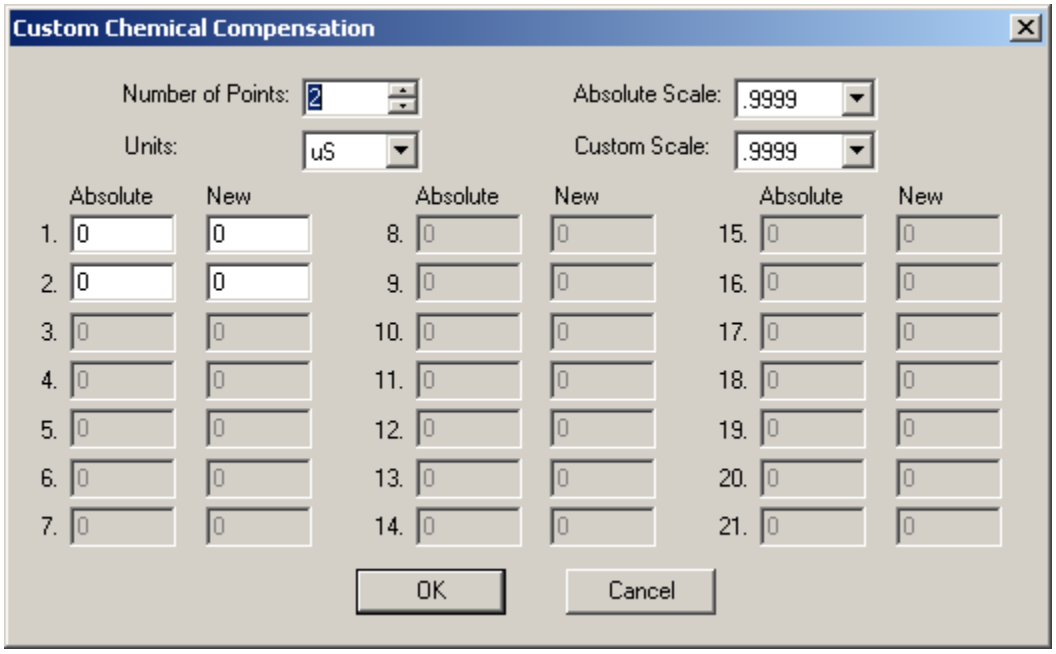

Figure 58. Custom Chemical Compensation Screen

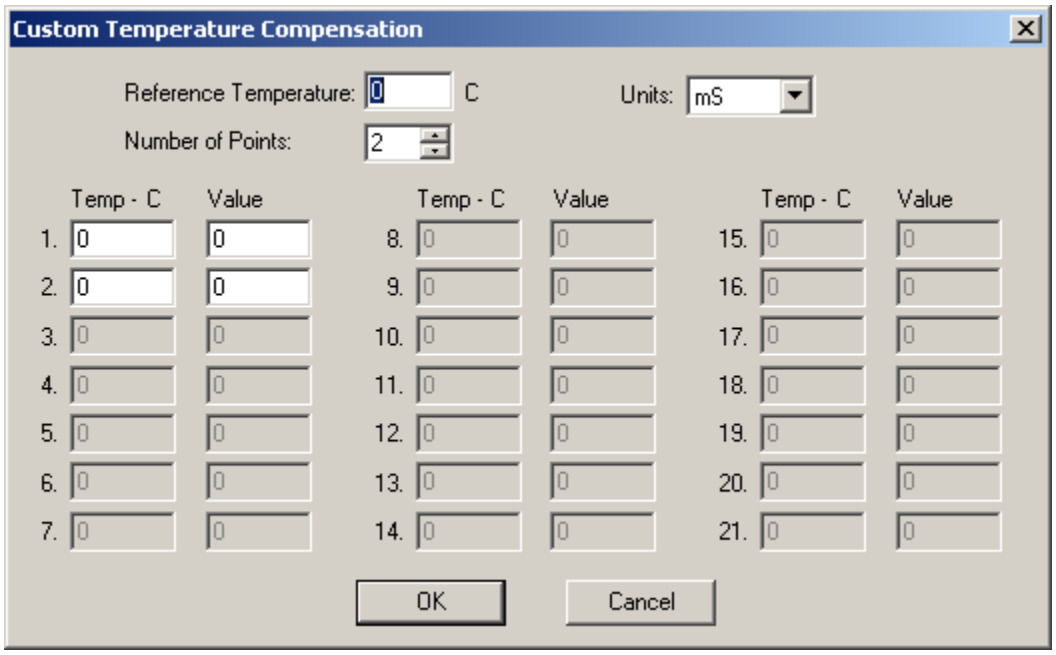

Figure 59. Custom Temperature Compensation Screen

8. 870ITPH pH/ORP/ISE Transmitters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with 870ITPH pH/ORP/ISE Transmitters with FoxCom communication protocol. Additional information about these transmitters and FoxCom communication is contained in the following documents.

- B0193XXChecklist for FoxCom Measurement Integration
- MI 611-211Installation, Operation, Configuration, and Maintenance.

Measure Screen

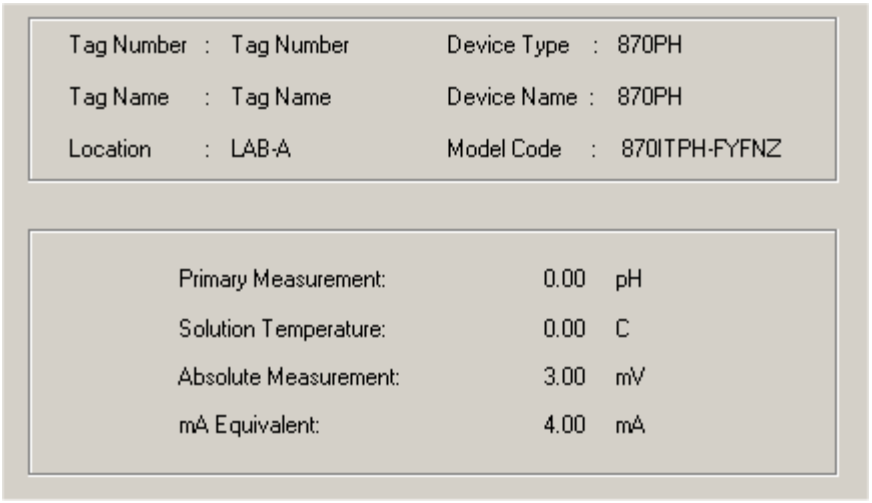

Figure 60. Sample 870ITPH Measure Screen

Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 11.

Table 11. Transmitter Status Error Messages

Message	Explanation	Recommended Action
Primary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Init Required	Transmitter is re-initializing on reset.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Diagnostic Error	Indicates an active diagnostic error.	See diagnostic error message to determine problem and corrective action.
Secondary Status Error	Indicates an error in secondary status.	The secondary status error is shown in Column 2 of the screen display.
Secondary Status Fields		
Measurement Error	Unstable process measurement.	Check sensor connection. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Bad Message Received	Transmitter received a bad message.	Select `Test > Go On-Line`. If this does not clear problem, contact Global Customer Support.
Stability Error	Raw measurement has been unstable.	Check wiring. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Probe Error	Indicates an error with the probe.	If Coat error, clean probe. If Lowslope error, replace buffer solution (if contaminated). For other problems, replace probe.
Temp Comp Error	Problem in temperature measurement.	Check ATC connection. Verify process temperature. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Amplifier Error	Out of range error.	Check probe. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Extended Status - Hardware [(a)]		
ATC Open	Resistance of temperature compensation is less than expected resistance of device configured.	Replace temperature compensator.
ATC Short	Resistance of temperature compensation is greater than expected resistance of device configured.	Replace temperature compensator.
Coat Error	Reference junction resistance in relation to solution ground is less than user set limit.	Clean electrode.

Table 11. Transmitter Status Error Messages (Continued)

Message	Explanation	Recommended Action
Glass Res Error	Resistance of glass electrode in relation to solution ground is less than user set limit.	Replace electrode.
Aging Error	Aging glass electrode.	Check value of slope. See MI 611-211.
Leak Error	Resistance between solution ground and the RTD is greater than infinite.	Replace sensor.
Amp Failure	Out of range error.	Check sensor. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Slope Error	Nernst slope of sensor is less than user set limit.	Replace electrode or solution.
Cal Slope Error	A slope error has occurred as the result of the previous calibration.	Check sensor and recalibrate transmitter. If the problem persists, contact Global Customer Support.
Extended Status - Process (a)		
mA Under Range	Measurement outside configured range.	Reconfigure range or correct process error.
mA Over Range		
Cal Required	Calibration required.	Calibrate.
Comp Under Range	Measurement outside compensation curve.	Reconfigure compensation or correct process error.
Comp Over Range		
No A2D Interrupts	A/D hardware not responding.	Check PWA 0connections. If problem persists, contact Global Customer Support.
Unstable Temp	Unstable temperature measurement.	Check ATC connection. Verify process temperature. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Unstable Meas	Unstable process measurement.	Check measurement sensor connection. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Disp Under Range	Primary measurement is too low or too high.	Check sensor connection. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Disp Over Range		
Cal Comp Error	Indicates a problem in the previous calibration.	Recalibrate the transmitter. If problem persists, contact Global Customer Support.
RTD Cal Tolerance	RTD calibration is not within tolerance.	Recalibrate the RTD. If problem persists, contact Global Customer Support.
Cal Comp Error	Indicates a problem in the previous calibration.	Recalibrate the transmitter. If problem persists, contact Global Customer Support.

(a) Static Display

Calibration

You can perform the following calibration procedures on an 870ITPH Transmitter using the PC50 Field Device Tool:

- One Point Manual Calibration
- One Point Absolute Calibration
- Two Point Manual Calibration
- mA Calibration.
- Automatic Calibration
- Temperature Sensor

The calibration procedures are accessed as follows:

```
Device > Additional functions > Adjust set value
```

One Point Manual Calibration

This option permits you to set a calibration point (one point offset), using a known reference solution (buffer).

1. Select `One Point Manual` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.

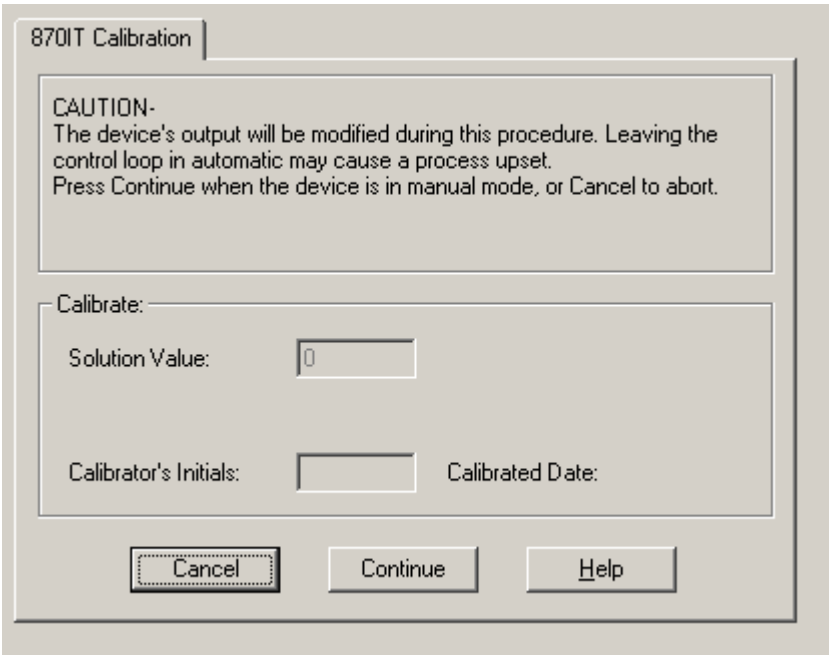

Figure 61. Sample 870ITPH One Point Manual Calibration Screen

3. Enter the solution value and the calibrator's initials and select `Continue`.
4. Immerse the sensor in the solution and select `Continue`.
5. Wait while the device is calibrating. The current calibration date is automatically updated.
6. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

One Point Absolute Calibration

This option permits you to set a 1-point absolute calibration point.

1. Select `One Point Absolute` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.

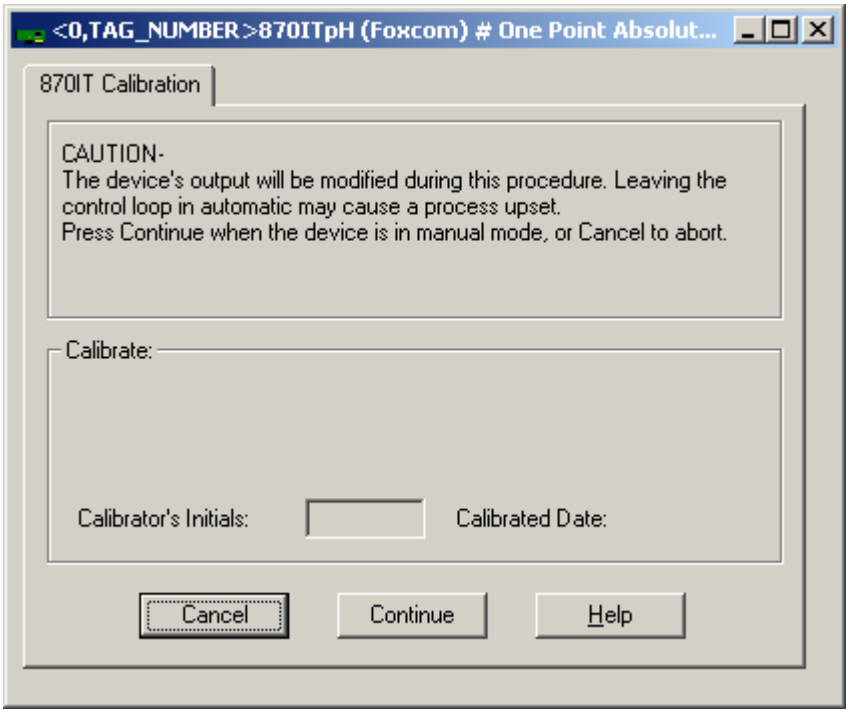

Figure 62. Sample 870ITPH One Point Absolute Calibration Screen

3. Enter the calibrator's initials and select `Continue`.
4. Immerse the sensor in the solution and select `Continue`.
5. Wait while the device is calibrating. The current calibration date is automatically updated.
6. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Two Point Manual Calibration

This option permits you to set span and offset, using two known reference solutions (buffers).

1. Select `Two Point Manual` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.

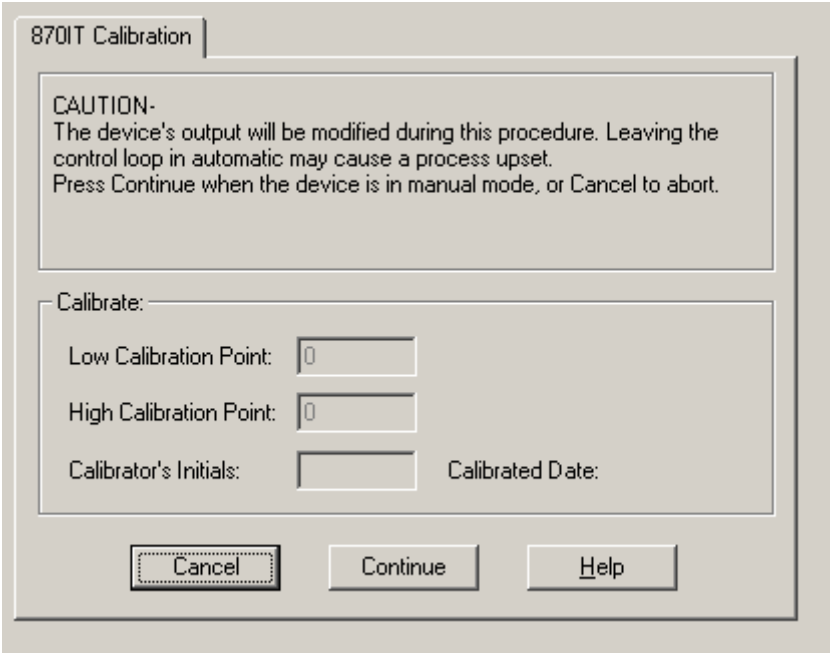

Figure 63. Sample 870ITPH Two Point Manual Calibration Screen

3. Enter the high and low solution values and the calibrator's initials and select `Continue`.
4. Immerse the sensor in the low solution and select `Continue`.
5. Wait while the device is calibrating.
6. Immerse the sensor in the high solution and select `Continue`.
7. Wait while the device is calibrating. The current calibration date is automatically updated.
8. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

mA Calibration

As your device was accurately calibrated at the factory, this function is not normally required. However, the mA output can be trimmed with this procedure if it is necessary to match the output to the output of a specific receiving device.

The procedure to perform a mA Output Calibration is:

1. Insert an accurate mA meter (or digital voltmeter and precision resistor) in the loop wiring.
2. Select `mA Output` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Select `4 mA Output`.
5. Set the `Step Size` (`-0.5`, `-0.05`, `-0.005`, `0.005`, `0.05`, `0.5`), and select `Apply`.
6. Repeat Step 4 until you are satisfied with the output. The cumulative change is shown on the screen display.
7. Select `20 mA Output`.
8. Repeat Steps 4 and 5. When finished, select `Continue`.
9. The screen then displays the adjustments. To accept this change, select `Continue`.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurement.

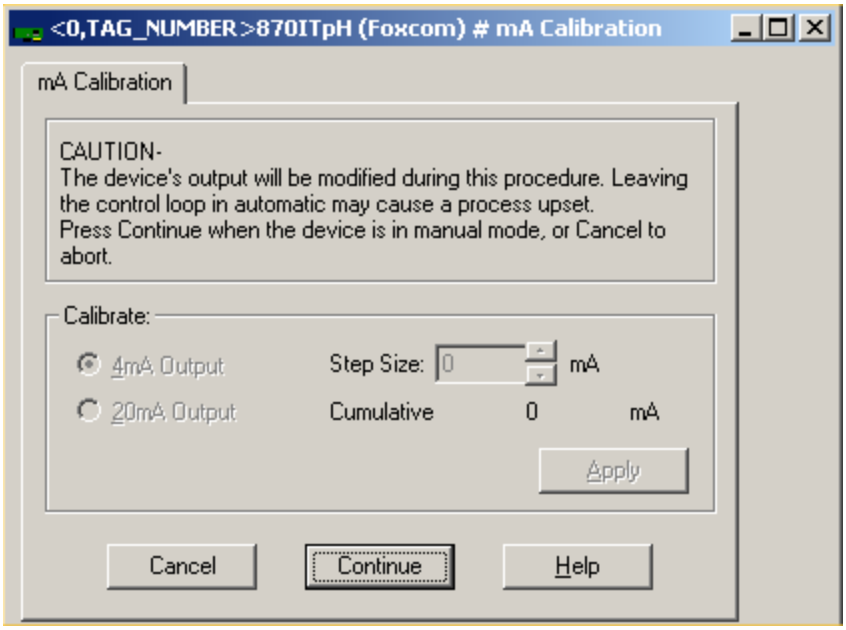

Figure 64. Sample 870ITPH mA Calibration Screen

Automatic Calibration

This option provides a buffer-recognition mechanism that locks in the buffer value representing millivolts and temperature being reported from the sensor, using known reference solutions. The algorithm checks each buffer starting with Buffer 1 and selects the first one for which this pH is within 0.5 pH of the average pH for the buffer. If not within 0.5 pH of any buffer table, no buffer is selected.

NOTE

The type of buffer is selected in the Configuration Sensor Tab Screen (see page 108).

1. Select `Automatic Calibration` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.
3. Enter the calibrator's initials and select `Continue`.
4. Immerse the sensor in the low solution and select `Continue`.
5. Wait while the device is calibrating.
6. Immerse the sensor in the high solution and select `Continue`.
7. Wait while the device is calibrating. The current calibration date is automatically updated.
8. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Temperature Sensor

This option permits you to calibrate the temperature sensor to the known temperature of a solution.

1. Select `Temperature Sensor` from the `Adjust set value` menu.
2. Follow the prompt to put the device in Manual mode and select `Continue`.

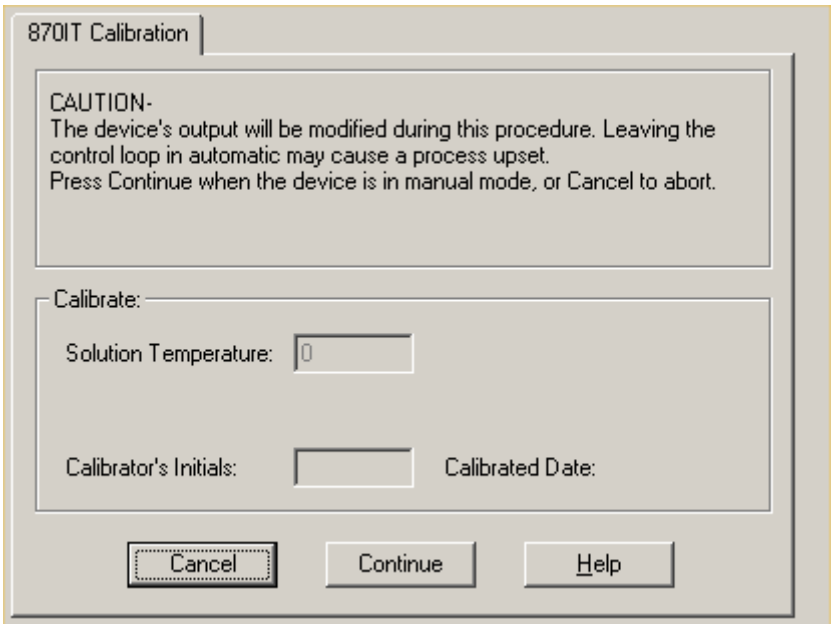

Figure 65. Sample 870ITPH Temperature Calibration Screen

3. Enter the solution temperature and the calibrator's initials and select `Continue`.
4. Immerse the sensor in the solution and select `Continue`.
5. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Configuration

Identifier Tab Screen

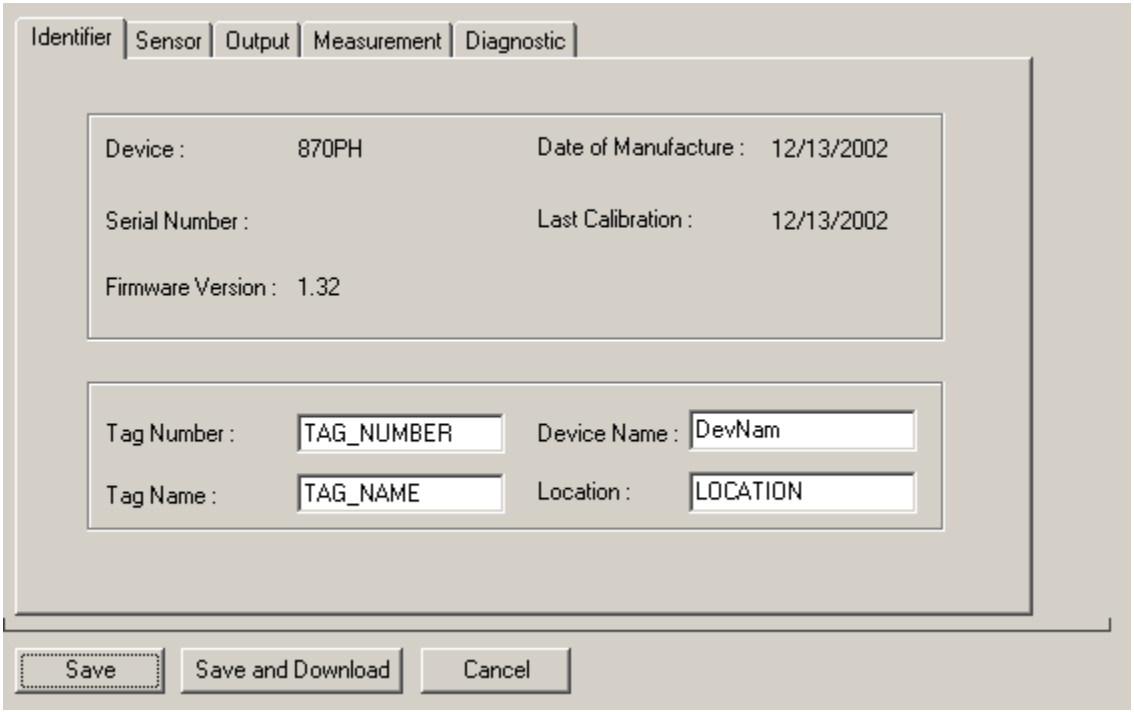

Figure 66. Sample 870ITPH Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the transmitter filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter `DevNam`.
Location	Enter maximum of 14 characters. Optional, used for reference only.

Sensor Tab Screen

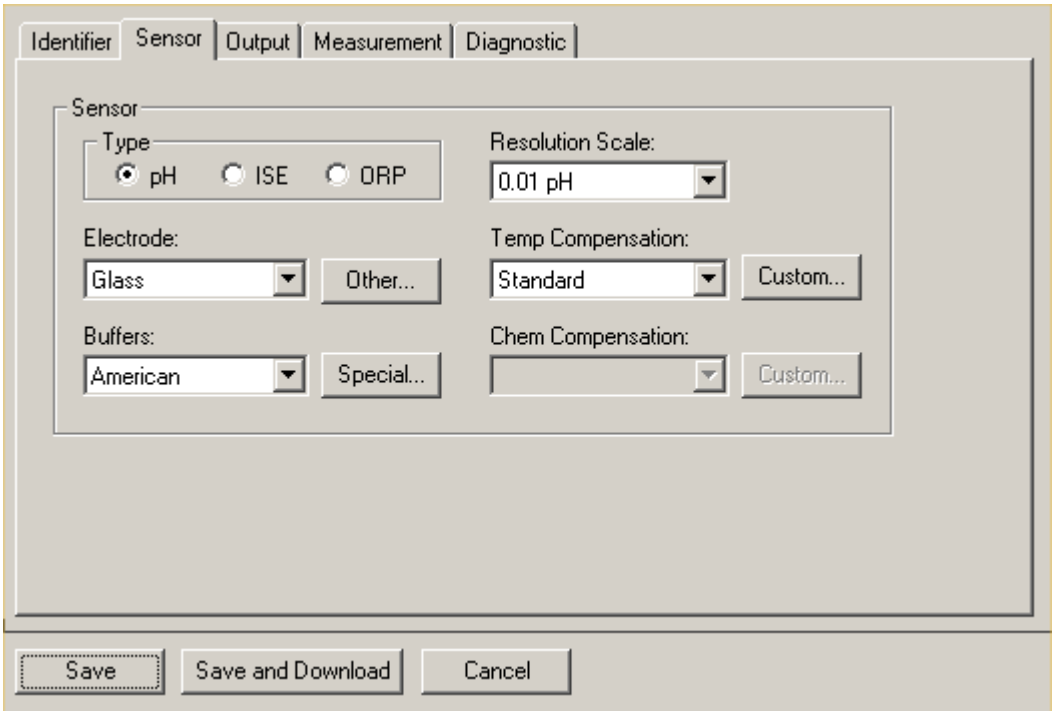

Figure 67. Sample 870ITPH Sensor Tab Screen

Field	Entry
Sensor	
Type	Select pH, ISE, or ORP.
Electrode	If pH, select Glass, Antimony, or Other. If ISE, select Positive or Negative.
Buffers	If pH, select American, NIST, European, or Special (see Figure 68). This parameter is used with Automatic Calibration.
Resolution Scale	If pH, select 0.1 pH or 0.01 pH.
Temp. Compensation	If pH, select Standard, Ammonia, or Custom (see Figure 69). If ISE, select Standard or Custom.
Chem. Compensation	If ISE, select Standard or Custom (see Figure 70).

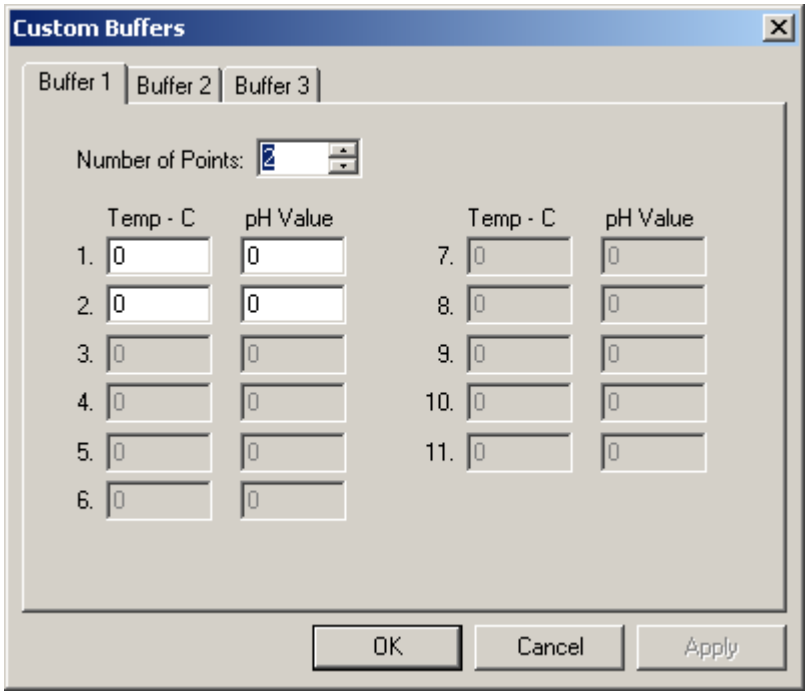

Figure 68. Custom Buffers Screen

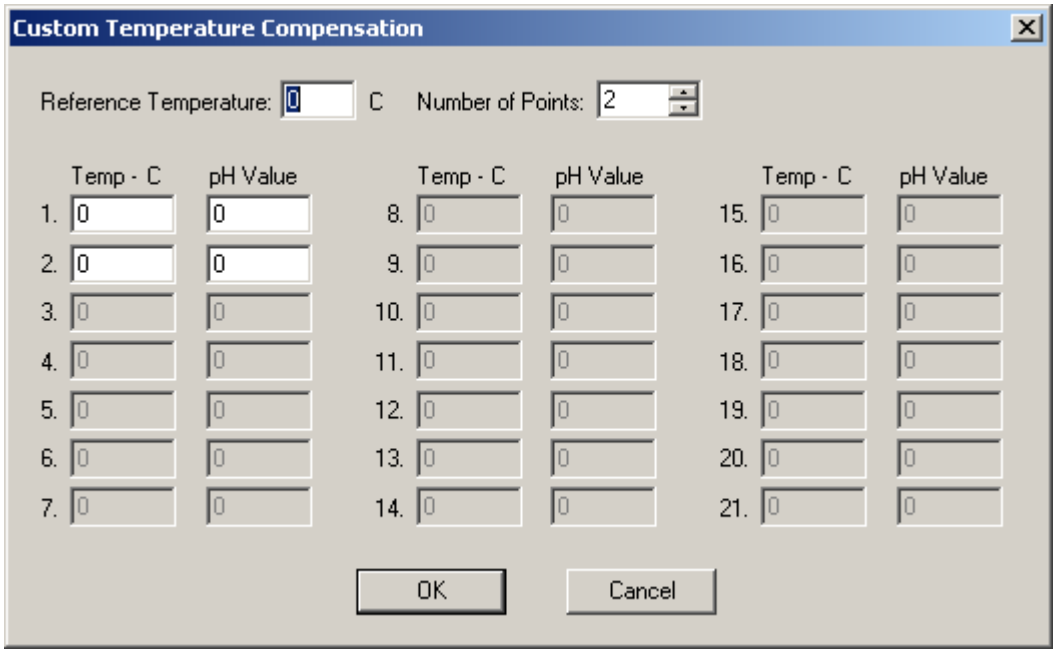

Figure 69. Custom Temperature Compensation Screen

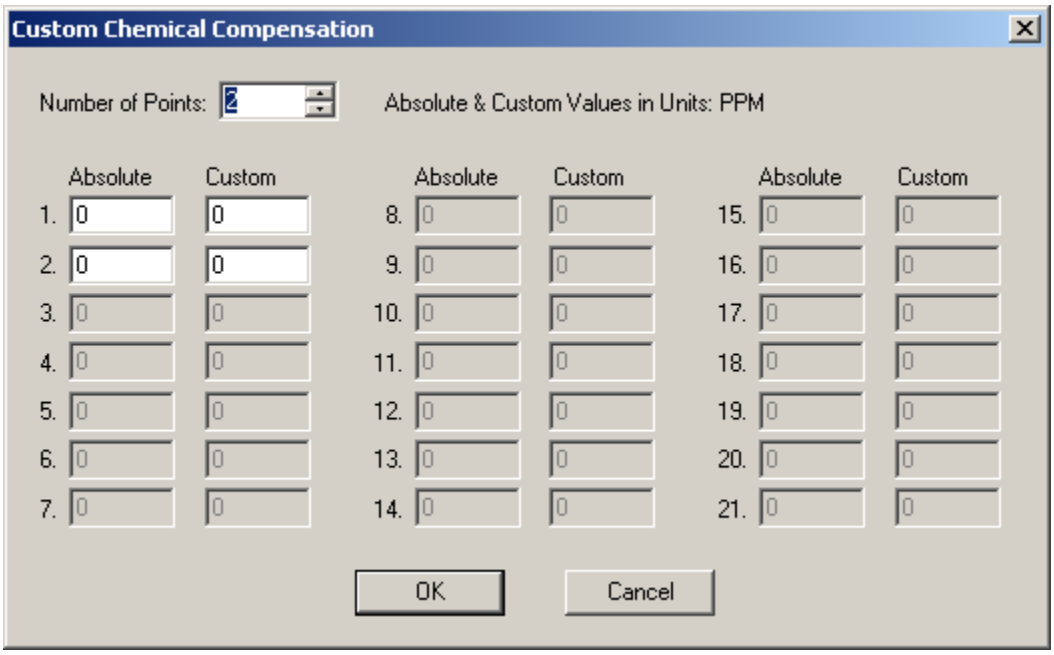

Figure 70. Custom Chemical Compensation Screen

Output Tab Screen

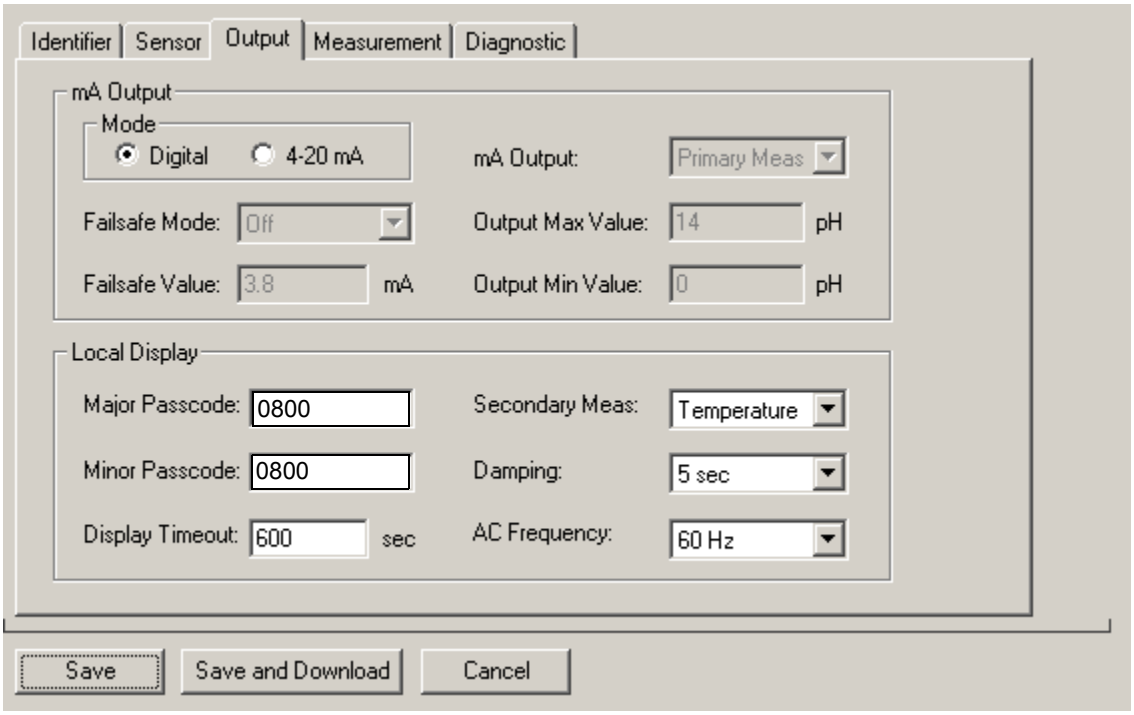

Figure 71. Sample 870ITPH Output Tab Screen

Field	Entry
mA Output	
Mode	Select `Digital` or `4-20 mA`.
Failsafe Mode	If 4-20 mA Mode, specify `OFF`, `ON`, or `PULSE`.
Failsafe Value	If ON, enter dc mA output between 3.8 and 20.5 mA.
mA Output	If 4-20 mA Mode, specify `Absolute`, `Measurement`, or `Temperature`.
Output Max Value	If 4-20 mA Mode, enter 20 mA range value.
Output Min Value	If 4-20 mA Mode, enter 4 mA range value.
Local Display	
Major Passcode	Enter 4-digit passcode.
Minor Passcode	Enter 4-digit passcode.
Display Timeout	Enter timeout between 0 and 999 seconds.
Secondary Meas	Select `Temperature`, `Absolute`, or `mA`.
Damping	Select damping response time of `1`, `5`, `10`, `20`, `40`, or `120 seconds`.
AC Frequency	Select `50` or `60 Hz`.

Measurement Tab Screen

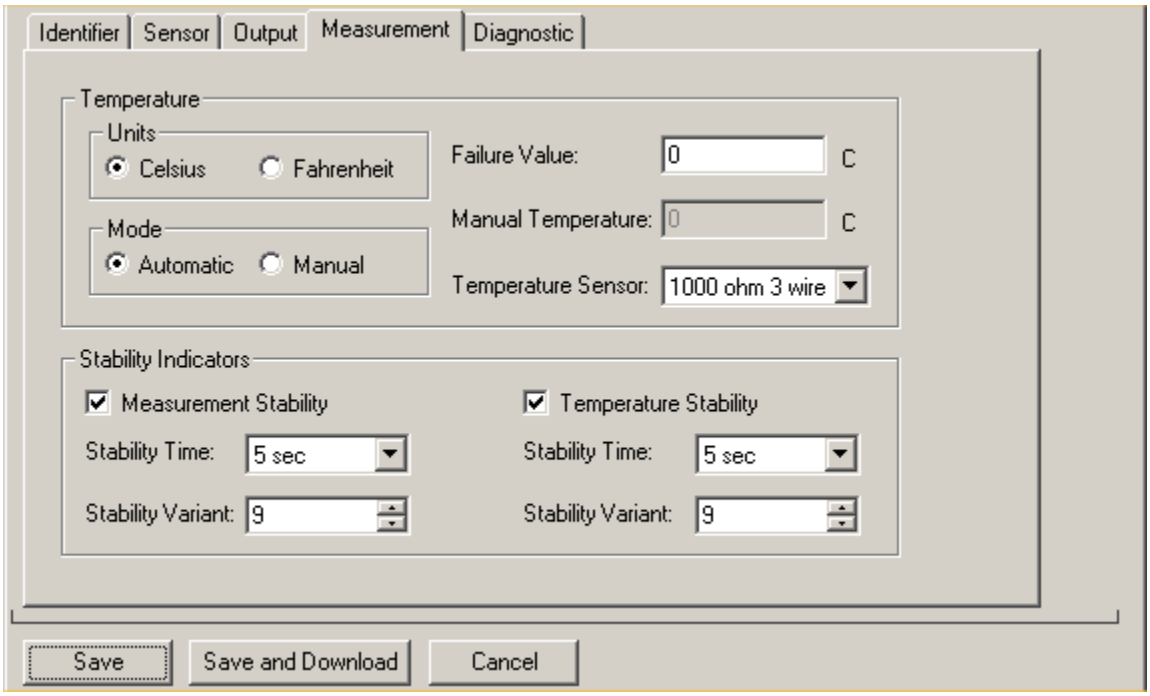

Figure 72. Sample 870ITPH Measurement Tab Screen

Field	Entry
Temperature	
Units	Select `Celsius` or `Fahrenheit`.
Mode	Select `Automatic` or `Manual`.
Failure Value	If Mode is Automatic, enter temperature in case RTD fails.
Manual Temperature	If Mode is Manual, enter temperature.
Temperature Sensor	Select `100 ohm 2-wire, 100 ohm 3-wire, 1000 ohm 2-wire, 1000 ohm 3-wire,` or `Balco 3K`.
Stability Indicators	
Measurement Stability	√ = Instrument Stability Measurement Feature On; Blank = Instrument Stability Measurement Feature Off
Stability Time	If on, enter time between 5 and 60 seconds in 5-second increments.
Stability Variant	If on, enter variant between 1 and 9.
Temperature Stability	√ = Instrument Stability Temperature Feature On; Blank = Instrument Stability Temperature Feature Off
Stability Time	If on, enter time between 5 and 60 seconds in 5-second increments.
Stability Variant	If on, enter variant between 1 and 9.

Diagnostic Tab Screen

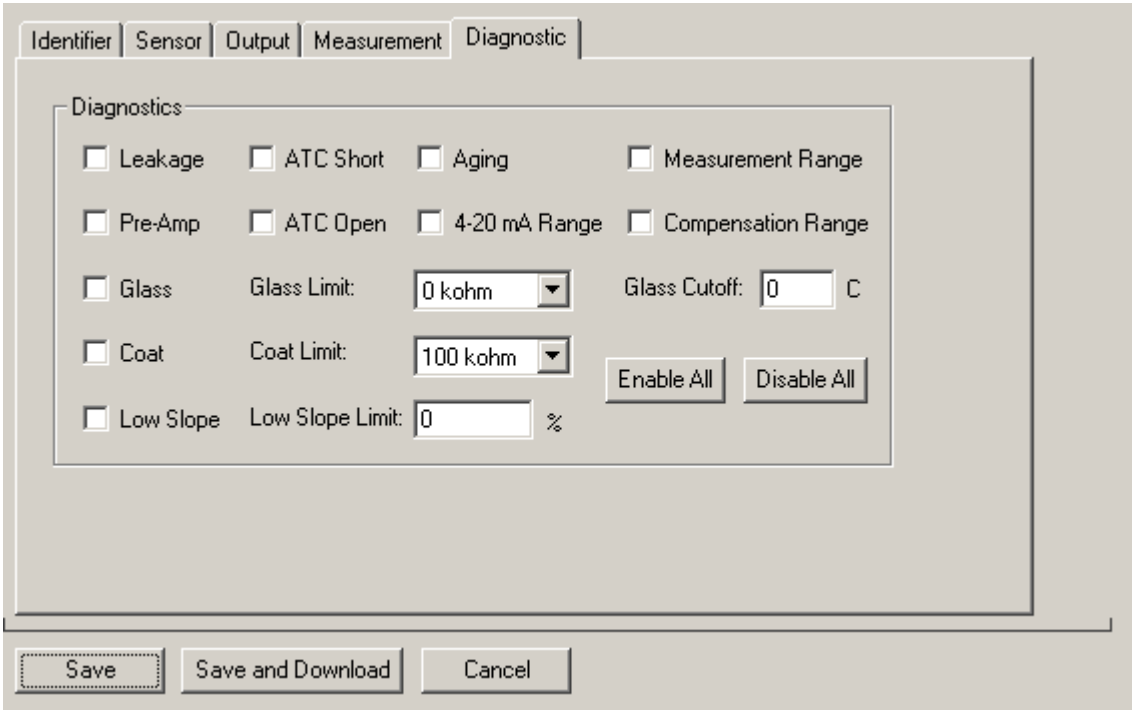

Figure 73. Sample 870ITPH Diagnostic Tab Screen

Field	Entry
Diagnostics	
Leakage	√ = Enable error messages; Blank = Disable error messages
Pre-Amp	
Glass	
Coat	
Low Slope	
ATC Short	
ATC Open	
Aging	
4-20 mA Range	
Measurement Range	
Compensation Range	
Enable All	Enables all messages listed above.
Disable All	Disables all messages listed above.
Glass Limit	Select from menu of values between 0 and 1100 kΩ.
Glass Cutoff	Enter value between 0 and 100 degrees.
Coat Limit	Select from menu of values between 0 and 100 kΩ.
Low Slope Limit	Enter value between 0 and 100%.

9. 870ITCR Conductivity/Resistivity Transmitters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with 870ITCR Conductivity/Resistivity Transmitters with FoxCom communication protocol. Additional information about these transmitters and FoxCom communication is contained in the following documents.

- B0193XXChecklist for FoxCom Measurement Integration
- MI 611-216Installation, Operation, Configuration, and Maintenance.

Measure Screen

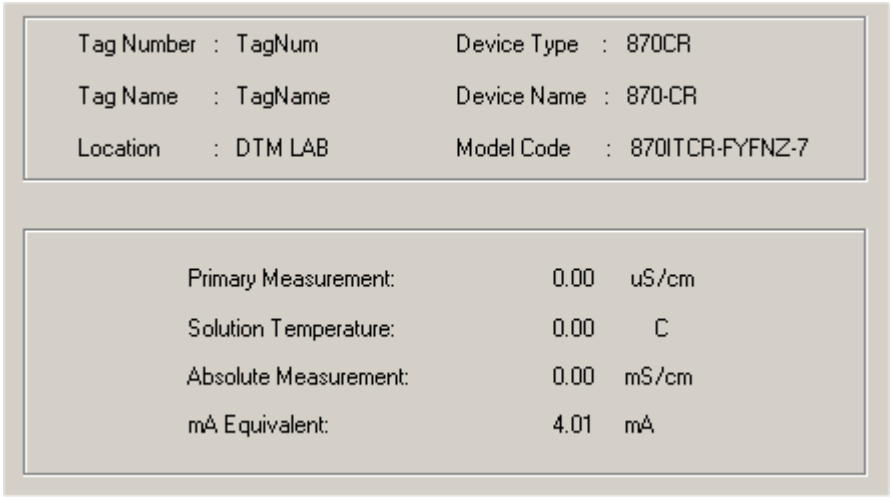

Figure 74. Sample 870ITCR Measure Screen

Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 12.

Table 12. Transmitter Status Error Messages

Message	Explanation	Recommended Action
Primary Status Fields		
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Init Required	Transmitter is reinitializing on reset.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Diagnostic Error	Indicates an active diagnostic error.	See diagnostic error message to determine problem and corrective action.
Secondary Status Error	Indicates an error in secondary status.	The secondary status error is shown in Column 2 of the screen display.
Secondary Status Fields		
Measurement Error	Unstable process measurement.	Check sensor connection. `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Device Busy	Transmitter is busy.	If problem persists, select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Bad Message Received	Transmitter received a bad message.	Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Stability Error	Raw measurement has been unstable.	Check wiring. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Probe Error	Problem with the sensor.	Replace sensor.
Temp Comp Error	Problem in temperature measurement.	Check ATC connection. Verify process temperature. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Amplifier Error	Not Applicable.	Not Applicable.
Extended Status - Hardware [(a)]		
ATC Open ATC Short	Resistance of temperature compensation is greater or less than expected resistance of device configured.	Replace temperature compensator.
Leak Error	Solution leakage into sensor.	Replace sensor.
App1 Cal Req	Application 1 calibration required.	Calibrate.
App2 Cal Req	Application 2 calibration required.	Calibrate.

Table 12. Transmitter Status Error Messages (Continued)

Message	Explanation	Recommended Action
App3 Cal Req	Application 3 calibration required.	Calibrate.
Cal Comp Error	Indicates a problem in the previous calibration.	Recalibrate the transmitter. If problem persists, contact Global Customer Support.
Cal Slope Error	Not Applicable.	Not Applicable.
RTD Cal Tolerance	RTD calibration is not within tolerance.	Recalibrate the RTD. If problem persists, contact Global Customer Support.
Therm Cal Tolerance	Thermistor calibration is not within tolerance.	Recalibrate the thermistor. If problem persists, contact Global Customer Support.
Tune Stability	Calibration measurement not stabilized.	Check stability configuration or replace sensor.
Amp Failure	Not Applicable.	Not Applicable.
Extended Status - Process (a)		
mA Under Range	Measurement under or over configured range.	Reconfigure range or correct process error.
mA Over Range		
Comp Under Range	Measurement under or over compensation range.	Reconfigure compensation or correct process error.
Comp Over Range		
Disp Under Range	Primary measurement is too low or too high.	Check sensor connection. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Disp Over Range		
Unstable Temp	Unstable temperature measurement.	Check ATC connection. Verify process temperature. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.
Unstable Meas	Unstable process measurement.	Check measurement sensor connection. Select `Device > Additional Functions > Commands > Mode Change > On-Line`. If this does not clear problem, contact Global Customer Support.

(a) Static Display

Calibration

You can perform the following calibration procedures on an 870ITCR Transmitter using the PC50 Field Device Tool:

- Solution 1-Point Offset
- Solution 1-Point Span
- Solution 2-Point
- Bench Calibration
- Calibration Pure H2O
- Temperature Sensor
- mA Calibration.

The calibration procedures are accessed as follows:

```
Device > Additional functions > Adjust set value
```

Solution 1-Point Offset

This option permits you to set a 1-point offset for up to three applications and is normally used to correct for zero shift. This should be used only if you have previously performed a 2-point calibration.

1. Select the application to be calibrated from the Sensor Tab screen in the Configuration function. See page 125.
2. Select `Solution 1-Point Offset` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

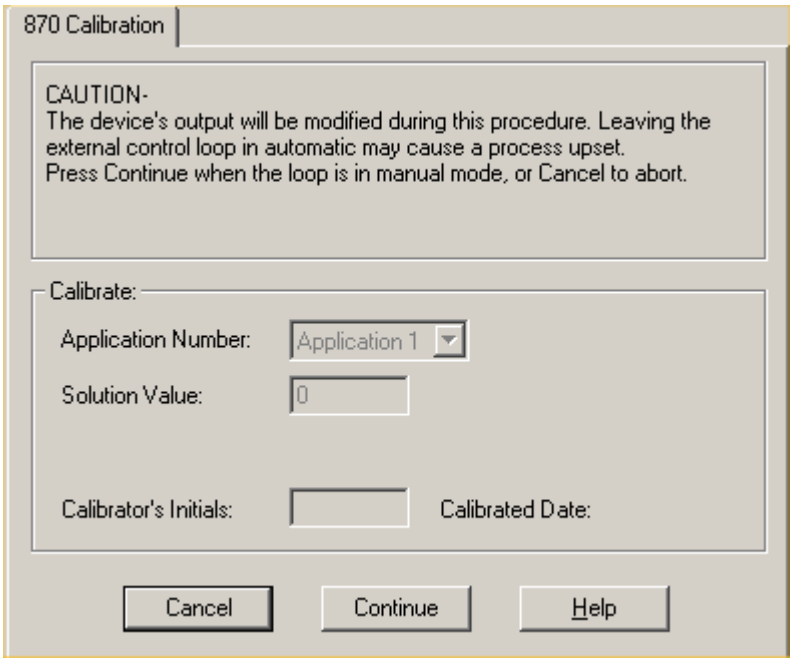

Figure 75. Sample 870ITCR Solution 1-Point Offset Screen

4. Enter the solution value and the calibrator's initials, and select `Continue`.
5. Wait while the device is reinitializing.
6. Immerse the sensor in the solution and select `Continue`.
7. Wait while the device is calibrating. The current calibration date is automatically updated.
8. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Solution 1-Point Span

This option permits you to set a calibration point (1-point span) for up to three applications. This is usually done to correct for a cell factor change due to installation. It should be used only if you have previously performed a 2-point calibration. The point selected should be at the high end of the measurement range.

1. Select the application to be calibrated from the Sensor Tab screen in the Configuration function. See page 125.
2. Select `Solution 1-Point Span` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

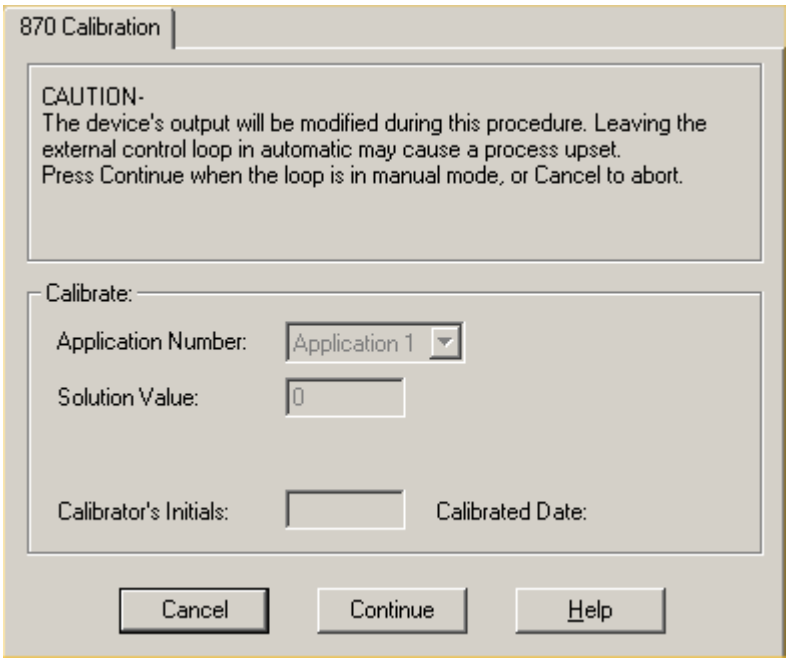

Figure 76. Sample 870ITCR Solution 1-Point Span Screen

4. Enter the solution value and the calibrator's initials, and select `Continue`.
5. Wait while the device is reinitializing.
6. Immerse the sensor in the solution and select `Continue`.
7. Wait while the device is calibrating. The current calibration date is automatically updated.
8. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Solution 2-Point

This option permits you to perform a 2-point calibration for up to three applications.

1. Select the application to be calibrated from the Sensor Tab screen in the Configuration function. See page 125.
2. Select `Solution 2-Point` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

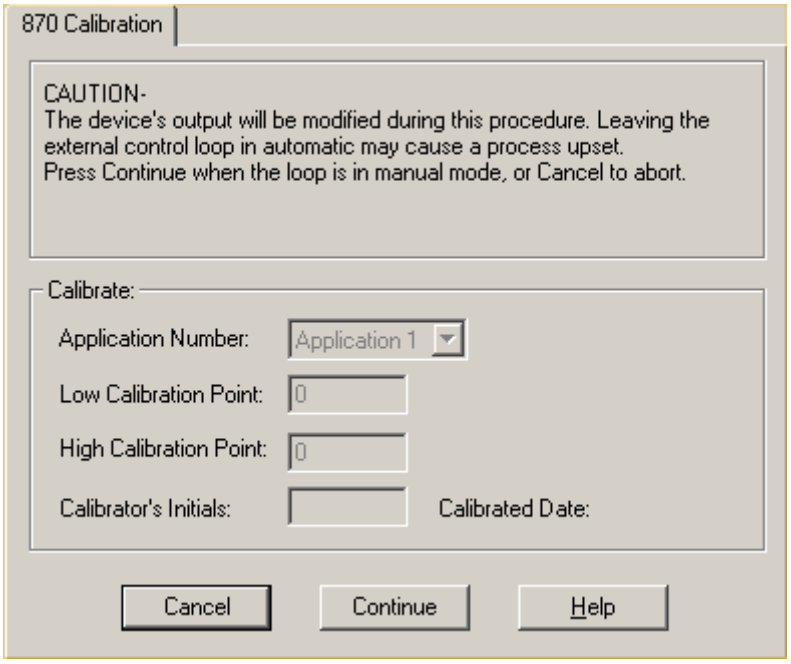

Figure 77. Sample 870ITCR Solution 2-Point Calibration Screen

4. Enter the low and high solution values and the calibrator's initials, and select `Continue`.
5. Wait while the device is reinitializing.
6. Immerse the sensor in the low calibration solution and select `Continue`.
7. Wait while the device is calibrating.
8. Immerse the sensor in the high calibration solution and select `Continue`.
9. Wait while the device is calibrating. The current calibration date is automatically updated.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Bench Calibration

You can perform a bench calibration for either conductivity or resistivity measurements by connecting your own discrete components to the transmitter.

1. Select the application to be calibrated from the Sensor screen in the Configuration function. See page 125.
2. Select `Bench Calibration` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Enter the calibrator's initials, and select `Continue`.
5. Wait while the device is reinitializing.
6. Follow the prompt to connect Resistor 1 between terminals 1B and 1E and select `Continue`.
7. Wait while the device is calibrating.
8. Follow the prompt to connect Resistor 2 or the specified capacitor in place of Resistor 1 and select `Continue`.
9. Wait while the device is calibrating. The current calibration date is automatically updated.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Calibration Pure H2O

If you are measuring purity of water by checking the conductivity in µS/cm or resistivity in MΩ•cm with an 871CR-A or 871CR-B sensor, you can use this calibration.

1. Select the application to be calibrated from the Sensor Tab screen in the Configuration function. See page 125.
2. Select `Calibration Pure H2O` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Enter the temperature cell factor (tCF) and cell factor (CF) found on your sensor. Also enter the calibrator's initials and select `Continue`.
5. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

Temperature Sensor

This option permits you to calibrate the temperature sensor to the known temperature of a solution.

1. Select the application to be calibrated from the Sensor Tab screen in the Configuration function. See page 125.
2. Select `Temperature Sensor` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.

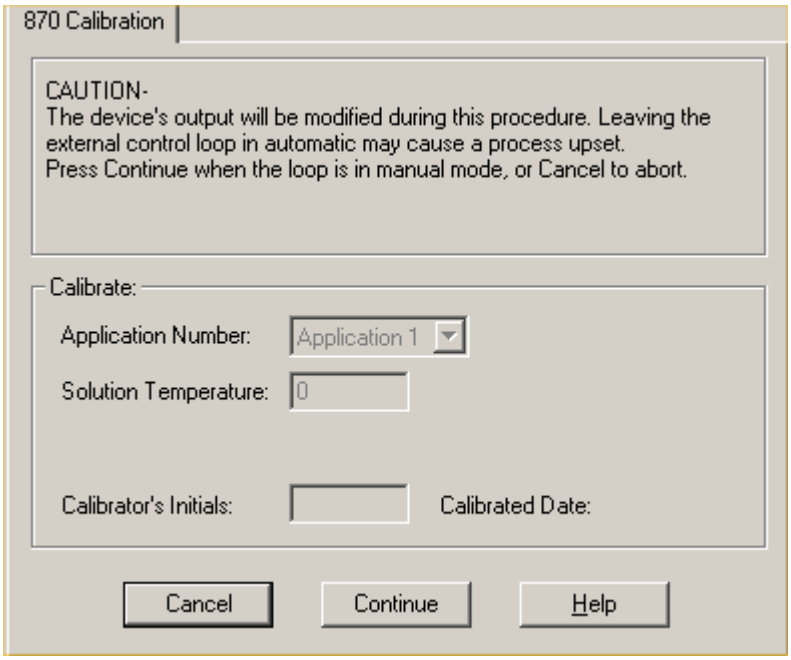

Figure 78. Sample 870ITCR Temperature Calibration

4. Enter the solution temperature and the calibrator's initials, and select `Continue`.
5. Immerse the sensor in the solution and select `Continue`.
6. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurements.

mA Calibration

As your device was accurately calibrated at the factory, this function is not normally required. However, the mA output can be trimmed with this procedure if it is necessary to match the output to the output of a specific receiving device.

The procedure to perform a mA Output Calibration is:

1. Insert an accurate mA meter (or digital voltmeter and precision resistor) in the loop wiring.
2. Select `mA Output` from the `Adjust set value` menu.
3. Follow the prompt to put the device in Manual mode and select `Continue`.
4. Select `4 mA Output`.
5. Set the `Step Size` (`-0.5`, `-0.05`, `-0.005`, `0.005`, `0.05`, `0.5`), and select `Apply`.
6. Repeat Step 4 until you are satisfied with the output. The cumulative change is shown on the screen display.
7. Select `20 mA Output`.
8. Repeat Steps 4 and 5. When finished, select `Continue`.
9. The screen then displays the adjustments. To accept this change, select `Continue`.
10. Follow the prompt to put the device back into Automatic mode. Select `Continue` to resume dynamic measurement.

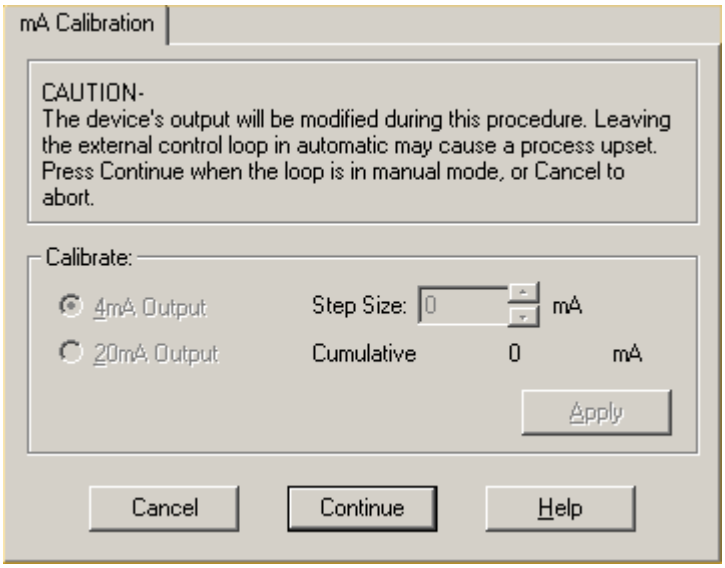

Figure 79. Sample 870ITCR mA Calibration Screen

Configuration

Identifier Tab Screen

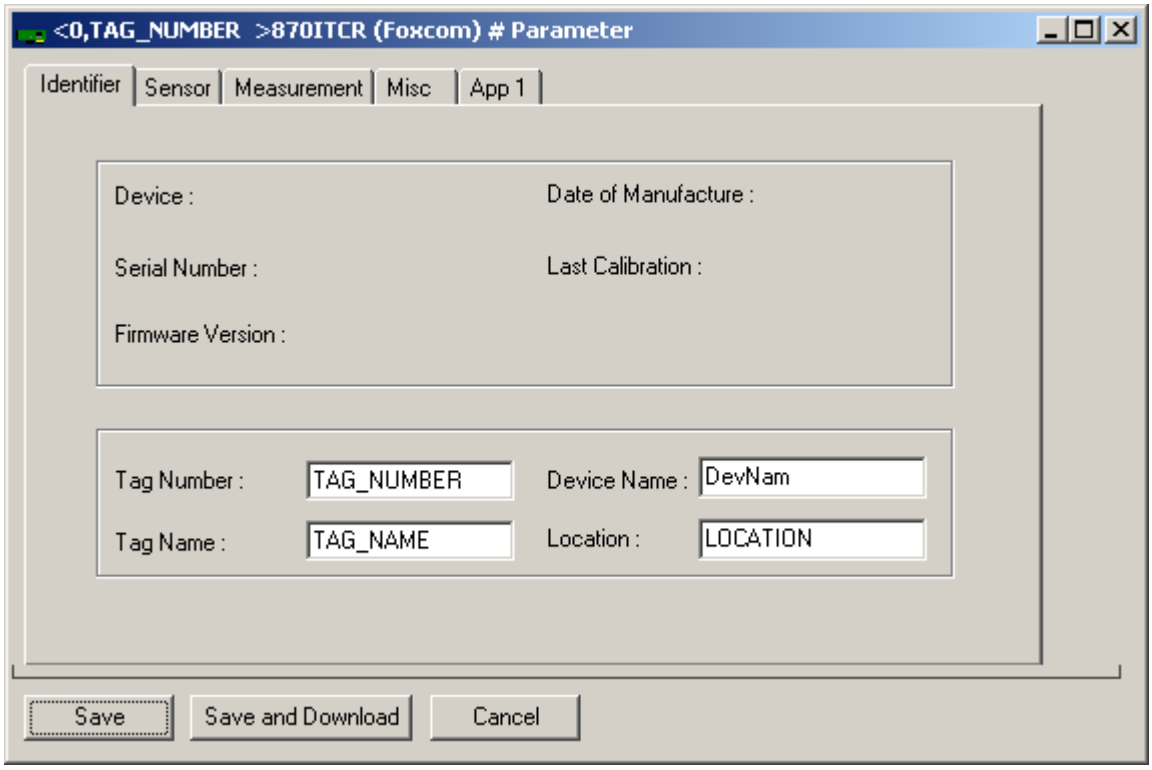

Figure 80. Sample 870ITCR Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the transmitter filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter `DevNam`.
Location	Enter maximum of 14 characters. Optional, used for reference only.

Sensor Tab Screen

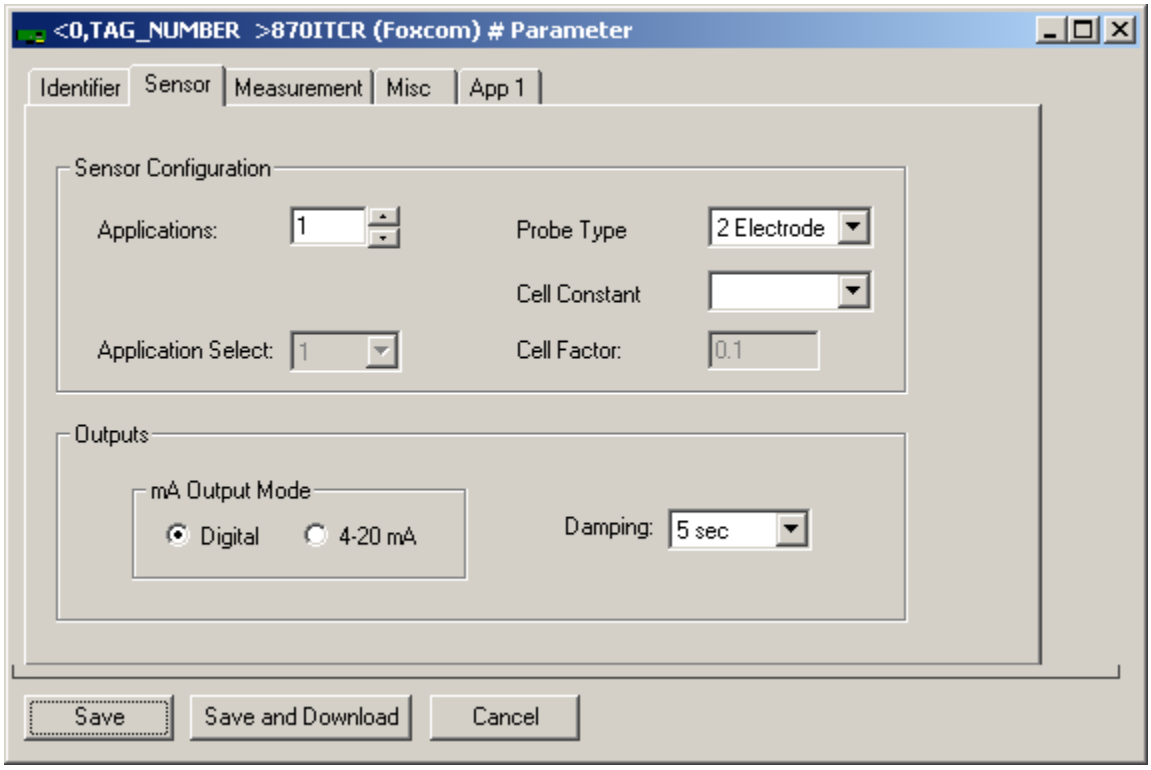

Figure 81. Sample 870ITCR Sensor Tab Screen

Field	Entry
Sensor Configuration	
Applications	Number of applications to be configured. Select `1`, `2`, or `3` applications.
Application Select	Select `1`, `2`, `3`, or `AUTO`.
Probe Type	Specify `2 Electrode`.
Cell Constant	Specify `0.1`, `10`, or `Other`.
Cell Factor	If sensor type is `Other`, specify cell factor between 00.00 and 99.99.
Outputs	
mA Output Mode	Select `Digital` or `4-20 mA`.
Damping	Select damping response time of `1`, `5`, `10`, `20`, `40`, or `120` seconds.

Measurement Tab Screen

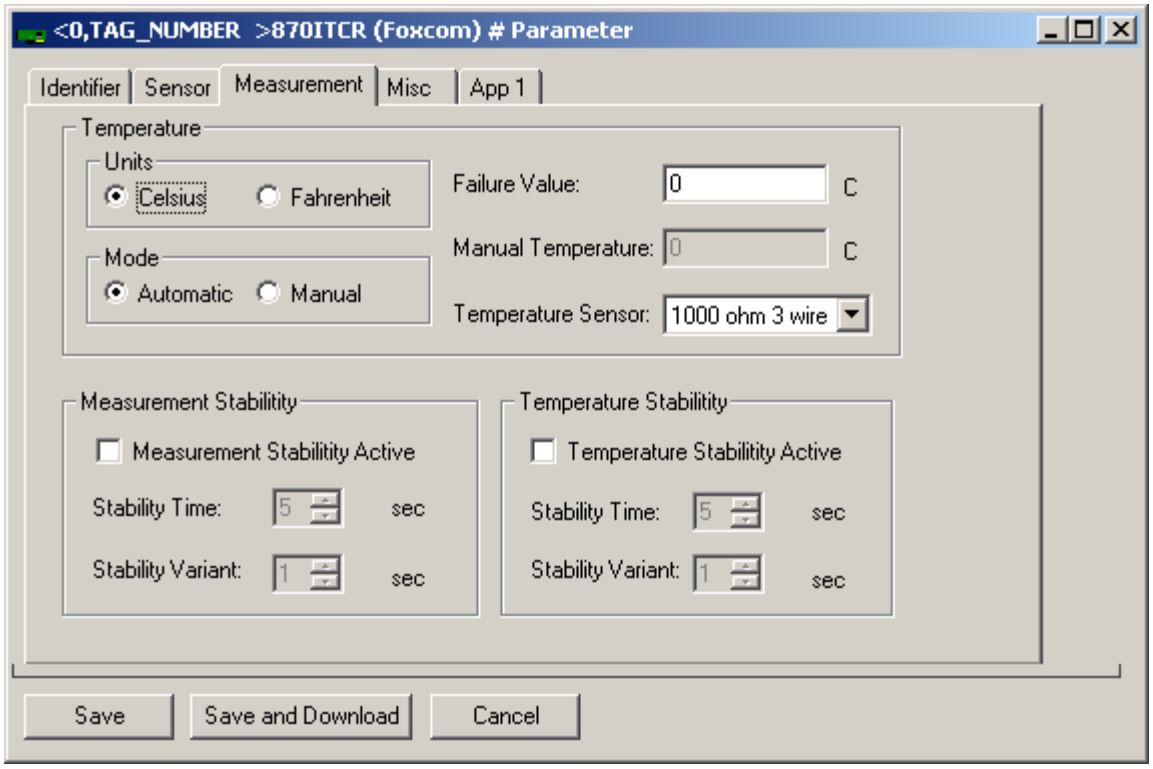

Figure 82. Sample 870ITCR Measurement Tab Screen

Field	Entry
Temperature	
Units	Select `Celsius` or `Fahrenheit`
Mode	Select `Automatic` (follows RTD) or `Manual` (fixed point).
Failure Value	If `Mode` is `Automatic`, enter temperature in case RTD fails.
Manual Temperature	If `Mode` is `Manual`, enter temperature.
Temperature Sensor	Select `2-wire 100` Ω, `2-wire 1000` Ω, `3-wire 100` Ω, or `3-wire 1000` Ω RTD, or `100` kΩ. `thermistor`.
Measurement Stability	
Measurement Stability Active	√ = Instrument Stability Measurement Feature On; Blank = Instrument Stability Measurement Feature Off
Stability Time	If on, enter time between 5 and 60 seconds in 5-second increments.
Stability Variant	If on, enter variant between 1 and 9.
Temperature Stability	
Temperature Stability Active	√ = Instrument Stability Temperature Feature On; Blank = Instrument Stability Temperature Feature Off
Stability Time	If on, enter time between 5 and 60 seconds in 5-second increments.
Stability Variant	If on, enter variant between 1 and 9.

Misc Tab Screen

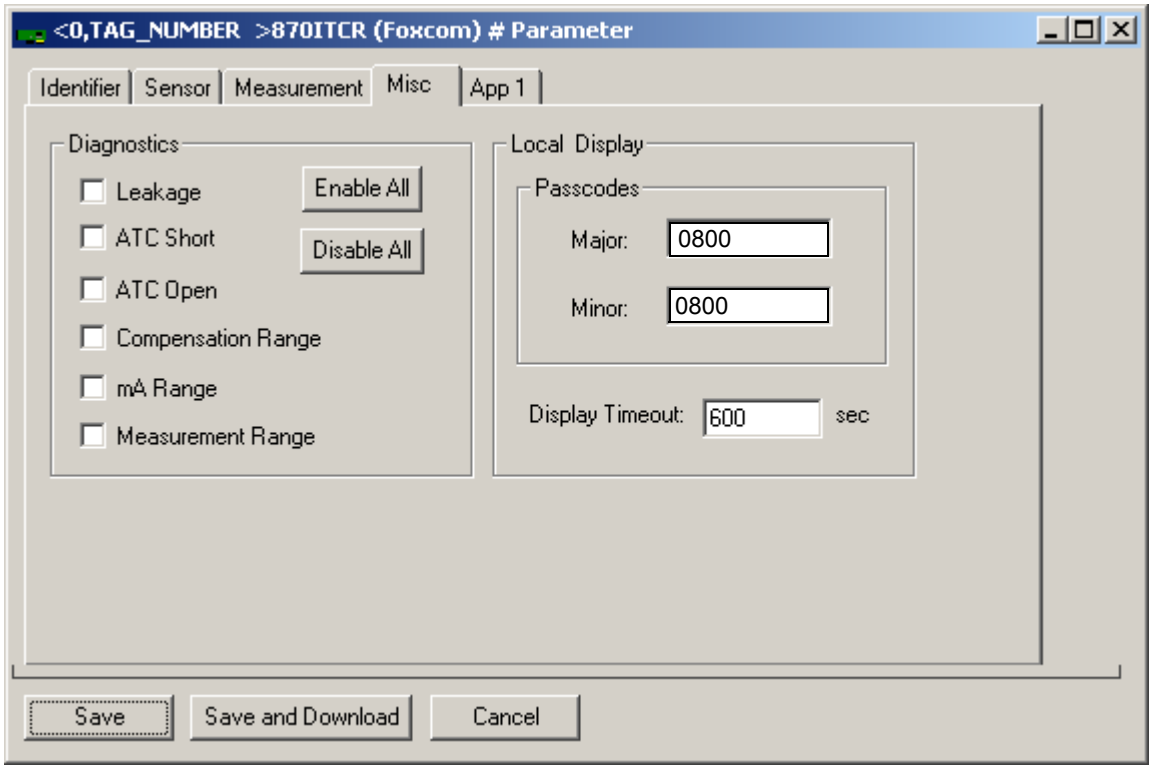

Figure 83. Sample 870ITCR Misc Tab Screen

Field	Entry
Diagnostics	
Leakage	√ = Enable error messages; Blank = Disable error messages
ATC Short	
ATC Open	
Compensation Range	
mA Range	
Measurement Range	
Enable All	Enables all messages listed above.
Disable All	Disables all messages listed above.
Local Display	
Major Passcode	Enter 4-digit passcode.
Minor Passcode	Enter 4-digit passcode.
Display Timeout	Enter timeout between 0 and 999 seconds.

Application Tab Screen

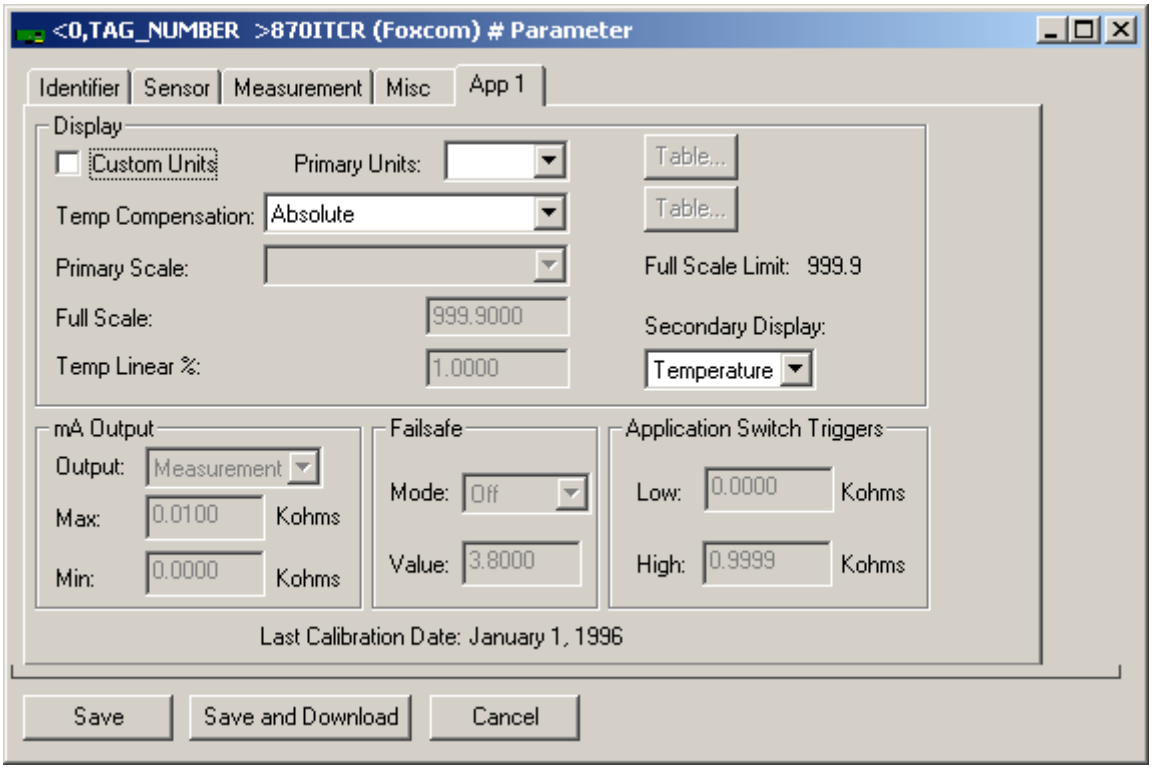

Figure 84. Sample 870ITCR App1 Tab Screen

Field	Entry
Display	
Custom Units	√ = Custom; Blank = Not Custom
Primary Units	If not `Custom`, select from menu of choices. If `Custom`, select `%`, `g/l`, `ppm`, `oz/gal`, `ppt`, or `None` and see Figure 85.
Temp Compensation	Select from menu of choices. If Custom, see Figure 86.
Primary Scale	Select from menu of choices.
Full Scale	Enter value up to full scale limit.
Temp Linear %	Enter value from 0 to 100,
Secondary Display	Select `Temp`, `Absolute`, or `mA`.
mA Output	
Output	If Analog Output Mode on sensor screen, specify `Absolute`, `Measurement`, or `Temperature`.
Max.	Enter 20 mA range value.
Min.	Enter 4 mA range value.
Failsafe	
Mode	Specify `Off`, `On`, or `Pulse`
Value	If on, enter dc mA output between 3.8 and 20.5 mA.
Application Switch Triggers	Enter value of Low and High triggers.

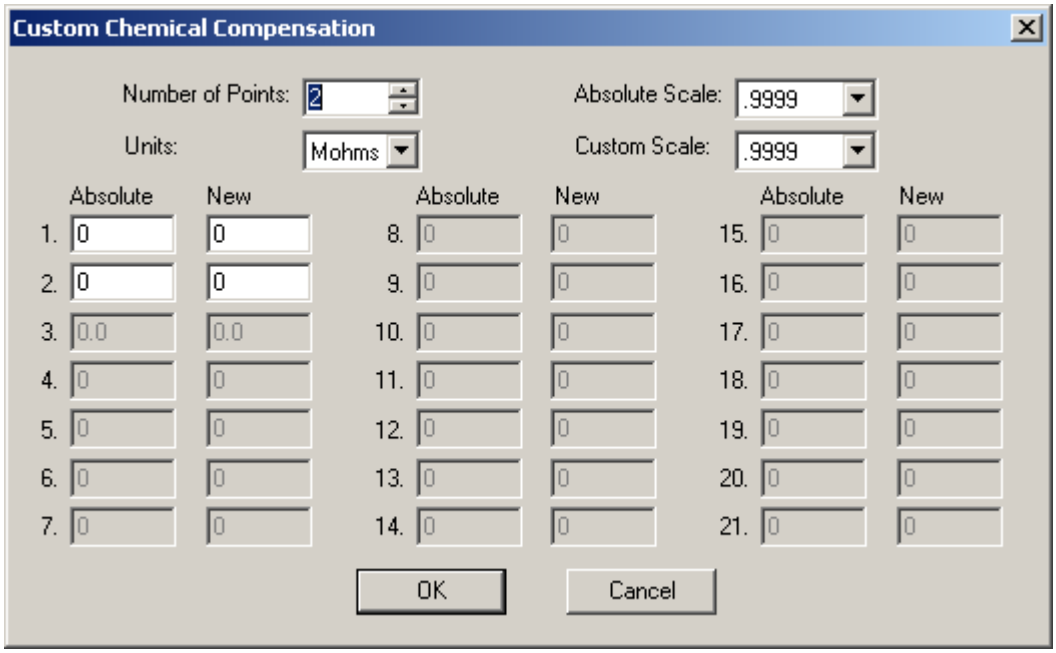

Figure 85. Custom Chemical Compensation Screen

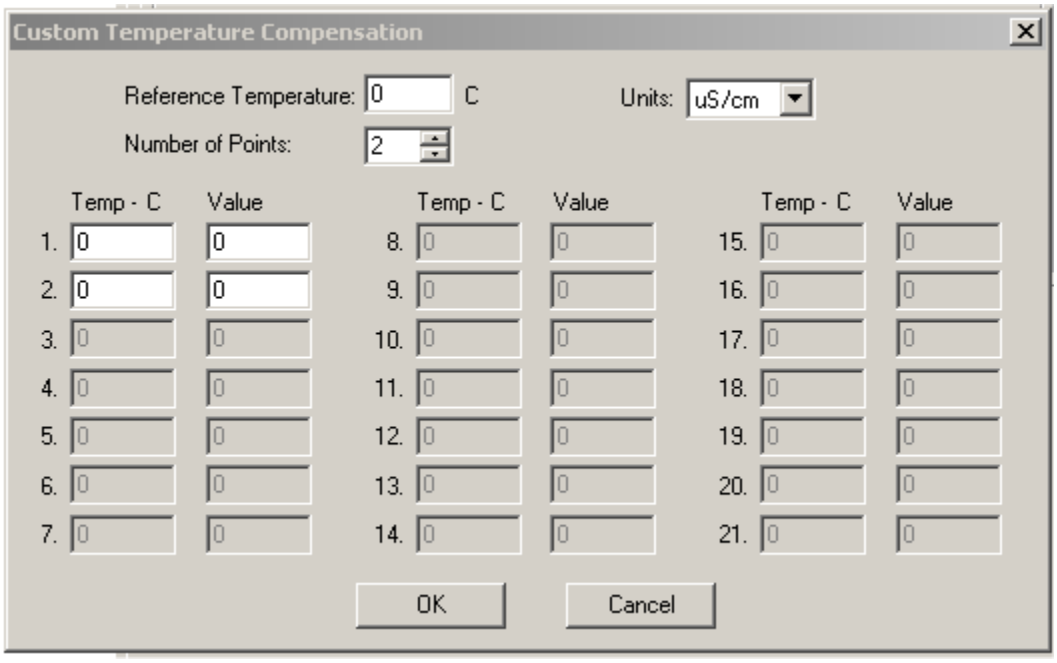

Figure 86. Custom Temperature Compensation Screen

10. Intelligent Positioners (SRD991, SRD960, SRD970, NAF-LinkIT)

This chapter provides information that is exclusive to using the PC50 Field Device Tool with SRD991, SRD960, SRD970, and NAF-LinkIT Intelligent Positioners with FoxCom communication protocol. The configurations of the different intelligent positioner models are very similar to each other. The following description shows the configuration of the intelligent positioners using the SRD991 as an example. If there are differences between the models, they are outlined in the description.

Additional information about these positioners and FoxCom communication is contained in the following documents.

- B0193XXChecklist for FoxCom Measurement Integration
- MI EVE0105Installation, Operation, Configuration, and Maintenance.

Measure Screen

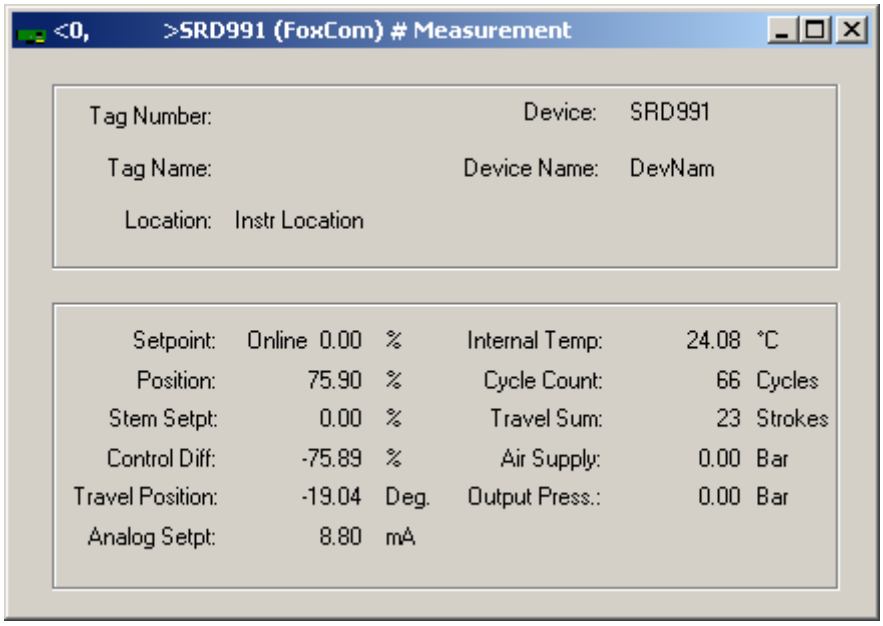

Figure 87. Sample SRD991 Device Data Screen

Status Error Messages

The Diagnosis function is described in Chapter 1 of this document. A sample diagnosis screen is shown in Figure 1. Explanation and recommended action of status error messages is given in Table 13.

Table 13. Field Device Status Error Messages

Message	Explanation	Recommended Action
Temp. High	Temperature above allowed limit.	Operation outside temperature limit may damage positioner components and violate electrical safety certification requirements. Stop operating positioner.
Temp. Low	Temperature below allowed limit.	
Invalid Configuration	Invalid configuration.	Correct configuration, perform Restore Factory Settings, rerun Autostart procedure.
Travel Sum Limit	Travel sum has exceeded limit configured.	Check valve performance and conduct maintenance if necessary.
Cycle Count Limit	Cycle count has exceeded limit configured.	Check valve performance and conduct maintenance if necessary.
Input Loop Trim	Input signal requires calibration.	Perform Analog Setpoint Calibration procedure.
Feedback Trim	Feedback unit requires calibration.	Perform Angle Calibration procedure.
No Autostart Done	No Autostart was done or Autostart was run and did not complete successfully.	Ensure proper mounting of positioner and adequate supply pressure. Refer to on-line Help for other potential causes. Rerun Autostart Calibration procedure.
Position High Alarm	Position above High Alarm Set Point.	Monitor situation or correct cause.
Position Low Alarm	Position below Low Alarm Set Point.	Monitor situation or correct cause.
Position High High Alarm	Position above High High Alarm Set Point.	Monitor situation or correct cause.
Position Low Low Alarm	Position below Low Low Alarm Set Point.	Monitor situation or correct cause.
Control Diff OOL	Difference between set point requested and current position exceeds allowed limit for a user specified time.	Check to ensure that there is adequate supply pressure. Verify tuning parameters. Refer to troubleshooting section of MI EVE 0105A.
Binary Input	The Binary Input signal 1 or 2 is active.	Monitor situation or correct cause.
Air Supply Pressure Alarm	The air supply pressure fell below the configured lower limit.	Check to ensure that there is adequate supply pressure.
Output Pressure Alarm	The positioner cannot regulate the output pressure.	Check the pneumatics.
RAM	Error writing positioner memory.	Replace failed item or positioner.
EEPROM	Error writing positioner EEPROM.	Replace failed item or positioner.
ROM	Error writing positioner ROM.	Replace failed item or positioner.
AD Converter	Converter function not controllable.	Replace failed item or positioner.
Actuator OOR	Position is not within permissible range (-5%...+105%).	Check mechanics of actuator and valve. Perform Endpoints calibration.

Table 13. Field Device Status Error Messages (Continued)

Message	Explanation	Recommended Action
Current Loop I/P Motor	Connection of I/P converter to electronic board failed.	Replace failed item or positioner.
Potentiometer	Connection of potentiometer to electronic board failed.	Replace failed item or positioner.
Option Board	Option board was not configured or failed.	Check configuration or replace failed option board.

Calibration

You can perform the following calibration procedures on your intelligent positioner using PC50 Field Device Tool software:

- Autostart
- Endpoints
- Analog Setpoint (only allowed at workshop security level)
- Angle (only allowed at workshop security level)
- Temperature (only allowed at workshop security level)
- Position Feedback (only allowed at workshop security level)
- Air Supply Pressure (only allowed at workshop security level)
- Output Pressure (only allowed at workshop security level)
- Restore Valve Specific Parameter (only allowed at workshop security level)
- Restore Factory Settings (only allowed at workshop security level).

The calibration procedures are accessed as follows:

```
Device > Additional functions > Adjust set value
```

Autostart Calibration

This function determines valve travel limits, zero, span, and tuning parameters. It does this in four stages:

- Determining the limits of actuator travel.
- A series of ramps to determine the control system parameters
- A series of steps to determine the control parameters
- Determining the positioning speeds.

⚠ CAUTION

In performing this function, the valve is stroked several times and ramps are applied to the input signal. If the process cannot be disturbed, then Autostart should not be executed.

The procedure to perform an Autostart calibration is:

1. Select `Autostart` from the `Adjust set value` menu.
2. Acknowledge the warning.
3. Enter the calibration data or suitable message upon successful completion.

If Autostart is not successful, it may terminate before reaching the last step. This means that the positioner is not properly calibrated. To check whether Autostart has been successfully completed or not, select Valve Status from Test in the device top level menu. Potential reasons for Autostart not completing include:

- Positioner mounting problem. Feedback lever or coupling is in the wrong orientation. Refer to Section 1 of MI EVE 0105A on "getting started".
- Inadequate supply pressure.
- Large actuator. Use Endpoint Calibration and tune manually. Employ boosters to increase output capacity.
- Hardware problem.

Endpoints Calibration

Endpoints calibration automatically detects the valve end points. It does this by using only the first of the four Autostart steps. This process determines the valve mechanical travel stops, zero and span, but not the tuning set. Accordingly, it requires much less time than a full Autostart calibration. If the tuning parameters are available for the control valve from previous testing or existing data, then performing Endpoints calibration and manually entering the tuning set shortens the positioner setup time significantly.

The procedure to perform an Endpoints calibration is:

1. Select `Endpoints` from the `Adjust set value` menu.
2. Acknowledge the warning.
3. Enter the calibration data or suitable message upon successful completion.

Analog Setpoint Calibration

Analog setpoint calibration enables you to calibrate the upper and lower limits of the current input (4 mA and 20 mA) if the positioner is being used in analog mode. Using the positioner in the analog mode requires jumper selection on the printed wiring board. Refer to MI EVE 0105A for the correct jumper location.

⚠ CAUTION

When in analog mode, the positioner cannot be connected to a voltage source. To do so causes permanent damage to the instrument.

NOTE

This function is only allowed at workshop security level.

The procedure to perform an Analog Setpoint calibration is:

1. Take the positioner out of the process loop and connect it to a current source.
2. Select `Analog Setpoint` from the `Adjust set value` menu.
3. Set input current to 4 mA.
4. Acknowledge by entering this value (4 mA) in the edit box on the display.
5. Set the input current to 20 mA.
6. Acknowledge by entering this value (20 mA) in the edit box on the display.
7. The screen responds with the message that the Analog Setpoint Calibration has finished.

Angle Calibration

Angle calibration is needed whenever the printed wiring board or the potentiometer is replaced. This operation is typically done on the bench and may require special tools and removal of the positioner from the valve. Refer to MI EVE 0105A for more information.

— NOTE

This function is only allowed at workshop security level.

The procedure to perform an Angle calibration is:

1. Select `Angle` from the `Adjust set value` menu.
2. The feedback lever is rotated to the lower angle value (typically 45° down from horizontal).
3. Acknowledge by entering the lower angle value into the edit box on the display.
4. The feedback lever is rotated to the upper angle value (typically 45° up from horizontal).
5. Acknowledge by entering the upper angle value into the edit box on the display.
6. The screen responds with a message that the Angle Calibration has finished.

Temperature Calibration

Temperature calibration is needed whenever the printed wiring board is replaced. The function calibrates the temperature of the internal electronics module. It is intended to be performed on the bench. A temperature probe and other special tools are required. Refer to MI EVE 0105A for more information.

— NOTE

This function is only allowed at workshop security level.

The procedure to perform a Temperature Calibration is:

1. Select `Temp` from the `Adjust set value` menu.
2. After selecting `Continue` to proceed, measure the electronics temperature with a probe.
3. Enter this value in the edit box on the display and select `Continue`.

The temperature calibration is finished.

Position Feedback Calibration

This function performs calibration of the output of the position feedback option board. This is typically done on the bench and may require special tools and special electrical connections. This function is accessed by selecting `Pos Feedback` from the `Adjust set value` menu. Refer to MI EVE 0105A for more information.

— NOTE

This function is only allowed at workshop security level.

Air Supply Pressure Calibration

Air Supply Pressure Calibration is needed whenever the printed wiring board is replaced. This operation is typically done on the bench and may require special tools. Refer to MI EVE 0105A for more information.

— NOTE

This function is only allowed at workshop security level.

The procedure to perform an Air Supply Pressure Calibration is:

1. Select `Air Supply` from the `Adjust set value` menu.
2. Regulate the air supply to the LOW supply pressure value.
3. Enter this value in the edit box on the display and select `Continue`.
4. Regulate the air supply to the HIGH supply pressure value.
5. Enter this value in the edit box on the display and select `Continue`.

The Air Supply Pressure Calibration is finished.

Output Pressure Calibration

Output Pressure Calibration is needed whenever the printed wiring board is replaced. This operation is typically done on the bench and may require special tools. Refer to MI EVE 0105A for more information.

— NOTE

This function is only allowed at workshop security level.

The procedure to perform an output pressure calibration is:

1. Select `Output Pressure` from the `Adjust set value` menu.
2. Using the pushbuttons, set the setpoint to 0%.
3. Check the pressure gauge attached to the output port of the positioner. Enter this value in the edit box on the display and select `Continue`.
4. Using the pushbuttons, set the setpoint to 100%.
5. Check the pressure gauge attached to the output port of the positioner. Enter this value in the edit box on the display and select `Continue`.

The Output Pressure Calibration is finished.

Restore Valve-Specific Parameter

This function allows writing of valve specific parameters into the positioner. By reading the data file of one positioner mounted to a valve and writing these values into a new positioner, the new positioner is adopted to that valve without performing an Autostart Calibration. However, due to mechanical tolerances in mounting, the adoption is not optimal. Therefore, performing a new Autostart Calibration or Endpoint Calibration is required as soon as possible. This function is accessed by selecting `Restore Valve-Specific Parameter` from the `Adjust set value` menu.

— NOTE

This function is only allowed at workshop security level.

Restore Factory Settings

This function resets all calibration and configuration data back to the calibration and configuration data existing at time of delivery from the factory. The valve's current database is overwritten. This function is useful, for example, when a positioner is taken from one valve and mounted to another valve. This function is accessed by selecting `Restore Factory` from the `Adjust set value` menu.

— NOTE

This function is only allowed at workshop security level.

Mode Change

You can perform the following mode changes on the positioners: On-Line, Off-line, Local Mode, Factory, and Calibrate. Use the following path to access this function:

`Device > Additional functions > Commands > Mode Change`

On-Line

This function sets the device into the on-line mode where normal control is performed. The positioner allows a digital or analog setpoint depending on the configuration of the set-point source.

Off-Line

This function sets the device into the off-line mode where normal control is **not** performed. The pneumatic output is frozen to the last value of the pneumatic output before performing this function.

Local Mode

This function sets the device into the local mode. Local mode is similar to on-line mode where normal control is performed. However, the positioner does not follow the digital or analog setpoint from the I/A Series system. It follows the digital setpoint from the Field Device Tool.

Calibrate

This function sets the device into calibrate mode.

Factory

This function is for use by Global Customer Support personnel only.

Reset Status

This function resets all current and historical status fields including the Diagnostic Status fields. It is accessed via the following path:

`Device > Additional functions > Commands > Reset Status`

NOTE

If an underlying problem has not been corrected, the failure bits will be reasserted almost immediately.

Reset Counters

This function resets the Cycle Count and Travel Sum parameters. his causes the device to be taken off-line for a short period which can cause a process upset. It is accessed via the following path:

`Device > Additional functions > Commands > Reset Counters`

Reset Device

This function causes the positioner to be rebooted. It is accessed via the following path:

`Device > Additional functions > Commands > Reset Device`

⚠ CAUTION

The device behaves as if the power supply were switched off and on. This can cause a process upset.

Write Protect

This function enables or disables write protection for valve parameters. If Write Protect is enabled, the positioner is write protected and inadvertent changing of positioner configuration data is prevented. This function is accessed via the following path:

`Device > Additional functions > Commands > Write Protect`

Configuration

Identifier Tab Screen

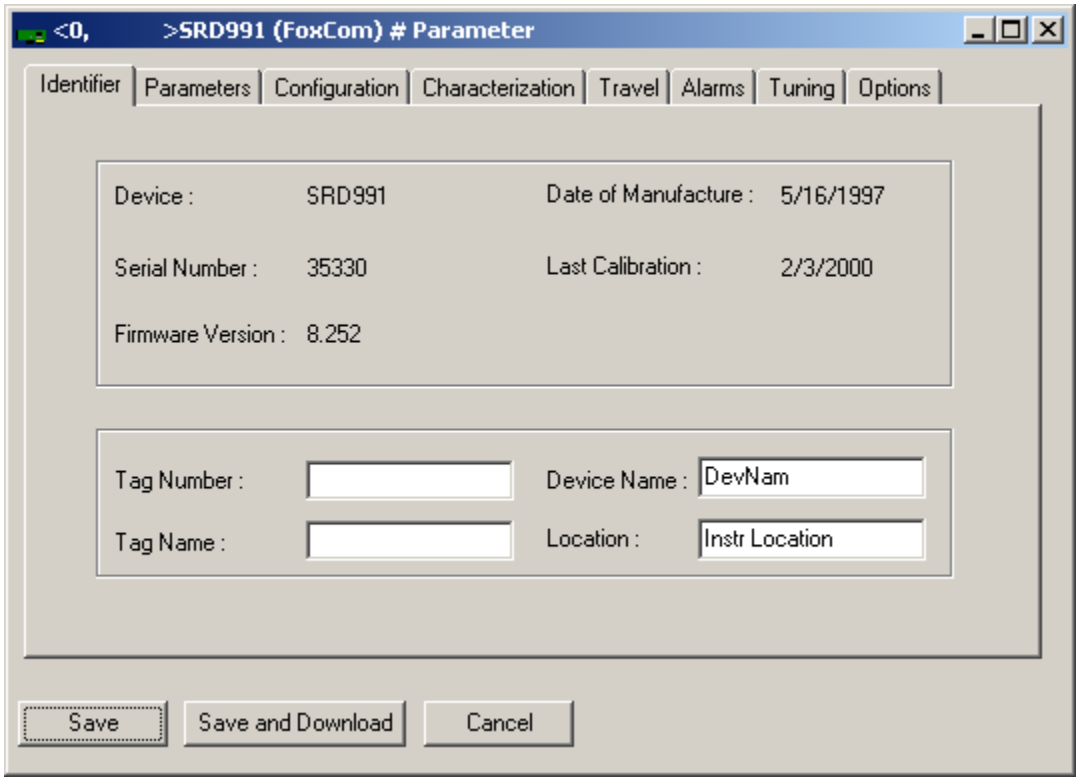

Figure 88. Sample SRD991 Identifier Tab Screen

Field	Entry
Tag Number	Enter maximum of 12 characters. The first 8 characters become the positioner configuration filename.
Tag Name	Enter maximum of 14 characters. Optional, used for reference only.
Device Name	Enter maximum of 6 characters. NOTE: To disable enhanced protocol name checking with I/A Series Versions 3.0 or later, enter `DevNam`.
Location	Enter maximum of 14 characters. Optional, used for reference only.

Parameters Tab Screen

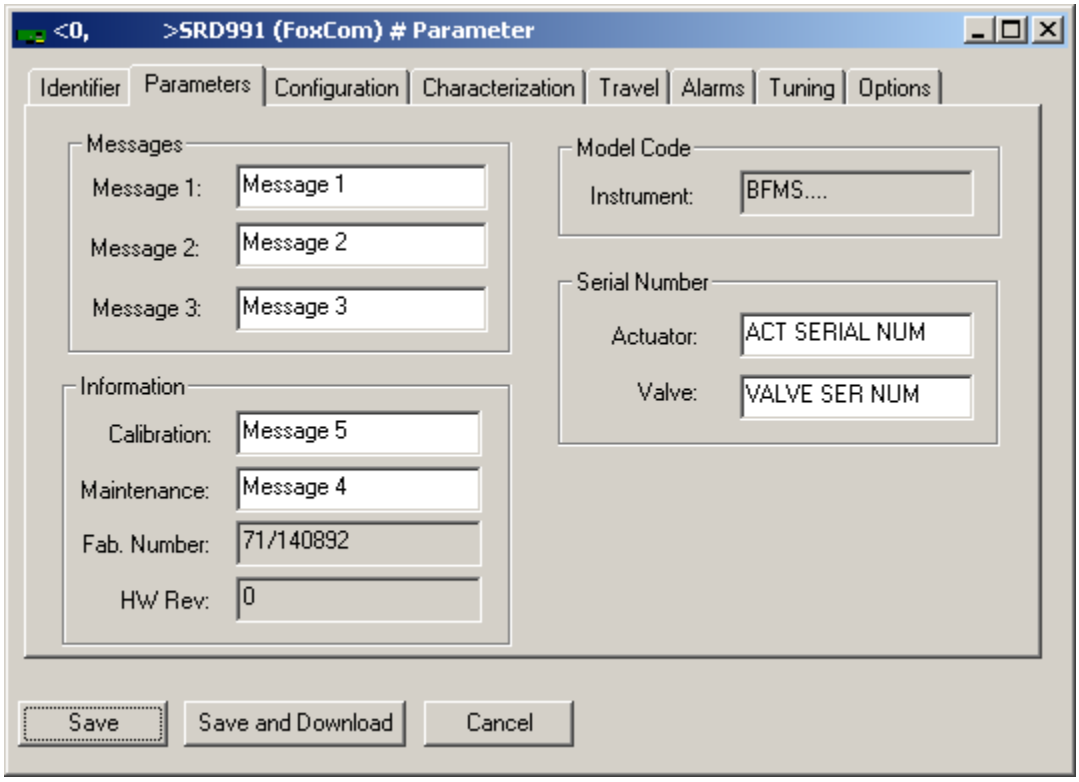

Figure 89. Sample SRD991 Parameters Tab Screen

Field	Entry
Messages 1, 2, and 3	Enter up to three messages, each up to 14 characters long.
Model Code	
Instrument	Displays the factory entered positioner model code.
Information	
Calibration	Enter calibration info message (14 characters maximum).
Maintenance	Enter maintenance message (14 characters maximum).
Fab. Number	Displays a factory entered identification number.
HW Rev.	Displays the factory entered hardware revision level.
Serial Number	
Actuator	Enter actuator serial number.
Valve	Enter valve serial number.

Configuration Tab Screen

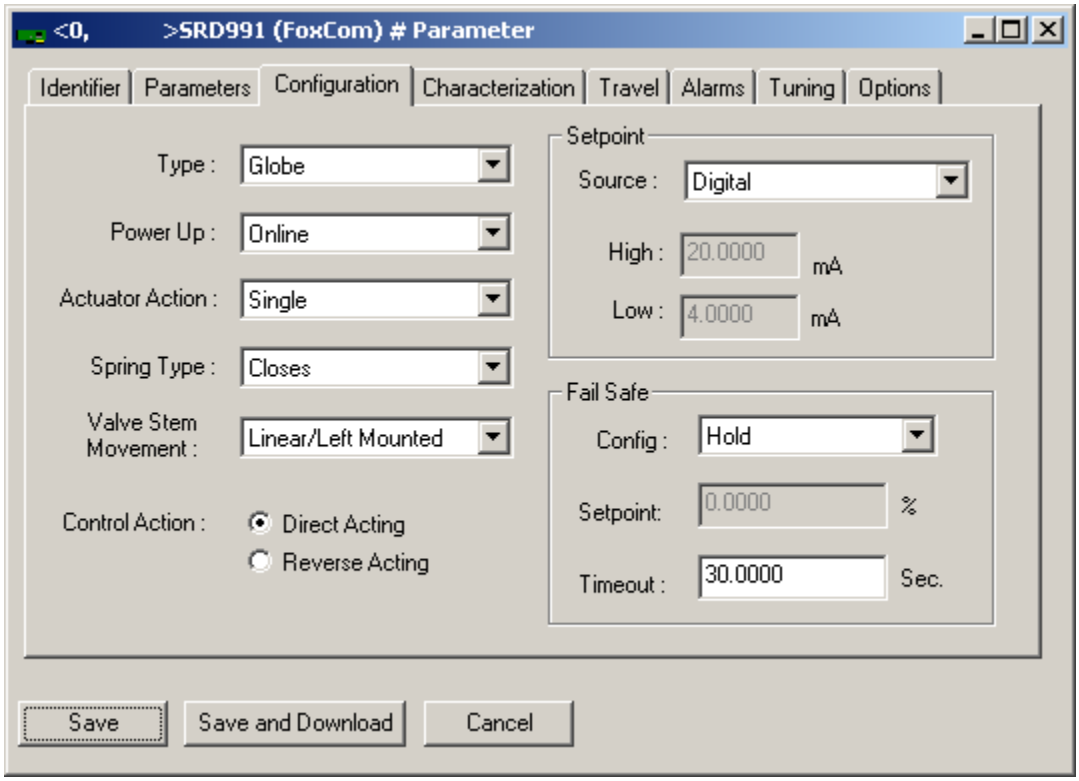

Figure 90. Sample SRD991 Configuration Tab Screen

Field	Entry
Type	Select `Globe`, `Rotary Plug`, `Butterfly`, `Ball`, or `Diaphragm`.
Power Up	Specify whether you want the valve to start in Fail-safe mode or fully On-line.
Actuator Action	Select `Single` or `Double`.
Spring Type	Specify whether the valve `Closes` or `Opens` with a spring or `None` if no spring exists.
Valve Stem Movement	Specify `Linear/Left Mounted`, `Linear/Right Mounted`, `Rotary/Counterclockwise`, or `Rotary/Clockwise`.
Control Action	Specify `Direct` or `Reverse Acting`.
Setpoint	
Source	Select `Analog`, `Analog High` (4800 Baud), or `Digital`.
High	If Analog, enter value at high end of mA range (20 mA max).
Low	If Analog, enter value at low end of mA range (4 mA min).
Fail-Safe	
Config.	Fail-safe occurs when no setpoint command is seen in the timeout specified below. Select the fail-safe condition: `De-Energize` (positioner exhausts all air in the actuator) `Hold` (last valve position) `Fallback` (send to position specified in next field).
Position	If Fallback, enter position in percent.
Timeout	Enter Timeout in seconds (0 means none).

Characterization Tab Screen

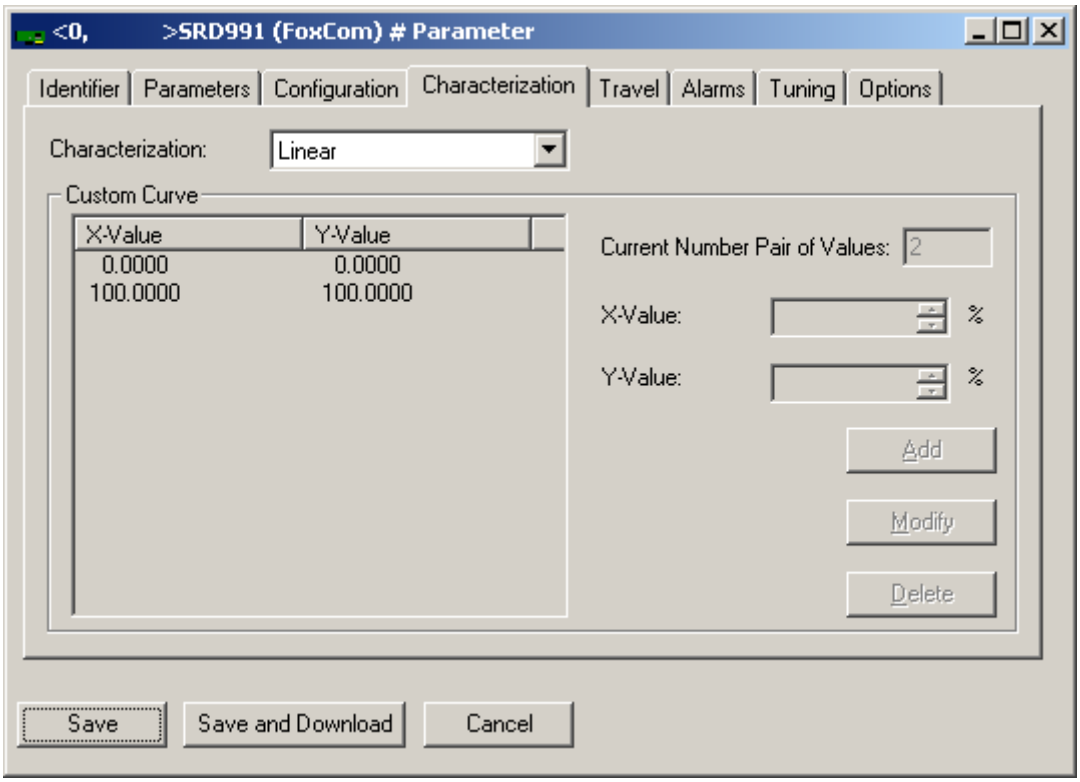

Figure 91. Sample SRD991 Characterization Tab Screen

`Characterization`: Select `Linear`, `Equal Percentage (1:50)`, `Quick Open (50:1)`, or `Custom`.

`Custom Curve:` Allows you to enter a custom curve consisting of up to 22 points (X/Y pairs).

To add a new pair of values, select `Custom,` enter the X- and Y-Values and press `Add`. The input value pair is sorted in increasing order of the X-Values.

To modify a value pair, select the X-Value in the list box, modify the values displayed in the edit boxes, and press `Modify`.

To delete a value pair, select the X-Value in the list box and press `Delete`.

A custom curve which is stored in the device can be activated by selecting `Custom` or deactivated by switching to `Linear`, `Equal Percentage (1:50)` or `Quick Open (50:1)`.

Travel Tab Screen

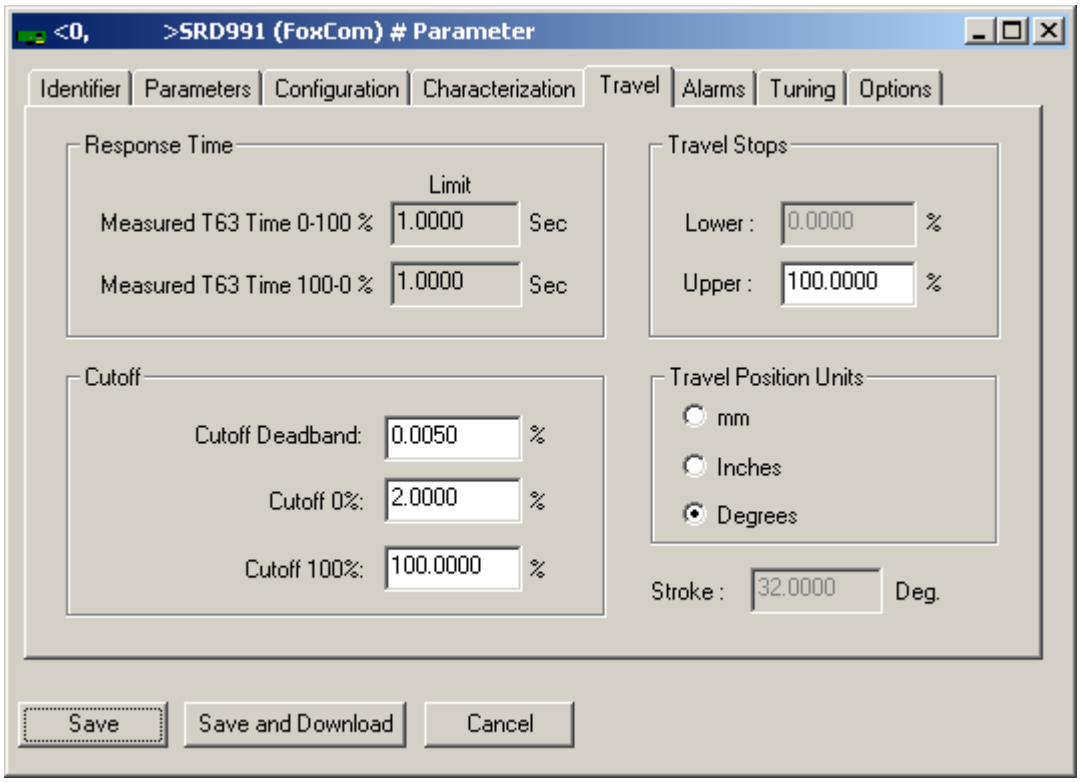

Figure 92. Sample SRD991 Travel Tab Screen

Field	Entry
Response Time [Limit]	
Measured T63 Time 0-100%	Displays the time it took for the valve to travel 63% of its full stroke in the increasing direction during Autostart.
Measured T63 Time 100-0%	Displays the time it took for the valve to travel 63% of its full stroke in the decreasing direction during Autostart.
Cutoff	
Cutoff Deadband	Enter the amount of hysteresis in percent of travel required above the cutoff value before the valve can reopen again. For example, with 2% cutoff, 0.5% cutoff hysteresis allows the valve to reopen at 2.5%.
Cutoff %	Enter the value in percent of travel below which the valve is fully closed. For example, when set at 2%, any signal below 2% is treated as 0%.
Cutoff 100%	Enter the value in percent of travel above which the valve is fully open.
Travel Stops	
Lower	Enter lower travel stop in percent of total stroke.
Upper	Enter upper travel stop in percent of total stroke.
Travel Position Units	Select `mm`, `Inches`, or `Degrees`
Stroke	Enter the stroke in the units specified.

Alarms Tab Screen

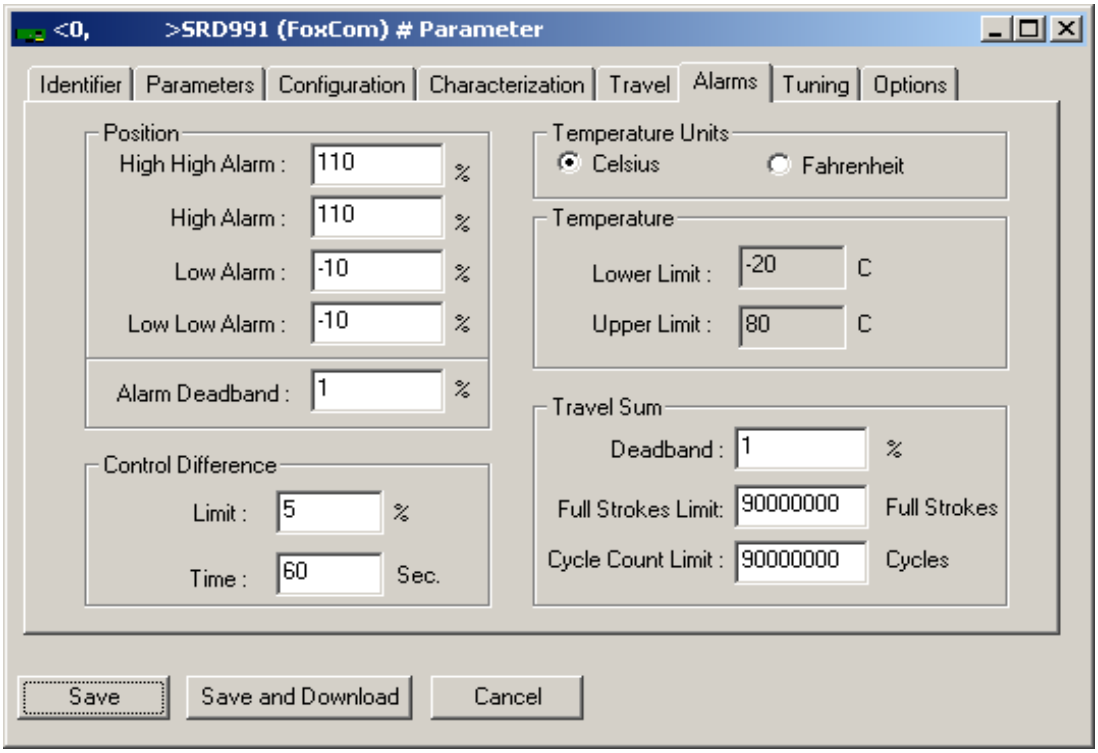

Figure 93. Sample SRD991 Alarms Tab Screen

Field	Entry
Position	Allows setting position limits at which alarms are triggered.
High High Alarm	Enter high high (full) alarm position in percent of stroke.
High Alarm	Enter high (warning) alarm position in percent of stroke.
Low Alarm	Enter low (warning) alarm position in percent of stroke.
Low Low Alarm	Enter low low (full) alarm position in percent of stroke.
Alarm Deadband	Enter alarm deadband in percent of travel.
Control Difference	Allows setting an alarm when the actual position varies from the setpoint by a specified amount for a specified time.
Limit	Enter the amount in percent of travel.
Time	Enter the time in seconds.
Temperature Units	Select `Celsius` or `Fahrenheit`.
Temperature	Displays temperature limits of the positioner in units specified on the Units Tab screen.
Lower Limit	
Upper Limit	
Travel Sum	Allows setting alarms on total stroke for maintenance purposes.
Deadband	Enter deadband in percent of stroke. Small movements below this value are not included in the travel sum.
Full Strokes Limit	Enter the alarm condition in number of full strokes. Partial movement larger than the deadband value are included in this total (for example, four 1/4 strokes are counted as one full stroke).
Cycle Count Limit	Enter the alarm condition in number of cycles. Each cycle is a change in value direction, any movement up or down, which exceeds sensitivity of the device.

Tuning Tab Screen

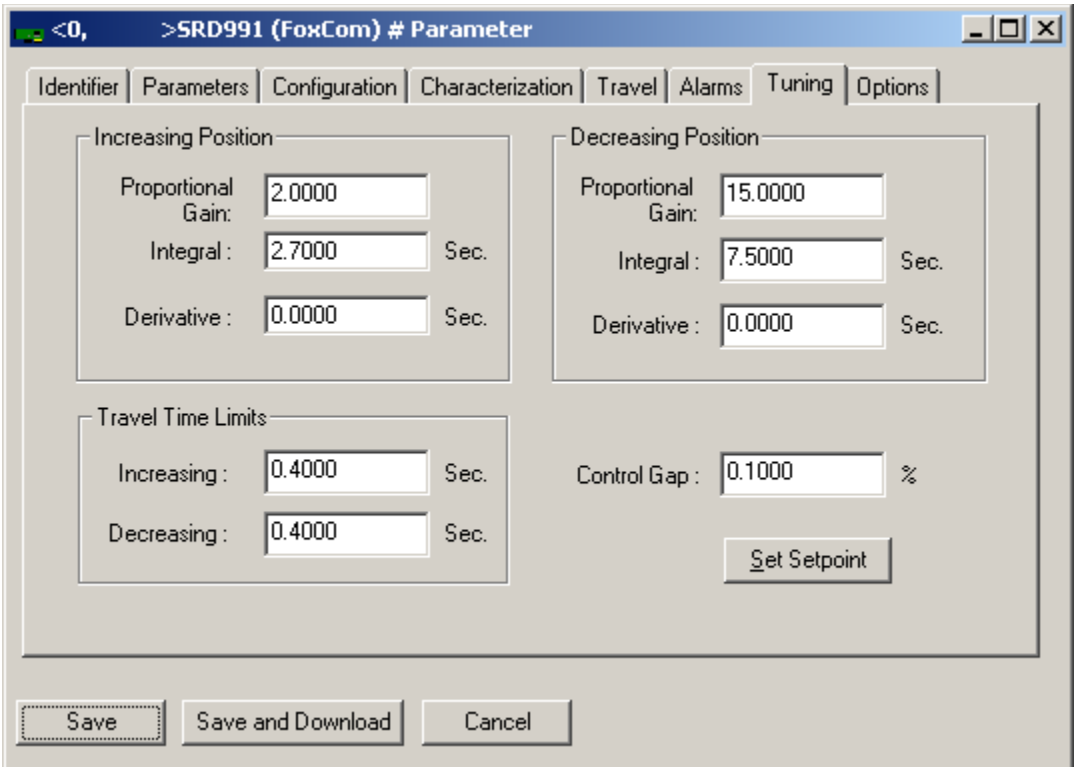

Figure 94. Sample SRD991 Tuning Tab Screen

Field	Entry
Increasing Position	
Proportional	Enter proportional gain value.
Integral	Enter reset time in seconds.
Derivative	Enter derivative time in seconds.
Decreasing Position	
Proportional	Enter proportional gain value.
Integral	Enter reset time in seconds.
Derivative	Enter derivative time in seconds.
Travel Time Limits	
Increasing	Entering values higher than the defaults slows down response. Travel time limits are used to modify control valve dynamics.
Decreasing	
Control Gap	Control gap defines the sensitivity of the positioner so that no corrective action is taken if the control difference is less than the defined limit.

Pressure Tab Screen

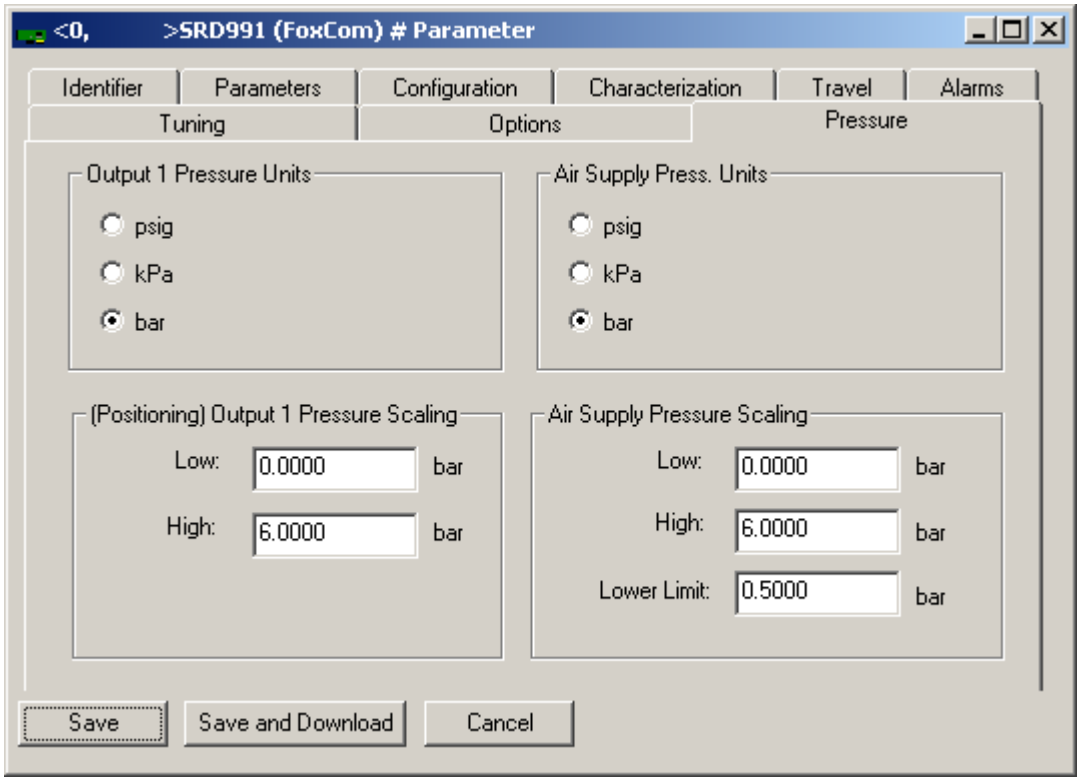

Figure 95. Sample SRD991 Pressure Tab Screen

Field	Entry
Output 1 Pressure Units	Select `psig`, `kPa`, or `bar`.
Air Supply Pressure Units	Select `psig`, `kPa`, or `bar`.
(Positioning) Output Pressure Scaling	
Low	Enter low limit for output pressure sensor. Default is 0 psig.
High	Enter high limit for output pressure sensor. Default is 87 psig (6 bars).
Air Supply (Pressure) Scaling	
Low	Enter low limit for supply pressure sensor. Default is 0 psig.
High	Enter high limit for supply pressure sensor. Default is 87 psig (6 bars).
Lower Limit	Enter the value for supply pressure below which an alarm is triggered.

Options Tab Screen

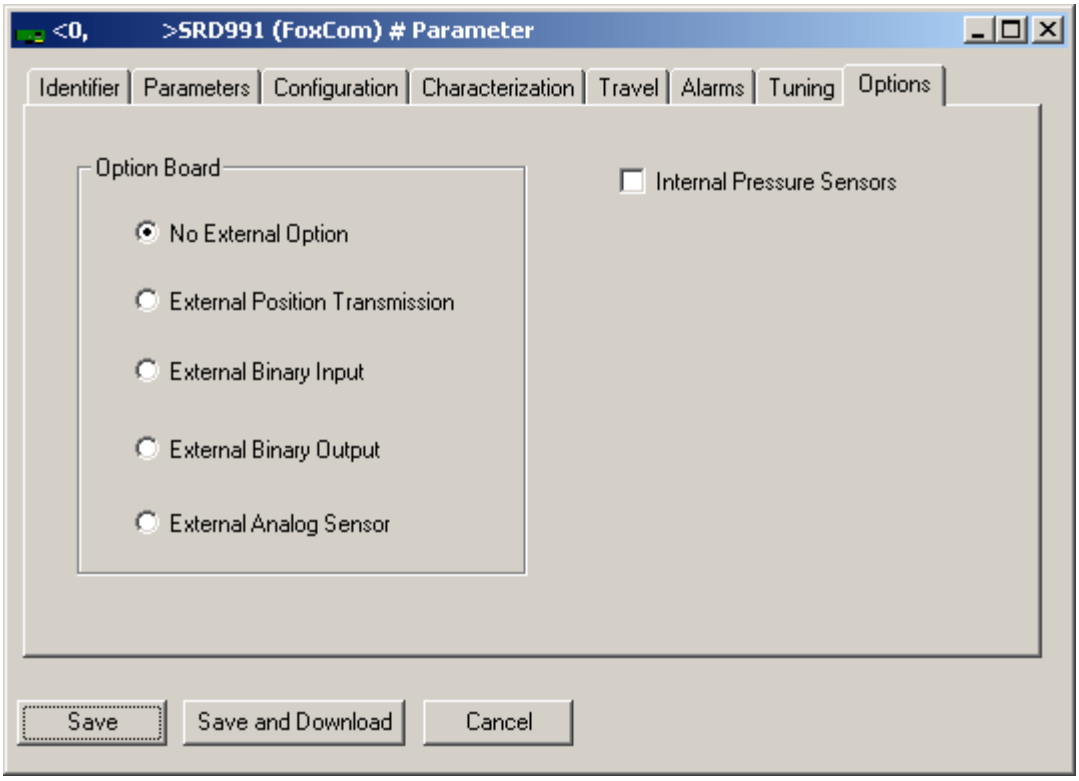

Figure 96. Sample SRD991 Options Tab Screen

Field	Entry
Option Board	Select from the following: No External Option External Position Transmission External Binary Input External Binary Output External Analog Sensor
Internal Pressure Sensors	Select or deselect internal pressure sensors.

Bin In Tab Screen

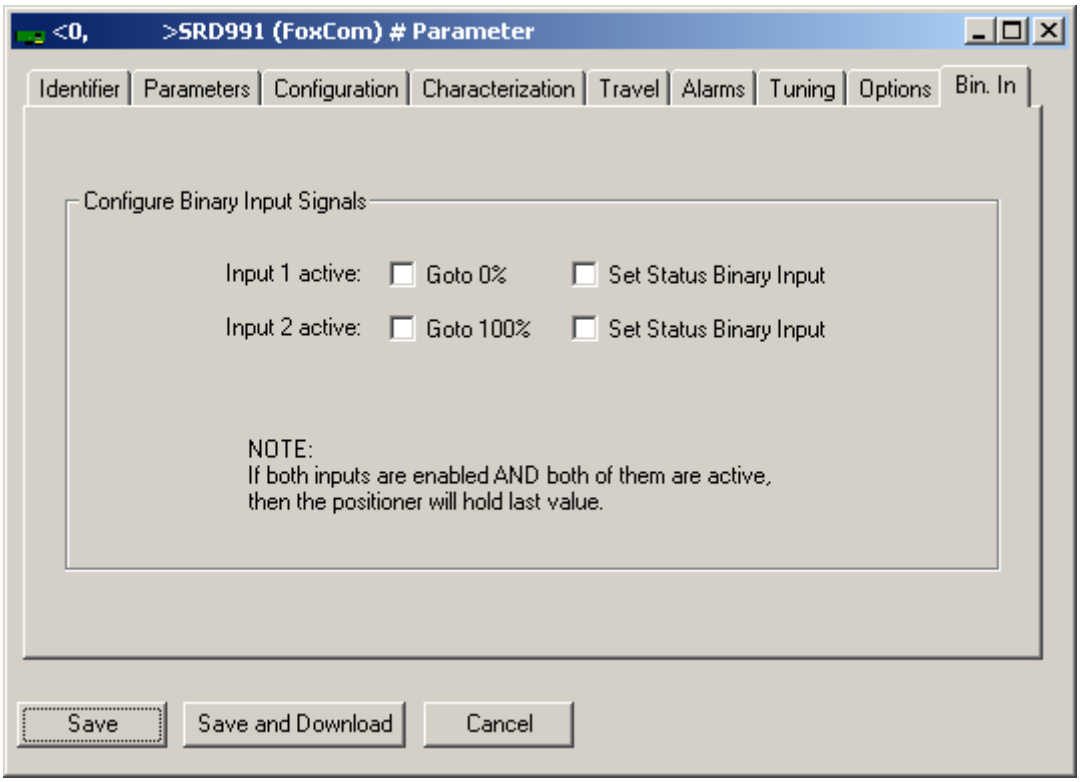

Figure 97. Sample SRD991 Bin In Tab Screen

The Binary Input option features two independent binary inputs with internal supply for connection of sensors. A connected switch is loaded with 3.5 V and 0.15 mA.

Using the Bin In Tab screen, you can configure an active signal to activate an alarm or force the actuator to go to 0% or 100%.

Bin Out Tab Screen

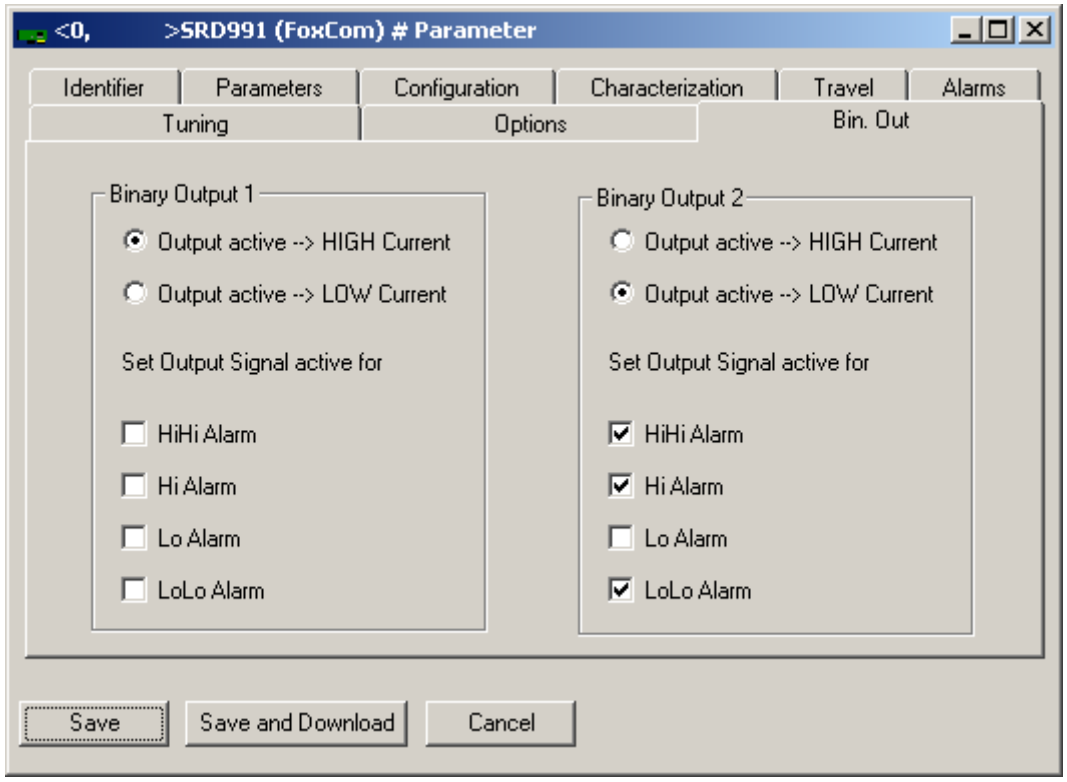

Figure 98. Sample SRD991 Bin Out Tab Screen

The Binary Output option enables you to define which alarm activates the binary input.

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