Instruction

MI 020-520
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PC50 Intelligent Field Device Tool with Advanced DTM Library

Operation Using HART® Communications Protocol

invensys
Foxboro®

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Preface

This manual explains how to operate, calibrate, and configure devices using a HART® communication protocol with the PC50 Field Device Tool software package.

Chapter 1 provides information that is common to for using the PC50 Field Device Tool with various transmitters with HART communication protocol. This is followed by chapters on each applicable Foxboro Intelligent Device. These chapters show the product structure to access each function and an explanation of each parameter.

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.

This document is organized by product families as shown in the table below.

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1. Common Information

— NOTE

When in offline configuration, the DTM shows a limited number of configuration parameters. Items such as device status, calibration, troubleshooting, and other similar parameters that require a live device are not shown.
If you transition to online mode while the offline screen is still visible, the menu tree will not be updated with all available parameters. To change from offline to online configuration, be sure to close the DTM user interface and reopen it to view all available parameters.

Configuration Report

The Configuration Report shows a summary of the Device, DTM, and relevant configuration information. You can use the **Save** and **Print** buttons at the bottom of the display to save the data to an html file or print the data respectively.

There are only OK, Cancel and Apply buttons.

HART Status

The HART Status screen shows the HART status as well as the field device status of the device. The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red cross mark (error). On most DTMs, if **Configuration Changed** does not show a green checkmark, it can be reset by clicking the **Reset Configuration Changed Flag** button on the lower left of the screen.

— NOTE

On some devices, only field device status is shown.

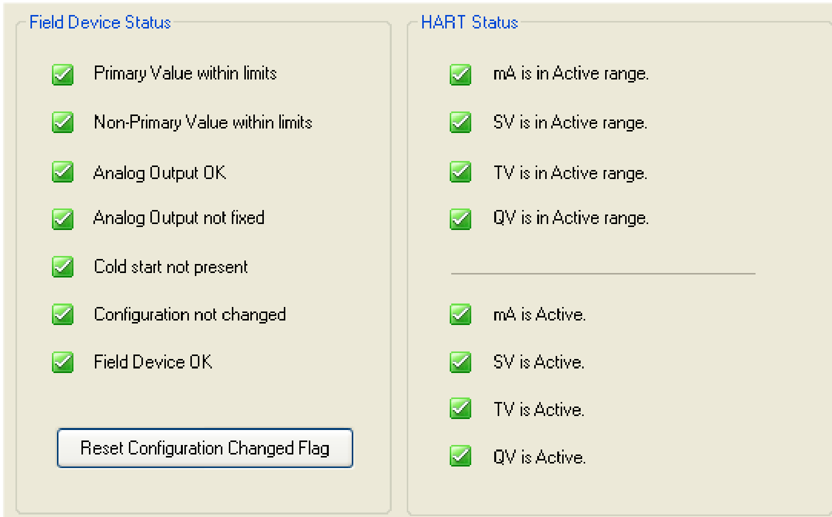


Figure 1. Sample HART Status Screen

Changing HART Polling Address

To change the HART Polling Address, you must change the address in both the device and the DTM. To do this follow the procedure below.

1. Change the device address via the HART Output Screen of your device in Setup.
2. Disconnect the Communications and Device DTMs.
3. Right-click on the HART communications DTM and go to **Additional Functions** to **Change DTM Address**.
4. Double-click on the old address. A dialog box appears as shown in Figure 2.

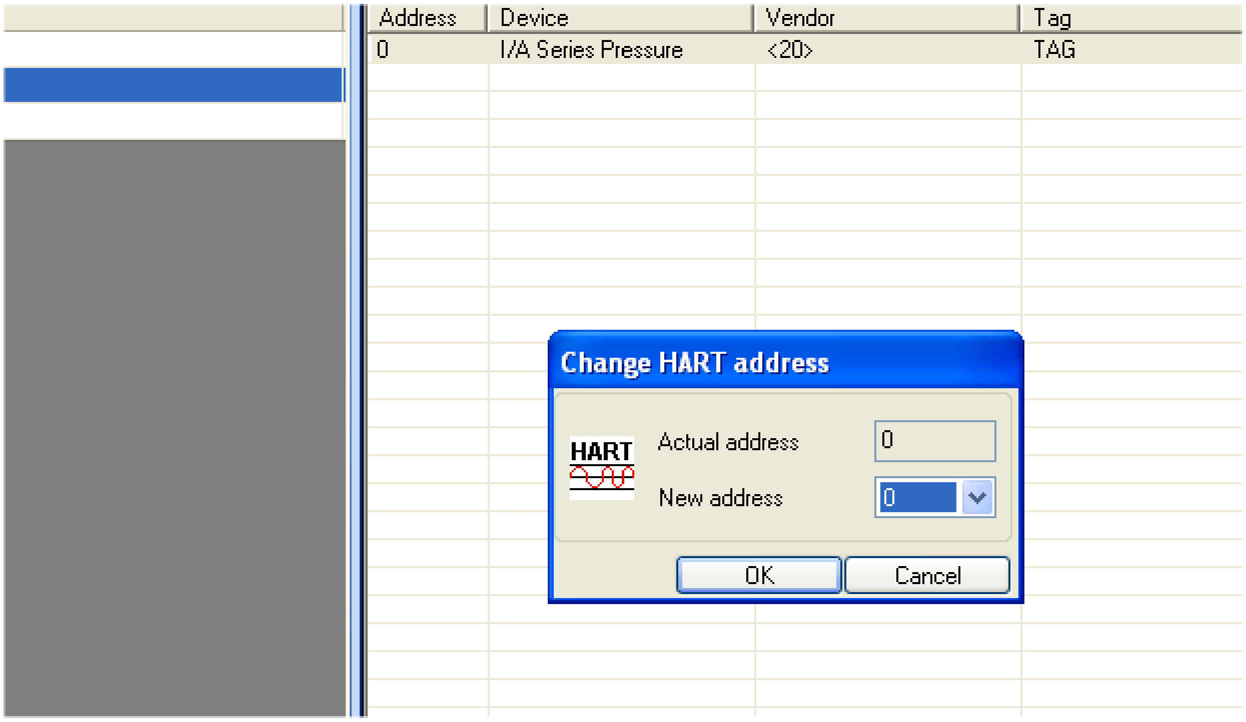


Figure 2. Sample HART Change Address Screen

5. Change the address in the dialog box. Click **OK**.
6. Connect the device and load the settings from the device.

Reference

This display shows a list of **Online Documentation** related to the device, **Useful Links** to related information, and **Customer Service** phone, fax, email, and website information.

Activity Log

The Activity Log records any changes made to the device. The **Clear Log** button is used to clear the log and the **Export Log** button to create an Excel file that you can save for future reference.

— NOTE
The information is stored in the DTM, not in the device.

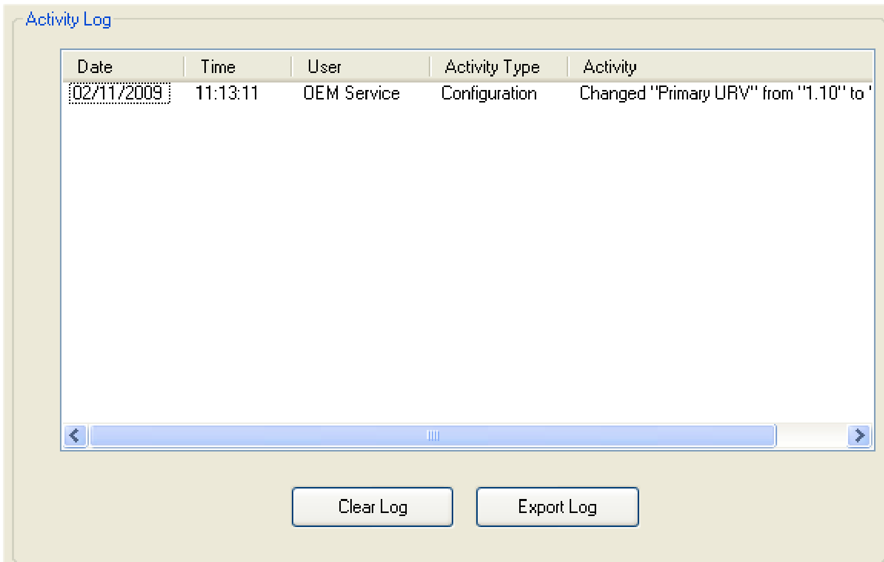


Figure 3. Sample Activity Log Screen

Scratch Pad

The Scratch pad provides a place for the user to record any type of information including website links (such as www.invensys.com), file links (such as “file: c:\readme.doc”), and mail links (such as mailto:john.doe@invensys.com). These links can be activated by clicking on them.

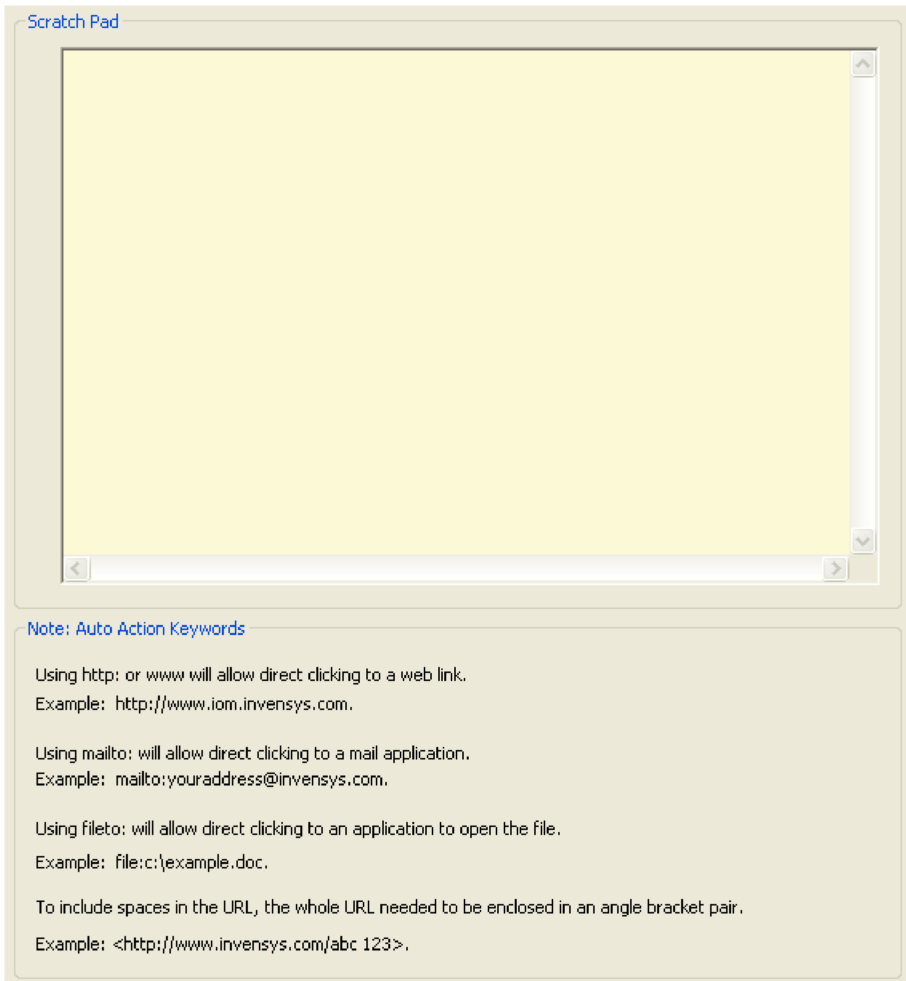


Figure 4. Sample Scratch Pad Screen

Trending

The Trending feature enables you to analyze trends in your measurements. You can simultaneously view any two of the available measurements - PV (flow rate), mA (flow rate), and Pulse Rate as shown in Figure 5. You can change the range of the left and right Y axis to suit your needs and the data update frequency. Time in hours, minutes, and seconds is on the horizontal axes. You can also scroll all three axes with the arrows on the display or by positioning your cursor on the range numbers and dragging it in the desired direction.

To start recording, click **Start Recording**. The legend on this button changes to **Stop Recording**. Clicking **Stop Recording** stops recording and changes the legend back to **Start Recording**. **Clear** clears the measurement display. **Export** creates an Excel file that you can save for future reference.

— NOTE —
The trend data is temporarily stored in the DTM, not in the device.

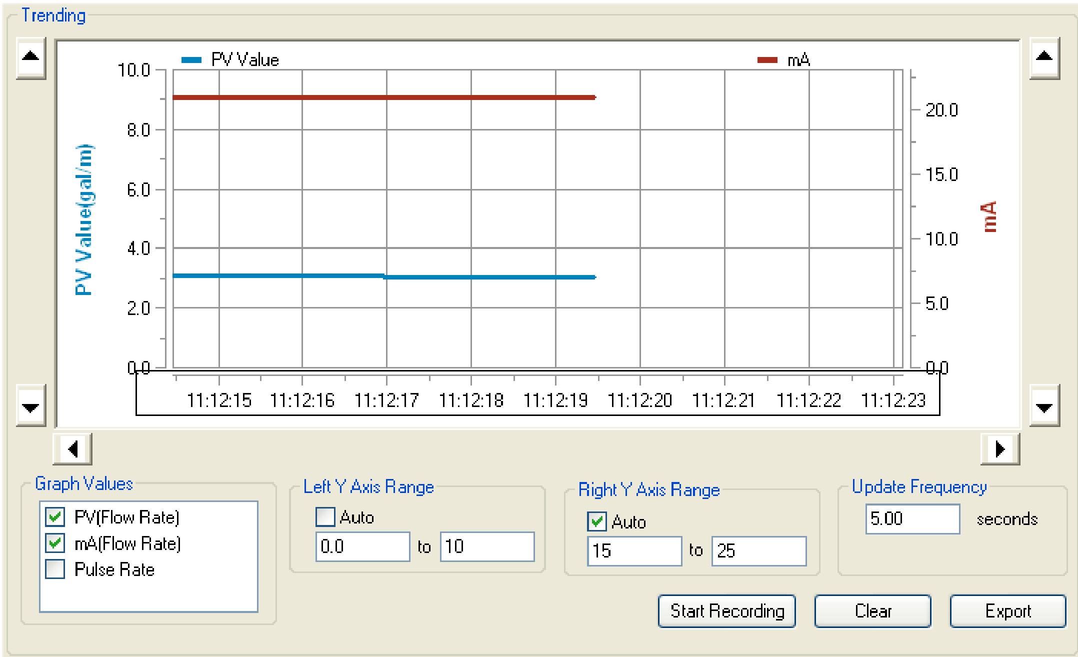


Figure 5. Sample Trending Screen

2. 84 Series Vortex Flowmeters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with 84 Series Vortex Flowmeters with HART communication protocol. Additional information about these transmitters and HART communication is contained in the following documents.

- MI 019-202 84F-T, 84F-U, 84W-T, and 84W-U Installation, Configuration, Troubleshooting and Maintenance
- MI 019-205 84S-T and 84S-U Installation, Configuration, Troubleshooting and Maintenance
- MI 019-211 84F-L, 84F-M, 84W-L, and 84W-M Installation, Configuration, Troubleshooting and Maintenance
- MI 019-214 84S-L and 84S-M Installation, Configuration, Troubleshooting and Maintenance

Device Overview Screen

The Device Overview screen displays HART information, Device Information, current PV, and Totals data.

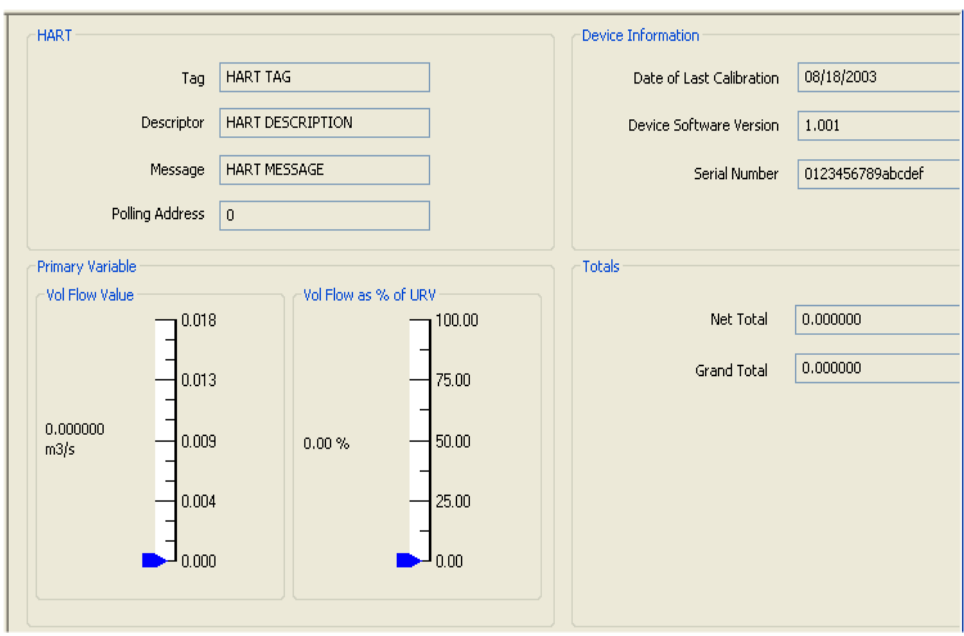


Figure 6. Sample 84 Series Vortex Flowmeter Device Overview Screen

Process Variables Screen

The Process Variables screen provides the PV and totals data that was displayed on the Device Overview screen plus additional measurement and device information.

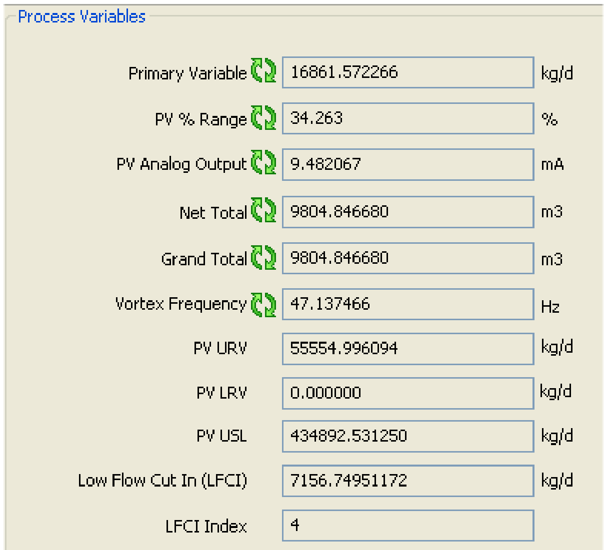


Figure 7. Sample 84 Series Vortex Flowmeter Process Variables Screen

Device Status Screen

The Device Status screen shows the current status of the device. In the **Measurement Status** section of the screen, the status of various parameters is recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red X (error). The current value of these parameters is also displayed.

In the **Detail Status** section of the screen, the Device Error Status and Device Warning Status is shown. The Error Reason may be given as a code. An explanation of the codes is given in Table 1.

— NOTE

Error Reason indicates the last error reason code. It is possible that the condition has since been cleared.

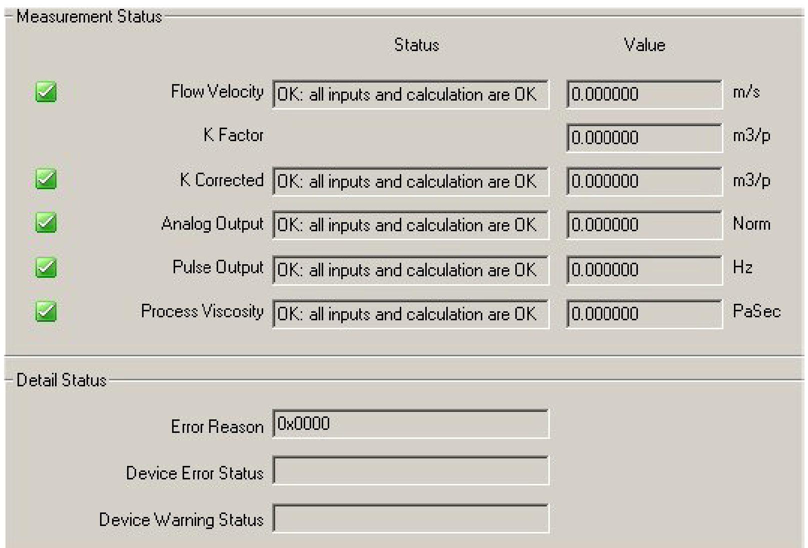


Figure 8. Sample 84 Series Vortex Flowmeter Device Status Screen

Table 1. Diagnostic Error Codes

Hex Reason Code	Error Message
0000	No Error
0200	Math Error
0400	Stack Underflow
0500	Stack Overflow
0600	MSTAT Mismatch
0700	MCU Register Error
0800	Bad Vector
0900	RAM Test Failure
0A00	ROM CRC Error
0Bxx where xx is 00 to FF	Bad Parameter at 01xx 0Bxx
0C00	EEPROM Initialization Needed
0CFF	SI EEPROM Blank

Table 1. Diagnostic Error Codes

Hex Reason Code (Continued)	Error Message (Continued)
0Cxx where xx is 01 to FE	Bad Parameter at 00xx 0Cxx
0D06	Bad EE Sensor User
0D08	Bad EE MAU Factory
0Dxx where xx is 00 to FF but not 06 or 08	Bad EE at 0Dxx
0Exx	EE Configuration With Error
0F00	S4 > URL
1000	Sensor No Input
1100	S1 > URL
1200	S3 > URL
1300	S3 < LRL
1400	SPI State Error
1500	SPI Read Block
1600	S5 < LRL
1700	S2 > URL
1800	S2 < LRL
1900	S2 = 0
1A00	S1 < LRL
1B00	State Machine Error
1C00	MCU EE Write Error
1Dxx where xx is not one of the values below	Sensor Initialization Error
1D10	A/D Calibration SPI Failure
1D20	Sensor Start SPI Bad
1D30	Sensor Start SPI Bad
1D40	Sensor Start SPI Bad
1D50	Display Interrupts SPI Bad
1D60	Loss of A/D Interrupts
1D70	One A/D Interrupts Loss
1D80	Data Process Hung
1D90	A/D Not Done With Calibration
1DA0	S1 Current Low
1DB0	S1 Current High
1E00	Sensor Error
1F00	Unintended Reset
2000	Unknown Display
21xx where xx is 00 to FF	MIT Mismatch 21xx = DIR

Table 1. Diagnostic Error Codes

Hex Reason Code (Continued)	Error Message (Continued)
22xx where xx is 00 to FF	Hot Connect Detected 22xx = Image
23xx where xx is 00 to FF	RAM Database Bad CRC
24xx where xx is 00 to FF	MCU EE Write Error
25xx where xx is 00 to FF	Bad DIR Detected
26xx where xx is 00 to FF	Invalid Communications Register
27xx where xx is 00 to FF	Communications Invalid Reason Code
28xx where xx is 00 to FF	Display Hot Connect Detected
2Axx where xx is 00 to FF	Offline/Load Command Received
2Fxx where xx is 00 to FF	Re-initialization Command Received
30xx where xx is 00 to FF	Unexpected Interface Manager Return Code
31xx where xx is 00 to FF	Communications Invalid Task Request
32xx where xx is 00 to FF	Communications Invalid Interrupt Seen
33xx where xx is 00 to FF	Communications Invalid Receive State
34xx where xx is 00 to FF	Communications Invalid Transmit State
35xx where xx is 00 to FF	Communications Write Never Ended
3600	Display Timeout
3700	ASIC Error
38xx where xx is 00 to FF	Initialization Issue eReturn = xx

Calibration

You can perform the following calibration procedures on an 84 Series Vortex Flowmeter (except low power versions) using the PC50 Field Device Tool:

- DAC Trim
  This procedure is used to trim the 4 mA (zero) and 20 mA (span) output values of the flowmeter to match the output of a plant standard measurement device. A suitable reference, like a digital multimeter, is used to calibrate the 4 mA and 20 mA points respectively.
- Scaled DAC Trim
  This procedure is the same as the DAC Trim procedure described above except that the 4 and 20 mA points are scaled to whatever units are required by the readout or control devices. For example, if the readout device is a voltmeter, across a 250 Ω resistor, the 4 and 20 mA points would correspond to 1 and 5 volts respectively.

Setup

Each flowmeter is shipped from the factory with an operating configuration database. However, the flowmeter will not provide an accurate measurement if the configuration does not fit your application. **Be sure to check the configuration of the flowmeter prior to start-up.**

If the user information is not supplied with the purchase order, the flowmeter is shipped with the following defaults:

Table 2. Default Database When User Information Not Supplied

Item	Metric	English
Fluid Type	**Liquid** (water)	**Liquid** (water)
Type of Flow	Volume	Volume
Measurement Units	m^3/s	gal/min
Flowing Temperature	20°C	68°F
Flowing Density	998.21 kg/m^3	62.316 lb/ft^3
Absolute Viscosity	1.002 cP	1.002 cP
Upper Range Value	Upper Range Limit for Flowmeter Size	Upper Range Limit for Flowmeter Size

These defaults are **not** recommended for general operation. If no other process information is available, entering **Liquid**, **Gas**, or **Steam** as the Fluid in the General Setup screen establishes default data bases as shown in Tables 3, 4, or 5 respectively.

Table 3. Default Database for Liquid

Parameter	Metric	English
Fluid Type	**Liquid** (water)	**Liquid** (water)
Type of Flow	Same as present configuration	
Measurement Units	Same as present configuration	
Flowing Temperature	20°C	68°F
Flowing Density	998.21 kg/m^3	62.316 lb/ft^3
Absolute Viscosity	1.002 cP	1.002 cP
Upper Range Value	Upper Range Limit for Flowmeter Size	Upper Range Limit for Flowmeter Size

Table 4. Default Database for Gas

Parameter	Metric	English
Fluid Type	**Gas** (air)	**Gas** (air)
Type of Flow	Same as present configuration	
Measurement Units	Same as present configuration*	
Flowing Temperature	20°C	68°F

Table 4. Default Database for Gas (Continued)

Parameter	Metric	English
Flowing Density	9.546 kg/m^3	0.596 lb/ft^3
Absolute Viscosity	0.0185 cP	0.0185 cP
Upper Range Value	Upper Range Limit for Flowmeter Size	Upper Range Limit for Flowmeter Size

*Liquid units of gallons, liters, imperial gallons, or barrels per unit time are not transferable to gas.

Table 5. Default Database for Steam

Parameter	Metric	English
Fluid Type	Steam	Steam
Type of Flow	Same as present configuration	
Measurement Units	Same as present configuration*	
Flowing Temperature	178.3°C	352.9°F
Flowing Density	4.966 kg/m^3	0.310 lb/ft^3
Absolute Viscosity	0.015 cP	0.015 cP
Upper Range Value	Upper Range Limit for Flowmeter Size	Upper Range Limit for Flowmeter Size

*Liquid units of gallons, liters, imperial gallons, or barrels per unit time are not transferable to steam.

Setup is accomplished using your PC50 Field Device Tool via several screens. These screens are described below.

General Setup Screen

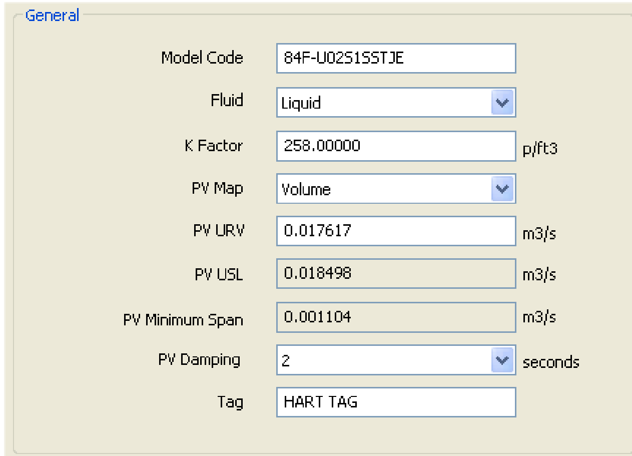


Figure 9. Sample 84 Series Vortex Flowmeter General Setup Screen

Field	Entry
Model Code	Enter the Model Code found on the flowmeter data plate.
Fluid	Select Liquid, Gas, or Steam.
K Factor	Enter the K Factor found on the flowmeter data plate.
PV Map	Select Volume, Base Volume, Mass, or Velocity.
PV URV	Enter the Upper Range Value (must be ≤ the PV USL shown).
PV USL	Shows the Upper Sensor Limit of the device.
PV Minimum Span	Shows the Minimum Span of the device.
PV Damping	Select the damping time between 0 and 32 seconds.
Tag	Enter maximum of 8 characters. Optional, used for reference only.

Measurement Units Screen

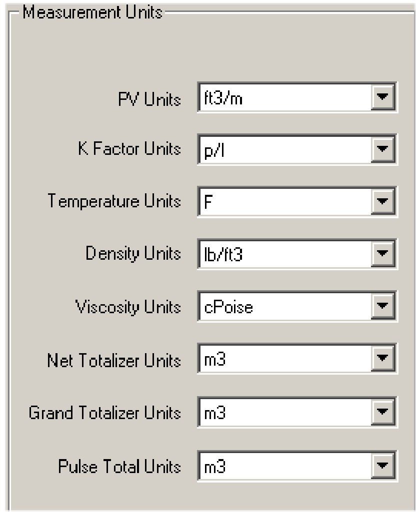


Figure 10. Sample 84 Series Vortex Flowmeter Measurement Units Screen

Field	Entry
PV Units	Select the PV Units from the list presented.
K Factor Units	Select p/l or p/ft^3.
Temperature Units	Select C (Celcius), K (Kelvin), F (Fahrenheit), or R (Rankine).
Density Units	Select lb/ft^3, lb/yd^3, LT/yd^3, ST/yd^3, lb/gal, kg/l, Custom.
Viscosity Units	Select cPoise or PaSec.
Net Totalizer Units	Select the Net Totalizer Unit from the list presented.
Grand Totalizer Units	Select the Grand Totalizer Unit from the list presented.
Pulse Total Units	Select the Pulse Totalizer Unit from the list presented.

Totalizers Screen

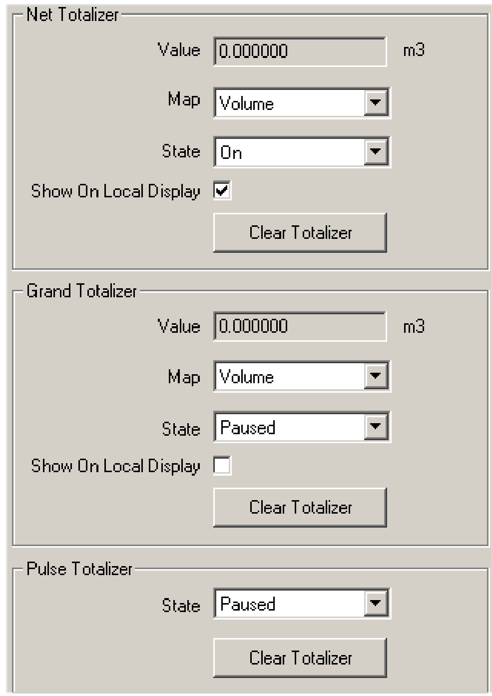


Figure 11. Sample 84 Series Vortex Flowmeter Totalizers Screen

Field	Entry
Net Totalizer	
Value	Shows the net totalizer value.
Map	Select Volume, Base Volume, or Mass.
State	Select On or Paused.
Show on Local Display	Check to show the value on the local display.
Grand Totalizer	
Value	Shows the grand totalizer value.
Map	Select Volume, Base Volume, or Mass.
State	Select On or Paused.
Show on Local Display	Check to show the value on the local display.
Pulse Totalizer	
State	Select On or Paused.

Each of the totalizers can be cleared by pressing the applicable **Clear Totalizer** button.

Process Parameters Screen

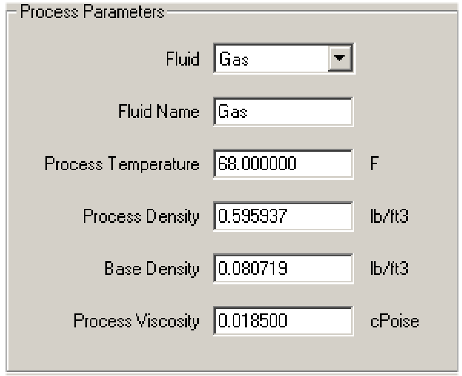


Figure 12. Sample 84 Series Vortex Flowmeter Process Parameters Screen

Field	Entry
Fluid	Select Liquid, Gas, or Steam.
Fluid Name	Enter the Fluid Name.
Process Temperature	Enter the Process Temperature in the units shown.
Process Density	Enter the Process Density in the units shown.
Base Density	Enter the Base Density in the units shown.
Process Viscosity	Enter the Process Viscosity in the units shown.

Piping Configuration Screen

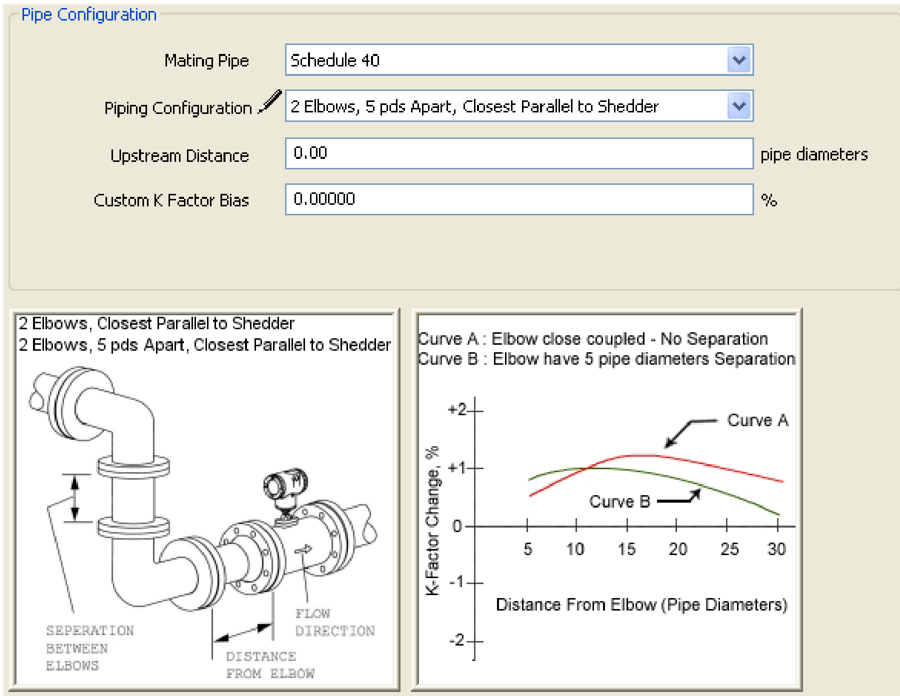


Figure 13. Sample 84 Series Vortex Flowmeter Piping Configuration Screen

Field	Entry
Mating Pipe	Select the Mating Pipe bore from the list presented.
Piping Configuration	Select the Piping Configuration from the list presented. An illustration of each configuration is shown as you highlight it.
Upstream Distance	The Upstream Distance to the first upstream disturbance in pipe diameters.
Custom K Factor Bias	Enter the Custom K Factor (with sign in percent).

Flowtube Screen

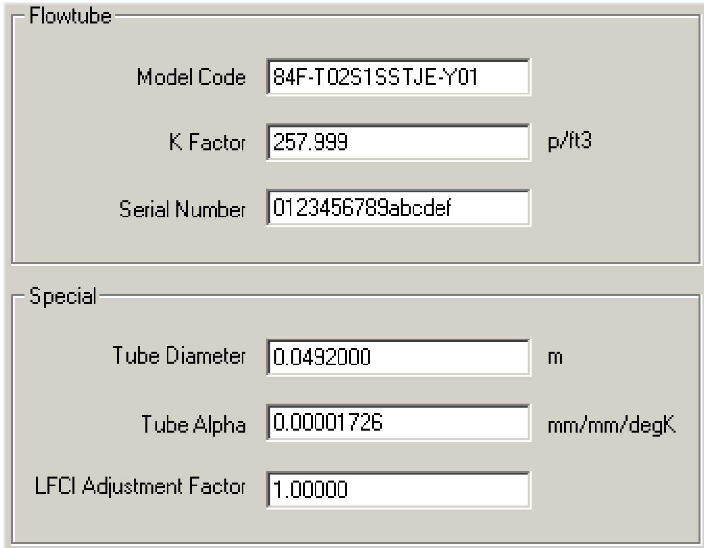


Figure 14. Sample 84 Series Vortex Flowmeter Flowtube Screen

Field	Entry
Flowtube	
Model Code	Enter the Model Number of the flowmeter.
K Factor	Enter the K Factor in the units shown.
Serial Number	Enter the Serial Number of the flowmeter.
Special (for customized flowtubes only)	
Tube Diameter	Enter the custom flowtube diameter in meters.
Tube Alpha	Enter the thermal coefficient of expansion (alpha) in mm/mm/°K.
LFCI Adjustment Factor	Enter the low flow cut-in user factor.

Tuning Screen

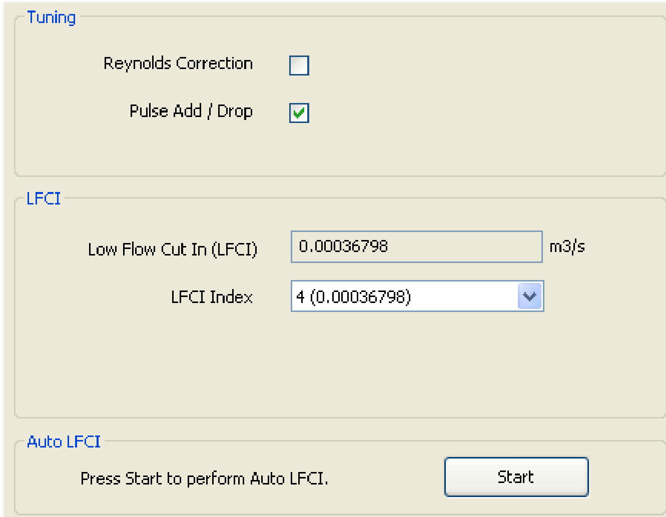


Figure 15. Sample 84 Series Vortex Flowmeter Tuning Screen

Field	Entry
Tuning	
Reynolds Correction	Check to turn Reynolds Correction feature on.
Pulse Add/Drop	Check to turn Pulse Add/Drop feature on.
LFCI (Low Flow Cut-In)	
LFCI	Shows the LFCI value.
LFCI Index	Shows the LFCI Index number.
Auto LFCI	
Start	Press Start button to perform Auto LFCI. **— NOTE —** This must be done while there is no flow in the meter.

Digital Output Screen

In Primary Variable Map, select the PV to be mapped to Volume, Base Volume, Mass or Velocity.

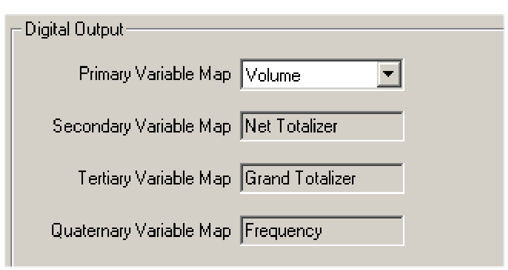


Figure 16. Sample 84 Series Vortex Flowmeter Digital Output Screen

Analog Output Screen

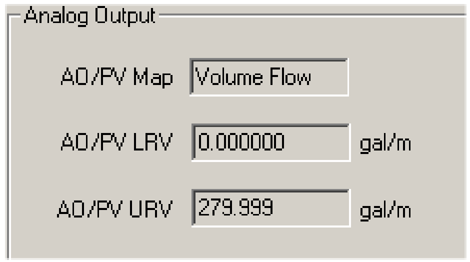


Figure 17. Sample 84 Series Vortex Flowmeter Analog Output Screen

Field	Entry
AO/PV Map	Shows whether the PV is mapped to Volume Flow, Mass Flow, BVolume Flow, or Velocity.
AO/PV LRV	Shows the AO/PV LRV (Analog Output / Primary Variable Low Range Value).
AO/PV URV	Shows the AO/PV URV (Analog Output / Primary Variable Upper Range Value).

Pulse Output Screen

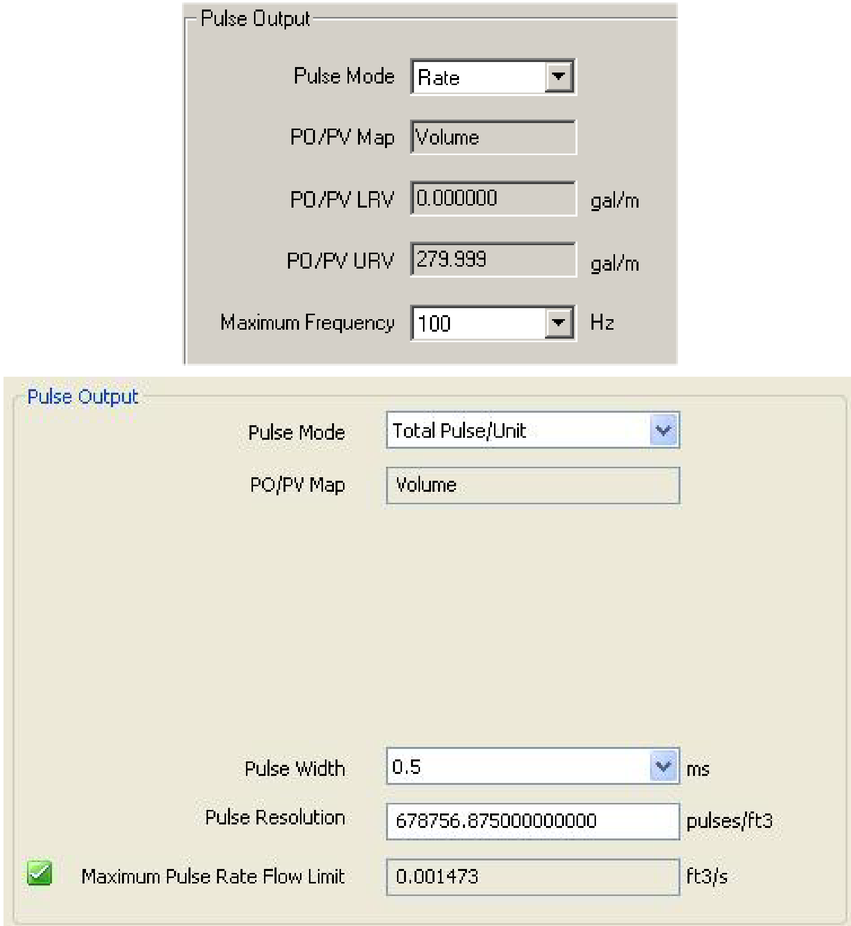


Figure 18. Sample 84 Series Vortex Flowmeter Pulse Output Screens

Field	Entry
Pulse Mode	Select the pulse mode as Off, Raw, Rate, or Total.
PO/PV Map	Shows whether the PV is mapped to Volume Flow, Mass Flow, BVolume Flow, or Velocity.
PO/PV LRV[a]	Shows the PO/PV LRV.
PO/PV URV[a]	Shows the PO/PV URV.
Maximum Frequency[a]	Select the upper frequency end point corresponding to the highest frequency generated as 10, 100, or 1000 Hz.
Pulse Width[b]	Select the pulse width as 0.5, 5, or 50 ms.
Pulse Resolution[b]	Check units per pulse or pulses per unit. Enter the value.
Maximum Flow Rate[b][c]	Shows the maximum flow rate.

(a) Only when Pulse Mode = Rate

(b) Only when Pulse Mode = Total

Output Alarm Screen

In this parameter, select **Fail Low** or **Fail High** for output to go fully downscale or fully upscale in the event of a failure.

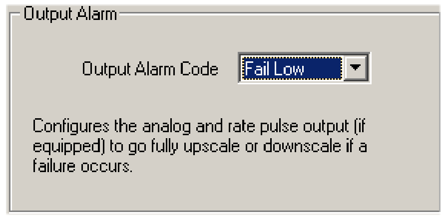


Figure 19. Sample 84 Series Vortex Flowmeter Output Alarm Screen

HART Screen

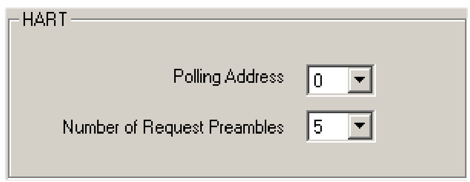


Figure 20. Sample 84 Series Vortex Flowmeter HART Screen

Field	Entry
Polling Address	Select an address between 0 and 15. A nonzero number applies to multidrop applications.
Number of Request Preambles	Select the number of preambles, between 3 and 20, to be sent in a response message from the flowmeter to the host.

Local Display Screen

This configuration affects the display local to the transmitter.

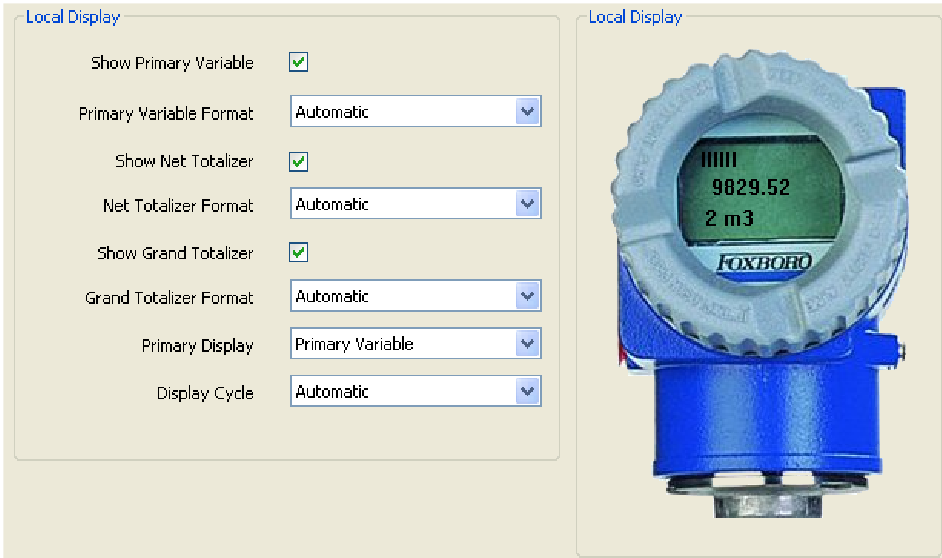


Figure 21. Sample 84 Series Vortex Flowmeter Local Display Screen

Field	Entry
Show Primary Variable	Check to show the Primary Variable Measurement on the local display.
Primary Variable Format	Select the decimal point placement of the Primary Variable measurement.
Show Net Totalizer	Check to show the net Totalizer Measurement on the local display.
Net Totalizer Format	Select the decimal point placement of the Net Totalizer measurement.
Show Grand Totalizer	Check to show the Grand Totalizer Measurement on the local display.
Grand Totalizer Format	Select the decimal point placement of the Grand Totalizer measurement.
Primary Display	Select the first measurement to be displayed.
Display Cycle	Select whether the measurements to be displayed are scanned Automatically or Manually.

Device Information Screen

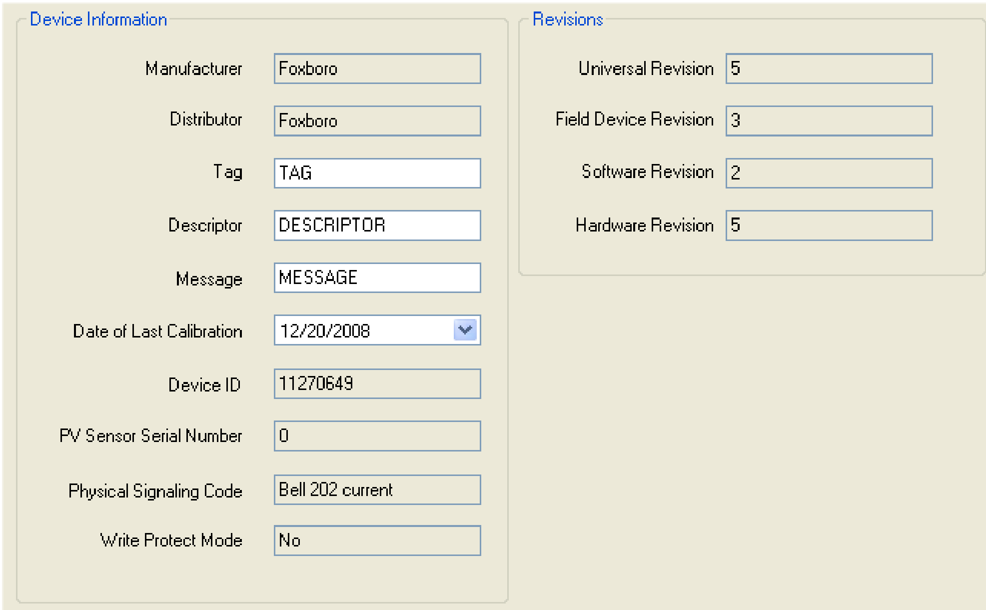


Figure 22. Sample 84 Series Vortex Flowmeter Device Information Screen

Field	Entry
Device Information	
Manufacturer	Shows the manufacturer as Foxboro.
Tag	Enter the Tag (8 characters maximum).
Descriptor	Enter the Descriptor (16 characters maximum).
Message	Enter the Message (32 characters maximum).
Date	Enter the date of the last calibration (mm/dd/yyyy).
Revisions	
Universal Revision	Shows the Universal command set revision level.
Field Device Revision	Shows the software version of the flowmeter.
Software Revision	Shows the software revision level.
Software Subrevision	Shows the software subrevision level.
Hardware Revision	Shows the flowmeter hardware revision level.

Troubleshooting

Self Test

In the Troubleshooting parameter, press the **Start Self Test** button to perform a flowmeter self test.

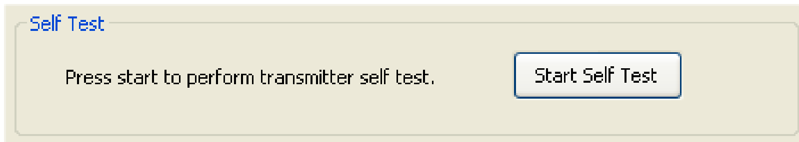


Figure 23. Sample 84 Series Vortex Flowmeter Self Test Screen

Loop Test

The loop test is a procedure to use the transmitter as a calibration source to check other instruments in the loop. There are separate screens to override the digital and pulse outputs.

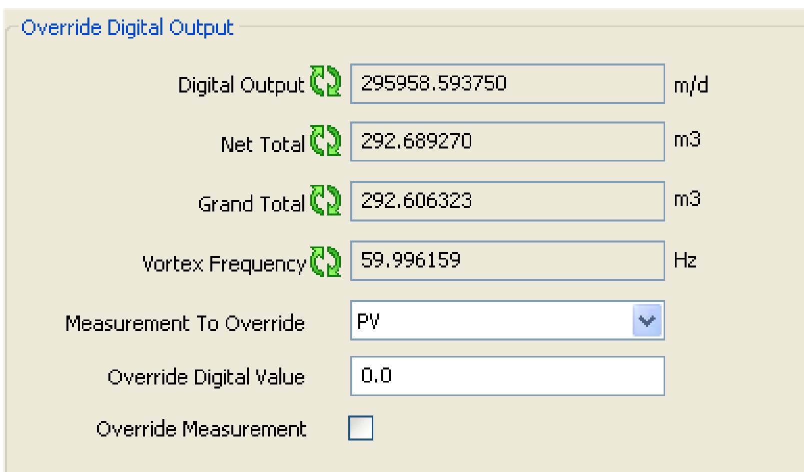


Figure 24. Sample 84 Series Vortex Flowmeter Override Digital Output Screen

Field	Entry
Digital Output	Shows the digital output.
Net Total	Shows the net total.
Grand Total	Shows the grand total.
Network Frequency	Shows the network frequency.
Measurement to Override	Select the measurement to override (PV, Net Total, Grand Total, Network Frequency).
Override Digital Value	Enter the value with which you wish to override the output.
Override Measurement	Select or clear this check box to activate/end the override of the measurement.

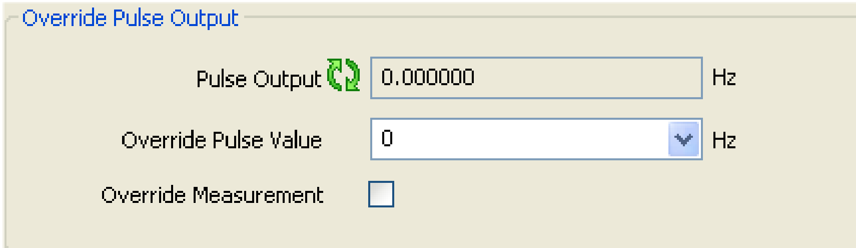


Figure 25. Sample 84 Series Vortex Flowmeter Override Pulse Output Screen

Field	Entry
Pulse Output	Shows the digital output.
Override Pulse Value	Enter the value with which you wish to override the output.
Override Measurement	Select or clear this check box to activate/end the override of the measurement.

Units Description

Under the Reference heading, the Units Description parameter gives a list of the unit abbreviations and their explanation.

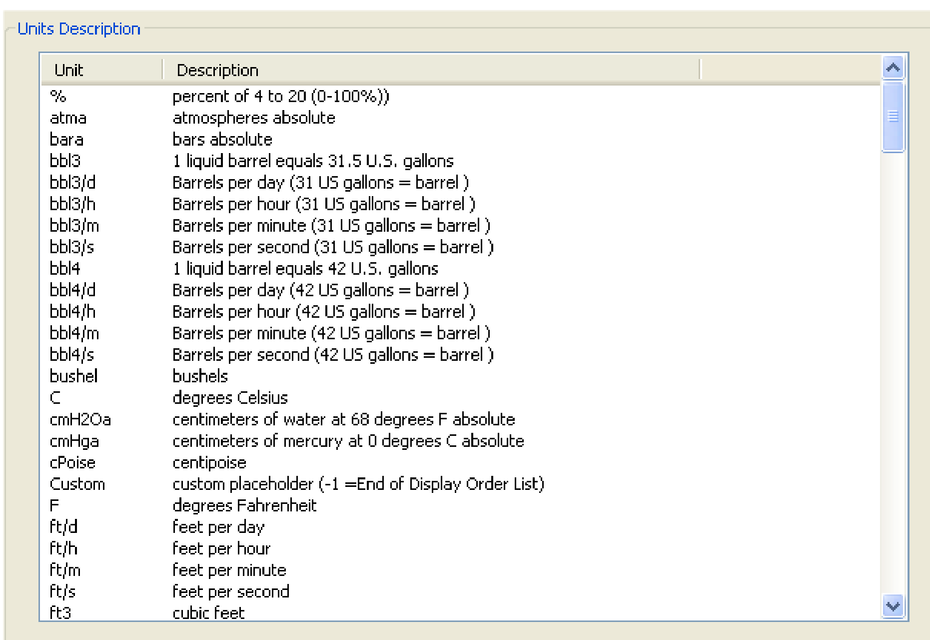


Figure 26. Sample 84 Series Vortex Flowmeter Units Description Screen

Model Code Description

Under the Reference heading, the Model Code Description parameter gives an explanation of the product model code.

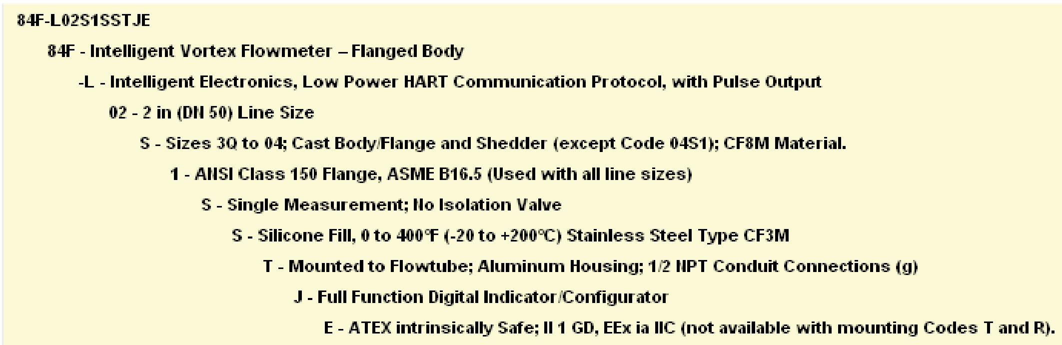


Figure 27. Sample 84 Series Vortex Flowmeter Model Code Description Screen

Store to Device

! CAUTION

Before storing your changes, decide whether you want to store any changes you may have made to the Model Code, K Factor, and Tube Serial Number. Changes in these parameters can change important factory set parameters or other highly device dependent parameters.

1. Select one or more of the parameters listed if you wish to change them.
2. Click **OK** to store **all** parameters except any of the unselected ones to the device.

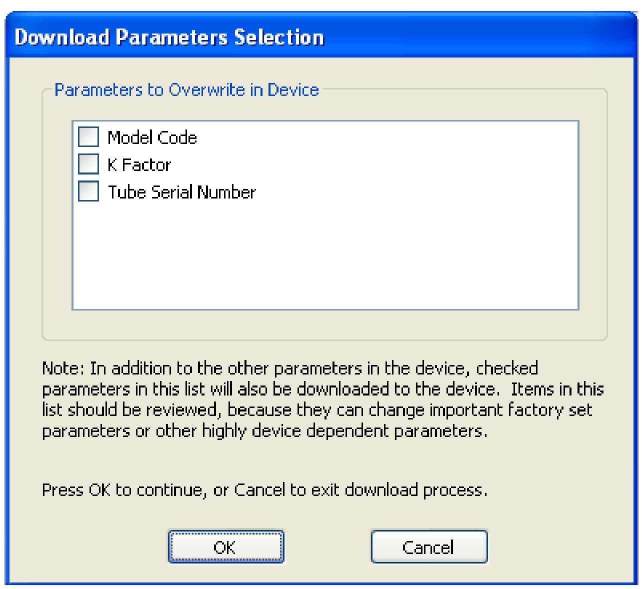


Figure 28. Sample 84 Series Vortex Flowmeter Store to Device Screen

3. CFT51 Transmitter

This chapter provides information that is exclusive to using CFT51 Transmitter with HART communication protocol. Additional information about these transmitters with HART communication is contained in the following document.

- MI 019-140   I/A Series Digital Coriolis Mass Flow Transmitter With HART and MODBUS Communication Protocols Model CFT51 - Installation, Startup, Configuration, and Maintenance

Device Overview Screen

The Device Overview screen displays HART information, Device Information, Measurements (PV, SV, TV, and QV), and Totals and Analog Output.

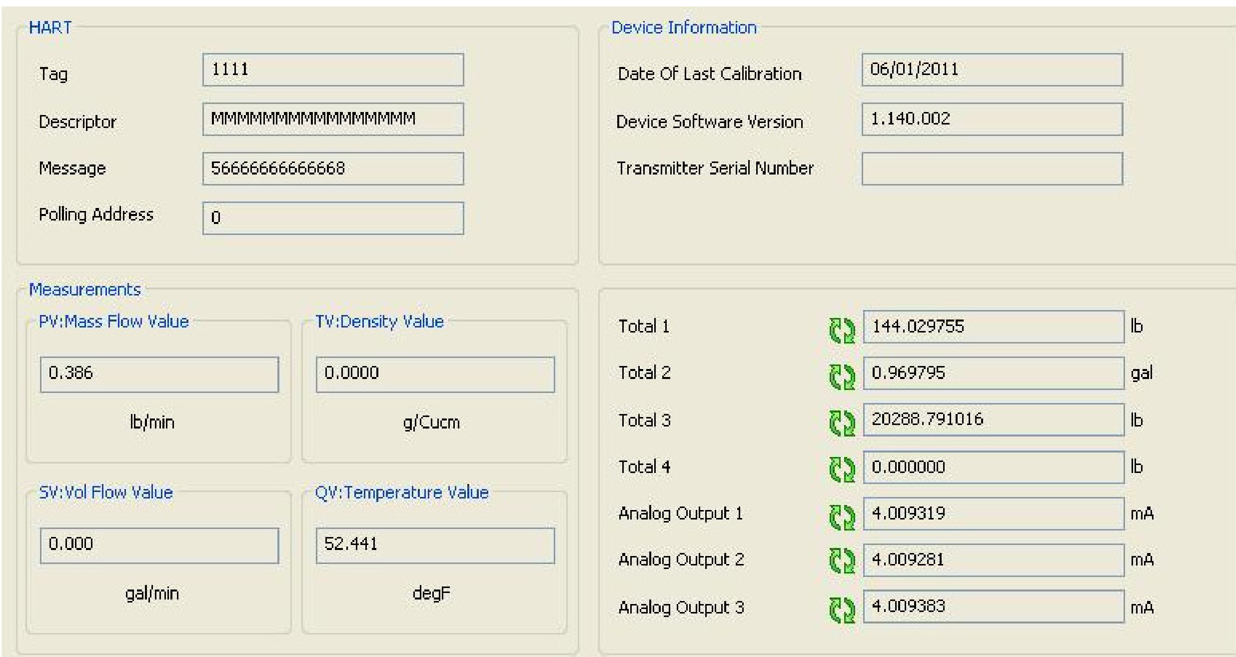


Figure 29. Sample CFT51 Transmitter Device Overview Screen

Process Variables Screen

The Process Variables 1 screen displays the Process Variable and totalizer instantaneous values. It continuously refreshes the values to match with local display.

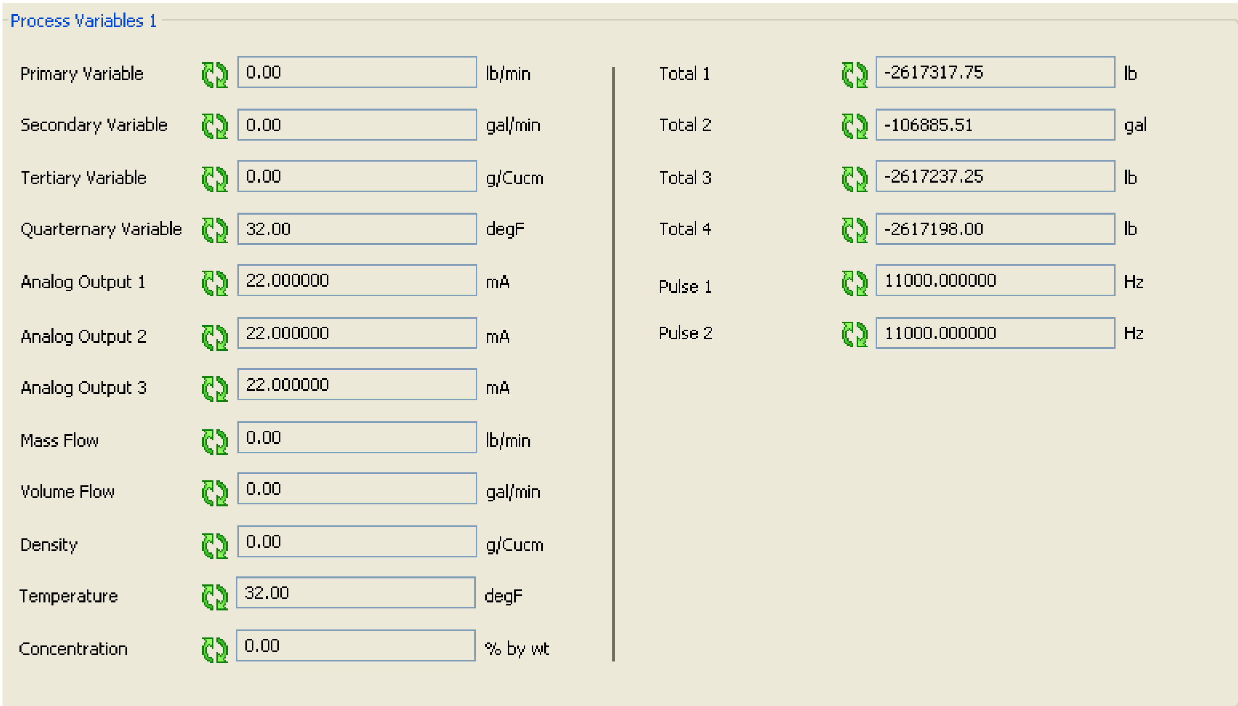


Figure 30. Sample CFT51 Transmitter Process Variables Screen

Process Variables 2 screen displays the mass flow and volume flow values.

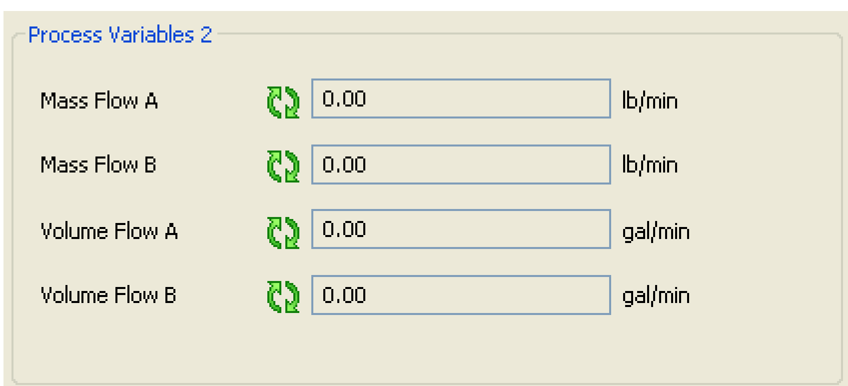


Figure 31. Sample CFT51 Transmitter Process Variables Screen (Mass Flow)

Device Configuration

General Setup Screen

The General screen shows the Access and Information about the Flow, Density constants and Flow tube Information.

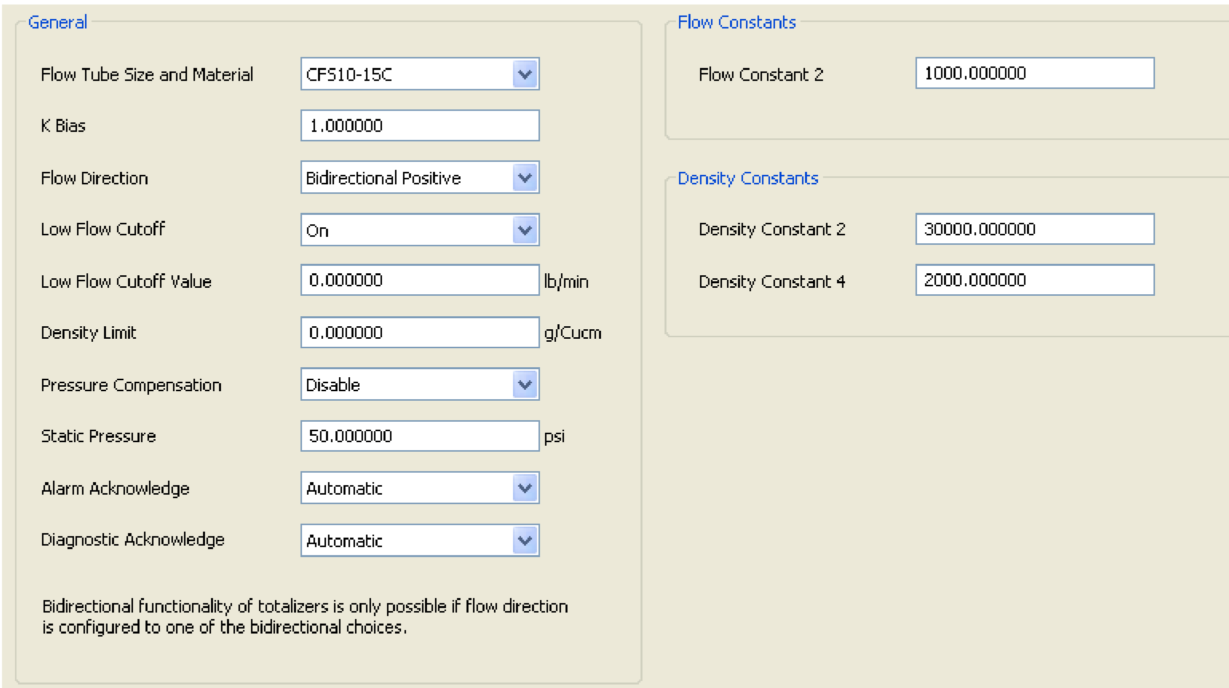


Figure 32. Sample CFT51 Transmitter General Setup Screen

Field	Entry
General	
Flow Tube Size and Material	Select the Flow Tube Size and Material from the drop-down menu. Choose from CFS10-02S, CFS10-02H, CFS10-03S, CFS10-03H, CFS10-03C, CFS10-05S, CFS10-05H, CFS10-05C, CFS10-08S, CFS10-08C, CFS10-10S, CFS10-10H, CFS10-10C, CFS10-15S, CFS10-15C, CFS10-20S, CFS10-20C, CFS20-15H, CFS20-30S, and CFS20-30C.
K Bias	Enter the K Bias.
Flow Direction	Select the Flow Direction from the drop-down menu. Choose from Bidirectional Positive, Bidirectional Negative, Unidirectional Positive, and Unidirectional Negative.
Low Flow Cutoff	Select the Low Flow Cutoff from the drop-down menu.
Low Flow Cutoff Value	If you select the Low Flow Cutoff as On, enter the Low Flow Cutoff Value.
Density Limit	Enter the Density Limit.

Field	Entry
Pressure Compensation	Select the Pressure Compensation from the drop-down menu. Choose from Disable, Enable External Pressure, and Unable Internal Pressure.
Static Pressure	Enter the Static Pressure.
Alarm Acknowledge	Select the Alarm Acknowledge from the drop-down menu. Choose from Automatic or Manual.
Diagnostic Acknowledge	Select the Diagnostic Acknowledge from the drop-down menu. Choose from Automatic or Manual.
Flow Constants	
Flow Constants 2	Enter the Flow Constant.
Density Constants	
Density Constant 2	Enter the Density Constant.
Density Constant 4	Enter the Density Constant.

Measurement Units

The Measurement Units screen is where you configure the units for each process parameter in the device. You can configure units for flow, density temperature, concentration and totalizers.

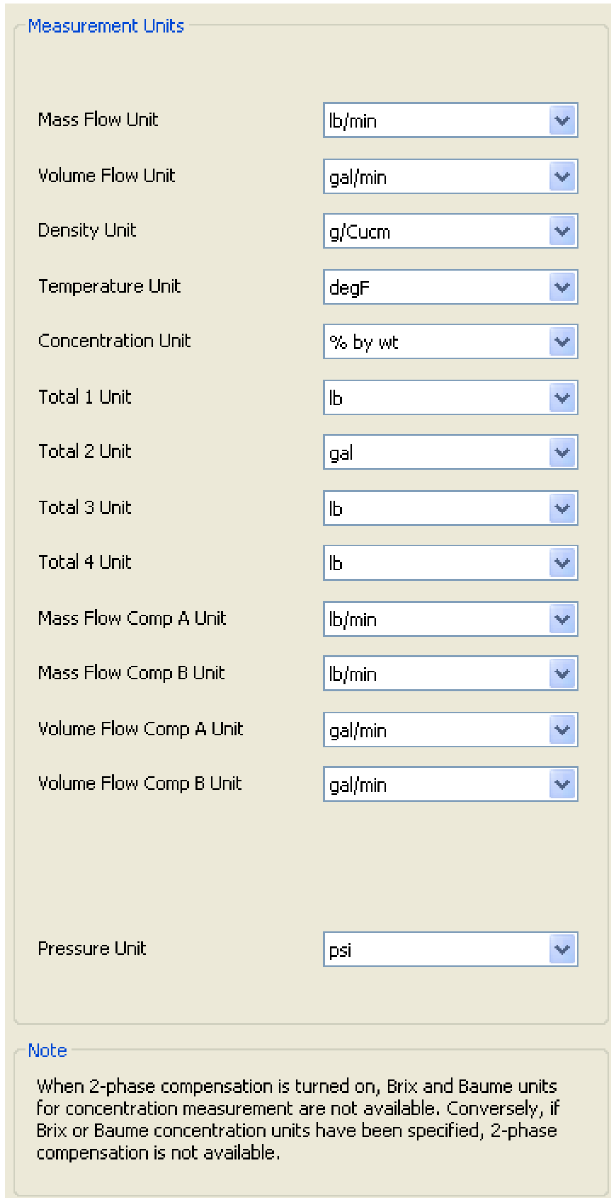


Figure 33. Sample CFT51 Transmitter - Measurement Units

Field	Entry
Mass Flow Unit	Select the Mass Flow Unit from the drop-down menu. Choose from g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, lb/s, lb/min, lb/h, lb/d, oz/s, oz/min, oz/h, oz/d, STon/s, STon/min, STon/h, STon/d, MetTon/min, MetTon/h, MetTon/d, and Custom. If you select Custom, enter the Label, Offset, and Slope.
Volume Flow Unit	Select the Volume Flow Unit from the drop-down menu. Choose from L/s, L/min, L/h, L/d, gal/s, gal/min, gal/h, gal/d, Impgal/s, Impgal/min, Impgal/h, Impgal/d, Cum/s, Cum/min, Cum/h, Cum/d, Cuft/s, Cuft/min, Cuft/h, Cuft/d, bbl/s, bbl/min, bbl/h, bbl/d, and Custom. If you select Custom, enter the Label, Offset, and Slope.
Density Unit	Select the Density Unit from the drop-down menu. Choose from SGU, kg/Cum, kg/L, lb/gal, lb/Cuft, lb/Cuin, g/mL, g/Cucm, g/l, STon/Cuyd, and Custom. If you select Custom, enter the Label, Offset, and Slope.
Temperature Unit	Select the Temperature Unit from the drop-down menu. Choose from degF and degC.
Concentration Unit	Select the Concentration Unit from the drop-down menu. Choose from % by wt, degBrix, degBaum hv, and % by vol.
Total 1 Unit	Select the Total 1 Unit from the drop-down menu. Choose from g, kg, MetTon, lb, STon, ounce, and Custom. If you select Custom, enter the Label, Offset, and Slope.
Total 2 Unit	Select the Total 2 Unit from the drop-down menu. Choose from gal, L, Impgal, bbl, and Custom. If you select Custom, enter the Label, Offset, and Slope.
Total 3 Unit	Select the Total 3 Unit from the drop-down menu. Choose from g, kg, MetTon, lb, STon, ounce, and Custom. If you select Custom, enter the Label, Offset, and Slope.
Total 4 Unit	Select the Total 4 Unit from the drop-down menu. Choose from g, kg, MetTon, lb, STon, ounce, and Custom. If you select Custom, enter the Label, Offset, and Slope.
Mass Flow Comp A Unit	Select the Mass Flow Comp A Unit from the drop-down menu. Choose from g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, lb/s, lb/min, lb/h, lb/d, oz/s, oz/min, oz/h, oz/d, STon/s, STon/min, STon/h, STon/d, MetTon/min, MetTon/h, MetTon/d, and Custom. If you select Custom, enter the Label, Offset, and Slope.
Mass Flow Comp B Unit	Select the Mass Flow Comp B Unit from the drop-down menu. Choose from g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, lb/s, lb/min, lb/h, lb/d, oz/s, oz/min, oz/h, oz/d, STon/s, STon/min, STon/h, STon/d, MetTon/min, MetTon/h, MetTon/d, and Custom. If you select Custom, enter the Label, Offset, and Slope.

Field	Entry
Volume Flow Comp A Unit	Select the Volume Flow Comp A from the drop-down menu. Choose from L/s, L/min, L/h, L/d, gal/s, gal/min, gal/h, gal/d, Impgal/s, Impgal/min, Impgal/h, Impgal/d, Cum/s, Cum/min, Cum/h, Cum/d, Cuft/s, Cuft/min, Cuft/h, Cuft/d, bbl/s, bbl/min, bbl/h, bbl/d, and Custom. If you select Custom, enter the Label, offset, and Slope.
Volume Flow Comp B Unit	Select the Volume Flow Comp B from the drop-down menu. Choose from L/s, L/min, L/h, L/d, gal/s, gal/min, gal/h, gal/d, Impgal/s, Impgal/min, Impgal/h, Impgal/d, Cum/s, Cum/min, Cum/h, Cum/d, Cuft/s, Cuft/min, Cuft/h, Cuft/d, bbl/s, bbl/min, bbl/h, bbl/d, and Custom. If you select Custom, enter the Label, offset, and Slope.
Pressure Unit	Select the Pressure Unit from the drop-down menu. Choose from psi, bar, and kPa.

If you select Total as Pulse Output Mode, the pulse total units are available as shown in Figure 34.

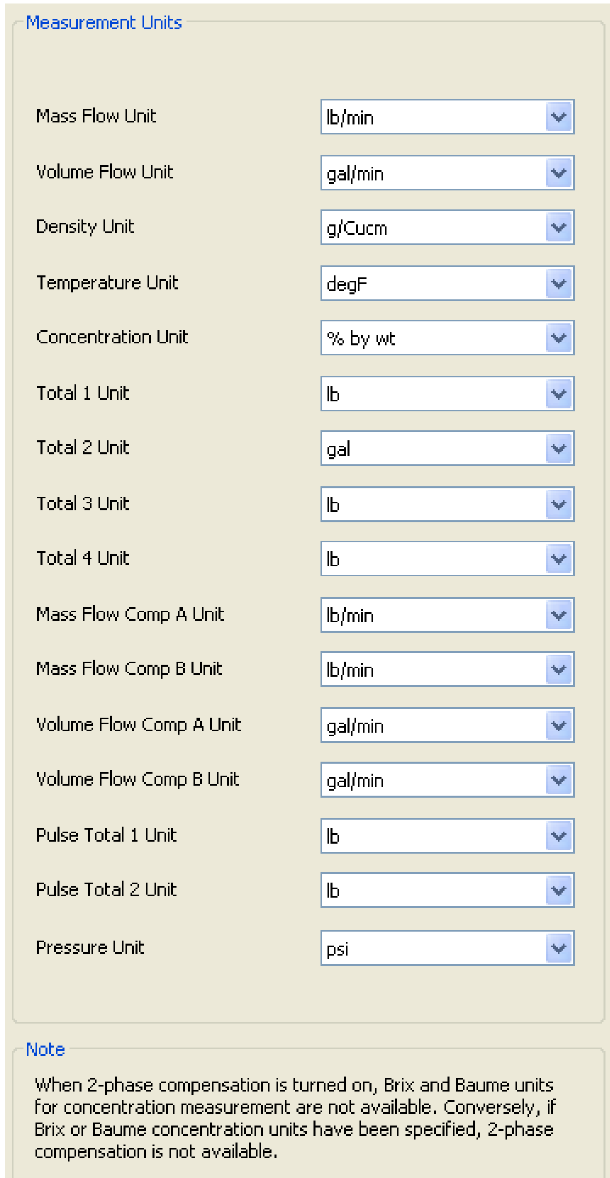


Figure 34. Sample CFT51 Transmitter Measurement Units (Pulse Total Units)

Totalizers

The Totalizers screen is where you configure the Totalizers Map, Direction, Protection, and State of Totals.

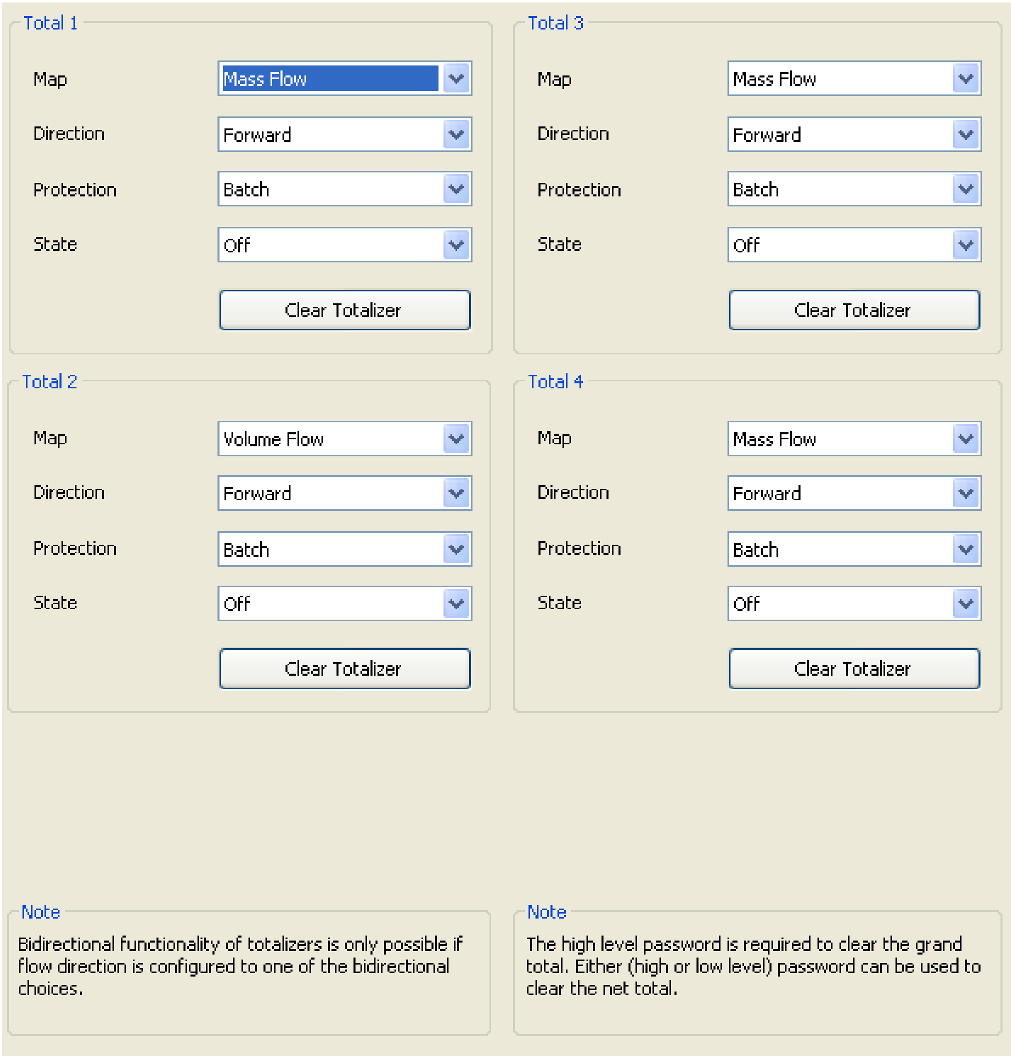


Figure 35. Sample CFT51 Transmitter Totalizers Screen

Field	Entry
Total 1	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Direction	Select the Direction from the drop-down menu. Choose from Forward, Reverse, and Bidirection.
Protection	Select the Protection from the drop-down menu. Choose from batch and Grand.
State	Select the State from the drop-down menu. Choose from Yes and No.

Field	Entry
Clear Totalizer	Click Clear Totalizer to clear the totalizer 1 value.
Total 2	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Direction	Select the Direction from the drop-down menu. Choose from Forward, Reverse, and Bidirection.
Protection	Select the Protection from the drop-down menu. Choose from batch and Grand.
State	Select the State from the drop-down menu. Choose from Yes and No.
Clear Totalizer	Click Clear Totalizer to clear the totalizer 2 value.
Total 3	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Direction	Select the Direction from the drop-down menu. Choose from Forward, Reverse, and Bidirection.
Protection	Select the Protection from the drop-down menu. Choose from batch and Grand.
State	Select the State from the drop-down menu. Choose from Yes and No.
Clear Totalizer	Click Clear Totalizer to clear the totalizer 3 value.
Total 4	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Direction	Select the Direction from the drop-down menu. Choose from Forward, Reverse, and Bidirection.
Protection	Select the Protection from the drop-down menu. Choose from batch and Grand.
State	Select the State from the drop-down menu. Choose from Yes and No.
Clear Totalizer	Click Clear Totalizer to clear the totalizer 4 value.

If you select Pulse Output Mode as Total, the pulse totalizer options are available for configuration as shown in Figure 36.

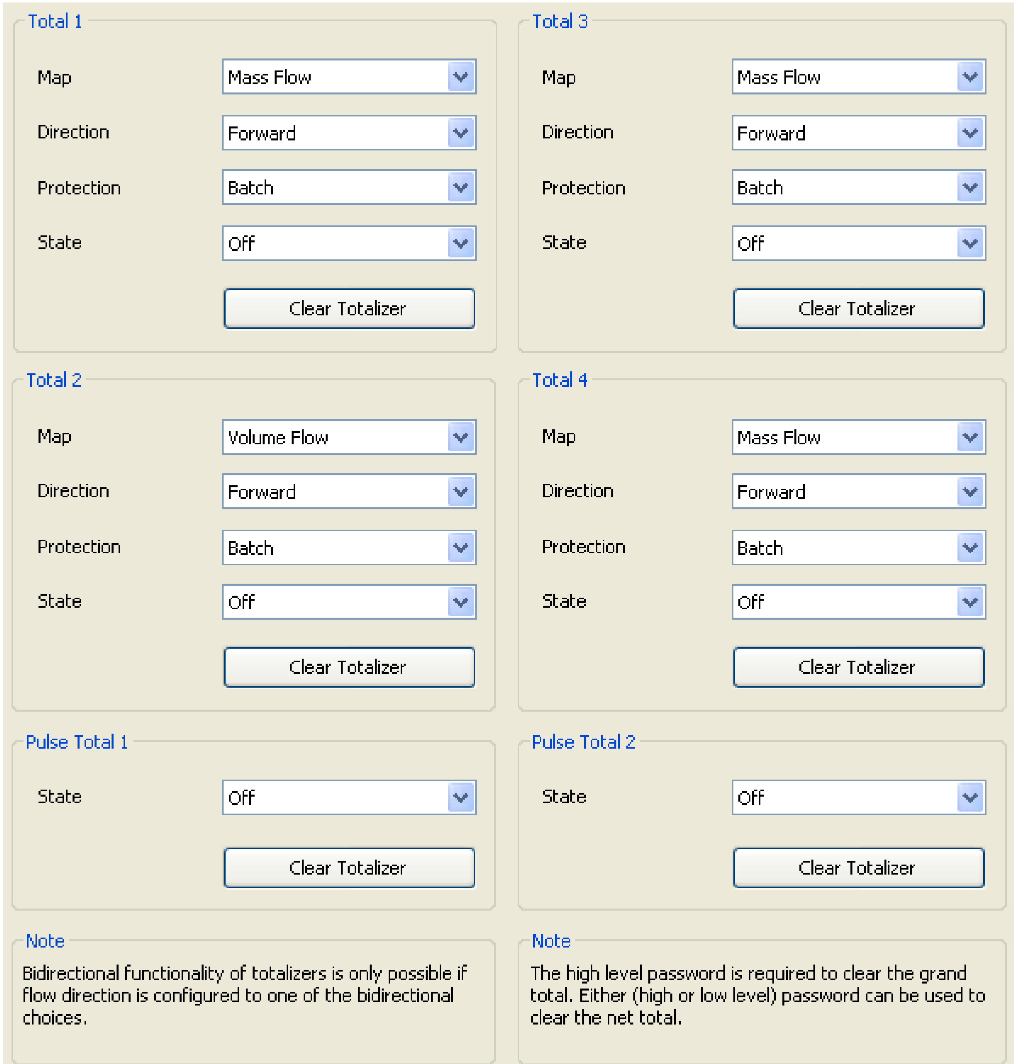


Figure 36. Sample CFT51 Transmitter Totalizers Screen (Pulse Output)

Display Configuration

The Display Configuration screen is where you configure the display pages and format of value display on local display.

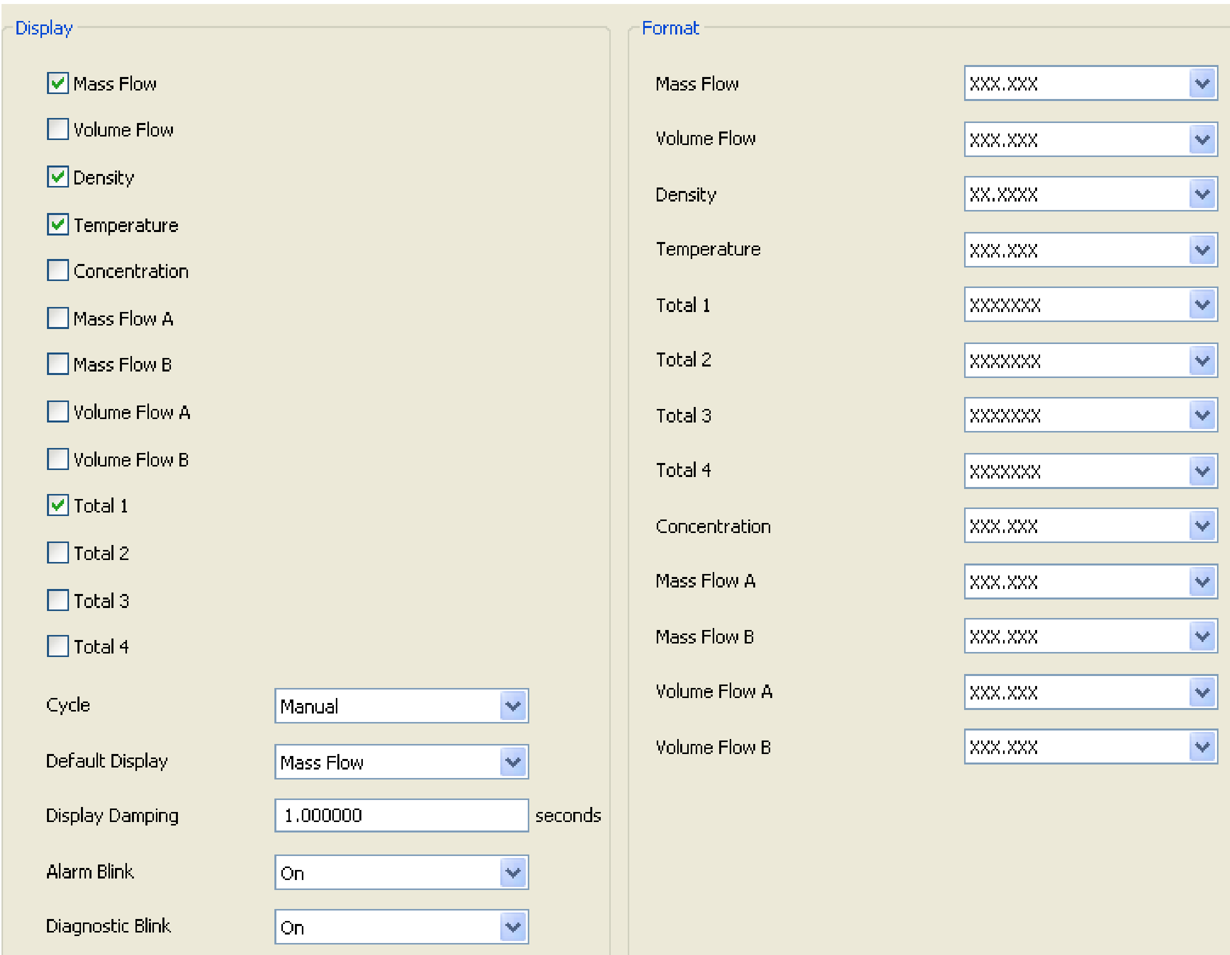


Figure 37. Sample CFT51 Transmitter Device Configuration Screen

Field	Entry
Display	
Mass Flow	Select Mass Flow to display the value on the front panel.
Volume Flow	Select Volume Flow to display the value on the front panel.
Density	Select the Density to display the value on the front panel.
Temperature	Select the Temperature to display the value on the front panel.
Concentration	Select the Concentration to display the value on the front panel.
Mass Flow A	Select Mass Flow A to display the value on the front panel.
Mass Flow B	Select Mass Flow B to display the value on the front panel.
Volume Flow A	Select Volume Flow A to display the value on the front panel.
Volume Flow B	Select Volume Flow B to display the value on the front panel.

Field	Entry
Total 1	Select the Total 1 to display the value on the front panel.
Total 2	Select the Total 2 to display the value on the front panel.
Total 3	Select the Total 3 to display the value on the front panel.
Total 4	Select the Total 4 to display the value on the front panel.
Cycle	Select the Cycle from the drop-down menu. Choose from Manual and Automatic.
Default Display	Select the Default Display from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Concentration, Temperature, Mass Flow A, Mass Flow B, Volume Flow A, Volume Flow B, Total 1, Total 2, Total 3, and Total 4.
Display Damping	Enter the Display Damping in seconds.
Alarm Blink	Select the Alarm Blink from the drop-down menu. Choose from On and Off.
Diagnostic Blink	Select the Diagnostic Blink from the drop-down menu. Choose from On and Off.
Format	
Mass Flow	Select the Mass Flow from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Volume Flow	Select the Volume Flow from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Density	Select the Density from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Temperature	Select the Temperature from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Total 1	Select Total 1 from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.

Field	Entry
Total 2	Select Total 2 from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Total 3	Select Total 3 from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Total 4	Select Total 4 from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Concentration	Select Concentration from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Mass Flow A	Select Mass Flow A from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Mass Flow B	Select Mass Flow A from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Volume Flow A	Select Volume Flow A from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.
Volume Flow B	Select Volume Flow A from the drop-down menu. Choose from XXXXXXX, XXXXX.X, XXXX.XX, XXX.XXX, XX.XXXX, and X.XXXXX. Select the format in which the device has to display the measurement value.

New Password

The New Password screen is where you can change the password based on the access level.

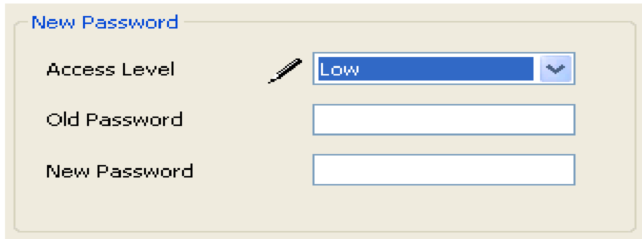


Figure 38. Sample CFT51 Transmitter New Password Screen

Field	Entry
Access Level	Select the Access Level from the drop-down menu. Choose from Low and High.
Old Password	Enter the old password.
New Password	Enter the new password.

Fluid

The Fluid screen is where you configure the Fluid Components like Component Name, Density, Density Change Per Degree, and Reference Temperature.

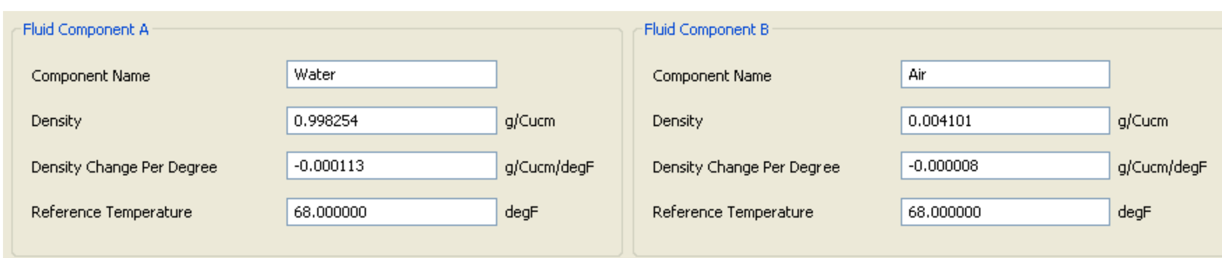


Figure 39. Sample CFT51 Transmitter Fluid Screen

Field	Entry
Fluid Component A	
Component Name	Enter the first Component Name.
Density	Enter the Density.
Density Change Per Degree	Enter the Density Change Per Degree.
Reference Temperature	Enter the Reference Temperature.

Field	Entry
Fluid Component B	
Component Name	Enter the second Component Name.
Density	Enter the Density.
Density Change Per Degree	Enter the Density Change Per Degree.
Reference Temperature	Enter the Reference Temperature.

2 Phase Correction

The 2 Phase Correction screen is where you configure the aggregate of the gas and liquid in the flow tube.

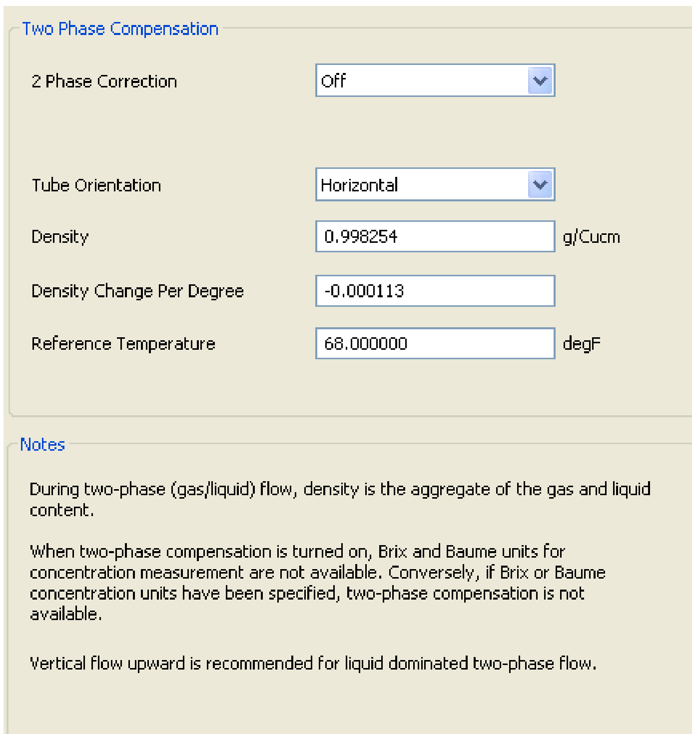


Figure 40. Sample CFT51 Transmitter 2 Phase Correction Screen

Field	Entry
Two Phase Compensation	
2 Phase Correction	Select the 2 Phase Correction from the drop-down menu. Select from On and Off.
Tube Orientation	Select the Tube Orientation from the drop-down menu. Select from Vertical and Horizontal.
Density	Enter the Density.
Density Change Per Degree	Enter the Density Change Per Degree
Reference Temperature	Enter the Reference Temperature.

Flow Alarm Configuration

The Flow Alarm Configuration screen is where you set the Mass, Volume, Concentration, Density, and Temperature Alarms.

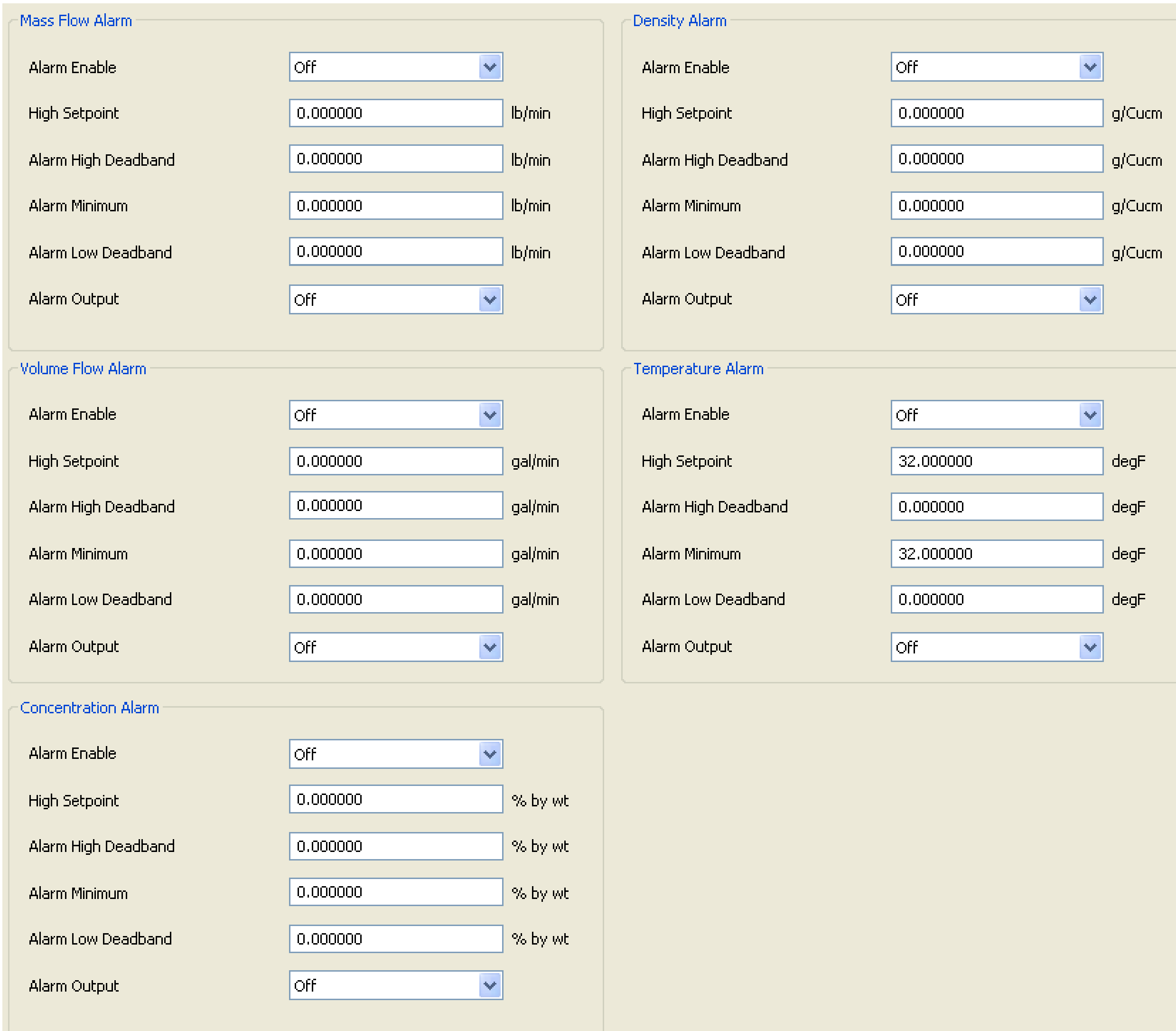


Figure 41. Sample CFT51 Transmitter Flow Alarm Configuration Screen

Field	Entry
Mass Flow Alarm	
Alarm Enable	Select the Alarm Enable from the drop-down menu. Choose from Off, Low, High, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.

Field	Entry
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
Volume Flow Alarm	
Alarm Enable	Select the Alarm Enable from the drop-down menu. Choose from Off, Low, High, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
Concentration Alarm	
Alarm Enable	Select the Alarm Enable from the drop-down menu. Choose from Off, Low, High, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
Density Alarm	
Alarm Enable	Select the Alarm Enable from the drop-down menu. Choose from Off, Low, High, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
Temperature Alarm	
Alarm Enable	Select the Alarm Enable from the drop-down menu. Choose from Off, Low, High, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.

Totals Alarm Configuration

The Totals Alarm Configuration screen is where you set the alarms, set point, and type of alarm.

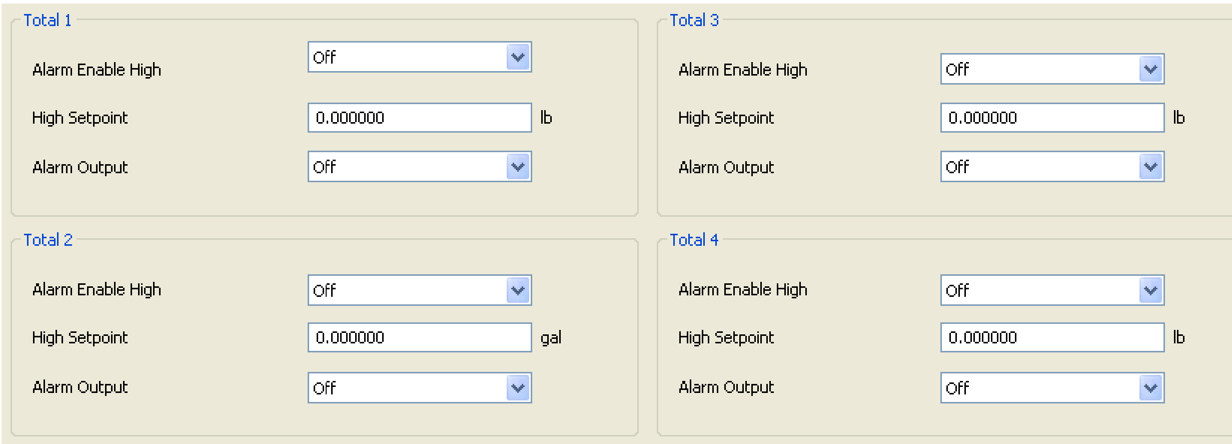


Figure 42. Sample CFT51 Transmitter Total Alarm Configuration Screen

Field	Entry
Total 1	
Alarm Enable High	Select the Alarm Enable High from the drop-down menu. Choose from Off and On.
High Setpoint	Enter the High Setpoint.
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
Total 2	
Alarm Enable High	Select the Alarm Enable High from the drop-down menu. Choose from Off and On.
High Setpoint	Enter the High Setpoint.
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
Total 3	
Alarm Enable High	Select the Alarm Enable High from the drop-down menu. Choose from Off and On.
High Setpoint	Enter the High Setpoint.
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
Total 4	
Alarm Enable High	Select the Alarm Enable High from the drop-down menu. Choose from Off and On.
High Setpoint	Enter the High Setpoint.
Alarm Output	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.

Flow Components Alarm Configuration

The Flow Components Alarm Configuration screen is where you configure alarms for Mass and Volume Flow Components.

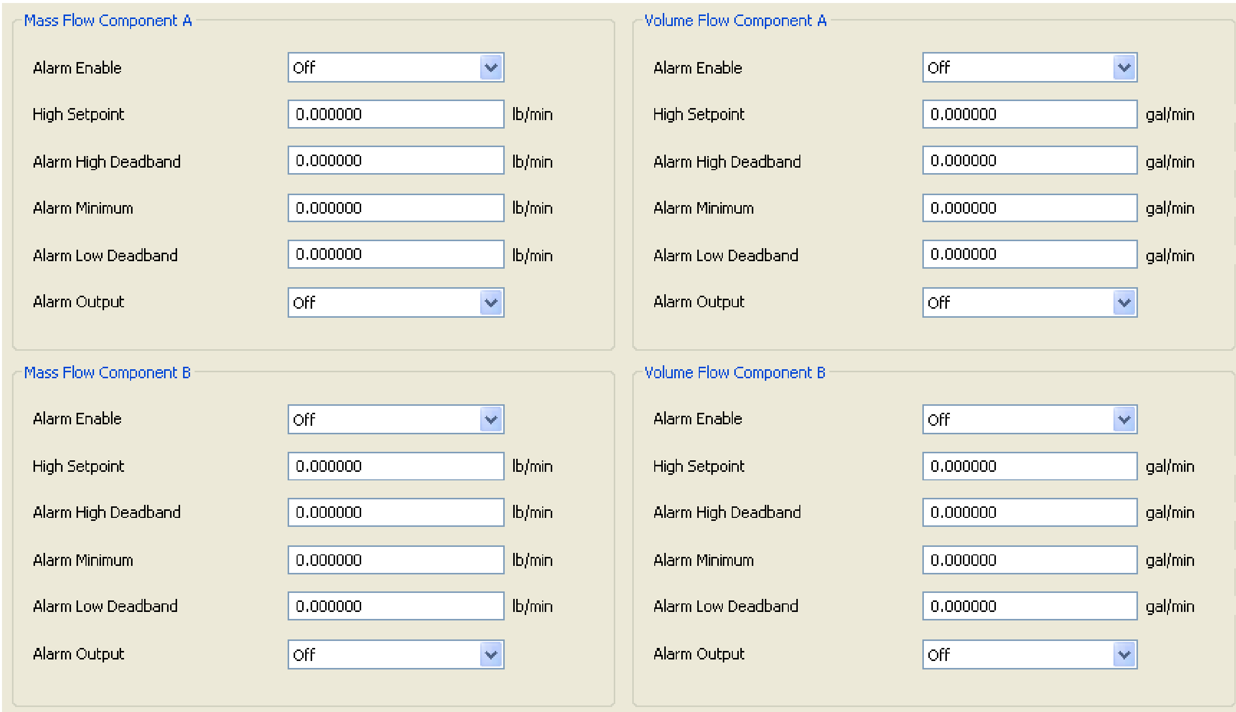


Figure 43. Sample CFT51 Transmitter Flow Components Alarm Configuration Screen

Field	Entry
Mass Flow Component A	
Alarm Enable	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.
Alarm Output	Enter the Alarm Output.
Mass Flow Component B	
Alarm Enable	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.
Alarm Output	Enter the Alarm Output.

Field	Entry
Mass Flow Component C	
Alarm Enable	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.
Alarm Output	Enter the Alarm Output.
Mass Flow Component D	
Alarm Enable	Select the Alarm Output from the drop-down menu. Choose from Off, Display, Discrete Out, and Both.
High Setpoint	Enter the High Setpoint.
Alarm High Deadband	Enter the Alarm High Deadband.
Alarm Minimum	Enter the Alarm Minimum.
Alarm Low Deadband	Enter the Alarm Low Deadband.
Alarm Output	Enter the Alarm Output.

Analog Output

The Analog Output screen is where you configure the Map, URV, LRV, Damping, Alarm Response, and Diagnostic Response.

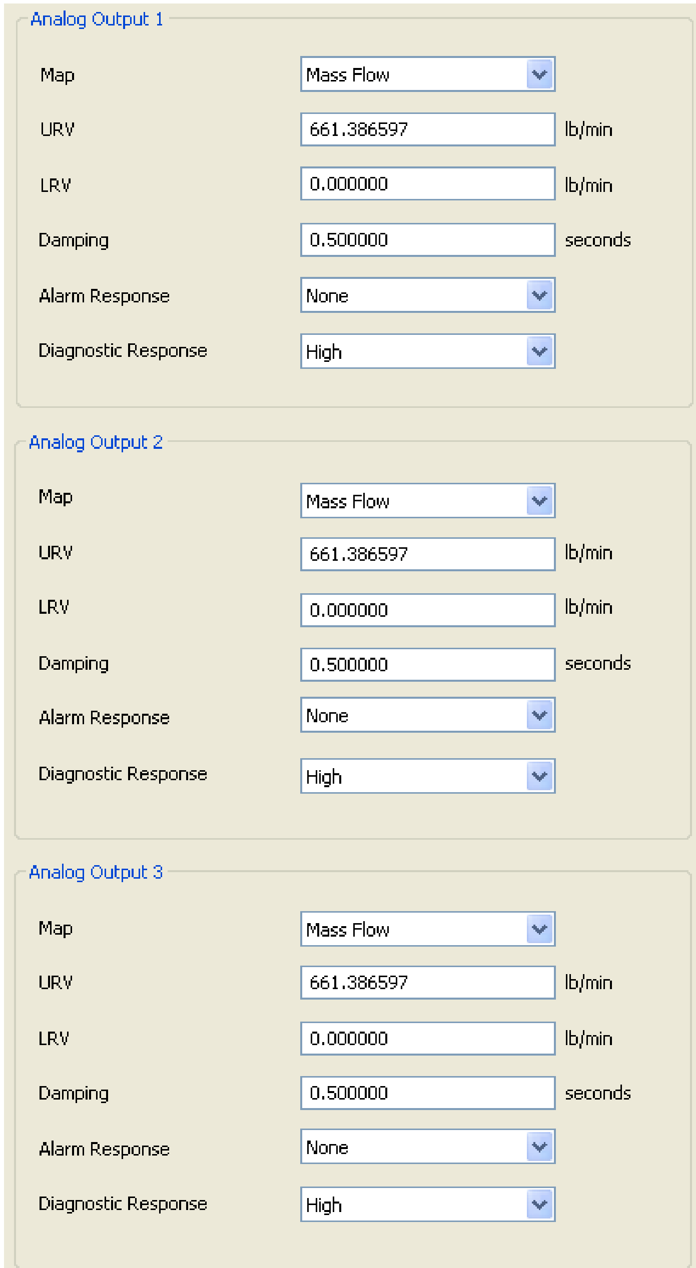


Figure 44. Sample CFT51 Transmitter Analog Output Screen

Field	Entry
Analog Output 1	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
URV	Enter the upper range value.
LRV	Enter the lower range value.
Damping	Enter the Damping in seconds.
Alarm Response	Select the Alarm Response from the drop-down menu. Choose from High, Low, Hold Last Output value, and None.
Diagnostic Response	Select the Diagnostic Response from the drop-down menu. Choose from High, Low, and Hold Last Output Value.
Analog Output 2	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
URV	Enter the upper range value.
LRV	Enter the lower range value.
Damping	Enter the Damping in seconds.
Alarm Response	Select the Alarm Response from the drop-down menu. Choose from High, Low, Hold Last Output value, and None.
Diagnostic Response	Select the Diagnostic Response from the drop-down menu. Choose from High, Low, and Hold Last Output Value.
Analog Output 3	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
URV	Enter the upper range value.
LRV	Enter the lower range value.
Damping	Enter the Damping in seconds.
Alarm Response	Select the Alarm Response from the drop-down menu. Choose from High, Low, Hold Last Output value, and None.
Diagnostic Response	Select the Diagnostic Response from the drop-down menu. Choose from High, Low, and Hold Last Output Value.

Pulse Output

The Pulse Output screen is where you configure Pulse Outputs, Modes, and Rate Modes.

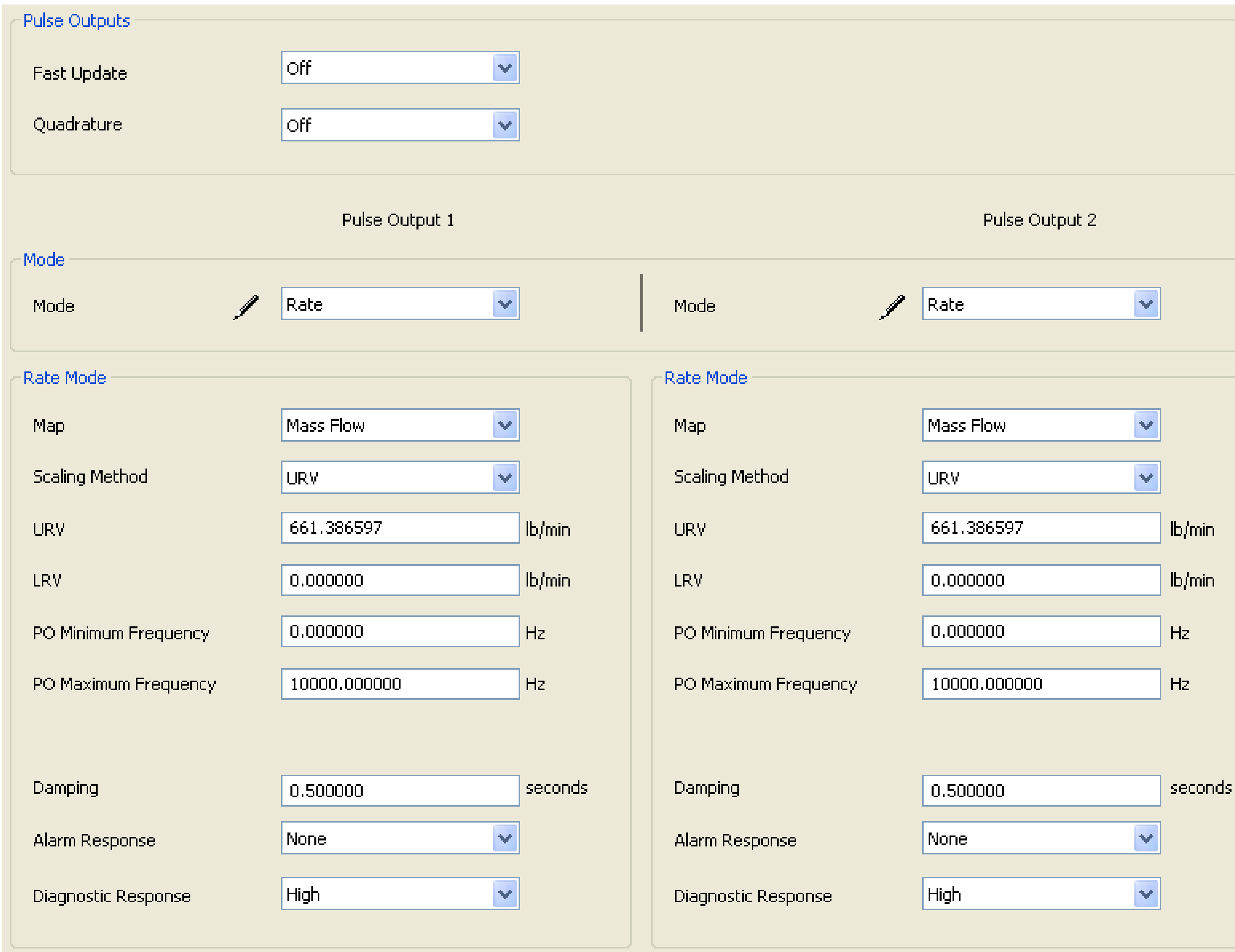


Figure 45. Sample CFT51 Transmitter Pulse Output Screen

Field	Entry
Pulse Outputs	
Fast Update	Select the Fast Update from the drop-down menu. Choose from Off and On.
Quadrature	Select the Quadrature from the drop-down menu. Choose from Off and On.
Pulse Output 1	
Mode	Select the Mode from the drop-down menu. Choose from Rate and Total.
Rate Mode	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.

Field	Entry
Scaling Method	Select the Scaling Method from the drop-down menu. Choose from URV, Units Per Pulse, and Pulses Per Unit. If you select Units Per Pulse or Pulses Per Unit, the URV and LRV fields are not available.
URV	Enter the upper range Value.
LRV	Enter the lower range value.
PO Minimum Frequency	Enter the PO Minimum Frequency in Hz.
PO Maximum Frequency	Enter the PO Maximum Frequency in Hz.
Damping	Enter the damping in seconds.
Alarm Response	Select the Alarm Response from the drop-down menu. Choose from High, Low, Hold Last Output Value, and None.
Diagnostic Response	Select the Diagnostic Response from the drop-down menu. Choose from High, Low, and Hold Last Output Value.
Pulse Output 2	
Mode	Select the Mode from the drop-down menu. Choose from Rate and Total.
Rate Mode	
Map	Select the Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Scaling Method	Select the Scaling Method from the drop-down menu. Choose from URV, Units Per Pulse, and Pulses Per Unit. If you select Units Per Pulse or Pulses Per Unit, the URV and LRV fields are not available.
URV	Enter the upper range value.
LRV	Enter the lower range value.
PO Minimum Frequency	Enter the PO Minimum Frequency in Hz.
PO Maximum Frequency	Enter the PO Maximum Frequency in Hz.
Damping	Enter the damping in seconds.
Alarm Response	Select the Alarm Response from the drop-down menu. Choose from High, Low, Hold Last Output Value, and None.
Diagnostic Response	Select the Diagnostic Response from the drop-down menu. Choose from High, Low, and Hold Last Output Value.

HART

The Output HART screen is where you configure the Polling Address, Number of Response Preambles, and Loop Current Mode.

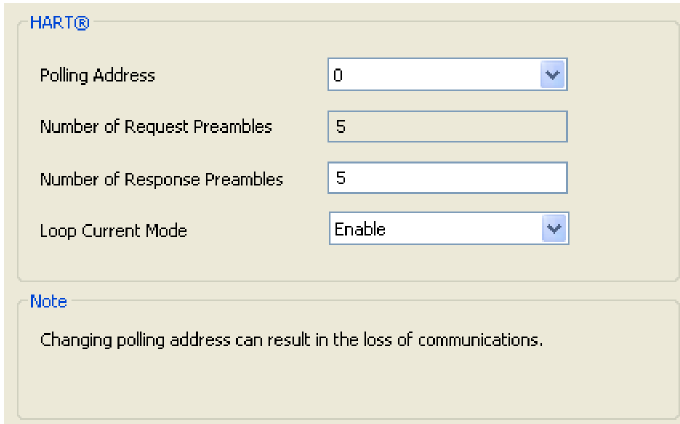


Figure 46. Sample CFT51 Transmitter HART Screen

Field	Entry
HART	
Polling Address	Select the Polling Address from the drop-down menu. Choose from 1 to 15 for HART 5, and 1 to 63 for HART 6.
Number of Requested Preambles	Shows the Number of Requested Preambles.
Number of Response Preambles	Enter the Number of Response Preambles.
Loop Current Mode	Select the Loop Current Mode from the drop-down menu. Choose from Enable and Disable.

HART Dynamics

The HART Dynamics screen is where you configure the PV, SV, TV, and QV Maps.

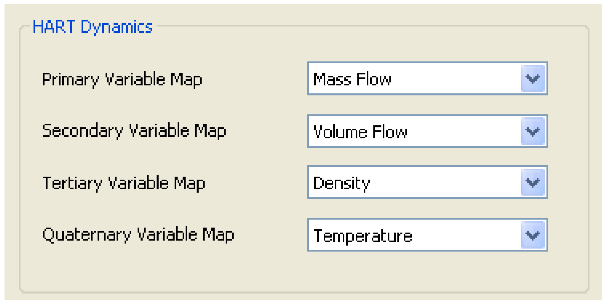


Figure 47. Sample CFT51 Transmitter HART Dynamics Screen

Field	Entry
Primary Variable Map	Select the Primary Variable Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Secondary Variable Map	Select the Secondary Variable Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Total 1, Total 2, Total 3, Total 4, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Tertiary Variable Map	Select the Tertiary Variable Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Total 1, Total 2, Total 3, Total 4, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Quaternary Variable Map	Select the Quaternary Variable Map from the drop-down menu. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Total 1, Total 2, Total 3, Total 4, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.

Contact Input

The Contact Input is used to configure inputs like calZero, Signal Lock, Alm/Diag Ack, Clear Total1, Clear Total2, Clear Total3, Clear Total4, Clear Nets, Clear All Totals and Sel Zero.

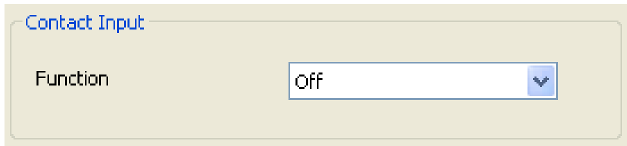


Figure 48. Sample CFT51 Transmitter Contact Input Screen

Field	Entry
Function	Select the Function from the drop-down menu. Choose from Off and On.

Contact Output

The Contact Output screen is where you configure the Function (Off, Alarm, Diags and Alarm Diags) and Digital Output (Normally, Off, On).

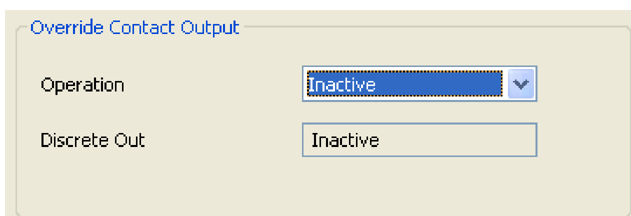


Figure 49. Sample CFT51 Transmitter Contact Output Screen

Field	Entry
Function	Select the Function from the drop-down menu. Choose from Off and On.
Operation	Select the Operation from the drop-down menu. Choose from Normally Open and Normally Close.

Device Information

The Device Info screen shows the complete information of the device (Hardware).

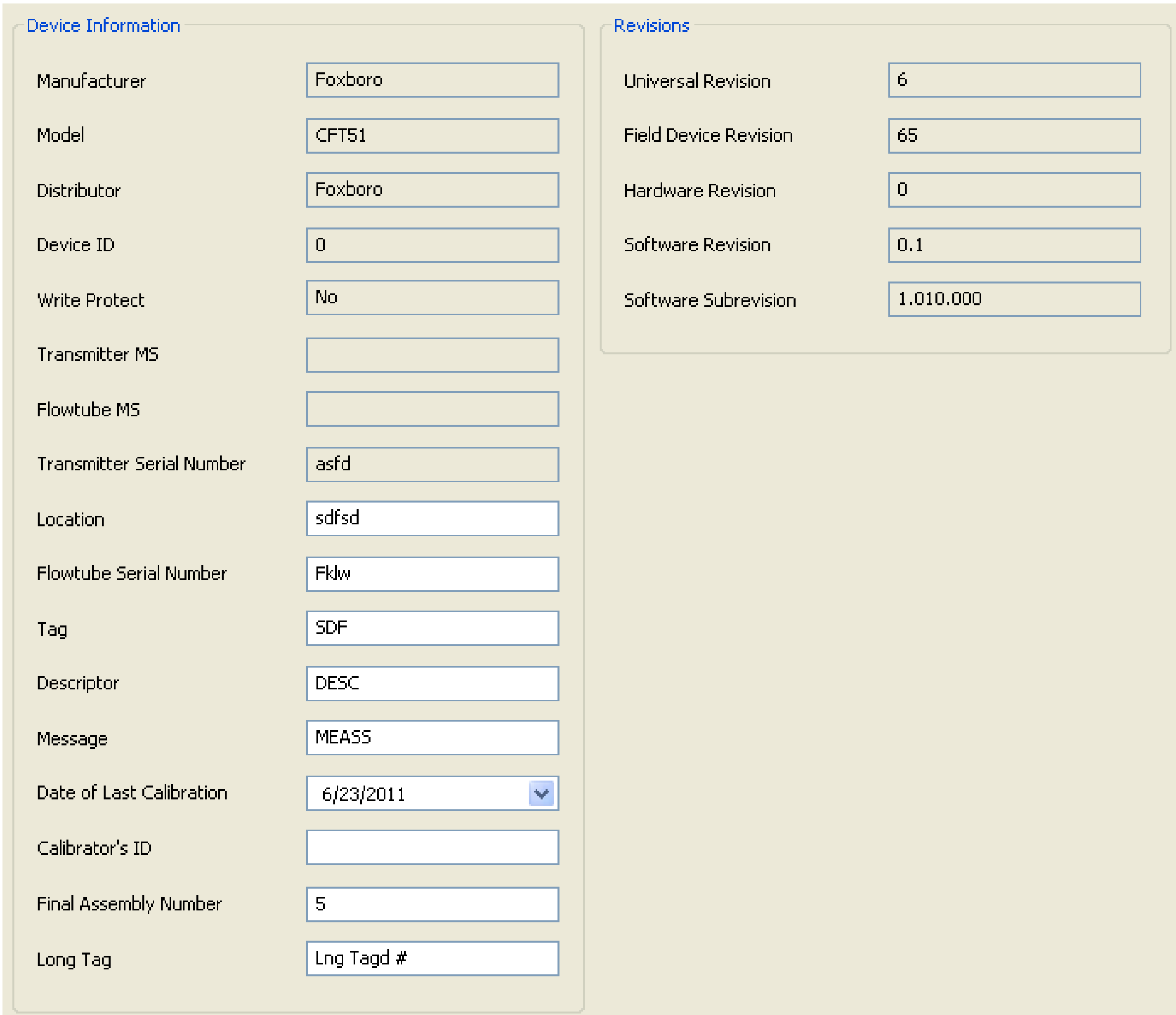


Figure 50. Sample CFT51 Transmitter Device Information Screen

Field	Entry
Device Information	
Manufacturer	Shows the manufacturer as Foxboro.
Model	Shows the model as CFT51.
Distributor	Shows the distributor as Foxboro.
Device ID	Shows the Device ID.
Write Protect	Shows the Write Protect.
Transmitter MS	Shows the Transmitter.
Flowtube MS	Shows the Flowtube MS.
Transmitter Serial Number	Shows the Transmitter Serial Number.
Location	Enter the Location.

Field	Entry
Flowtube Serial Number	Enter the Flowtube Serial Number.
Tag	Enter the Tag.
Descriptor	Enter the Descriptor.
Message	Enter the Message.
Date of Last Calibration	Select the Date of Last Calibration from the drop-down menu. Choose from calendar.
Calibrator’s ID	Enter the Calibrator’s ID.
Final Assembly Number	Enter the Final Assembly Number.
Long Tag	Enter the Long Tag.
Revisions	
Universal Revision	Shows the Universal Revision.
Field Device Revision	Shows the Field Device Revision.
Hardware Revision	Shows the Hardware Revision.
Software Revision	Shows the Software Revision.
Software Subrevision	Shows the Software Subrevision.

Device Status

HART Status

The HART Status screen shows the HART status as well as the field device status of the device.

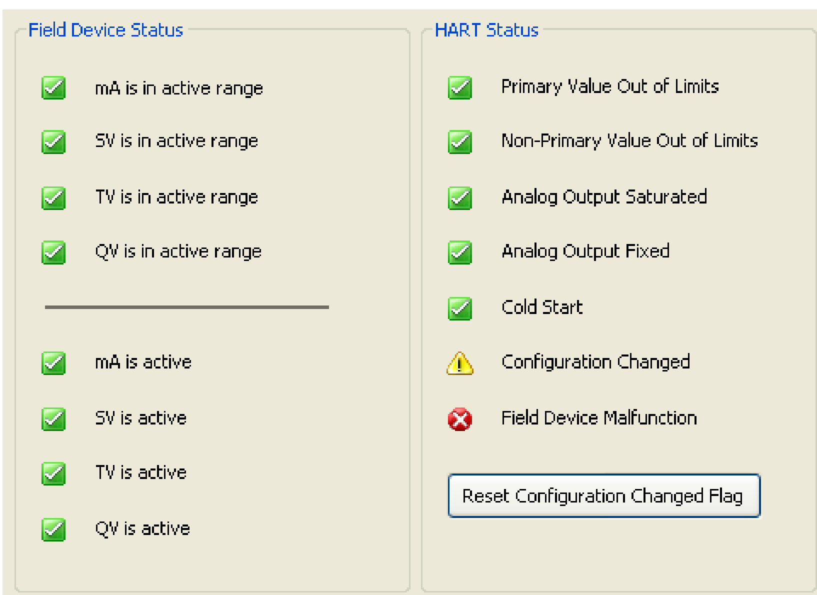


Figure 51. Sample CFT51 Transmitter HART Status Screen

— NOTE

The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red X (error).

Click Reset Configuration Changed Flag to reset the configuration flag in the device.

Device Status

The Device Status screen shows the current readings from the device like (Mode, Alarms, etc).

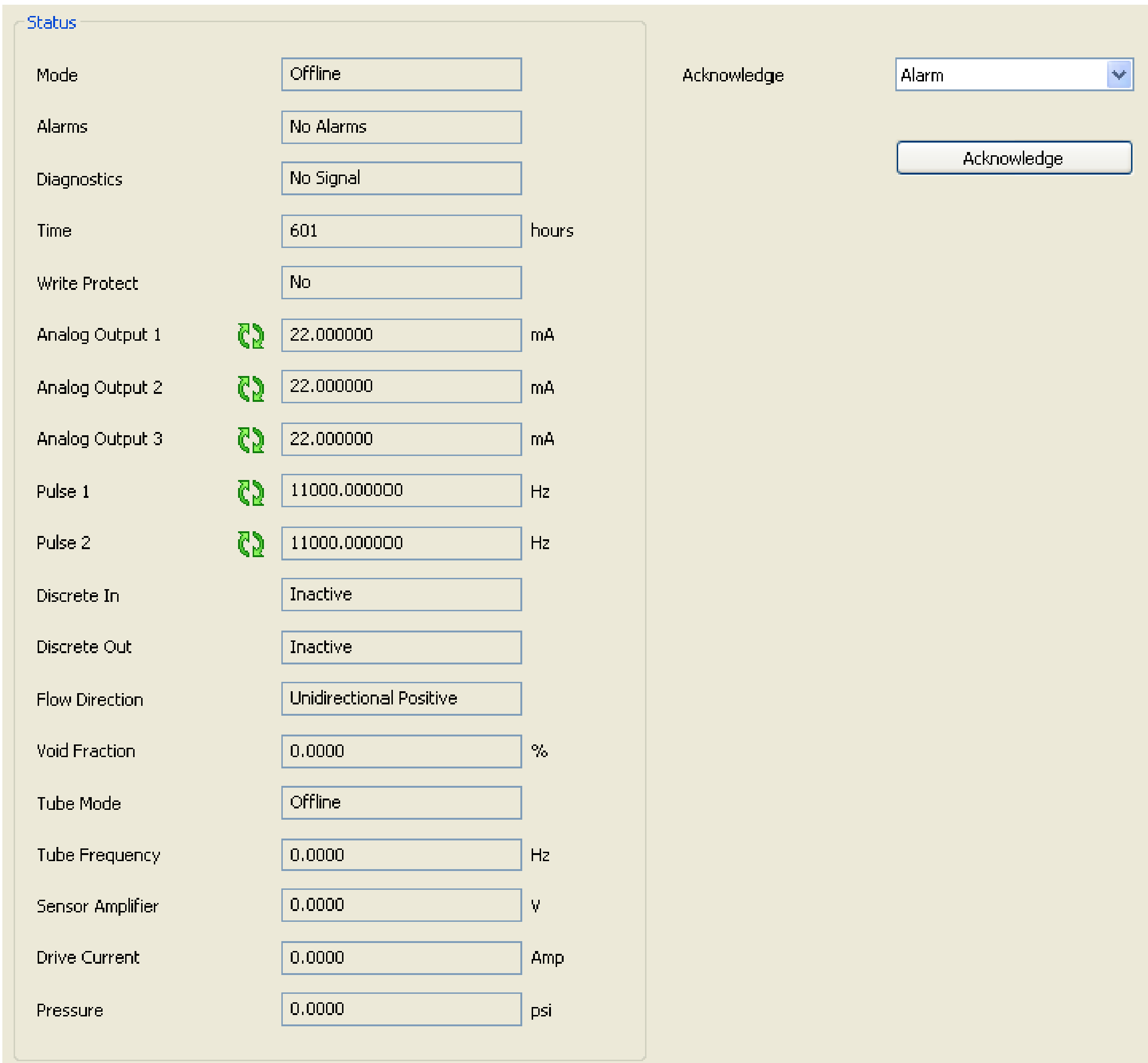


Figure 52. Sample CFT51 Transmitter Device Status Screen

Field	Entry
Status	
Mode	Shows the DTM Mode status.
Alarms	Shows the alarm status.
Diagnostics	Shows the Diagnostics status.
Time	Shows the Time in hours.
Write Protect	Shows the Write Protect status.
Analog Output 1	Shows the Analog Output 1 status.
Analog Output 2	Shows the Analog Output 2 status.
Analog Output 3	Shows the Analog Output 3 status.
Pulse 1	Shows the Pulse 1 status.
Pulse 2	Shows the Pulse 2 status.
Discrete In	Shows the Discrete In status.
Discrete Out	Shows the Discrete Out status.
Flow Direction	Shows the Flow Direction status.
Void Fraction	Shows the Void Fraction status.
Tube Mode	Shows the Tube Mode status.
Tube Frequency	Shows the Tube Frequency status.
Sensor Amplifier	Shows the Sensor Amplifier status.
Drive Current	Shows the Drive Current status.
Pressure	Shows the Pressure status.
Acknowledge	Choose Alarm or Diagnostic from the drop-down menu and click the Acknowledge button.

Diagnostic History

The Diagnostic History screen shows the history log of the device.

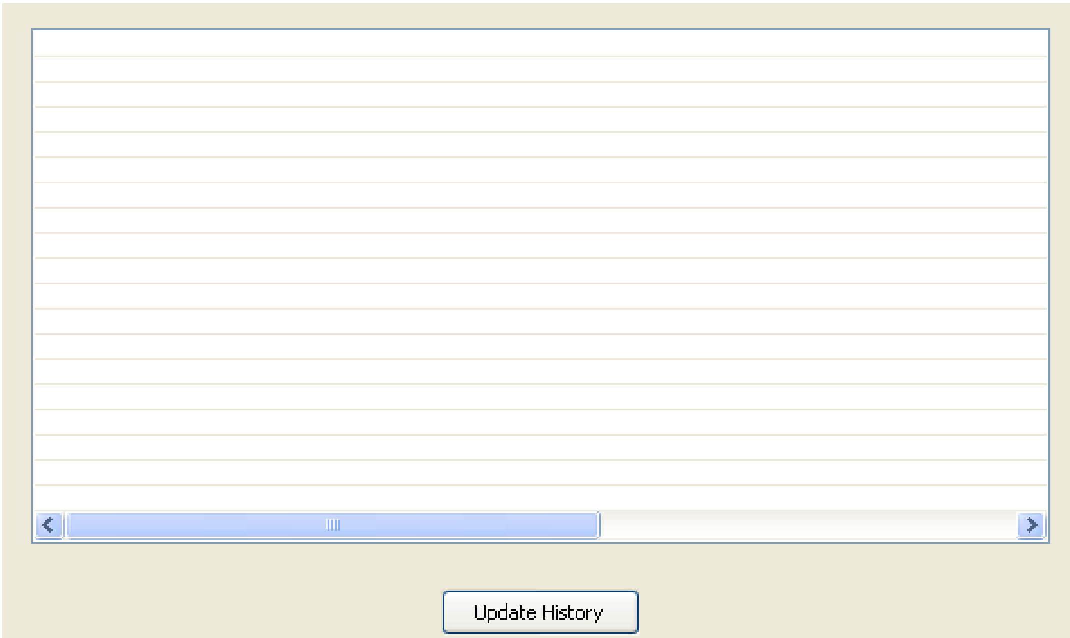


Figure 53. Sample CFT51 Transmitter Diagnostic History Screen

Calibration

Flow Zero Value

The Zero Value register shows you the value of the calibration.

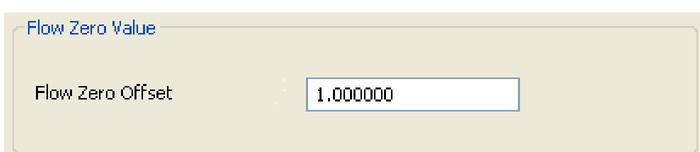


Figure 54. Sample CFT51 Transmitter Flow Zero Value Screen

Field	Entry
Flow Zero Offset	Enter the Flow Zero Offset.

Flow Zero Calibration

The Flow Zero Calibration calibrates Zero Flow.

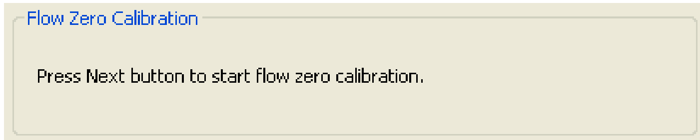


Figure 55. Sample CFT51 Transmitter Flow Zero Calibration Screen

Click the Next button, the screen appears as shown in Figure 56.

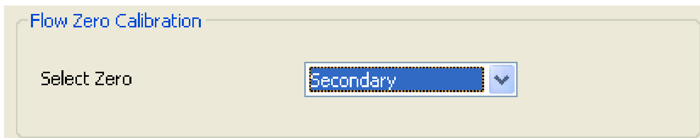


Figure 56. Sample CFT51 Transmitter Flow Zero Calibration Screen (2)

Field	Entry
Select Zero	Select the Select Zero from the drop-down menu. Choose from Secondary and Primary.

Click the Next button, the screen appears as shown in Figure 57.

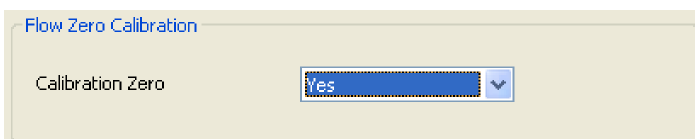


Figure 57. Sample CFT51 Transmitter Flow Zero Calibration Screen (3)

Field	Entry
Calibration Zero	Select the Calibration Zero from the drop-down menu. Choose from Yes and No.

Flow Zero Restore

It restores the measurement value in zero flow conditions.

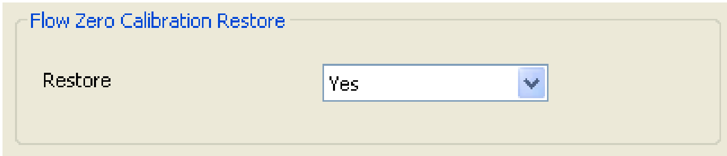


Figure 58. Sample CFT51 Transmitter Flow Zero Restore Screen

Field	Entry
Restore	Select the Restore from the drop-down menu. Choose from Yes and No.

Density Calibration

The Density Calibration calibrates Density.

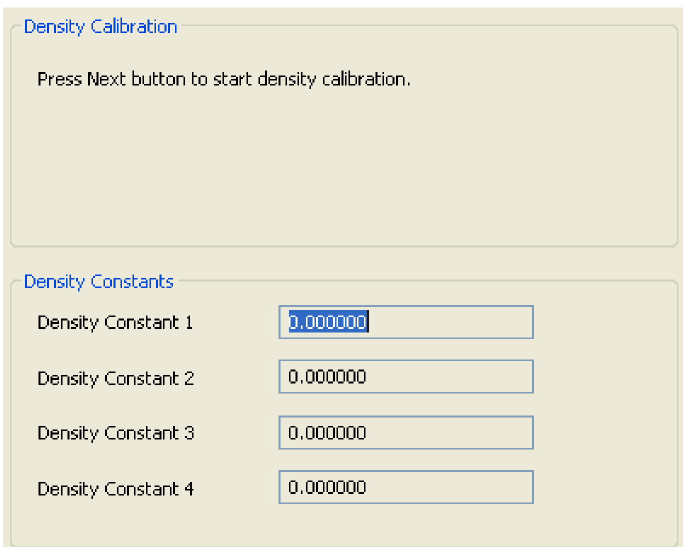


Figure 59. Sample CFT51 Transmitter Density Calibration Screen

Click the Next button, the screen appears as shown in Figure 60.

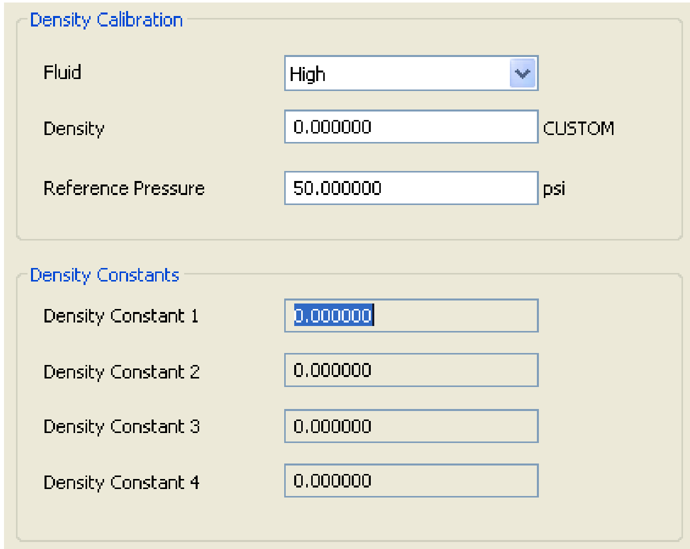


Figure 60. Sample CFT51 Transmitter Density Calibration Screen (2)

Field	Entry
Density Calibration	
Fluid	Select the Fluid from the drop-down menu. Choose from High and Low.
Density	Enter the Density.
Reference Pressure	Enter the Reference Pressure in psi.

Click the Next button, the screen appears as shown in Figure 61.

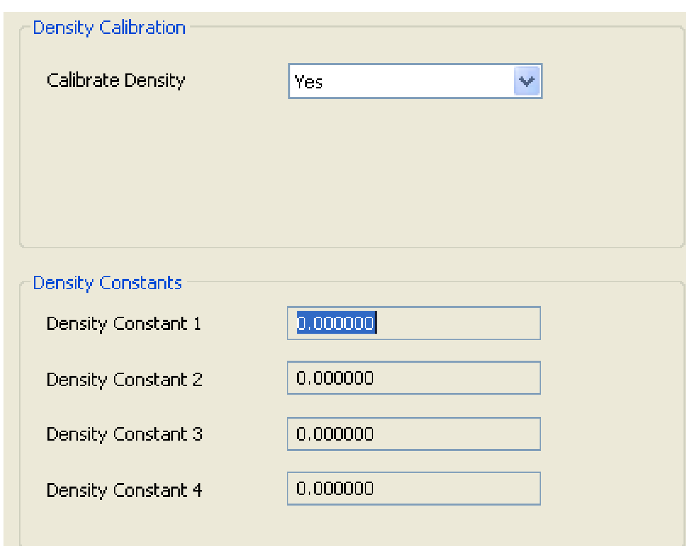


Figure 61. Sample CFT51 Transmitter Density Calibration Screen (3)

Field	Entry
Density Calibration	
Calibrate Density	Select Yes to calibrate density.

Click Next to complete calibrating the density.

Density Restore

It restores the density value to the original value.

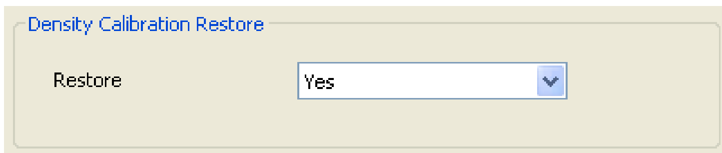


Figure 62. Sample CFT51 Transmitter Density Restore Screen

Field	Entry
Restore	Select Yes or No from the Restore drop-down menu.

mA Calibration

This procedure is used to trim the 4 mA (zero) and 20 mA (span) output values of the flow meter to match the output of a plant standard measurement device. A suitable reference, like a digital multimeter, is used to calibrate the 4 mA and 20 mA points respectively.

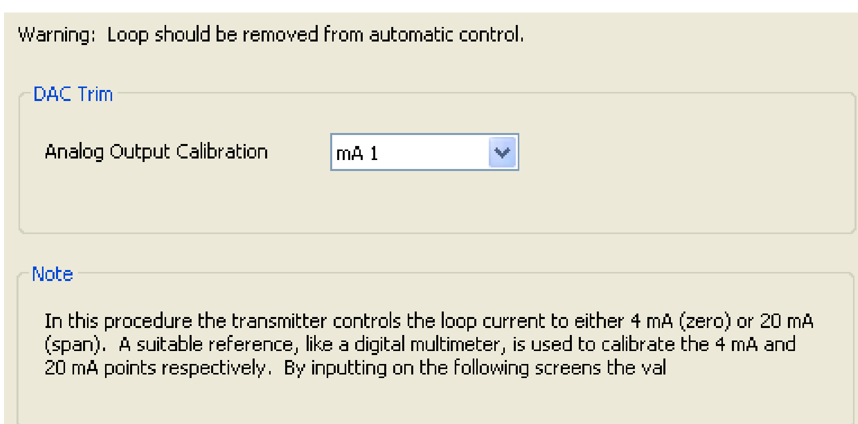


Figure 63. Sample CFT51 Transmitter mA Calibration Screen

Field	Entry
DAC Trim	
Analog Output Calibration	Select the Analog Output Calibration from the drop-down menu. Choose from mA 1, mA 2, and mA 3.

mA Restore

The mA Restore screen is where you restore the selected mA value.

Figure 64. Sample CFT51 Transmitter mA Restore Screen

Field	Entry
mA Restore	Select the mA Restore from the drop-down menu. Choose from mA 1, mA 2, and mA 3.

Tube Check

The Tube Check screen is where you check the ratio and percent of change with value and time. It saves the current ratio and datum.

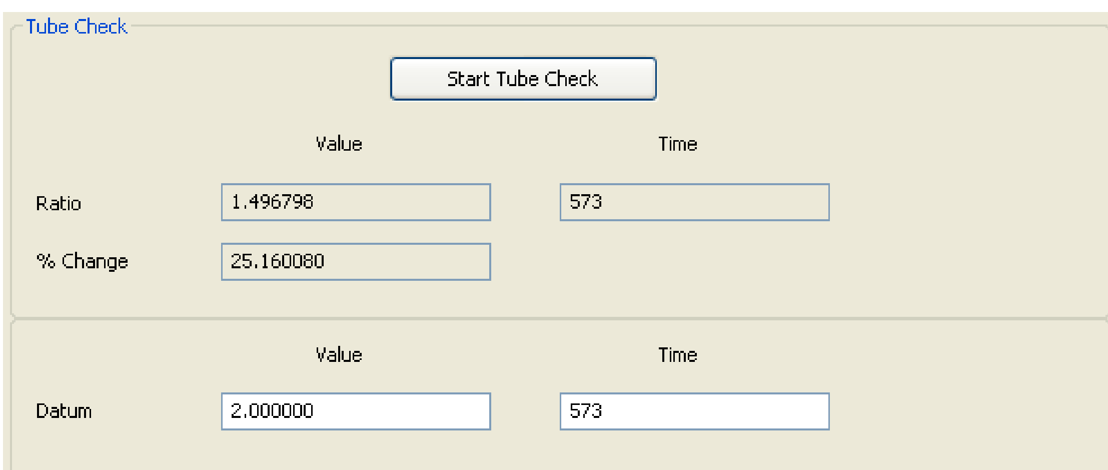


Figure 65. Sample CFT51 Transmitter Tube Check Screen

Field	Entry
Start Tube Check	Click Start Tube Check to perform the tube check.
Datum	Enter the Value and Time.

Troubleshooting

Restore Factory Settings

The Restore Factory Settings configures all the data to factory default values.

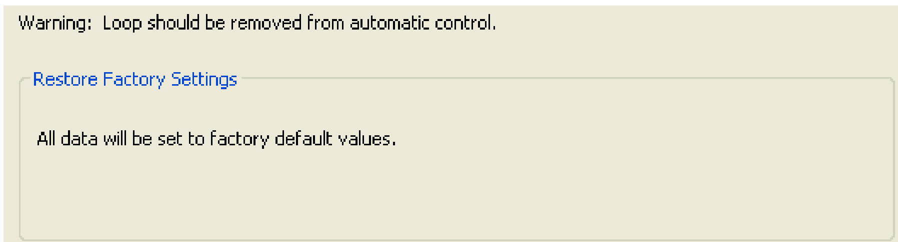


Figure 66. Sample CFT51 Transmitter Restore Factory Settings Screen

Click Next and follow on screen messages to restore the factory settings of the DTM.

Contact Output

Contact Output screen allows to perform the override of contact output or digital output.

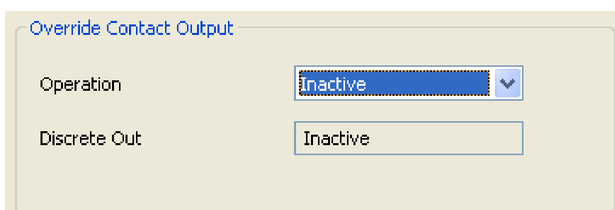


Figure 67. Sample CFT51 Transmitter Contact Output Screen

Field	Entry
Operation	Select the Operation from the drop-down menu. Choose from Inactive and Active.
Discrete Out	Shows the status of the contact output.

Analog Output

The Analog output overrides the Analog Output Value with the selected Loop Test.

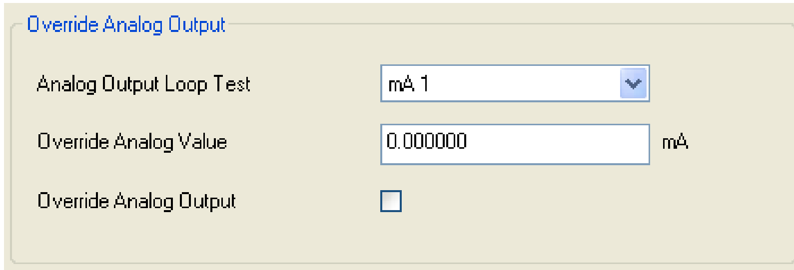


Figure 68. Sample CFT51 Transmitter Analog Output Screen

Field	Entry
Analog Output Loop Test	Select the Analog Output Loop Test from the drop-down menu. Choose from mA1, mA 2, and mA 3.
Override Analog Value	Enter Override Analog Value.
Override Analog Output	Selecting the Override Analog Output check box overrides the measurement value.

Pulse output

The Pulse output overrides the Pulse Output Value with the selected Loop Test.

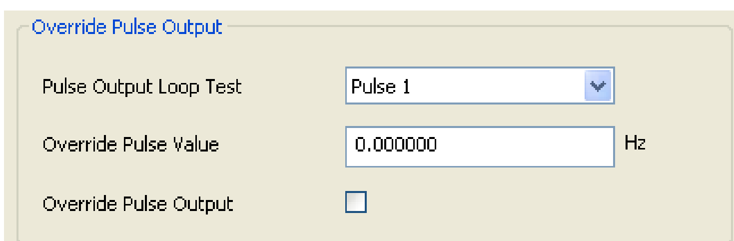


Figure 69. Sample CFT51 Transmitter Pulse Output Screen

Field	Entry
Pulse Output Loop Test	Select the Pulse Output Loop Test from the drop-down menu. Choose from Pulse 1 and Pulse 2.
Override Pulse Value	Enter Override Analog Value.
Override Pulse Output	Selecting the Override Pulse Output check box overrides the measurement value.

Configuration Report

The Configuration Report gives a summary of the Device, DTM, and relevant configuration information.

FOXBORO

CFT51 DTM Configuration Report

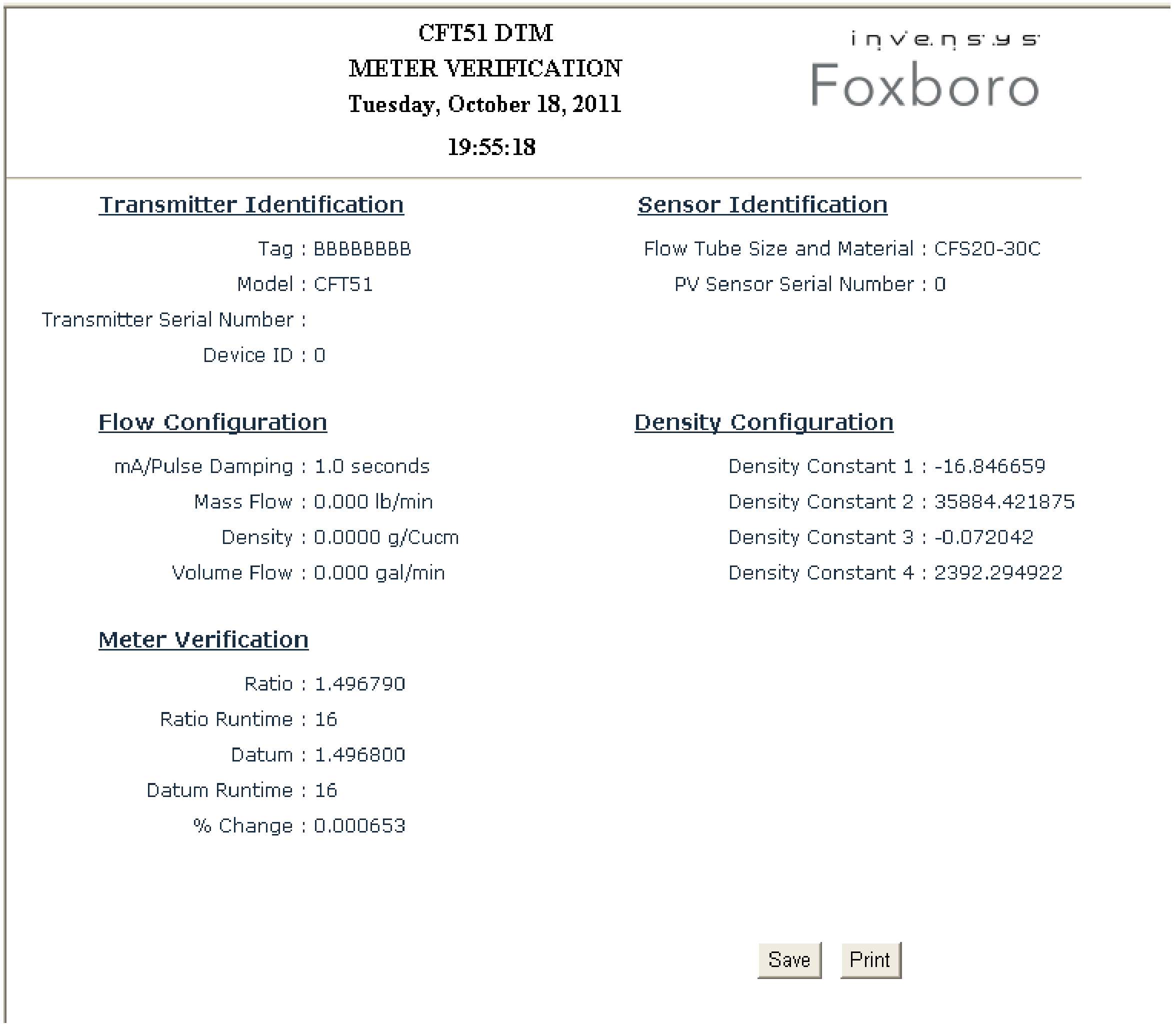
Current Date and Time	**08-09-2011 10:36**

Device Information	
Tag	**SDF**
Descriptor	**DESC**
Message	**MEASS**
Long Tag	**Lng Tagd #**
Location	**sdfsd**
Manufacturer	**Foxboro**
Device ID	**0**
Model	**CFT51**
Date Of Last Calibration	**06/23/2011**
Distributor	**Foxboro**
Final Assembly Number	**5**
Flowtube Serial Number	**Fklw**
Transmitter Serial Number	**asfd**
PV Sensor Serial Number	**0**
Transmitter MS	
Flowtube MS	

Figure 70. Sample CFT51 Transmitter Configuration Report Screen

Tube Verification Report

Tube Verification Report gives the transmitter, sensor, flow, and density configuration and meter validation.



CFT51 DTM
METER VERIFICATION
Tuesday, October 18, 2011
19:55:18

invensys Foxboro

Transmitter Identification

Tag : BBBBBBBB
Model : CFT51
Transmitter Serial Number :
Device ID : 0

Sensor Identification

Flow Tube Size and Material : CFS20-30C
PV Sensor Serial Number : 0

Flow Configuration

mA/Pulse Damping : 1.0 seconds
Mass Flow : 0.000 lb/min
Density : 0.0000 g/Cucm
Volume Flow : 0.000 gal/min

Density Configuration

Density Constant 1 : -16.846659
Density Constant 2 : 35884.421875
Density Constant 3 : -0.072042
Density Constant 4 : 2392.294922

Meter Verification

Ratio : 1.496790
Ratio Runtime : 16
Datum : 1.496800
Datum Runtime : 16
% Change : 0.000653

Save Print

Figure 71. Sample CFT51 Transmitter Tube Verification Report Screen

4. IMT25 and IMT96 Series Magnetic Flow Transmitters

This chapter provides information that is exclusive to using the PC50 Field Device Tool with IMT25 and IMT96 Series Magnetic Flow Transmitters with HART communication protocol. Additional information about these transmitters with HART communication is contained in the following documents.

IMT25

- MI 021-387 IMT25 Installation
- MI 021-390 IMT25 Operation, Configuration, and Calibration
- MI 021-391 IMT25 System Maintenance
- MI 021-397 IMT25 Operation Using a HART Communicator

IMT96

- MI 021-402 IMT96 Installation
- MI 021-403 IMT96 Operation, Configuration, and Calibration
- MI 021-404 IMT96 System Maintenance
- MI 021-415 IMT96 Operation Using a HART Communicator

Device Overview Screen

The Device Overview screen displays HART information, Device Information, and current PV data.

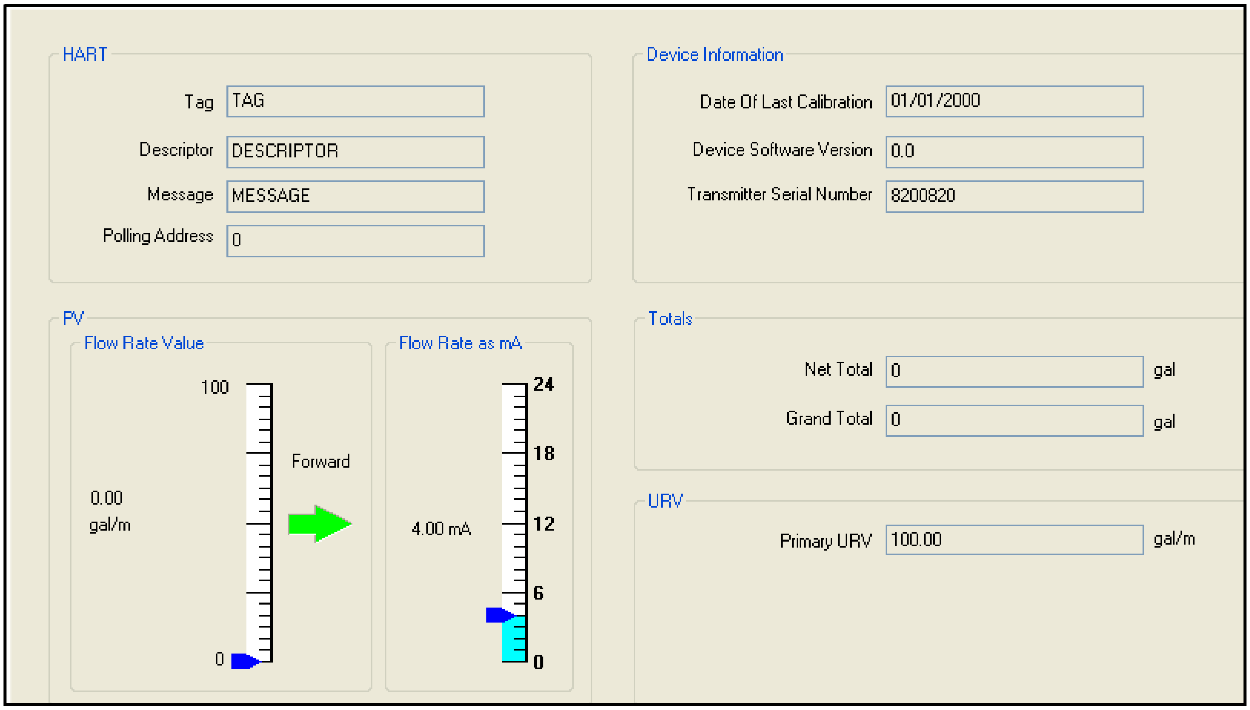


Figure 72. Sample IMT25 or IMT96 Transmitter Device Overview Screen

Process Variables Screen

The Process Variables screen provides the PV and totals data that was displayed on the Device Overview screen plus additional measurement information.

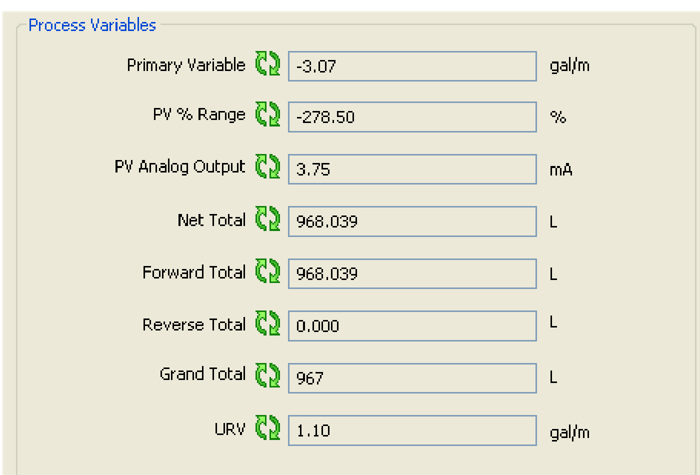


Figure 73. Sample IMT25 or IMT96 Transmitter Process Variables Screen

Device Status Screen

The Device Status screen shows the current status of the device. The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red X (error).

In the **Error Reason** and **Error Reason Code** sections of the screen, the reason and code for the error is given.

— NOTE

Error Reason indicates the last error reason. It is possible that the condition has since been cleared.

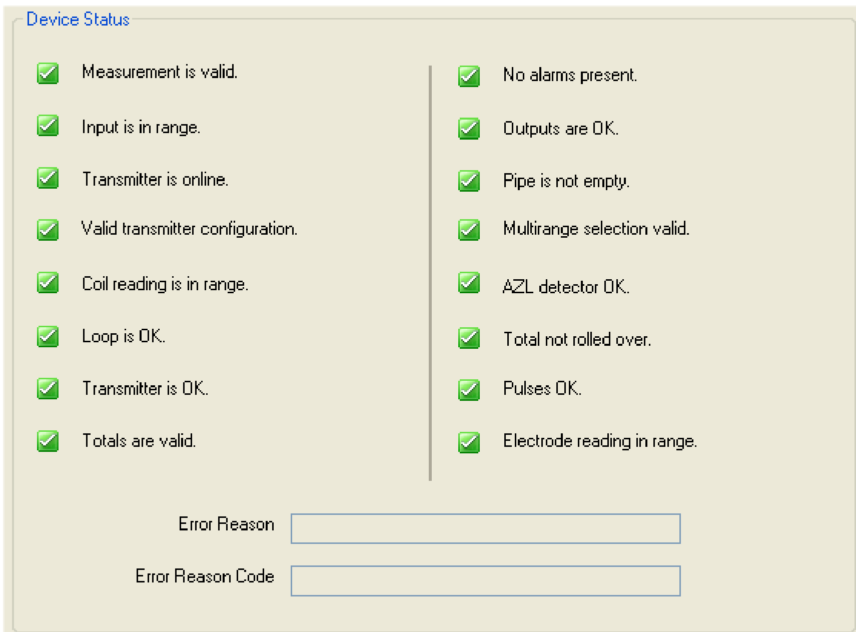


Figure 74. Sample IMT25 or IMT96 Transmitter Device Status Screen

Diagnostic/Alarm Status Screen

The Diagnostic/Alarm Status screen shows diagnostic and alarm status information as well as present URV information.

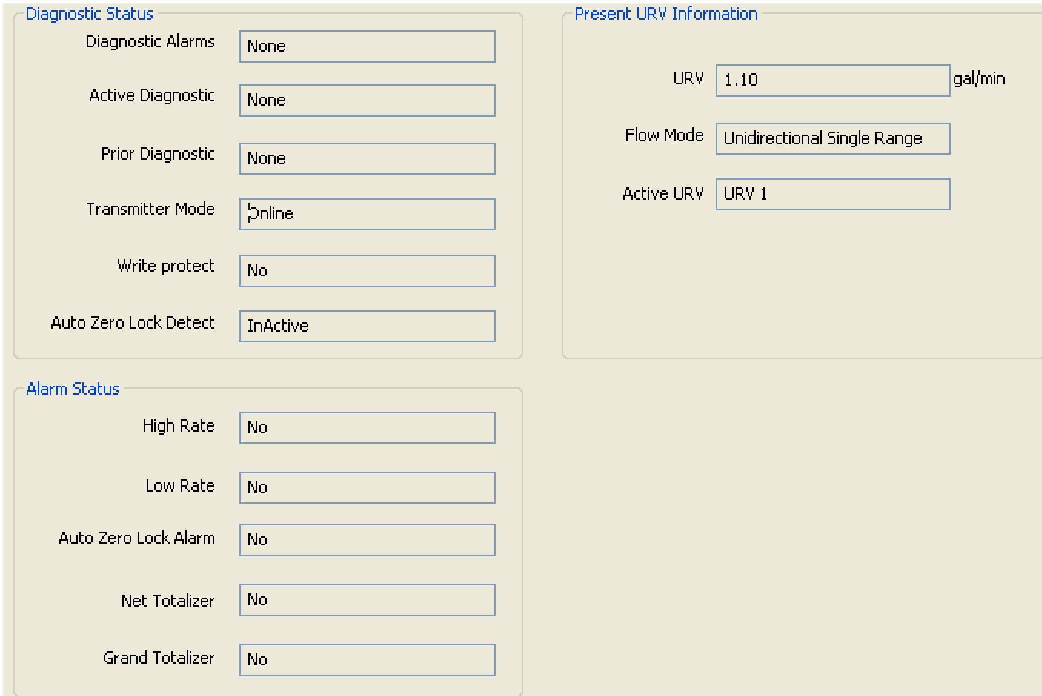


Figure 75. Sample IMT25 or IMT96 Series Transmitter Diagnostic/Alarm Status Screen

Input/Output Status Screen

The Input/Output Status screen shows contact input and relay output status as well as output owners information.

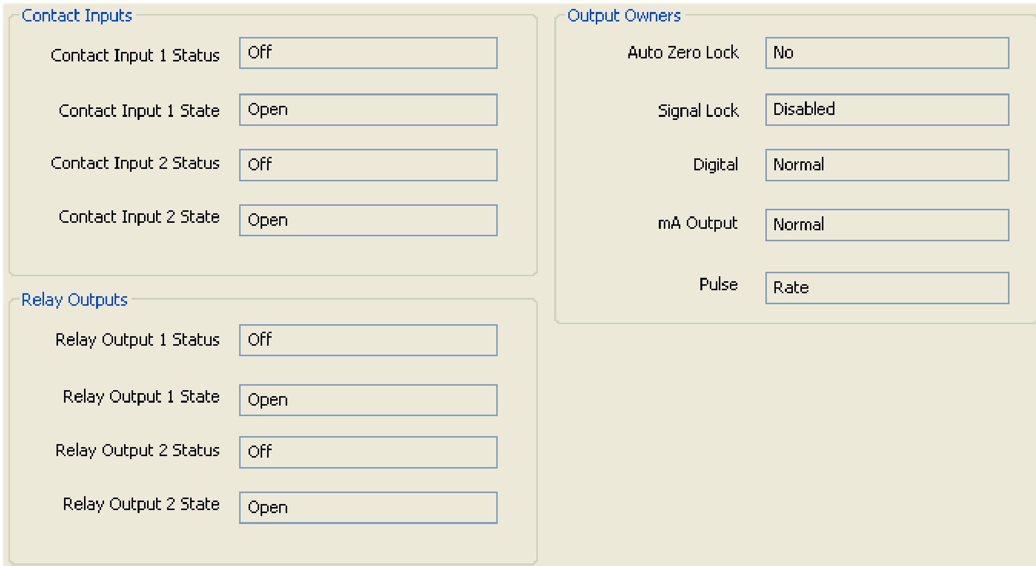


Figure 76. Sample IMT25 or IMT96 Transmitter Input/Output Status Screen

Calibration

You can perform the following calibration procedures on an IMT25 or IMT96 Series Transmitter using the PC50 Field Device Tool:

- Calibration
  - → DAC Trim
  - → Scaled DAC Trim
- Auto Zero Lock

The Auto Zero Lock selection includes an Auto Zero Lock Setup as shown in Figure 77.

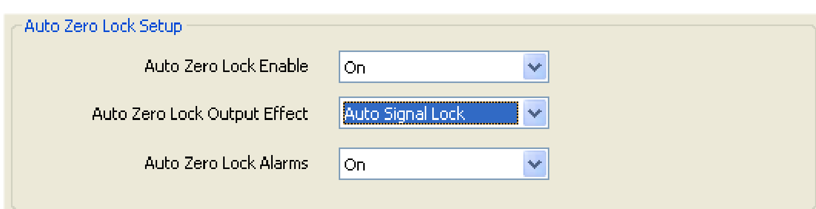


Figure 77. Sample IMT25 or IMT96 Transmitter Auto Zero Lock Setup Screen

Field	Entry
Auto Zero Lock Enable	Specify whether Auto Zero Lock is enabled (On or Off).
Auto Zero Lock Output Effect	Specify whether Auto Zero Lock is to affect the outputs.
Auto Zero Lock Alarms	Specify whether Auto Zero Lock is to generate an alarm condition.

Setup

General Setup Screen

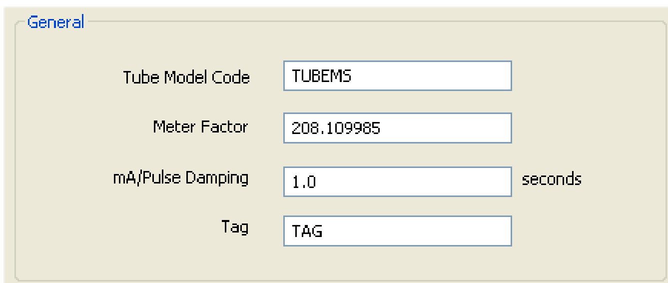


Figure 78. Sample IMT25 or IMT96 Transmitter General Setup Screen

Field	Entry
Tube Model Code	Enter the flowtube model code.
Meter Factor	Enter the Cal Factor stamped on the flowtube data plate.[a]
mA/Pulse Damping	Enter the damping time in seconds.
Tag	Enter maximum of 8 characters. Optional, used for reference only.

(a) If data plate just says Cal Factor, refer to MI 019-397.

Measurement Units Screen

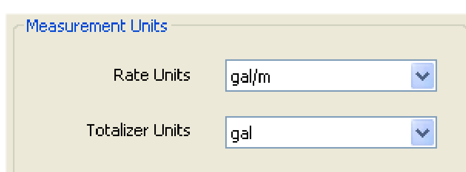


Figure 79. Sample IMT25 or IMT96 Transmitter Measurement Units Screen

Field	Entry
Rate Units	Select the Rate Units from the list presented.
Totalizer Units	Select the Totalizer Units from the list presented.

Totalizers Screen

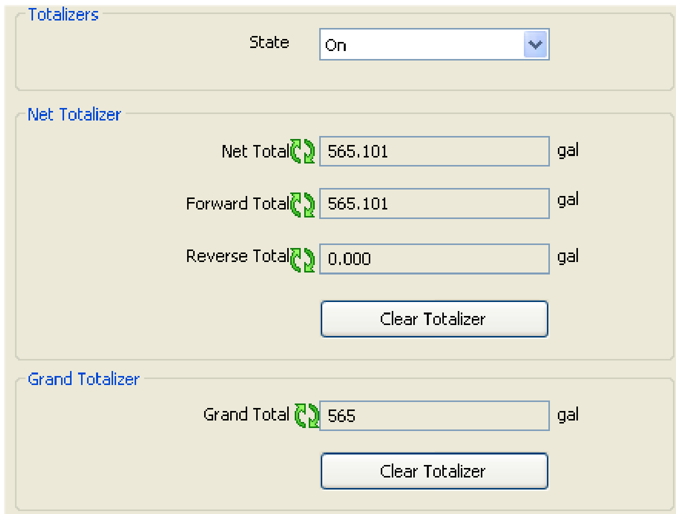


Figure 80. Sample IMT25 or IMT96 Transmitter Totalizers Screen

Field	Entry
Totalizers	
State	Select totalizers On or Off.
Net Totalizer	
Net Total	Shows the result of the forward total minus the reverse total.
Forward Total	Shows the sum of the positive flow readings.
Reverse Total	Shows the sum of the negative flow readings.
Clear Totalizer	Clears the Net Totalizer
Grand Totalizer	
Grand Total	Shows the result of the forward total minus the reverse total since the Grand Totalizer was last cleared.
Clear Totalizer	Clears the Grand Totalizer

Rate Range Screen

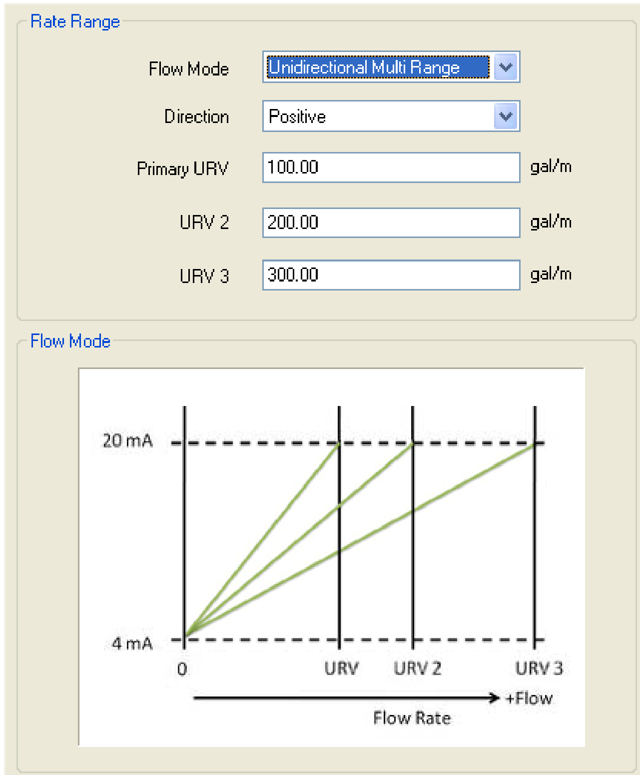


Figure 81. Sample IMT25 or IMT96 Transmitter Rate Range Screen

Field	Entry
Rate Range	
Flow Mode	Select Unidirectional Single Range, Unidirectional Multi-Range, Bidirectional Dual Range, or Bidirectional Split Range.
Direction	Select flow tube direction as Positive or Reverse.
Primary URV	Enter the upper range value for forward flow in all flow modes except Unidirectional Multi-Range where it is the URV for the first range.
URV2	Enter the upper range value for reverse flow Bidirectional flow modes and the URV for the second range in the Multi-Range flow mode.
URV3	Enter the upper range value for the third range in Multi-Range flow mode.

Flowmeter Screen

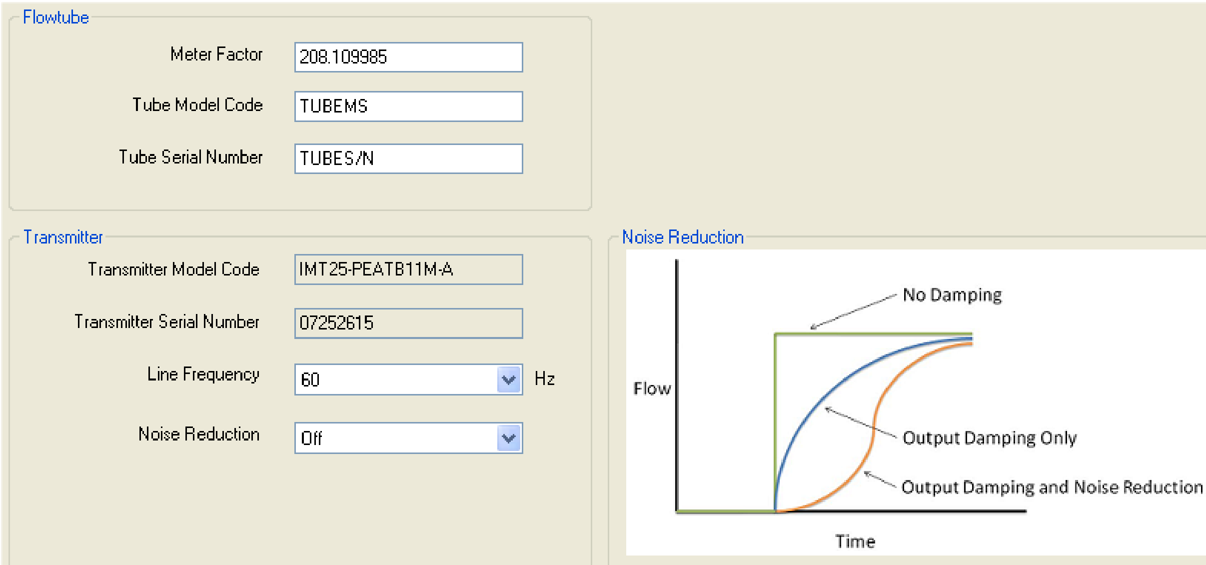


Figure 82. Sample IMT25 or IMT96 Transmitter Alarm Output Screen

Field	Entry
Flowtube	
Meter Factor	Enter the Cal Factor stamped on the flowtube data plate.[a]
Tube Model Code	Enter the flowtube model number stamped on the flowtube data plate.
Tube Serial Number	Enter the flowtube serial number stamped on the flowtube data plate.
Transmitter	
Transmitter Model Code	Shows the transmitter model code.
Transmitter Serial Number	Shows the transmitter serial number.
Line Frequency	Select the line frequency as 50 or 60 Hz.
Reduction	Select whether the reduction feature is to be On or Off.

(a) If data plate just says Cal Factor, refer to MI 019-397.

Contact Inputs Screen

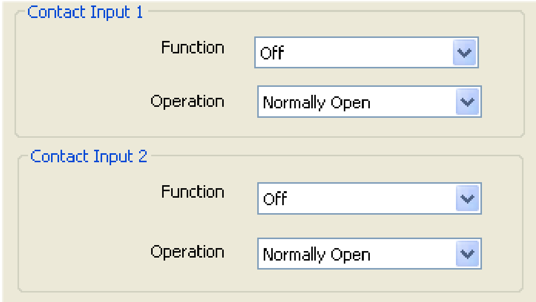


Figure 83. Sample IMT25 or IMT96 Transmitter Contact Inputs Screen

Field	Entry
Function	Select to enable (On) or not enable (Off) the specified contact input.
Operation	Select whether the contact input is Normally Open or Normally Closed.

Analog Output Screen

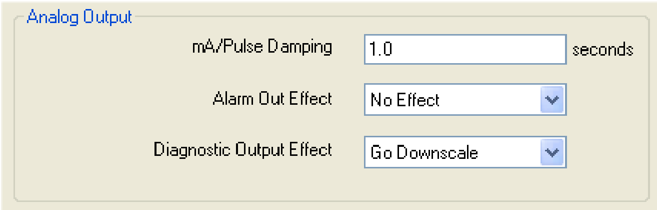


Figure 84. Sample IMT25 or IMT96 Transmitter Analog Output Screen

Field	Entry
mA/Pulse Damping	Enter the mA/Pulse Damping time in seconds.
Alarm Out Effect	Select how an alarm affects the output: No Effect, Go Upscale, or Go Downscale.
Diagnostic Output Effect	Select how a diagnostic condition affects the output: Go Upscale, or Go Downscale.

Pulse Output Screen

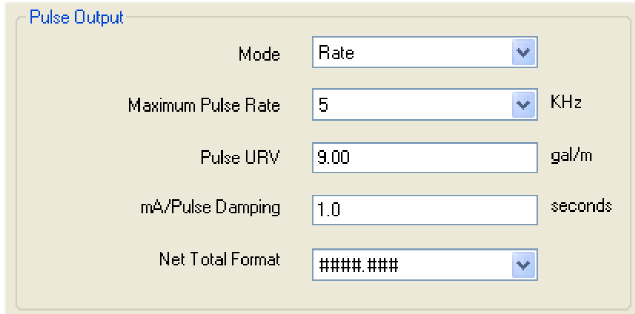


Figure 85. Sample IMT25 or IMT96 Transmitter Pulse Output Screen

Field	Entry
Mode	Select pulse output state as Rate or Total.
Maximum Pulse Rate	Select the output at full scale flow: 1, 2, 5, or 10 kHz.
Pulse URV	Specify the flow at the maximum pulse rate.
mA/Pulse Damping	Enter the damping time in seconds.
Net Total Format	Select the resolution of the displayed values for Net Total, Forward Total, and Reverse Total from the list provided.

Relay Output Screen

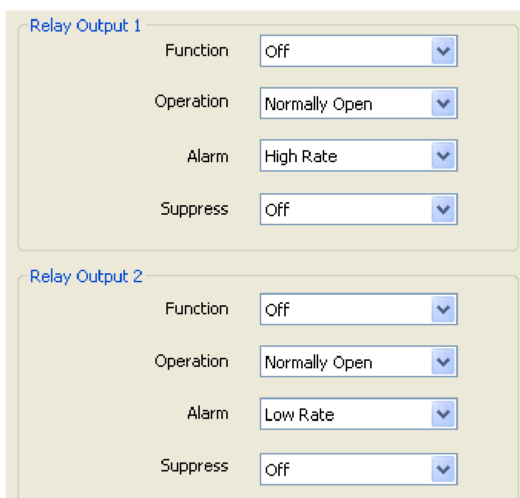


Figure 86. Sample IMT25 or IMT96 Transmitter Relay Output Screen

Field	Entry
Function	Select the function of the specified relay output: Off (not used), Alarms, Diags, Alarms+Diags, or Flow Direction. Also Test Mode on the IMT25.
Operation	Select whether the specified relay output is Normally Open or Normally Closed.
Alarm	Select the type of alarm that triggers the relay output (if Function is set to Alarms or Alarms+Diags.
Suppress	Select On or Off. On deactivates the relay while the alarm condition still exists.

Auto Zero Lock Screen

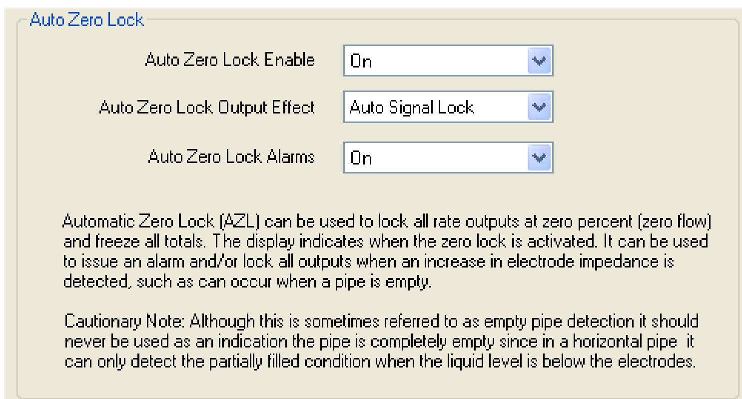


Figure 87. Sample IMT25 or IMT96 Transmitter Auto Zero Lock Screen

Field	Entry
Auto Zero Lock Enable	Select to enable (On) or not enable (Off) the AZL detector.
Auto Zero Lock Output Effect	Select to enable (Auto Zero Lock) or not enable (None) the AZL detector to affect the outputs.
Auto Zero Lock Alarms	Select to enable (On) or not enable (Off) the AZL detector to generate an alarm condition.

Alarm Screen

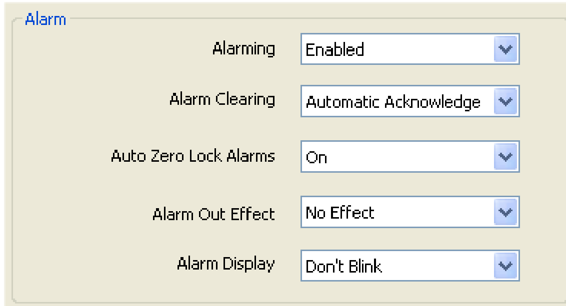


Figure 88. Sample IMT25 or IMT96 Transmitter Alarm Screen

Field	Entry
Alarming	Select On or Off to enable the alarm feature.
Alarm Clearing	Select Automatic Acknowledge to acknowledge an alarm automatically when the alarm condition no longer exists or select Manual Acknowledge only.
Auto Zero Lock Alarms	Select On or Off to enable or disable AZL to cause an alarm.
Alarm Out Effect	Select how an alarm affects the output: No Effect, Go Upscale, or Go Downscale
Alarm Display	Select whether you want the display to Blink or Don't Blink when an alarm condition occurs.

Flow Alarms Screen

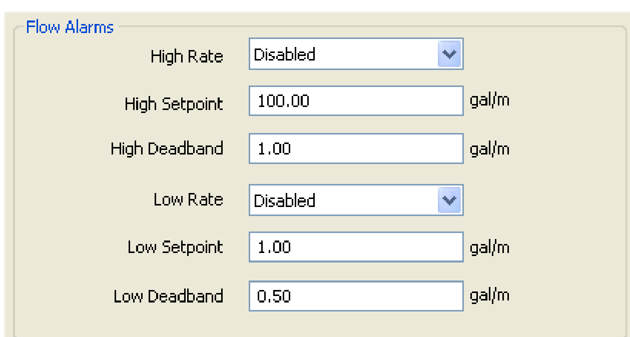


Figure 89. Sample IMT25 or IMT96 Transmitter Flow Alarms Screen

Field	Entry
High Rate	Select On or Off to specify whether High Rate Alarm is enabled.
High Setpoint	Enter the setpoint if High Rate alarming is enabled.
High Deadband	Enter the deadband if High Rate alarming is enabled.
Low Rate	Select On or Off to specify whether Low Rate Alarm is enabled.
Low Setpoint	Enter the setpoint if Low Rate alarming is enabled.
Low Deadband	Enter the deadband if Low Rate alarming is enabled.

Totalizer Alarms Screen

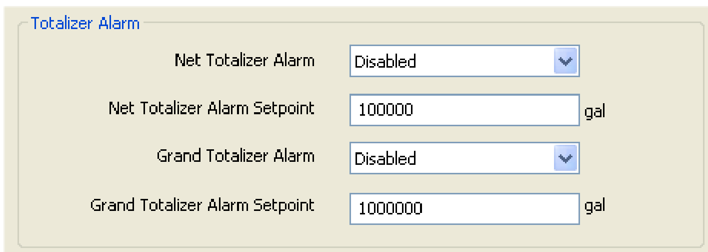


Figure 90. Sample IMT25 or IMT96 Transmitter Totalizer Alarms Screen

Field	Entry
Net Totalizer Alarm	Select On or Off to specify whether Net Totalizer Alarming is enabled.
Net Totalizer Alarm Setpoint	Enter the Net Totalizer Alarm Setpoint if Net Totalizer Alarm is enabled.
Grand Totalizer Alarm	Select On or Off to specify whether Grand Totalizer Alarming is enabled.
Grand Totalizer Alarm Setpoint	Enter the Grand Totalizer Alarm Setpoint if Grand Totalizer Alarm is enabled.

HART Screen

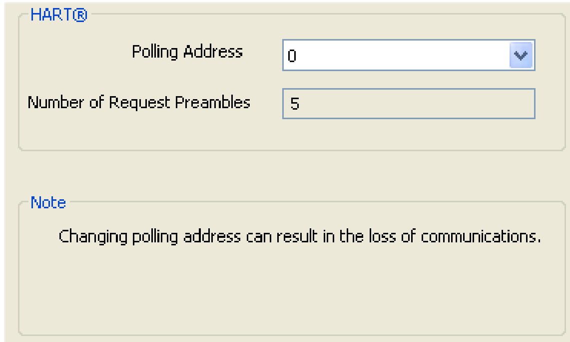


Figure 91. Sample IMT25 or IMT96 Transmitter HART Screen

Field	Entry
Polling Address	Select an address between 0 and 15. A nonzero number applies to multidrop applications.
Number of Request Preambles	Shows the number of preambles to be sent in a response message from the transmitter to the host.

Local Display Screen

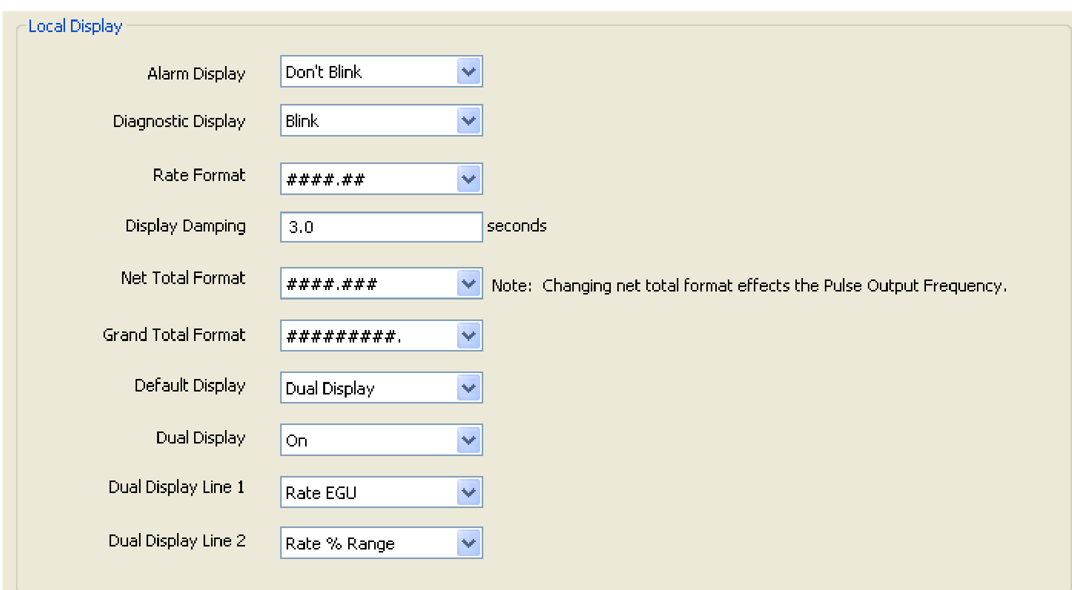


Figure 92. Sample IMT25 or IMT96 Transmitter Local Display Screen

Field	Entry
Alarm Display	Select whether you want the display to Blink or Don't Blink when an alarm condition occurs.
Diagnostic Display	Select whether you want the display to Blink or Don't Blink when an diagnostic condition occurs.
Rate Format	Select the resolution of the displayed values for flowrate from the list provided.
Display Damping	Enter the Display Damping time in seconds.
Net Total Format	Select the resolution of the displayed values for Net Total from the list provided.
Grand Total Format	Select the resolution of the displayed values for Grand Total from the list provided.
Default Display	Select the measurement to be displayed from the list provided.
Dual Display	Select On or Off to enable or disable the Dual Display feature.
Dual Display Line 1	Select the measurement to be displayed on Line 1 if Dual Display was enabled.
Dual Display Line 2	Select the measurement to be displayed on Line 2 if Dual Display was enabled.

Device Information

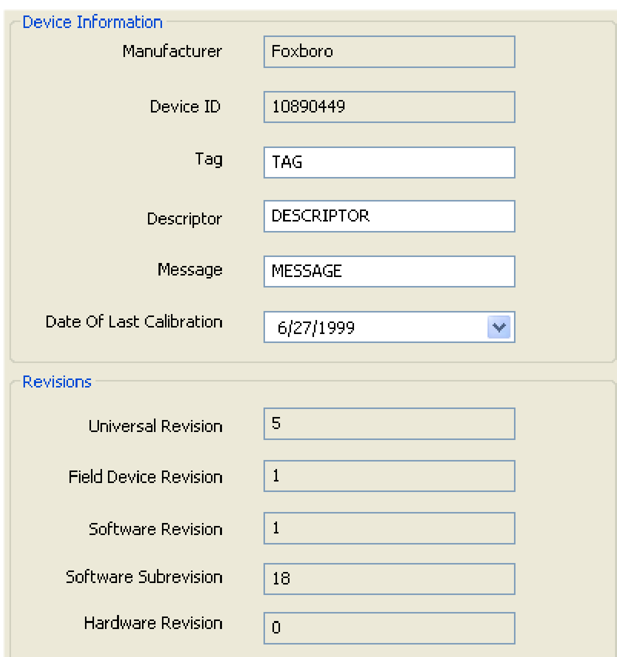


Figure 93. Sample IMT25 or IMT96 Transmitter Device Information Screen

Field	Entry
Device Information	
Manufacturer	Shows the manufacturer as Foxboro.
Device ID	Shows the Device ID.
Tag	Enter the Tag (8 characters maximum).
Descriptor	Enter the Descriptor (16 characters maximum).
Message	Enter the Message (32 characters maximum).
Date of last Calibration	Select the Date of Last Calibration.
Revisions	
Universal Revision	Shows the universal command set revision level.
Field Device Revision	Shows the field device revision level.
Software Revision	Shows the software revision level.
Software Subrevision	Shows the software subrevision level.
Hardware Revision	Shows the hardware revision level.

Troubleshooting

Loop Test

The Loop Test is a procedure to use the transmitter as a calibration source to check other instruments in the loop.

Digital Output

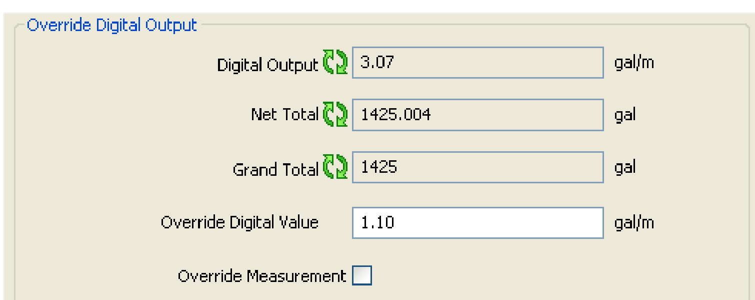


Figure 94. Sample IMT25 or IMT96 Transmitter Loop Test (Digital Output) Screen

Field	Entry
Digital Output	Shows the current Digital Output.
Net Total	Shows the current Net Total.
Grand Total	Shows the current Grand Total.

Field	Entry
Override Digital Value	Enter the desired digital value.
Override Measurement	Check/uncheck to activate/end override of measurement.

Analog Output

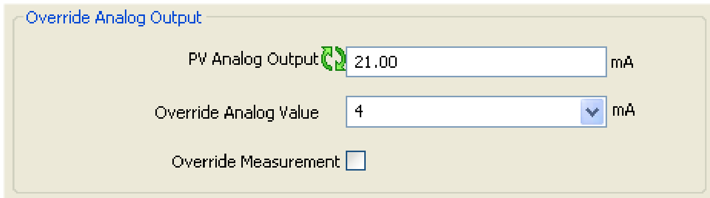


Figure 95. Sample IMT25 or IMT96 Transmitter Loop Test (Analog Output) Screen

Field	Entry
PV Analog Output	Shows the current PV Analog Output in mA.
Override Analog Value	Select 4 mA or 20 mA.
Override Measurement	Check/uncheck to activate/end override of measurement.

Pulse Output

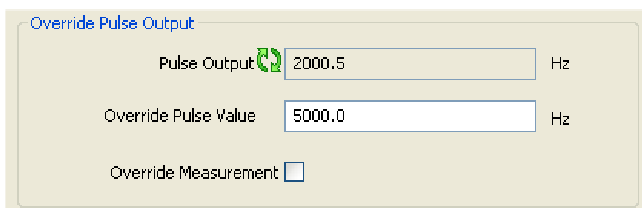


Figure 96. Sample IMT25 or IMT96 Transmitter Loop Test (Pulse Output) Screen

Field	Entry
Pulse Output	Shows the current Pulse Output.
Override Pulse Value	Enter the desired pulse value in Hz.
Override Measurement	Check/uncheck to activate/end override of measurement.

5. MAG2 Series Magnetic Flow Transmitters

This chapter provides information that is exclusive to using MAG2 series of high performance Magnetic Flow Transmitters with HART communication protocol. Additional information about these transmitters with HART communication is contained in the following document.

- MI 021-500 Installation, operation, and maintenance of MAG2 Series Magnetic Flowmeters

Device Overview Screen

The Device Overview screen displays HART information, Device Information, current PV, and current Totals data.

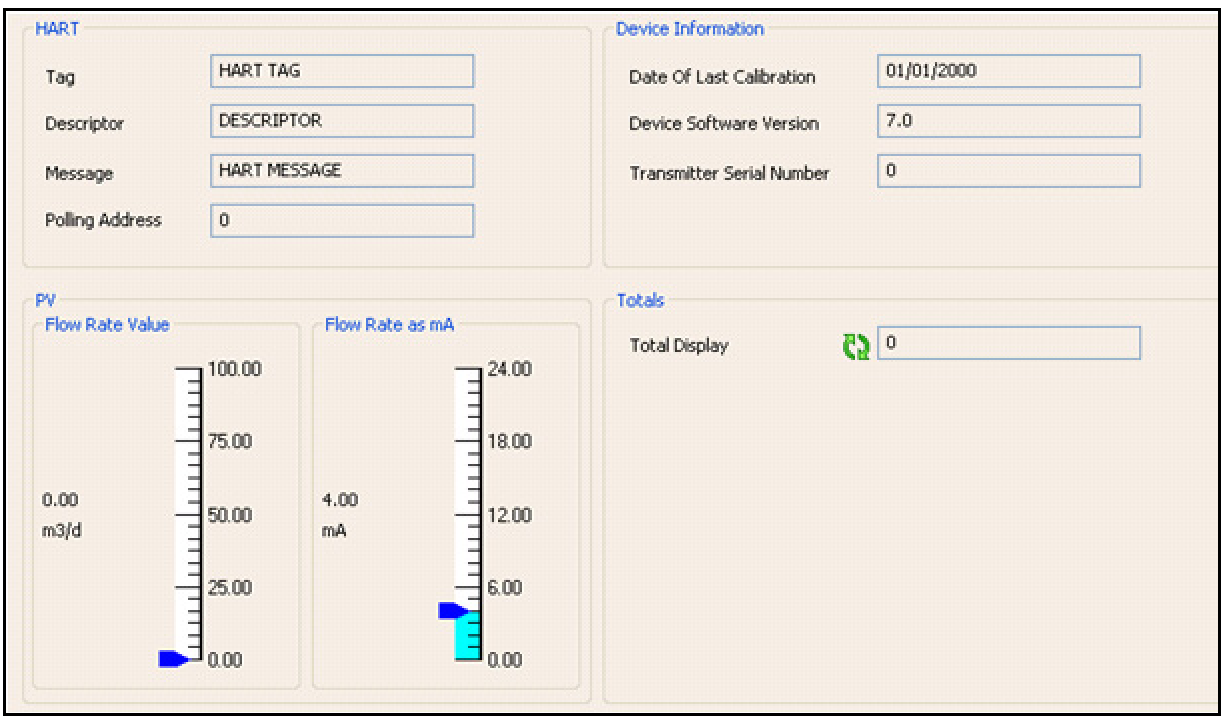


Figure 97. Sample MAG2 Series Transmitter Device Overview Screen

Process Variables Screen

The Process Variables screen displays the PV and totals data that was displayed on the Device Overview screen plus additional measurement information.

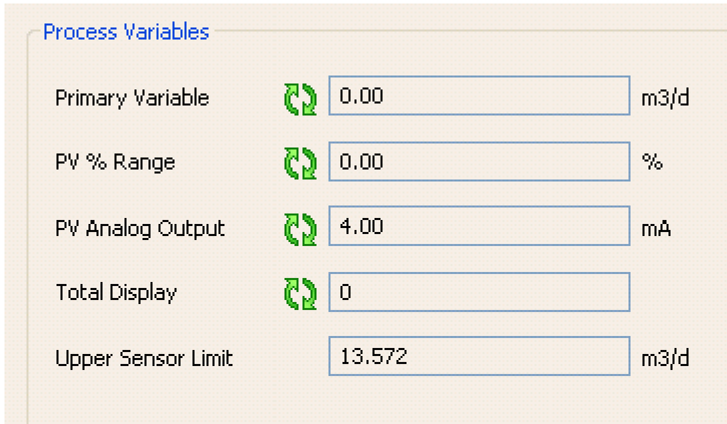


Figure 98. Sample MAG2 Series Transmitter Process Variables Screen

Setup

General Setup Screen

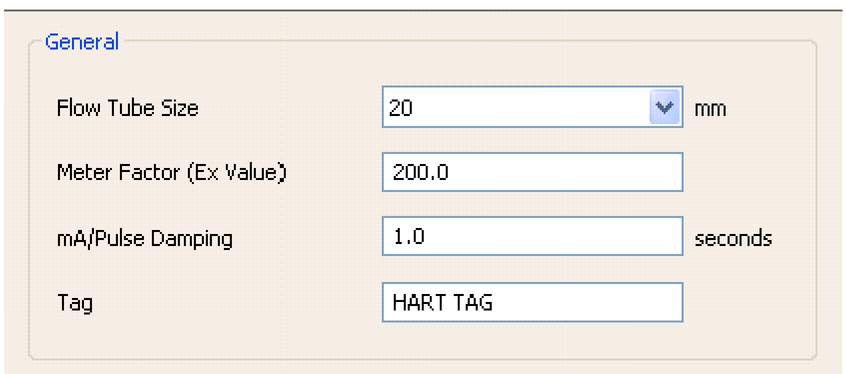


Figure 99. Sample MAG2 Series Transmitter General Setup Screen

Field	Entry
Flow Tube Size	Select the nominal inside diameter of the flow tube size adjacent to the sensor from the drop-down menu.
Meter Factor	Set the Cal Factor stamped on the flowtube data plate.
mA/Pulse Damping	Set the damping time in seconds.
Tag	Set the tag name. Enter maximum of 8 characters. Optional, used for reference only.

Measurement Units Screen

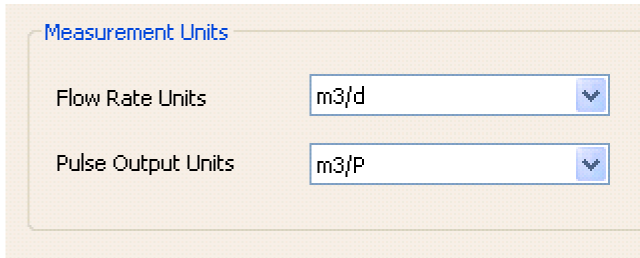


Figure 100. Sample MAG2 Series Transmitter Measurement Units Screen

Field	Entry
Flow Rate Units	Select the flow rate units from the drop-down menu.
Pulse Output Units	Select the pulse output units from the drop-down menu.

When Mass Flow units is selected, the Measurement screen appears as shown in Figure 101.

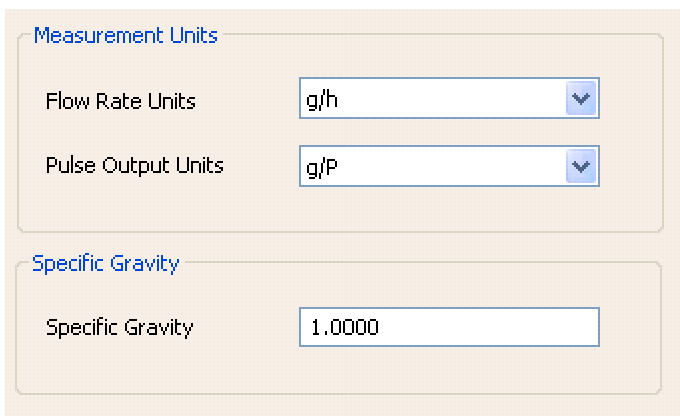


Figure 101. Sample MAG2 Series Transmitter Measurement Units Screen - Mass Flow Units Selected

Field	Entry
Measurement Units	
Flow Rate Units	Select the flow rate units from the drop-down menu.
Pulse Output Units	Select the pulse output units from the drop-down menu.
Specific Gravity	
Specific Gravity	Enter the specific gravity.

Totalizers Screen

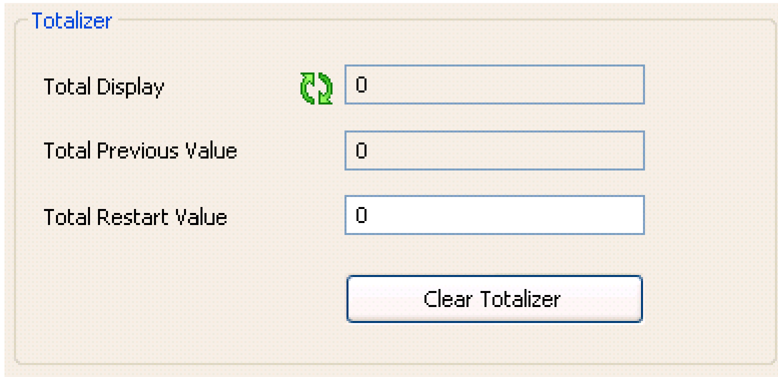


Figure 102. Sample MAG2 Series Transmitter Totalizers Screen

Field	Entry
Total Restart Value	Set the Total restart value.
Clear Totalizer Button	Clears the Net Totalizer

Rate Range Screen

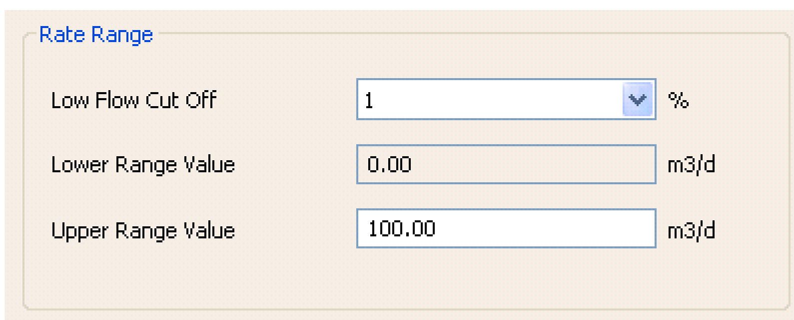


Figure 103. Sample MAG2 Series Transmitter Rate Range Screen

Field	Entry
Low Flow Cut Off	Select the low flow cut off value from the drop-down menu.
Upper Range Value	Set the upper range value, which is the value when the output reaches 100%.

Flow Tube Screen

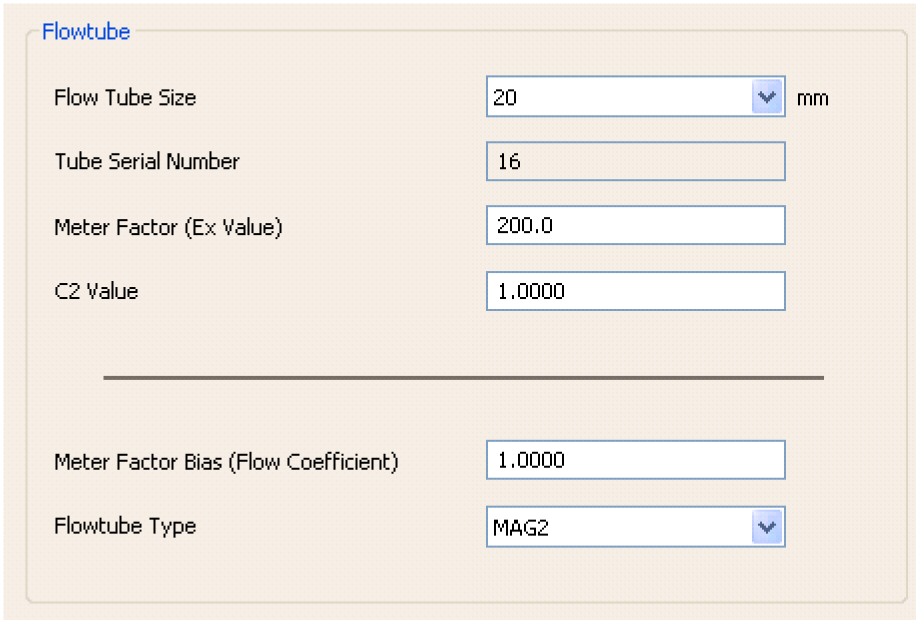


Figure 104. Sample MAG2 Series Transmitter Flow Tube Screen

Field	Entry
Flowtube	
Flow Tube Size	Select the Flowtube size from the drop-down menu.
Meter Factor (Ex Value)	Set the meter factor.
C2 Value	Set the Flowtube factor.
Meter Factor Bias (Flow Coefficient)	Set a compensation coefficient for flow rate calculation.
Flowtube Type	Select the Flowtube type from the drop-down menu. MAG2 should be the only chosen option for normal product operation.

Transmitter Screen

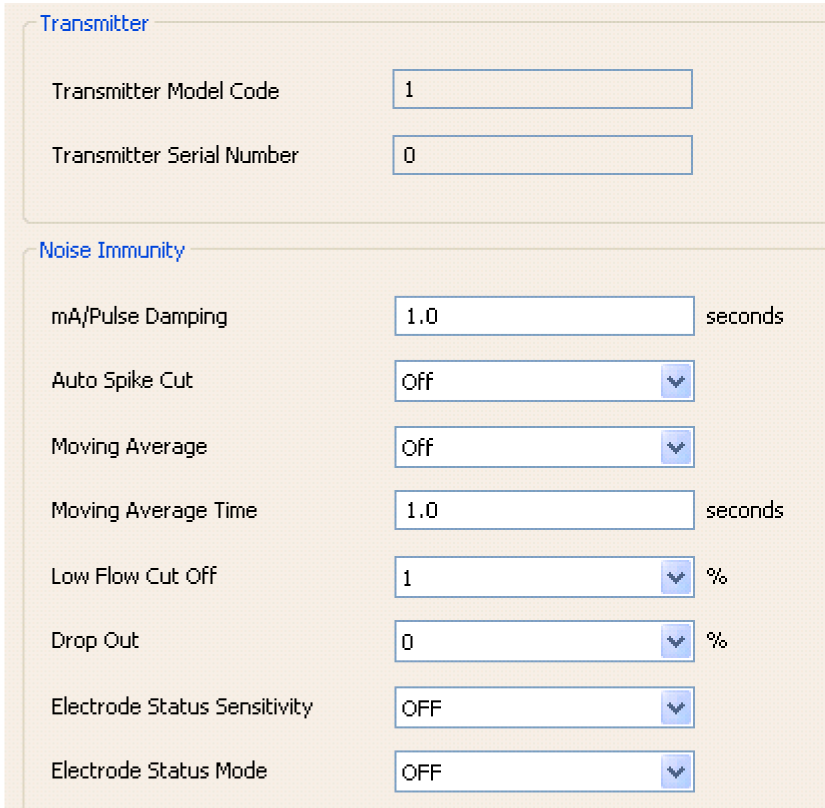


Figure 105. Sample MAG2 Series Transmitter Screen

Field	Entry
Immunity	
mA/Pulse Damping	Set the pulse damping time in seconds.
Auto Spike Cut	Allows you to turn the auto spike cut on or off.
Moving Average	Allows you to set the moving average to on or off.
Moving Average Time	Set the moving average time in seconds.
Low Flow Cut Off	Select the low flow cut off value, in percentage, from the drop-down menu.
Drop Out	Select the drop-out rate in percentage
Electrode Status Sensitivity	Select the electrode status sensitivity from the drop-down menu.
Electrode Status Mode	Select the electrode status mode.

Output Screen - Analog

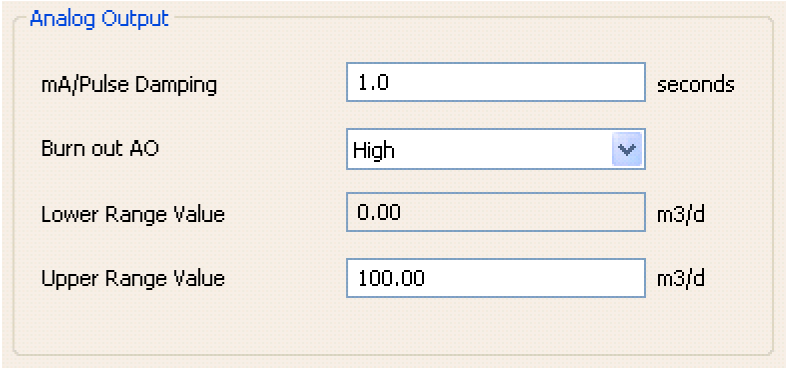


Figure 106. Sample MAG2 Series Transmitter Analog Output Screen

Field	Entry
mA/Pulse Damping	Set the pulse damping time in seconds.
Burn out AO	Select the burn-out value from the drop-down menu.
Upper Range Value	Set the upper range value for the analog output.

Output Screen - Pulse/Contact

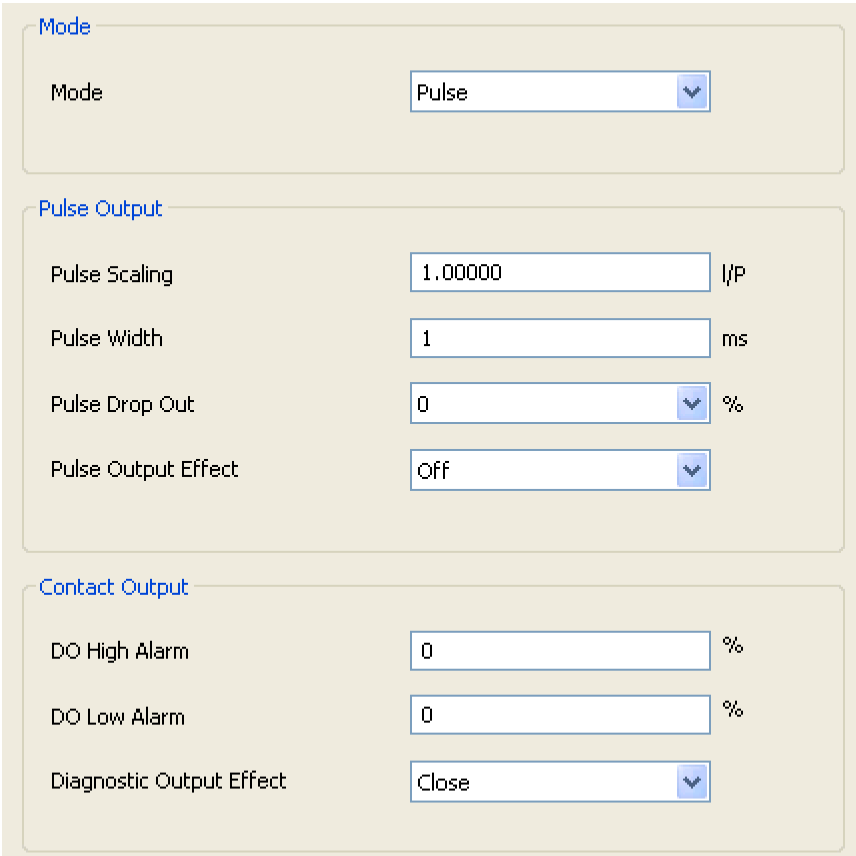


Figure 107. Sample MAG2 Series Transmitter Pulse Output Screen

Field	Entry
Mode	
Output Mode	Select the output mode from the drop-down menu.
Pulse Output	
Pulse Scaling	Set the pulse scaling value.
Pulse Width	Set the pulse width value in milliseconds.
Pulse Drop Out	Select the drop-out value from the drop-down menu.
Pulse Output Effect	Set the burn-out value.
Contact Output	
DO High Alarm	Set the alarm to trigger at the higher value set.
DO Low Alarm	Set the alarm to trigger at the lower value set.
Diagnostic Output Effect	Select the diagnostic output effect from the drop-down menu.

Output Screen - HART

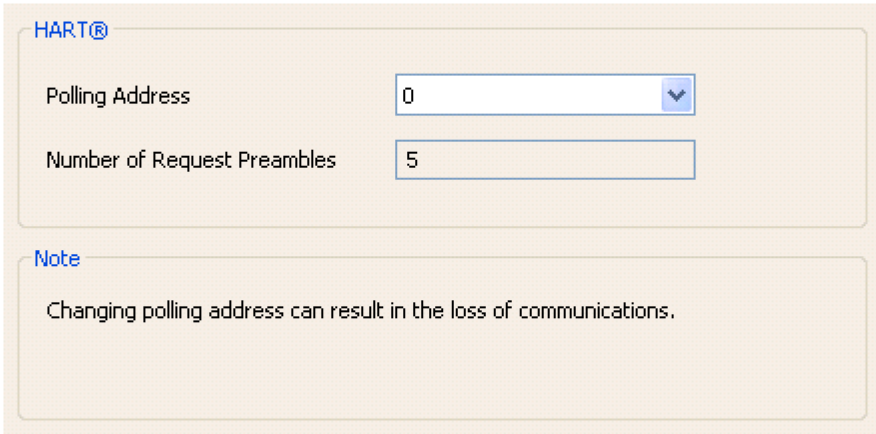


Figure 108. Sample MAG2 Series Transmitter HART Output Screen

Field	Entry
HART	
Polling Address	Select an address between 0 and 15. A nonzero number applies to multidrop applications.

Output Screen - Local Display

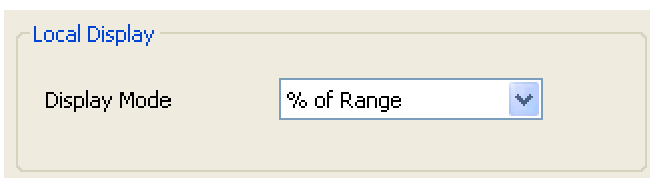


Figure 109. Sample MAG2 Series Transmitter Local Display Output Screen

Field	Entry
Display Mode	Select the display mode in percentage of range from the drop-down menu.

Device Information

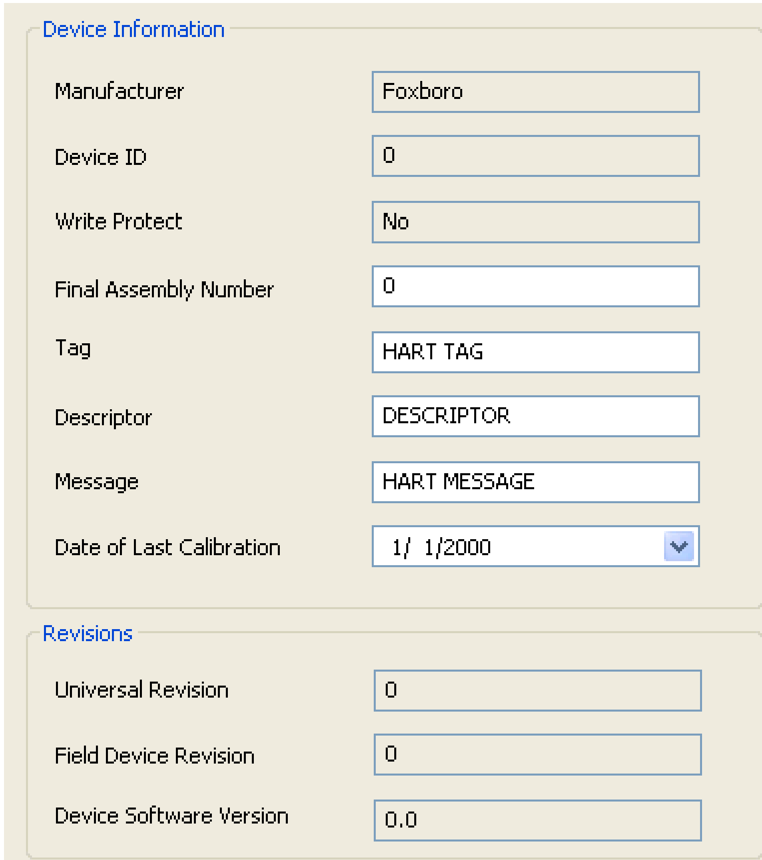


Figure 110. Sample MAG2 Series Transmitter Device Information Screen

Field	Entry
Device Information	
Final Assembly Number	Enter the assembly number of the device that is connected.
Tag	Enter the Tag (8 characters maximum).
Descriptor	Enter the Descriptor (16 characters maximum).
Message	Enter the Message (32 characters maximum).
Date of last Calibration	Select the Date of Last Calibration.

Device Status Screen

The Device Status screen shows the current status of the device. The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red X (error).

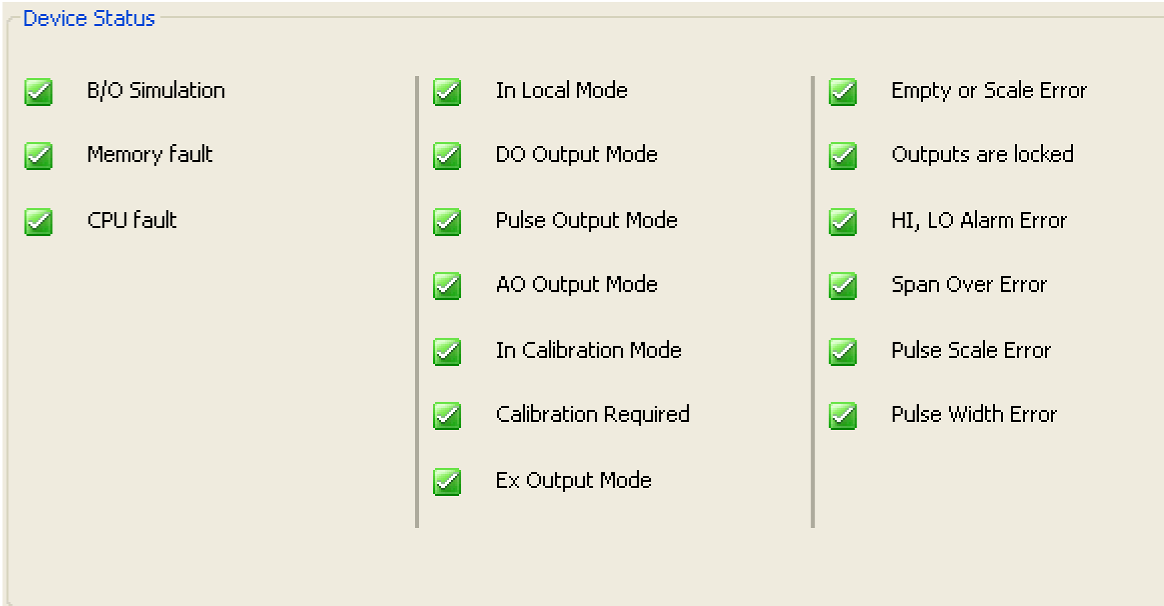


Figure 111. Sample MAG2 Series Transmitter Device Status Screen

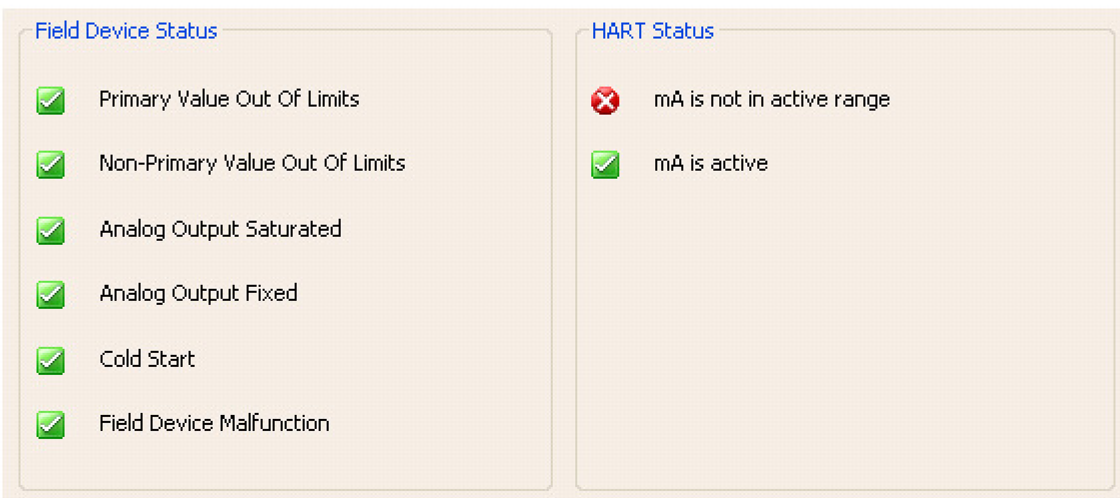


Figure 112. Sample MAG2 Series Transmitter HART Status Screen

Calibration

You can perform the following calibration procedures on a MAG2 Series Transmitter:

DAC Trim

In this procedure the transmitter controls the loop current to either 4 mA (zero) or 20 mA (span). By providing the inputs to the following screens, the values indicated by a suitable reference like a digital multimeter, the transmitter can trim its output.

Gain Trim

This is an electrical trim and you can set the meter to the following values, 0.0m/s, 2.5m/s, and 10.0 m/s.

Pulse Trim

Pulse trim is the calibration for pulse output.

Ex Trim

Ex trim is the calibration for excitation current. You can choose from the following options, 3.5 mA, 4.9 mA, 7.0 mA, 11.9 mA, and 14.0 mA.

Manual Zero

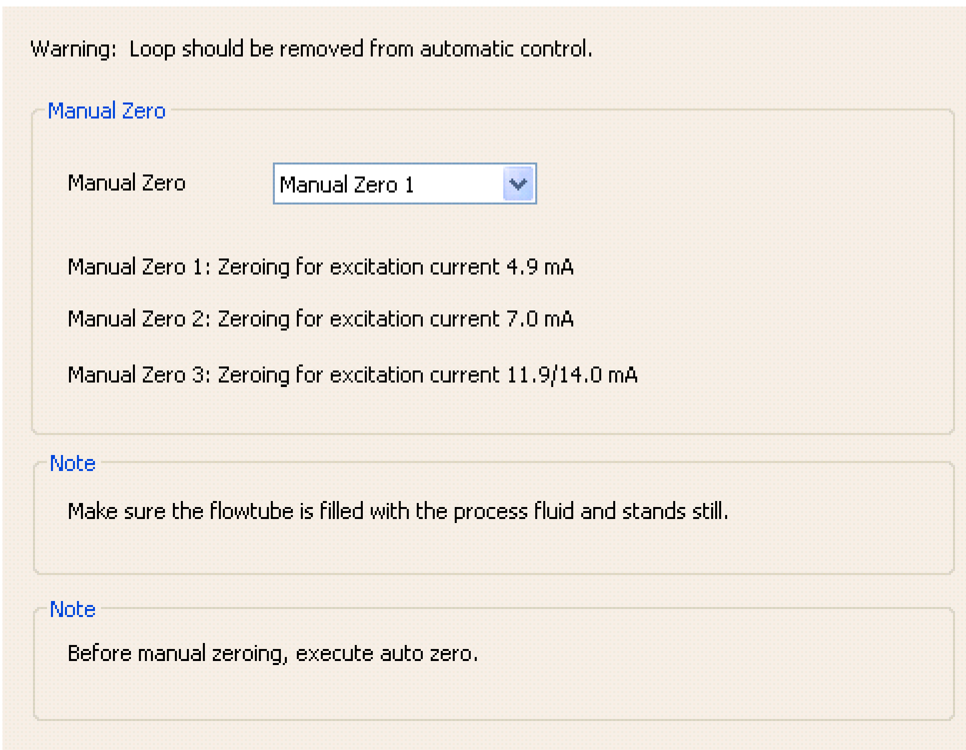


Figure 113. Sample MAG2 Series Transmitter Manual Zero Screen Page 1

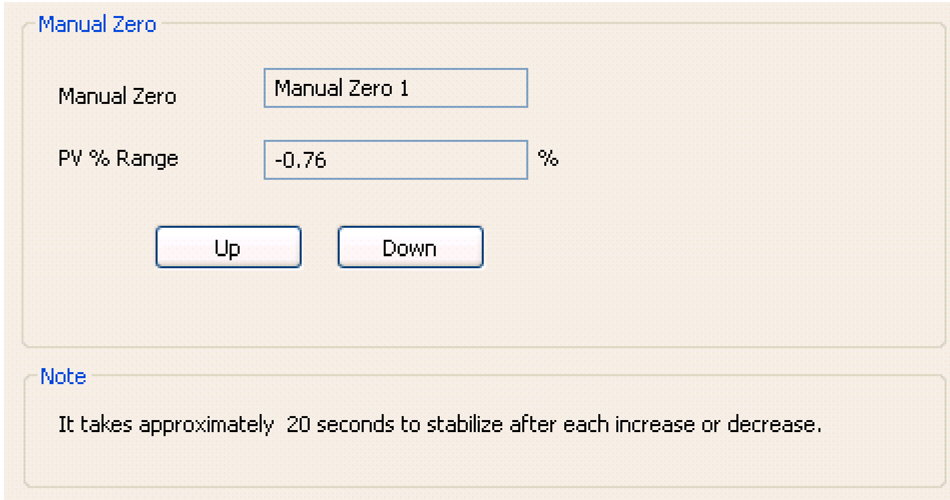


Figure 114. Sample MAG2 Series Transmitter Manual Zero Screen Page 2

Auto Zero

In this procedure, the transmitter calibrates the impedance of the fluid between the electrodes so that it may be used to detect when the fluid level gets below the electrode level.

Troubleshooting

Restore Factory Settings

The Restore Factory Settings options will reset all data to factory default values. This helps with the troubleshooting tasks.

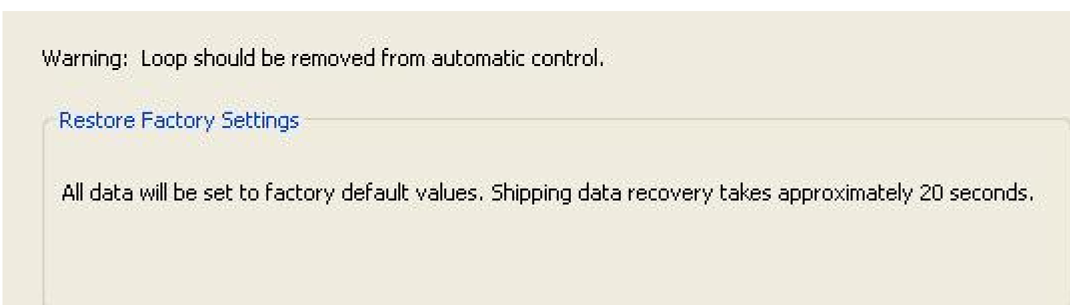


Figure 115. Sample MAG2 Series Transmitter Restore Factory Settings Options Screen

Loop Test

The Loop Test is a procedure to use the transmitter as a calibration source to check other instruments in the loop.

Loop Check

Figure 116. Sample MAG2 Series Transmitter Loop Check Screen

Analog Output

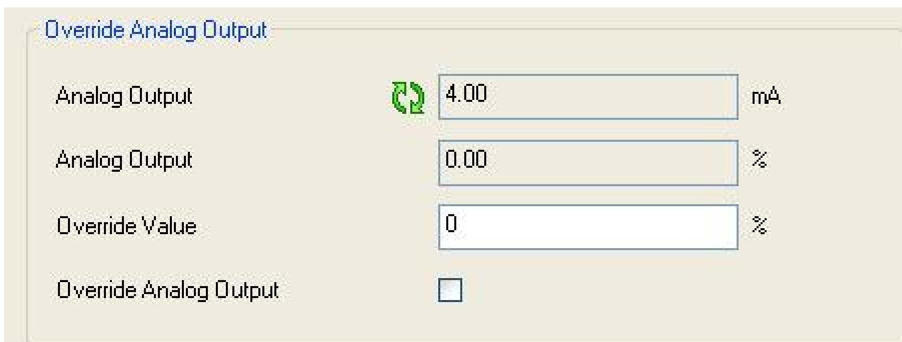


Figure 117. Sample MAG2 Series Transmitter Loop Test (Analog Output) Screen

Field	Entry
Override Value	Allows you to set the override value in percentage.
Override Analog Output	Select the check box to override analog output.

Pulse Output

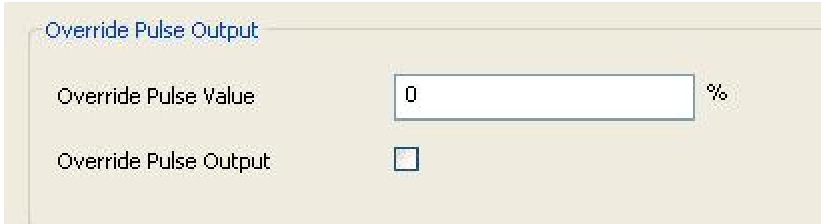


Figure 118. Sample MAG2 Series Transmitter Loop Test (Pulse Output) Screen

Field	Entry
Override Pulse Value	Allows you to set the override pulse value in percentage.
Override Pulse Output	Select the check box to override pulse output.

6. 875PH Analyzer

This chapter provides information that is exclusive to using 875PH with HART communication protocol. Additional information is available in the following document.

- MI 611-225 Model 875PH Intelligent Electrochemical Analyzer for pH, ORP, or Ion Selective Electrode (ISE) Measurements

Device Overview

The Device Overview screen displays the HART information and the device information. The current measurement, temperature, analog 1 output (PV) and HART analog (SV) data is represented in a graph.

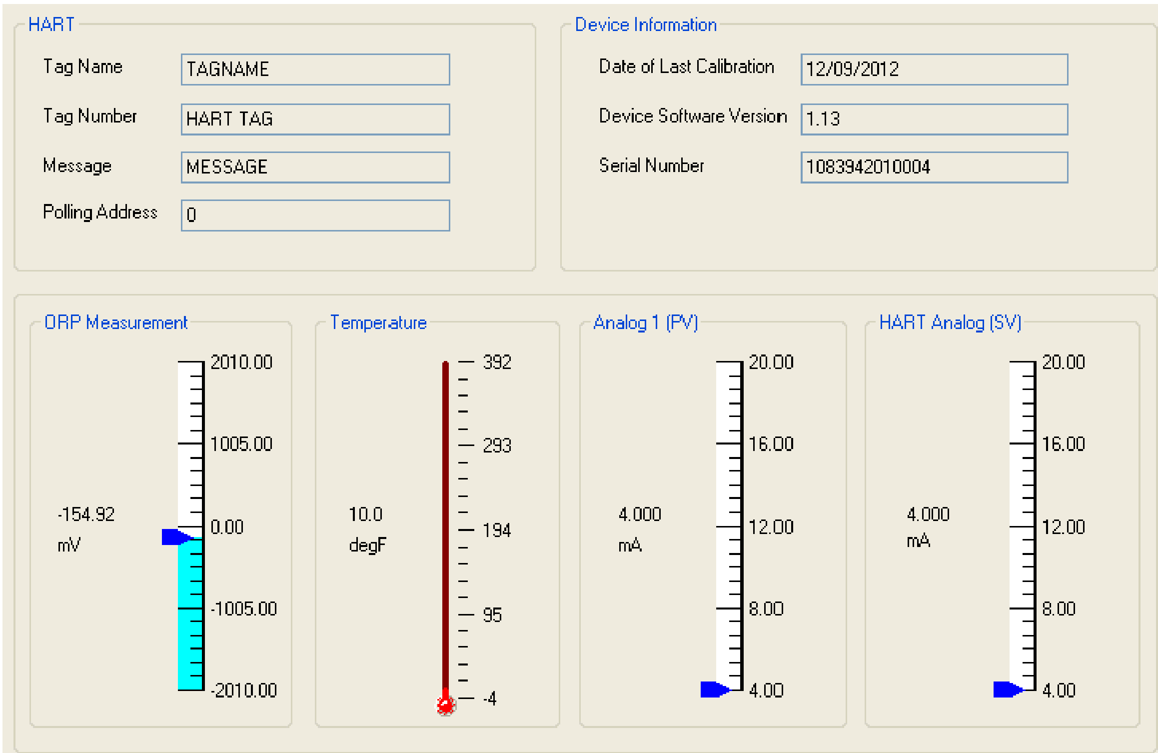


Figure 119. Sample 875PH Analyzer Device Overview Screen

Field	Entry
HART	
Tag Name	This field shows the HART tag which is the unique identifier of the device.
Tag Number	This field shows the tag number.
Message	This field shows the HART message that is sent from the device when requested. The message can have a maximum of 32 characters.
Polling Address	This field shows the configured address of the device.

Field	Entry
Device Information	
Date of Last Calibration	This field shows the last calibrated date of the transmitter. **— NOTE** You can change the calibration date in "Device Information".
Device Software Version	This field shows the software version of the device.
Serial Number	This field shows the serial number of the device.

Device Configuration

General

The General screen is where you can set measurement units for device parameters and specify a passcode that allows you to access the configurable device parameters.

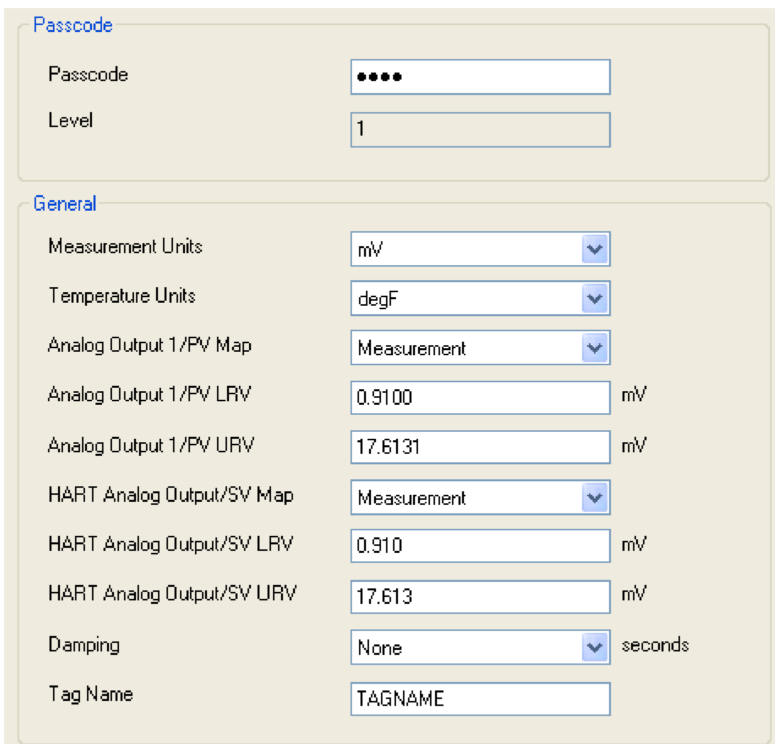


Figure 120. Sample 875PH Analyzer General Screen

Field	Entry
Passcode	
Passcode	Specify a passcode (valid) for configuring the device parameters.
Level	This field shows the passcode level.
General	
Measurement Units	Select the units for measurement from the drop-down list. Choose from ppm, mV, pH, and Custom.
Temperature Units	Select the units for temperature from the drop-down list. Choose from degC and degF.
Analog Output 1/PV Map	Map a measurement for analog output 1 from the drop-down list. Choose from Measurement, Temperature, Absolute, and Off. Select Off if you choose not to use this feature.
Analog Output 1/PV LRV	Specify the lower range value for analog output 1.
Analog Output 1/PV URV	Specify the upper range value for analog output 1.
HART Analog Output/SV Map	Map a measurement for HART analog output from the drop-down list. Choose from Measurement, Temperature, Absolute, and Off. Select Off if you choose not to use this feature.
HART Analog Output/SV LRV	Specify the lower range value for HART analog output.
HART Analog Output/SV URV	Specify the upper range value for HART analog output.
Damping	Select the damping time that is applied to the current output. Choose from None, 5, 10, 20, 40, and 120 seconds.
Tag Name	Specify the HART tag name. The tag name can have a maximum of 8 characters.

Sensor

The Sensor screen allows you to configure parameters for sensor.

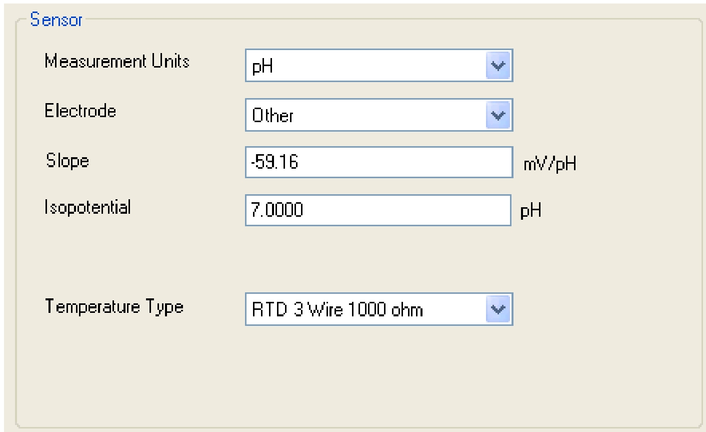


Figure 121. Sample 875PH Analyzer Sensor Screen (pH Selection)

Field	Entry
Sensor	
Measurement Units	Select the measurement units to measure sensor temperature. Choose from ppm, mV, pH, and Custom. For pH or ppm units you must select the electrode.
Electrode	Select the electrode from the drop-down list. If measuring pH - choose from Glass, Antimony, or Other. • Glass sets the isopotential point at 7 pH. • Antimony sets it at 1 pH. • Other allows the isopotential point to be set manually from -2.0 through 16.0 pH. If measuring ppm - choose from Positive or Negative to specify the ion polarity as positive or negative. • A positive ion selective measurement gets more positive as the concentration increases • A negative ion selective measurement gets more negative as the concentration increases.
Slope[a]	Specify mV change per decade change in concentration.
Isopotential[b]	Set the isopotential point.
Temperature Type	Select the temperature type from the drop-down list. Choose from 2 Wire 100 Ω, 2 Wire 1000 Ω, 3 Wire 100 Ω, or 3 Wire 1000 Ω, and BALCO.

a. This parameter appears for pH measurement when the Electrode is selected as ‘Other’.

b. This parameter appears for ppm measurement, and for pH measurement when the Electrode is selected as ‘Other’.

For ppm measurement with positive electrode, you must select Valence.

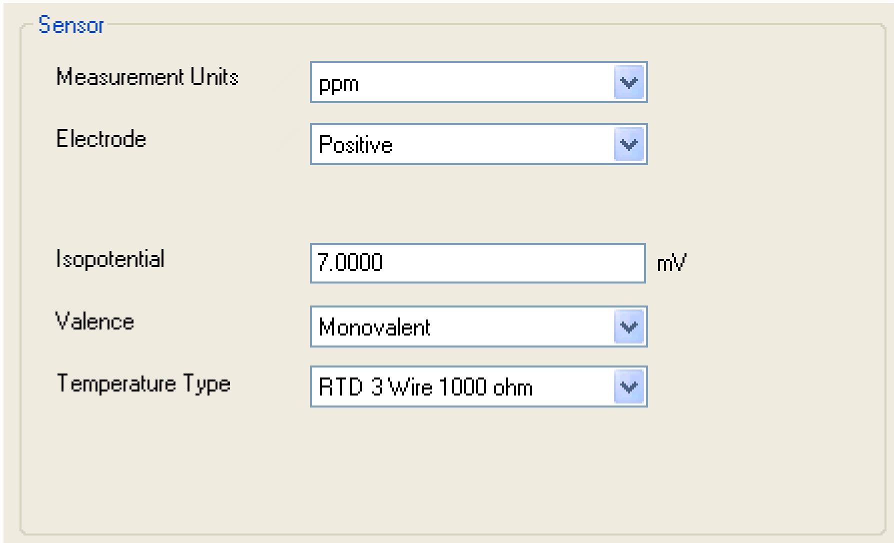


Figure 122. Sample 875PH Analyzer Sensor Screen (ppm Selection)

Field	Entry
Sensor	
Valence	Select valence as Monovalent or Divalent from the drop-down list.

Measurement Units

The Measurement Units screen allows you to set measurement units, scale for the measurement units, and the damping time.

Figure 123. Sample 875PH Analyzer Measurement Units Screen (pH Selection)

Field	Entry
Measurement Units	
Measurement Units	Select the units for measurement. Choose from ppm, mV, pH, and Custom.
Resolution	This parameter appears only for pH measurement. Set the resolution as 0.1 or 0.01 from the drop-down list.
Damping	
Damping	Select the damping time from the drop-down list. Choose from None, 5, 10, 20, 40, and 120 seconds.

If you choose ppm measurement, you must select scale and chemical compensation.

Figure 124. Sample 875PH Analyzer Measurement Units Screen (ppm Selection)

Field	Entry
Measurement Units	
Measurement Units	Select the measurement units as ppm.
Scale	This parameter appears only for ppm measurement. Select scale from the drop-down list. Choose from 0.9999, 9.999, 99.99, 999.9, and 9999.
Chemical Compensation	Select chemical compensation from the drop-down list. Choose from Standard and Custom. If you select Custom, specify number of points to plot a measurement curve, and the base and custom points for the custom units. Refer to Figure 125.
Damping	
Damping	Select the damping time from the drop-down list. Choose from None, 5, 10, 20, 40, and 120 seconds.

For Custom measurement units you must specify custom units and select custom scale. You should also specify the number of points to plot a measurement curve, and the base and custom points.

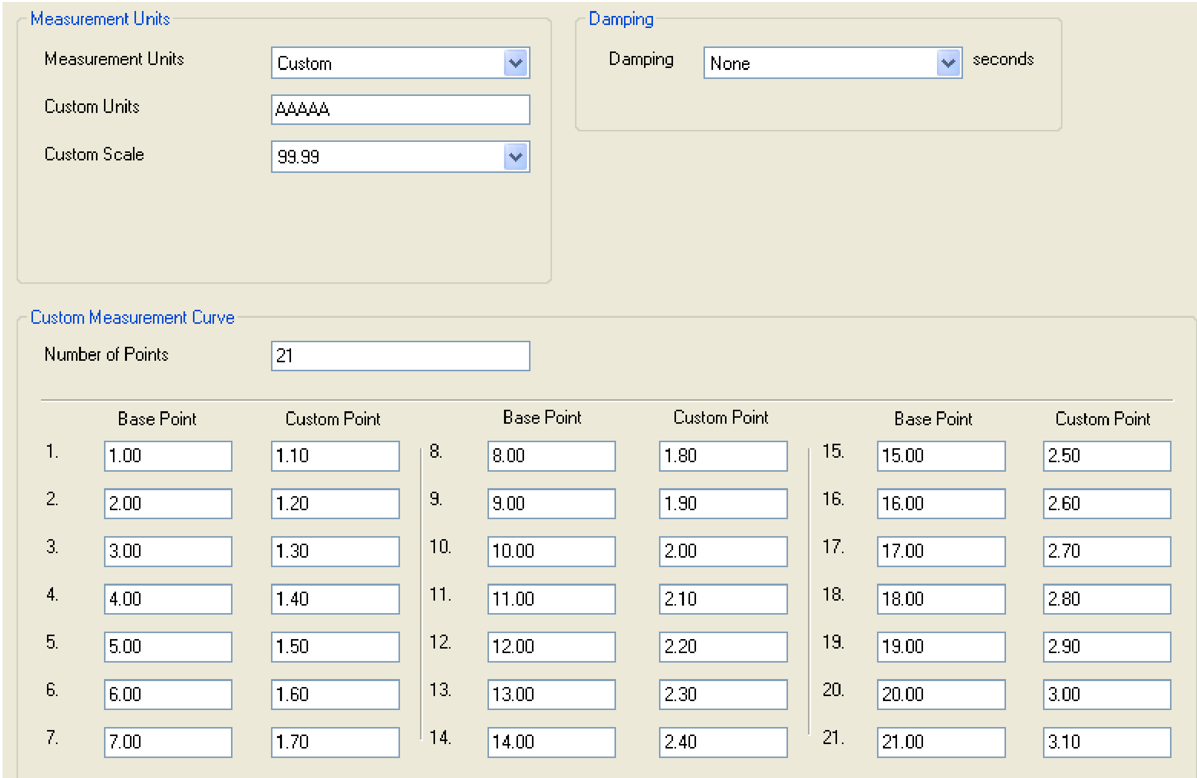


Figure 125. Sample 875PH Analyzer Measurement Units Screen (Custom Selection)

Field	Entry
Measurement Units	
Measurement Units	Select the units as Custom from the drop-down list.
Custom Units	Specify the custom units.
Custom Scale	Select the custom scale from the drop-down list. Choose from 0.9999, 9.999, 99.99, 999.9, and 9999.
Damping	
Damping	Select the damping time from the drop-down list. Choose from None, 5, 10, 20, 40, and 120 seconds.
Custom Measurement Curve	
Number of Points	Specify the number of points to plot a measurement curve. You can specify from 2 to 21 points. Based on the number of points you specify, the fields to enter base and custom points are displayed.
Base Point	Specify the base point.
Custom Point	Specify the custom point.

— NOTE —

A Slope Error is displayed when errors made during the entry of custom tables cause an invalid slope.

Temperature

The Temperature screen allows you to set units for temperature measurement.

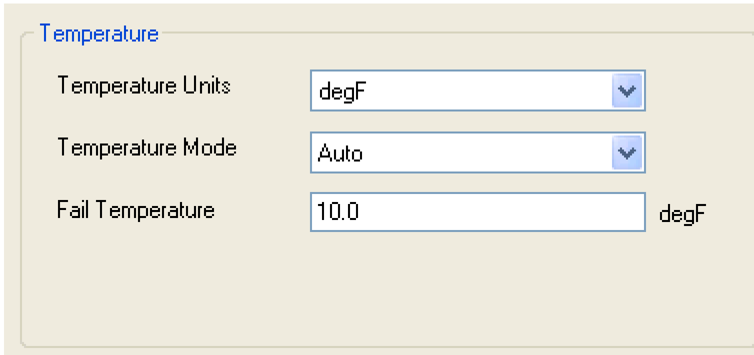


Figure 126. Sample 875PH Analyzer Temperature Screen (Temperature Mode as Auto)

Field	Entry
Temperature	
Temperature Units	Select units for temperature measurement from the drop-down list. Choose from degF or degC.
Temperature Mode	Select the temperature mode from the drop-down list. Choose from Auto or Manual. • In Automatic mode, the temperature follows the temperature input RTD and you can set a temperature fail signal value in case the RTD fails at the temperature at which you expect the process to be operating. • In Manual mode, the temperature can be set at a fixed temperature value and resistance inputs on the temperature terminal are ignored.
Fail Temperature	Set a temperature that can be used in case of RTD failure.

If you select Manual mode, specify a value for temperature.

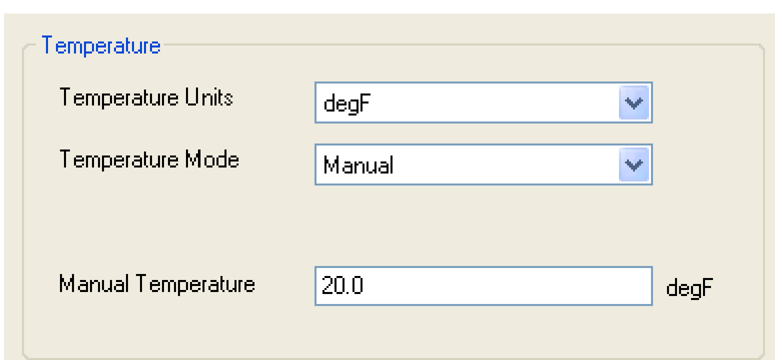


Figure 127. Sample 875PH Analyzer Temperature Screen (Temperature Mode as Manual)

Field	Entry
Temperature	
Manual Temperature	Specify a temperature value.

Temperature Compensation

The Temperature Compensation screen allows you to set the temperature compensation for pH, ppm, and custom measurements.

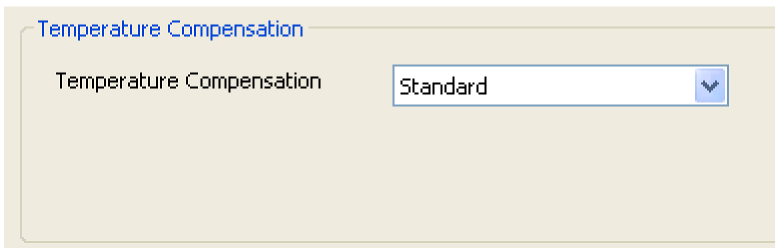


Figure 128. Sample 875PH Analyzer Temperature Compensation Screen

— NOTE —
Temperature Compensation is not available for mV measurement.

Field	Entry
Temperature Compensation	
Temperature Compensation	Select the temperature compensation from the drop-down list. The options in this drop-down vary based on the measurement selected. If pH was chosen as measurement unit, select from Standard, Ammonia, or Custom. If ppm was chosen as measurement unit, choose from Standard or Custom. If Custom was chosen as the measurement unit, you can customize units for measurement. • Standard - assumes a glass or antimony electrode and applies the Nernst equation. The nominal temperature compensation range is -5 to +105° C (23 to 221° F). • Ammonia - compensates for traces of ammonia in addition to the standard compensation. • Custom - allows you to specify particular solution characteristics into the analyzer's memory. All measurements are corrected back to a reference temperature measurement value. Therefore, you are asked to specify a reference temperature and a number of points to plot a compensation curve.

For custom temperature compensation specify reference temperature and the number of points to plot a custom compensation curve.

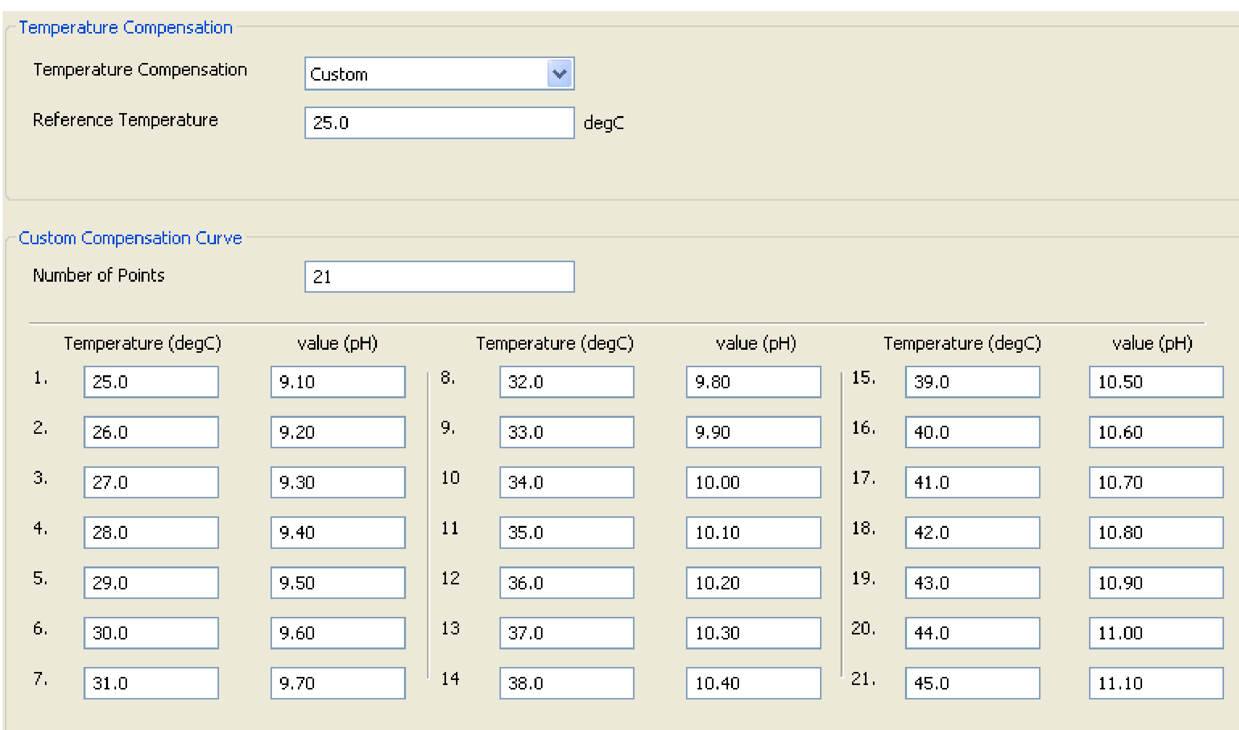


Figure 129. Sample 875PH Analyzer Temperature Compensation Screen (Custom Selection)

Field	Entry
Temperature Compensation	
Temperature Compensation	Select the temperature compensation as Custom.
Reference Temperature	This parameter appears only for Custom temperature compensation. Set the reference temperature from -20 through + 200°C or -4 through +392°F in increments of 0.1 degree. It should be within the nominal temperature compensation range.
Custom Compensation Curve	
Number of Points	Specify the number of points to plot a compensation curve. You can specify from 2 to 21 points. Based on the number of points you specify, the fields to enter base and custom points are displayed.
Temperature (units)	Specify the temperature based on the measurement units selected for temperature.
Value (units)	Specify a value based on the scale selected for the measurement unit.

— NOTE

1. The temperature values must be entered in increasing or decreasing order or the display will read Slope Error.
2. Actual database saving of the compensation table is not performed until the last point pair is entered.
3. The reference temperature should be one of the temperatures listed in compensation table.

Output

Analog

The Analog screen allows you to configure the analog outputs in the analyzer. There are two analog outputs - Analog Output 1 (PV), and HART Analog Output (SV), which can be mapped to different measurements. You can specify the minimum and maximum range values for the outputs, and a fail-safe signal for each output.

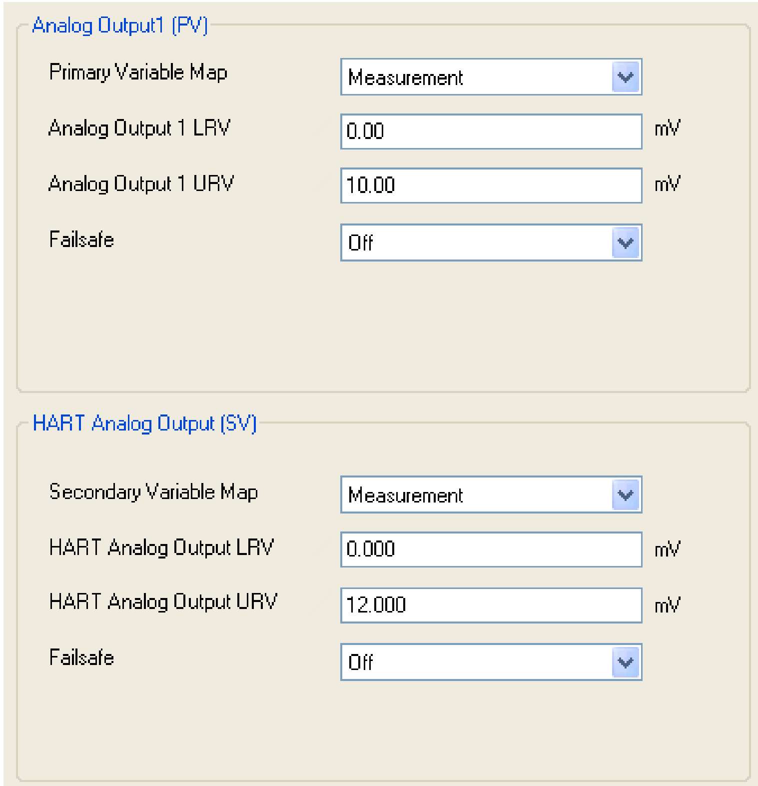


Figure 130. Sample 875PH Analyzer Analog Output Screen

Field	Entry
Analog Output 1 (PV)	
Primary Variable Map	Select a measurement to map the primary variable from the drop-down list. Choose from Temperature, Measurement, Absolute, and Off. Select Off if you are not using the output.
Analog Output 1 LRV	Specify the lower range value for Analog Output 1.
Analog Output 1 URV	Specify the upper range value for Analog Output 1.
Failsafe	Select failsafe mode from the drop-down list. Choose from On, Off, and Pulse.
HART Analog Output (SV)	
Secondary Variable Map	Select a measurement to map the secondary variable from the drop-down list. Choose from Temperature, Measurement, Absolute, and Off. Select Off if you are not using the output.
HART Analog Output LRV	Specify the lower range value for HART Analog Output.

Field	Entry
HART Analog Output URV	Specify the upper range value for HART Analog Output.
Failsafe	Select failsafe mode from the drop-down list. Choose On or Off.

— NOTE —

The measurements mapped to Analog and HART Analog Outputs are updated in “General” and “Digital” sections also.

You can configure the analyzer to deliver fail-safe outputs for all analyzer faults and for certain sensor diagnostic faults. Select Failsafe as On to specify a fixed output in a failed condition.

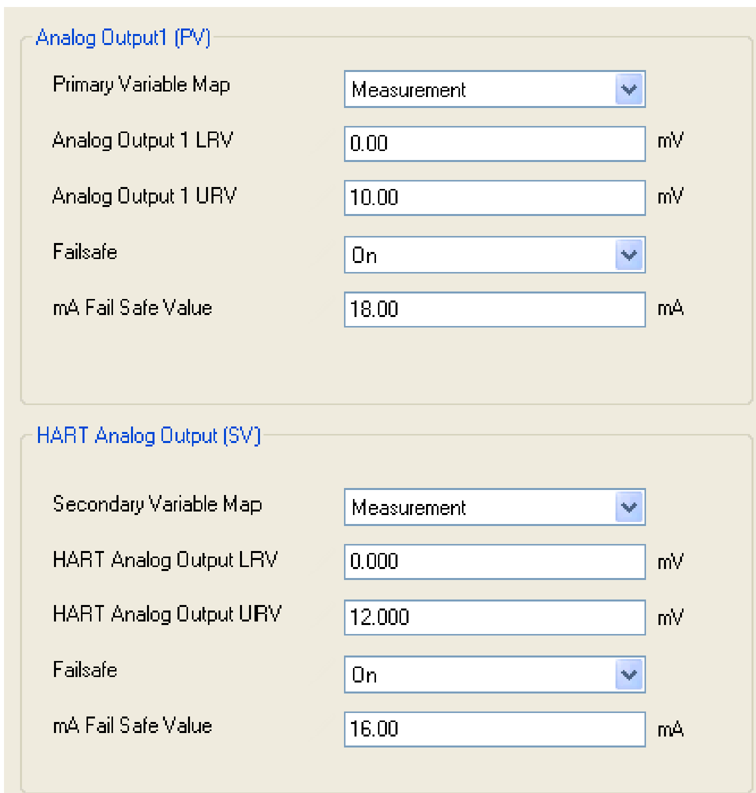


Figure 131. Sample 875PH Analyzer Analog Output Screen (Failsafe as On)

Field	Entry
Analog Output 1 (PV) and HART Analog Output (SV)	
mA Fail Safe Value	Specify DC mA/Analog output value between 3.8 and 20.5 mA.

Select Failsafe as Pulse if you want the signal outputted with a pulsed saw-tooth waveform.

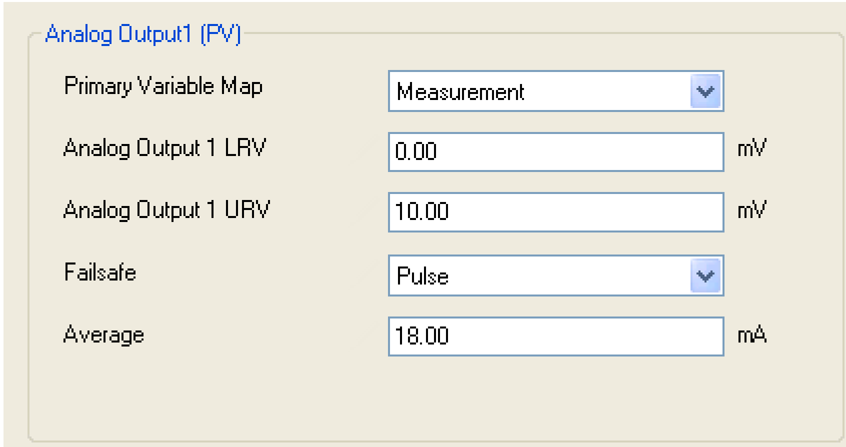


Figure 132. Sample 875PH Analyzer Analog Output Screen (Failsafe as Pulse)

Field	Entry
Analog Output 1 (PV)	
Average	Specify the Average mA/Analog output value between 3.8 and 20.5 mA.

— NOTE

The Failsafe (HART) parameter does not have a Pulse selection.

HART

The HART screen allows you to specify the HART polling address. Polling address is set to zero by default. If you change it to a non zero value, it will result in loss of communication between the DTM and the device.

This screen also shows the number of preambles that are sent in the response message.

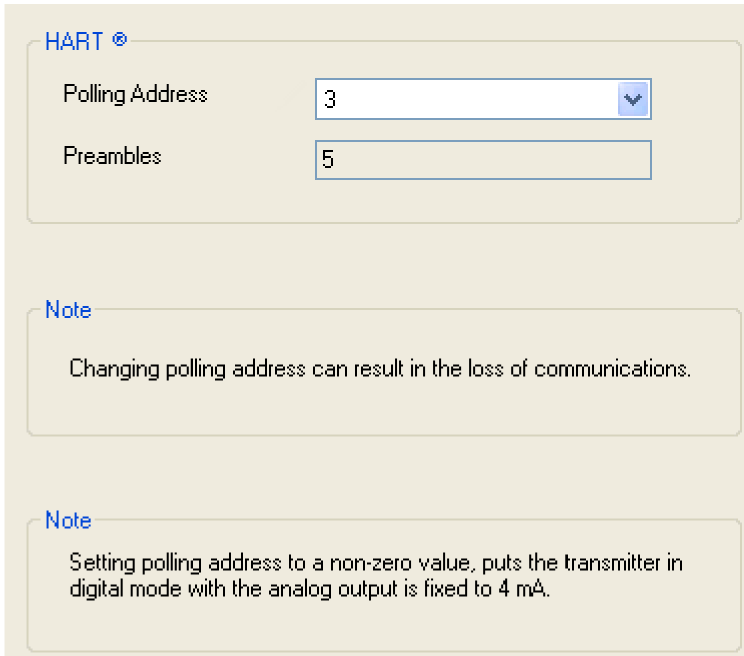


Figure 133. Sample 875PH Analyzer HART Output Screen

Field	Entry
HART	
Polling Address	Select a polling address between 0 and 15.
Preambles	This field shows the number of preambles in the response message.

Digital

The Digital screen allows you to map measurements to primary, secondary, tertiary, and quaternary variables.

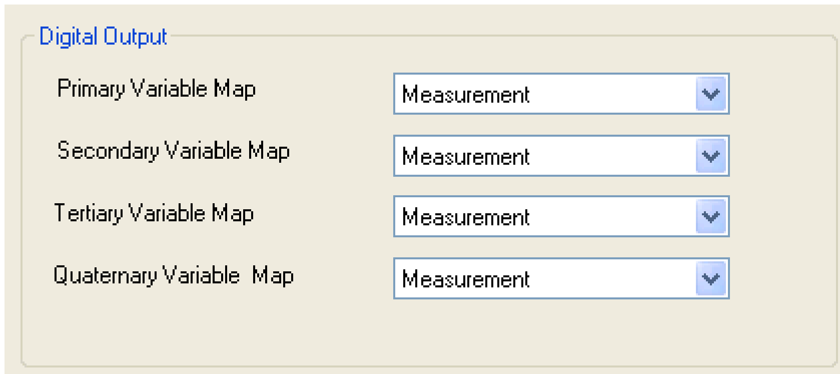


Figure 134. Sample 875PH Analyzer Digital Output Screen

Field	Entry
Digital Output	
Primary Variable Map	The primary variable (PV) is the measurement configured for Analog Output 1. Configure this parameter to represent one of the measurements in the drop-down list: Measurement, Temperature, or Absolute. Select Off if you are not using the PV.
Secondary Variable Map	The secondary variable (SV) is the measurement configured for HART Analog Output. Configure this parameter to represent one of the measurements in the drop-down list: Measurement, Temperature, or Absolute. Select Off if you are not using the SV.
Tertiary Variable Map	Configure the tertiary variable to represent one of the measurements in the drop-down list: Measurement, Temperature, or Absolute. Select Off if you are not using the TV.
Quaternary Variable Map	Configure the quaternary variable to represent one of the measurements in the drop-down list: Measurement, Temperature, or Absolute. Select Off if you are not using the QV.

— NOTE —

1. The measurements mapped to PV and SV are updated in “General” and “Analog” sections also.

Local Display

The Local Display screen is where you can configure the parameters for display.

If you select single mode configuration, you must select the measurements you want to show in the line 1 of the display.

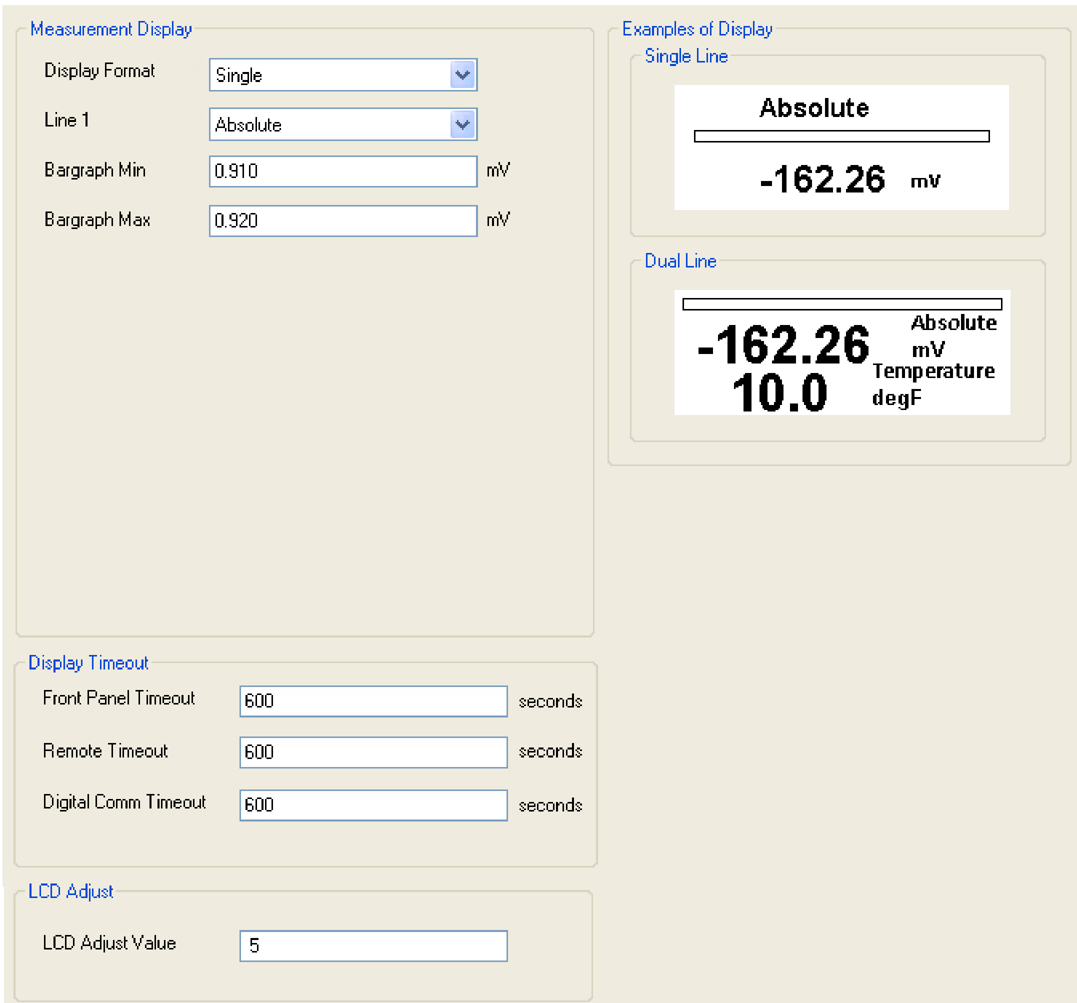


Figure 135. Sample 875PH Analyzer Local Display Screen (Single Line)

Field	Entry
Measurement Display	
Display Format	Select the display format from the drop-down list. Choose from Dual, Single, or Scan. • Single: Displays a single measurement title, value, and unit on the local display. • Dual: Displays two measurement titles, values, and units on the local display. • Scan: Displays several selected measurements in sequence in a designated scan time.
Line 1	This parameter appears if you are in single line mode. Select a measurement from the drop-down list. Choose from Measurement, Temperature, Absolute, Analog 1, and HART.
Bargraph Min	Specify the minimum bargraph value. This parameter does not appear if Line 1 is configured to Analog 1 or HART.
Bargraph Max	Specify the maximum bargraph value. This parameter does not appear if Line 1 is configured to Analog 1 or HART.
Display Timeout	
Front Panel Timeout	Configure front panel timeout between 5 to 999 seconds.
Remote Timeout	Configure remote timeout between 5 to 999 seconds.
Digital Comm Timeout	Configure digital communication timeout between 5 to 999 seconds.
LCD Adjust	
LCD Adjust Value	This parameter allows you to adjust the brightness of the display. The numbers (-9 to 0 to +9) shown on the display should only be used for darkening or lightening the display.

If you select Dual mode, you must select the measurements you want to show in line 1 and line 2 parameters of the display.

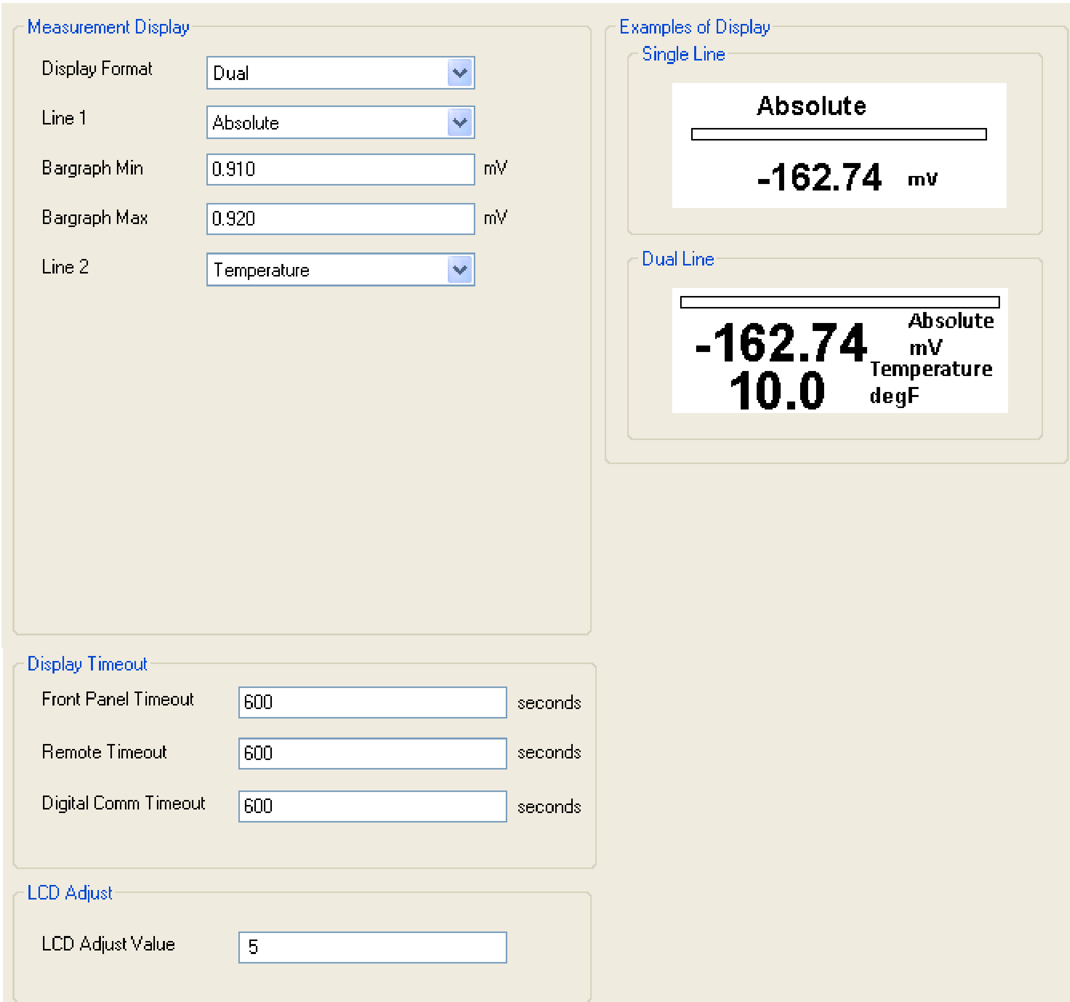


Figure 136. Sample 875PH Analyzer Local Display Screen (Dual Line)

Field	Entry
Measurement Display	
Line 2	This parameter appears if you are in dual line mode. Select a measurement from the drop-down list. Choose from Measurement, Temperature, Absolute, Analog 1, and HART.

If you select Scan mode, you must specify which measurements you want to display in sequence, and the scan time.

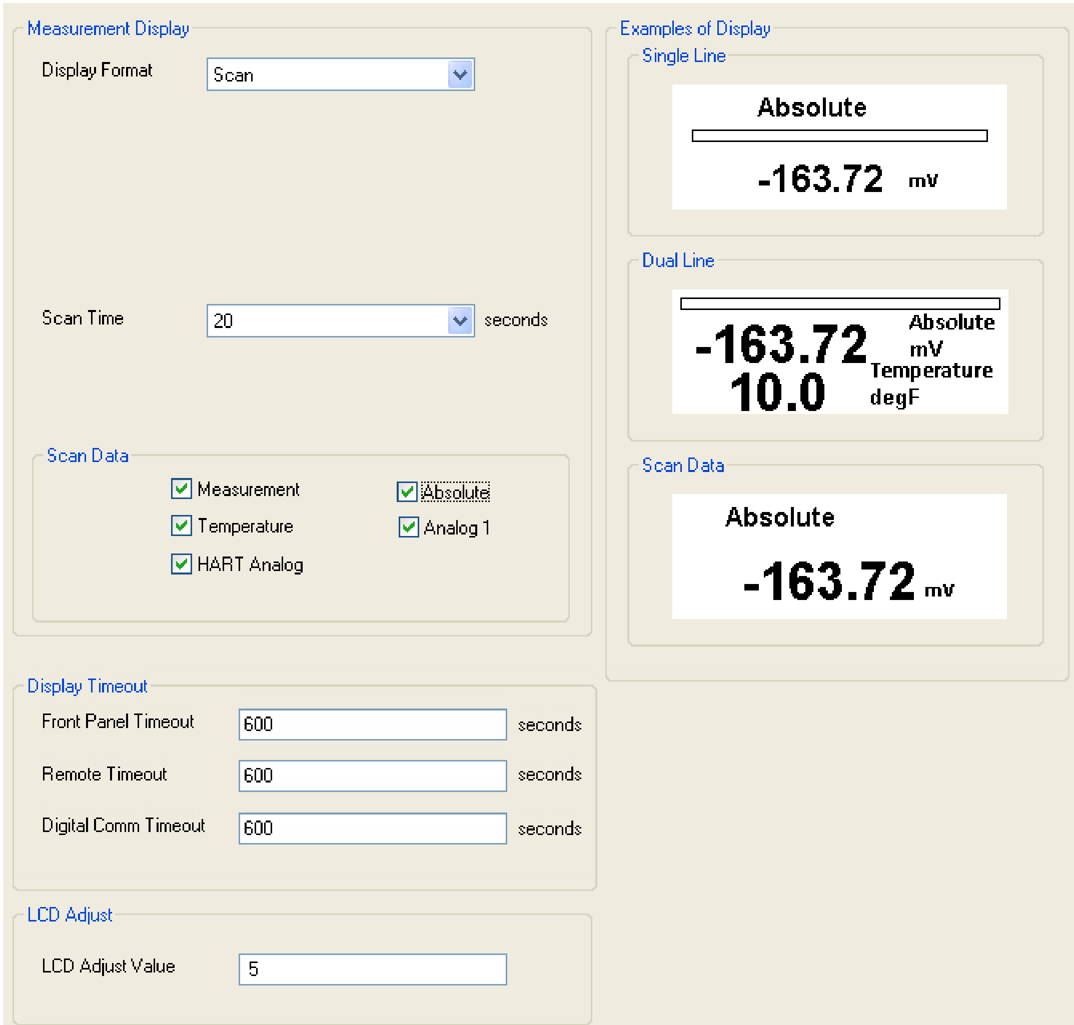


Figure 137. Sample 875PH Analyzer Local Display Screen (Scan)

Field	Entry
Measurement Display	
Scan Time	Select the scan time from the drop-down list. Choose from 2, 5, 10, and 20 seconds.
Scan Data	Select the measurements you want to display in sequence on the local display. Choose from Measurement, Temperature, Absolute, Analog 1, and HART.

Auto Hold

The Auto Hold screen is where you can configure the analyzer to go into a Hold state in calibration or configuration mode, or upon receiving a digital signal without setting the Hold each time. It also automatically removes the Hold after calibration or configuration mode.

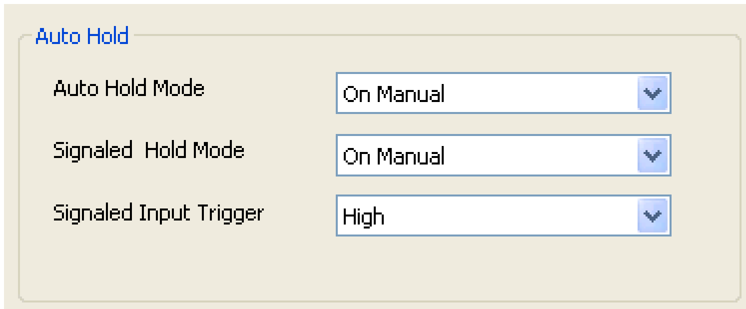


Figure 138. Sample 875PH Analyzer Auto Hold Screen

Field	Entry
Auto Hold	
Auto Hold Mode	This parameter is used to configure the analyzer to go into Hold mode when in calibration or configuration mode. Select the auto hold mode from the drop-down list. Choose from: • On Present - to hold all values and states at their current levels • On Manual - to hold all values and states at desired levels • Off - to release the analyzer from Hold state
Signaled Hold Mode	This parameter is used to configure the analyzer to go into Hold mode upon receiving a digital signal. Select one of the following options from the drop-down list: • On Present - to hold all values and states at their current level • On Manual - to set all values and states at the levels specified in Hold mode • Off - if you choose not to use this feature
Signaled Input Trigger	Select signaled input trigger from the drop-down list. Choose from High or Low. If High, Hold is initiated when input switch is closed. If Low, it is initiated when the input switch is open.

Diagnostic Configuration

The Diagnostics screen is where you select the diagnostic faults for which the error messages should be displayed.

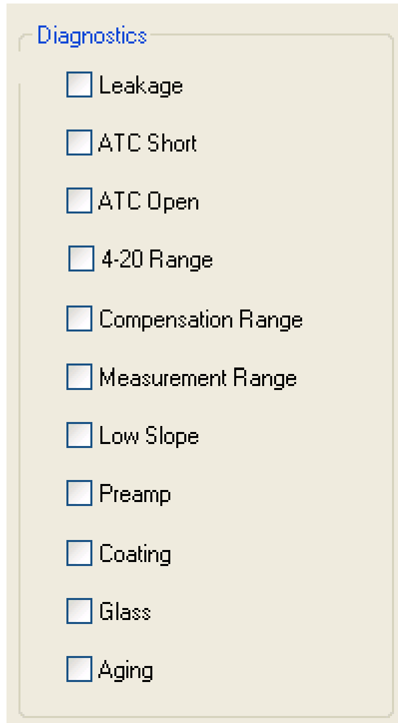


Figure 139. Sample 875PH Analyzer Diagnostic Configuration Screen

NOTE

Low Slope, Glass, and Aging options are not available for mV or Custom measurements.

If you select Glass, Low Slope, Preamp, or Coating, set the diagnostic limits.

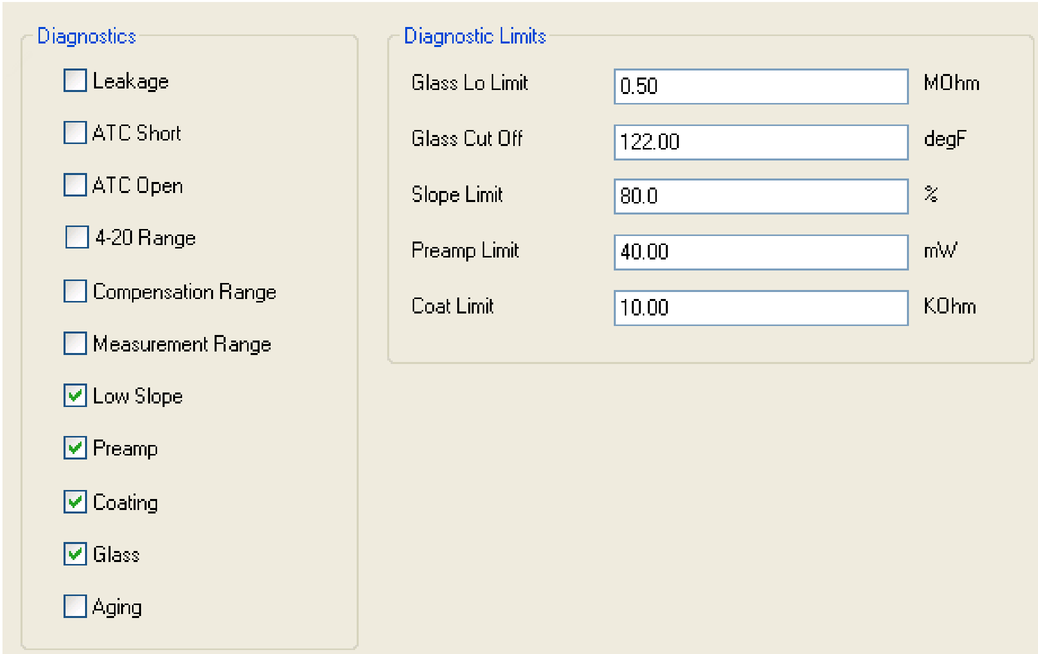


Figure 140. Sample 875PH Analyzer Diagnostic Configuration Screen

Field	Entry
Diagnostic Limits	
Glass Lo Limit	This parameter limits the message to resistances below a set value. You can set the glass lo limit from 0.1 through 1.1 MΩ in increments of 0.1 MΩ.
Glass Cut Off	This parameter is used to set a cutoff value at which the fault message should be displayed. You can set this value from -20 through +200°C or -4 through 392°F in increments of 1 degree.
Slope Limit	Set the slope limit from 0 through 100 percent in increments of 1 percent.
Preamp Limit	Set the preamp limit from 0 through 70 mW in increments of 1 mW.
Coat Limit	Set the coat limit from 0 through 100 kΩ.

Passcode Access

The Passcode Access screen allows you to establish or change passcodes for the three levels of security. Users having access to Level 1 can set or modify these passcodes in configuration mode.

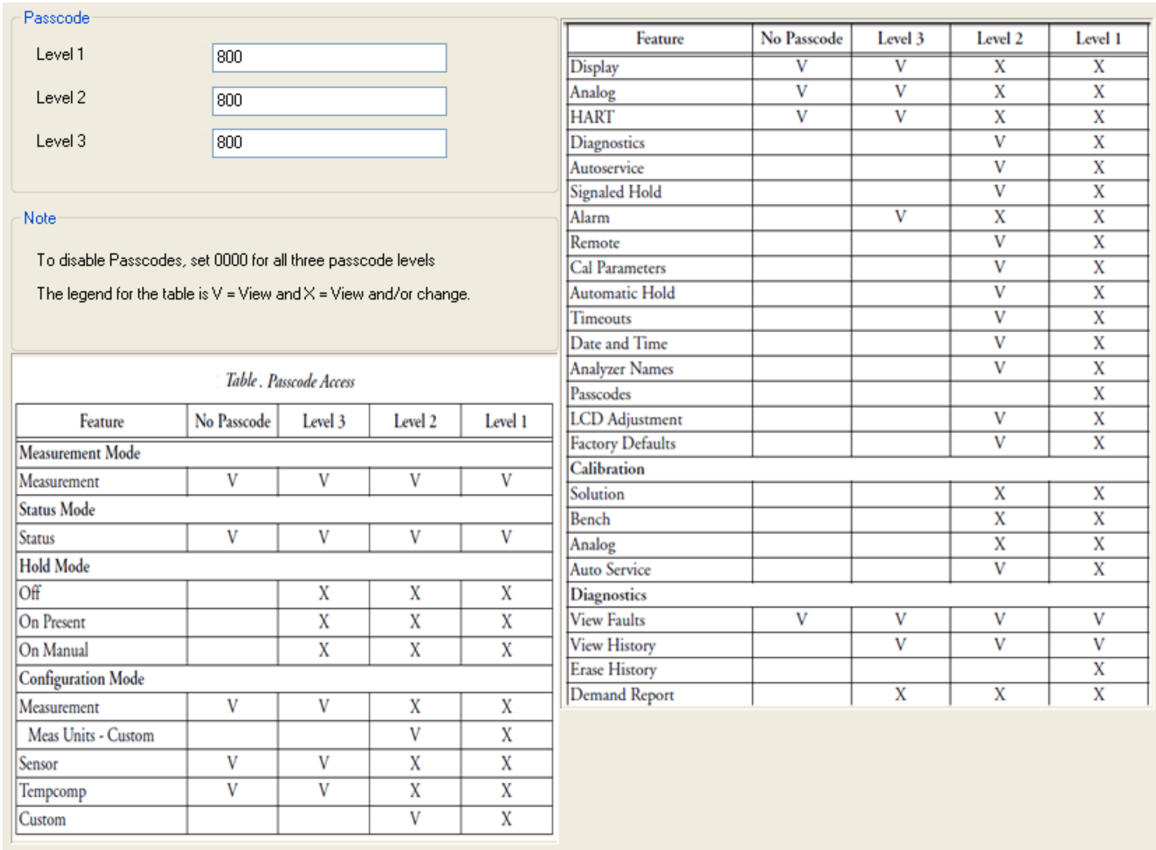


Table . Passcode Access

Feature	No Passcode	Level 3	Level 2	Level 1
Measurement Mode				
Measurement	V	V	V	V
Status Mode				
Status	V	V	V	V
Hold Mode				
Off		X	X	X
On Present		X	X	X
On Manual		X	X	X
Configuration Mode				
Measurement	V	V	X	X
Meas Units - Custom			V	X
Sensor	V	V	X	X
Tempcomp	V	V	X	X
Custom			V	X

Feature	No Passcode	Level 3	Level 2	Level 1
Display	V	V	X	X
Analog	V	V	X	X
HART	V	V	X	X
Diagnostics			V	X
Autoservice			V	X
Signaled Hold			V	X
Alarm		V	X	X
Remote			V	X
Cal Parameters			V	X
Automatic Hold			V	X
Timeouts			V	X
Date and Time			V	X
Analyzer Names			V	X
Passcodes				X
LCD Adjustment			V	X
Factory Defaults			V	X
Calibration				
Solution			X	X
Bench			X	X
Analog			X	X
Auto Service			V	X
Diagnostics				
View Faults	V	V	V	V
View History		V	V	V
Erase History				X
Demand Report		X	X	X

Figure 141. Sample 875PH Analyzer Passcode Access Screen

Field	Entry
Passcode	
Level 1	Specify the passcode for Level 1. It can be set from 0 to 9999.
Level 2	Specify the passcode for Level 2. It can be set from 0 to 9999.
Level 3	Specify the passcode for Level 3. It can be set from 0 to 9999.

— NOTE

1. The table in the screen shows the access permissions of the users to each of the screens.
   'X' - user can edit
   'V' - user can only view
2. The factory default pass code for all three levels is 0800.

Restore Configuration

The Restore Configuration screen allows you to reset all data to default values.

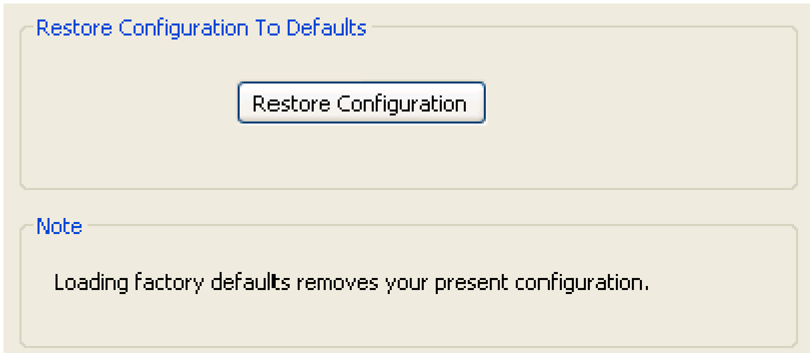


Figure 142. Sample 875PH Analyzer Restore Configuration Screen 1

Field	Entry
Restore Configuration to Defaults	
Restore Configuration	Click Restore Configuration to reset the parameters to default values.

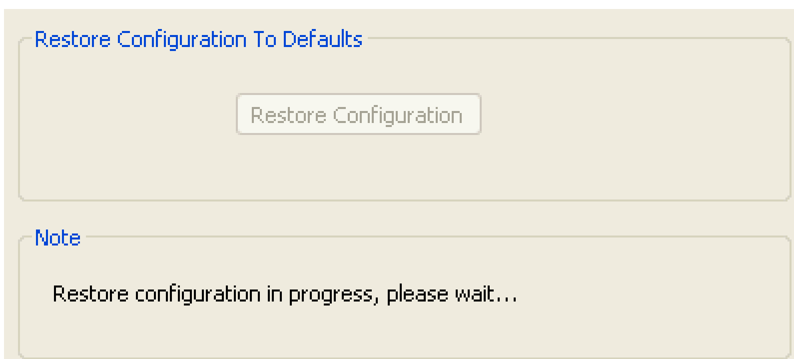


Figure 143. Sample 875PH Analyzer Restore Configuration Screen 2

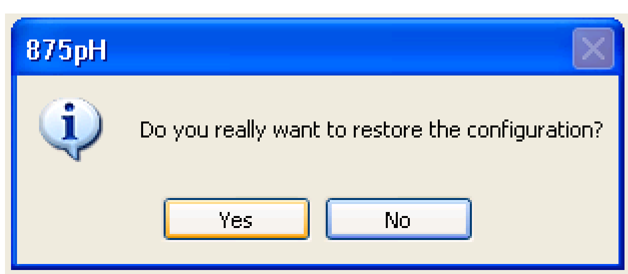


Figure 144. Sample 875PH Analyzer Restore Configuration Screen 3

Click Yes to continue the restore process.

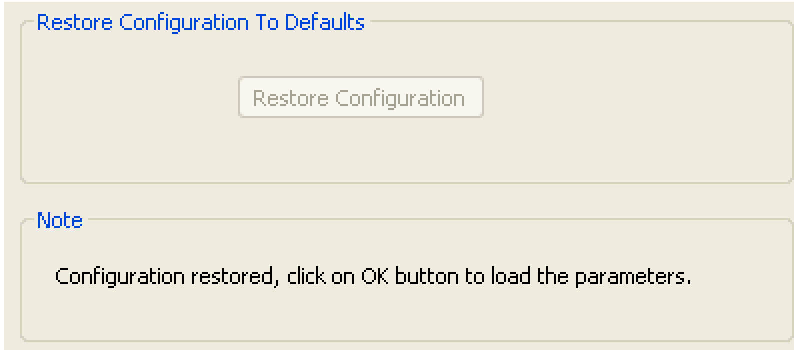


Figure 145. Sample 875PH Analyzer Restore Configuration Screen 4

When the process is completed, click OK. The values are restored.

Auto Service 1

The Auto Service 1 screen allows you automate the process of cleaning and calibrating sensors. When this service is activated, a signal is sent to the control instrument which automatically sequences the removal of the sensor from the process, its cleaning, calibration, and reinstallation.

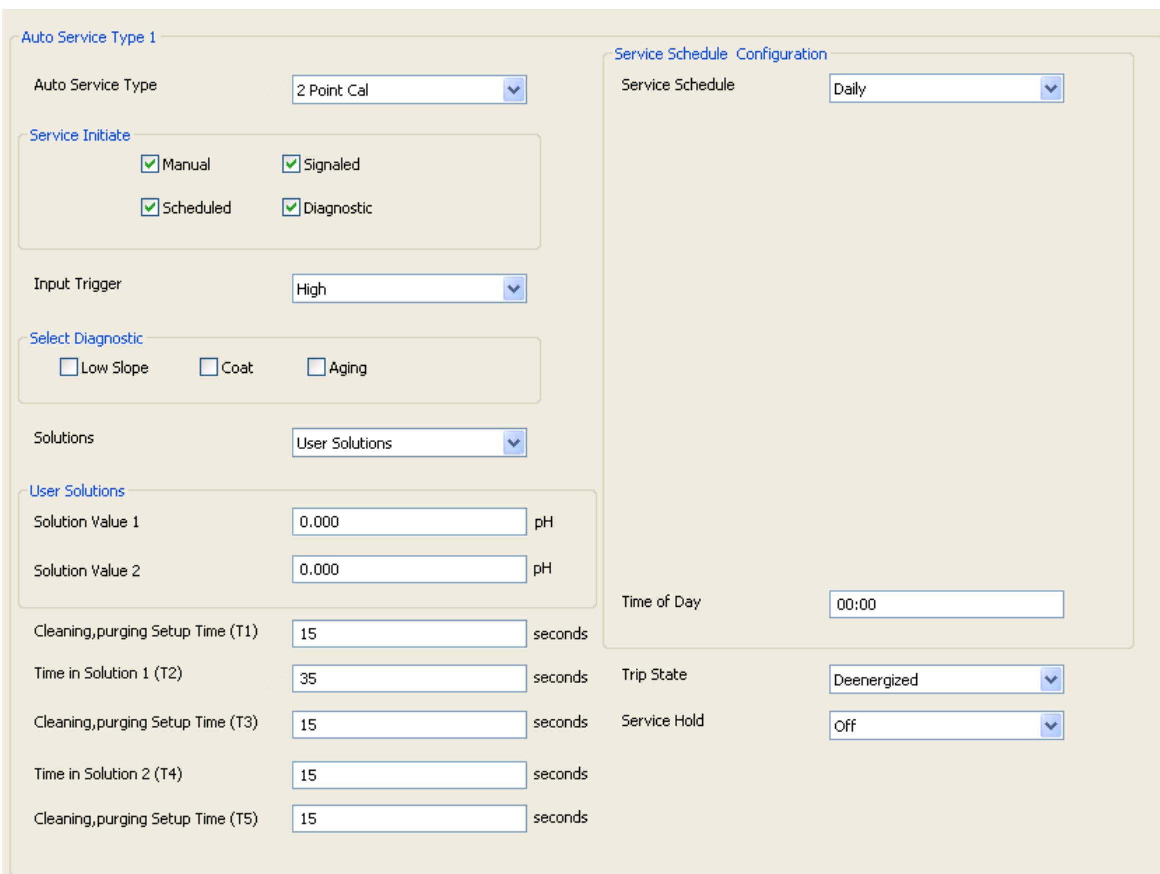


Figure 146. Sample 875PH Analyzer Auto Service 1 Screen

Field	Entry
Auto Service Type 1	
Auto Service Type	Select the service type from the drop-down list. Choose from Auto-Clean, 1 Point Cal, 2 Point Cal, Clean + 1PT Cal, Clean + 2PT Cal, and Off. Select Off if you choose not to use this feature.
Service Initiate	
Manual	Select this method to initiate the auto service manually.
Signaled	Select this method to initiate the auto service by an input trigger.
Scheduled	Select this method to initiate the auto service by a set date or period. If you select this method, you must select the schedule.
Diagnostic	Select this method to initiate the auto service by a fault.
Input Trigger	This parameter is available only for signaled method. Select one of the following options for input trigger. • High - auto service is initiated when the input switch is closed. • Low - auto service is initiated when the input switch is open.
Select Diagnostic	This parameter is available only for Diagnostic method. Select Low Slope or Coat or Aging.
Solutions	This parameter is not available for the service type 'Auto-Clean'. You can set this parameter to User Solutions or Smart Cal Buff. Smart Cal Buff is available when the measurement is pH and the service type is 2 Point Cal or Clean + 2PT Cal.
User Solutions	
Solution Value 1	Specify a value for solution 1. This parameter is not available if the service type is 'Auto-Clean'.
Solution Value 2	Specify a value for solution 2. This parameter is not available if the service type is - 'Auto-Clean' or '1 Point Cal' or 'Clean + 1PT Cal'.
Cleaning, Purging Setup Time (T1)	Specify the time for cleaning, purging, and setup.
Time in Solution 1 (T2)	Specify the time in solution 1.
Cleaning, Purging Setup Time (T3)	Specify the time for cleaning, purging, and setup if you are doing a calibration.
Time in Solution 2 (T4)	Specify the time in solution 2.
Cleaning, Purging Setup Time (T5)	Specify the time for cleaning, purging, and setup if you are doing a two-point calibration.

Field	Entry
Trip State	Select one of the following options from the drop-down list for alarm trip state: • Energized - provides a contact closure between 1C and 1NO (2C and 2NO) and an open contact between 1C and 1NC (2C and 2NC). • Deenergized - provides a contact closure between 1C and 1NC (2C and 2NC) and an open contact between 1C and 1NO (2C and 2NO).
Service Hold	Select one of the following options for service hold: • On Present - holds all values and states at their present level. • On Manual - sets all values and states at the levels specified in Hold mode. • Off - select this option if you choose not to use Service Hold feature.

— NOTE

Auto Service 1 must be configured Off for Alarm 1 to be available for configuration.

If you select Scheduled method, you must select the schedule for auto service.

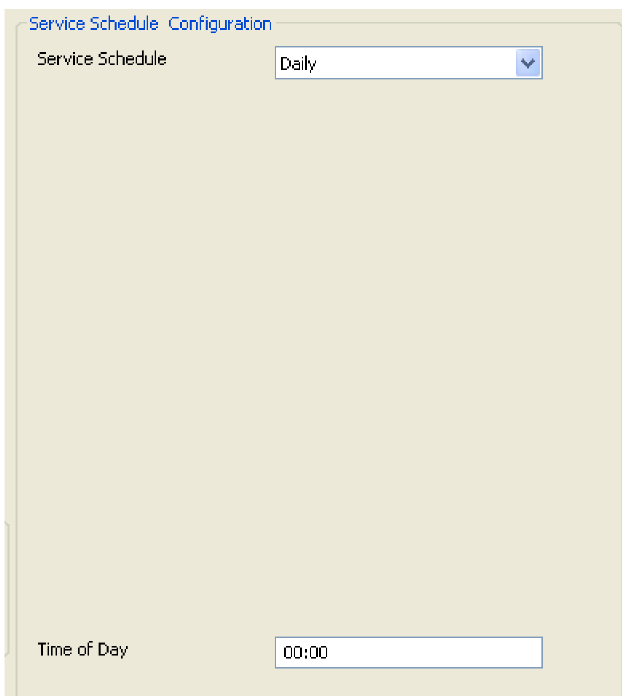


Figure 147. Sample 875PH Analyzer Auto Service 1 Screen (Scheduled Method Selection)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Daily from the drop-down list.
Time of Day	Specify the scheduled time from 00:00 to 23:59 in the format hh:mm.

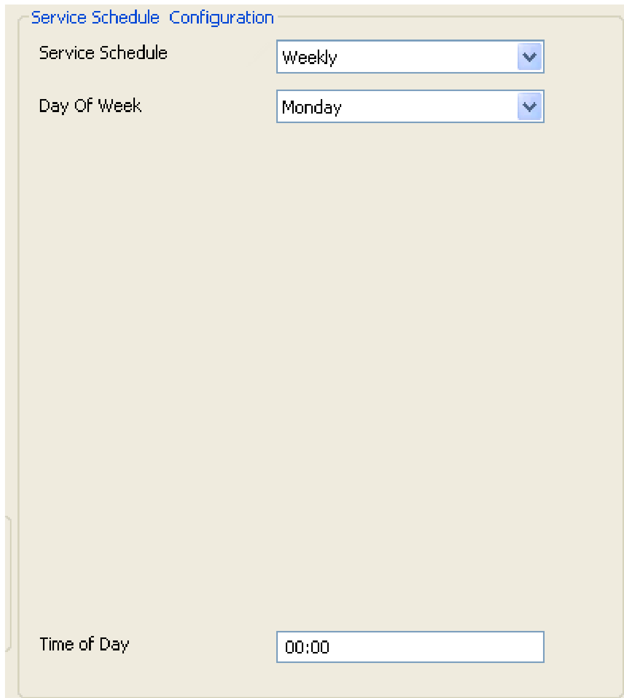


Figure 148. Sample 875PH Analyzer Auto Service 1 Screen (Scheduled Method Selection)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Weekly from the drop-down list.
Day of Week	Select a day from the drop-down list.
Time of Day	Specify the scheduled time from 00:00 to 23:59 in the format hh:mm.

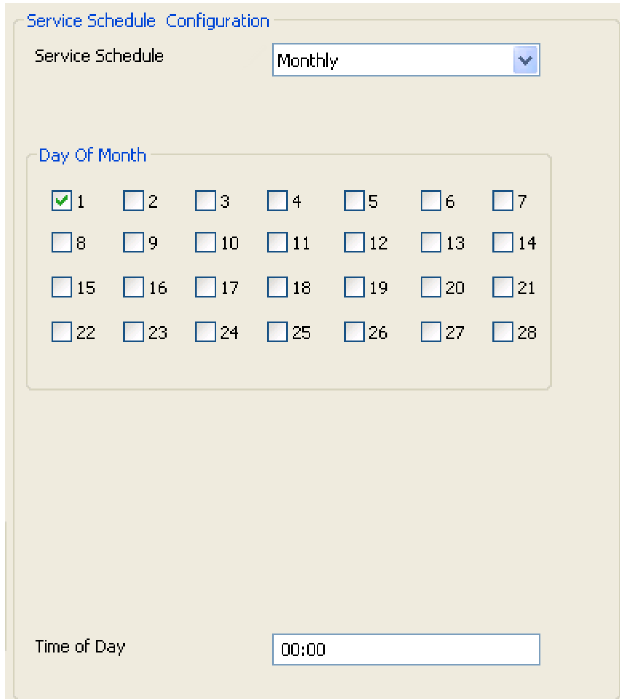


Figure 149. Sample 875PH Analyzer Auto Service 1 Screen (Scheduled Method Selection)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Monthly from the drop-down list.
Day of Month	Select a day from 1 to 28 days of the month.
Time of Day	Specify the scheduled time from 00:00 to 23:59 in the format hh:mm.

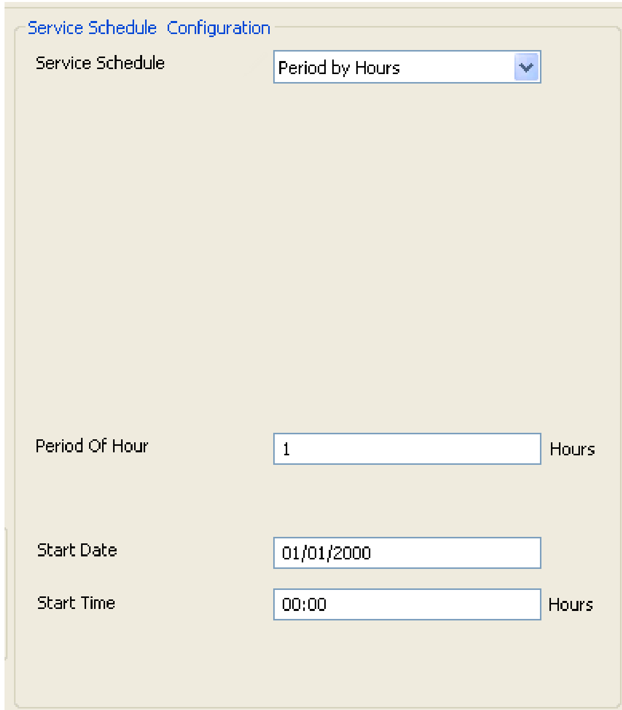


Figure 150. Sample 875PH Analyzer Auto Service 1 Screen (Scheduled Method Selection)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Period by Hours from the drop-down list.
Period of Hour	Specify the period of hours from 1 to 8760 hours.
Start Date	Specify a date from 1/01/1999 to 12/31/2098 as a start date.
Start Time	Specify a time from 00:00 to 23:59 hours as start time.

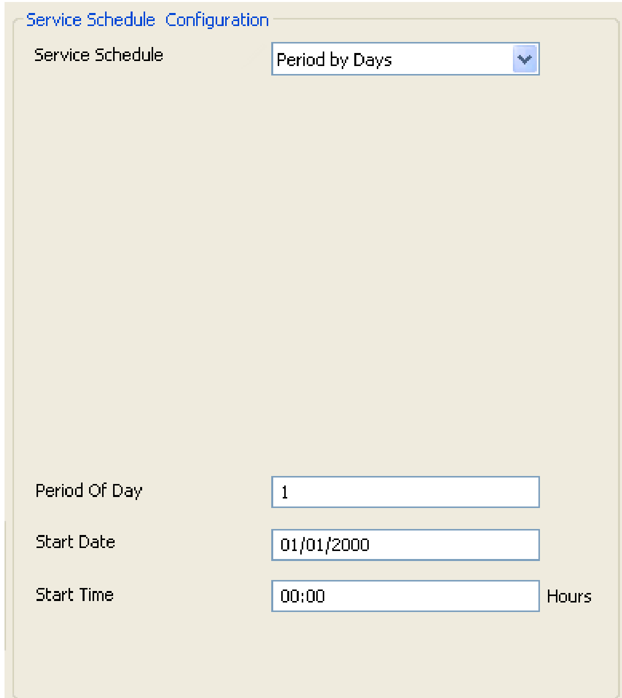


Figure 151. Sample 875PH Analyzer Auto Service 1 Screen (Scheduled Method Selection)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Period by Days from the drop-down list.
Period of Day	Specify the period of days from 1 to 365.
Start Date	Specify a start date from 1/01/1999 to 12/31/2098.
Start Time	Specify a start time from 00:00 to 23:59 hours.

Auto Service 2

The Auto Service 2 screen also allows you to automate the process of cleaning and calibrating sensors. For detailed description on the parameters, refer to “Auto Service 1”.

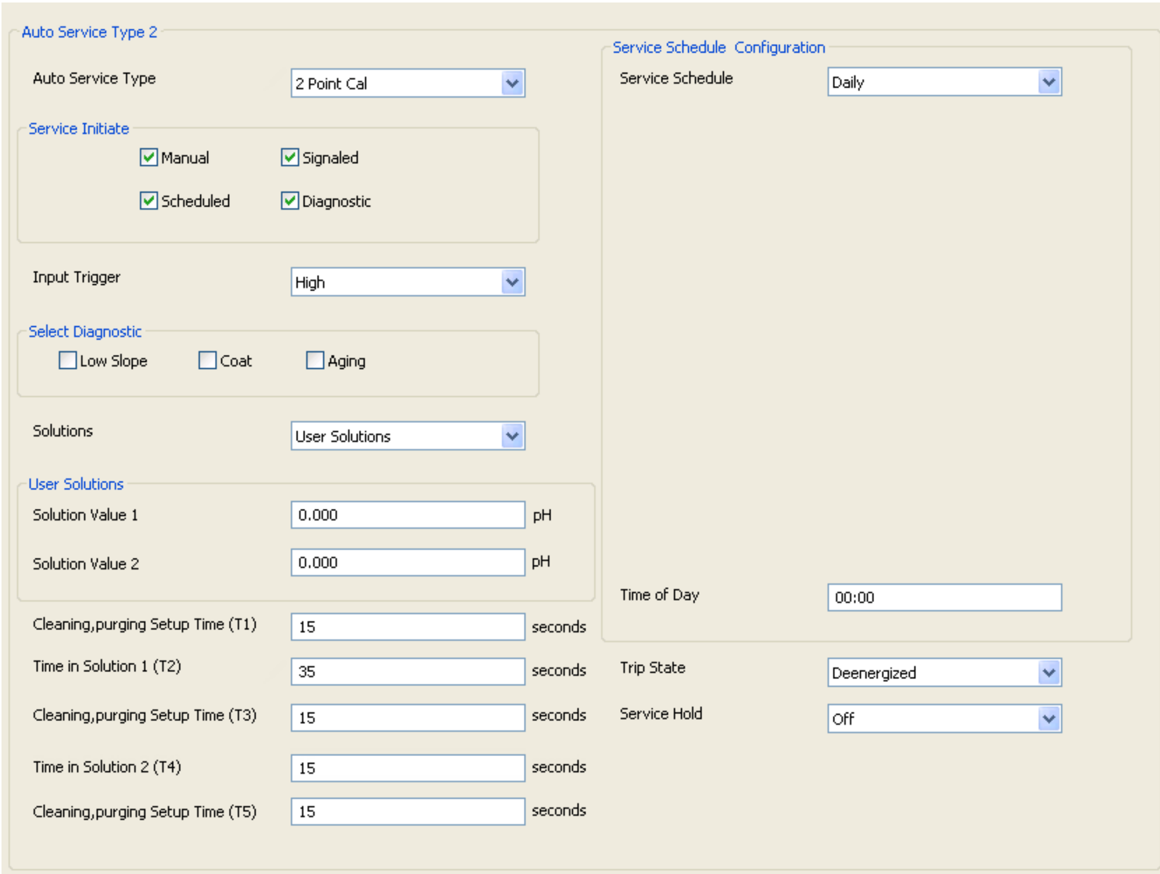


Figure 152. Sample 875PH Analyzer Auto Service 2 Screen

NOTE

Auto Service 2 must be configured Off for Alarm 2 to be available for configuration.

Remote

The Remote screen allows you to configure parameters associated with a remote personal computer or a printer.

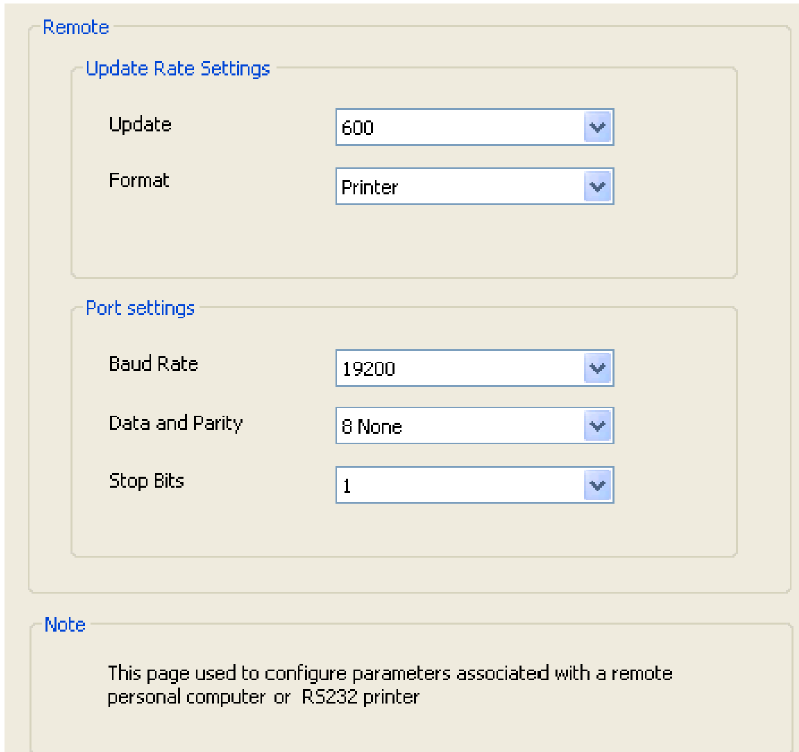


Figure 153. Sample 875PH Analyzer Remote Screen

Field	Entry
Update Rate Settings	
Update	Set the update frequency from the drop-down list. Choose from 5, 10, 30, 60, 120, 300, 600, 1200, 3600, or Off. Select Off if you choose not to use this feature.
Format	Select the format for the measurements report. Choose from Printer or Spreadsheet.
Port Settings	
Baud Rate	Set the baud rate to 300, 600,1200, 2400, 4800, 9600, or 19200.
Data and Parity	Set the data and parity to 7 Odd, 7 Even, 8 Odd, 8 Even, or 8 None.
Stop Bits	Set the stop bits to 1 or 2.

Alarm 1

The Alarm 1 screen is where you can configure alarm parameters. Specify the alarm to one of the following measurements or conditions: Measurement, Temperature, Absolute, or On Fault. The alarm reacts if the measurement exceeds the trip high point or drops below the trip low point.

It uses two controls - Hysteresis and Timed, to minimize chatter around the setpoint. Hysteresis does this by using the measurement; and Timed, by using time.

NOTE
Auto Service 1 must be configured Off for Alarm 1 to be available for configuration.

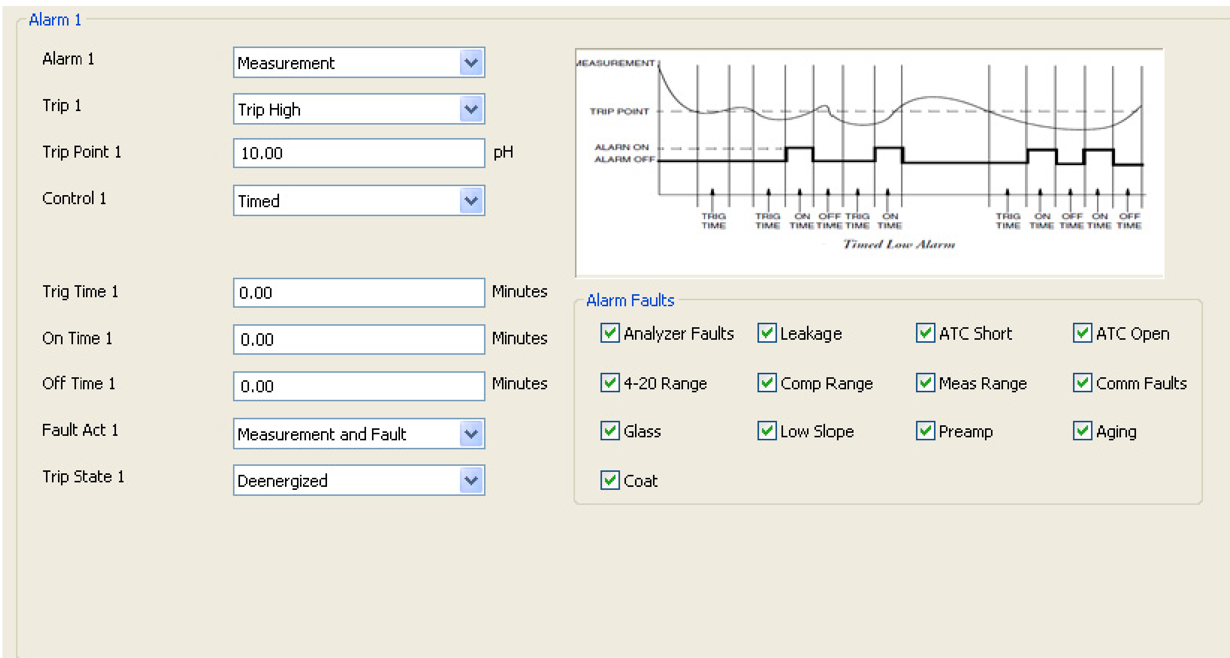


Figure 154. Sample 875PH Analyzer Alarm 1 Screen (Timed Selection)

Field	Entry
Alarm 1	
Alarm 1	Set the alarm 1 from the drop-down list. Choose from Measurement, Temperature, Absolute, On Fault, or Off. Select Off if you are not using the alarm.
Trip 1	Select trip 1 from the drop-down list. Choose from: • Trip Low - to active alarm on a low going condition. • Trip High - to active alarm on a high going condition.
Trip Point 1	Specify the trip point 1 value.
Control 1	Select the control as Timed from the drop-down list.
Trig Time 1	Set the trig time from 00.00 to 99.99 minutes. When you specify a trig time, condition must exist continuously for the specified time period before the alarm condition is met.

Field	Entry
On Time 1	Specify the alarm feed time from 00.00 to 99.99 minutes.
Off Time 1	This is the delay time before the alarm can trigger again. Specify the delay time from 00.00 to 99.99 minutes.
Fault Act 1	Select the alarm fault action from the drop-down list. Choose from: • Measurement Value - enables an alarm only when the measurement exceeds the alarm set point. • Valid Measurement - enables an alarm when the measurement exceeds the set point and if one of the selected faults is present. • Measurement and Fault - validates the cause when the measurement exceeds the setpoint. If the cause is a fault and not process related, the alarm is disabled. You can select the faults from the list of alarm faults that are displayed below the alarm graph. — NOTE This parameter is available only for users having access to Level 1.
Trip State 1	Select the trip state from the drop-down list. Choose from: • Energized - provides a contact closure between 1C and 1NO (2C and 2NO) and an open contact between 1C and 1NC (2C and 2NC). • Deenergized - provides a contact closure between 1C and 1NC (2C and 2NC) and an open contact between 1C and 1NO (2C and 2NO).

— **NOTE**

The faults appear only when the alarm 1 is set to:

1. On Fault
2. Measurement or Temperature or Absolute and the Fault Act is set to ‘Measurement and Fault’.

Field	Entry
Alarm Faults	
Analyzer Faults	Select this check box to enable alarm in case of analyzer faults.
4-20 Range	Select this check box to enable alarm if the measurement mapped to the analog output is outside the range configured (4-20 mA).
Glass	Select this check box to enable alarm if a problem exists in the resistance of a glass electrode in the sensor.
Coat	Select this check box to enable alarm if there is an increase in reference junction resistance due to a fouled reference junction.
Leakage	Select this check box to enable alarm in case of severe liquid leakage into the sensor.

Field	Entry
Comp Range	Select this check box to enable alarm if the measured temperature or absolute conductivity or resistivity measurement is outside the temperature or chemical compensation curve configured for the currently running application.
Low Slope	Select this check box to enable alarm if the analyzer encounters problem with an aging glass electrode.
ATC Short and ATC Open	Select these check boxes to enable alarm if the resistance of the temperature compensator is greater or less than the expected resistance of the device configured.
Meas Range	Select this check box to enable alarm if the measurement is over or under the measurable range that is configured for the currently running application.
Preamp	Select this check box to enable alarm in case of failed preamplifier.
Comm Faults	Select this check box to enable alarm in case of communication faults.
Aging	Select this check box to enable alarm for aging glass electrode.

If Control is specified as Hysteresis, you must specify the hysteresis value.

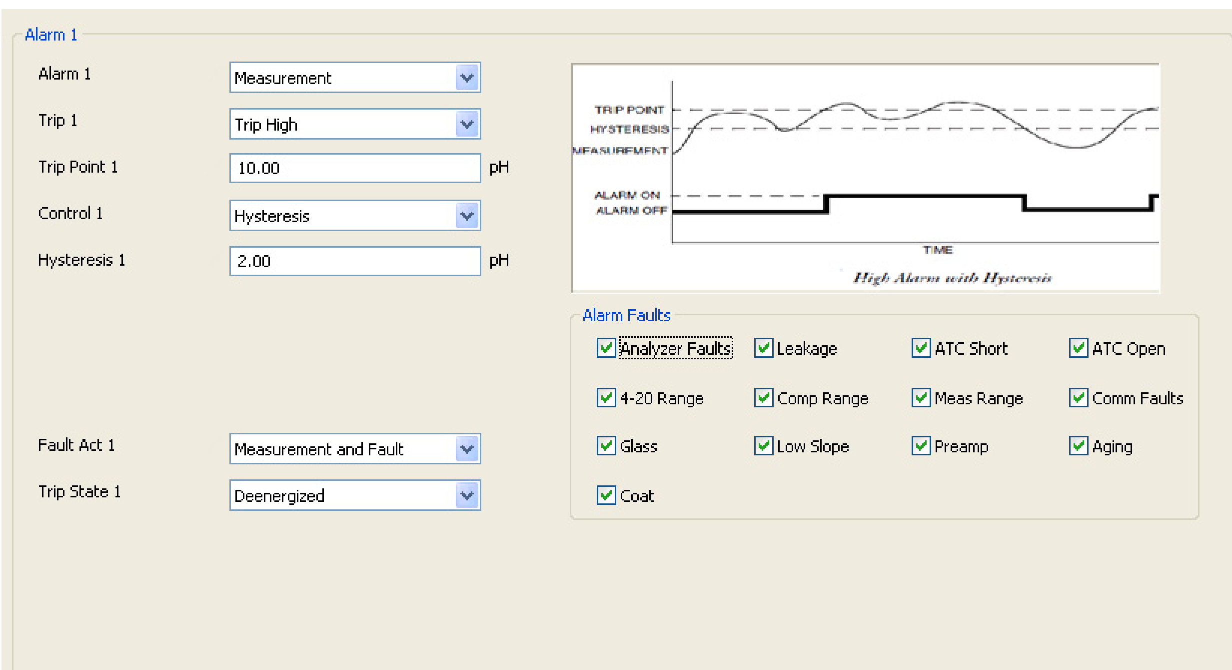


Figure 155. Sample 875PH Analyzer Alarm 1 Screen (Hysteresis Selection)

Field	Entry
Control 1	Select the control as Hysteresis from the drop-down list.
Hysteresis 1	Specify the hysteresis value.

Alarm 2

The Alarm 2 screen allows you to configure alarm 2 parameters to represent measurement, temperature, absolute, or a fault. For detailed description of the parameters in this screen, refer to "Alarm 1".

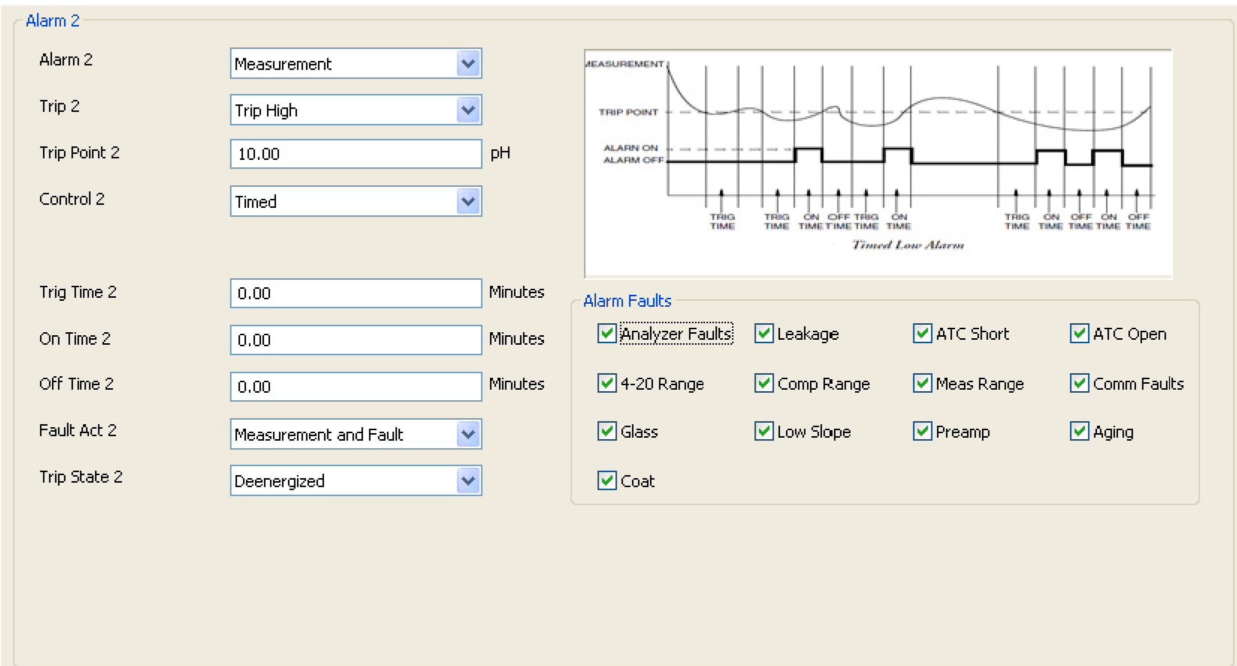


Figure 156. Sample 875PH Analyzer Alarm 2 Screen (Timed Selection)

— NOTE
Auto Service 2 must be configured Off for Alarm 2 to be available for configuration.

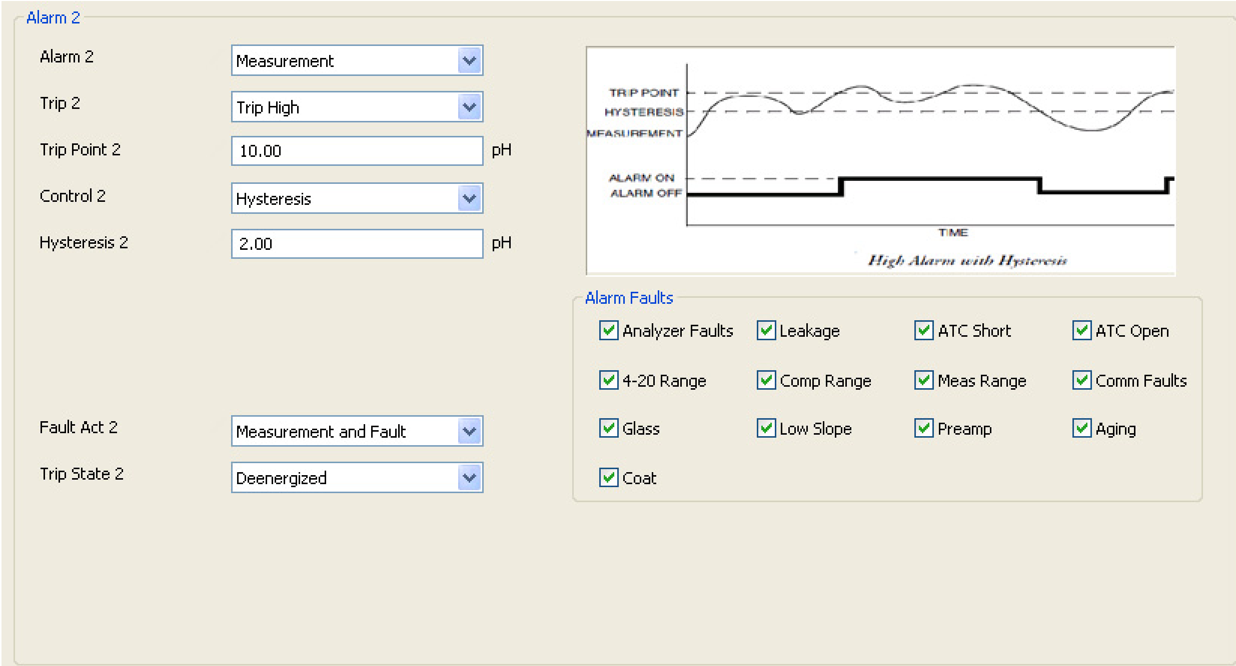


Figure 157. Sample 875PH Analyzer Alarm 2 Screen (Hysteresis Selection)

Device Information

The Device Information screen displays complete information of the device. It allows you to set the tag name, tag number, HART message, location, device name, and date of last calibration.

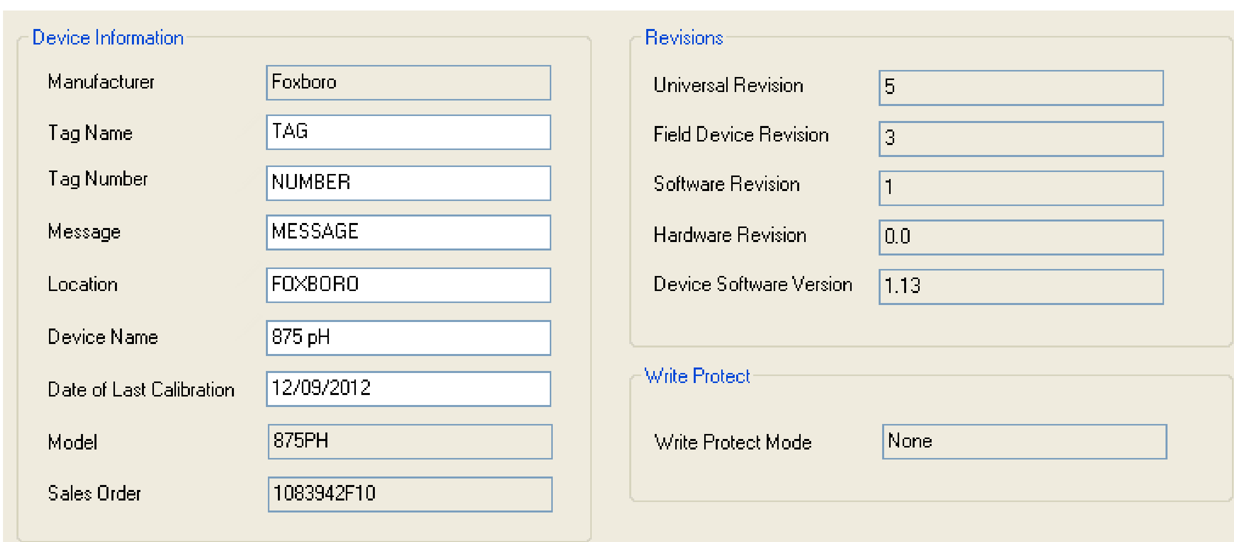


Figure 158. Sample 875PH Analyzer Device Information Screen

Field	Entry
Device Information	
Manufacturer	This field shows the name of the manufacturer of the device.
Tag Name	Specify the HART tag name.
Tag Number	Specify the HART tag number.
Message	Specify the HART message.
Location	Specify the location where the measurements are done.
Device Name	Specify the name of the device.
Date of Last Calibration	Set the date of last calibration.
Model	This field shows the model of the device.
Sales Order	This field shows the sales order number.
Revisions	
Universal Revision	This field shows the universal command set revision level.
Field Device Revision	This field shows the field device revision level.
Software Revision	This field shows the software revision level.
Hardware Revision	This field shows the hardware revision level.
Device Software Revision	This field shows the device software revision level.
Write Protect	
Write Protect Mode	This field shows the write protect status.

Device Status

HART Status

The HART Status screen shows the HART status as well as the field device status of the device. The status of each parameter is easily recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

If Configuration Changed does not show a green check mark, it can be reset by clicking the **Reset Configuration Changed Flag** button on the lower right side of the screen.

Figure 159. Sample 875PH Analyzer HART Status Screen

Calibration

Parameters

The Parameters calibration screen allows you to define the parameters used by the analyzer in checking for measurement and temperature stability when performing a calibration. You can also specify the buffers to be used if you are measuring pH and using the Smart solution calibration feature.

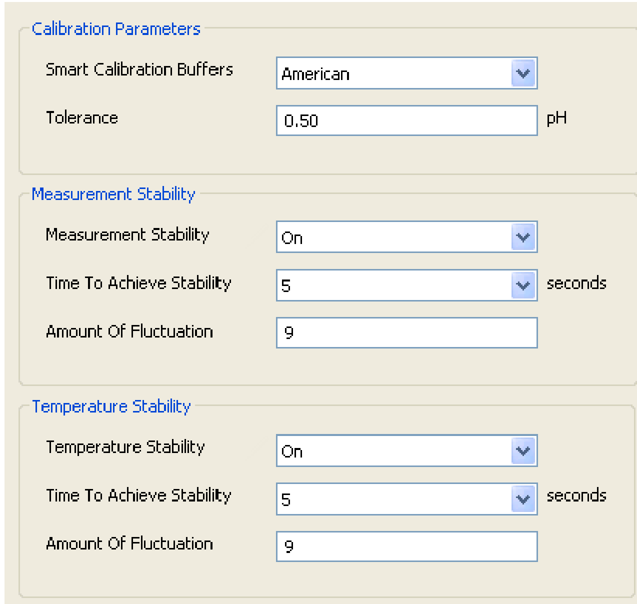


Figure 160. Sample 875PH Analyzer Parameter Calibration Screen

Field	Entry
Calibration Parameters	
Smart Calibration Buffers	This parameter is available only for pH measurement. Select the smart calibration buffer from the drop-down list. Choose from American, NIST, European, Buffer 1, Buffer 2, and Buffer 3.
Tolerance	This parameter is available only for pH measurement. Specify a value from 0.0 to 2.0 pH.
Measurement Stability	
Measurement Stability	While performing calibration, the analyzer checks the stability in absolute measurement before accepting the change. Set the measurement stability as On or Off.
Time to Achieve Stability	This parameter is available if Measurement Stability is configured as On. Specify the time between 5 and 60 seconds (in 5-second increments) to attain stability.
Amount of Fluctuation	This parameter is available if Measurement Stability is configured as On. Specify the amount of fluctuation between 1 and 9. A longer time period and a smaller measurement value assures more stability during calibration.
Temperature Stability	
Temperature Stability	While performing calibration the analyzer checks the stability in temperature before accepting the change. Set the temperature stability as On or Off.

Field	Entry
Time to Achieve Stability	This parameter is available if Temperature Stability is configured as On. Specify the time between 5 and 60 seconds (in 5-second increments) to attain stability.
Amount of Fluctuation	This parameter is available if Temperature Stability is configured as On. Specify the amount of fluctuation between 1 and 9. A longer time period and a smaller measurement value assures more stability during calibration.

If you select Buffer 1, 2, or 3, specify number of points for Custom pH Buffer.

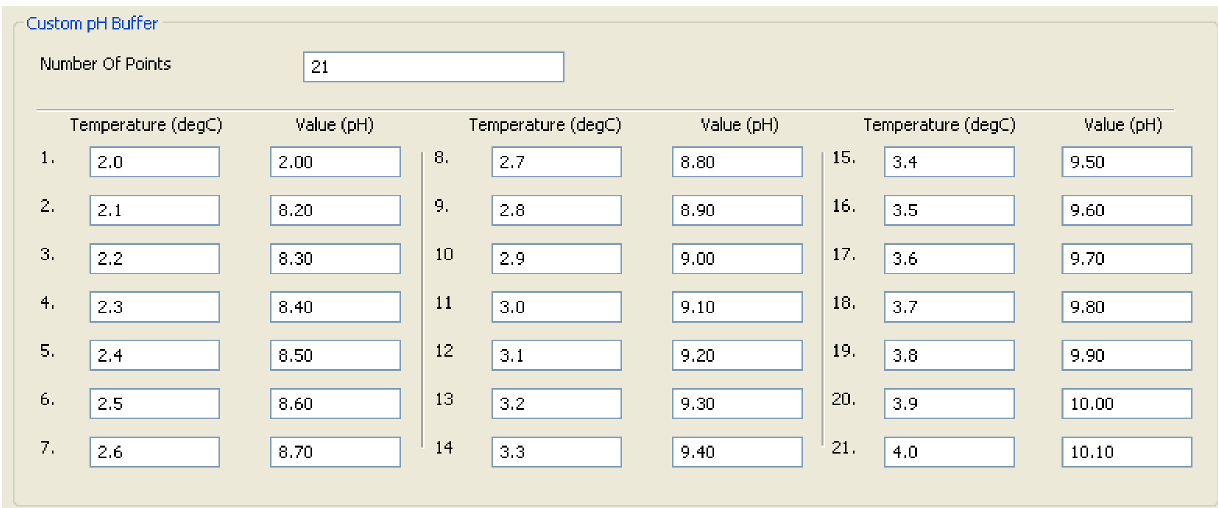


Figure 161. Sample 875PH Analyzer Parameter Calibration Screen (Custom Selection)

Field	Entry
Number of Points	
Number of Points	Specify the number of points between 2 and 21.
Temperature (Units)	Specify a temperature value from -20 to +200°C by 0.1°C or -4 to 392°F by 0.1 °F.
Value (pH)	Specify pH value from -2.00 to +16.00 pH.

Bench

The Bench calibration screen allows you to perform a calibration using theoretical inputs or to return to the stored factory default calibration. This calibration is used if you have a problem with your analyzer.

Default Calibration

The Default Calibration screen allows you to return to the stored factory default calibration.

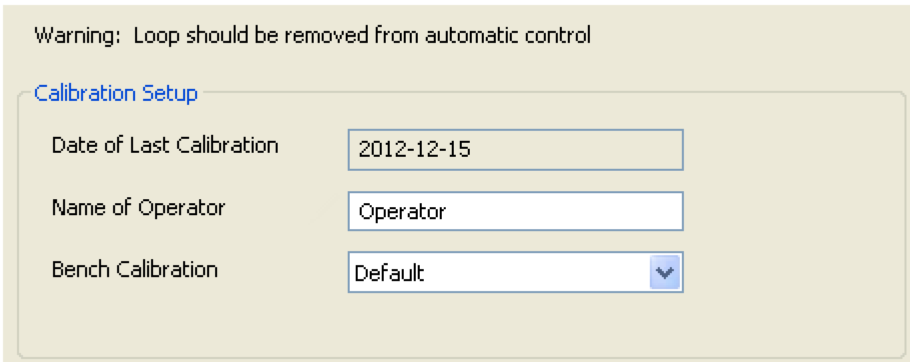


Figure 162. Sample 875PH Analyzer Default Calibration Screen 1

Field	Entry
Calibration Setup	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the operator.
Bench Calibration	Select the calibration as ‘Default’ from the drop-down list.

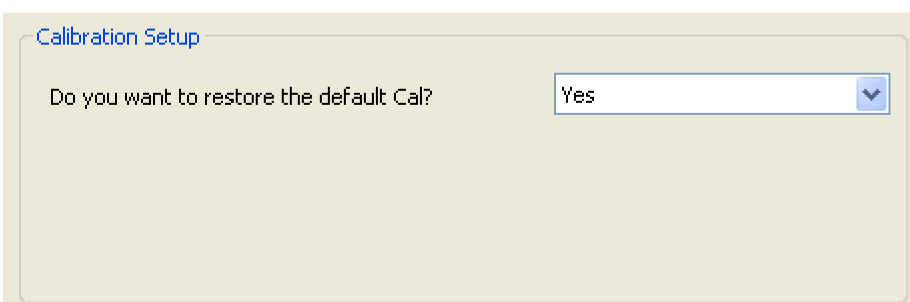


Figure 163. Sample 875PH Analyzer Default Calibration Screen 2

Field	Entry
Calibration Setup	
Do you want to restore the default cal?	Select Yes if you want to restore the default calibration. Select No if you choose not to restore.

If you have selected Yes, click Next to continue the calibration process.

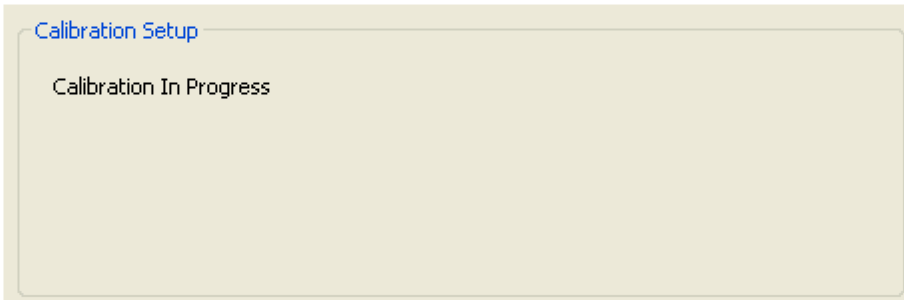


Figure 164. Sample 875PH Analyzer Default Calibration Screen 3

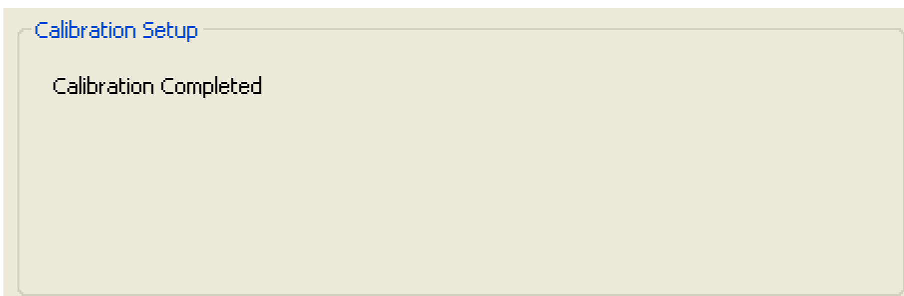


Figure 165. Sample 875PH Analyzer Default Calibration Screen 4

User Calibration

The User Calibration screen allows you to alternatively verify the calibration of the analyzer (without the sensor) with theoretical millivolt inputs.

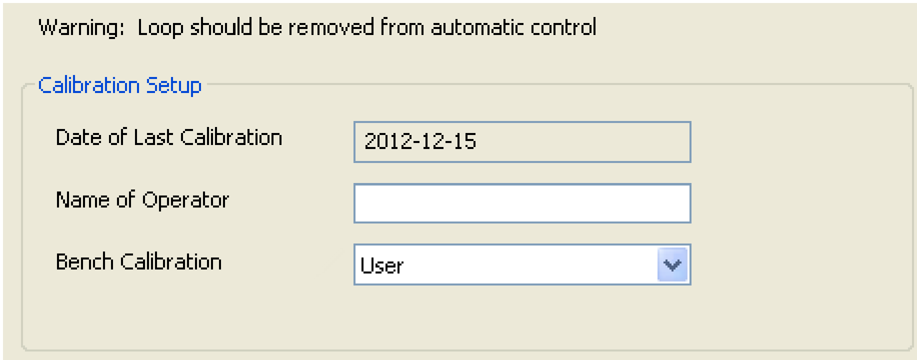


Figure 166. Sample 875PH Analyzer User Calibration Screen 1

Field	Entry
Calibration Setup	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the operator.
Bench Calibration	Select the calibration as ‘User’ from drop-down list.

Adjust the millivolt supply to the first value.

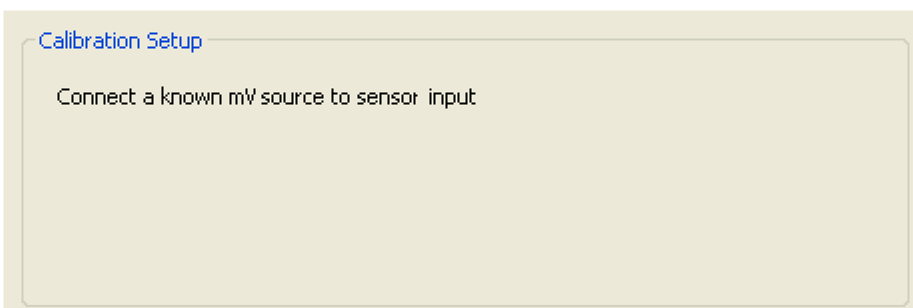


Figure 167. Sample 875PH Analyzer User Calibration Screen 2

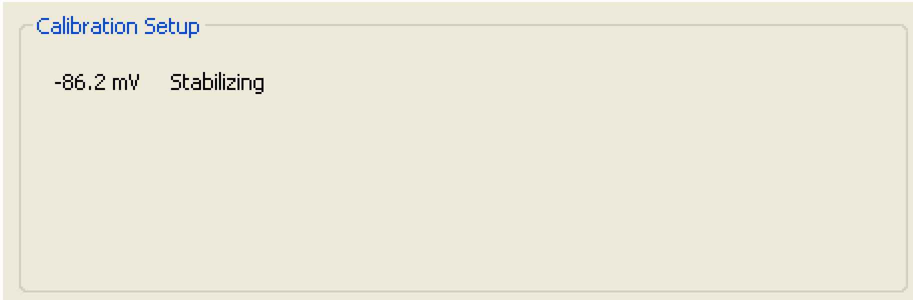


Figure 168. Sample 875PH Analyzer User Calibration Screen 3

If Meas Stability is configured Off, watch for the measurement to stabilize before proceeding. If it is configured On, the display reads Stabilizing until stability is achieved. When the message disappears, click Next.

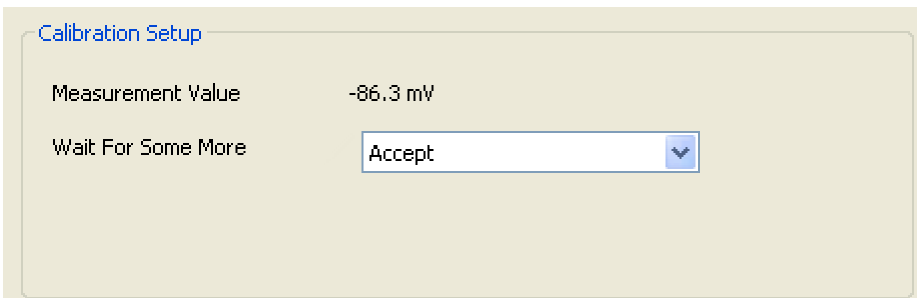


Figure 169. Sample 875PH Analyzer User Calibration Screen 4

Field	Entry
Calibration Setup	
Measurement Value	This parameter shows the measurement value.
Wait for Some More	Select one of the options from the drop-down list. • Accept - to accept the displayed measurement value. • Wait - to wait for another measurement value.

If the displayed reading is not correct, edit it to the correct value (to within 0.01%).

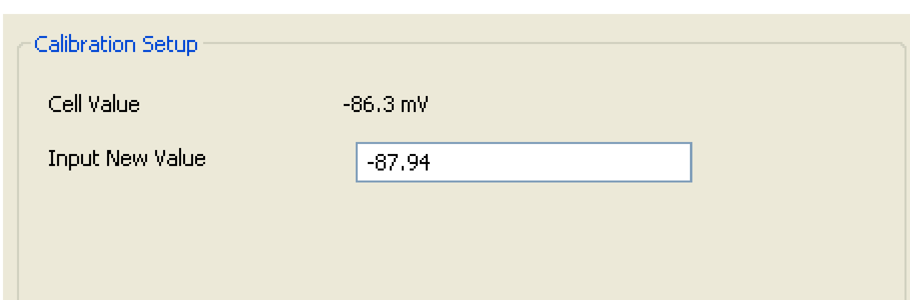


Figure 170. Sample 875PH Analyzer User Calibration Screen 5

If this part of the calibration is successfully completed, the display prompts you to adjust the millivolt supply to the second value and repeat the procedure.

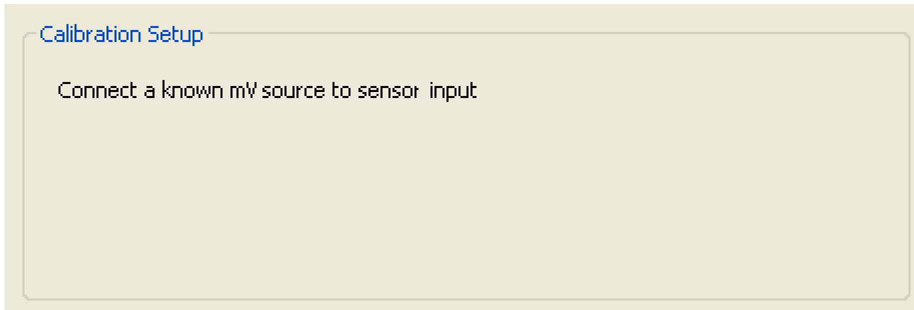


Figure 171. Sample 875PH Analyzer User Calibration Screen 6

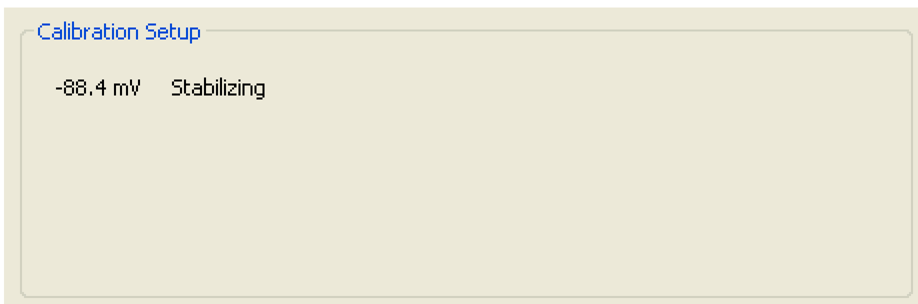


Figure 172. Sample 875PH Analyzer User Calibration Screen 7

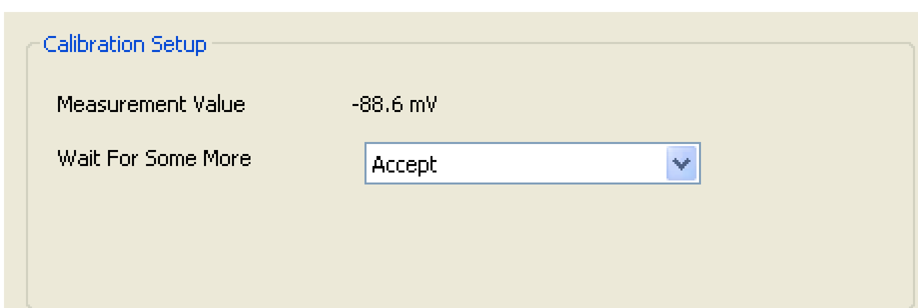


Figure 173. Sample 875PH Analyzer User Calibration Screen 8

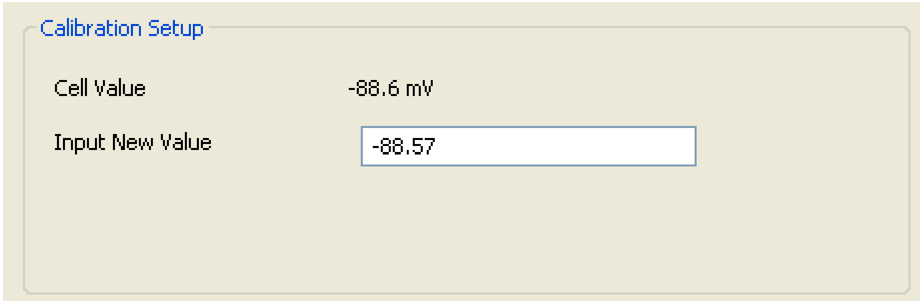


Figure 174. Sample 875PH Analyzer User Calibration Screen 9

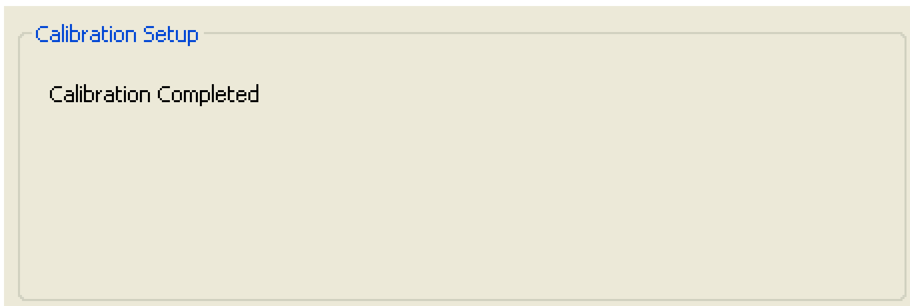


Figure 175. Sample 875PH Analyzer User Calibration Screen 10

If the calibration is successfully completed, the display reads Calibration Completed.

NOTE

If you are changing from an ISE measurement to a pH measurement, you should use a bench factory default calibration followed by a 2-point solution calibration.

Solution

The Solution screen allows you to perform a calibration using real solutions. Calibration can be done using Manual 1 Pt, Manual 2 Pt, Smart Cal, or Temp Adjust calibration types.

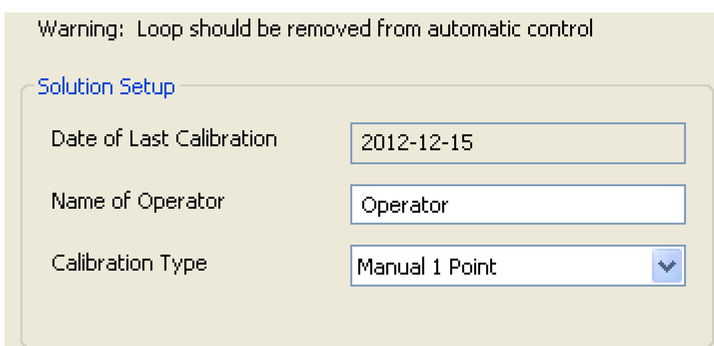


Figure 176. Sample 875PH Analyzer Solution Calibration Screen

Field	Entry
Calibration Setup	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the operator.
Calibration Type	Select one of the following calibration types from the drop-down list: • Manual 1 Point • Manual 2 Point • Smart Cal • Temp Adjust

Manual 1 Point

Manual 1 Pt calibration allows calibration at a user entered value. It can be used if you are measuring ORP.

Select the calibration type as Manual 1 Point and follow the steps given below:

1. Put the sensor in the solution and click Next.
2. The display reads Stabilizing until stability is achieved. Then the measurement value is displayed. Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value and click Next.
3. If the reading is not correct, edit it to the correct value and click Next.
4. After the process is completed, click OK to return to Calibrate menu.

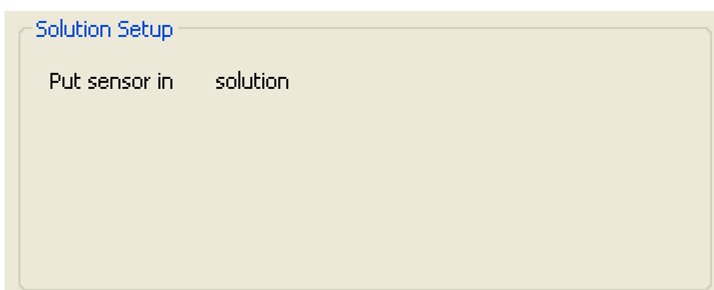


Figure 177. Sample 875PH Analyzer One Point Calibration Screen 1

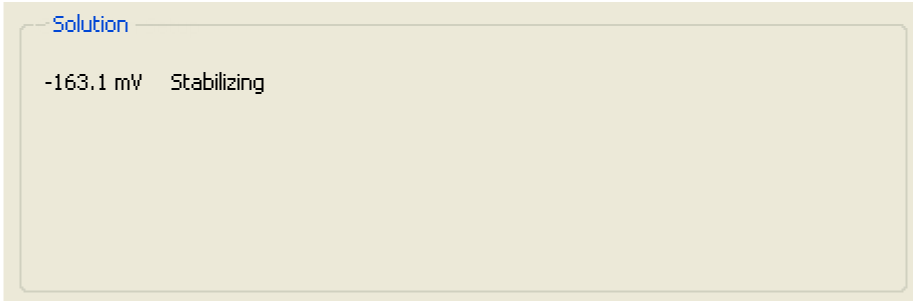


Figure 178. Sample 875PH Analyzer One Point Calibration Screen 2

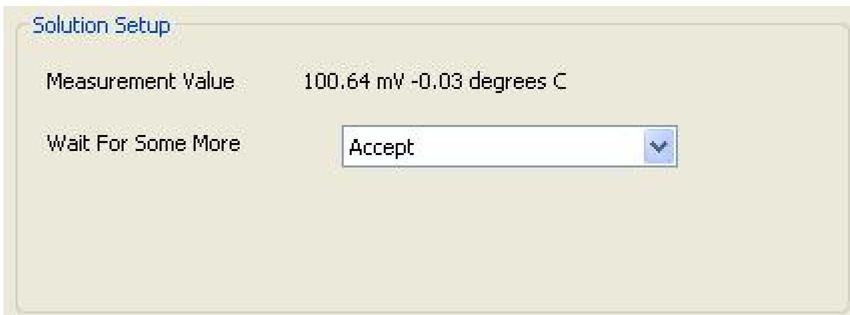


Figure 179. Sample 875PH Analyzer One Point Calibration Screen 3

Field	Entry
Solution	
Measurement Value	This parameter shows the stabilized measurement value.
Wait For Some More	Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value.

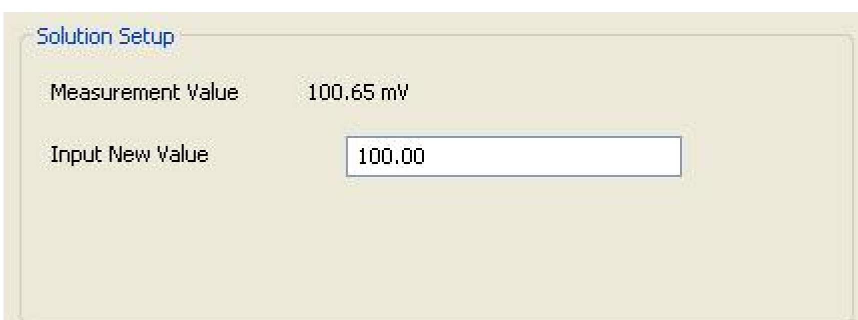


Figure 180. Sample 875PH Analyzer One Point Calibration Screen 4

Field	Entry
Solution	
Measurement Value	This parameter shows the stabilized measurement value.
Input New Value	If the reading is not the intended value, edit it to the correct value.

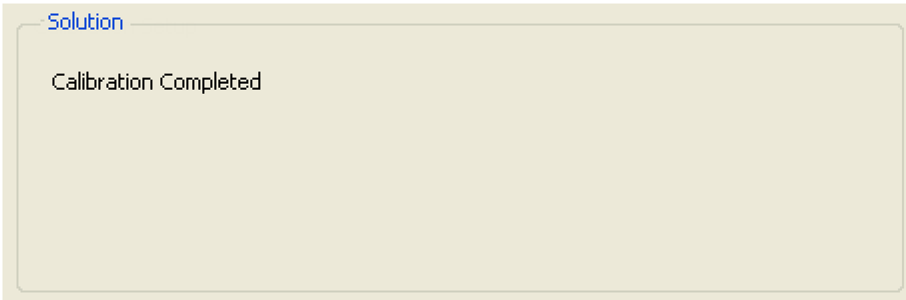


Figure 181. Sample 875PH Analyzer One Point Calibration Screen 5

Manual 2 Point

Manual 2 Point calibration allows calibration at 2 user entered values.

Select the calibration type as Manual 2 Point and follow the steps given below:

1. Put sensor into Solution 1 and click Next.
2. The display reads Stabilizing until stability is achieved. Then the measurement value is displayed. Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value and click Next.
3. If the reading is not correct, edit it to the correct value and click Next.
4. The message advises to immerse your sensor into the second solution.
5. Repeat steps 2 and 3.
6. After the process is completed, click OK to return to Calibrate menu.

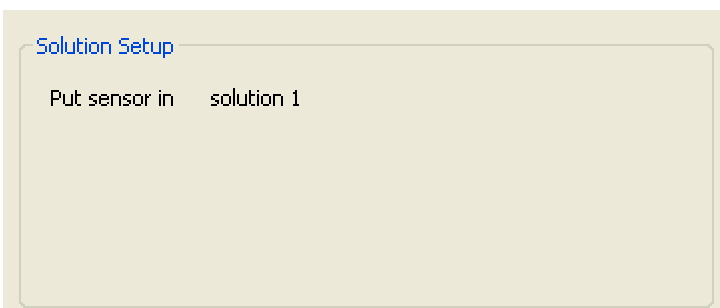


Figure 182. Sample 875PH Analyzer Two Point Calibration Screen 1

Figure 183. Sample 875PH Analyzer Two Point Calibration Screen 2

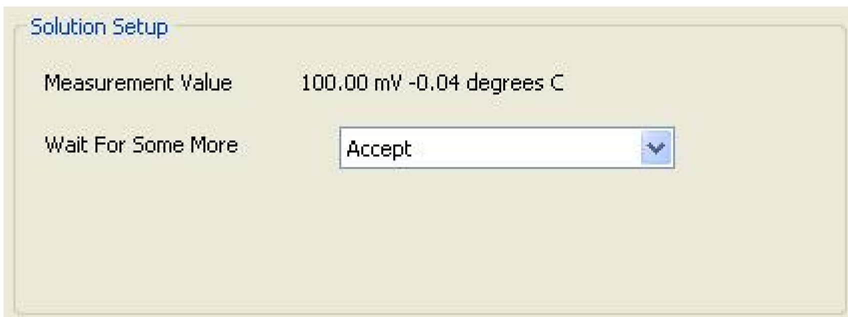


Figure 184. Sample 875PH Analyzer Two Point Calibration Screen 3

Field	Entry
Solution	
Measurement Value	This parameter shows the stabilized measurement value for solution 1.
Wait For Some More	Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value.

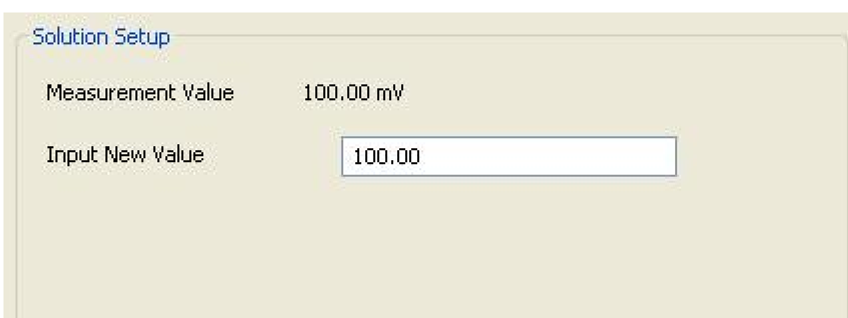


Figure 185. Sample 875PH Analyzer Two Point Calibration Screen 4

Field	Entry
Solution	
Measurement Value	This parameter shows the stabilized measurement value for solution 1.
Input New Value	If the reading is not the intended value, edit it to the correct value.

Figure 186. Sample 875PH Analyzer Two Point Calibration Screen 5

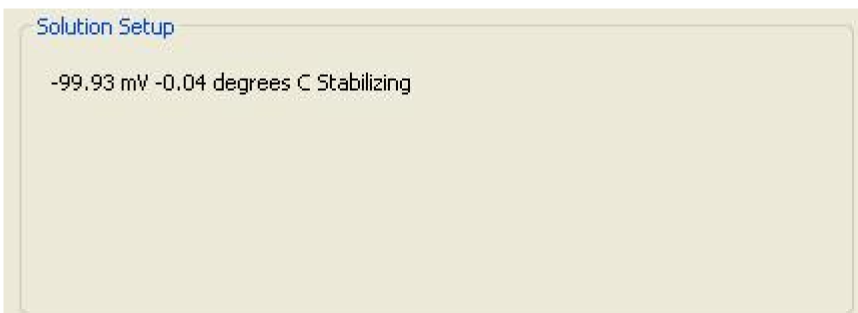


Figure 187. Sample 875PH Analyzer Two Point Calibration Screen 6

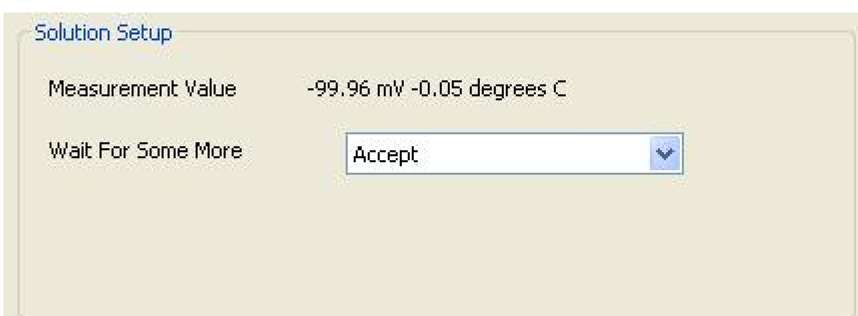


Figure 188. Sample 875PH Analyzer Two Point Calibration Screen 7

Field	Entry
Solution	
Measurement Value	This parameter shows the stabilized measurement value for solution 2.
Wait For Some More	Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value.

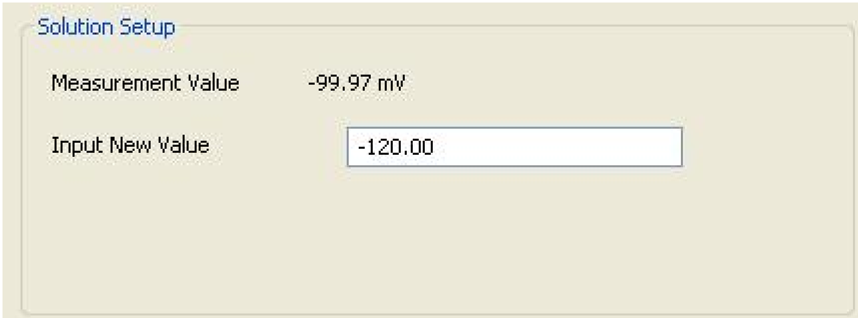


Figure 189. Sample 875PH Analyzer Two Point Calibration Screen 8

Field	Entry
Solution	
Measurement Value	This parameter shows the stabilized measurement value for solution 2.
Input New Value	If the reading is not the intended value, edit it to the correct value.

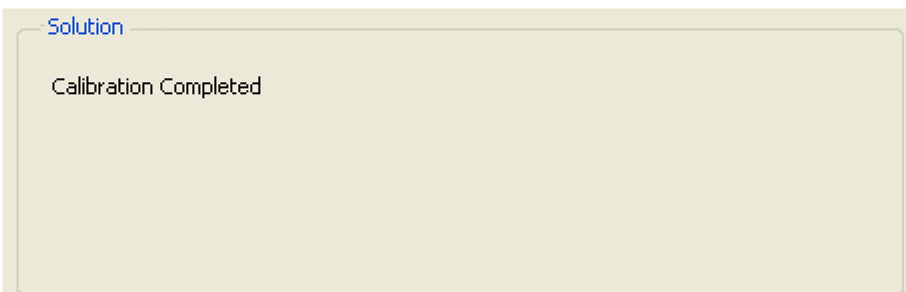


Figure 190. Sample 875PH Analyzer Two Point Calibration Screen 9

Temp Adjust

Temp Adjust calibration allows you to adjust a value if there is a difference in the temperature in Status mode and actual temperature of the solution.

Select the calibration type as Temp Adjust and follow the calibration steps mentioned in “Manual 1 Point” calibration.

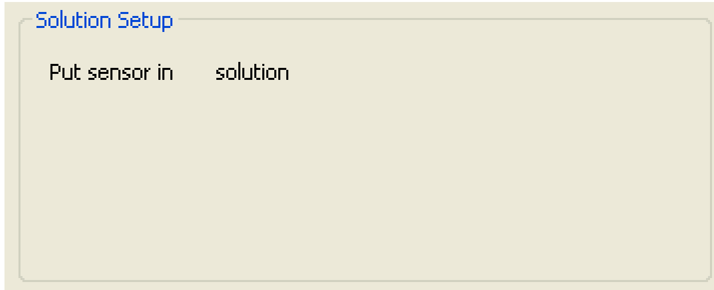


Figure 191. Sample 875PH Analyzer Temp Adjust Calibration Screen 1

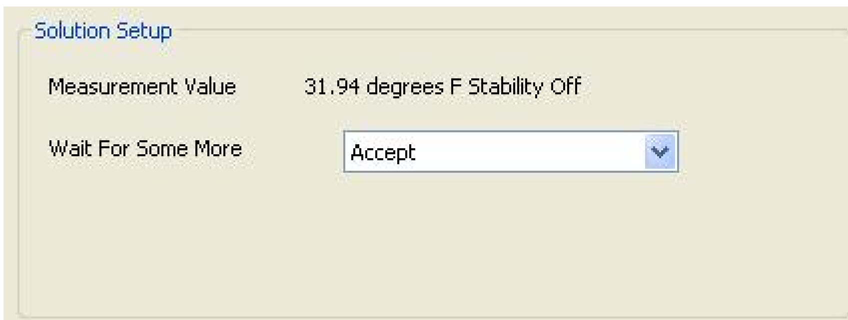


Figure 192. Sample 875PH Analyzer Temp Adjust Calibration Screen 2

Field	Entry
Solution	
Measurement Value	This parameter shows the stabilized measurement value.
Wait For Some More	Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value.

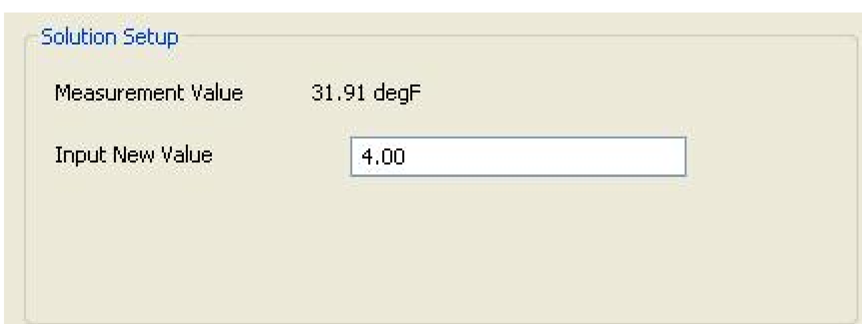


Figure 193. Sample 875PH Analyzer Temp Adjust Calibration Screen 3

Field	Entry
Solution	
Measurement Value	This parameter shows the stabilized measurement value.
Input New Value	If the reading is not the intended value, edit it to the correct value.

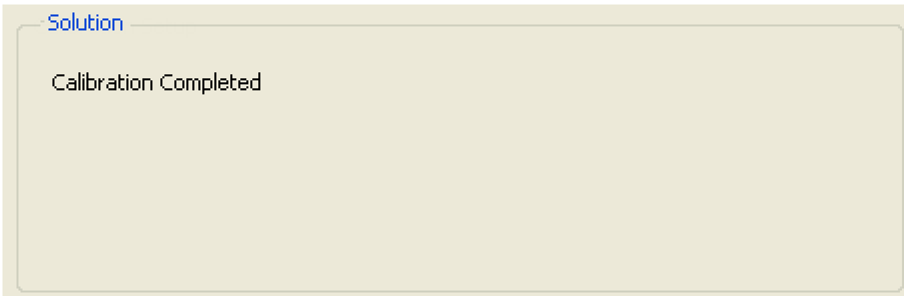


Figure 194. Sample 875PH Analyzer Temp Adjust Calibration Screen 4

Smart Cal

Smart Cal calibration provides a buffer recognition mechanism which locks in on the buffer value most closely representing the combination of millivolts and temperature values being reported from the sensor.

Select the calibration type as Smart Cal and follow the steps given below:

1. Put sensor into solution 1 and click Next.
2. The display reads Stabilizing until stability is achieved. Then the measurement value is displayed. Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value and click Next.
3. The display shows which buffer is applicable. The message advises to immerse your sensor into the second solution.
4. Repeat the procedure.
5. When complete, click OK to return to Calibrate menu.

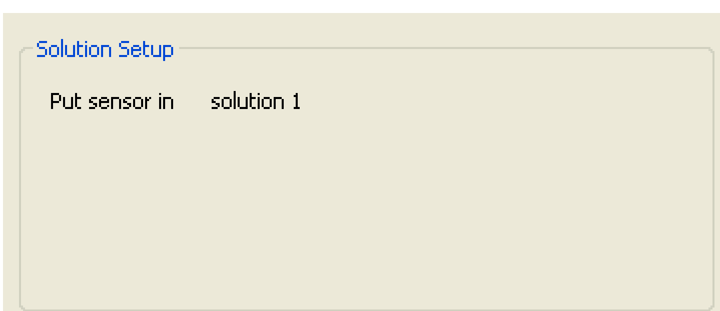


Figure 195. Sample 875PH Analyzer Smart Calibration Screen 1

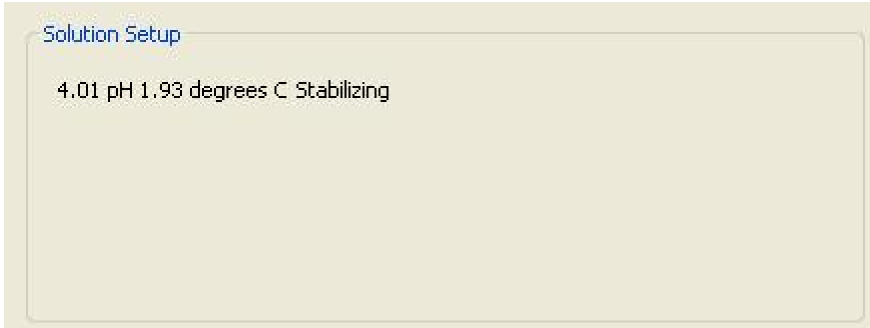


Figure 196. Sample 875PH Analyzer Smart Calibration Screen 2

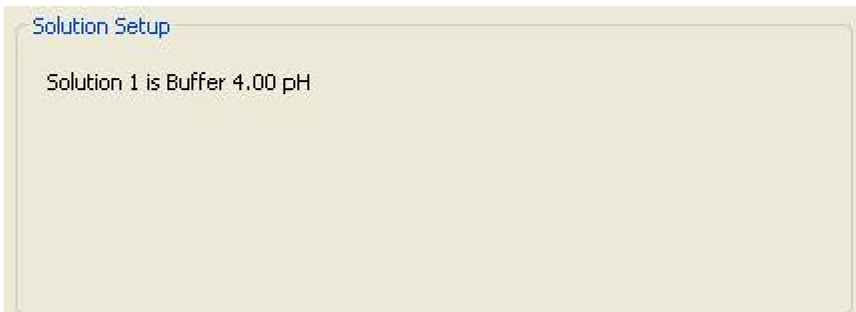


Figure 197. Sample 875PH Analyzer Smart Calibration Screen 3

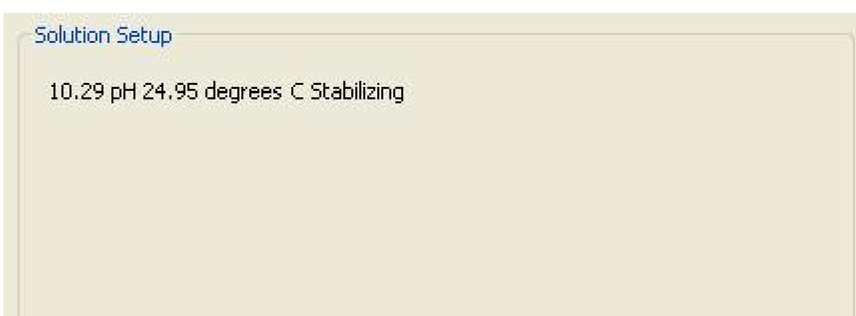


Figure 198. Sample 875PH Analyzer Smart Calibration Screen 4

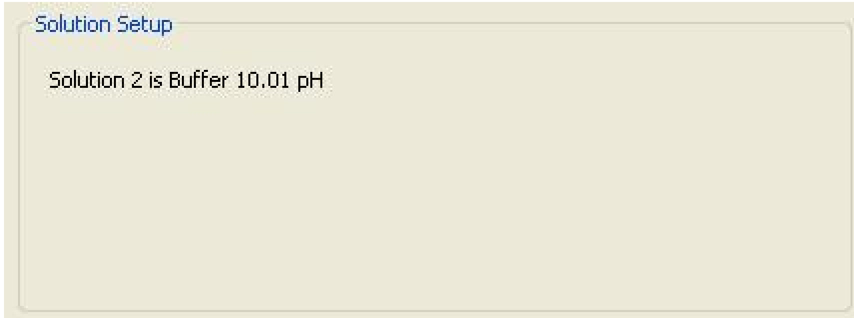


Figure 199. Sample 875PH Analyzer Smart Calibration Screen 5

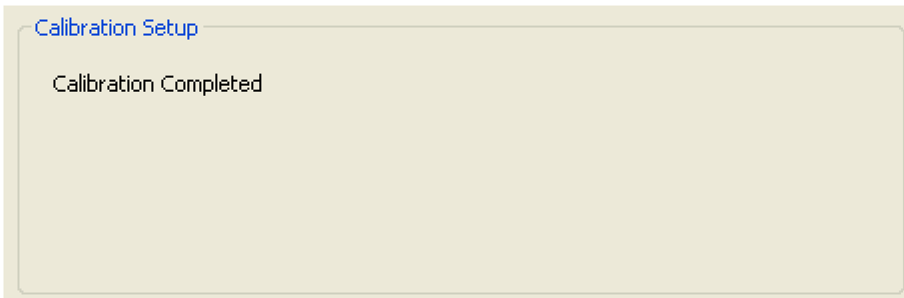


Figure 200. Sample 875PH Analyzer Smart Calibration Screen 6

Analog

This procedure is used to trim the 4 mA and 20 mA output values of the flow meter to match the output of a plant standard measurement device.

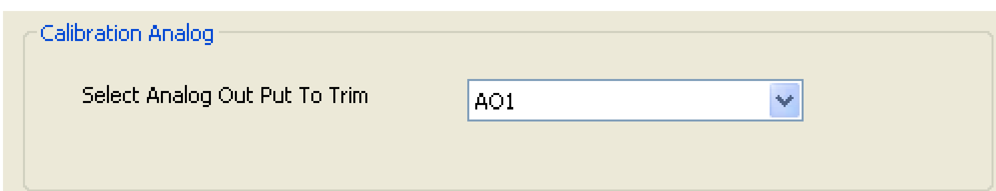


Figure 201. Sample 875PH Analyzer Analog Calibration Screen 1

Field	Entry
Calibration Analog	
Select Analog Output To Trim	Select the output from the drop-down list. Choose from AO1 and HART ANALOG.

Click Next to continue the calibration process for analog 4 mA.

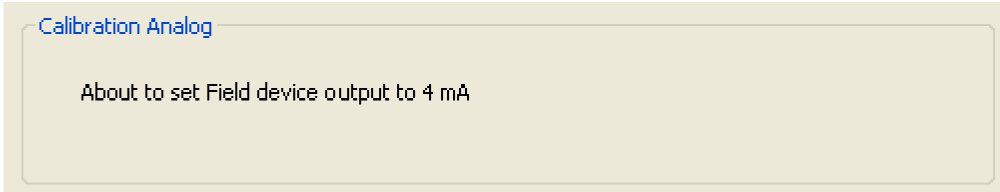


Figure 202. Sample 875PH Analyzer Analog Calibration Screen 2

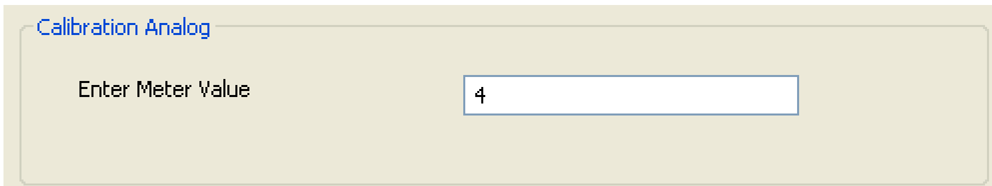


Figure 203. Sample 875PH Analyzer Analog Calibration Screen 3

Field	Entry
Calibration Analog	
Enter Meter Value	Specify a meter value.

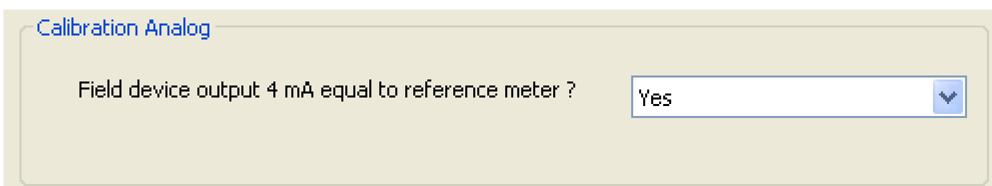


Figure 204. Sample 875PH Analyzer Analog Calibration Screen 4

Select Yes to continue the process. Calibration will be done for analog 20 mA.

If you select No, enter the reference meter value.

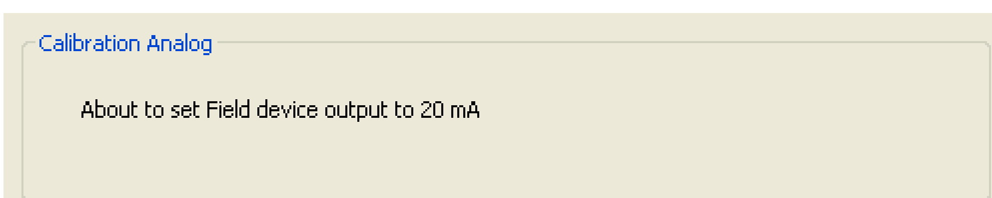


Figure 205. Sample 875PH Analyzer Analog Calibration Screen 5

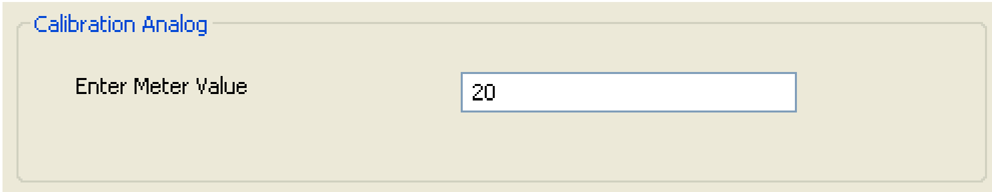


Figure 206. Sample 875PH Analyzer Analog Calibration Screen 6

Field	Entry
Calibration Analog	
Enter Meter Value	Specify a meter value.

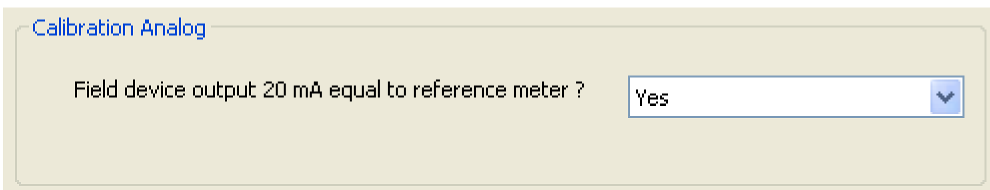


Figure 207. Sample 875PH Analyzer Analog Calibration Screen 7

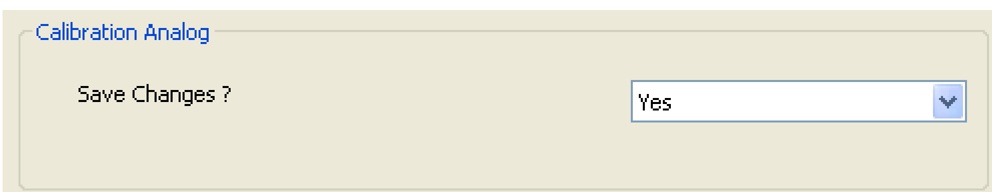


Figure 208. Sample 875PH Analyzer Analog Calibration Screen 8

Click Yes to save the changes, or No to abort the changes.

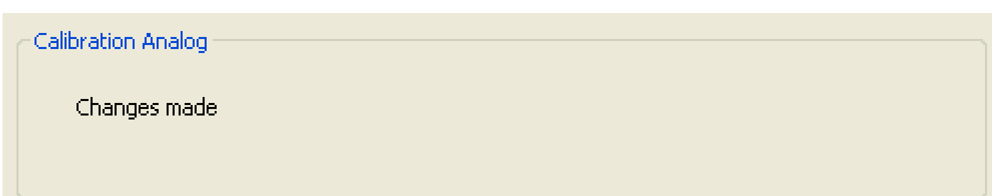


Figure 209. Sample 875PH Analyzer Analog Calibration Screen 9

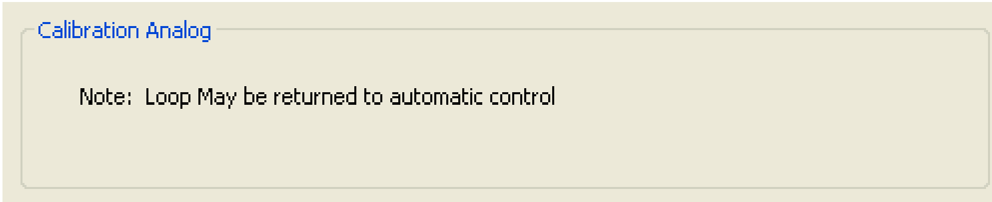


Figure 210. Sample 875PH Analyzer Analog Calibration Screen 10

Click OK after the calibration is completed.

Troubleshooting

Faults

Fault status is displayed in the main Diagnostic Menu. You can suspend faults from the measurement status for one hour and resume faults at any time.

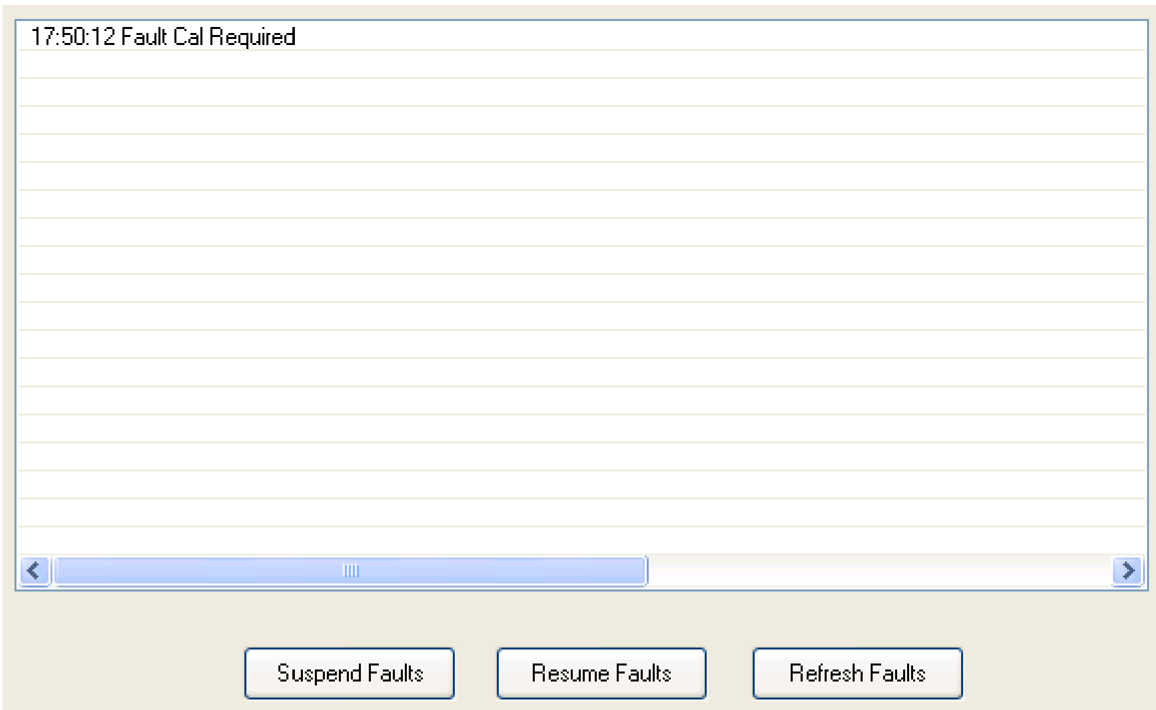


Figure 211. Sample 875PH Analyzer Faults Screen

— NOTE —
This screen displays a maximum of 100 faults that occurred.

History

The history log includes all faults, power restore, entries and exits from Configuration, Calibration and Hold, and Faults temporarily suspended.

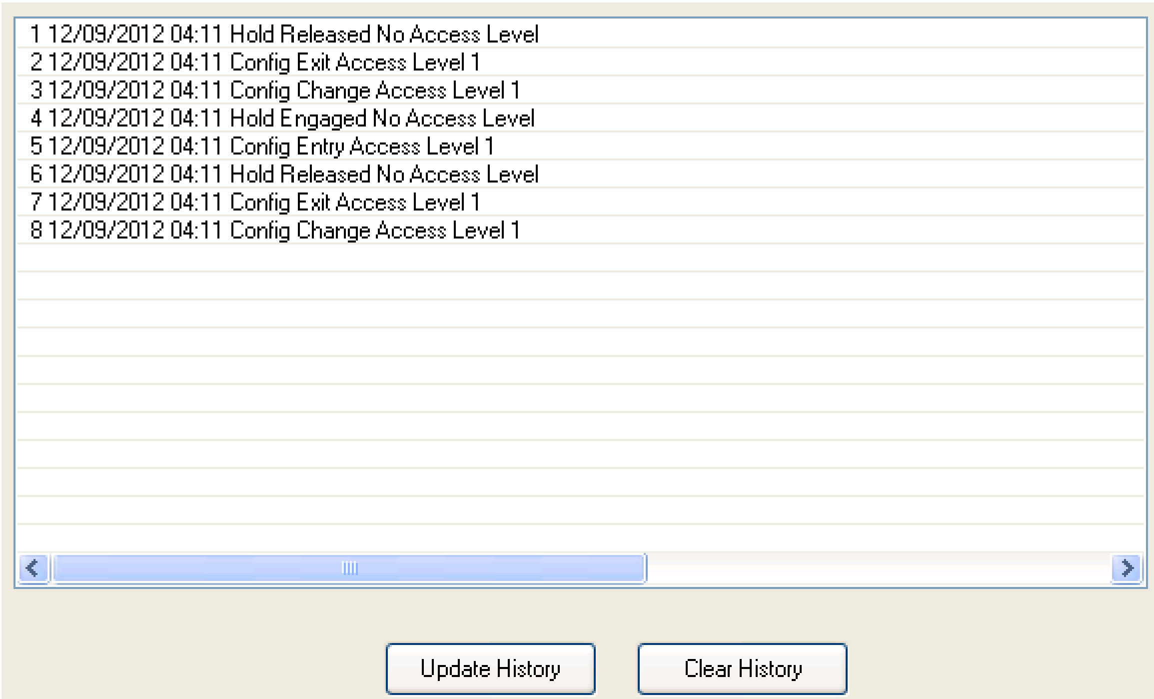


Figure 212. Sample 875PH Analyzer History Screen 1

NOTE

This screen displays up to 100 of the most current history log entries.

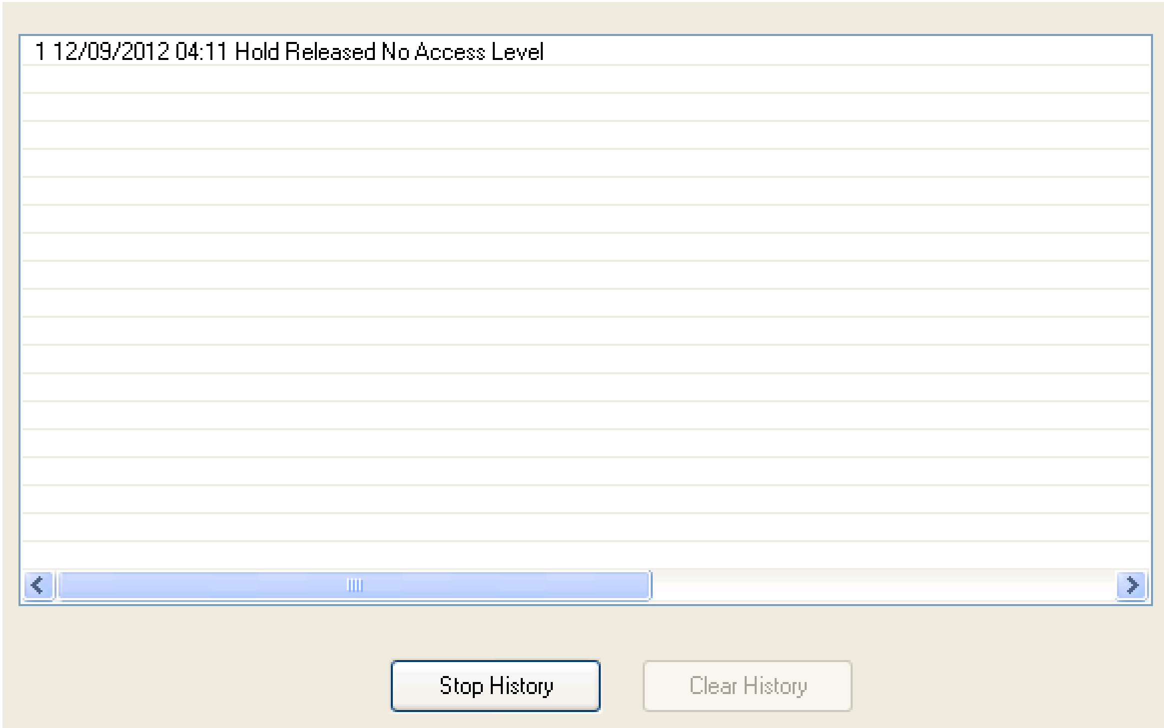


Figure 213. Sample 875PH Analyzer History Screen 2

7. 876PH Transmitter

This chapter provides information that is exclusive to using 876PH Transmitter with HART communication protocol. Additional information about this transmitter with HART communication is available in the following document.

- MI 611-262 Model 876PH Intelligent Transmitter for pH, ORP, and ISE Measurement with HART Communications

NOTE

If you are using HART 7, note that the 876PH devices do no support HART 7 wireless communication.

Device Overview Screen

The Device Overview screen displays HART information, Device Information, and current PV data.

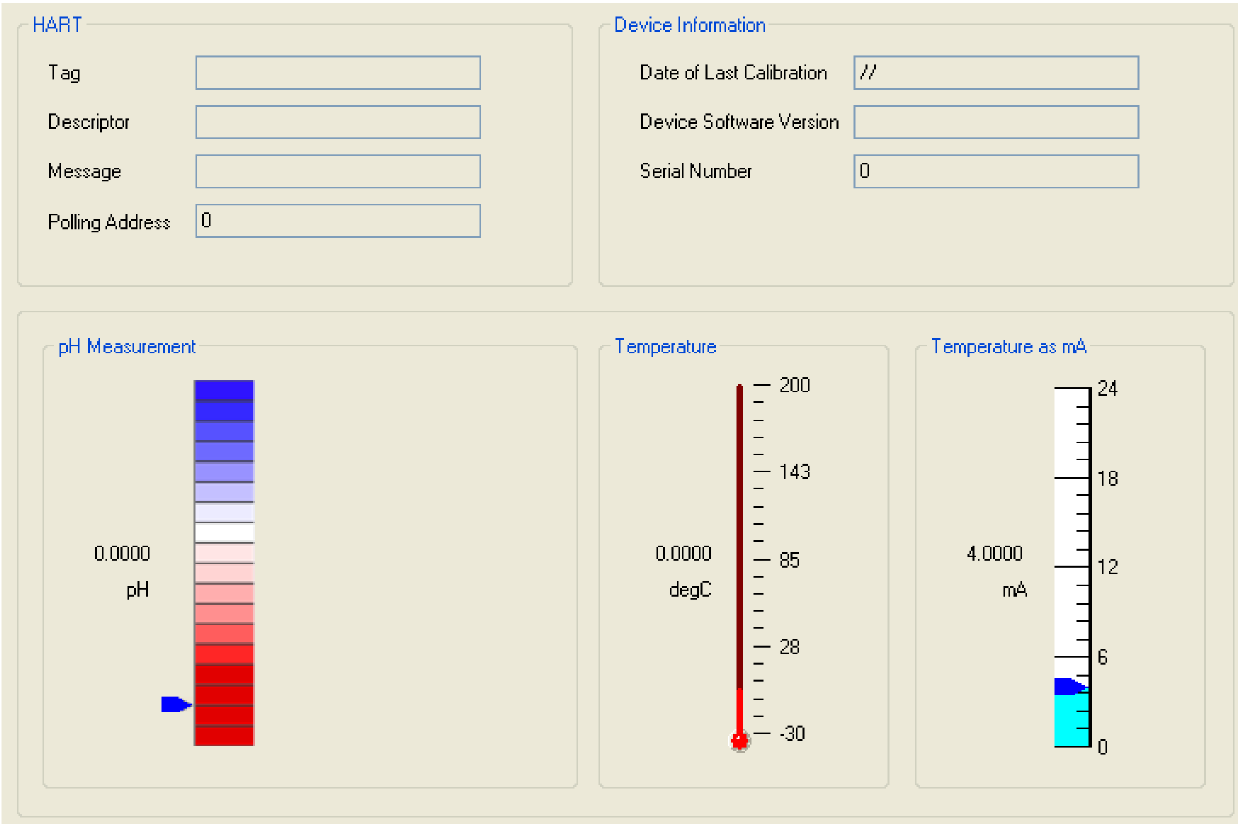


Figure 214. Sample 876PH Transmitter Device Overview Screen (pH)

Process Variables Screen

The Process Variables screen displays PV data that is displayed on the Device Overview screen plus additional measurement information.

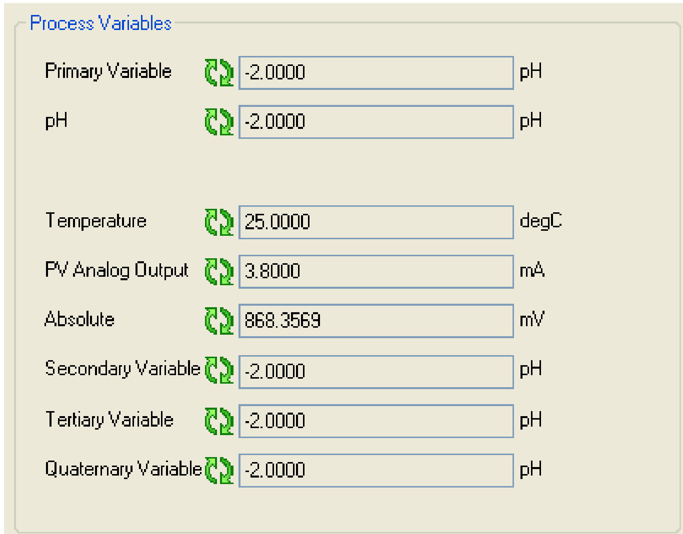


Figure 215. Sample 876PH Transmitter Process Variables Screen (pH)

Device Configuration

General Setup Screen

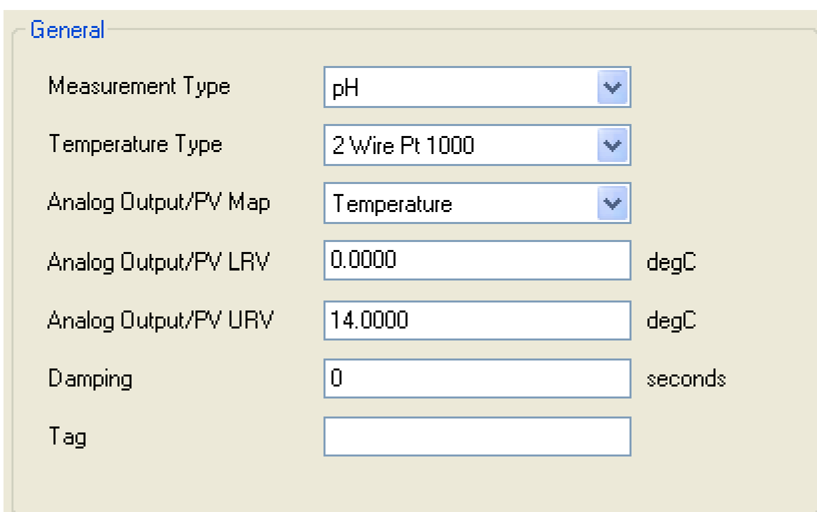


Figure 216. Sample 876PH Transmitter General Setup Screen

Field	Entry
Measurement Type	Select the Measurement Type from the drop-down menu. Choose from pH, ISE Concentration, mV (ORP), pH and ORP.
Temperature Type	Select the Temperature Type from the drop-down menu. Choose from 2 Wire Pt 100, 2 Wire Pt 1000, 3 Wire Pt 100, 3 Wire Pt 1000, and 3k Balco.
Analog Output/PV Map	Select the Analog Output from the drop-down menu. Choose from Measurement, ORP (if Measurement type is pH and ORP), Temperature, Absolute, Glass Resistance (if glass diagnostic is on and electrode is glass), Reference Resistance (if coat diagnostic is on), and ATC Resistance.
Analog Output/PV LRV	Set the analog output/process variable lower range value.
Analog Output/PV URV	Set the analog output/process variable upper range value.
Damping	Set the damping time in seconds.
Tag	Set the Tag name. You can enter up to 8 characters maximum.

Sensor

Sensor configuration enables you to choose pH, ISE Concentration, mV (ORP), and pH and ORP measurement types. Example screens are provided below for various measurement types.

If you select pH as Measurement Type, the following fields appear as shown in Figure 217.

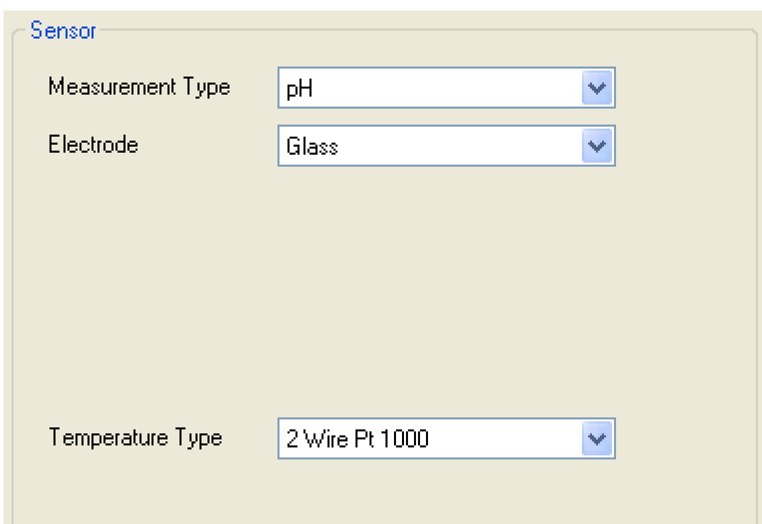


Figure 217. Sample 876PH Transmitter Sensor Screen (pH)

Field	Entry
Measurement Type	Select pH from the Measurement Type drop-down menu.
Electrode	Select the electrode type from the drop-down menu. Choose from Glass, Antimony, and Other. If Other is chosen, enter the information for Slope and Isopotential pH as shown in Figure 218.
Temperature Type	Select the temperature type from the drop-down menu. Choose from 2 Wire Pt 100, 2 Wire Pt 1000, 3 Wire Pt 100, 3 Wire Pt 1000, and 3k Balco.

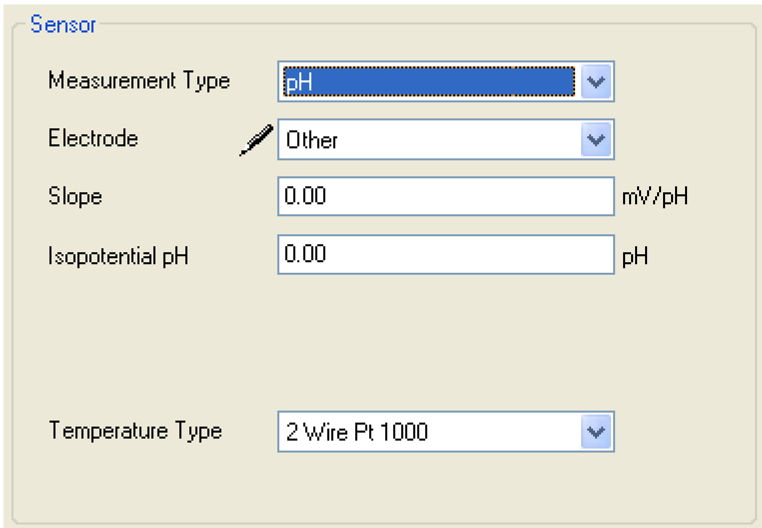


Figure 218. Sample 876PH Transmitter Sensor Screen (PH Measurement Type and Other Electrode Option)

Field	Entry
Measurement Type	Select the Measurement Type from the drop-down menu.
Electrode	Select the electrode type from the drop-down menu. Choose pH as Measurement Type and Other as Electrode.
Slope	Enter the Slope. This is measured in mV/pH.
Isopotential pH	Enter the Isopotential pH.
Temperature Type	Select the Temperature Type from the drop-down menu. Choose from 2 Wire Pt 100, 2 Wire Pt 1000, 3 Wire Pt 100, 3 Wire Pt 1000, and 3k Balco.

If you select ISE Concentration as Measurement Type, the following fields appear as shown in Figure 219.

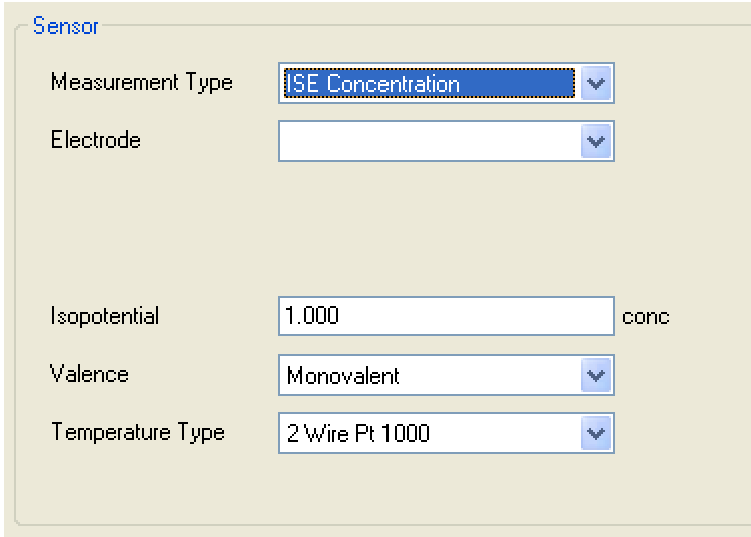


Figure 219. Sample 876PH Transmitter Sensor Screen (ISE Concentration)

Field	Entry
Measurement Type	Select ISE Concentration as measurement type from the drop-down menu.
Electrode	Select the electrode type from the drop-down menu. Choose from Positive or Negative.
Isopotential	Set the isopotential concentration.
Valence	Set the valence value. Choose from Monovalent and Divalent.
Temperature Type	Select the Temperature Type from the drop-down menu. Choose from 2 Wire Pt 100, 2 Wire Pt 1000, 3 Wire Pt 100, 3 Wire Pt 1000, and 3k Balco.

If you select mV (ORP) as Measurement Type, the following fields appear as shown in Figure 220.

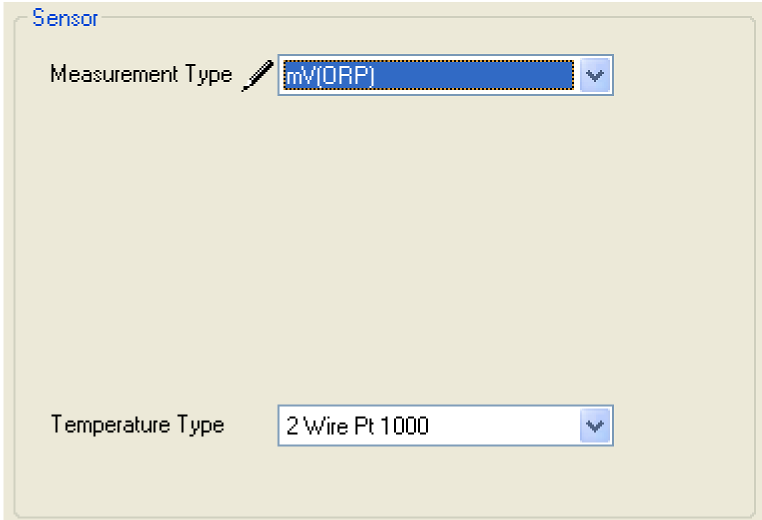


Figure 220. Sample 876PH Transmitter Sensor Screen mV (ORP)

Field	Entry
Measurement Type	Select mV (ORP) from the Measurement Type drop-down menu.
Temperature Type	Select the Temperature Type from the drop-down menu. Choose from 2 Wire Pt 100, 2 Wire Pt 1000, 3 Wire Pt 100, 3 Wire Pt 1000, and 3k Balco.

If you select pH and ORP as Measurement Type, the following fields appear as shown in Figure 221.

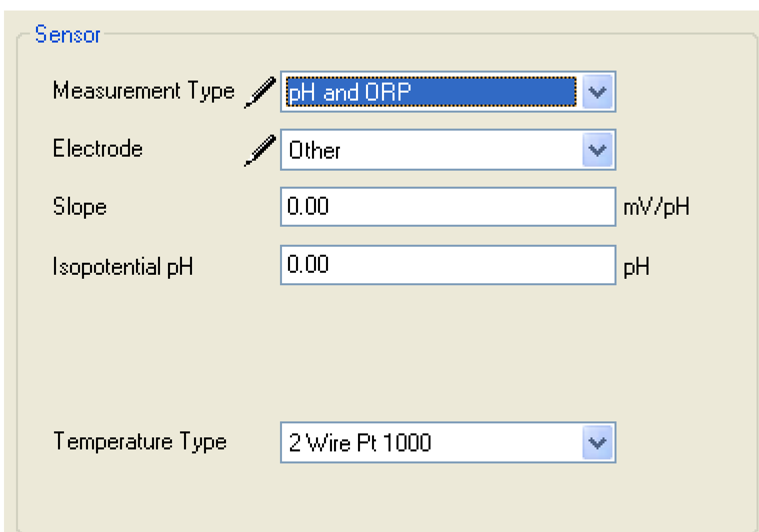


Figure 221. Sample 876PH Transmitter Sensor Screen (pH and ORP)

Field	Entry
Measurement Type	Select the measurement type as pH and ORP from the drop-down menu.
Electrode	Select the electrode type from the drop-down menu. Choose from Glass, Antimony, and Other. If Other is chosen, enter the information for Slope and Isopotential pH as shown in Figure 218.
Temperature Type	Select the temperature type from the drop-down menu. Choose from 2 Wire Pt 100, 2 Wire Pt 1000, 3 Wire Pt 100, 3 Wire Pt 1000, and 3k Balco.
Slope	Set the slope value.
Isopotential pH	Set the Isopotential pH value.

Measurement Units Screen

If you select pH or pH and ORP as Measurement Type, select the values for pH resolution and damping, as shown in Figure 222.

Figure 222. Sample 876PH Transmitter Measurement Units Screen (pH/pH and ORP)

Field	Entry
pH Resolution	Select the pH resolution from the drop-down menu. Choose from 0.01 and 0.1.
Damping	Set the damping time in seconds.

If you select ISE Concentration as Measurement Type, select the values for ISE units and ISE scale, as shown in Figure 223.

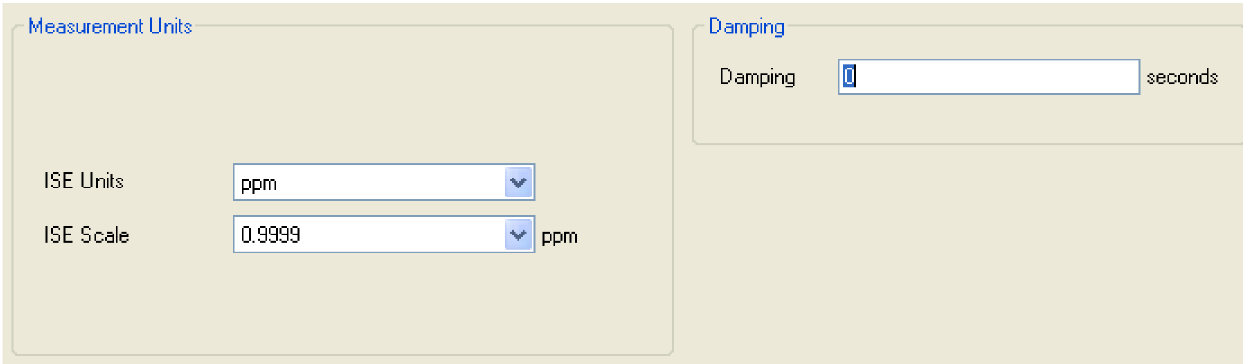


Figure 223. Sample 876PH Transmitter Measurement Units Screen (ISE Concentration Measurement Type)

Field	Entry
Measurement Units	
ISE Units	Select the ISE units from the drop-down menu. Choose from %, ppm, ppb, or Custom. If you choose Custom, enter the Custom Label name in the field.
ISE Scale	Set the ISE scale value. Choose from 0.9990, 9.999, 99.99, 999.9, or 9999.
Custom Label	If you choose Custom from ISE Units drop-down menu, enter a label in this field.
Damping	
Damping	Set the damping value in seconds.

If you select mV (ORP) as Measurement Type, set the value for damping, as shown in Figure 224.

Figure 224. Sample 876PH Transmitter Measurement Units Screen (Measurement Type ORP)

Field	Entry
Measurement Units	
Damping	Set the damping value in seconds.

Temperature

Temperature configuration enables you to choose automate or manual temperature modes.

If you select Auto as temperature mode, the temperature screen appears as shown in Figure 225

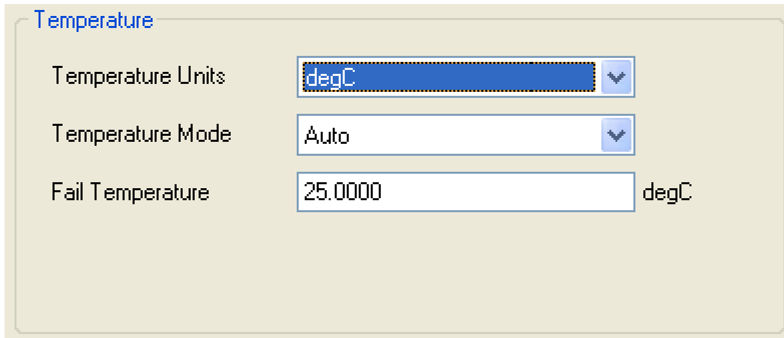


Figure 225. Sample 876PH Transmitter Temperature Screen (Temperature Mode as Auto)

Field	Entry
Temperature Units	Select the temperature units from the drop-down menu. Choose from degC (centigrade) or degF (fahrenheit).
Temperature Mode	Select Auto as the Temperature Mode from the drop-down menu.
Fail Temperature	If Temperature Mode is set to auto, set the Fail Temperature to the value at which you expect the process to be operating if the RTD fails.

If you select Manual as temperature mode, the temperature screen appears as shown in Figure 226.

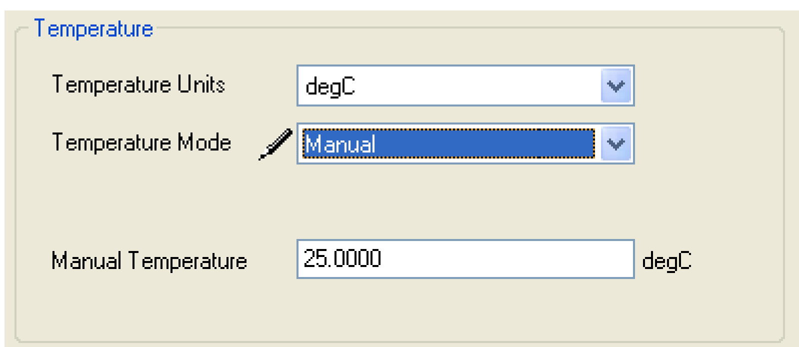


Figure 226. Sample 876PH Transmitter Temperature Screen (Temperature Mode as Manual)

Field	Entry
Temperature Units	Select the Temperature Units from the drop-down menu. Choose from degC (centigrade) or degF (fahrenheit).
Temperature Mode	Select the Temperature Mode as Manual from the drop-down menu.
Manual Temperature	Set the temperature at a fixed temperature value.

Temperature Compensation

Select the desired temperature compensation from the drop-down menu as shown in Figure 227.

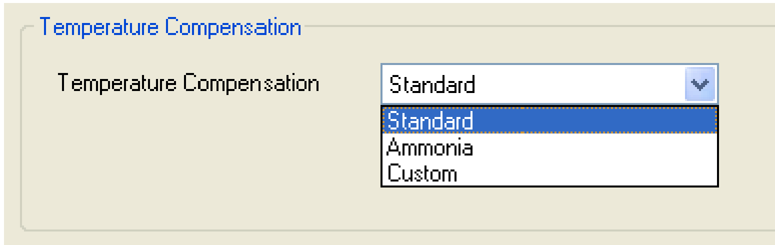


Figure 227. Sample 876PH Transmitter Temperature Compensation Screen (Standard)

On selecting Ammonia (shown for measurement types pH and ORP only), enter the reference temperature, as shown in Figure 228.

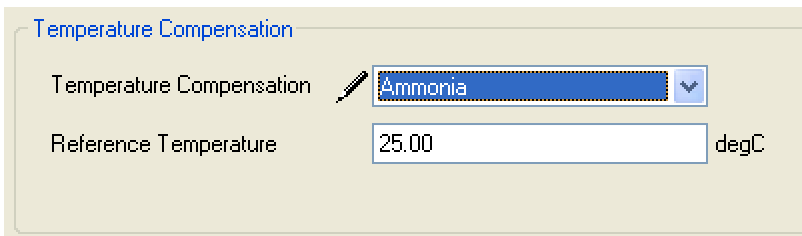


Figure 228. Sample 876PH Transmitter Temperature Compensation Screen (Ammonia)

If you select Custom from the Temperature Compensation drop-down menu, enter the following fields as shown in Figure 229.

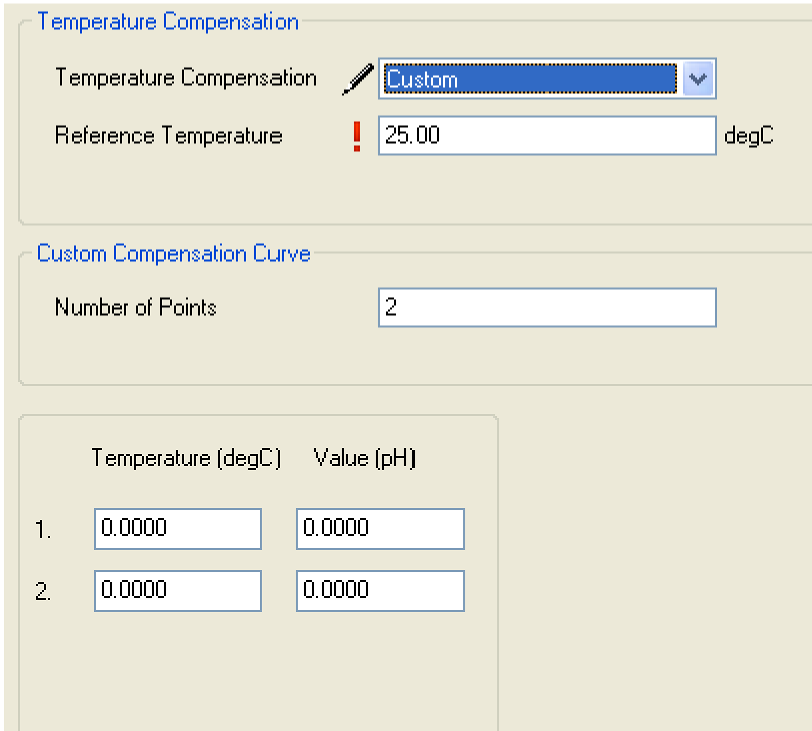


Figure 229. Sample 876PH Transmitter Temperature Compensation Screen (Custom)

Field	Entry
Temperature Compensation	
Reference Temperature	Set the reference temperature.
Custom Compensation Curve	
Number of Points	Set the number of points. The number of points can be specified from 2 to 21 points. Each point specifies a value at certain temperature.
Temperature	Enter the temperature values.
Values	Enter the values.

If you select ORP as the Measurement Type, the Temperature Compensation screen does not appear.

Output Screen

Digital

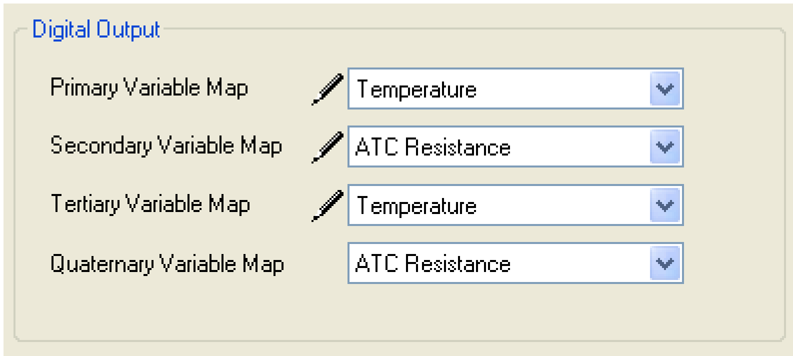


Figure 230. Sample 876PH Transmitter Digital Output Screen

Field	Entry
Primary Variable Map	Select the primary variable from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Glass Resistance (if glass diagnostic is on and electrode is set to glass), Reference Resistance (if coat diagnostic is on), ATC Resistance, and Absolute.
Secondary Variable Map	Select the secondary variable from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute, Glass Resistance (if glass diagnostic is on and electrode is set to glass), Reference Resistance (if coat diagnostic is on), and ATC Resistance.
Tertiary Variable Map	Select the tertiary variable from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute, Glass Resistance (if glass diagnostic is on and electrode is set to glass), Reference Resistance (if coat diagnostic is on), and ATC Resistance.
Quaternary Variable Map	Select the quaternary variable map from the drop-down menu. Choose from the Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute, Glass Resistance (if glass diagnostic is on, and electrode is set to glass), Reference Resistance (if coat diagnostic is on), and ATC Resistance.

Output Screen - Analog

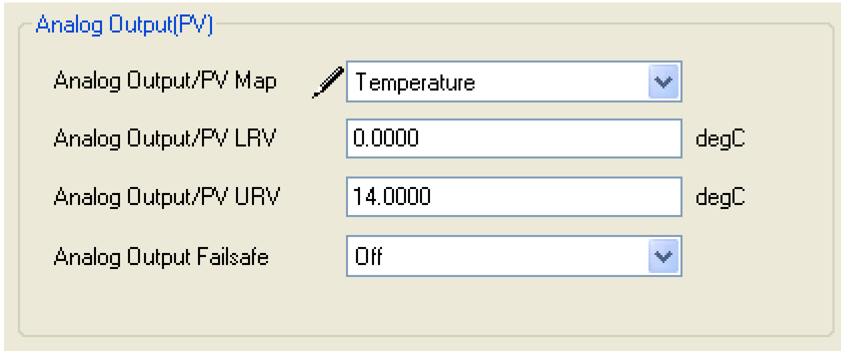


Figure 231. Sample 876PH Transmitter Analog Output Screen

Field	Entry
Analog Output/PV Map	Select analog output (PV map) from the drop-down menu. Choose from Measurement, ORP (if sensor set to pH and ORP), Temperature, or Absolute, Glass Resistance (if glass diagnostic is on and electrode is set to glass), Reference Resistance (if coat diagnostic on), and ATC Resistance. **— NOTE —** Analog Output/PV Map is the same as Primary Variable Map for Digital Output.
Analog Output/PV LRV	Set analog output (PV low range value).
Analog Output/PV URV	Set analog output (PV upper range value).
Analog Output Failsafe	Select analog output failsafe value from the drop-down menu. Choose from Off, Fail Low, or Fail High. This is visible for HART version 5 if polling address set to 0, or for HART version is 6/7 if loop mode is in active state.

Output Screen - HART

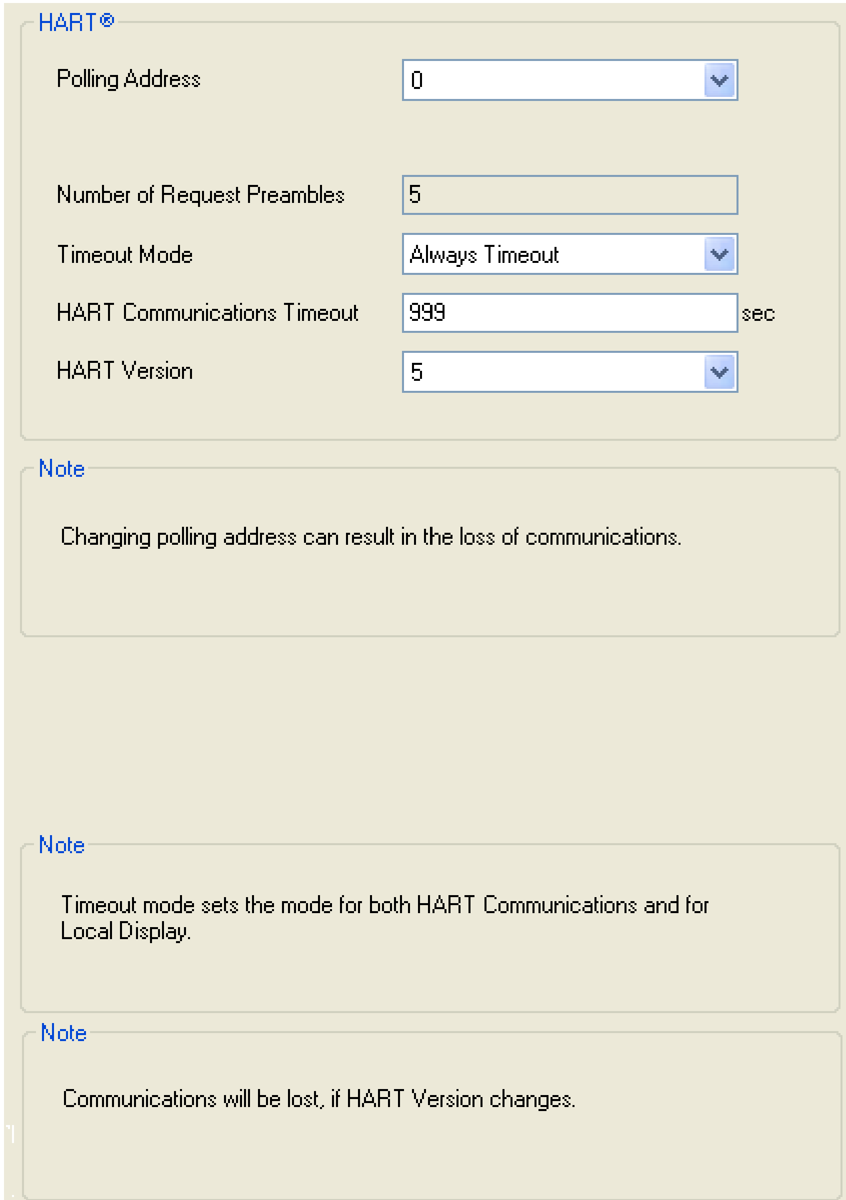


Figure 232. Sample 876PH Transmitter HART Output Screen (HART Version 5)

Field	Entry
Polling Address	Select the polling address from the drop-down menu. Choose any number from 0 to 15.
Number of Request Preambles	Displays the number of preambles to be sent in response message from the transmitter to the host.
Timeout Mode	Select the timeout mode. Choose from Never Timeout, Online Timeout Only, or Always Timeout.

Field	Entry
HART Communications Timeout	Set the HART communications timeout. The HART communications timeout is not visible if timeout mode is chosen as Never Timeout.
HART Version	Select HART version 5 from the drop-down menu.

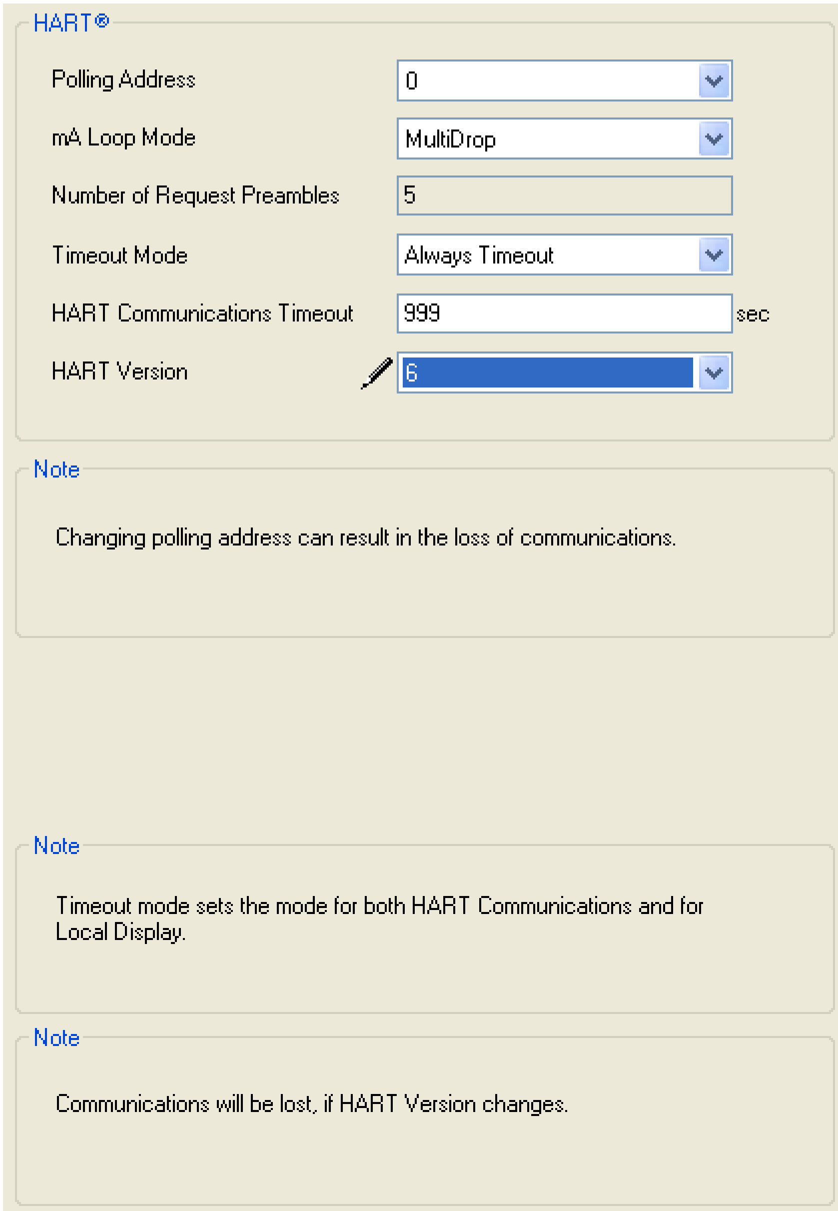


Figure 233. Sample 876PH Transmitter HART Output Screen (HART Version 6 or 7)

Field	Entry
Polling Address	Select the polling address from the drop-down menu. Choose any number from 0 to 63.
mA Loop Mode	Select the mA Loop Mode from the drop-down menu. Choose Active or Multidrop.
Number of Request Preambles	Shows the number of preambles to be sent in response message from the transmitter to the host.
Timeout Mode	Select the timeout mode. Choose from Never Timeout, Online Timeout Only, or Always Timeout.
HART Communications Timeout	Set the HART communications timeout. The HART time communications timeout is not visible if the timeout mode is chosen as Never Timeout.
HART Version	Select the HART version from the drop-down menu. Choose from 6 or 7. **— NOTE** If you select HART 7, note that HART 7 wireless communication is not supported.

Local Display

You can choose the display format to be in single line, dual line, or triple line, as shown in Figure 234.

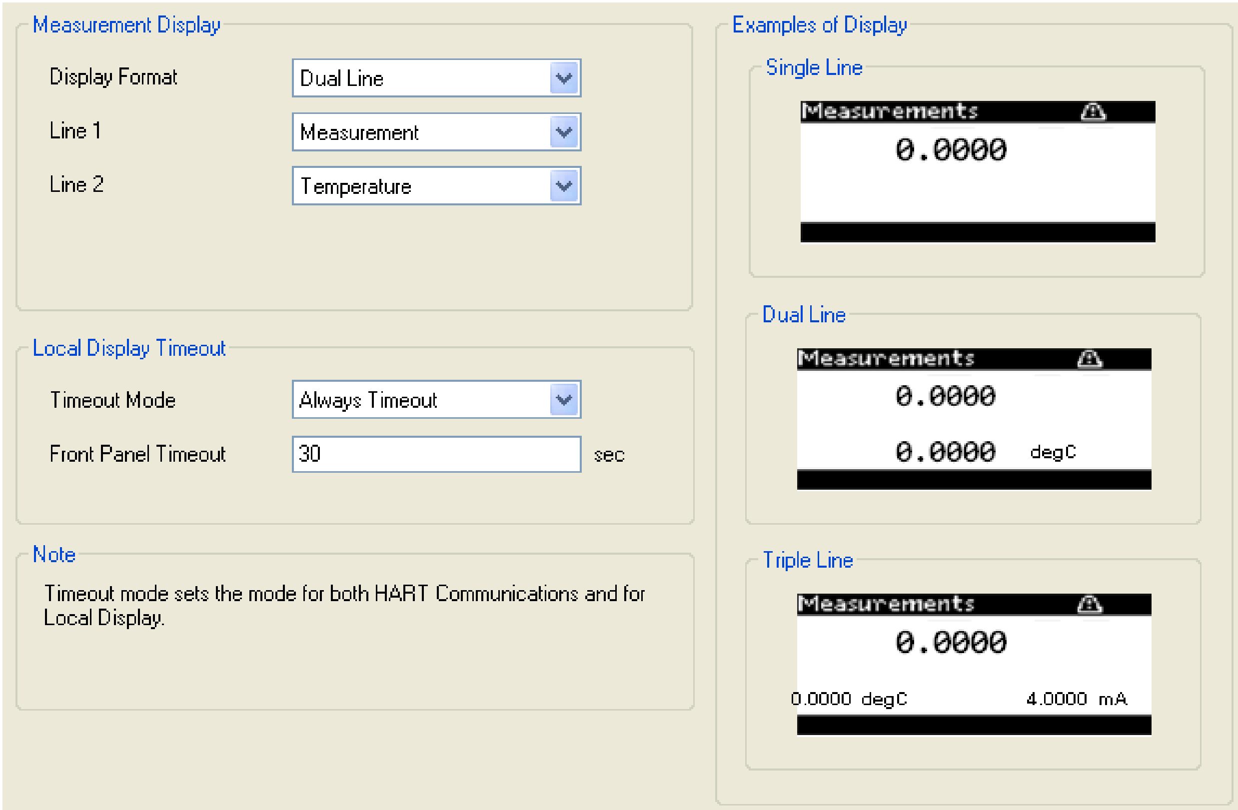


Figure 234. Sample 876PH Transmitter Local Display Output Screen

Field	Entry
Measurement Display	
Display Format	Select the Display Format from the drop-down menu. Choose from Single Line, Dual Line, or Triple Line. Examples of each of the display formats are shown to the right of the screen.
Line 1/Line 2/Line 3	Select the line reading to be displayed from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute Measurement, and Analog Output.
Local Display Timeout	
Timeout Mode	Select the timeout mode. Choose from Never Timeout, Online Timeout Only, or Always Timeout. If you select Never Timeout, the Front Panel Timeout option is not visible. **— NOTE —** This is the same as the HART timeout mode above.
Front Panel Timeout	If there are no key clicks within the configured timeout period, the transmitter reverts to measurement mode.

If you select Single Line as the Display Format, the screen appears as shown in Figure 235.

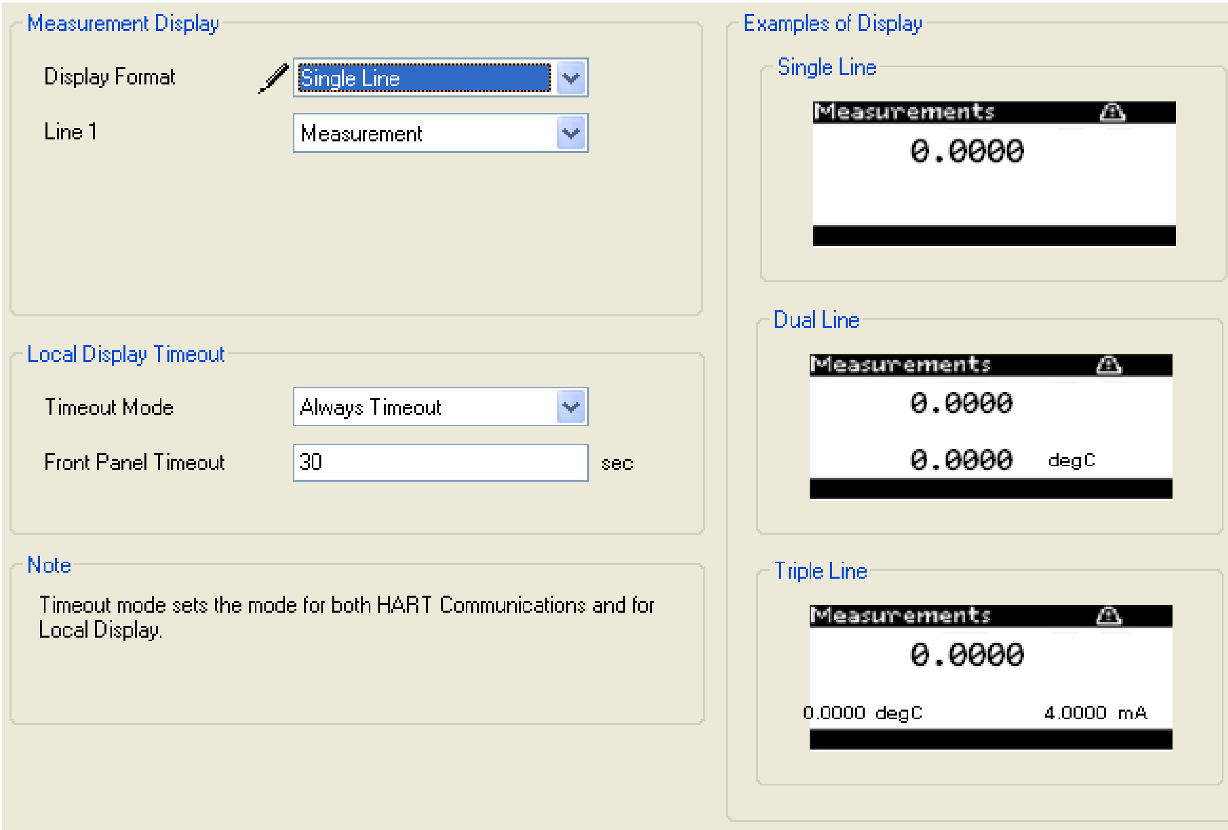


Figure 235. Sample 876PH Transmitter Local Display Output Screen (Single Line)

Field	Entry
Measurement Display	
Display Format	Select Single Line from the Display Format drop-down menu.
Line 1	Select the first line reading to be displayed from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute Measurement, and Analog Output.
Local Display Timeout	
Timeout Mode	Select the Timeout Mode from the drop-down menu. Choose from Never Timeout, Online Timeout Only, or Always Timeout.

If you select Dual Line as the Display Format, the screen appears as shown in Figure 236.

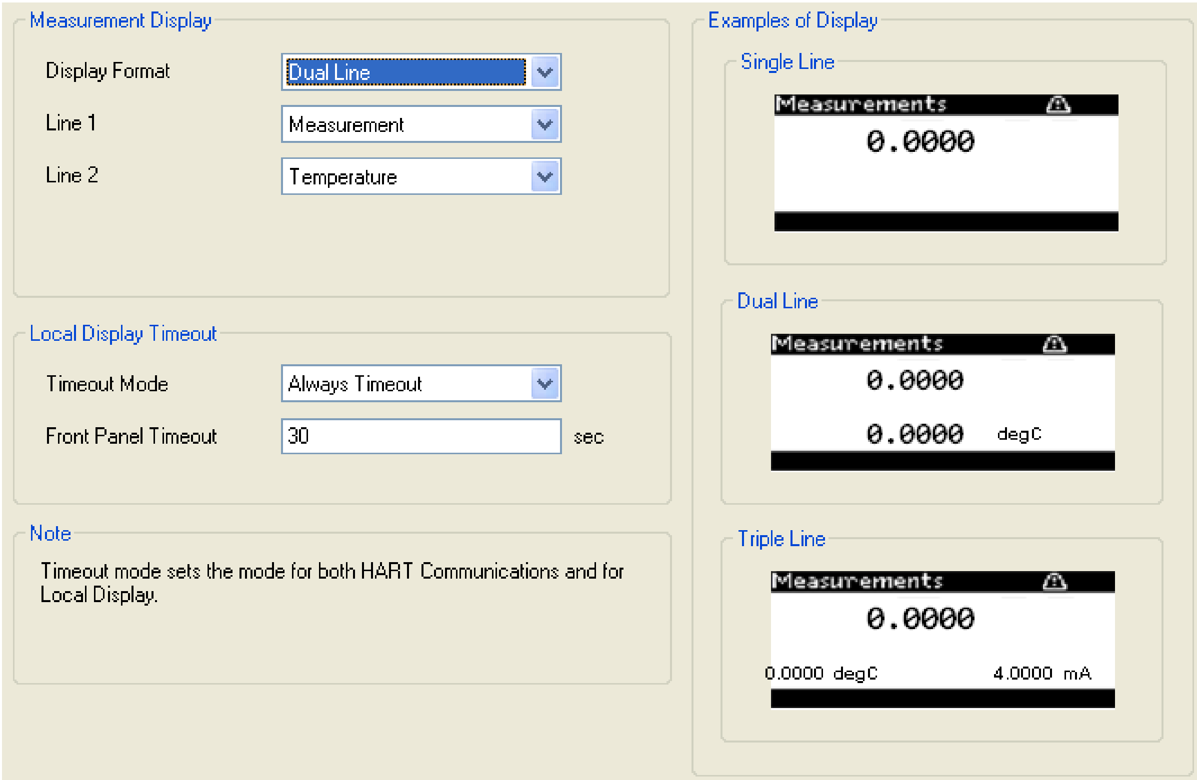


Figure 236. Sample 876PH Transmitter Local Display Output Screen (Dual Line)

Field	Entry
Measurement Display	
Display Format	Select Dual Line from the Display Format drop-down menu.
Line 1	Select the first line reading to be displayed from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute Measurement, and Analog Output.
Line 2	Select the second line reading to be displayed from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute Measurement, and Analog Output.
Local Display Timeout	
Timeout Mode	Select the Timeout Mode from the drop-down menu. Choose from Never Timeout, Online Timeout Only, or Always Timeout.

If you select Triple Line as the Display Format, the screen appears as shown in Figure 237.

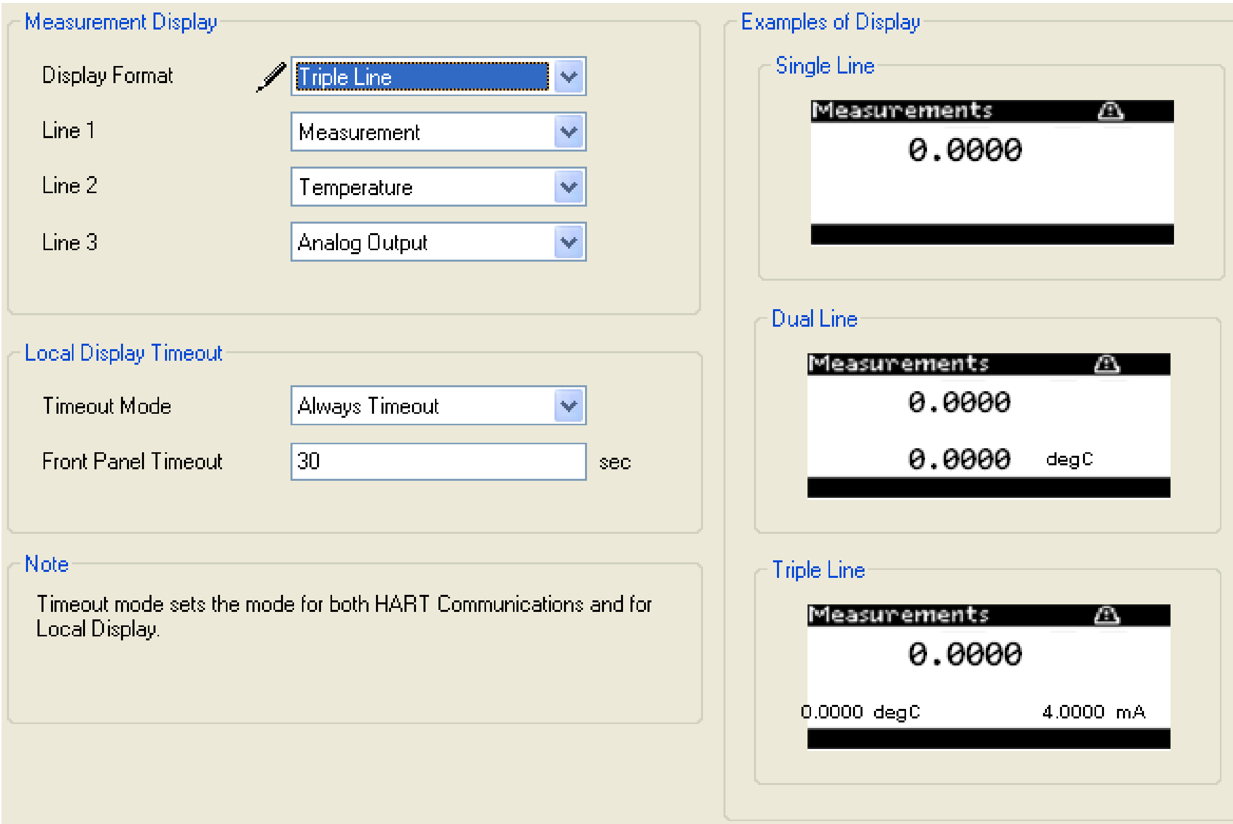


Figure 237. Sample 876PH Transmitter Local Display Output Screen (Triple Line)

Field	Entry
Measurement Display	
Display Format	Select the Display Format from the drop-down menu. Select Triple Line. Examples of each of the display formats are shown on the right of the screen.
Line 1	Select the first line reading to be displayed from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute Measurement, and Analog Output.
Line 2 (If you choose Dual Line or Triple Line display format)	Select the second line reading to be displayed from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute Measurement, and Analog Output.
Line 3 (If you choose the Triple Line display format)	Select the third line reading to be displayed from the drop-down menu. Choose from Measurement, ORP (if sensor is pH and ORP), Temperature, Absolute Measurement, and Analog Output.
Local Display Timeout	
Timeout Mode	Select the Timeout Mode from the drop-down menu. Choose from Never Timeout, Online Timeout Only, or Always Timeout.

Auto Hold

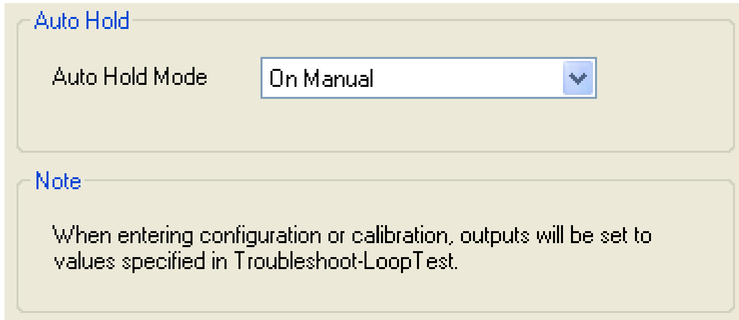


Figure 238. Sample 876PH Transmitter Auto Hold Output Screen

Field	Entry
Auto Hold Mode	Select Auto Hold Mode from the drop-down menu. Choose from Off, On Present, or On Manual. Auto Hold Mode Off: If you enter into configuration or calibration mode, output will remain active. On Present: If you enter into configuration or calibration mode, output will remain at its current value. On Manual: If you enter into configuration or calibration mode, output will set to values specified in troubleshoot- loop Test.

Diagnostic Configuration

Diagnostic page enables you to set the diagnostic limits for all the diagnostic parameters, as shown in Figure 239.

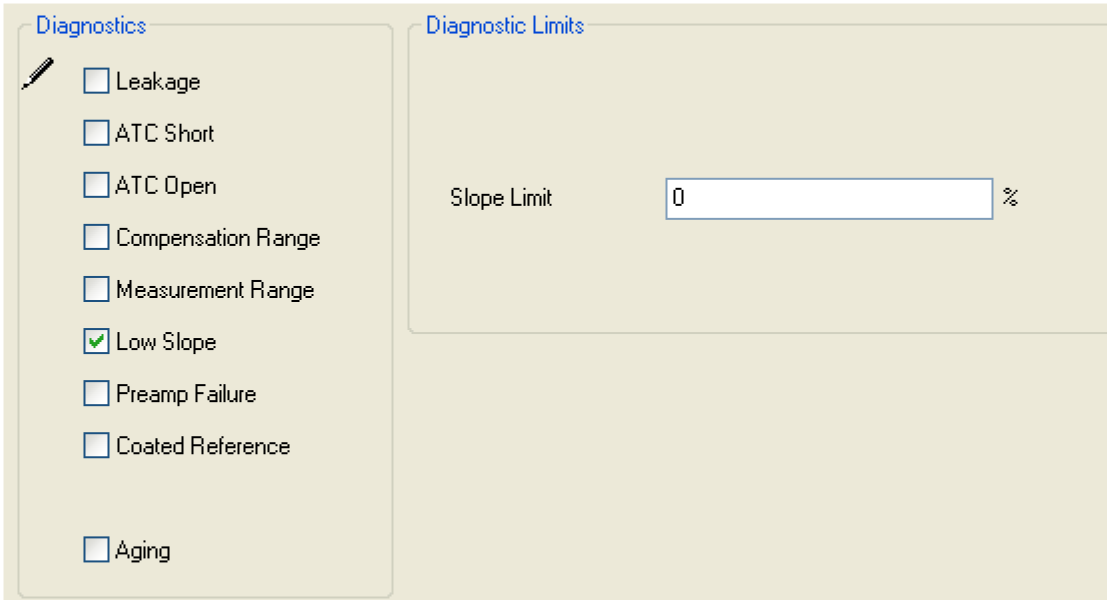


Figure 239. Sample 876PH Transmitter Diagnostic Screen

Field	Entry
Diagnostic	Select the appropriate check box to set the diagnostic parameters. You can select all of the diagnostic parameters, or each of the following individually: Leakage, ATC Shot, ATC Open, Compensation Range, Low Slope, Preamp Failure, Coated Reference, Broken Glass, and Aging. If you choose Measurement type as ORP, Aging and Low Slope options are not visible. Similarly, Broken Glass option is visible if the Measurement type is pH or pH/ORP, and electrode is set to glass.
Diagnostic Limits	Diagnostic Limits are displayed for the corresponding diagnostic selection.

If you select Low Slope as the diagnostic parameter, you need to set the diagnostic limits for Slope Limit, as shown in Figure 239.

If you select Coated Reference as the diagnostic parameter, you will need to set the diagnostic limit for Coat Limit, as shown in Figure 240.

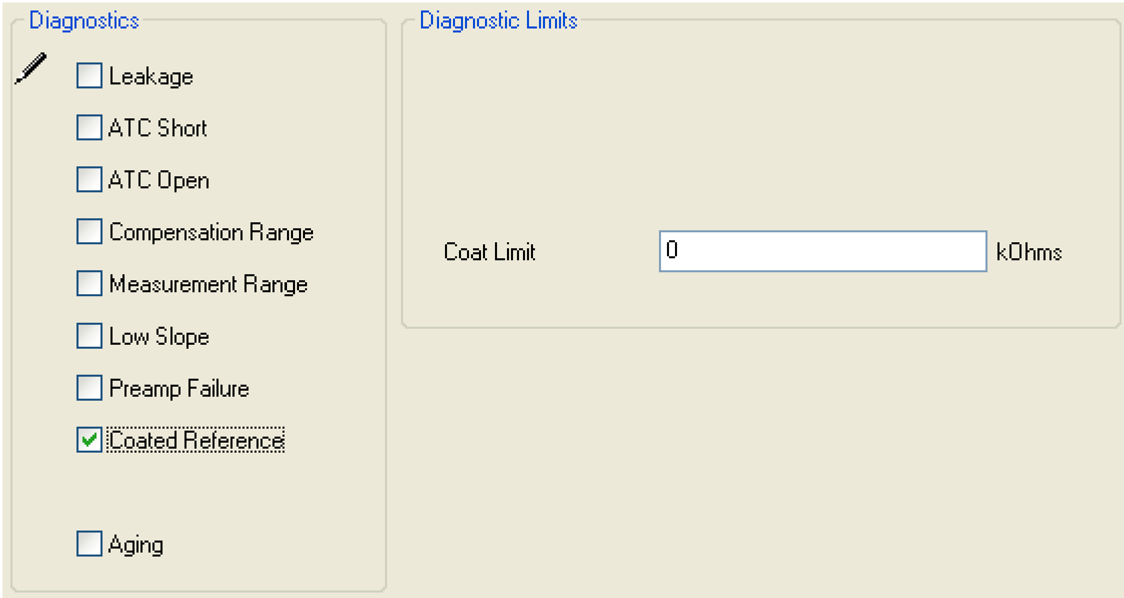


Figure 240. Sample 876PH Transmitter Diagnostic Limit for Coated Reference

If you select Broken Glass as diagnostic parameter, you need to set the diagnostic limit for Glass Low Limit and Glass Cutoff, as shown in Figure 241.

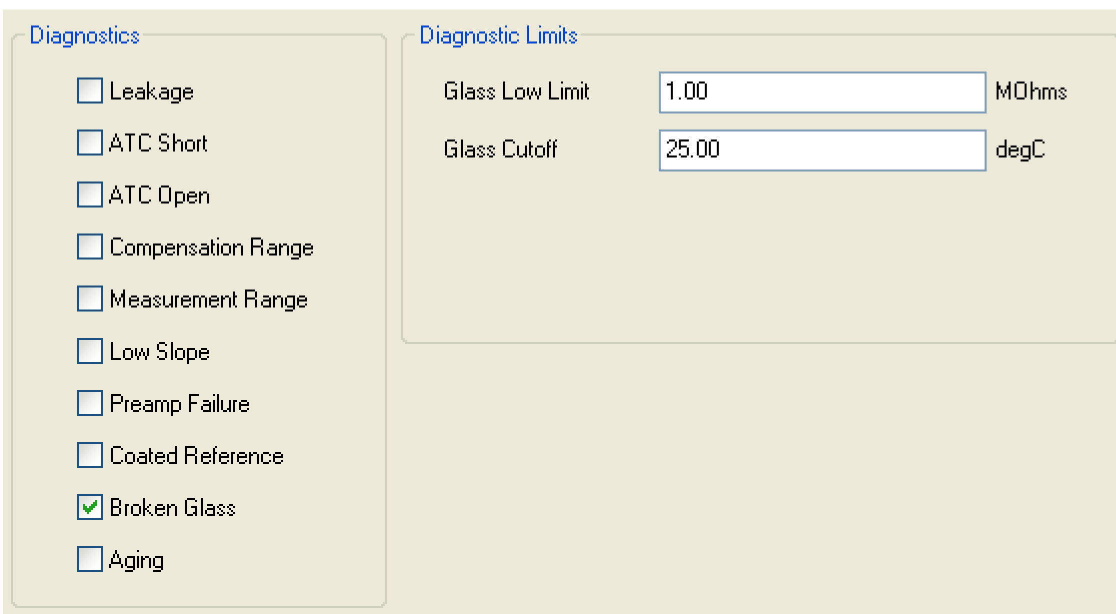


Figure 241. Sample 876PH Transmitter Diagnostic Limits for Broken Glass

Passcode Access

Passcode Access screen enables the two levels of protection. Administrator access permits changing all parameters in configuration whereas User Code access permits change and viewing access to those areas specified by the administrator.

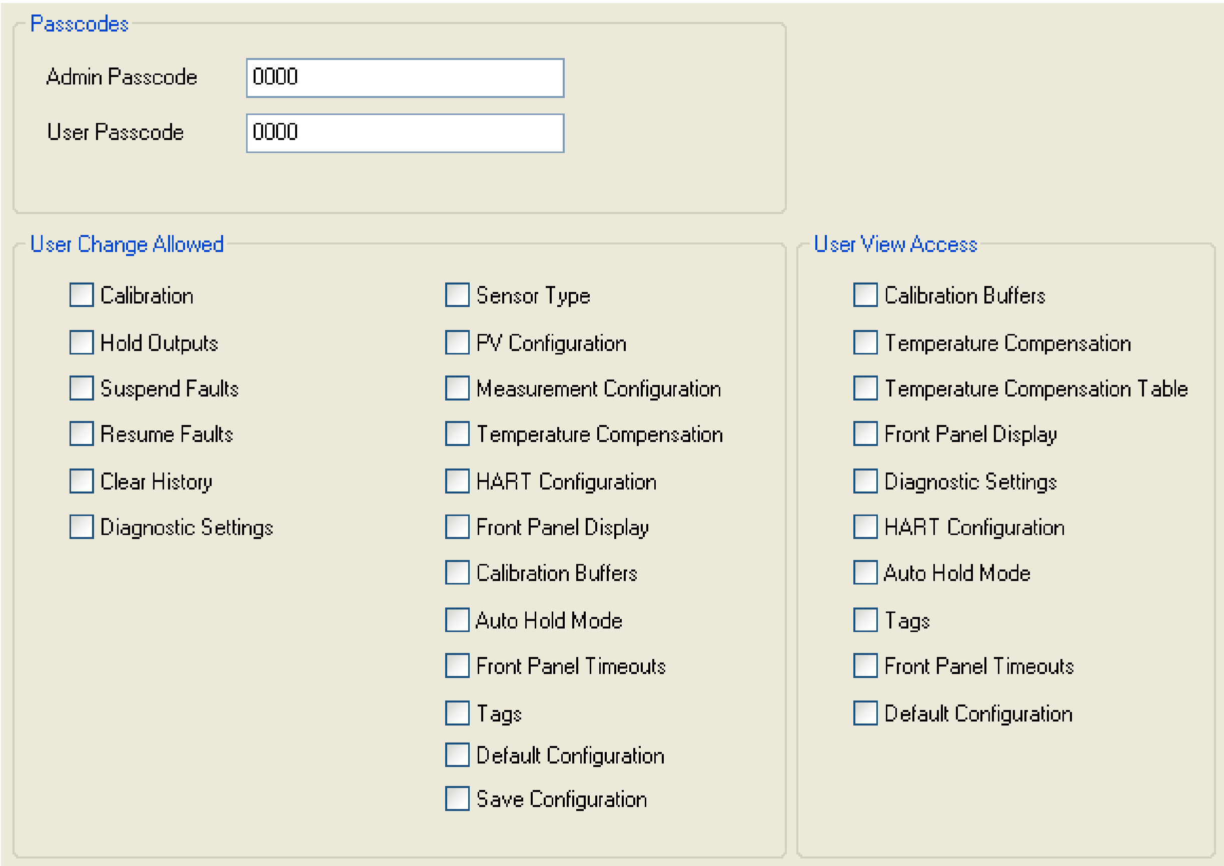


Figure 242. Sample 876PH Transmitter Passcode Access Screen

Field	Entry
Admin Passcode	Set the administrator passcode.
User Passcode	Set the user passcode.
User Change Allowed	Select the appropriate check box against parameters to allow the user to change it.
User View Access	Select the check box to set access level for user to view the parameters.

Device Information

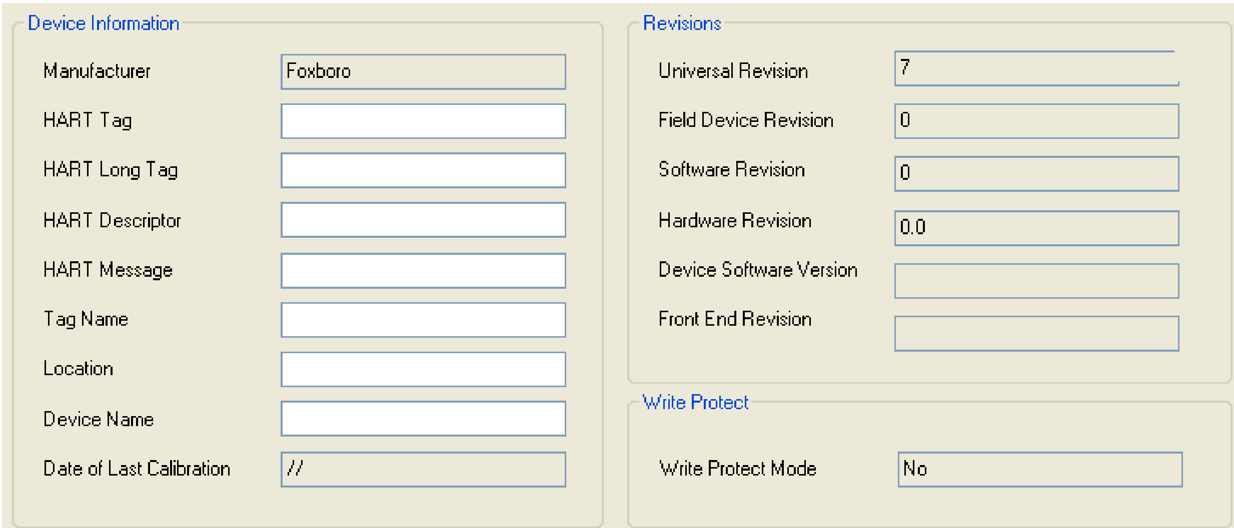


Figure 243. Sample 876PH Transmitter Device Information Screen

Field	Entry
Device Information	
HART Tag	Set the HART tag name.
HART Long Tag	Set the HART long tag name. It is displayed for HART version 6 or 7.
HART Descriptor	Set the HART descriptor.
HART Message	Set the HART message.
Tag Name	Set the tag name.
Location	Set the name of the location.
Device Name	Set the name of the device.
Date of Last Calibration	Shows the date of last calibration.
Write Protect Mode	Shows the Write Protect status of the device.

Save/Restore Configuration

The Save/Restore Configuration screen allows you to save and restore up to 2 user configurations as shown in Figure 244.

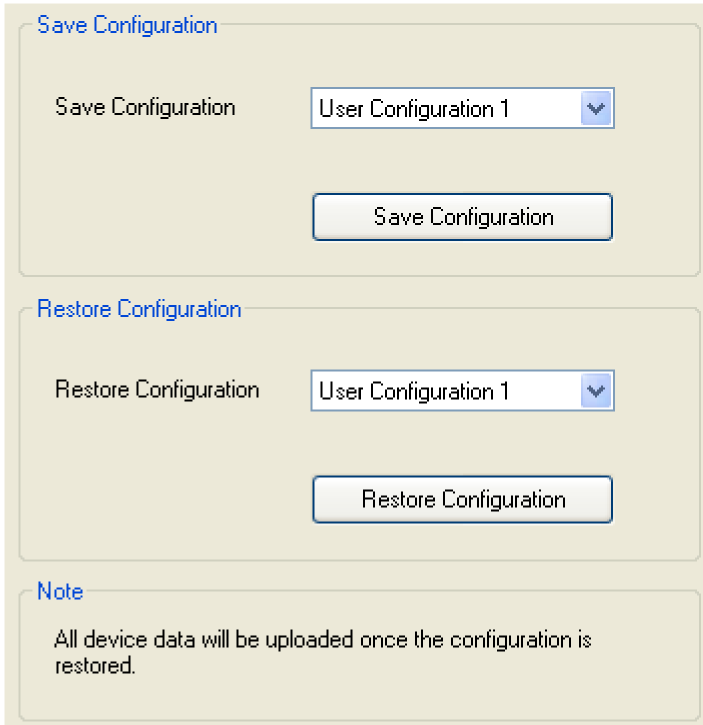


Figure 244. Sample 876PH Transmitter Save/Restore Configuration screen

Field	Entry
Save/Restore Configuration	
Save Configuration	To save the current configuration: 1. Select User Configuration 1 or User Configuration 2 after you have configured all the DTM parameters. 2. Click Save Configuration. 3. Click OK.
Restore Configuration	To restore the current configuration: 1. Select User Configuration 1, User Configuration 2 or Factory Configuration depending on the configuration you wish to restore. 2. Click Restore Configuration. 3. Click OK.

HART Status

The HART Status screen shows the HART status as well as the field device status of the device. The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red cross mark (error). On most DTMs, if Configuration Changed does not show a green checkmark, it can be reset by clicking the Reset Configuration Changed Flag button on the lower left of the screen.

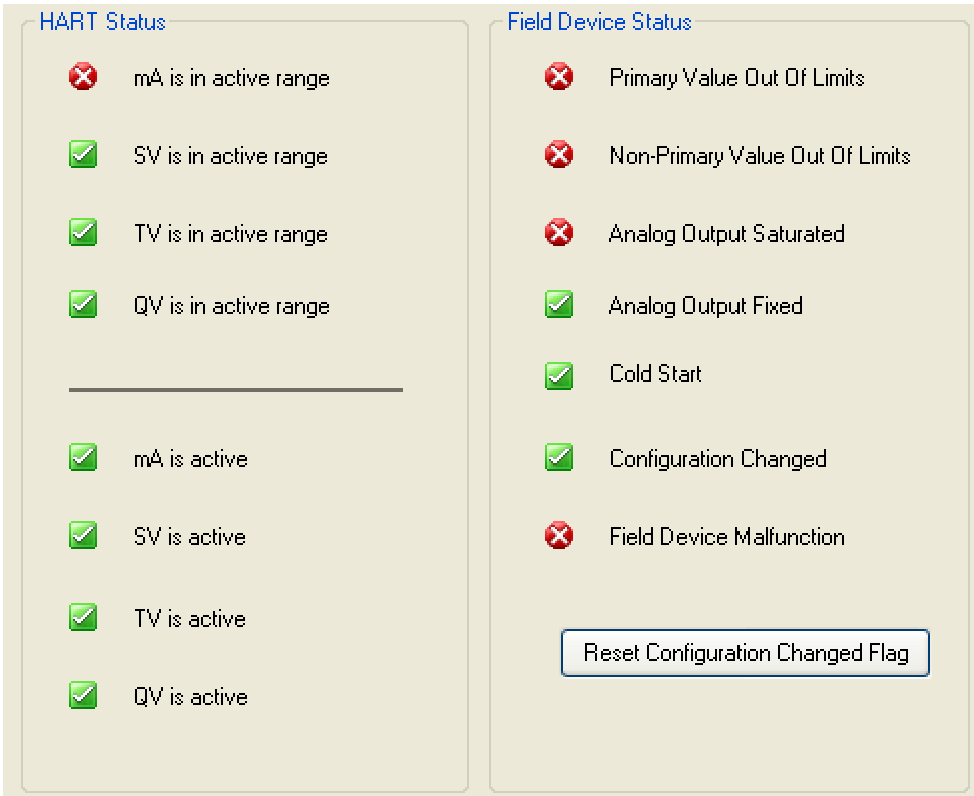


Figure 245. Sample 876PH Transmitter HART Status screen

Device Status Screen

The Device Status screen shows current status of the device. The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red cross mark (error).

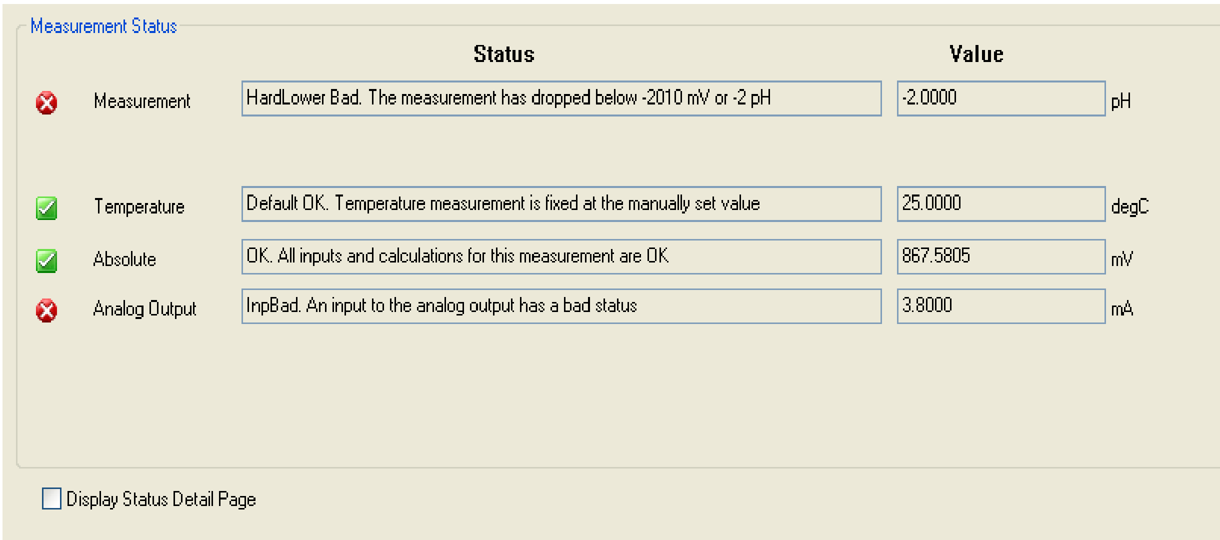


Figure 246. Sample 876PH Transmitter Device Status Screen

Field	Entry
Device Status for Measurement	
Measurement	Shows the measurement status and value.
ORP	Shows the ORP status and value if the measurement type is selected as pH and ORP.
Temperature	Shows the Temperature status and value.
Absolute	Shows the Absolute parameter status and value.
Analog Output	Shows the Analog Output status and value.
Glass Resistance	Shows the Glass Resistance status if the Glass diagnostic On and measure type is chosen as pH or pH and ORP.
Reference Coating	Shows the Reference Resistance status if the Glass diagnostic is On and measure type is chosen as pH or pH and ORP.
Display Status Detail Page	Select this check box to display the Status Tree page.

Status Tree Screen

The Status Tree screen shows the device status and allows to diagnose the device failures. The screen shows the various parameters and the status of these parameters can be easily recognized by the color of the parameters. The Green circle indicates the selected user configuration where as the Grey circle indicates parameters the user has not selected. The Red circle indicates the error in the device due to that parameters. The status screen appears as shown in Figure 247.

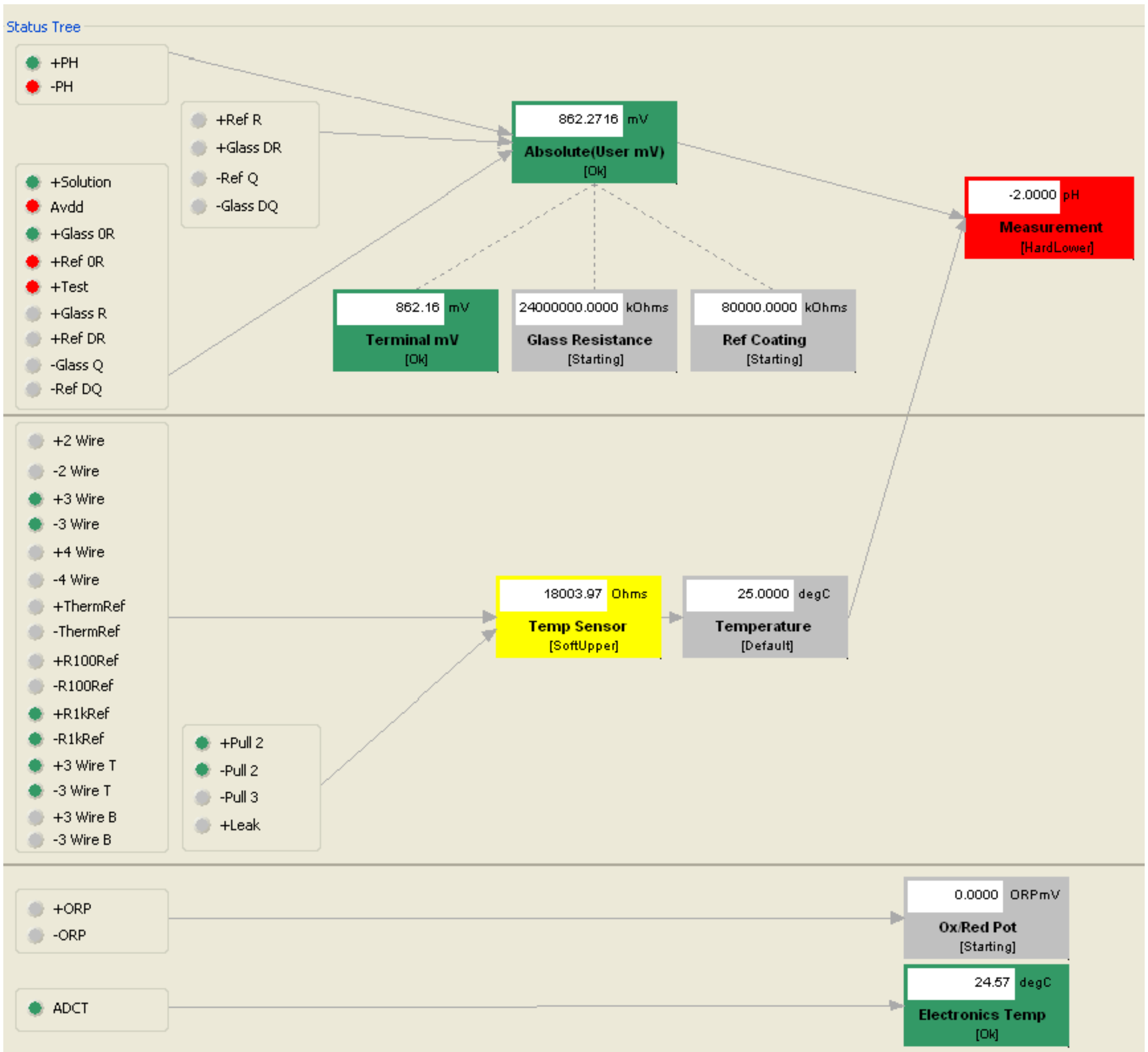


Figure 247. Sample 876PH Transmitter Status Tree Screen

Calibration

You can perform the following calibration procedures:

Parameters

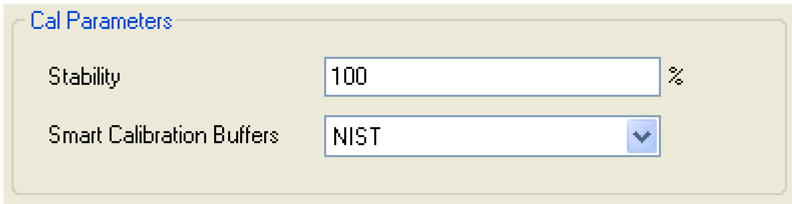


Figure 248. Sample 876PH Transmitter Cal Parameters Screen

Field	Entry
Stability	Set the stability value in percentage.
Smart Calibration Buffers	Select the smart calibration buffers from the drop-down menu. Choose from American, NIST, European, DIN, MERCK, JIS 8802, and User Selectable. If Measurement type is pH, pH and ORP then the smart calibration buffers are visible.

User Selectable

If you select User Selectable as your smart calibration buffer, you can select up to seven buffers as shown in Figure 249.

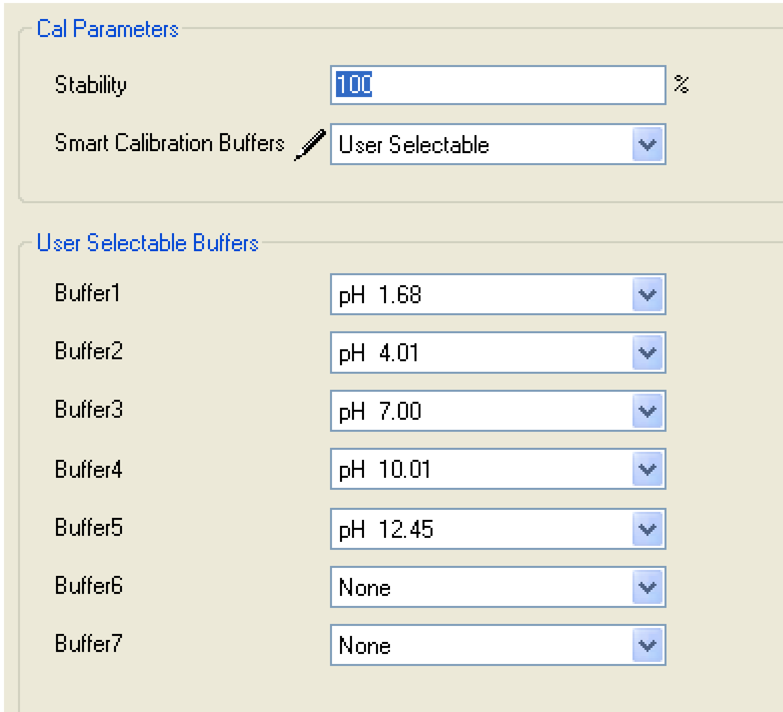


Figure 249. Sample 876PH Transmitter Cal Parameters User Selectable Buffers

Field	pH Values
User Selectable Buffers	
Buffer1	Select one of the following values: 1.68, 4.01, 4.61, 6.87, 7.00, 9.18, 10.01, 12.45, custom pH or None.
Buffer2	Select one of the following values: 1.68, 4.01, 4.61, 6.87, 7.00, 9.18, 10.01, 12.45, custom pH or None.
Buffer3	Select one of the following values: 1.68, 4.01, 4.61, 6.87, 7.00, 9.18, 10.01, 12.45, custom pH or None.
Buffer4	Select one of the following values: 1.68, 4.01, 4.61, 6.87, 7.00, 9.18, 10.01, 12.45, custom pH or None.
Buffer5	Select one of the following values: 1.68, 4.01, 4.61, 6.87, 7.00, 9.18, 10.01, 12.45, custom pH or None.
Buffer6	Select one of the following values: 1.68, 4.01, 4.61, 6.87, 7.00, 9.18, 10.01, 12.45, custom pH or None.
Buffer7	Select one of the following values: 1.68, 4.01, 4.61, 6.87, 7.00, 9.18, 10.01, 12.45, custom pH or None.

Each buffer can be selected once. You can select Custom pH which requires a nominal value and a minimum of 2-21 points. If you choose a custom buffer, you must enter a nominal pH value for the buffer and then establish a curve of temperature values and pH values as shown in Figure 250.

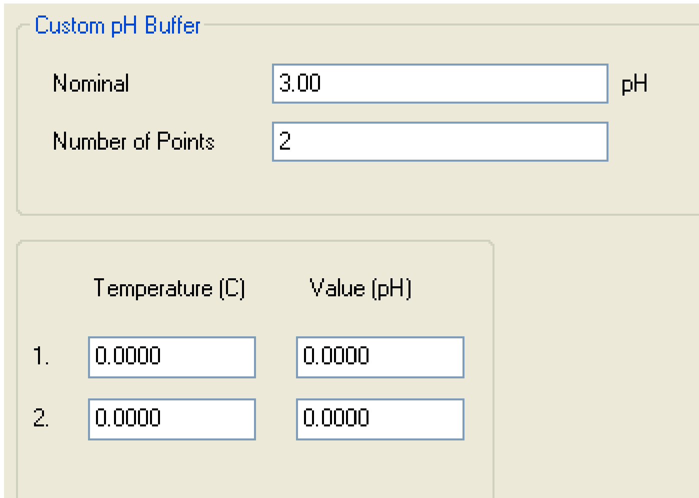


Figure 250. Sample 876PH Transmitter Cal Parameters User Selectable Custom pH Buffer

Field	Entry
Nominal	Enter the nominal pH.
Number of Points	Enter the number of points.
Temperature and Value	Enter the temperature and value for each point.

Calibrate

The Calibrate screen enables you to calibrate the device as shown in Figure 251.

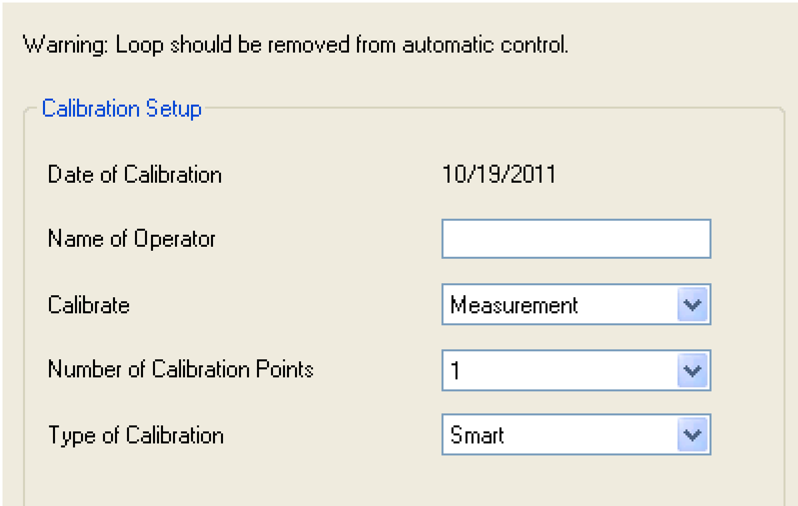


Figure 251. Sample 876PH Transmitter Calibration Setup Screen

Field	Entry
Date of Calibration	Displays the date of calibration.
Name of Operator	Set the name of the operator.
Calibrate	Select the Calibrate from the drop-down menu. Choose from Measurement, ORP, Restore ORP or Temperature.
Number of Calibration Points	Select the Number of Calibration Points from the drop-down menu.
Type of Calibration	Select the Type of Calibration from the drop-down menu. Choose from Smart or Manual.

After you set the calibration values, click Next. The screen appears as shown in Figure 252.

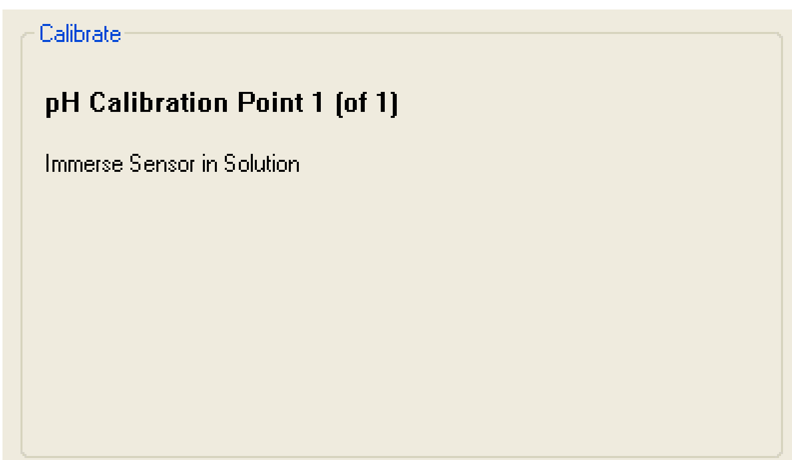


Figure 252. Sample 876PH Transmitter Calibration Setup Screen 2

Click Next, the screen appears as shown in Figure 253.

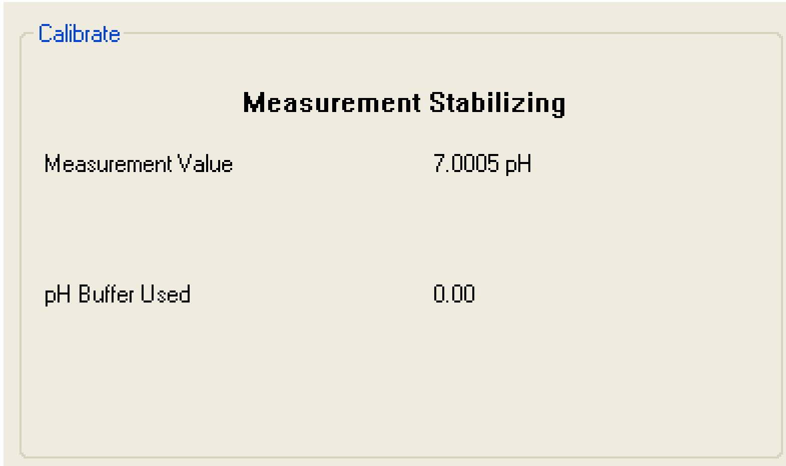


Figure 253. Sample 876PH Transmitter Calibration Setup Screen 3

Click Next, the screen appears as shown in Figure 254.

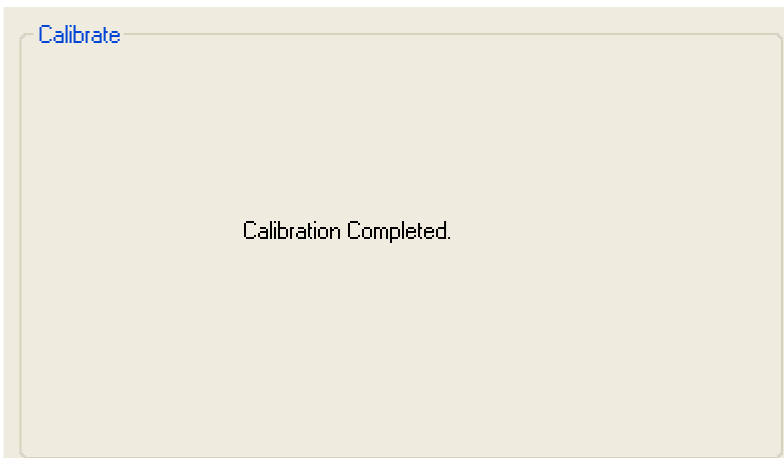


Figure 254. Sample 876PH Transmitter Calibration Setup Screen 4

DAC Trim

In this procedure the transmitter controls the loop current to either 4 mA (zero) or 20 mA (span). By providing the inputs to the following screens, the values indicated by a suitable reference like a digital multimeter, the transmitter can trim its output. DAC Trim performs 4 mA and 20 mA calibration points respectively.

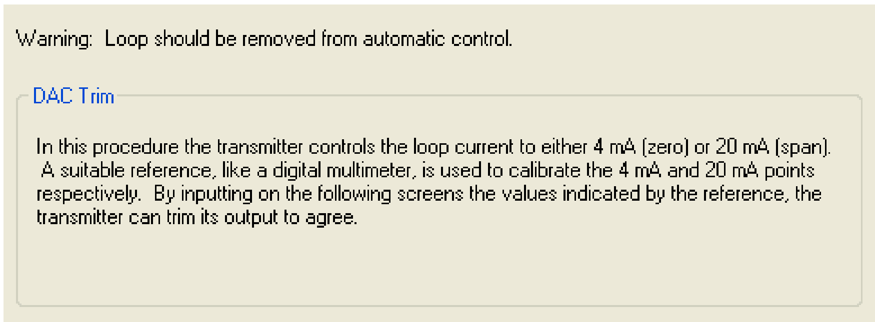


Figure 255. Sample 876PH Transmitter DAC Trim Screen

Troubleshooting

Faults

Fault status is displayed in the main Diagnostic Menu. You can suspend faults from the measurement status for one hour and resume faults at any time. The Faults status screen appears as shown in Figure 256.

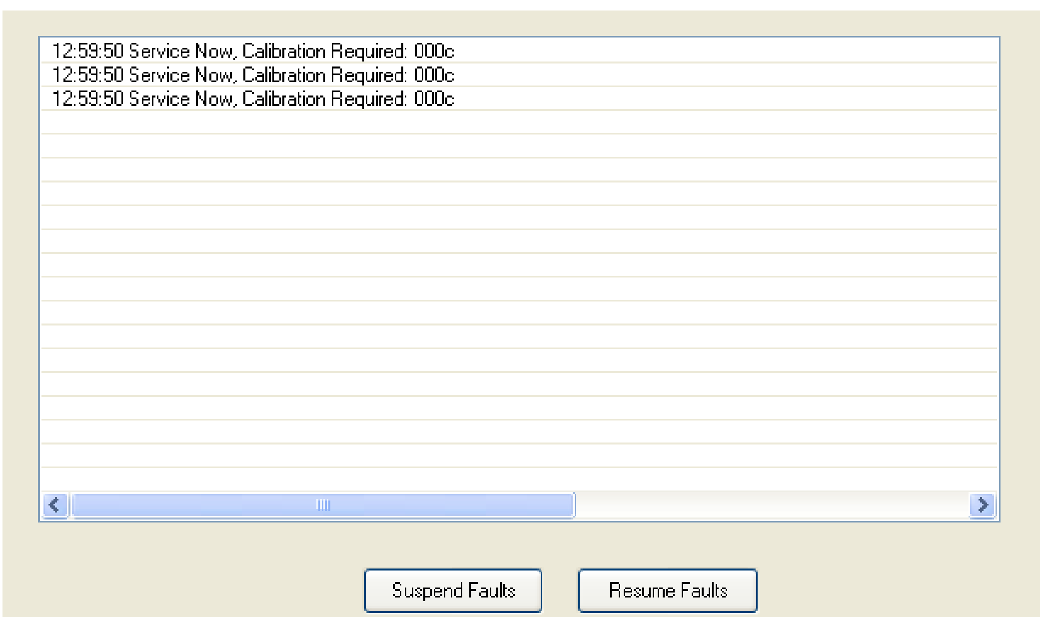


Figure 256. Sample 876PH Transmitter Faults Screen

Field	Entry
Suspend Faults	Click this button to suspend faults.
Resume Faults	Click this button to resume faults.

NOTE
Suspend Faults, Resume Faults, and Clear History operations must be done from the front panel.

Faults Suspended state with time details appears as shown in Figure 257.

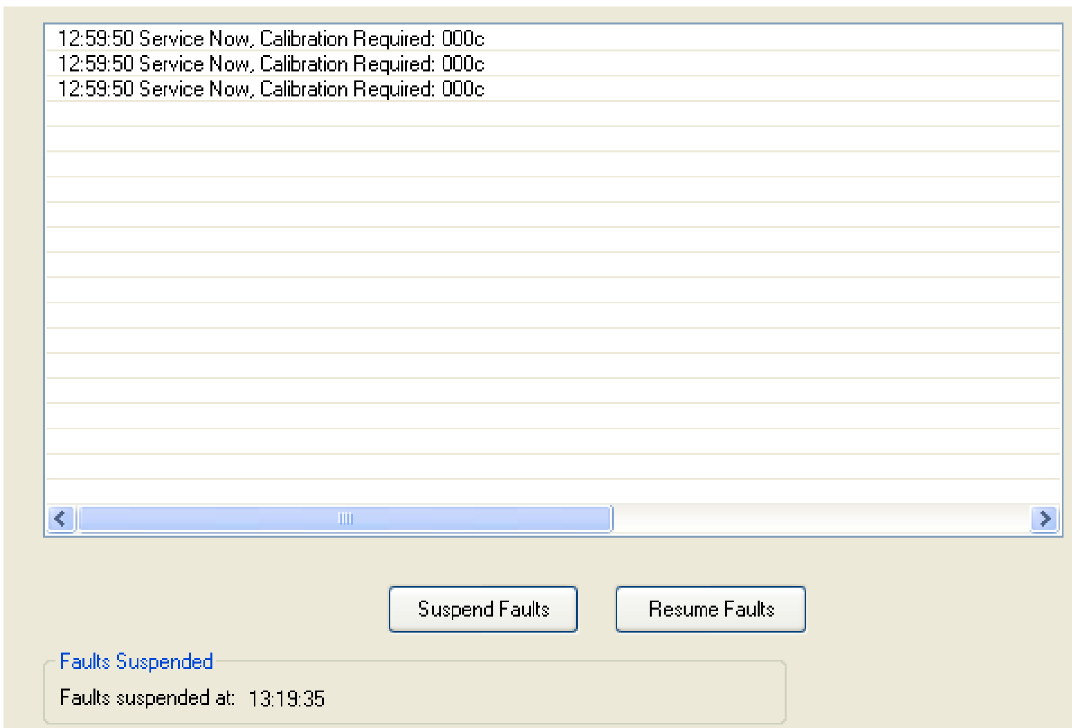


Figure 257. Sample 876PH Transmitter Faults Suspended State with Time Screen

History Log

The history log includes all faults, power restore, entries and exits from Configuration, Calibration and Hold, and Faults temporarily suspended.

The history log appears as shown in Figure 258.

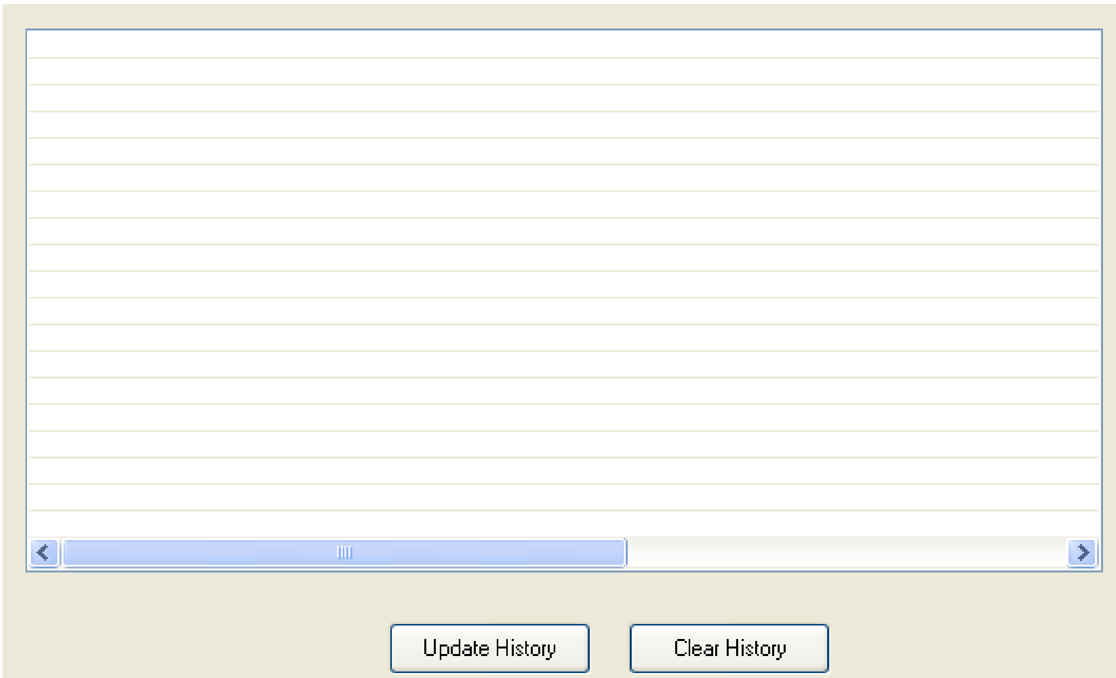


Figure 258. Sample 876PH Transmitter History Log Screen

Loop Test

The Loop Test is a procedure to use the analyzer, as a calibration source to check other instruments in the loop.

Off

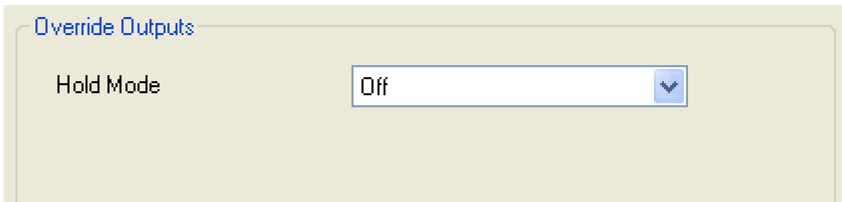


Figure 259. Sample 876PH Transmitter Loop Test Screen (Hold)

Field	Entry
Hold Mode	Select the Hold Mode from the drop-down menu. Choose from Off, Hold Present Values and Manual Hold.

Hold Present Values

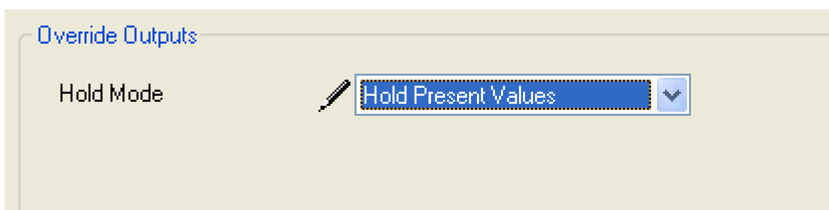


Figure 260. Sample 876PH Transmitter Loop Test Screen (Hold Present Values)

Field	Entry
Hold Mode	Select Hold Present Values from the drop-down menu.

Manual Hold

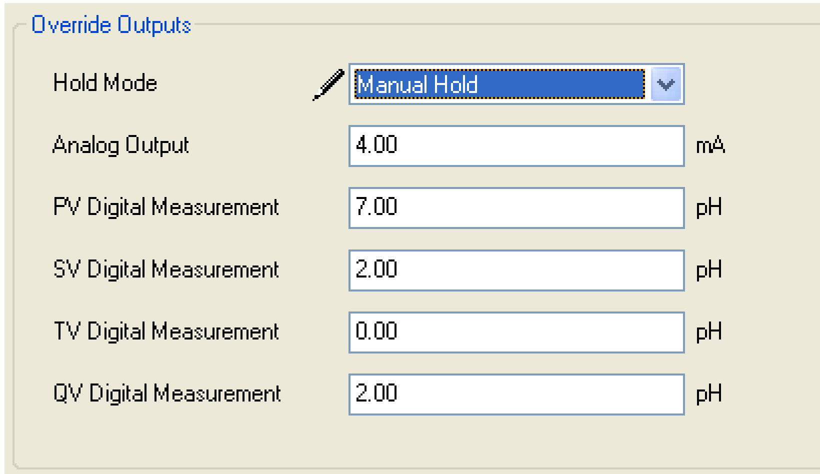


Figure 261. Sample 876PH Transmitter Loop Test Screen (Manual Hold)

Field	Entry
Hold Mode	Select Manual Hold option from the Hold Mode drop-down menu.
Analog Output	Set analog output reading. If the HART mode is selected as multidrop, then the Analog Output is not shown.
PV Digital Measurement	Set PV digital measurement.
SV Digital Measurement	Set SV digital measurement.
TV Digital Measurement	Set TV digital measurement.
QV Digital Measurement	Set QV digital measurement.

Firmware Upgrade

The Firmware Upgrade screen allows you to upgrade the firmware of device. It is required to upload Flasher and Firmware Image file to device to upgrade the device firmware.

The firmware upgrade page appears as shown in Figure 262.

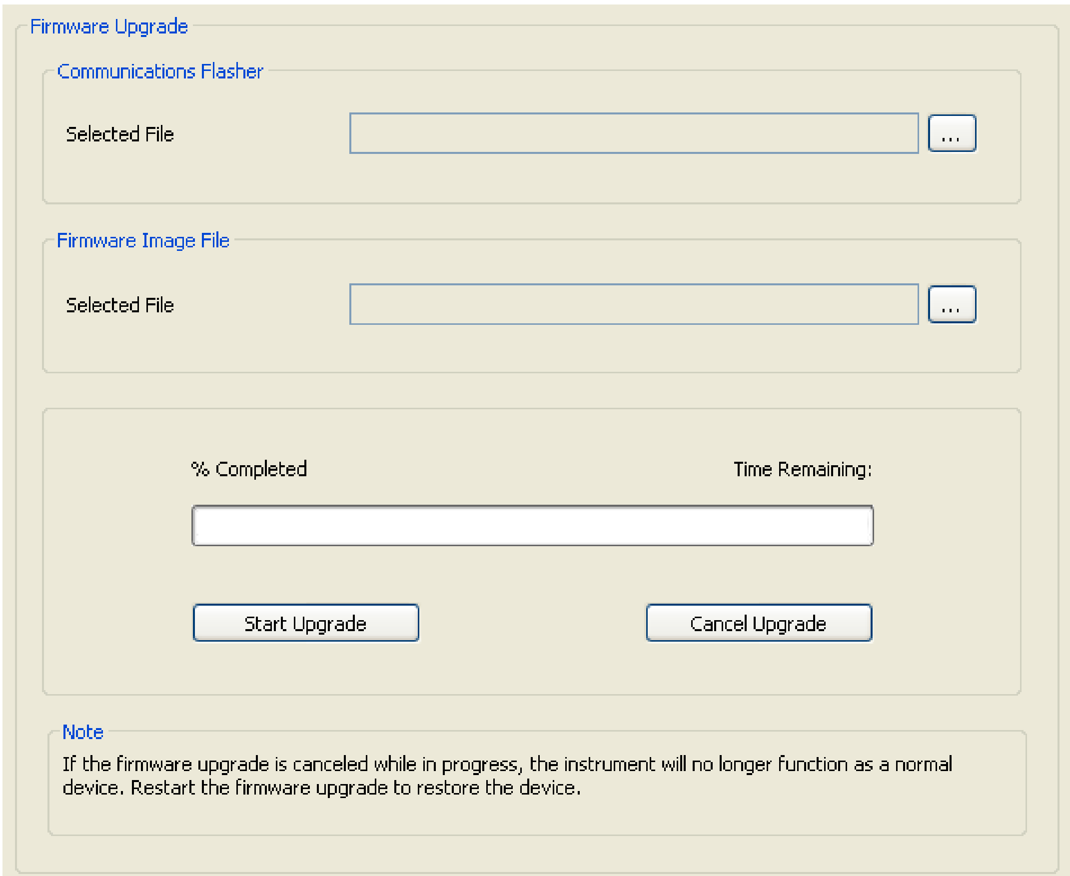


Figure 262. Sample 876PH Transmitter Firmware Upgrade Screen

Field	Entry
Communication Flasher	
Selected File	To upgrade device firmware: 1. Use the browse button and select the communication flasher file. You need to select .rbin file type to upgrade the device.
Firmware Image File	
Selected File	2. Use the browse button and select the firmware image file. You need to select .rbin file type to upgrade the device firmware. The Communication Flasher and Firmware Image File are necessary to upgrade the device firmware. 3. Click Start Upgrade.

The upgrade normally takes around 90 minutes. The % completed and the Time Remaining is shown on screen indicating the status of the device firmware upgrade.

! WARNING

Do not cancel the upgrade process while upgrading the device firmware. Interrupting the upgrade process may cause the instrument to be left in a state where it is only available for upgrades and may not operate normally.

8. 875EC Analyzer

This chapter provides information that is exclusive to using 875EC Analyzer with HART communication protocol. Additional information about this Analyzer with HART communication is available in the following documents

- MI 611-224, Model 875EC Intelligent Electrochemical Analyzer for Electrodeless Conductivity Measurements
- MI 611-227, 875 Series Intelligent Analyzers - Operation, Configuration, and Calibration Using a HART Communicator

Device Overview

The Device Overview screen displays the HART information and the device information. The current measurement, temperature, analog 1 output (PV) and HART analog (SV) data is represented in a graph.

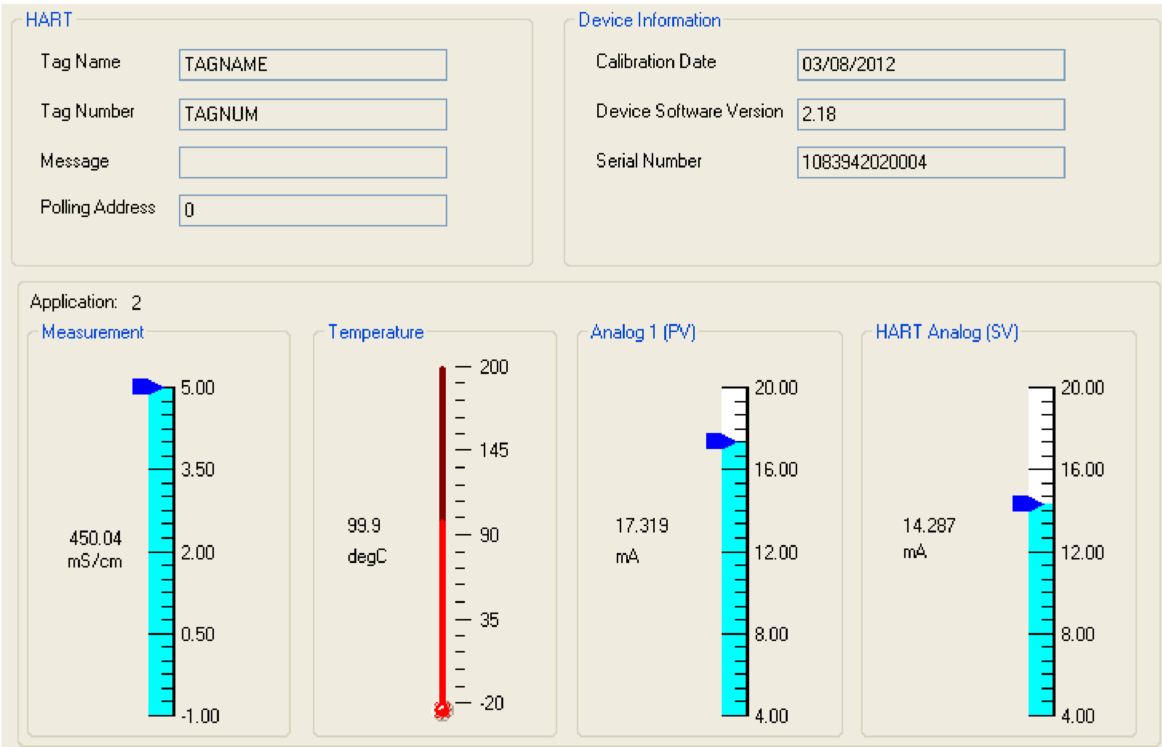


Figure 263. Sample 875EC Analyzer Device Overview Screen

Field	Entry
HART	
Tag Name	This field shows the HART tag which is the unique identifier of the device.
Tag Number	This field shows the tag number.
Message	This field shows the HART message that is sent from the device when requested. The message can have a maximum of 32 characters.
Polling Address	This field shows the configured address of the device.
Device Information	
Calibration Date	This field shows the last calibrated date of the transmitter. **— NOTE** You can change the calibration date in “Device Information”.
Device Software Version	This field shows the software version of the device.
Serial Number	This field shows the serial number of the device.

— NOTE —
The scales for the measurement and temperature graphical representations are updated based on the scale defined for the selected sensor.

Process Variables

The Process Variables screen displays the values of device variables and the measured values assigned to the device variables of the currently running application.

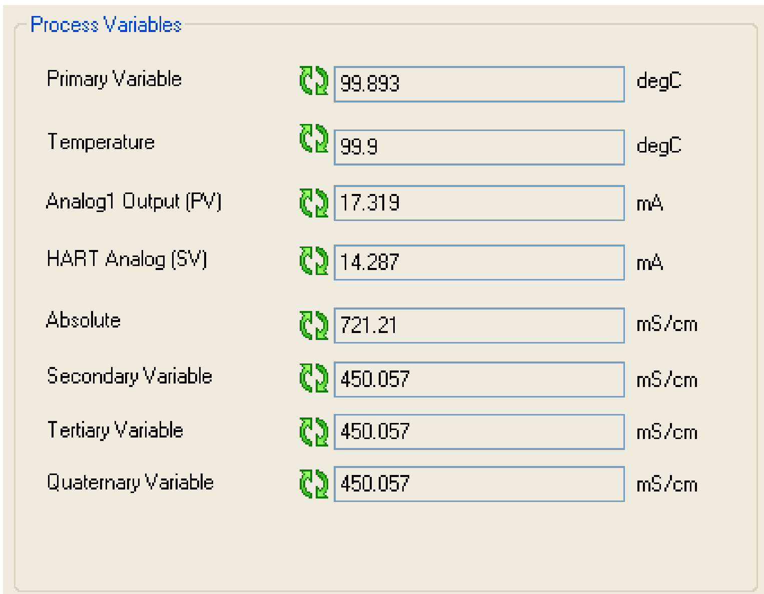


Figure 264. Sample 875EC Analyzer Process Variables Screen

Field	Entry
Process Variables	
Primary Variable	This field shows the value of the measurement mapped to primary variable.
Temperature	This field shows the current temperature.
Analog1 Output (PV)	This field shows the current PV value in mA units.
HART Analog (SV)	This field shows the current SV value in mA units.
Absolute	This field shows the absolute value of the measurement in conductivity units.
Secondary Variable	This field shows the value of the measurement mapped to secondary variable.
Tertiary Variable	This field shows the value of the measurement mapped to tertiary variable.
Quaternary Variable	This field shows the value of the measurement mapped to quaternary variable.

Device Configuration

General

The General screen is where you can specify a passcode that allows you to access the configurable device parameters.

This screen shows the applications (such as 1, 2, or 3) that are preconfigured for the analyzer, and allows you to specify parameters for the preconfigured applications.

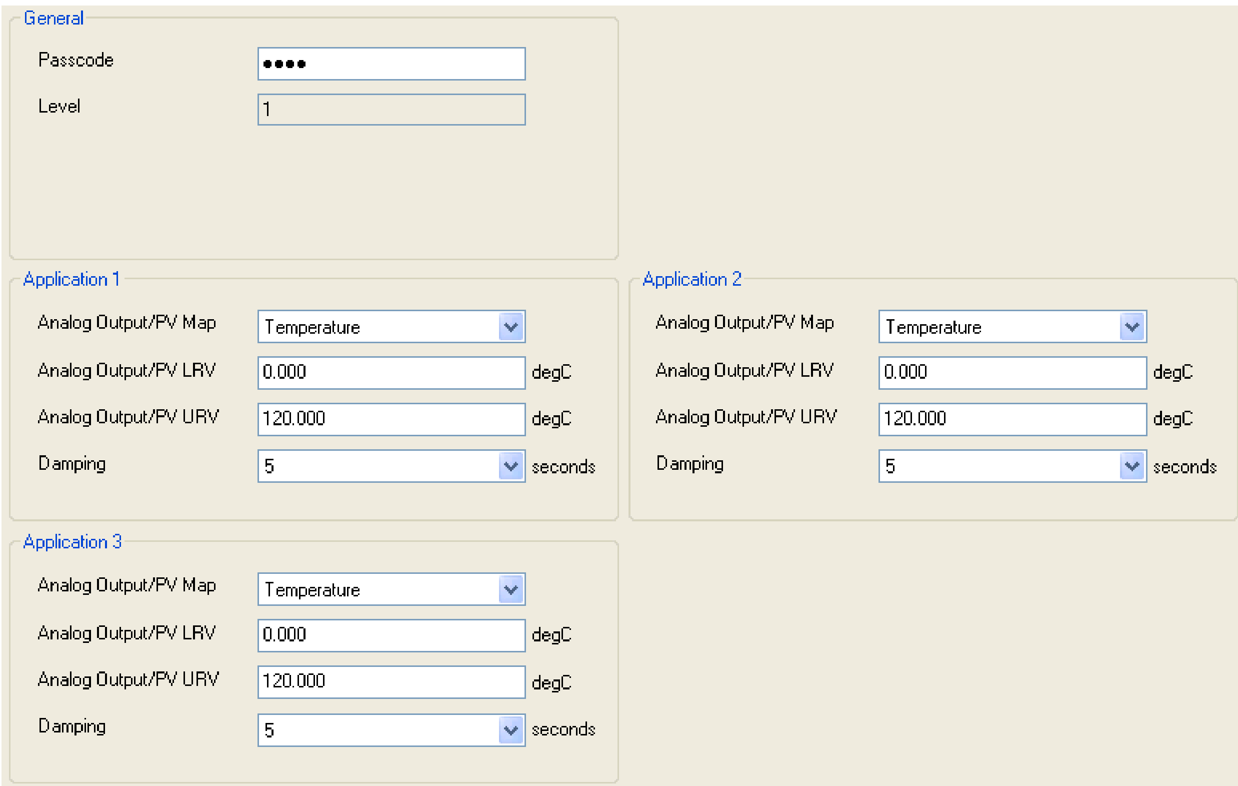


Figure 265. Sample 875EC Analyzer General Screen

Field	Entry
Passcode	
Passcode	Specify a passcode (valid) for configuring the device parameters. If you enter the Level 3 passcode, you can only view the basic configuration parameters. If you enter the Level 2 passcode, you are allowed to view or change the basic configuration parameters. If you enter the Level 1 passcode, you can view or change any configuration parameters.
Level	This field shows the passcode level.

Field	Entry
Application 1	
Analog Output/PV Map	Map a measurement for analog output for application 1 from the drop-down list. Choose from Measurement, Temperature, Absolute, and Off. Select Off if you choose not to use this feature.
Analog Output/PV LRV	Specify the lower range value for analog output of application 1.
Analog Output/PV URV	Specify the upper range value for analog output of application 1.
Damping	Select the damping time that is applied to the current output of application 1. Choose from None, 5, 10, 20, 40, 120, and 300 seconds.
Application 2	
Analog Output/PV Map	Map a measurement for analog output for application 2 from the drop-down list. Choose from Measurement, Temperature, Absolute, and Off. Select Off if you choose not to use this feature.
Analog Output/PV LRV	Specify the lower range value for analog output of application 2.
Analog Output/PV URV	Specify the upper range value for analog output of application 2.
Damping	Select the damping time that is applied to the current output of application 2. Choose from None, 5, 10, 20, 40, 120, and 300 seconds.
Application 3	
Analog Output/PV Map	Map a measurement for analog output for application 3 from the drop-down list. Choose from Measurement, Temperature, Absolute, and Off. Select Off if you choose not to use this feature.
Analog Output/PV LRV	Specify the lower range value for analog output of application 3.
Analog Output/PV URV	Specify the upper range value for analog output of application 3.
Damping	Select the damping time that is applied to the current output of application 3. Choose from None, 5, 10, 20, 40, 120, and 300 seconds.

— NOTE

The applications are preconfigured in “Application”.

Sensor

The Sensor screen is where you can specify the sensor type and the temperature features that are used for the preconfigured applications.

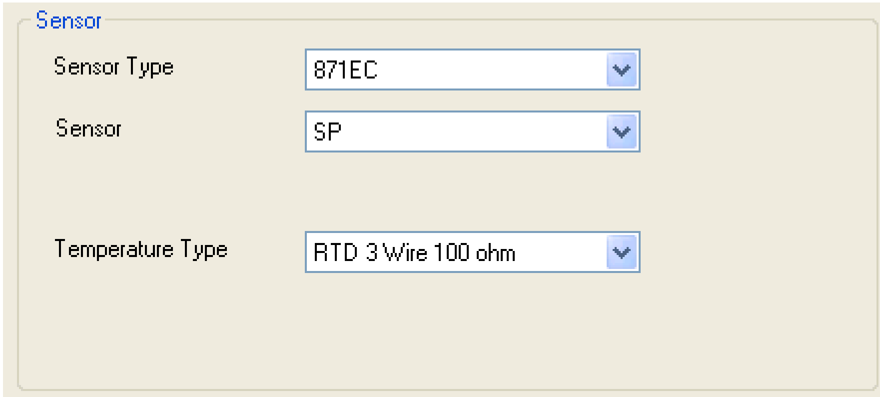


Figure 266. Sample 875EC Analyzer Sensor Screen

Field	Entry
Sensor	
Sensor Type	Select the sensor type from the drop-down list. Choose from 871EC, 871FT English, 871FT Metric, FT10, or Other. If you choose Other, specify the Cell Factor.
Sensor	The list of sensors vary for each of the sensor type. Select the sensor from the drop-down list that is displayed for the selected sensor type. • For 871EC, choose from SP, HP, LB, UT, RE, BW, TF, NL, EV, AB, PN, and PX. • For 871FT English, choose from 1C, 2C, 1D, 2D, 1E, 2E, 1F, 2F, 1G, 2G, 1H, 2H, 1J, 2J, 3C, 4C, 3E, 4E, 3F, 4F, 3G, 4G, 3H, 4H, 3J, and 4J. • For 871FT Metric, choose from 1C, 2C, 1D, 2D, 1E, 2E, 1F, 2F, 1G, 2G, 1H, 2H, 3E, 4E, 3F, 4F, 3G, 4G, 3H, 4H, 3J, and 4J. • For FT10, choose from FT10-08, FT10-12, and FT10-16.
Cell Factor	This parameter appears if 'Other' is chosen as the sensor. Specify the cell factor between 0.0001 and 99.999. Refer to Figure 267.
Temperature Type	Select the temperature type from the drop-down list. Choose from 100K Thermistor, RTD 2 Wire 100 **Ω**, RTD 2 Wire 1000 **Ω**, RTD 3 Wire 100 **Ω**, RTD 3 Wire 1000 **Ω**, 2W 100 **Ω** MIL, or 3W 100 **Ω** MIL.

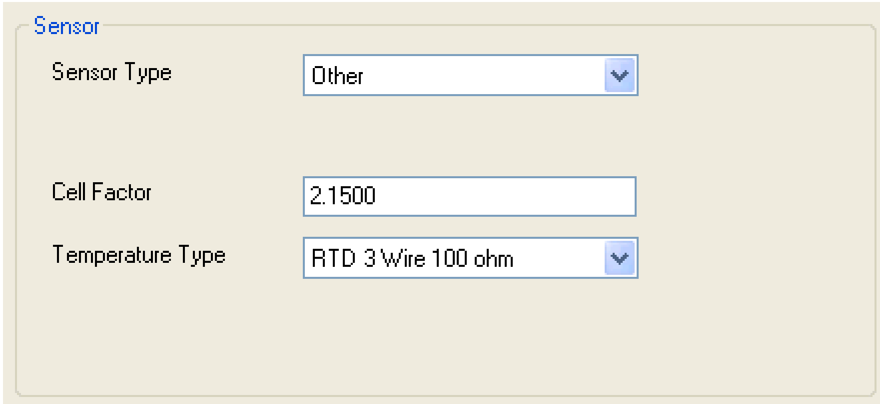


Figure 267. Sample 875EC Analyzer Sensor Screen (Sensor Type as Other)

Temperature

The Temperature screen allows you to configure parameters for temperature measurement for the preconfigured applications.

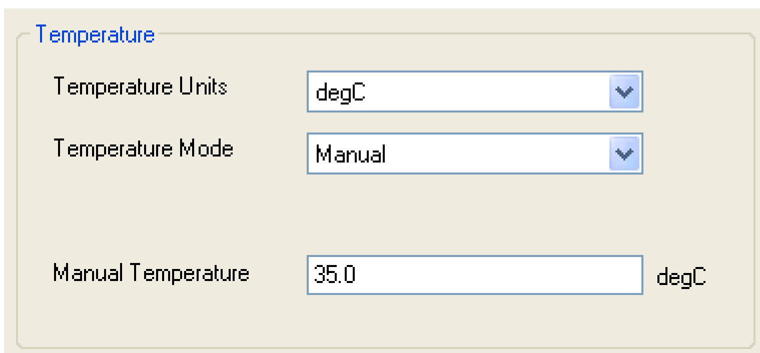


Figure 268. Sample 875EC Analyzer Temperature Screen (Manual Selection)

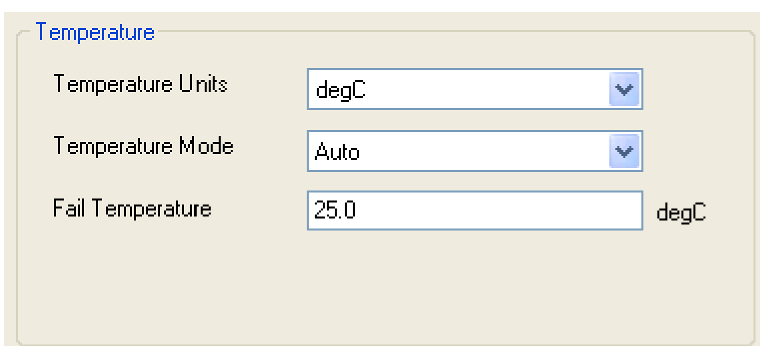


Figure 269. Sample 875EC Analyzer Temperature Screen (Auto Selection)

Field	Entry
Temperature	
Temperature Units	Select the temperature units from the drop-down list. Choose from degC or degF. All references to temperature appear in the specified units within the analyzer software.
Temperature Mode	Select the temperature mode from the drop-down list. Choose from Automatic or Manual. • In Automatic mode, the temperature follows the temperature input RTD or thermistor “ATC” and you can set a temperature Failsafe Signal value (in case the RTD or thermistor fails) at the temperature at which you expect the process to be operating. Refer to Figure 269. • In Manual mode, the temperature can be set at a fixed temperature value and resistance inputs on the temperature terminal are ignored.
Fail Temperature	This parameter appears when the temperature mode is set to ‘Automatic’. Set a temperature that can be used in case of RTD failure.
Manual Temperature	This parameter appears if the temperature mode is set to ‘Manual’. Specify a fixed temperature value.

Application

The Application screen is where you can preconfigure the analyzer for up to three distinct applications. Each application can have its own (standard or custom) display, temperature compensation curve, chemical concentration curve (if applicable), and output configuration. Each application is assigned an identification number (such as 1, 2, or 3).

If, in using the analyzer, you wish to change from one application to another, you can select the application 1, 2, or 3 in **Application to Run**. The entire application switches to that preconfigured application. You can also choose ‘Auto’ or ‘Signal’ instead of an application number.

→ ‘Auto’ selection configures the analyzer to switch from one application to another when triggered by measurements above or below the established limits.

→ ‘Signal’ selection configures the analyzer to change applications from an external device connected to the analyzer signal inputs.

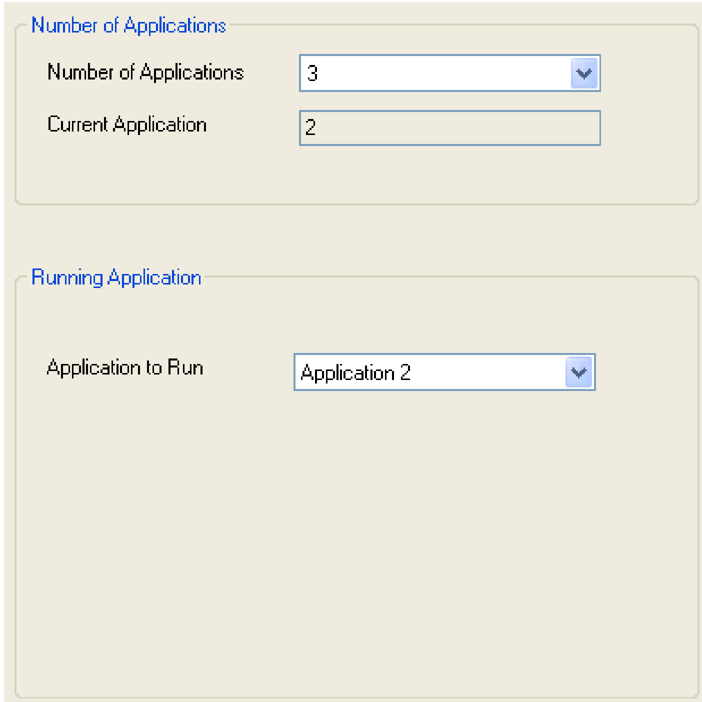


Figure 270. Sample 875EC Analyzer Application Screen

Field	Entry
Number of Applications	
Number of Applications	Select the number of applications you want to preconfigure from the drop-down list. Choose from 1, 2, or 3.
Current Application	This parameter shows the current application that is running.
Running Application	
Application to Run	This parameter appears only if the analyzer is preconfigured to more than 1 applications. Select the application you want to run from the drop-down list. Choose from Application 1, Application 2, Application 3, Auto, or Signal.

Auto

When **Application to Run** is set to 'Auto', you must establish the presets which trigger movement from one application to another. The switching from one application to another only takes a few seconds and once a switch is made, another switch can occur within a few seconds.

Specify the values of Application 1 High, Application 2 Low, Application 2 High, and Application 3 Low in the measurement units chosen for the application.

→ When the measurement value exceeds the Application 1 High preset, Application 2 runs.

→ When the value then exceeds the Application 2 High preset, Application 3 runs.

→ When the value decreases below the Application 3 Low preset, Application 2 runs.

→ When the value decreases below the Application 2 Low preset, Application 1 runs.

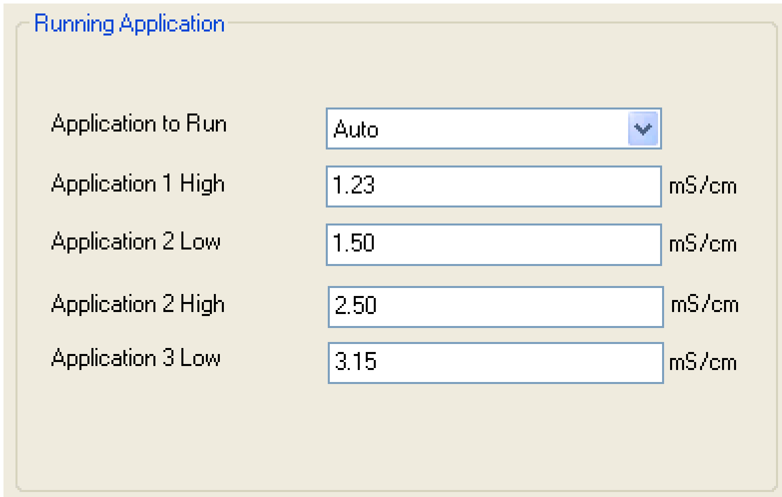


Figure 271. Sample 875EC Analyzer Application Screen (Auto Selection)

Field	Entry
Running Application	
Application to Run	Select 'Auto' from the drop-down list.
Application 1 High	Specify a value for application 1 high limit.
Application 2 Low	Specify a value for application 2 low limit.
Application 2 High	Specify a value for application 2 high limit.
Application 3 Low	Specify a value for application 3 low limit.

— NOTE

It is assumed that although the ranges of the applications must overlap, application 1 has the lowest conductivity value, application 2 is next, and application 3 has the highest.

Signal

When **Application to Run** is set to 'Signal', the analyzer changes applications from an external device connected to the analyzer signal inputs. When one of the three application switching inputs Digital Input 1, Digital Input 2, or Digital Input 3 changes from inactive to active state, the corresponding application 1, 2, or 3 is activated. When first configured, operation starts with the lowest configured application.

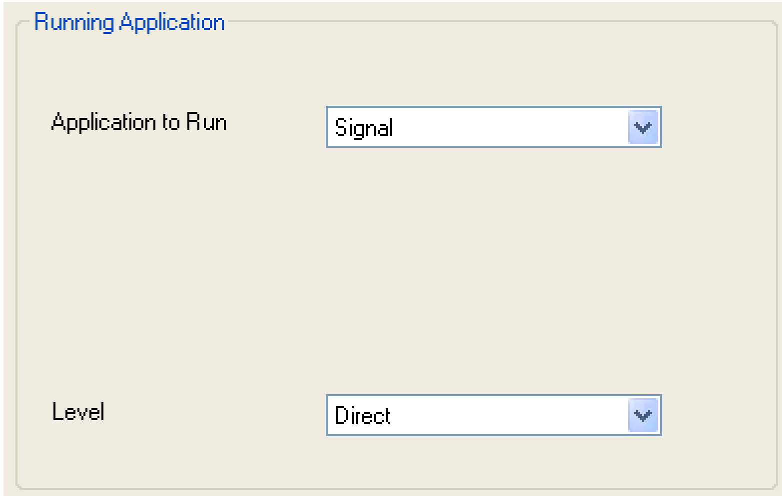


Figure 272. Sample 875EC Analyzer Application Screen (Signal Selection)

Field	Entry
Running Application	
Application to Run	Select 'Signal' from the drop-down list.
Level	Set the active state level to Direct or Inverted from the drop-down list. • If Direct, the application becomes active when the input switch closes. • If Inverted, it becomes active when the input switch opens.

Application 1

Measurement Units

The Measurement Units screen is where you can configure units, scale, damping, and other measurement parameters.

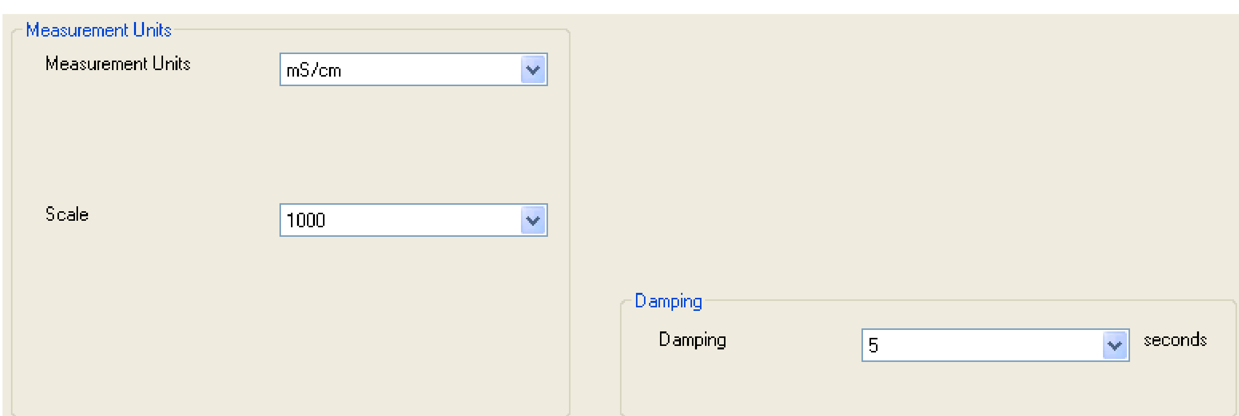


Figure 273. Sample 875EC Analyzer Measurement Units Screen

Field	Entry
Measurement Units	
Measurement Units	Select the measurement units from the drop-down list. Choose from mS/cm, %, µS/cm, mS/m, S/m, and Custom. • If you choose % you need to specify the chemical being measured. • If you choose Custom you must specify other parameters associated with custom units.
Scale	This parameter is available when the measurement units are chosen as mS/cm, µS/cm, mS/m, or S/m. The scale differs for each of the selected measurement units based on the sensor selected. Select the scale from the drop-down list that is displayed for the selected sensor and the measurement units.
Damping	Select the damping time (in seconds) from the drop-down list. Choose from None, 5, 10, 20, 40, 120, or 300.

If you select % as the measurement units, you must specify the chemical that is being measured and the concentration.

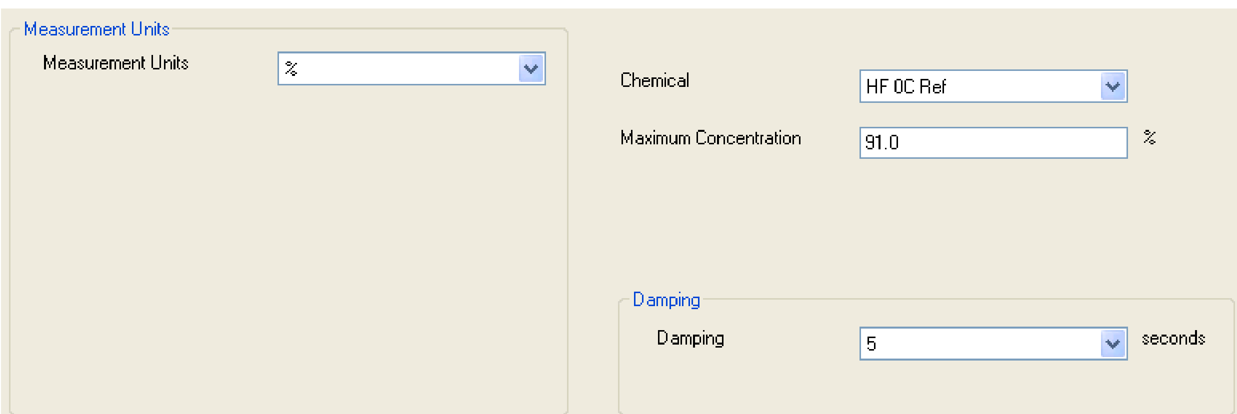


Figure 274. Sample 875EC Analyzer Measurement Units Screen (% Selection)

Field	Entry
Measurement Units	
Measurement Units	Select measurement units as '%' from the drop-down list.
Chemical	This parameter appears when the measurement units are chosen as '%'. Select the chemical that is being measured from the drop-down list. Choose from NaCl, H3PO4, HCl, H2SO4 25C Ref, H2SO4 30C Ref, H2SO4 50C Ref, Oleum 0-10% Ref, Oleum 42-18% Ref, HN03, NaOH 25C Ref, NaOH 50C Ref, NaOH 100C Ref, HF 0C Ref, HF 25C Ref, KOH, KCl, or CH3COOH.

Field	Entry
Maximum Concentration	Specify the maximum concentration. Maximum concentration varies for different chemicals.
Damping	Select the damping time (in seconds) from the drop-down list. Choose from None, 5, 10, 20, 40, 120, or 300.

If you select **Custom** as the measurement units, you need to first determine if measurement in the range desired is feasible. Then, you need to specify Custom Units, Custom Scale, Base Units, Base Scale, and the number of points to plot the custom measurement curve.

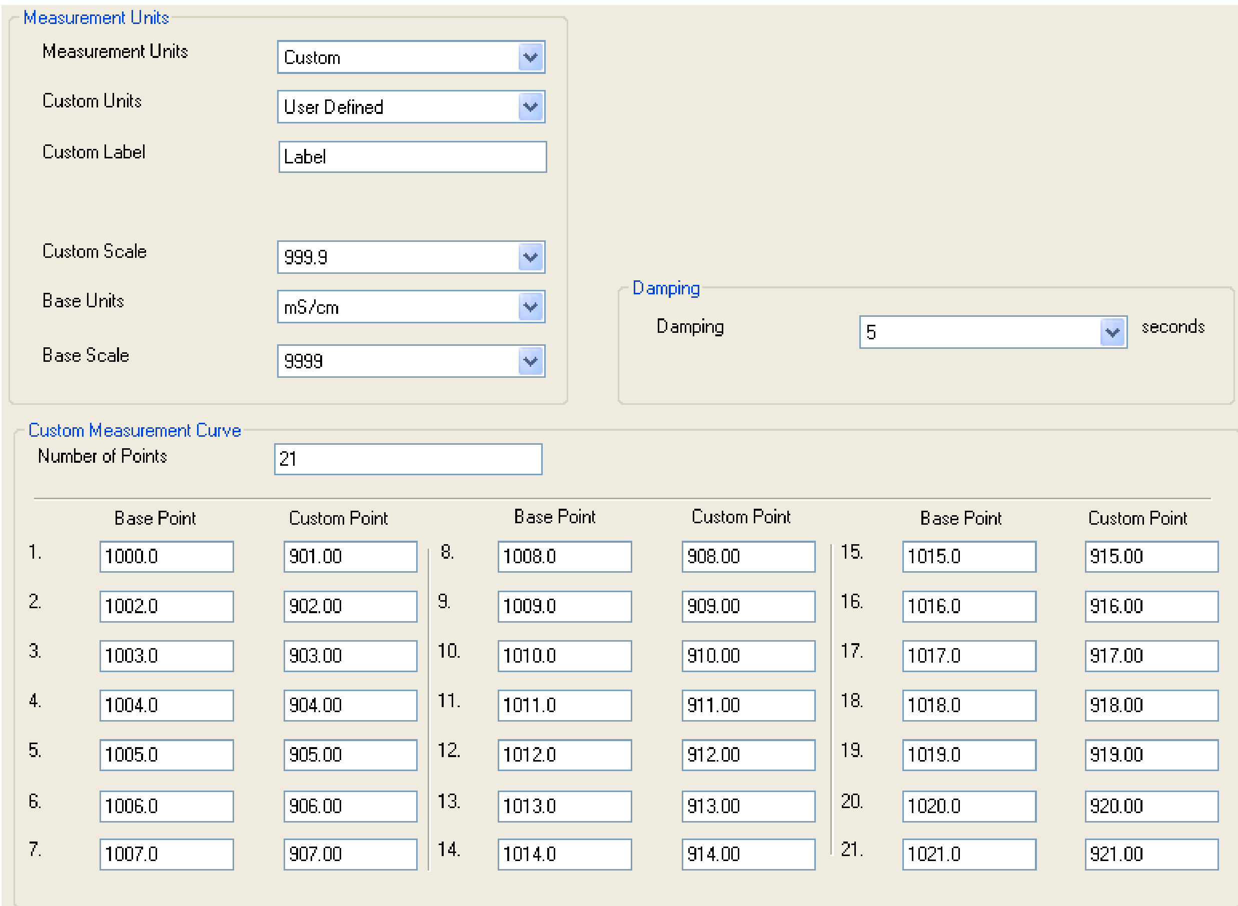


Figure 275. Sample 875EC Analyzer Measurement Units Screen (Custom Selection)

Field	Entry
Measurement Units	
Measurement Units	Select the measurement units as ‘Custom’ from the drop-down list.
Custom Units	Select the custom units from the drop-down list. Choose from %, g/l, ppm, oz/gal, ppt, User Defined, or None.
Custom Label	This parameter appears for the ‘User Defined’ custom units. Specify a name for the units.

Field	Entry
Custom Scale	Select the scale for the custom units from the drop-down list. Choose from 0.9999, 9.999, 99.99, 99.999, 999.9, or 9999.
Base Units	Select the base units from the drop-down list. Choose from mS/cm, µS/cm, mS/m, or S/m.
Base Scale	Select the scale for the base units from the drop-down list. Choose from 0.9999, 9.999, 99.99, 999.9, or 9999.
Damping	Select the damping time (in seconds) from the drop-down list. Choose from None, 5, 10, 20, 40, 120, or 300.
Number of Points	Specify the number of points to plot the compensation curve. You can specify from 2 to 21 points. Based on the number of points you specify, the entry fields are displayed to enter base and custom points.
Base Point	Specify the base point within the scale specified for the base units.
Custom Point	Specify the custom point within the scale specified for the custom units.

Temperature Compensation

The Temperature Compensation screen is where you can configure the temperature compensation for the chemical being measured. Temperature compensation adjusts the measurement to a conductivity reading equivalent to that at the reference temperature.

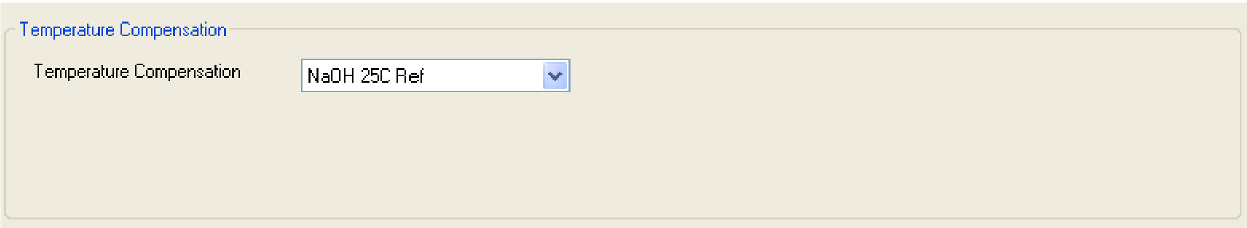


Figure 276. Sample 875EC Analyzer Temperature Compensation

Field	Entry
Temperature Compensation	
Temperature Compensation	Select the compensation that represents your process application most closely. Choose from NaCl, Sea Water, NaOh 25C Ref, NaOh 50C Ref, NaOh 100C Ref, KOH, H3PO4, HCl, HNO3, KCl, CH3COOH, H2SO4 25C Ref, H2SO4 30C Ref, H2SO4 50C Ref, Oleum, HF 0C Ref, HF 25C Ref, Linear, Custom, Grn Liquor, Blk Liquor, Absolute, or Dilute NaCl. Select Absolute if temperature compensation is not used. **NOTE** If your application is not covered in the choices available, you may use either Linear or Custom temperature compensation.

NOTE

Temperature Compensation does not appear if measurement units was configured as percent (%) since the analyzer applies the appropriate compensation automatically.

Linear compensation can be used for a simple binary solution or when other compensation choices are not appropriate for your application. By entering a linear slope value that is representative of your solution's conductivity change with temperature, the analyzer multiplies the factor entered by the temperature deviation times the absolute conductivity. Therefore, if you select Linear, enter the reference temperature and specify the slope of the linear compensation curve (Lin Slope) between 0.5 and 5.0 %/°C.

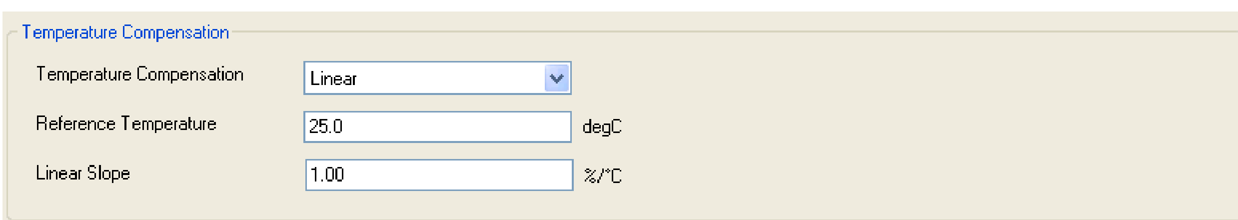


Figure 277. Sample 875EC Analyzer Temperature Compensation (Linear Selection)

Field	Entry
Temperature Compensation	
Temperature Compensation	Select 'Linear' as temperature compensation from the drop-down list.
Reference Temperature	Specify the reference temperature.
Linear Slope	Specify the linear slope between 0.5 and 5%/°C.

If you select **Custom**, you need to specify the number of points to plot the compensation curve. To prepare the curve, you must select a solution of typical concentration and measure its conductivity in precisely controlled temperature increments.

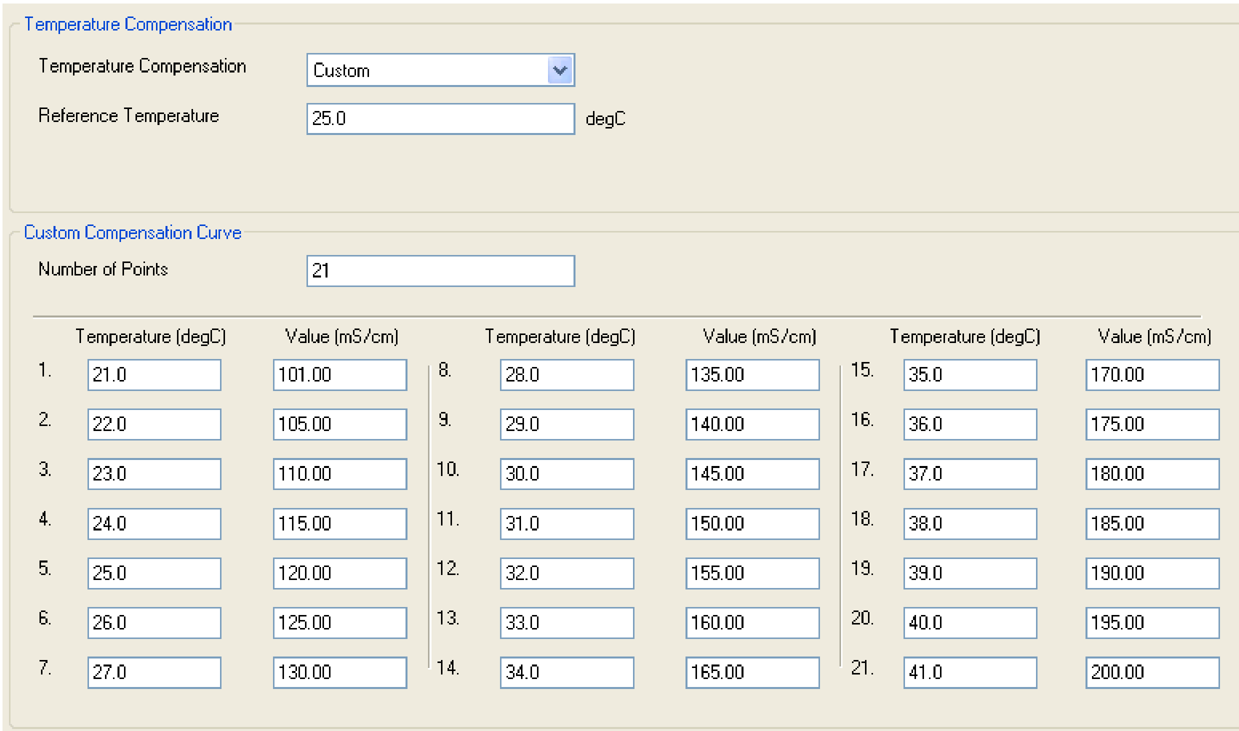


Figure 278. Sample 875EC Analyzer Temperature Compensation (Cusotom Selection)

Field	Entry
Temperature Compensation	
Temperature Compensation	Select 'Custom' as temperature compensation from the drop-down list.
Reference Temperature	Specify the reference temperature.
Number of Points	Specify the number of points to plot temperature compensation curve. Each point specifies a conductivity value at a certain temperature. You can specify from 2 to 21 points. Based on the number of points you specify, the entry fields to enter temperature and value points are displayed.
Temperature (units)	Specify the temperature based on the units selected for temperature.
Value (units)	Specify a value based on the scale selected for the measurement unit. It can be specified from 0 to five times the scale value chosen.

NOTE

1. The temperature values must be entered in increasing or decreasing order or the display will read Slope Error.
2. Actual database saving of the compensation table is not performed until the last point pair is entered.

Output

Analog

The Analog screen allows you to configure the analog outputs in the analyzer. There are two analog outputs - Analog Output 1 (PV), and HART Analog Output (SV), which can be mapped to different measurements. You can specify the minimum and maximum range values for the outputs, and a fail-safe signal for each output.

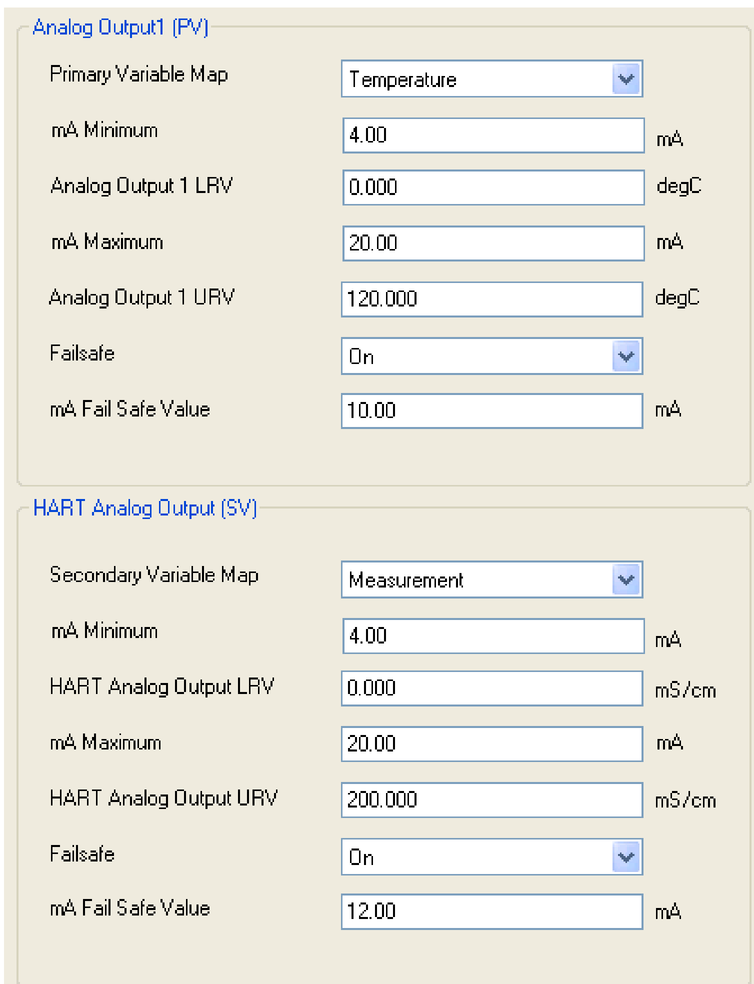


Figure 279. Sample 875EC Analyzer Output Analog (Failsafe as On)

Field	Entry
Analog Output 1 (PV)	
Primary Variable Map	Select a measurement to map the primary variable. Choose from Temperature, Measurement, Absolute, and Off. Select Off if you are not using the output.
mA Minimum	Specify mA minimum value between 4 mA and 20 mA.
Analog Output 1 LRV	Specify the lower range value for Analog Output 1.
mA Maximum	Specify mA maximum value between 4 mA and 20 mA.
Analog Output 1 URV	Specify the upper range value for Analog Output 1.
Failsafe	Select failsafe mode from the drop-down list. Choose from On, Off, and Pulse.
mA Failsafe Value	This parameter appears only if the failsafe mode is ‘On’. Specify a failsafe output that is to be delivered for the analyzer faults and for critical cell diagnostic faults when so configured.
HART Analog Output (SV)	
Secondary Variable Map	Select a measurement to map the secondary variable. Choose from Temperature, Measurement, Absolute, and Off. Select Off if you are not using the output.
mA Minimum	Specify mA minimum value between 4mA and 20mA.
HART Analog Output LRV	Specify the lower range value for HART Analog Output.
mA Maximum	Specify mA maximum value between 4 mA and 20 mA.
HART Analog Output URV	Specify the upper range value for HART Analog Output.
Failsafe	Select failsafe mode from the drop-down list. Choose from On or Off. **NOTE** The Failsafe (HART) parameter does not have a ‘Pulse’ option.
mA Failsafe Value	This parameter appears when the failsafe mode is ‘On’. Specify a failsafe output that is to be delivered for the analyzer faults and for critical cell diagnostic faults when so configured.

NOTE

1. If a non-zero value is configured as the polling address, the **HART Analog Output** (SV) displays only the ‘Secondary Variable Map’. Other parameters of HART Analog Output will not be shown.

Select the failsafe as ‘Pulse’ if you want to have the analyzer failure signal outputted with a pulsed saw-tooth waveform of 0.5 mA. The waveform has a frequency of 10 Hz with 10 steps of 0.1 mA increments.

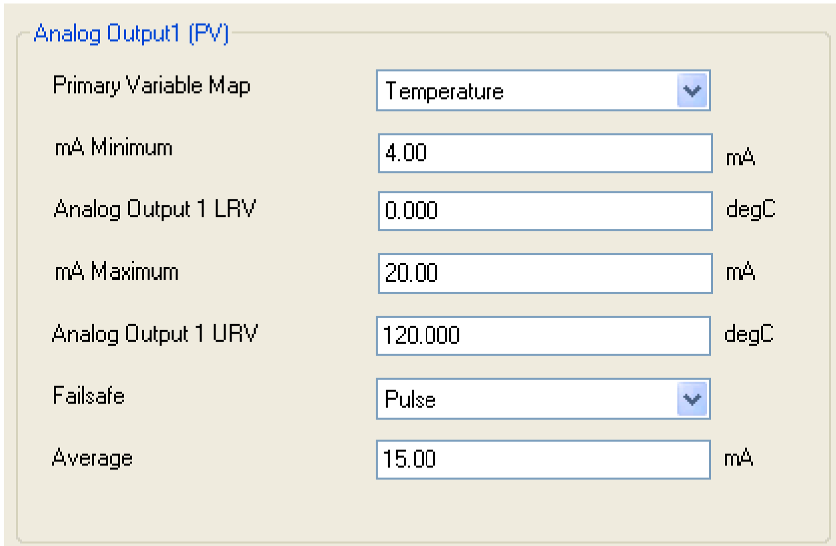


Figure 280. Sample 875EC Analyzer Output Analog (Failsafe as Pulse)

Field	Entry
Analog Output 1 (PV)	
Average	This parameter appears when the failsafe mode is ‘Pulse’. Specify average output between 3.8 and 20.5 mA.

— NOTE

1. The Failsafe (HART) parameter does not have a Pulse option.
2. mA Minimum and mA Maximum parameters are displayed when Number of Applications > 2.

Digital

The Digital screen allows you to map measurements to primary, secondary, tertiary, and quaternary variables.

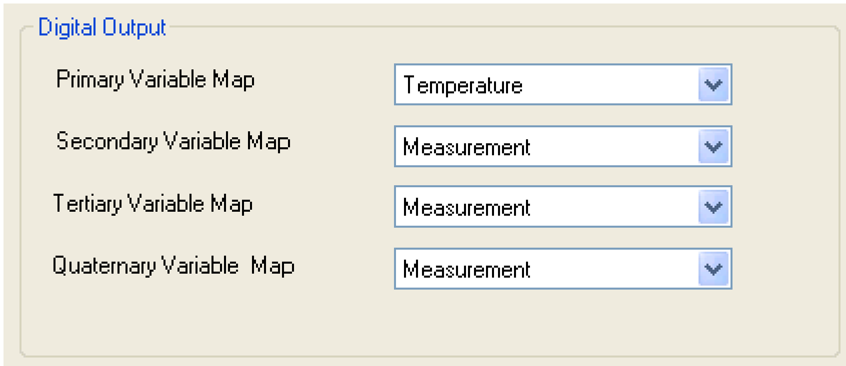


Figure 281. Sample 875EC Analyzer Output Digital

Field	Entry
Digital Output	
Primary Variable Map	The primary variable (PV) is the measurement configured for Analog Output 1. Configure this parameter to represent one of the measurements in the drop-down list: Measurement, Temperature, or Absolute. Select Off if you are not using the PV.
Secondary Variable Map	The secondary variable (SV) is the measurement configured for HART Analog Output. Configure this parameter to represent one of the measurements in the drop-down list: Measurement, Temperature, or Absolute. Select Off if you are not using the SV.
Tertiary Variable Map	Configure the tertiary variable to represent one of the measurements in the drop-down list: Measurement, Temperature, or Absolute. Select Off if you are not using the TV.
Quaternary Variable Map	Configure the quaternary variable to represent one of the measurements in the drop-down list: Measurement, Temperature, or Absolute. Select Off if you are not using the QV.

Local Display

The Local Display screen is where you can configure the parameters for display.

If you select single mode configuration, you must select the measurements you want to show in the line 1 of the display.

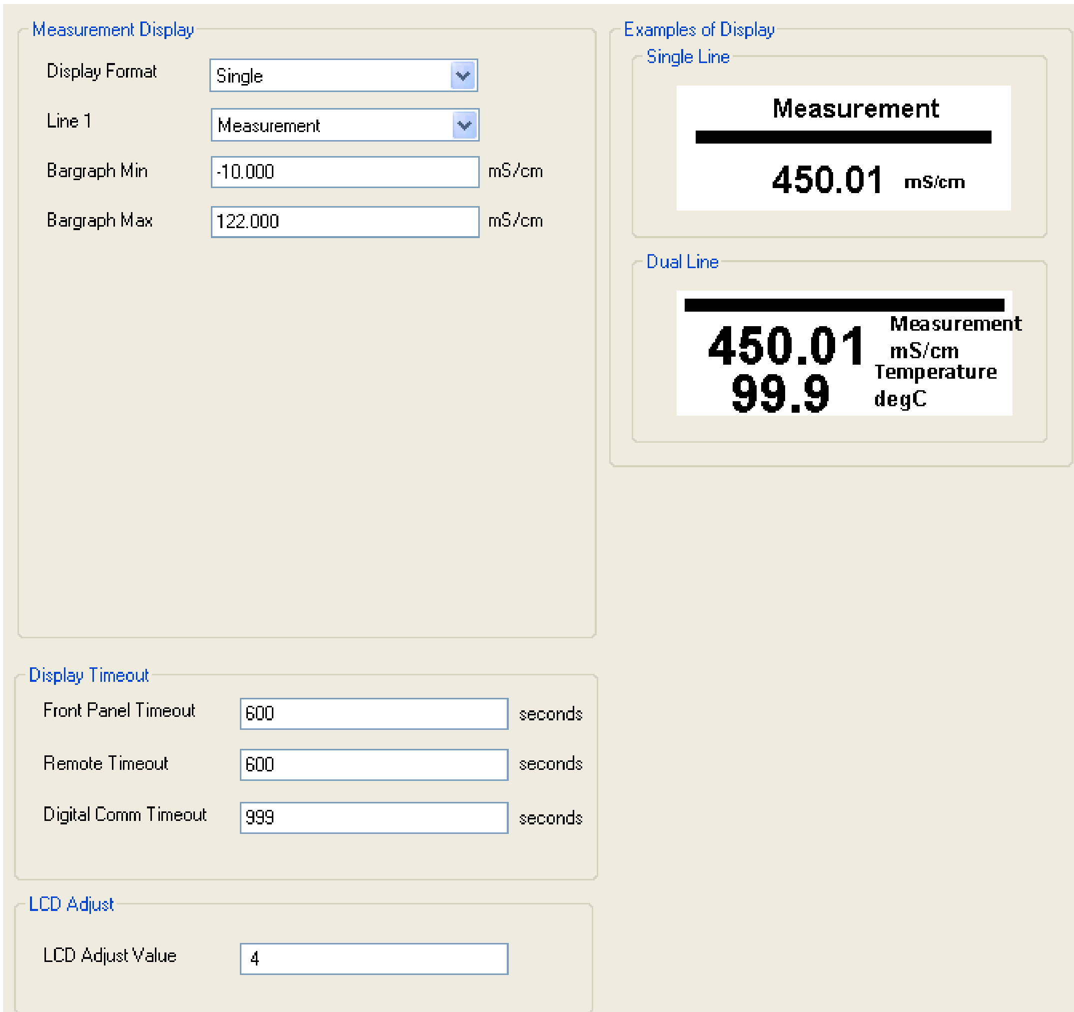


Figure 282. Sample 875EC Analyzer Local Display (Single Line)

Field	Entry
Measurement Display	
Display Format	Select the display format from the drop-down list. Choose from Dual, Single, or Scan. • Single: Displays a single measurement title, value, and unit on the local display. • Dual: Displays two measurement titles, values, and units on the local display. • Scan: Displays several selected measurements in sequence in a designated scan time.
Line 1	This parameter appears if you are in single line mode. Select a measurement from the drop-down list. Choose from Measurement, Temperature, Absolute, Analog 1, and HART.
Bargraph Min	Specify the minimum bargraph value. This parameter does not appear if Line 1 is configured to Analog 1 or HART.
Bargraph Max	Specify the maximum bargraph value. This parameter does not appear if Line 1 is configured to Analog 1 or HART.
Display Timeout	
Front Panel Timeout	Configure front panel timeout between 5 to 999 seconds.
Remote Timeout	Configure remote timeout between 5 to 999 seconds.
Digital Comm Timeout	Configure digital communication timeout between 5 to 999 seconds.
LCD Adjust	
LCD Adjust Value	This parameter allows you to adjust the brightness of the display. The numbers (-9 to 0 to +9) shown on the display should only be used for darkening or lightening the display.

If you select Dual mode, you must select the measurements you want to show in line 1 and line 2 parameters of the display.

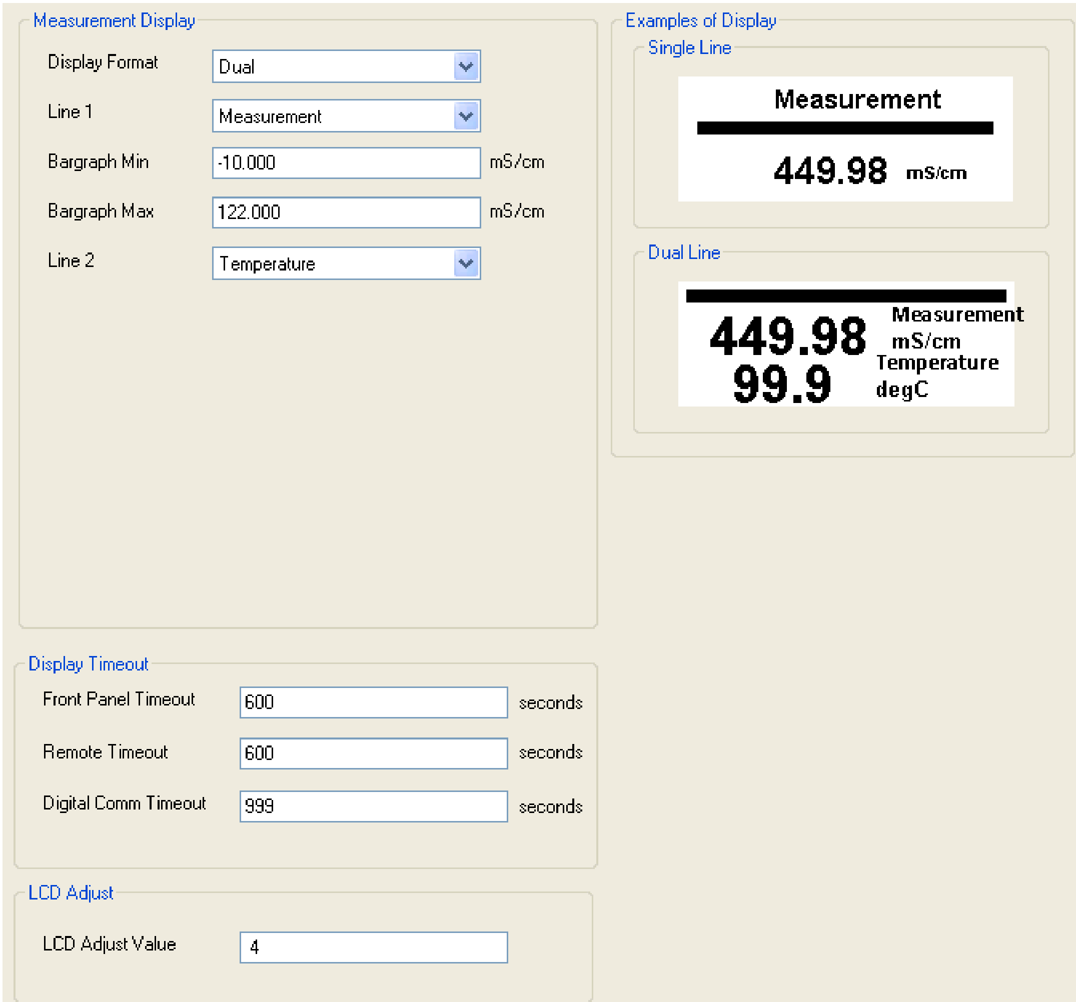


Figure 283. Sample 875EC Analyzer Local Display (Dual Line)

Field	Entry
Measurement Display	
Line 2	This parameter appears if you are in dual line mode. Select a measurement from the drop-down list. Choose from Measurement, Temperature, Absolute, Analog 1, and HART.

If you select Scan mode, you must specify which measurements you want to display in sequence, and the scan time.

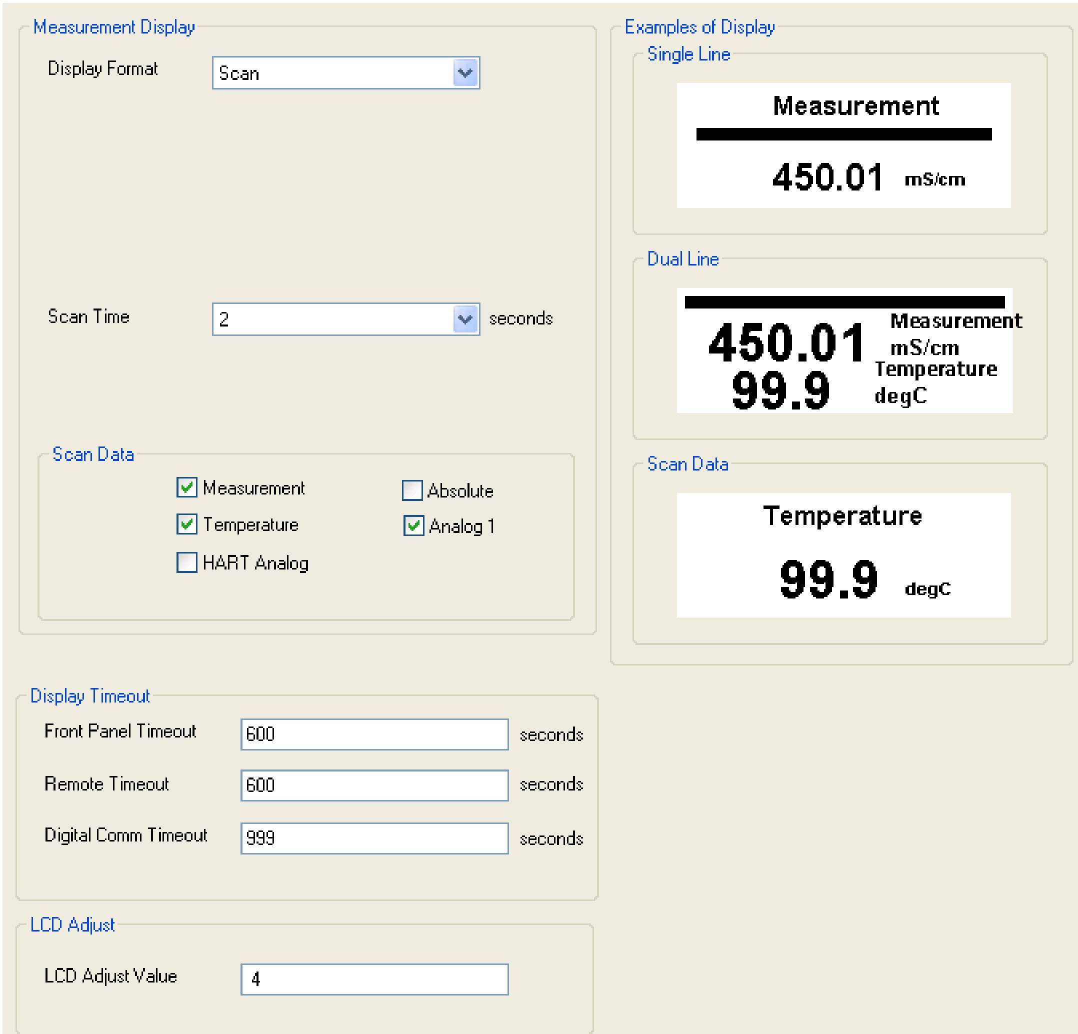


Figure 284. Sample 875EC Analyzer Local Display (Scan)

Field	Entry
Measurement Display	
Scan Time	Select the scan time from the drop-down list. Choose from 2, 5, 10, and 20 seconds.
Scan Data	Select the measurements you want to display in sequence on the local display. Choose from Measurement, Temperature, Absolute, Analog 1, and HART.

Auto Service

The Auto Service screen allows you automate the process of cleaning and calibrating sensors. When this service is activated, a signal is sent to the control instrument which automatically sequences the removal of the sensor from the process, its cleaning, calibration, and reinstallation.

The Auto Service feature is available only if Number of Applications = 1.

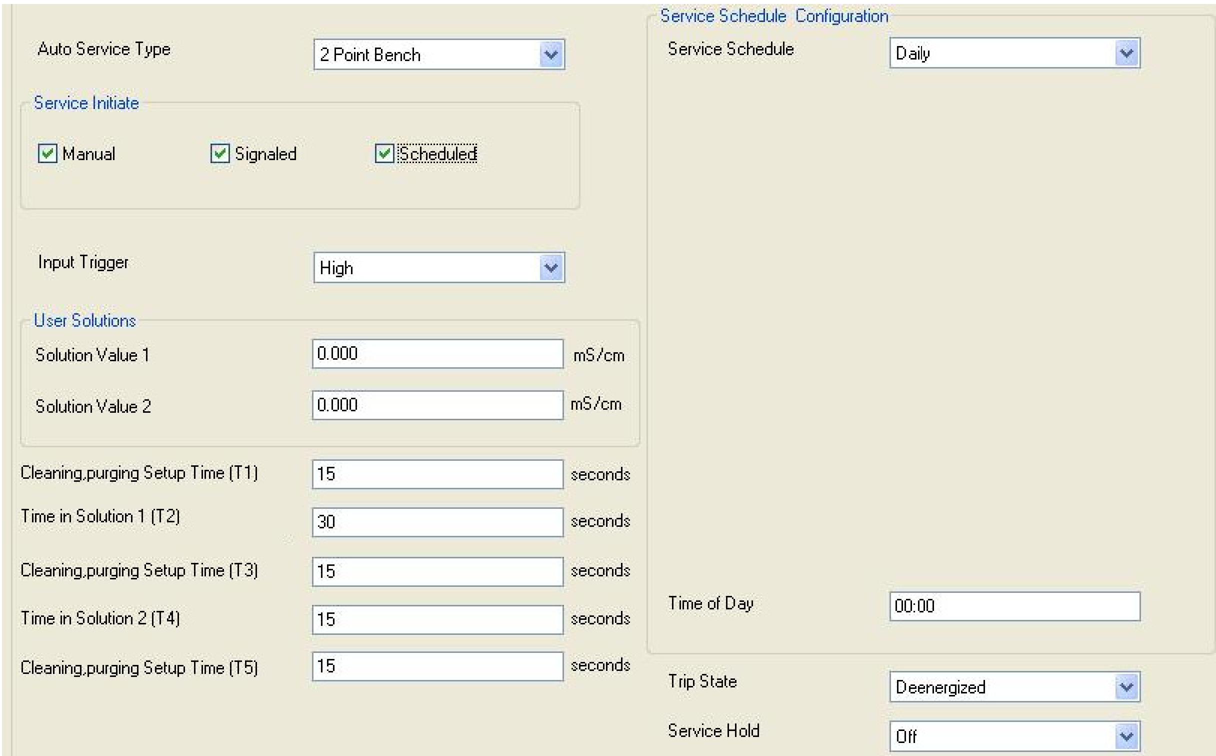


Figure 285. Sample 875EC Analyzer Auto Service Screen

Field	Entry
Auto Service	
Auto Service Type	Select the service type from the drop-down list. Choose from 1 Point Offset, 1 Point Span, 2 Point Sol, 2 Point Bench, and Off. Select Off if you choose not to use this feature.
Service Initiate	
Manual	Select this method to initiate the auto service manually.
Signaled	Select this method to initiate the auto service by an input trigger.
Scheduled	Select this method to initiate the auto service by a set date or period. If you select this method, you must select the schedule.
Input Trigger	This parameter appears only for Signaled method. Select one of the following options for input trigger. • High - auto service is initiated when the input switch is closed. • Low - auto service is initiated when the input switch is open.

Field	Entry
User Solutions	
Solution Value 1	Specify a value for calibration solution 1. This parameter is not available if the service type is 'Auto-Clean'.
Solution Value 2	Specify a value for calibration solution 2. This parameter appears if the auto service is chosen as 2 Point Sol or 2 Point Bench.
Cleaning, Purging Setup Time (T1)	Set cleaning and purging setup time.
Time in Solution 1 (T2)	Specify the hold time in solution 1.
Cleaning, Purging Setup Time (T3)	Set cleaning and purging setup time.
Time in Solution 2 (T4)	Specify the hold time in solution 2. This parameter appears if the auto service is chosen as 2 Point Sol or 2 Point Bench.
Cleaning, Purging Setup Time (T5)	Set cleaning and purging setup time. This parameter appears if the auto service is chosen as 2 Point Sol or 2 Point Bench.
Trip State	Select one of the following options from the drop-down list for alarm trip state: • Energized - provides a contact closure between 1C and 1NO (2C and 2NO) and an open contact between 1C and 1NC (2C and 2NC). • Deenergized - provides a contact closure between 1C and 1NC (2C and 2NC) and an open contact between 1C and 1NO (2C and 2NO).
Service Hold	Select one of the following options for service hold: • On Present - holds all values and states at their present level. • On Manual - sets all values and states at the levels specified in Hold mode. • Off - select this option if you choose not to use Service Hold feature.

If you select Scheduled method, you must select the schedule for auto service.

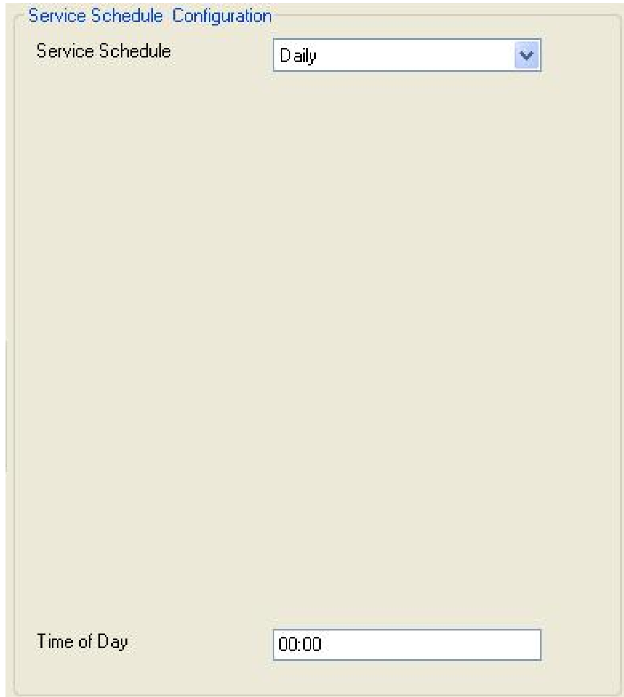


Figure 286. Sample 875EC Analyzer Auto Service Screen (Schedule - Daily)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Daily from the drop-down list.
Time of Day	Specify the scheduled time from 00:00 to 23:59 in the format hh:mm.

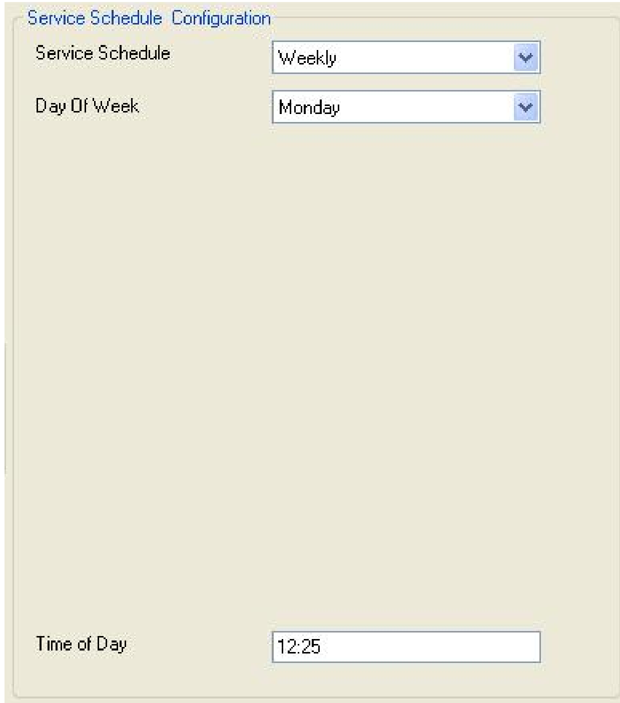


Figure 287. Sample 875EC Analyzer Auto Service Screen (Schedule - Weekly)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Weekly from the drop-down list.
Day of Week	Select a day from the drop-down list.
Time of Day	Specify the scheduled time from 00:00 to 23:59 in the format hh:mm.

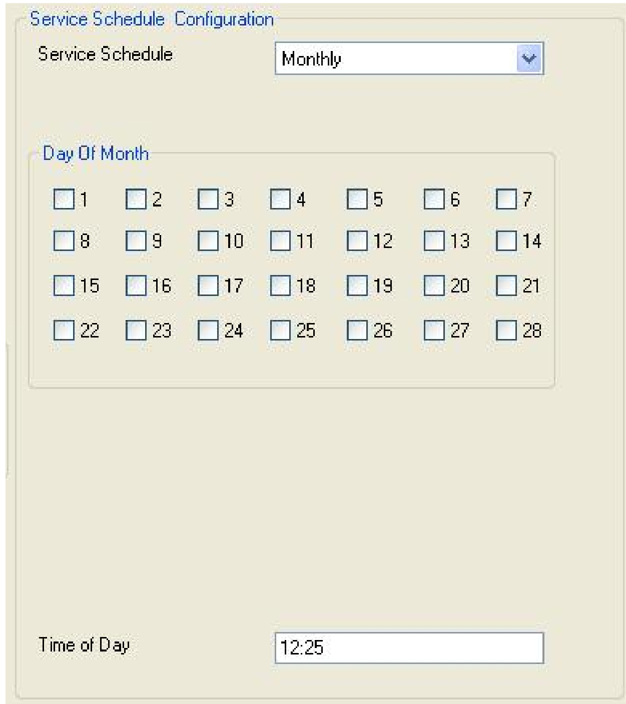


Figure 288. Sample 875EC Analyzer Auto Service Screen (Schedule - Monthly)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Monthly from the drop-down list.
Day of Month	Select a day from 1 to 28 days of the month.
Time of Day	Specify the scheduled time from 00:00 to 23:59 in the format hh:mm.

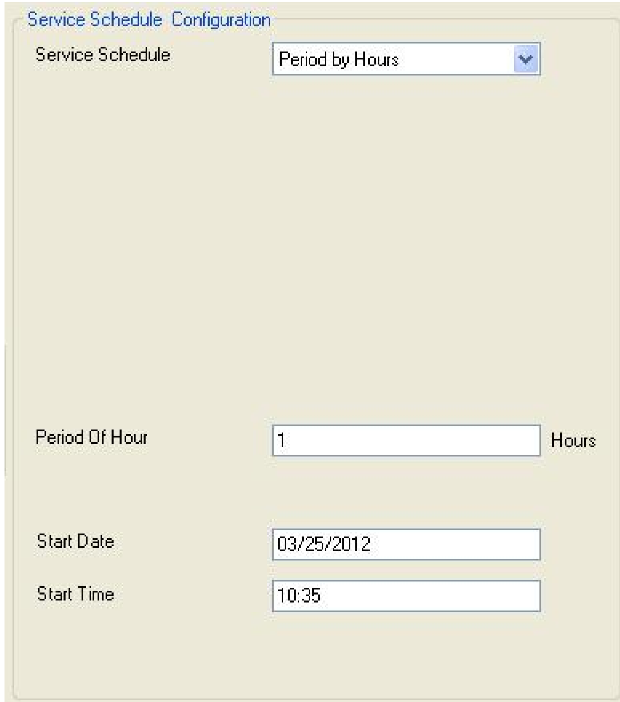


Figure 289. Sample 875EC Analyzer Auto Service Screen (Schedule - Period by Hours)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Period by Hours from the drop-down list.
Period of Hour	Specify the period of hours from 1 to 8760 hours.
Start Date	Specify a date from 1/01/1999 to 12/31/2098 as a start date.
Start Time	Specify a time from 00:00 to 23:59 hours as start time.

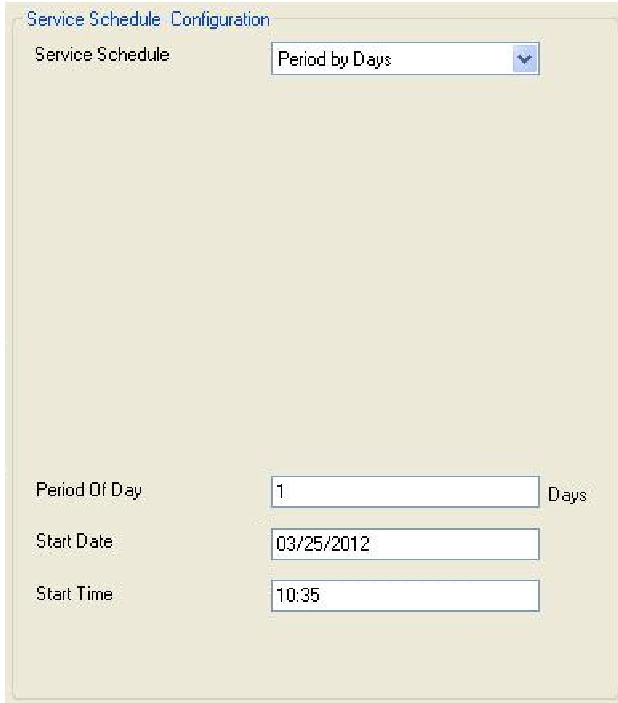


Figure 290. Sample 875EC Analyzer Auto Service Screen (Schedule - Period by Days)

Field	Entry
Service Schedule Configuration	
Service Schedule	Select the service schedule as Period by Days from the drop-down list.
Period of Day	Specify the period of days from 1 to 365.
Start Date	Specify a start date from 1/01/1999 to 12/31/2098.
Start Time	Specify a start time from 00:00 to 23:59 hours.

Alarm 1

The Alarm 1 screen is where you can configure alarm parameters. Specify the alarm to one of the following measurements or conditions: Measurement, Temperature, Absolute, or On Fault. The alarm reacts if the measurement exceeds or drops below the set point.

It uses two controls - Hysteresis and Timed, to minimize chatter around the setpoint. Hysteresis does this by using the measurement; and Timed, by using time.

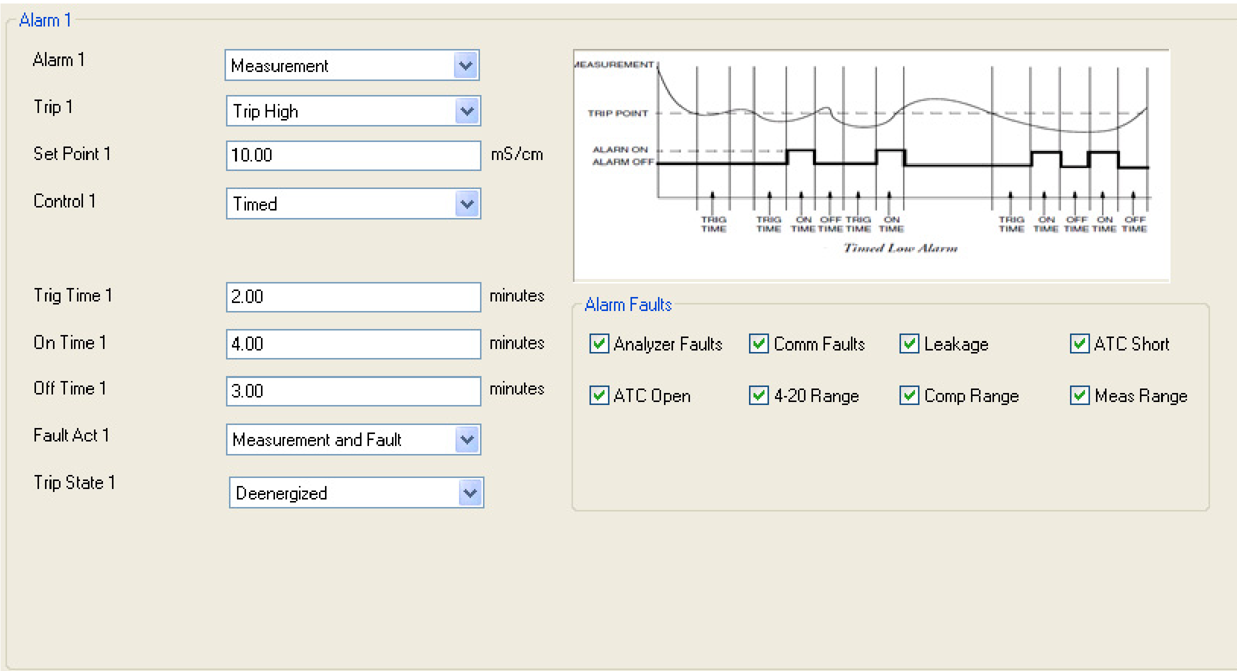


Figure 291. Sample 875EC Analyzer Alarm 1 Screen (Timed Selection)

Field	Entry
Alarm 1	
Alarm 1	Set the alarm 1 from the drop-down list. Choose from Measurement, Temperature, Absolute, On Fault, or Off. Select Off if you are not using the alarm.
Trip 1	Select trip 1 from the drop-down list. Choose from: • Trip Low - to active alarm on a low going condition. • Trip High - to active alarm on a high going condition.
Set Point 1	Specify the value at which you want the alarm to activate.
Control 1	Select the control as Timed from the drop-down list.
Trig Time 1	Set the trig time from 00.00 to 99.99 minutes. When you specify a trig time, condition must exist continuously for the specified time period before the alarm condition is met.
On Time 1	Specify the alarm feed time from 00.00 to 99.99 minutes.

Field	Entry
Off Time 1	This is the delay time before the alarm can trigger again. Specify the delay time from 00.00 to 99.99 minutes.
Fault Act 1	Select the alarm fault action from the drop-down list. Choose from: • Measurement Value - enables an alarm only when the measurement exceeds the alarm set point. • Valid Measurement - enables an alarm when the measurement exceeds the set point and if one of the selected faults is present. • Measurement and Fault - validates the cause when the measurement exceeds the setpoint. If the cause is a fault and not process related, the alarm is disabled. You can select the faults from the list of alarm faults that are displayed below the alarm graph. — NOTE This parameter is available only for users having access to Level 1.
Trip State 1	Select the trip state from the drop-down list. Choose from: • Energized - provides a contact closure between 1C and 1NO (2C and 2NO) and an open contact between 1C and 1NC (2C and 2NC). • Deenergized - provides a contact closure between 1C and 1NC (2C and 2NC) and an open contact between 1C and 1NO (2C and 2NO).

— NOTE

The alarm faults are displayed in the following two conditions:
Condition 1: Alarm is set to 'On Fault'
Condition 2: Alarm is set to 'Measurement' or 'Temperature' or 'Absolute' and the Fault Act is set to 'Measurement and Fault'.

Field	Entry
Alarm Faults	
Analyzer Faults	Select this check box to enable alarm in case of analyzer faults.
4-20 Range	Select this check box to enable alarm if the measurement mapped to the analog output is outside the range configured (4-20 mA).
Leakage	Select this check box to enable alarm in case of severe liquid leakage into the sensor.
Comp Range	Select this check box to enable alarm if the measured temperature or absolute conductivity or resistivity measurement is outside the temperature or chemical compensation curve configured for the currently running application.
ATC Short and ATC Open	Select these check boxes to enable alarm if the resistance of the temperature compensator is greater or less than the expected resistance of the device configured.

Field	Entry
Meas Range	Select this check box to enable alarm if the measurement is over or under the measurable range that is configured for the currently running application.
Comm Faults	Select this check box to enable alarm in case of communication faults.

If Control is specified as Hysteresis, you must specify the hysteresis value.

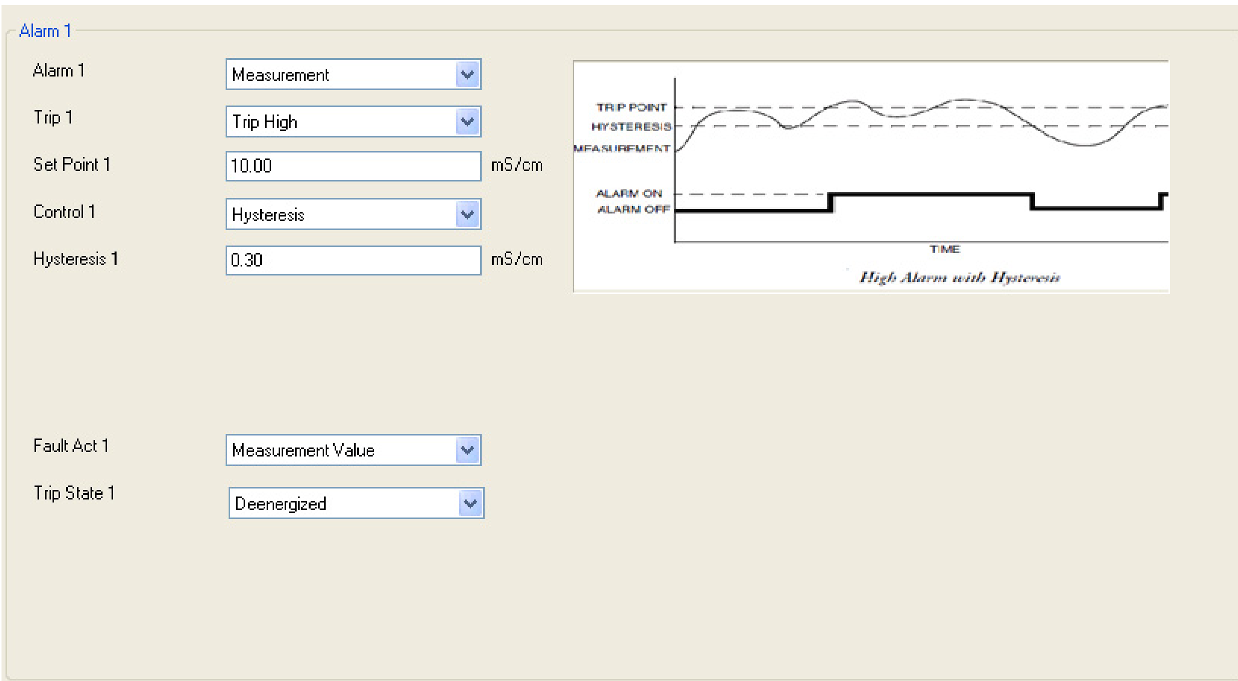


Figure 292. Sample 875EC Analyzer Alarm 1 Screen (Hysteresis Selection)

Field	Entry
Control 1	Select the control as Hysteresis from the drop-down list.
Hysteresis 1	Specify the hysteresis value.

Alarm 2

The Alarm 2 screen allows you to configure alarm 2 parameters to represent measurement, temperature, absolute, or a fault. For detailed description of the parameters in this screen, refer to "Alarm 1".

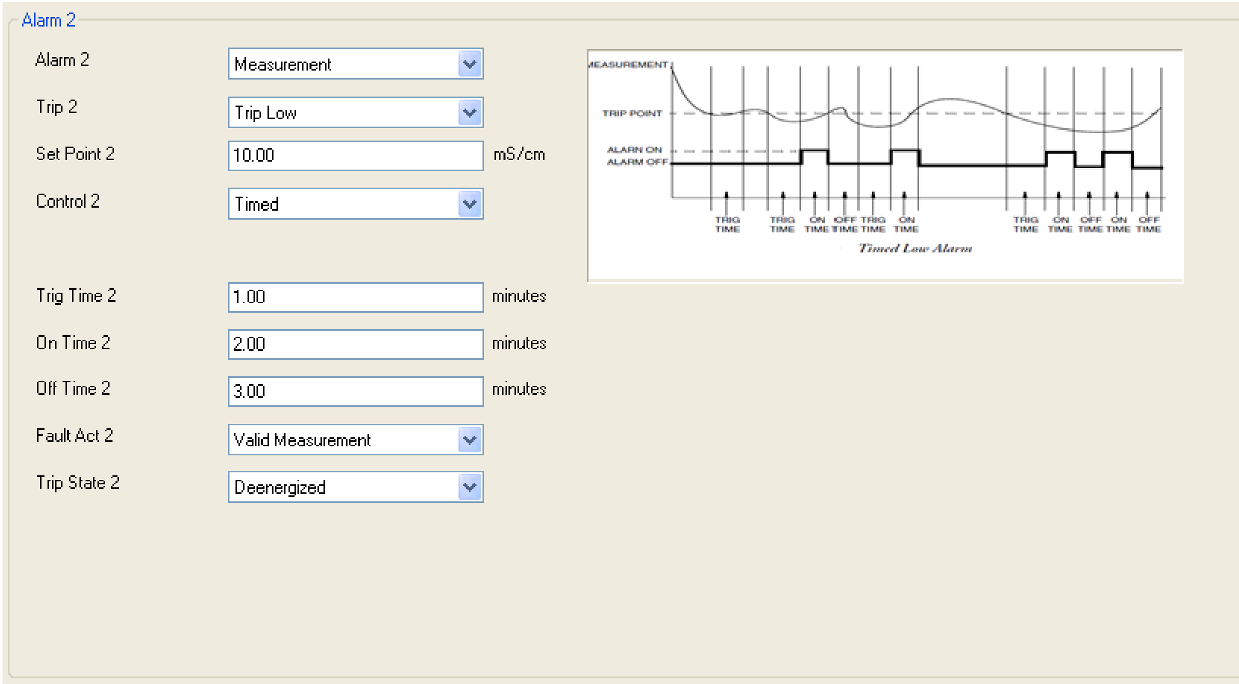


Figure 293. Sample 875EC Analyzer Alarm 2 Screen (Timed Selection)

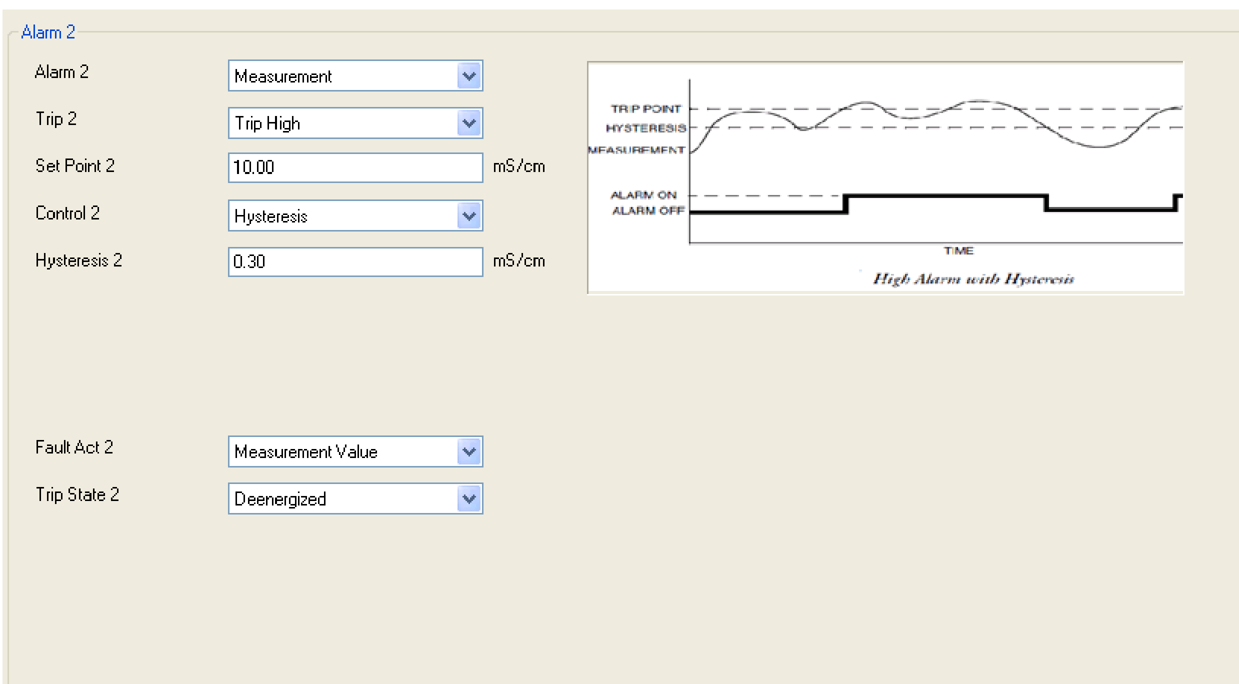


Figure 294. Sample 875EC Analyzer Alarm 2 Screen (Hysteresis Selection)

NOTE
Each of the preconfigured applications can have its own measurement, display, temperature compensation, output, and alarm configuration. The applications must be configured separately before use.

Output

HART

The HART screen allows you to specify the HART polling address. Polling address is set to zero by default. If you change it to a non zero value, it will result in loss of communication between the DTM and the device.

This screen also shows the number of preambles that are sent in the response message.

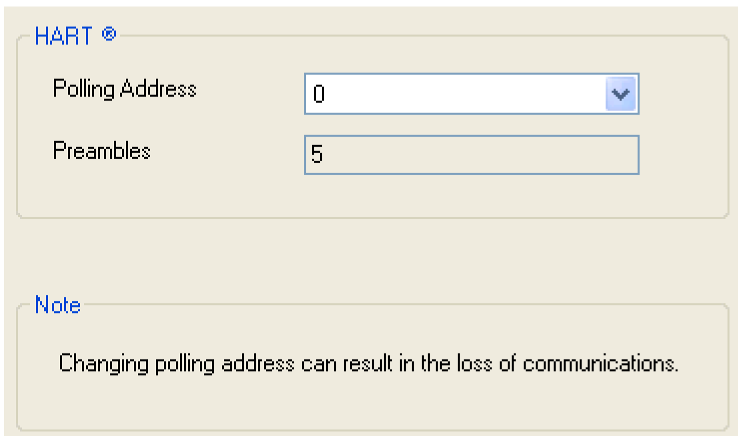


Figure 295. Sample 875EC Analyzer Output HART

Field	Entry
HART	
Polling Address	Select a polling address between 0 and 15.
Preambles	This field shows the number of preambles in the response message.

Auto Hold

The Auto Hold screen is where you can configure the analyzer to go into a Hold state while in calibration or configuration. It also automatically removes the Hold after calibration or configuration.

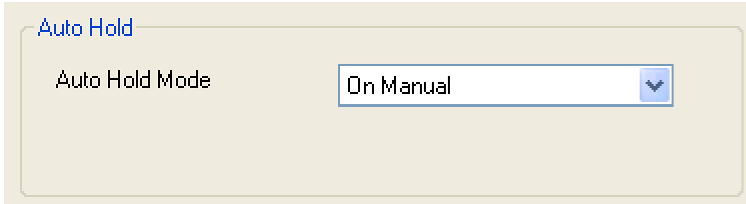


Figure 296. Sample 875EC Analyzer Output Autohold

Field	Entry
Auto Hold	
Auto Hold Mode	This parameter is used to configure the analyzer to go into Hold mode when in calibration or configuration. Select the auto hold mode from the drop-down list. Choose from: • On Present - to hold all values and states at their current level • On Manual - to hold all values and states at desired levels • Off - to release the analyzer from Hold state

Remote

The Remote screen allows you to configure parameters associated with a remote personal computer or a printer.

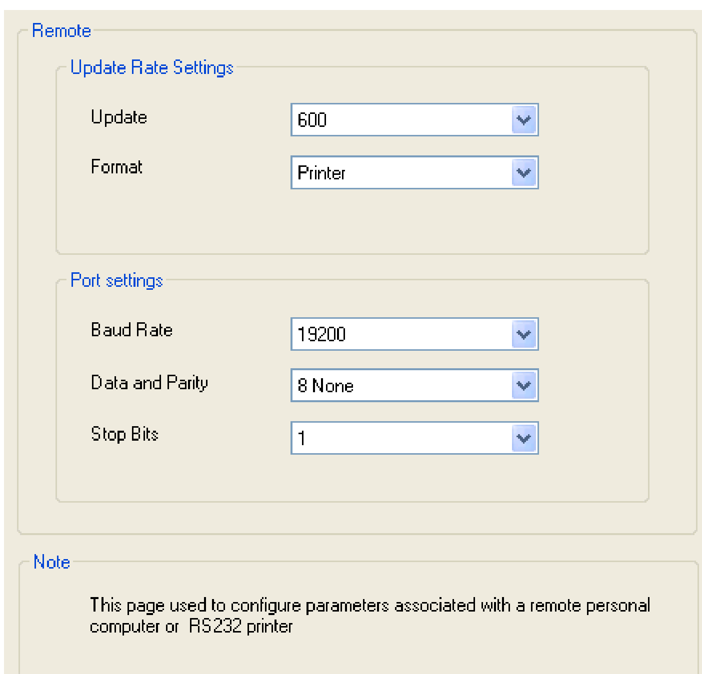


Figure 297. Sample 875EC Analyzer Remote Screen

Field	Entry
Update Rate Settings	
Update	Set the update frequency from the drop-down list. Choose from 5, 10, 30, 60, 120, 300, 600, 1200, 3600, or Off. Select Off if you choose not to use this feature.
Format	Select the format for the measurements report. Choose from Printer or Spreadsheet.
Port Settings	
Baud Rate	Set the baud rate to 300, 600,1200, 2400, 4800, 9600, or 19200.
Data and Parity	Set the data and parity to 7 Odd, 7 Even, 8 Odd, 8 Even, or 8 None.
Stop Bits	Set the stop bits to 1 or 2.

Diagnostic Configuration

The Diagnostics screen is where you select the diagnostic faults for which the error messages should be displayed.

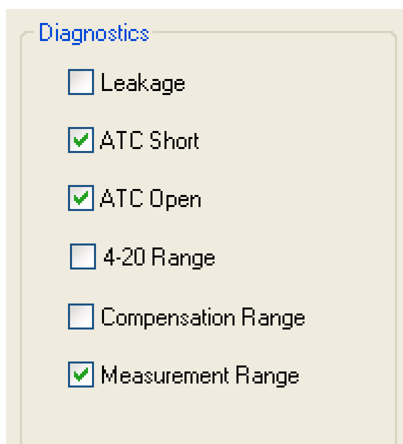
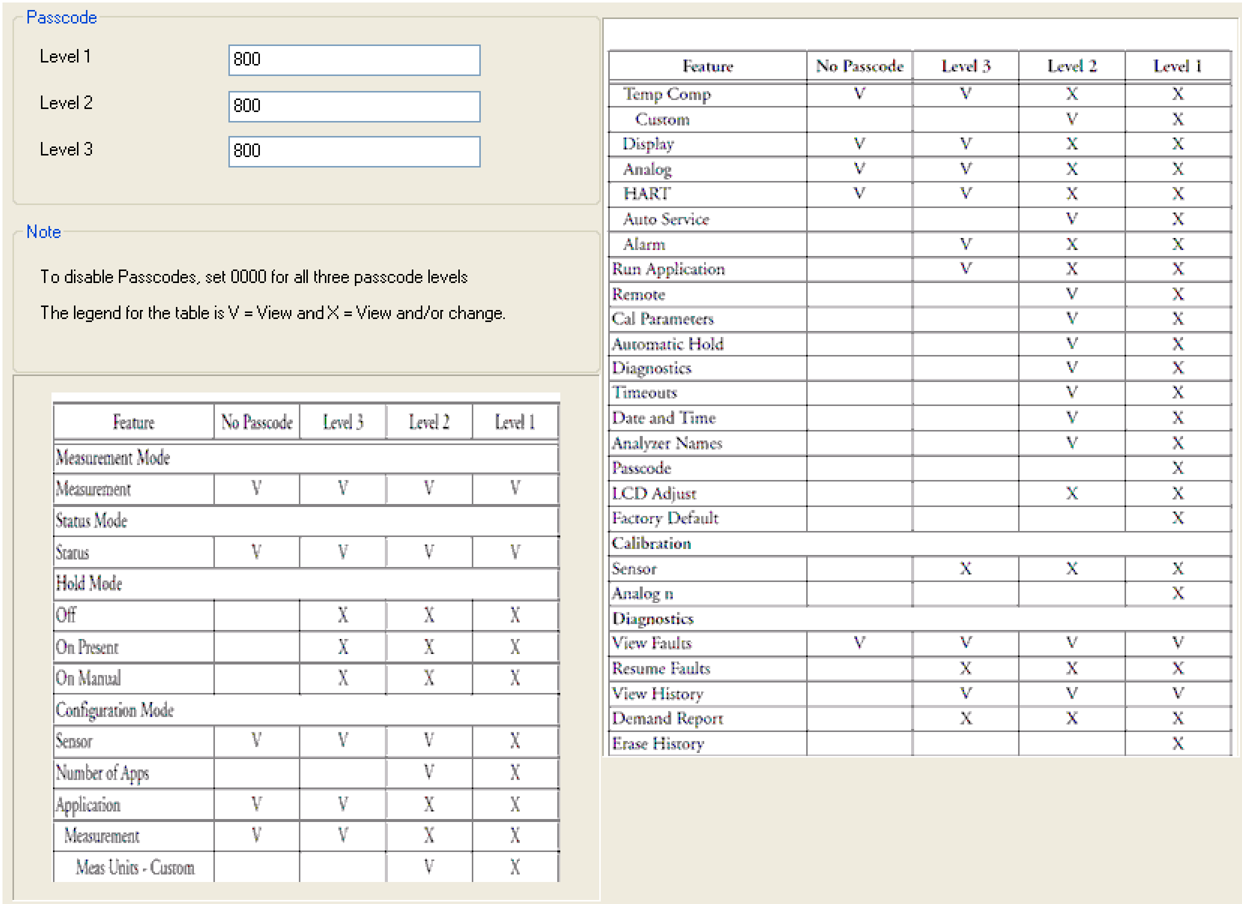


Figure 298. Sample 875EC Analyzer Diagnostic Configuration Screen

Passcode Access

The Passcode Access screen allows you to establish or change passcodes for the three levels of security. Users having access to Level 1 can set or modify these passcodes in configuration mode.



Feature	No Passcode	Level 3	Level 2	Level 1
Measurement Mode				
Measurement	V	V	V	V
Status Mode				
Status	V	V	V	V
Hold Mode				
Off		X	X	X
On Present		X	X	X
On Manual		X	X	X
Configuration Mode				
Sensor	V	V	V	X
Number of Apps			V	X
Application	V	V	X	X
Measurement	V	V	X	X
Meas Units - Custom			V	X
Temp Comp	V	V	X	X
Custom			V	X
Display	V	V	X	X
Analog	V	V	X	X
HART	V	V	X	X
Auto Service			V	X
Alarm		V	X	X
Run Application		V	X	X
Remote			V	X
Cal Parameters			V	X
Automatic Hold			V	X
Diagnostics			V	X
Timeouts			V	X
Date and Time			V	X
Analyzer Names			V	X
Passcode				X
LCD Adjust			X	X
Factory Default				X
Calibration				
Sensor		X	X	X
Analog n				X
Diagnostics				
View Faults	V	V	V	V
Resume Faults		X	X	X
View History		V	V	V
Demand Report		X	X	X
Erase History				X

Figure 299. Sample 875EC Analyzer Passcode Access Screen

Field	Entry
Passcode	
Level 1	Specify the passcode for Level 1. It can be set from 0 to 9999.
Level 2	Specify the passcode for Level 2. It can be set from 0 to 9999.
Level 3	Specify the passcode for Level 3. It can be set from 0 to 9999.

NOTE

1. The table in the screen shows the access permissions of the users to each of the screens.
   'X' - user can edit
   'V' - user can only view
2. The factory default pass code for all three levels is 0800.

Restore Configuration

The Restore Configuration screen allows you to reset all data to default values.

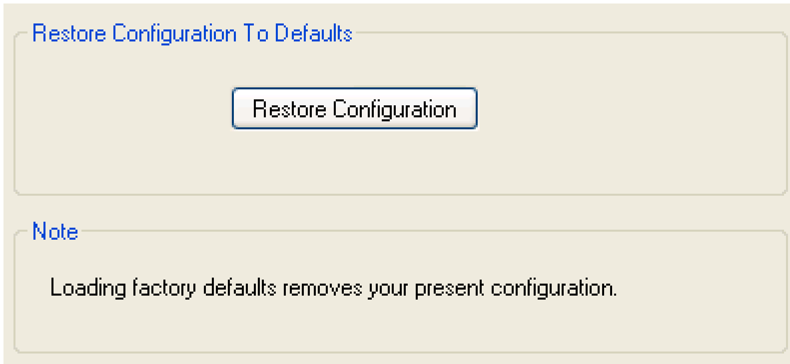


Figure 300. Sample 875EC Analyzer Restore Configuration Screen

Field	Entry
Restore Configuration to Defaults	
Restore Configuration	Click Restore Configuration to reset the parameters to default values.

Device Information

The Device Information screen displays complete information of the device. It allows you to set the tag name, tag number, HART message, location, device name, and date of last calibration.

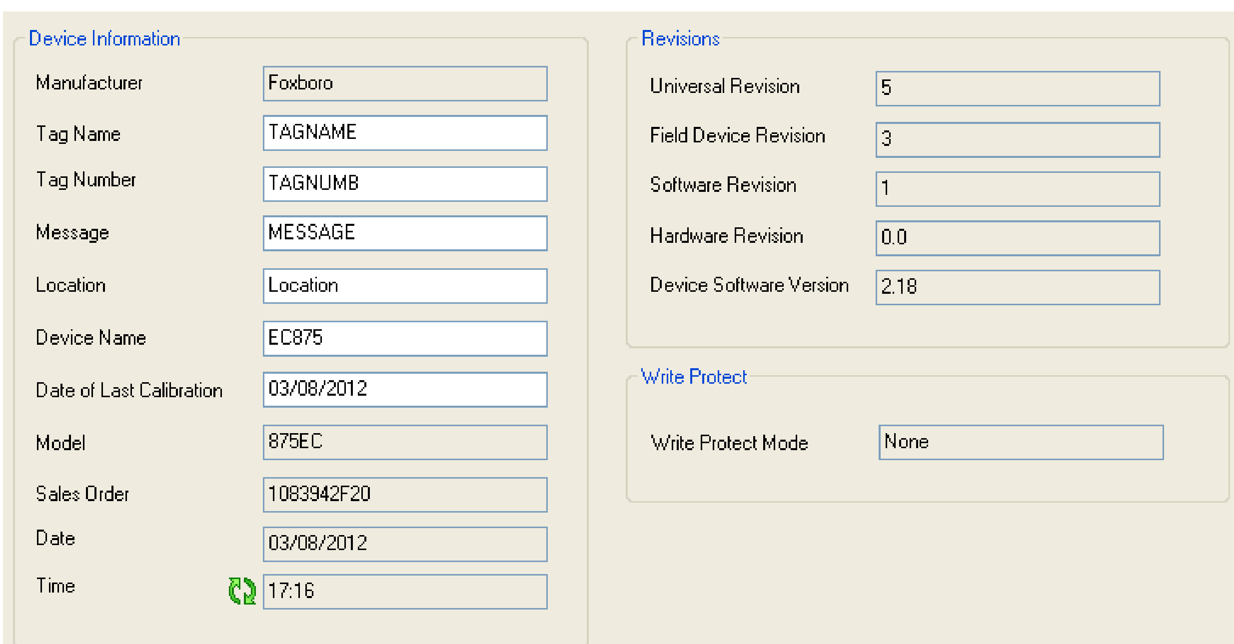


Figure 301. Sample 875EC Analyzer Device Information Screen

Field	Entry
Device Information	
Manufacturer	This field shows the name of the manufacturer of the device.
Tag Name	Specify the HART tag name.
Tag Number	Specify the HART tag number.
Message	Specify the HART message.
Location	Specify the location where the measurements are done.
Device Name	Specify the name of the device.
Date of Last Calibration	Set the date of last calibration.
Model	This field shows the model of the device.
Sales Order	This field shows the sales order number.
Date	This field shows the current date.
Time	This field shows the current time.
Revisions	
Universal Revision	This field shows the universal command set revision level.
Field Device Revision	This field shows the field device revision level.
Software Revision	This field shows the software revision level.
Hardware Revision	This field shows the hardware revision level.
Device Software Revision	This field shows the device software revision level.
Write Protect	
Write Protect Mode	This field shows the write protect status.

Device Status

HART Status

The HART Status screen shows the HART status as well as the field device status of the device. The status of each parameter is easily recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

If Configuration Changed does not show a green check mark, it can be reset by clicking the Reset Configuration Changed Flag button on the lower right side of the screen.

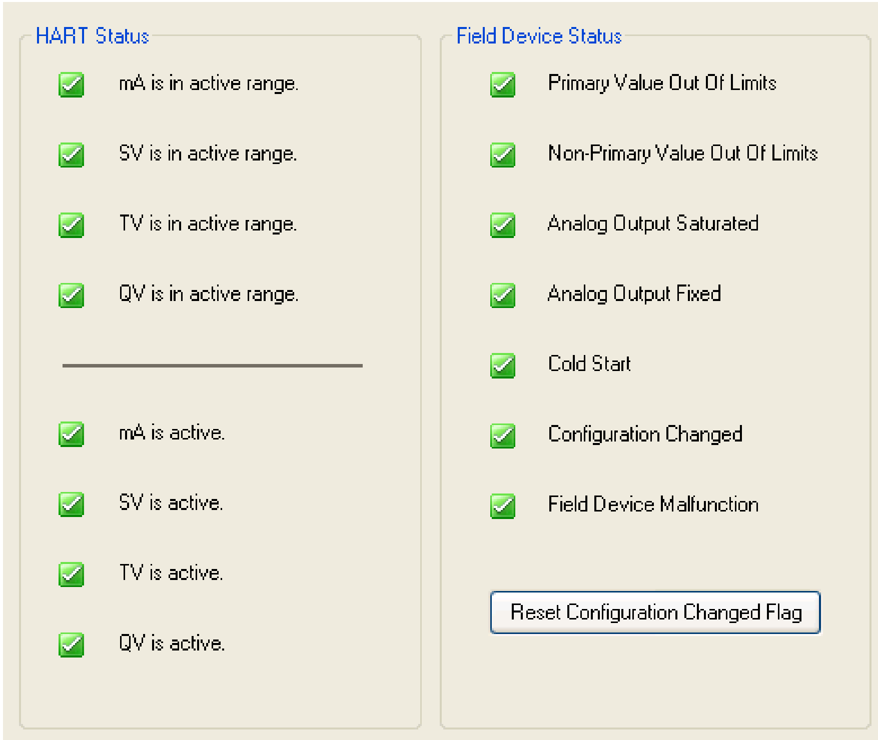


Figure 302. Sample 875EC Analyzer HART Status Screen

Calibration

Parameters

The Parameters calibration screen allows you to define the parameters used by the analyzer in checking for measurement and temperature stability when performing a calibration.

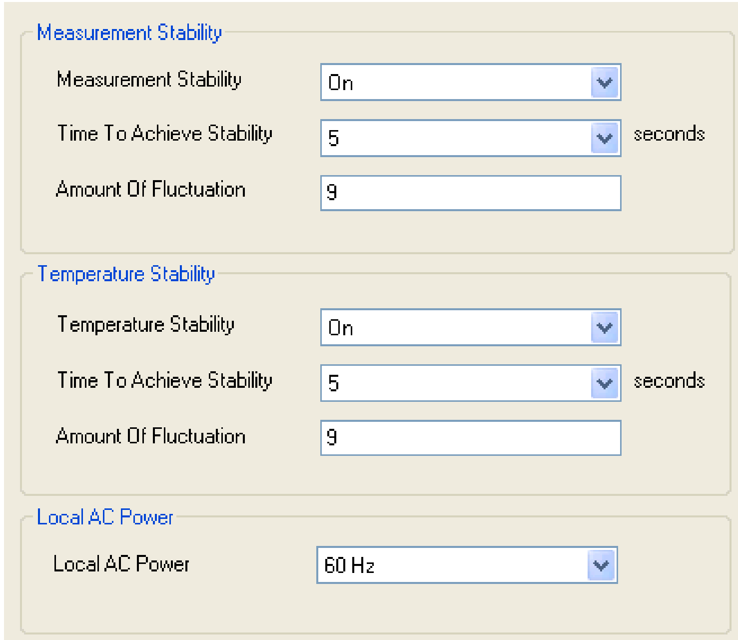


Figure 303. Sample 875EC Analyzer Parameters Calibration Screen

Field	Entry
Measurement Stability	
Measurement Stability	While performing calibration, the analyzer checks the stability in absolute measurement before accepting the change. Set the measurement stability as On or Off.
Time to Achieve Stability	This parameter is available if Measurement Stability is configured as 'On'. Specify the time between 5 and 60 seconds (in 5-second increments) to attain stability.
Amount of Fluctuation	This parameter is available if Measurement Stability is configured as 'On'. Specify the amount of fluctuation between 1 and 9. A longer time period and a smaller measurement value assures more stability during calibration.
Temperature Stability	
Temperature Stability	While performing calibration the analyzer checks the stability in temperature before accepting the change. Set the temperature stability as On or Off.
Time to Achieve Stability	This parameter is available if Temperature Stability is configured as 'On'. Specify the time between 5 and 60 seconds (in 5-second increments) to attain stability.
Amount of Fluctuation	This parameter is available if Temperature Stability is configured as 'On'. Specify the amount of fluctuation between 1 and 9. A longer time period and a smaller measurement value assures more stability during calibration.

Field	Entry
Local AC Power	
Local AC Power	If the analyzer uses 24 V dc supply voltage, you must specify Local AC Power as 50 Hz or 60 Hz from the drop-down list, to best filter the readings.

— NOTE
The Local AC Power can be specified from the front panel display or the PC-Based configurator. It cannot be done from a HART Communicator.

Bench

The Bench calibration is used to perform a calibration using theoretical inputs or to return to the stored factory default calibration. It is a sensor/analyzer calibration accomplished by using specific resistance values input via a decade box or discrete resistors. This calibration is not subject to impurities in a solution or temperature variations.

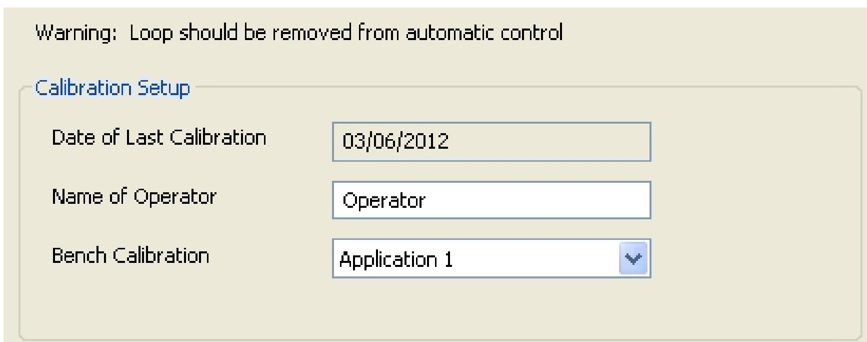


Figure 304. Sample 875EC Analyzer Bench Calibration Screen 1

Step 1:

Specify the following parameters and click Next.

Field	Entry
Calibration Setup	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the calibrator.
Bench Calibration	From the drop-down list of preconfigured applications, select the application to perform the calibration.

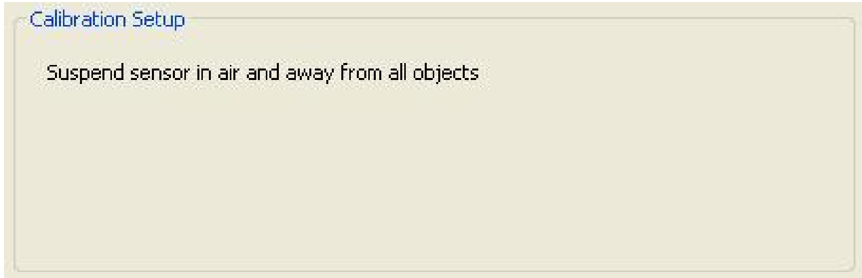


Figure 305. Sample 875EC Analyzer Bench Calibration Screen 2

Step 2:

Suspend the sensor in air and away from all objects and click Next. If Measurement Stability is configured Off, the display reads Stability Off. If Measurement Stability is configured On, the display reads Stabilizing until stability is achieved. Then the measurement value is displayed.

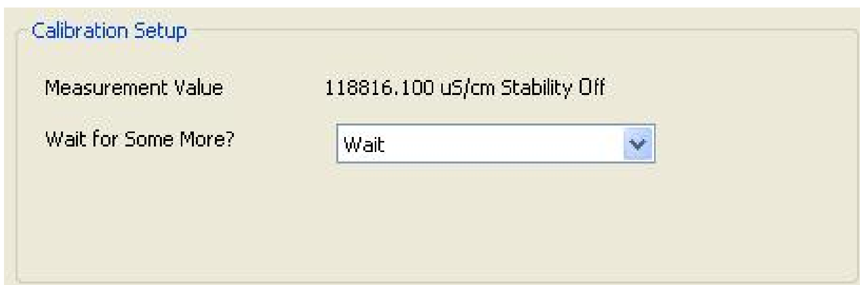


Figure 306. Sample 875EC Analyzer Bench Calibration Screen 3

Step 3:

Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value, and click Next.

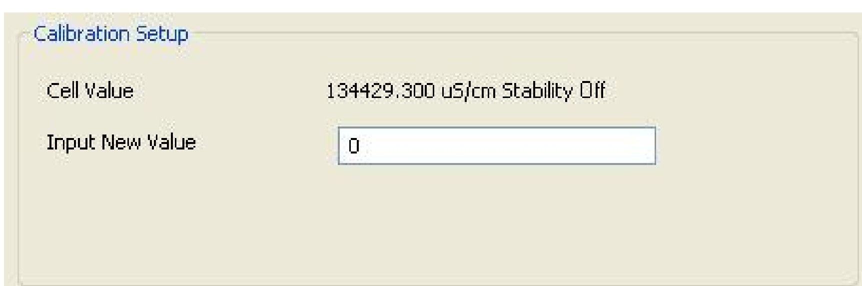


Figure 307. Sample 875EC Analyzer Bench Calibration Screen 4

Step 4:

If the reading is not correct, adjust it to the correct value and click Next.

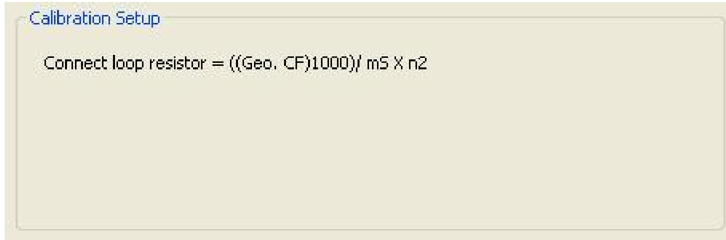


Figure 308. Sample 875EC Analyzer Bench Calibration Screen 5

Step 5:

Click Next and repeat steps 3 and 4 for the following screens.

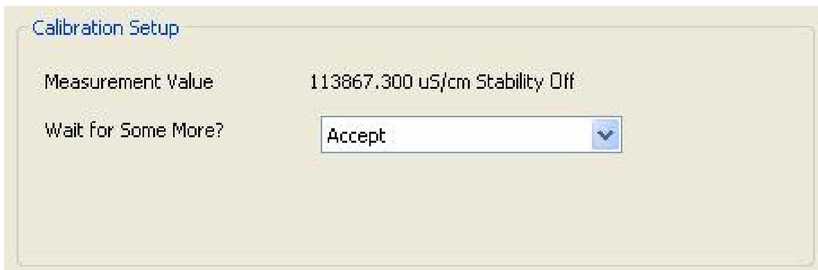


Figure 309. Sample 875EC Analyzer Bench Calibration Screen 6

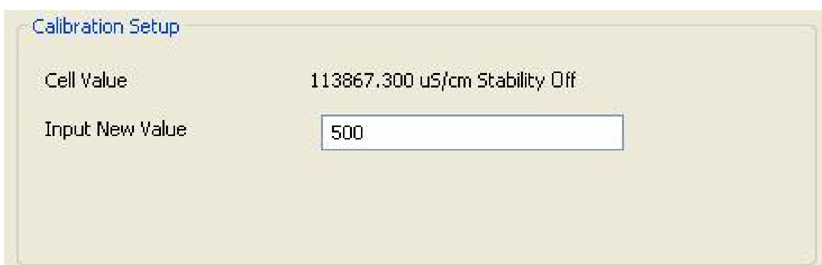


Figure 310. Sample 875EC Analyzer Bench Calibration Screen 7

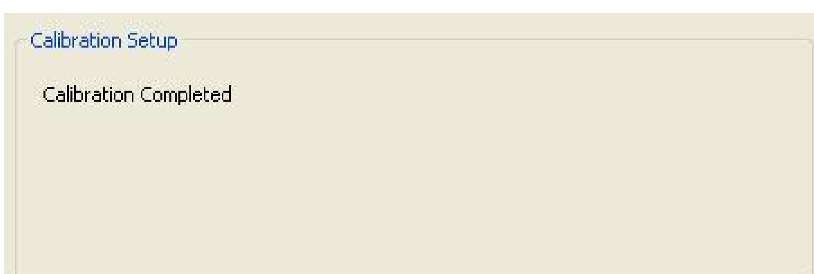


Figure 311. Sample 875EC Analyzer Bench Calibration Screen 8

Step 6:

After the calibration is completed, click OK to return to the Calibration menu.

Solution

The Solution calibration is used to perform a calibration using real solutions. This process allows you to calibrate the cell and analyzer together based upon solution conductivity. It enables you to enter or edit the conductivity values of your solution.

Before doing a solution calibration, check that the temperature in Status mode agrees with the actual temperature of your solution. If there is a difference, the actual temperature should be entered before beginning your calibration. After specifying the temperature, you can perform a single point offset calibration, or a single point span calibration, or 2-point solution calibration.

— NOTE
A 2 Point calibration must be done before using a 1 Pt Offset or 1 Pt Span calibration.

1 Pt Offset

The One Point Offset calibration can be used if you are correcting for a shift in system zero to bias the measurement by a constant value.

Figure 312. Sample 875EC Analyzer One Point Offset Calibration Screen 1

Step 1:

Specify the following parameters and click Next. The Display advises to put the sensor in the solution.

Field	Entry
Solution Setup	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the calibrator.
Calibration Type	Select the calibration as ‘1 Pt Offset’ from the drop-down list.
Solution Calibration	From the drop-down list of preconfigured applications, select the application to perform the calibration.

Figure 313. Sample 875EC Analyzer One Point Offset Calibration Screen 2

Step 2:

Put the sensor in the solution and click Next. The display reads Stabilizing until stability is achieved. Then the measurement value is displayed.

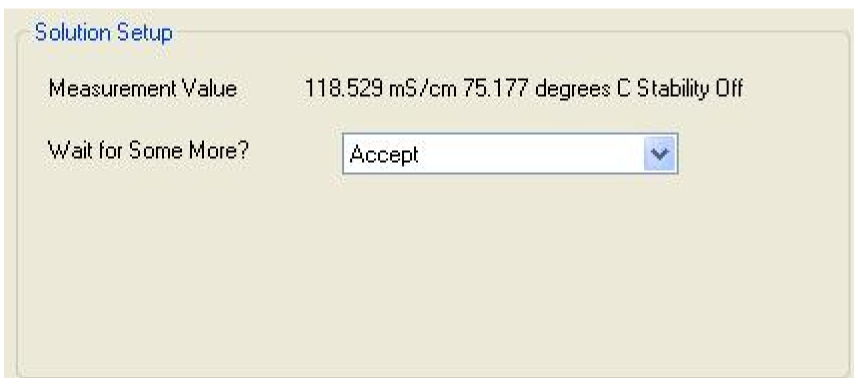


Figure 314. Sample 875EC Analyzer One Point Offset Calibration Screen 3

Step 3:

Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value and click Next.

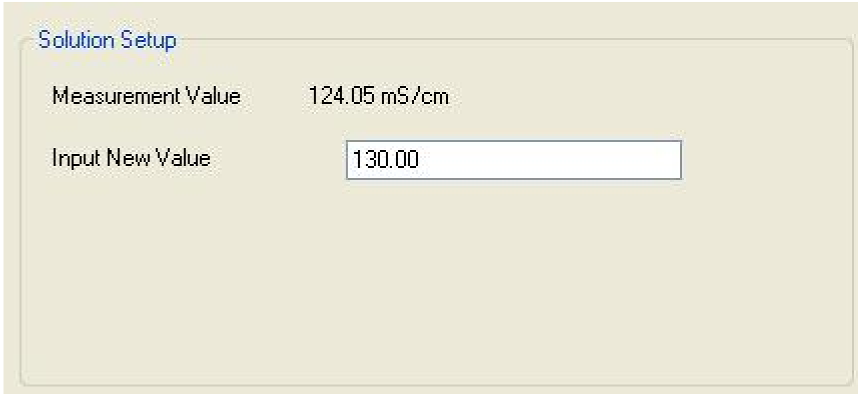


Figure 315. Sample 875EC Analyzer One Point Offset Calibration Screen 4

Step 4:

If the reading is not correct, edit it to the correct value and click Next.

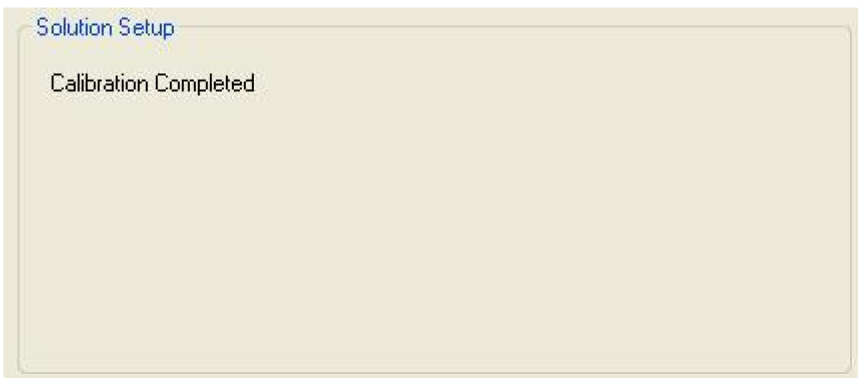


Figure 316. Sample 875EC Analyzer One Point Offset Calibration Screen 5

Step 5:

After the calibration is completed, click OK to return to Calibration menu.

1 Pt Span

The 1 Pt Span calibration can be used to correct for a shift in system span and should be used at the higher end of the measurement range chosen.

Select the calibration type as '1 Pt Span' and follow the calibration steps mentioned for "1 Pt Offset" calibration.

Figure 317. Sample 875EC Analyzer One Point Span Calibration Screen 1

Figure 318. Sample 875EC Analyzer One Point Span Calibration Screen 2

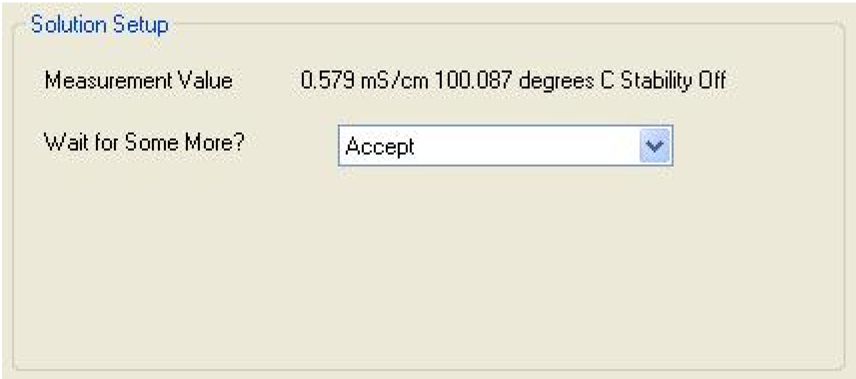


Figure 319. Sample 875EC Analyzer One Point Span Calibration Screen 3

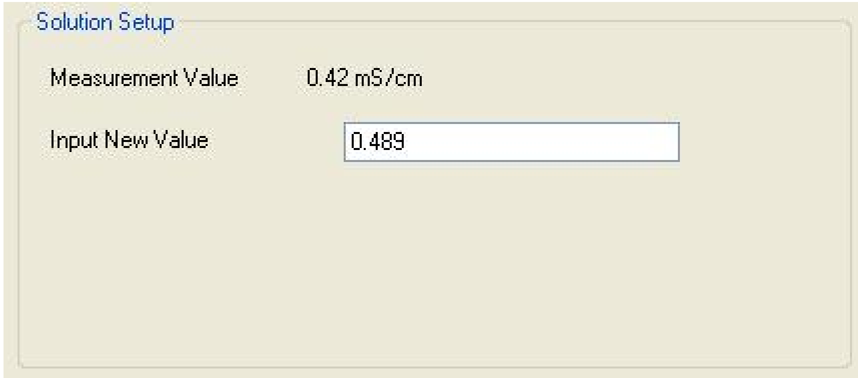


Figure 320. Sample 875EC Analyzer One Point Span Calibration Screen 4

Figure 321. Sample 875EC Analyzer One Point Span Calibration Screen 5

2 Point

The 2 Point calibration allows calibration at 2 user entered values.

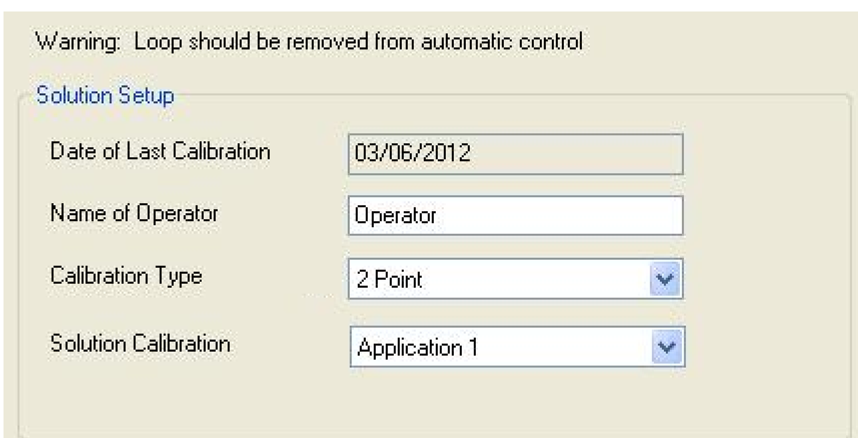


Figure 322. Sample 875EC Analyzer Two Point Calibration Screen 1

Step 1:

Specify the following parameters and click Next. The Display advises to put the sensor in the solution 1.

Field	Entry
Solution Setup	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the calibrator.
Calibration Type	Select the calibration as ‘2 Point’ from the drop-down list.
Solution Calibration	From the drop-down list of preconfigured applications, select the application to perform the calibration.

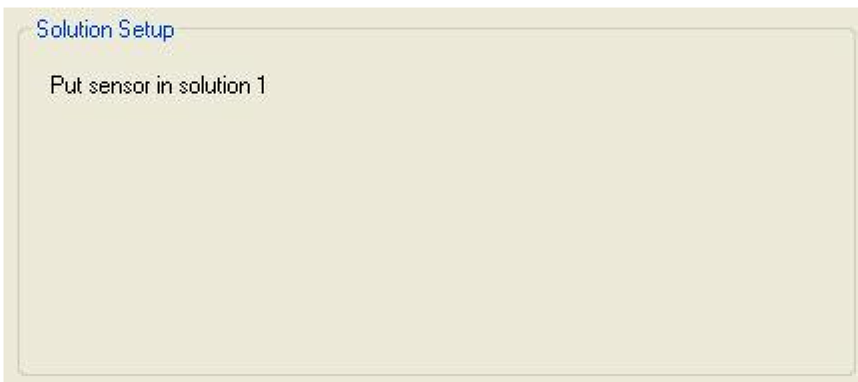


Figure 323. Sample 875EC Analyzer Two Point Calibration Screen 2

Step 2:

Put sensor into Solution 1 and click Next. The display reads Stabilizing until stability is achieved. Then the measurement value is displayed.

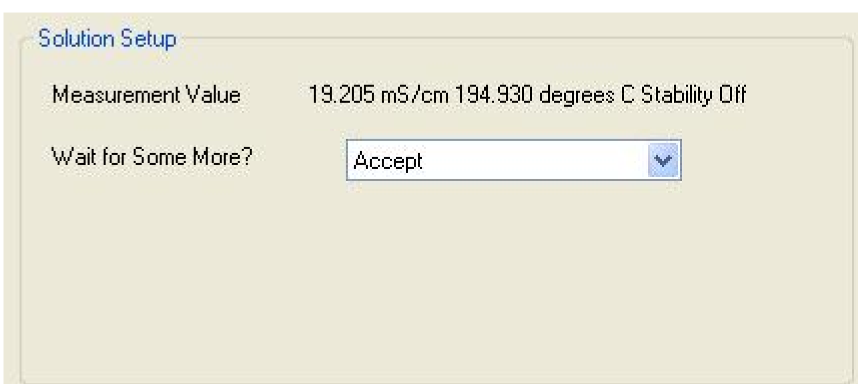


Figure 324. Sample 875EC Analyzer Two Point Calibration Screen 3

Step 3:

Select Accept from the drop-down list to accept the stabilized value or select Wait to wait for another stabilized value and click Next.

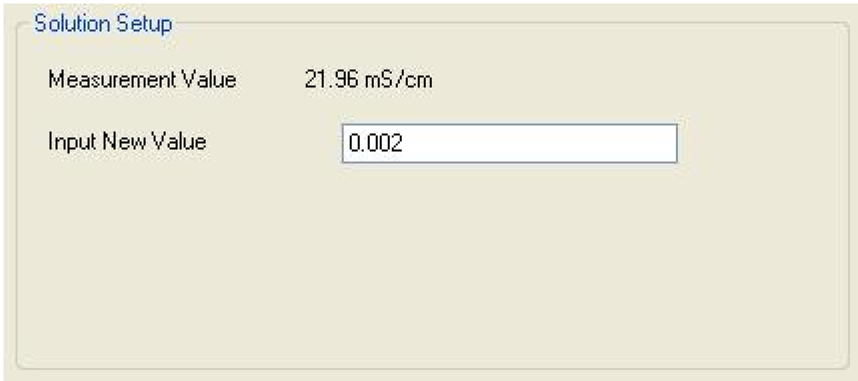


Figure 325. Sample 875EC Analyzer Two Point Calibration Screen 4

Step 4:

If the reading is not correct, edit it to the correct value and click Next. The message advises to immerse your sensor into Solution 2.

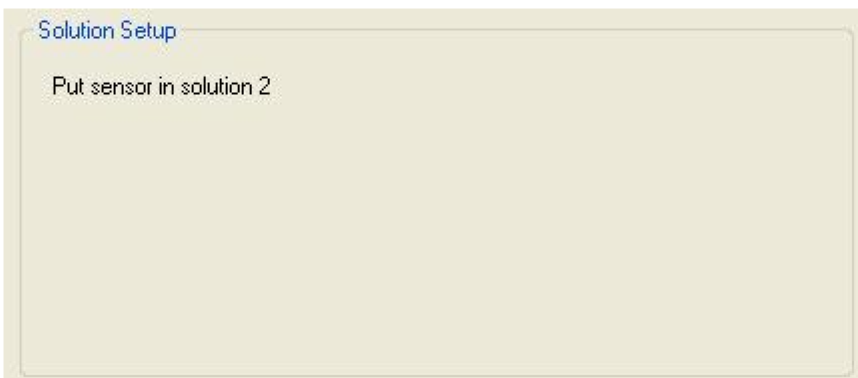


Figure 326. Sample 875EC Analyzer Two Point Calibration Screen 5

Step 5:

Put the sensor in Solution 2 and repeat steps 3 and 4 for the following screens.

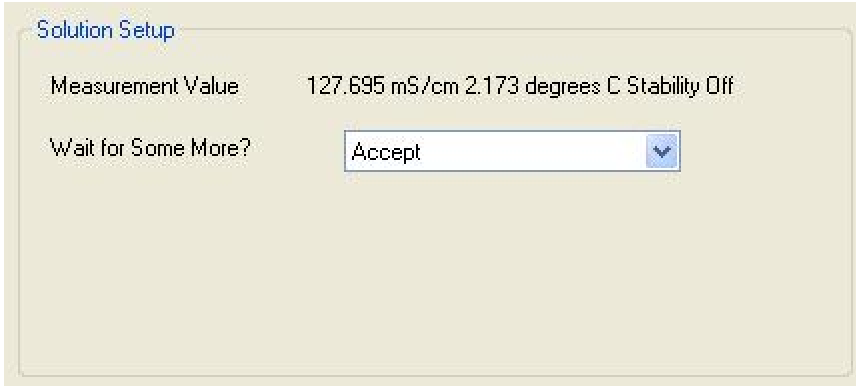


Figure 327. Sample 875EC Analyzer Two Point Calibration Screen 6

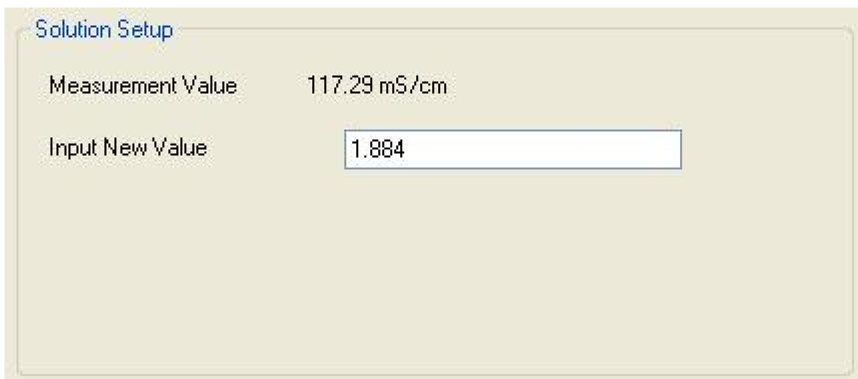


Figure 328. Sample 875EC Analyzer Two Point Calibration Screen 7

Figure 329. Sample 875EC Analyzer Two Point Calibration Screen 8

Step 6:

After the calibration is completed, click OK to return to Calibration menu.

Temp Adjust

Temp Adjust calibration allows you to adjust a value if there is a difference in the temperature in Status mode and actual temperature of the solution. You can specify values between -20 to 200°C or -4 to +392°F.

Select the calibration type as ‘Temp Adjust’ and follow the calibration steps mentioned for “1 Pt Offset” calibration.

Figure 330. Sample 875EC Analyzer Temp Adjust Calibration Screen 1

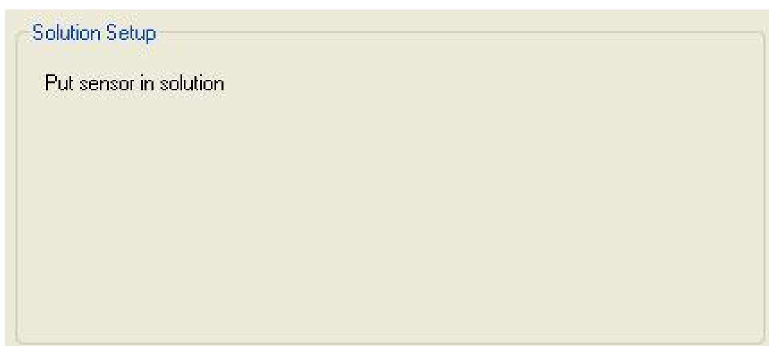


Figure 331. Sample 875EC Analyzer Temp Adjust Calibration Screen 2

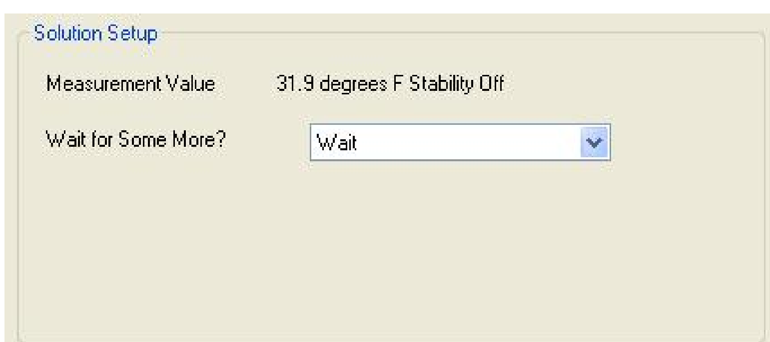


Figure 332. Sample 875EC Analyzer Temp Adjust Calibration Screen 3

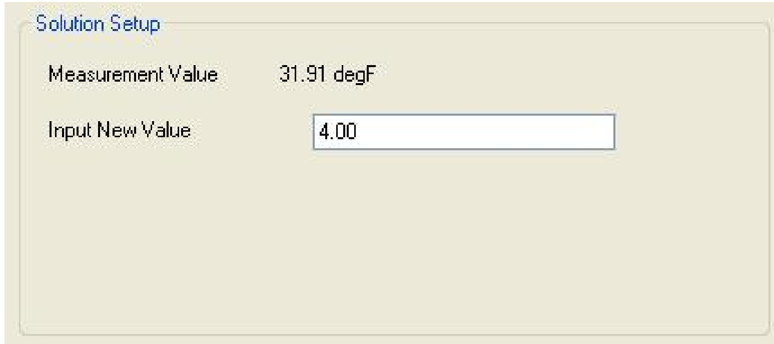


Figure 333. Sample 875EC Analyzer Temp Adjust Calibration Screen 4

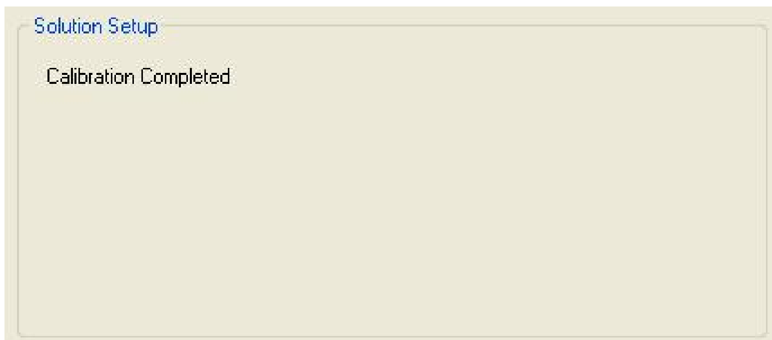


Figure 334. Sample 875EC Analyzer Temp Adjust Calibration Screen 5

Analog

The Analog calibration allows you to tune the 4 mA and 20 mA values of the analog outputs.

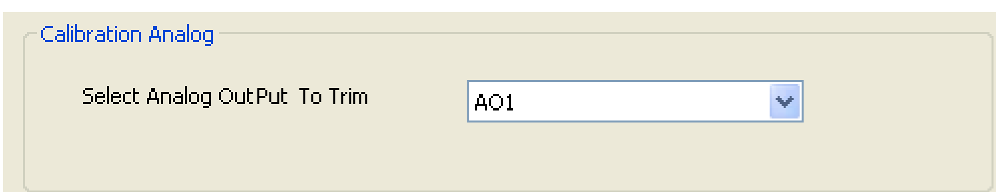


Figure 335. Sample 875EC Analyzer Analog Calibration Screen 1

Field	Entry
Calibration Analog	
Select Analog Output To Trim	Select the output from the drop-down list. Choose from AO1 and HART ANALOG.

Click Next to continue the calibration process for analog 4 mA.

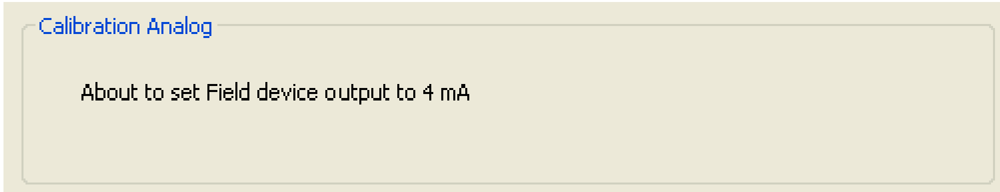


Figure 336. Sample 875EC Analyzer Analog Calibration Screen 2

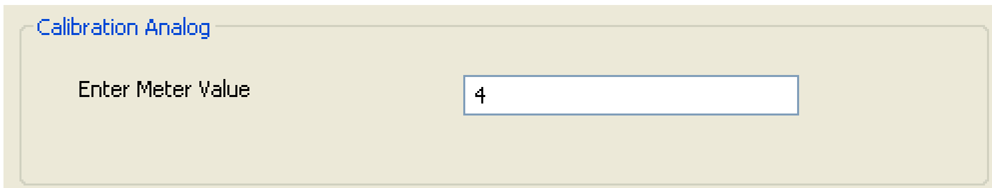


Figure 337. Sample 875EC Analyzer Analog Calibration Screen 3

Field	Entry
Calibration Analog	
Enter Meter Value	Specify a meter value.

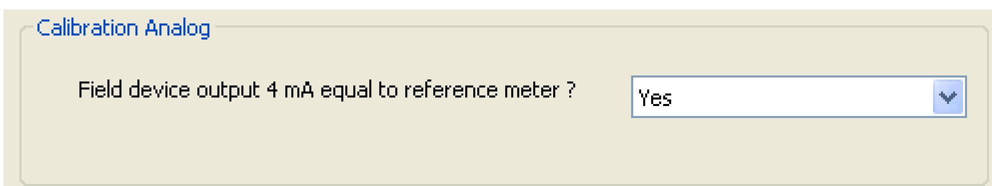


Figure 338. Sample 875EC Analyzer Analog Calibration Screen 4

Select Yes to continue the process. Calibration will be done for analog 20 mA.

If you select No, enter the reference meter value.

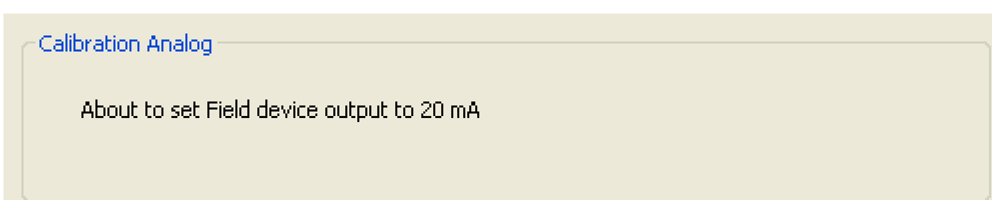


Figure 339. Sample 875EC Analyzer Analog Calibration Screen 5

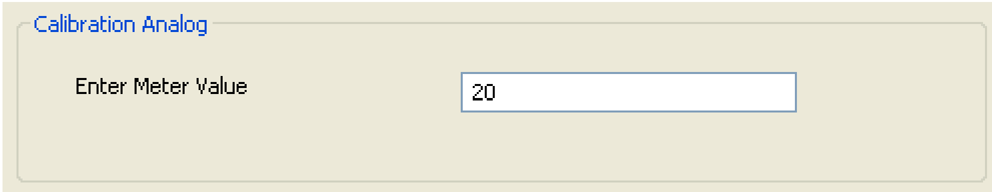


Figure 340. Sample 875EC Analyzer Analog Calibration Screen 6

Field	Entry
Calibration Analog	
Enter Meter Value	Specify a meter value.

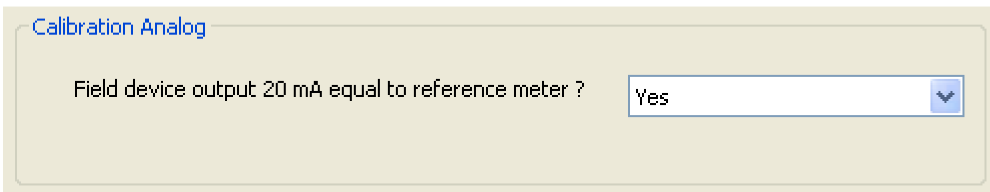


Figure 341. Sample 875EC Analyzer Analog Calibration Screen 7

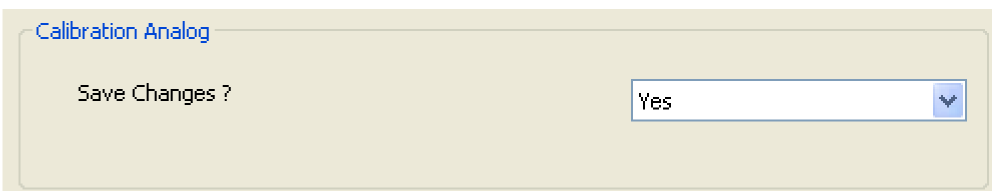


Figure 342. Sample 875EC Analyzer Analog Calibration Screen 8

Click Yes to save the changes, or No to abort the changes.

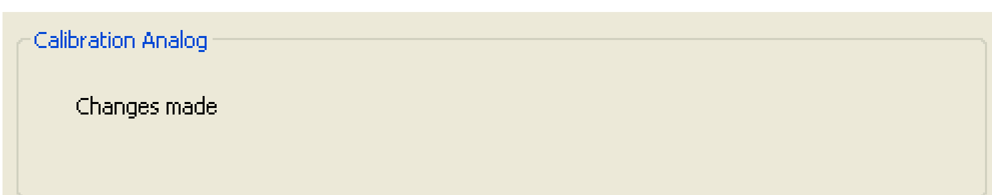


Figure 343. Sample 875EC Analyzer Analog Calibration Screen 9

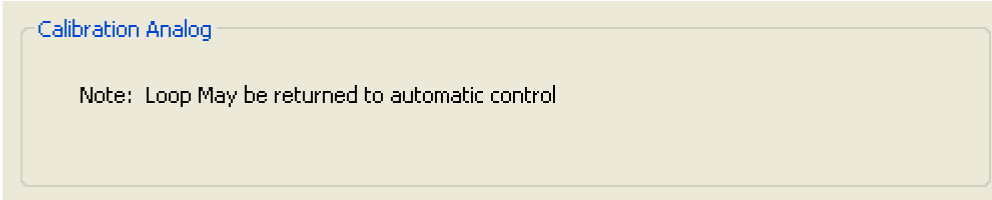


Figure 344. Sample 875EC Analyzer Analog Calibration Screen 10

Click OK after the calibration is completed.

Troubleshooting

Faults

Fault status is displayed in the main Diagnostic Menu. You can suspend faults from the measurement status for one hour and resume faults at any time.

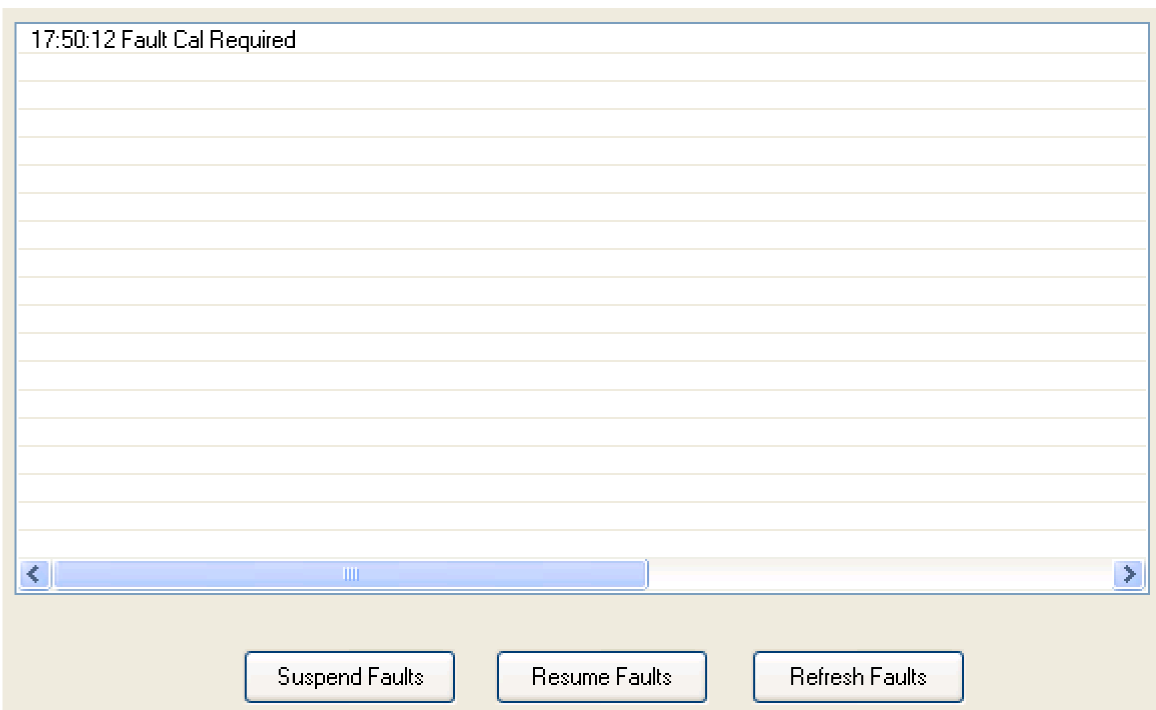


Figure 345. Sample 875EC Analyzer Faults Screen

NOTE
This screen displays a maximum of 100 faults that occurred.

History

The history log includes all faults, power restore, entries and exits from Configuration, Calibration and Hold, and Faults temporarily suspended.

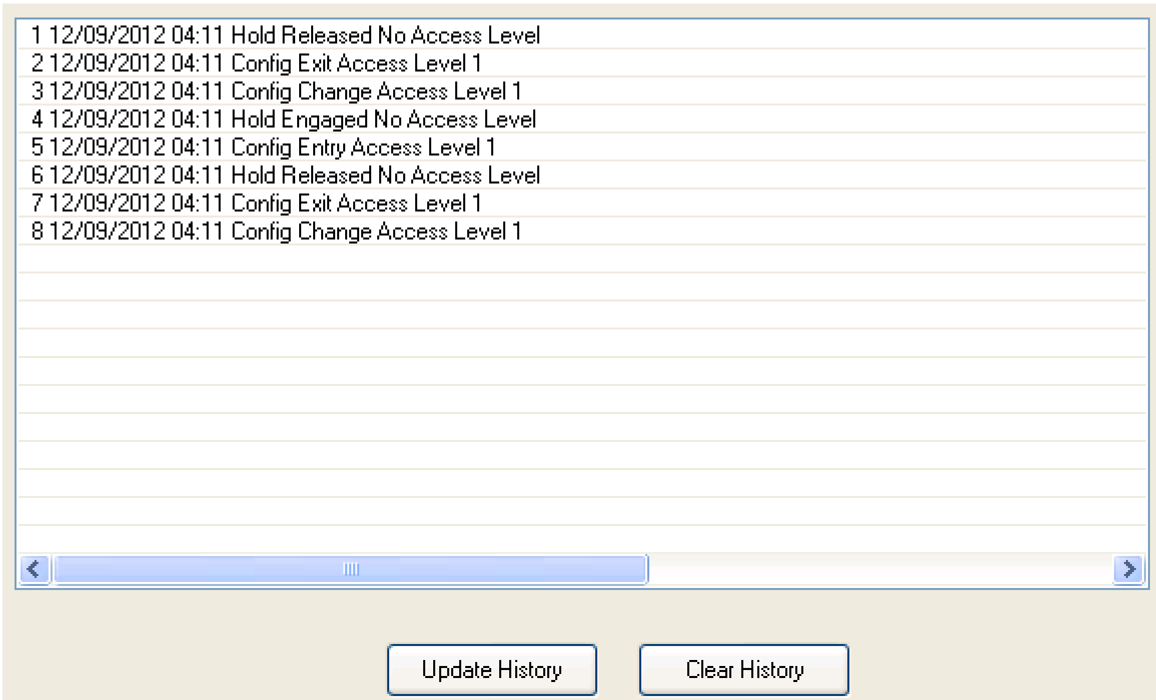


Figure 346. Sample 875EC Analyzer History Screen 1

— NOTE

This screen displays up to 100 of the most current history log entries.

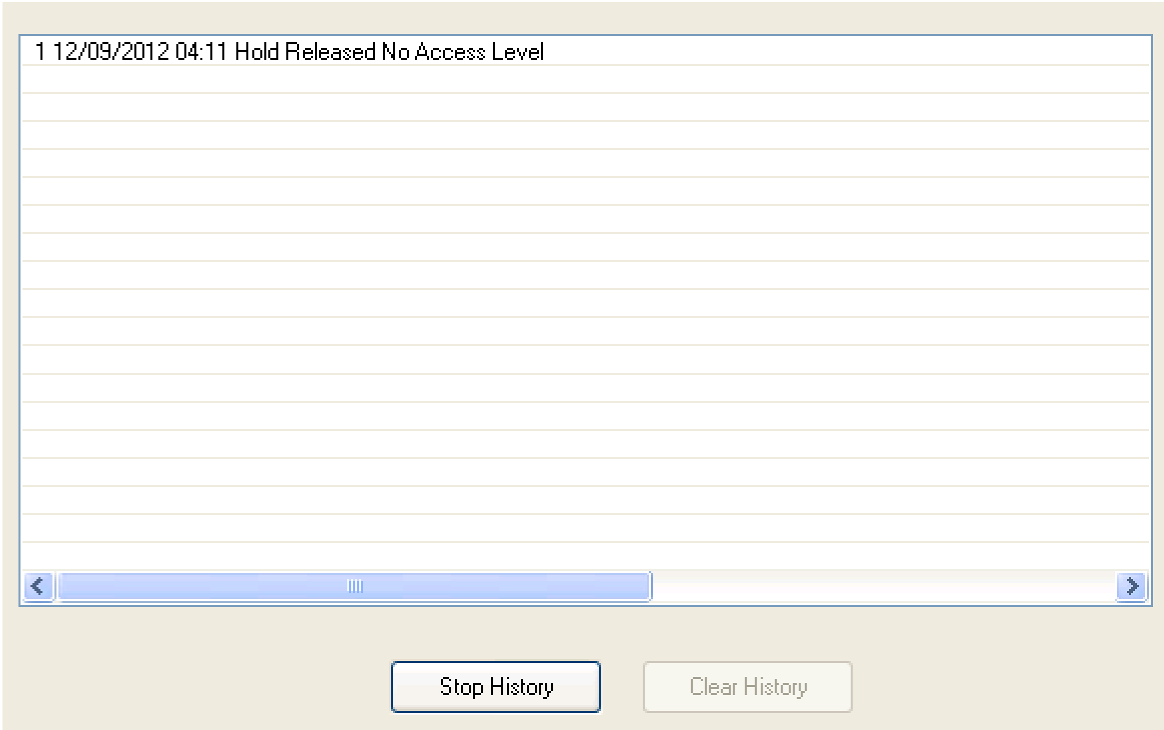


Figure 347. Sample 875EC Analyzer History Screen 2

9. 876EC Transmitter

This chapter provides information that is exclusive to using 876EC Transmitter with HART communication protocol. Additional information about this transmitter with HART communication is contained in the following document.

- MI 611-261 Model 876EC Intelligent Electrochemical Transmitter for Electrodeless Conductivity Measurements with HART Communications

Device Overview Screen

The Device Overview screen displays HART information, Device Information, and current PV data.

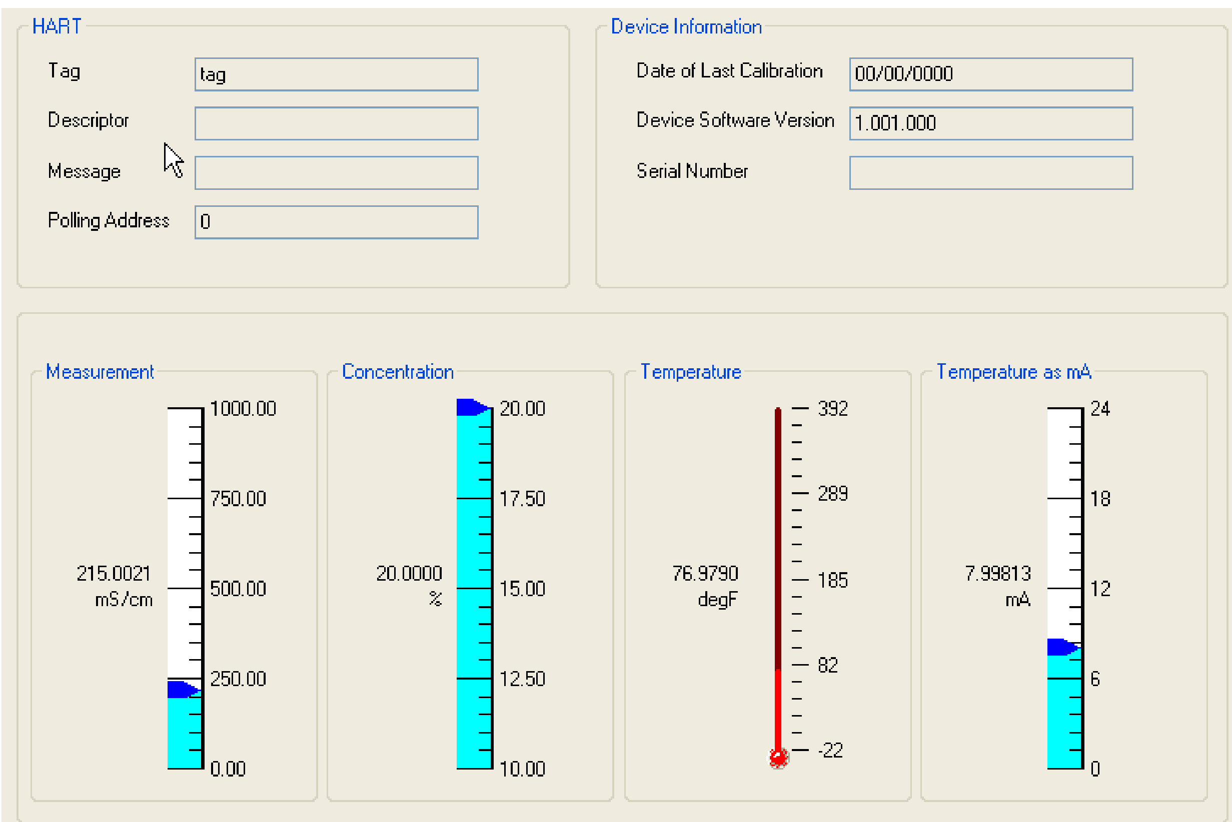


Figure 348. Sample 876EC Transmitter Device Overview Screen

Process Variables Screen

The Process Variables screen displays the PV data along with additional information that is available on the Device Overview screen.

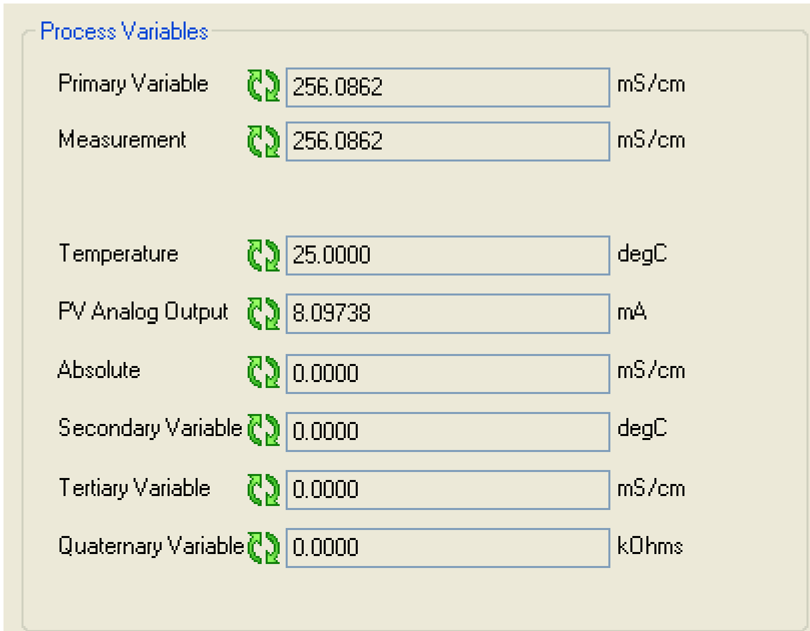


Figure 349. Sample 876EC Transmitter Process Variables Screen (Measurement)

Device Configuration

General Setup Screen

The General Setup screen enables you to select the sensor type, temperature type, and set the tag name.

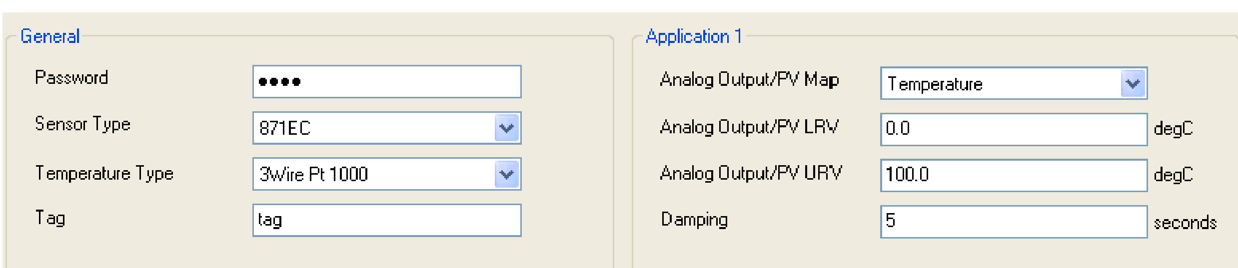


Figure 350. Sample 876EC Transmitter General Setup Screen

Field	Entry
General	
Password	Enter the password.
Sensor Type	Select the sensor type from the drop-down menu. Choose from 871EC, 871FT English, 871FT Metric, FT10, and Other.
Temperature Type	Select the temperature type from the drop-down menu. Choose from 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, 3Wire Pt 1000, Mil RTD, and 100K Thermistor.
Tag	Set the tag name. You can enter a maximum of 8 characters.
Application 1	
Analog Output/PV Map	Select the analog output from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, and ATC Resistance.
Analog Output/PV LRV	Set the analog output/process variable lower range value.
Analog Output/PV URV	Set the analog output/process variable upper range value.
Damping	Set the damping time in seconds.

If you have selected more than one application, the screen appears as shown in Figure 351.

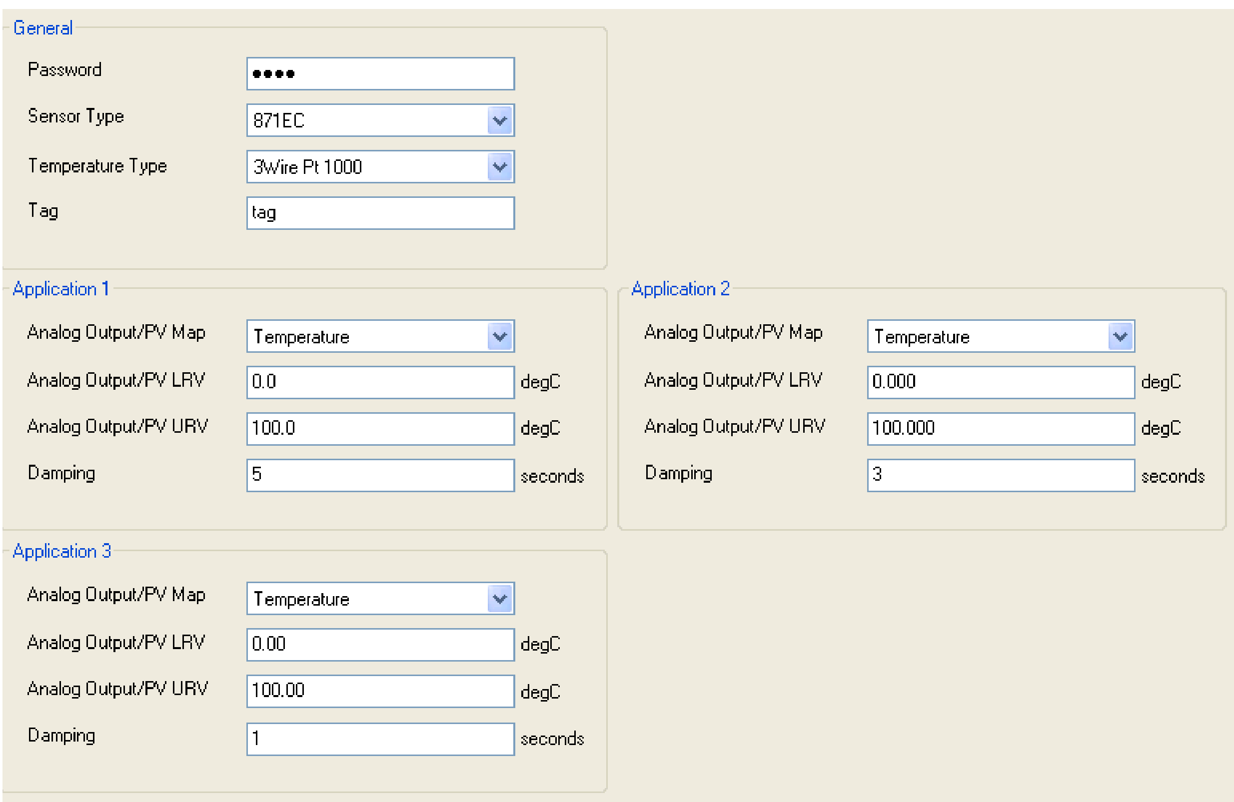


Figure 351. Sample 876EC Transmitter General Setup Screen (3 Applications)

Sensor

The Sensor screen enables you to select the Sensor type, Temperature Type, and 871EC Type. Example screens are provided below for various sensor types.

If sensor type 871EC is selected, the following fields appear as shown in Figure 352.

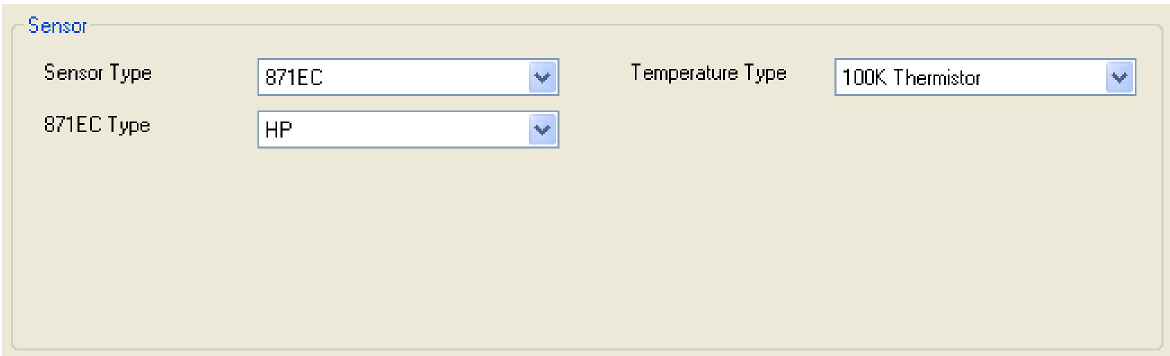


Figure 352. Sample 876EC Transmitter Sensor Screen (871EC)

Field	Entry
Sensor Type	Select 871EC as the sensor type from the drop-down menu.
871EC Type	Select the 871EC type from the drop-down menu. Choose from SP, HP, LB, UT, RE, BW, TF, NL, EV, AB, PN, and PX.
Temperature Type	Select the temperature type from the drop-down menu. Choose from 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, 3Wire Pt 1000, Mil RTD, and 100K Thermistor.

If sensor type 871FT English or 871FT Metric is selected, the following fields appear as shown in Figure 353.

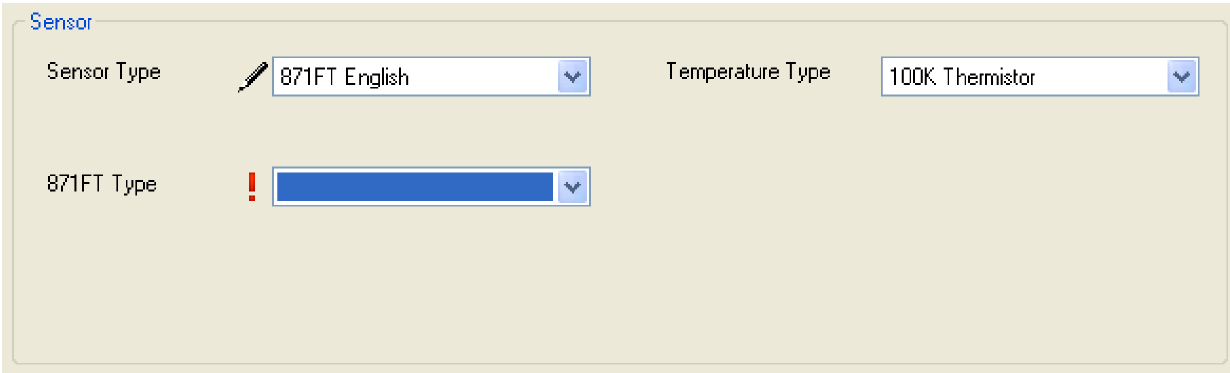


Figure 353. Sample 876EC Transmitter Sensor Screen (871FT Type)

Field	Entry
Sensor Type	Select 871FT English or 876FT Metric as the sensor type from the drop-down menu.
871FT Type	Select the 871FT type from the drop-down menu. Choose from 871FT-1C, 871FT-2C, 871FT-1D, 871FT-2D, 871FT-1E, 871FT-2E, 871FT-1F, 871FT-2F, 871FT-1G, 871FT-2G, 871FT-1H, 871FT-2H, 871FT-1J, 871FT-2J, 871FT-3C, 871FT-4C, 871FT-3E, 871FT-4E, 871FT-3F, 871FT-4F, 871FT-3G, 871FT-4G, 871FT-3H, 871FT-4H, 871FT-3J, and 871FT-4J.
Temperature Type	Select the temperature type from the drop-down menu. Choose from 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, 3Wire Pt 1000, Mil RTD, and 100K Thermistor.

If sensor type EP307 is selected, the following fields appear as shown in Figure 354.

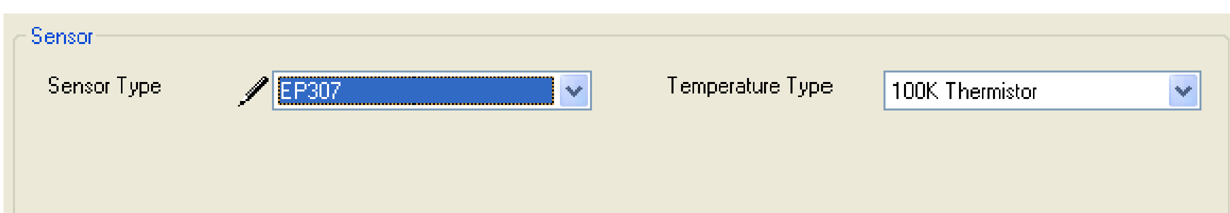


Figure 354. Sample 876EC Transmitter Sensor Screen (EP307)

Field	Entry
Sensor Type	Select EP307 as the sensor type from the drop-down menu.
Temperature Type	Select the temperature type from the drop-down menu. Choose from 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, 3Wire Pt 1000, Mil RTD, and 100K Thermistor.

If sensor type FT10 is selected, the following fields appear as shown in Figure 355.

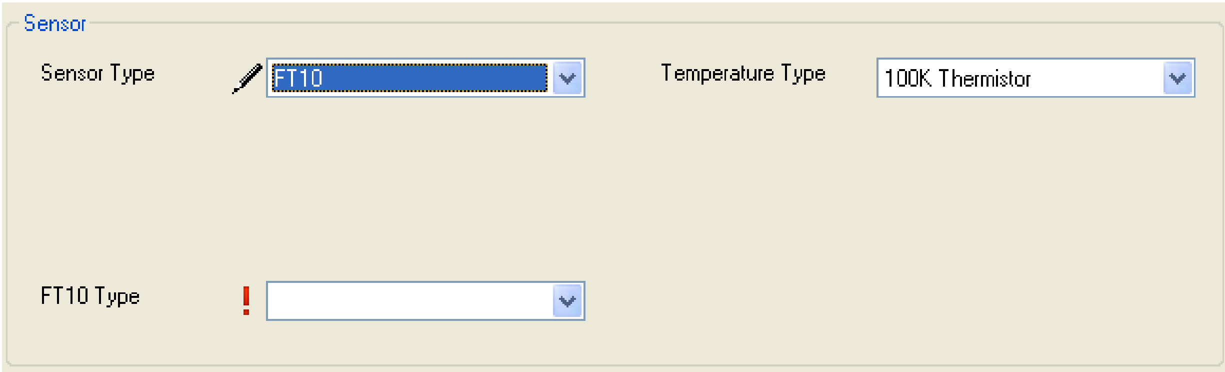


Figure 355. Sample 876EC Transmitter Sensor Screen (FT10 Type)

Field	Entry
Sensor Type	Select FT10 as the sensor type from the drop-down menu.
FT10 Type	Select the FT10 type from the drop-down menu. Choose from FT10-08, FT10-12, and FT10-16.
Temperature Type	Select the temperature type from the drop-down menu. Choose from 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, 3Wire Pt 1000, Mil RTD, and 100K Thermistor.

If sensor type Other is selected, the following fields appear as shown in Figure 356.

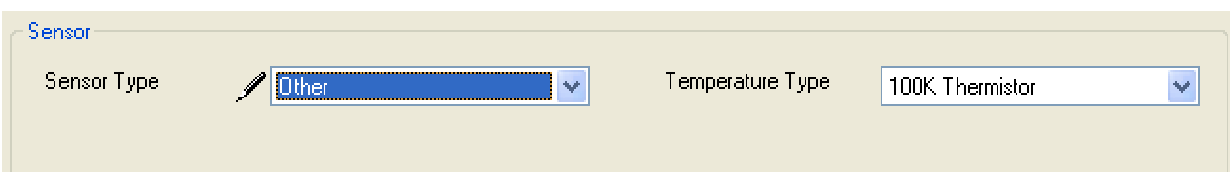


Figure 356. Sample 876EC Transmitter Sensor Screen (Other)

Field	Entry
Sensor Type	Select the sensor type as Other from the drop-down menu.
Temperature Type	Select the temperature type from the drop-down menu. Choose from 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, 3Wire Pt 1000, Mil RTD, and 100K Thermistor.

Applications

The Applications screen enables you to select up to three distinct applications you want to preconfigure. Each application will have its own measurement, temperature configuration, temperature compensation curve, display, and output configuration.

The Number of Applications screen appears as shown in Figure 357.

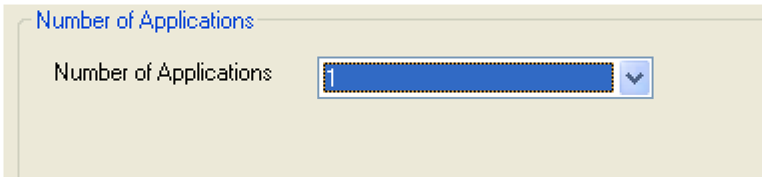


Figure 357. Sample 876EC Transmitter Number of Applications Screen

Field	Entry
Number of Applications	Select the number of applications you want to preconfigure from the drop-down menu. Choose from 1, 2, and 3.

If the number of applications is selected as 2, the following fields appear as shown in Figure 358.

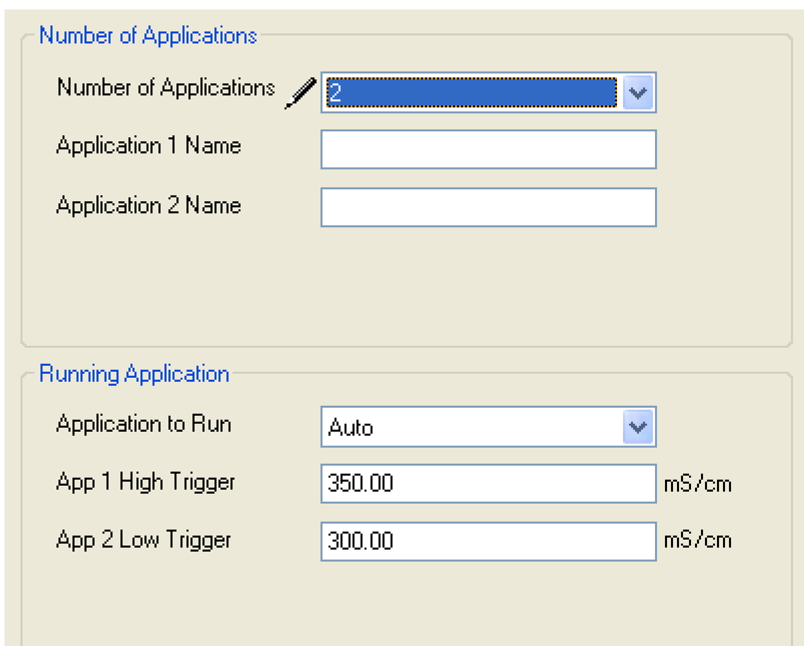


Figure 358. Sample 876EC Transmitter Number of Applications Screen (with 2 Applications)

Field	Entry
Number of Applications	
Number of Applications	Select the number of applications as 2 from the drop-down menu.
Application 1 Name	Enter the application 1 name.
Application 2 Name	Enter the application 2 name.
Running Application	
Application to Run	Specify the application you want to use by selecting the application number as 1, 2, or Auto from the drop-down menu. If Auto is selected, enter the information for App 1 High Trigger and App 2 Low Trigger as shown in Figure 358. Establish the preset that will trigger the application movement from one application to another. Enter the value for application 1 high limit. This is measured in mS/cm. Enter the value for application 2 lowest limit. This is measured in mS/cm.

If the number of applications is selected as 3, the following fields appear as shown in Figure 359.

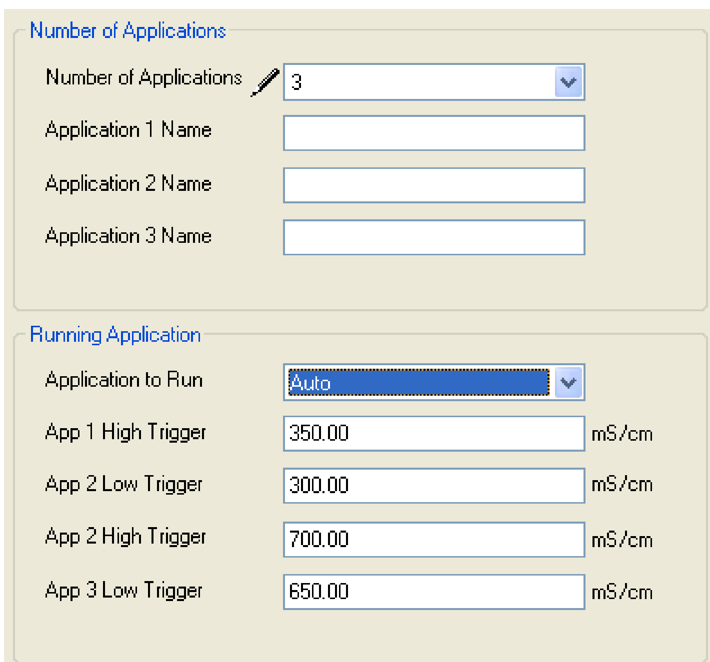


Figure 359. Sample 876EC Transmitter Number of Applications - Running Application Selection Screen (with Auto Selected for Application to Run)

Field	Entry
Number of Applications	
Number of Applications	Select the number of applications as 3 from the drop-down menu.
Application 1 Name	Enter the application 1 name.
Application 2 Name	Enter the application 2 name.
Application 3 Name	Enter the application 3 name.
Running Application	
Application to Run	Specify the application, by selecting Auto from the drop-down menu.
App 1 High Trigger	Establish the preset that will trigger the application movement from one application to another. Enter the value for application 1 high limit. This is measured in mS/cm.
App 2 Low Trigger	Enter the value for application 2 lowest limit. This is measured in mS/cm.
App 2 High Trigger	Enter the value for application 2 highest limit. This is measured in mS/cm.
App 3 Low Trigger	Enter the value for application 3 lowest limit. This is measured in mS/cm.

Measurement

The Measurement Units screen enables you to select the measurement unit and base display scale as shown in Figure 360.

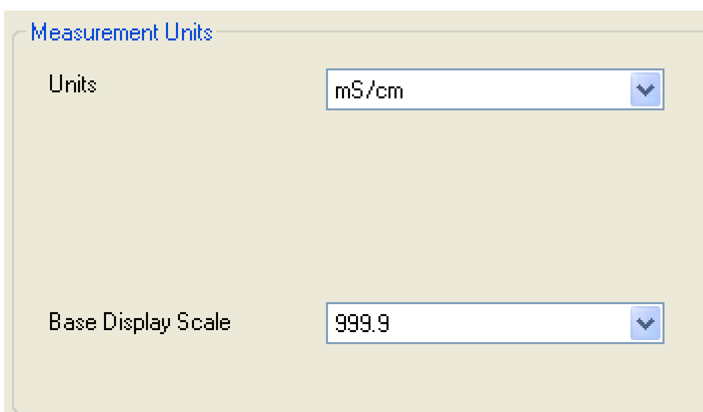


Figure 360. Sample 876EC Transmitter Measurement Units Screen

Field	Entry
Measurement Units	
Units	Select a measurement unit from the drop-down menu. Choose from µS/cm, µS/m, mS/cm, mS/m, S/m, %, and Custom.
Base Display Scale	Set base display scale value from the drop-down menu. Choose from 0.9999, 9.999, 99.99, 999.9, and 9999.

If you select % from the Units drop-down menu, the following fields appear as shown in Figure 361.

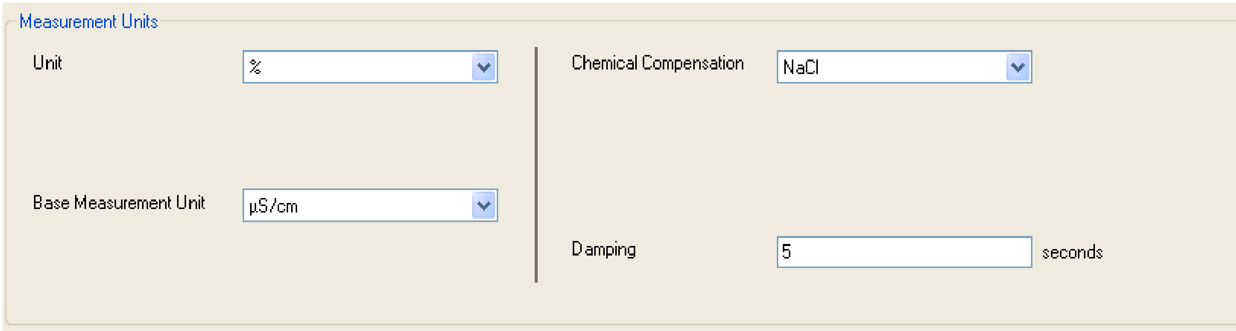


Figure 361. Sample 876EC Transmitter Measurement Units Screen (Units % Selection)

Field	Entry
Measurement Units	
Units	Select % from the Units drop-down menu.
Base Measurement Units	Set Base Measurement Units value from the drop-down menu. Choose from µS/cm, µS/m, mS/cm, mS/m, and S/m.
Chemical Compensation	Select chemical compensation value from the drop-down menu. Choose from NaCl, KCl, CH_3COOH, H_3PO_4, HCI, H_2SO_4, Oleum, HNO_3, NaOH, KOH, and HF. If you select H_2SO_4, Oleum, NaOH or HF, the Conc Range field appears as shown in Figure 362.
Damping	Enter Damping.

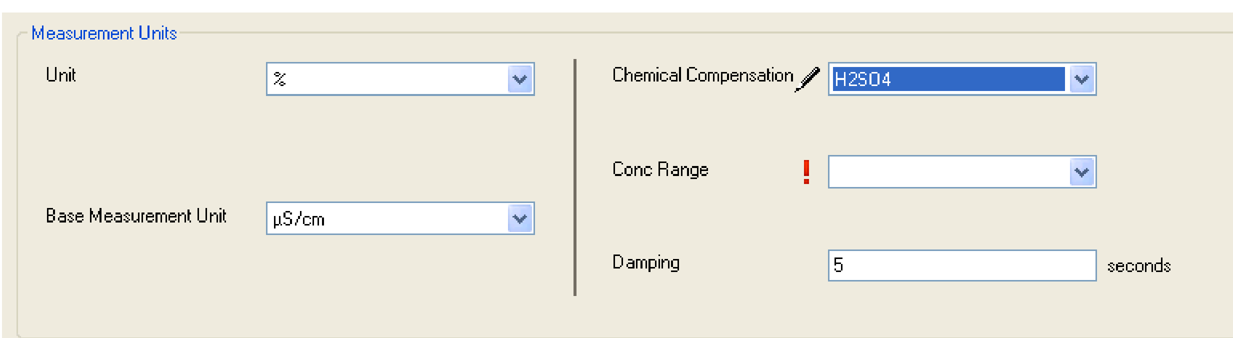


Figure 362. Sample 876EC Transmitter Measurement Units Screen (Units % Selection - Conc Range)

Field	Entry
Conc Range	If you select H_2SO_4 as Chemical Compensation, choose 25°C Ref, 30°C Ref, or 50°C Ref from the Conc Range drop-down menu. If you select Oleum as Chemical Composition, choose 42-18% or 0-10% from the Conc Range drop-down menu. If you select NaOH as Chemical Composition, choose 25°C Ref, 50°C Ref, or 100°C Ref from the Conc Range drop-down menu. If you select HF as Chemical Composition, select 0°C Ref or 20°C Ref from the Conc Range drop-down menu.

If you select Custom from the Units drop-down menu, the following fields appear as shown in Figure 363.

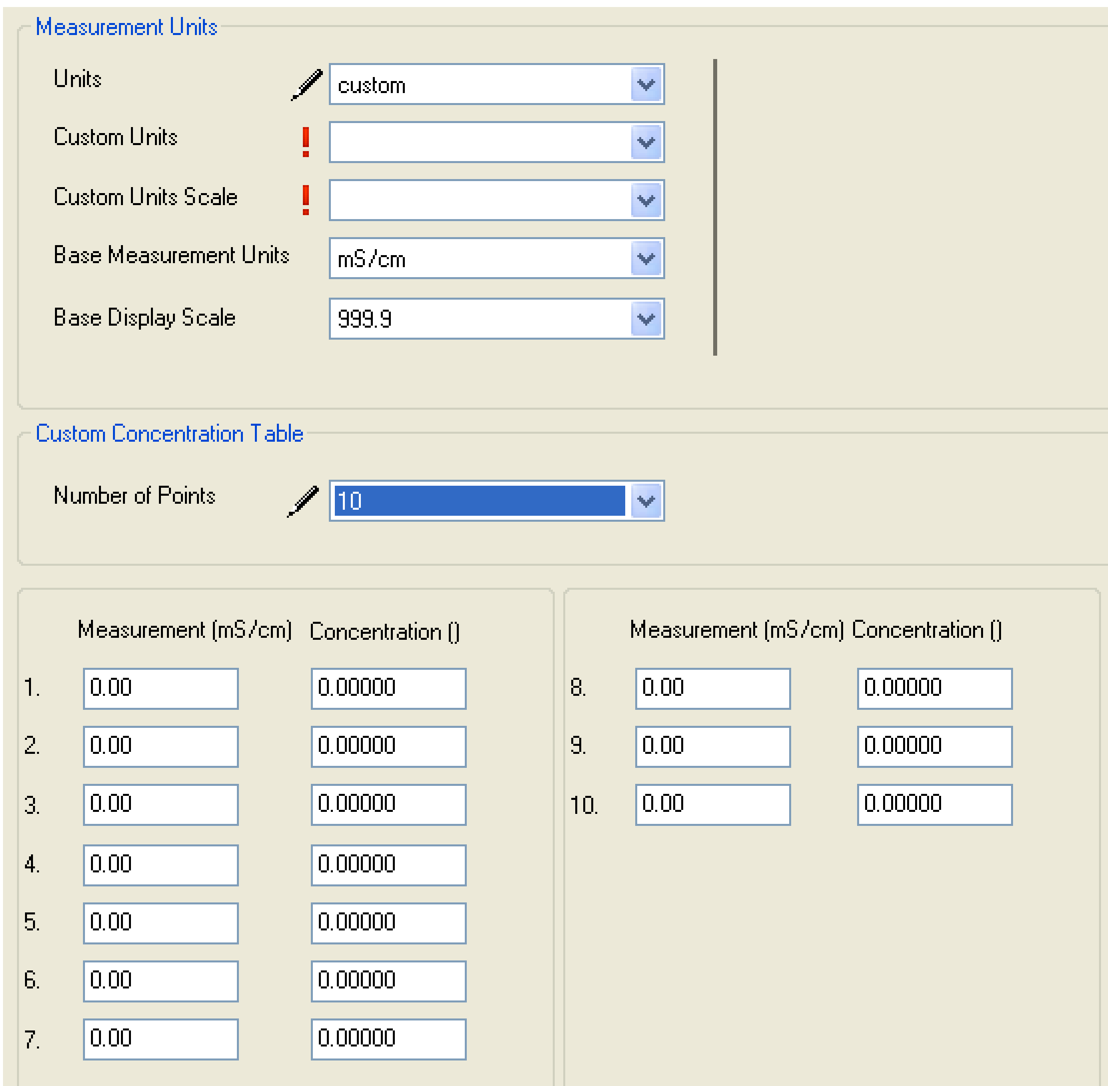


Figure 363. Sample 876EC Transmitter Measurement Units Screen (Number of Points Selection)

Field	Entry
Measurement Units	
Units	Select Custom from the Units drop-down menu.
Custom Units	Select Custom Units from the drop-down menu. Choose from %, g/l, ppm, oz/gal, ppt, user defined, and none.
Custom Units Scale	Select the Custom Units Scale from the drop-down menu. Choose from 0.9999, 9.999, 99.99, 999.9, and 9999.
Base Measurement Units	Set Base Measurement Units value from the drop-down menu. Choose from µS/cm, µS/m, mS/cm, mS/m, and S/m.
Base Display Scale	Set the base display scale value from the drop-down menu. Choose from 0.9999, 9.999, 99.99, 999.9, and 9999.
Custom Concentration Table	
Number of Points	Specify the number of points to plot the concentration curve. The number of points can be specified from 2 to 21.

Temperature

The Temperature configuration enables you to select auto or manual temperature modes.

If you select Auto as Temperature Mode, the temperature screen appears as shown in Figure 364.

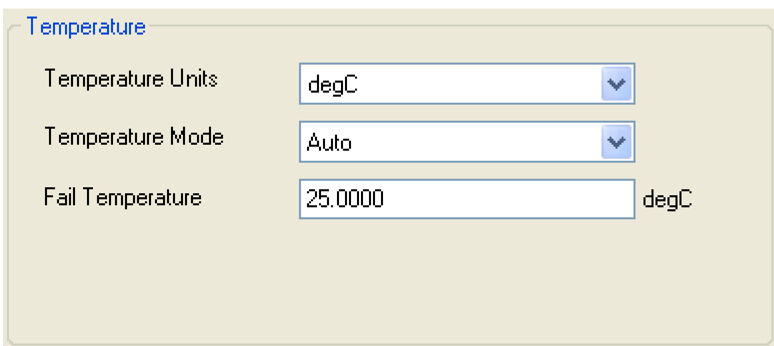


Figure 364. Sample 876EC Transmitter Temperature Screen (Auto as Temperature Mode)

Field	Entry
Temperature Units	Select the temperature units from the drop-down menu. Choose from degC (Centigrade) or degF (Fahrenheit).
Temperature Mode	Select Auto from the Temperature Mode drop-down menu.
Fail Temperature	If Temperature Mode is set to Auto, set the Fail Temperature to the value at which you expect the process to operate if the RTD fails.

If you select Manual as Temperature Mode, the temperature screen appears as shown in Figure 365.

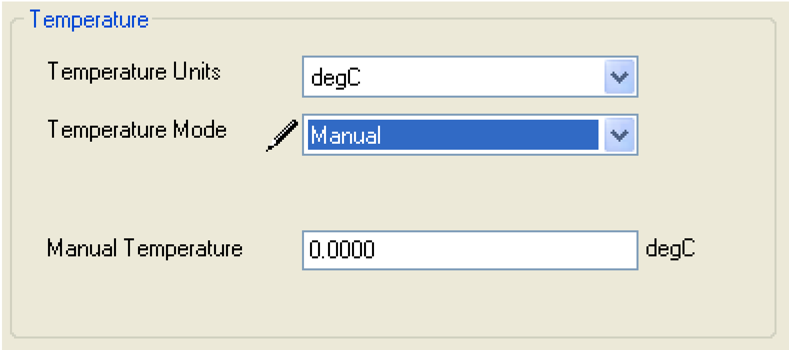


Figure 365. Sample 876EC Transmitter Temperature Screen (Temperature Mode as Manual)

Field	Entry
Temperature Units	Select the temperature units from the drop-down menu. Choose from degC (Centigrade) or degF (Fahrenheit).
Temperature Mode	Select Manual from the drop-down menu.
Manual Temperature	Set the temperature at a fixed temperature value.

Temperature Compensation

Select the desired Temperature Compensation from the drop-down menu as shown in Figure .

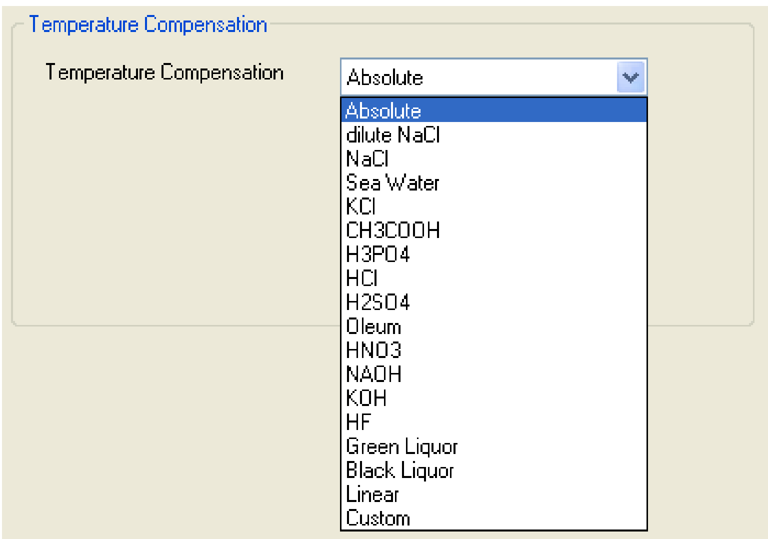


Figure 366. Sample 876EC Transmitter Temperature Compensation Screen

Field	Entry
Temperature Compensation	Select the temperature compensation from the drop-down menu. Choose from Absolute, dilute NaCl, NaCl, Sea Water, KCl, CH_3COOH, H_3PO_4, HCI, H_2SO_4, Oleum, HNO_3, NaOH, KOH, HF, Green Liquor, Black Liquor, Linear, and Custom.

If you select Linear from the Temperature Compensation drop-down menu, enter the values for the other fields as shown in Figure 367.

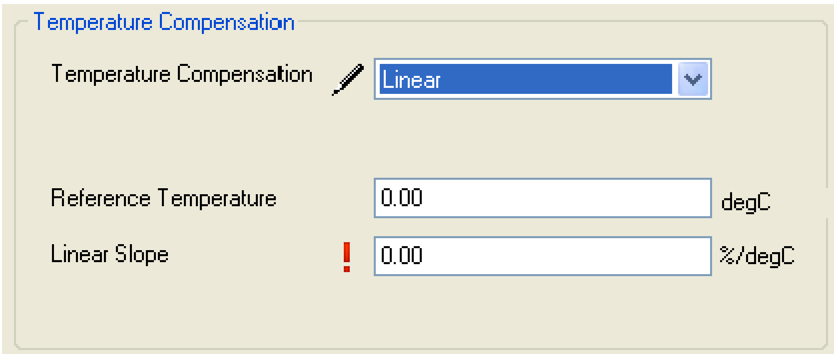


Figure 367. Sample 876EC Transmitter Temperature Compensation Screen (Linear)

Field	Entry
Temperature Compensation	Select Linear from the drop-down menu.
Reference Temperature	Select the reference temperature from the drop-down menu. Choose from 0.0 degC Ref, 20 decC Ref, 25 decC Ref, 30 decC Ref, 50 decC Ref, and 100 decC Ref.
Linear Slope	Set the Linear Slope.

If you select Custom from the Temperature Compensation drop-down menu, the following fields appear as shown in Figure 368.

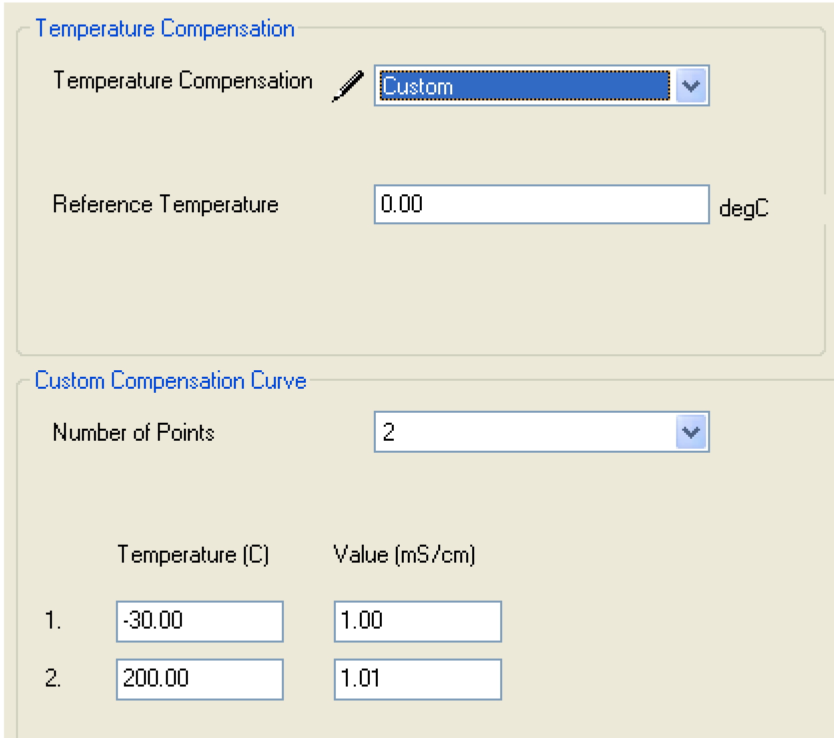


Figure 368. Sample 876EC Transmitter Temperature Compensation Screen (Custom)

Field	Entry
Temperature Compensation	
Reference Temperature	Select the reference temperature from the drop-down menu. Choose from 0.0 degC Ref, 20 degC Ref, 25 degC Ref, 30 degC Ref, 50 degC Ref, and 100 degC Ref.
Custom Compensation Curve	
Number of Points	Set the number of points. The number of points can be specified from 2 to 21 points. Each point specifies a value at certain temperature.
Temperature	Enter the temperature values.
Values	Enter the values.

Output

Output Screen - Digital

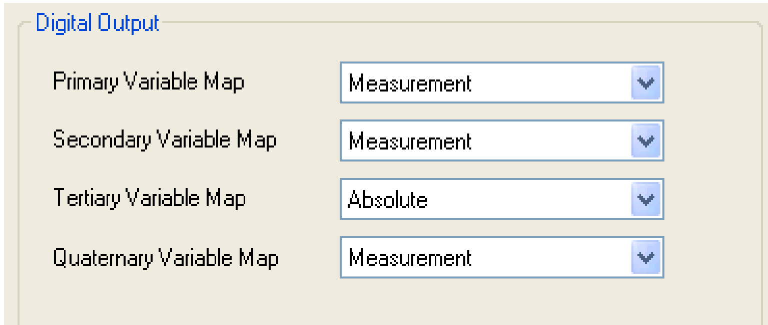


Figure 369. Sample 876EC Transmitter Digital Output Screen

Field	Entry
Primary Variable Map	Select the primary variable from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, and ATC Resistance.
Secondary Variable Map	Select the secondary variable from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration and ATC Resistance.
Tertiary Variable Map	Select the tertiary variable from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, and ATC Resistance.
Quaternary Variable Map	Select the quaternary variable from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, and ATC Resistance.

Output Screen - Analog

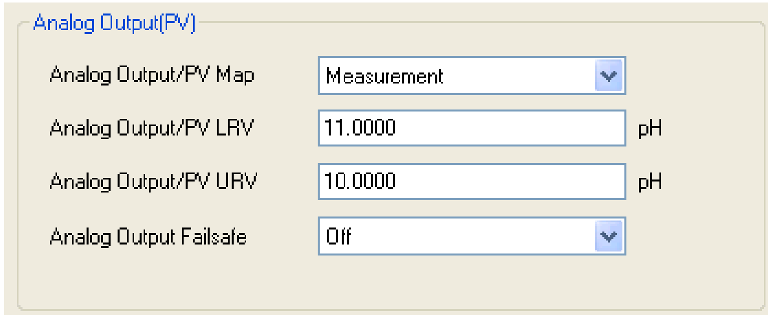


Figure 370. Sample 876EC Transmitter Analog Output Screen

Field	Entry
Analog Output/PV Map	Select analog output (PV Map) from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, and ATC Resistance. **— NOTE** Analog Output/PV Map is the same as Primary Variable Map for Digital Output.
Analog Output/PV LRV	Set analog output (PV low-range value).
Analog Output/PV URV	Set analog output (PV upper-range value).
Analog Output Failsafe	Select analog output failsafe value from the drop-down menu. Choose from Off, Fail Low, and Fail High. This is visible for HART version 5 if polling address is set to 0, or for HART version 6/7 if loop mode is in active state.

Transmitter Display

You can choose the display format to be in single line, double line, or triple line as shown in Figure 371.

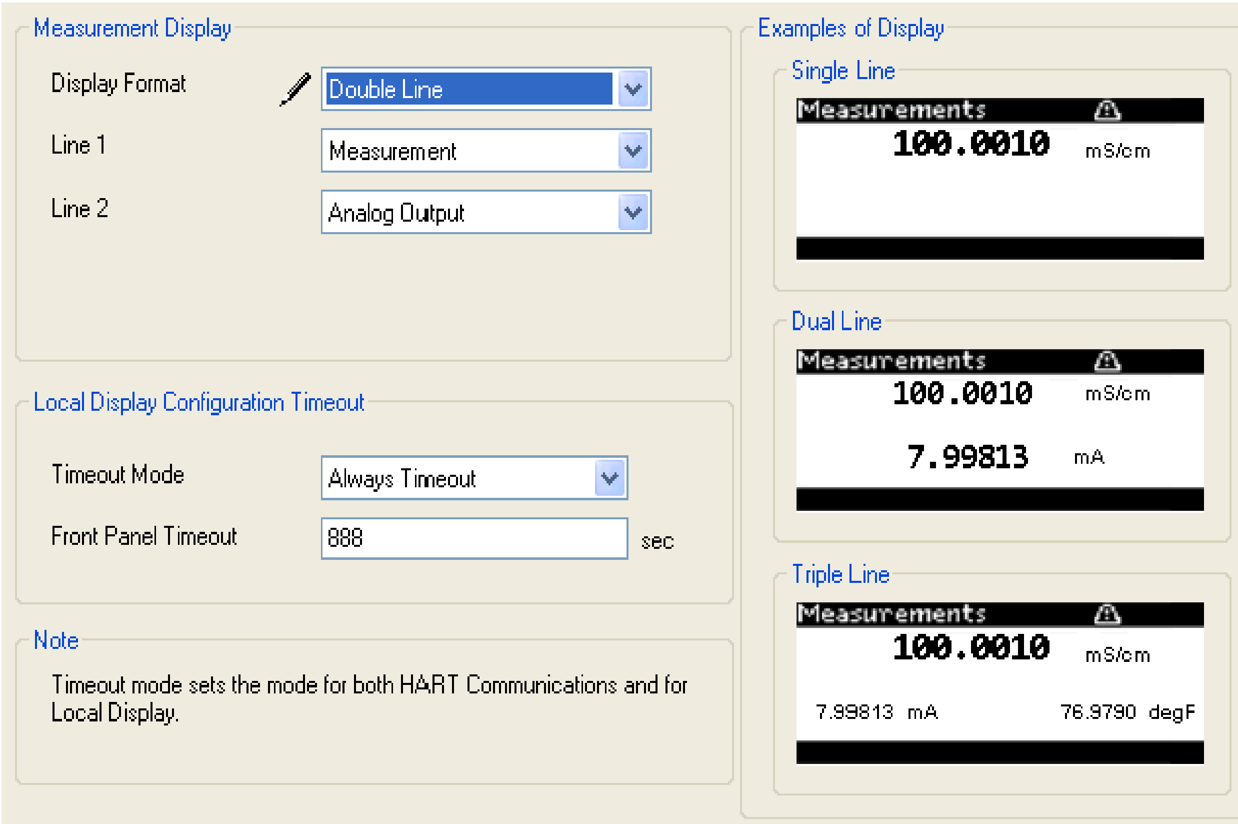


Figure 371. Sample 876EC Transmitter Local Display Output Screen

Field	Entry
Measurement Display	
Display Format	Select the display format from the drop-down menu. Choose from Single Line, Double Line, or Triple Line. Examples of each of the display formats are shown on the right side of the screen.
Line 1/Line 2	Select the line reading to be displayed from the drop-down menu. Choose from Measurement, Temperature, Absolute Measurement, Concentration, and Analog Output.
Local Display Configuration Timeout	
Timeout Mode	Select the timeout mode. Choose from Never Timeout, Online Timeout Only, and Always Timeout. If you select Never Timeout, the Front Panel Timeout option is not visible. Invensys recommends Always Timeout.
Front Panel Timeout	If there is no user action on the keys within the configured timeout period, the transmitter reverts to measurement mode.

If you select single line in the display format, the local display screen appears as shown in Figure 372.

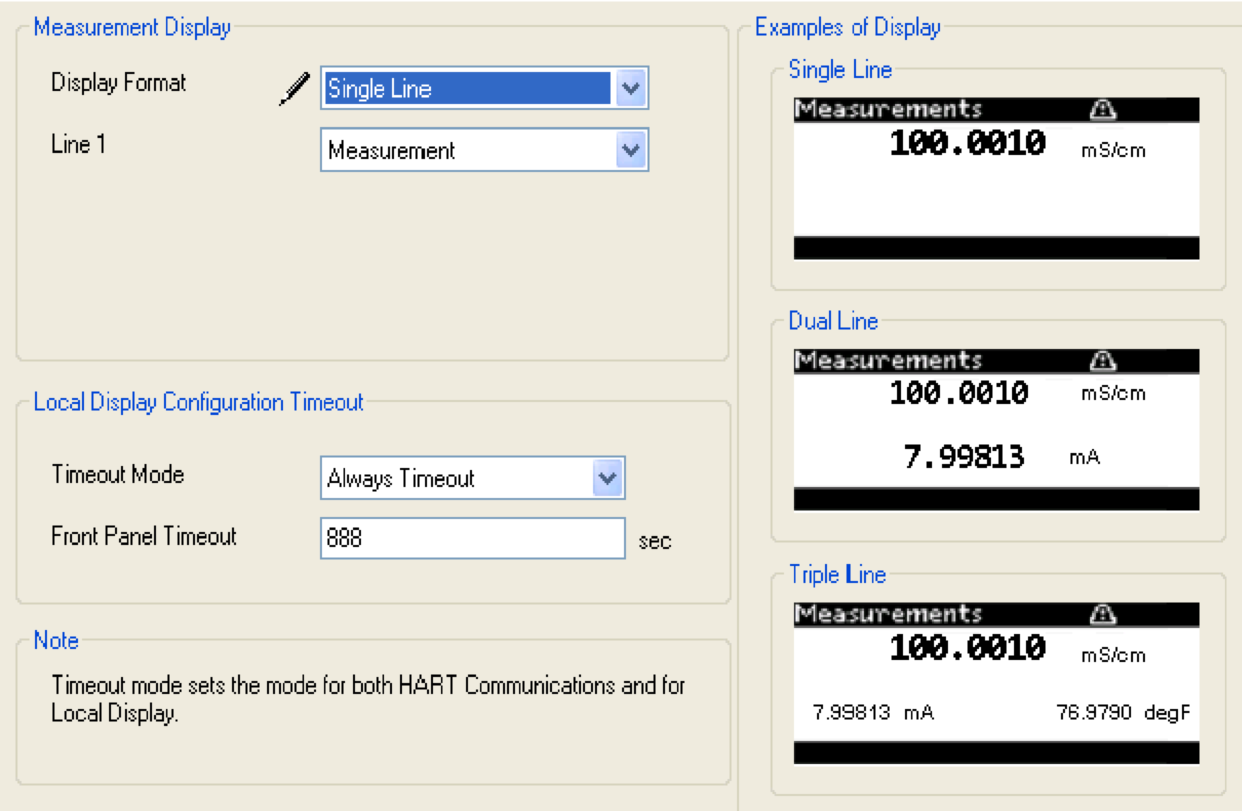


Figure 372. Sample 876EC Transmitter Local Display Output Screen (Single Line)

Field	Entry
Measurement Display	
Display Format	Select Single Line from the drop-down menu.
Line 1	Select the first line reading to be displayed from the drop-down menu. Choose from Measurement, Temperature, Absolute Measurement, Concentration, and Analog Output.
Local Display Configuration Timeout	
Timeout Mode	Select the timeout mode. Choose from Never Timeout, Online Timeout Only, and Always Timeout.
Front Panel Timeout	Enter the time in seconds for the front panel timeout.

If you select Triple Line for the Display Format, the local display screen appears as shown in Figure 373.

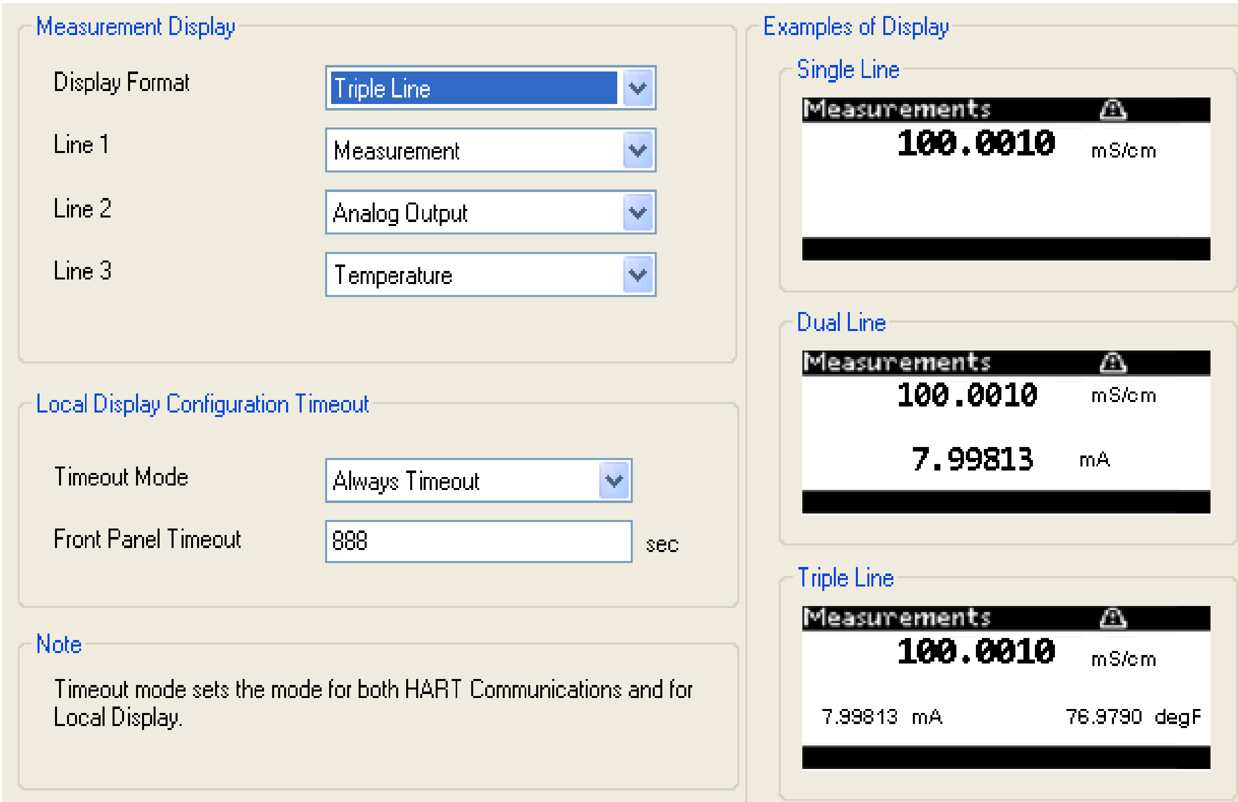


Figure 373. Sample 876EC Transmitter Local Display Output Screen (Triple Line)

Field	Entry
Measurement Display	
Display Format	Select the display format from the drop-down menu. Select Triple Line. Examples of each of the display formats are shown on the right side of the screen.
Line 1/Line 2/Line 3	Select the first line reading to be displayed from the drop-down menu. Choose from Measurement, Temperature, Absolute Measurement, Concentration, and Analog Output.
Local Display Configuration Timeout	
Timeout Mode	Select the timeout mode. Choose from Never Timeout, Online Timeout Only, and Always Timeout.
Front Panel Timeout	Enter the time in seconds for the front panel timeout.

Output Screen - HART

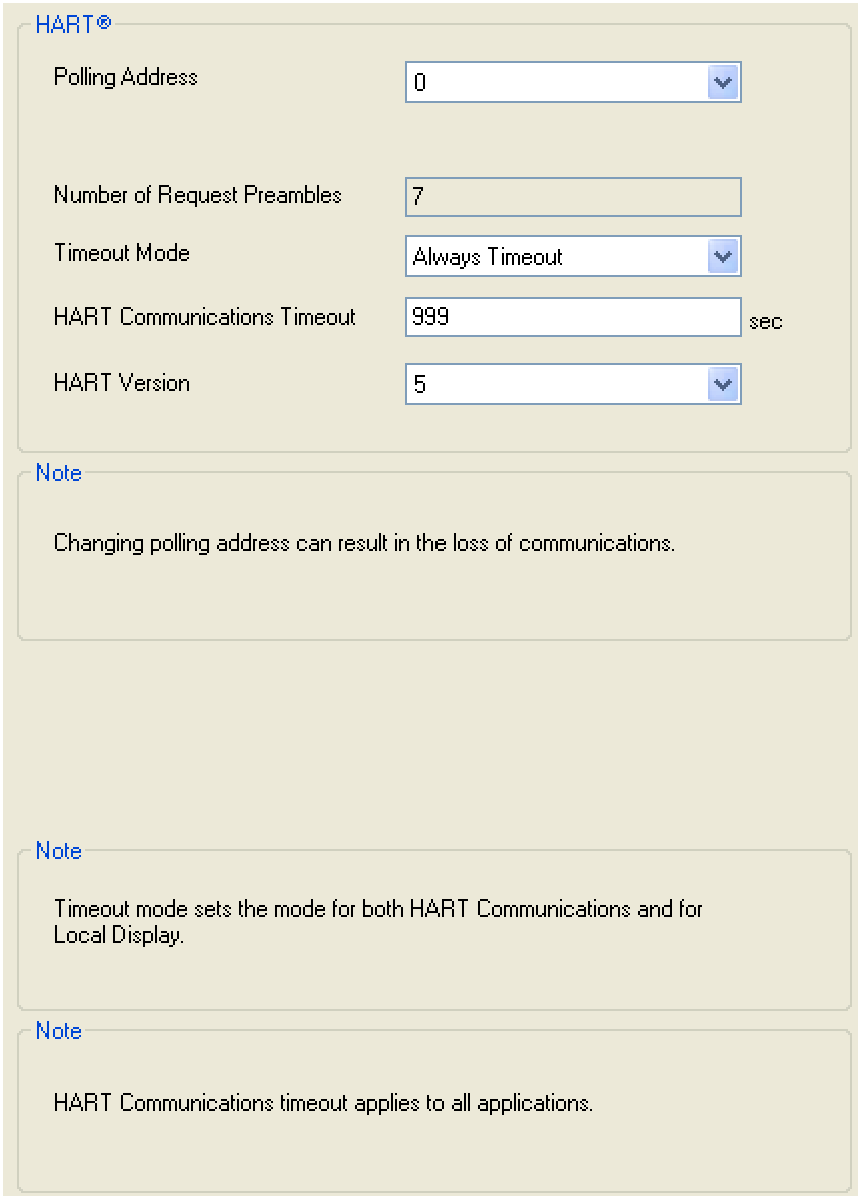


Figure 374. Sample 876EC Transmitter HART Output Screen (HART Version 5)

Field	Entry
Polling Address	Select the polling address from the drop-down menu. Choose a number from 0 to 15.
Number of Request Preambles	Shows the number of preambles to be sent in the response message from the transmitter to the host.
Timeout Mode	Select the timeout mode. Choose from Never Timeout, Online Timeout Only, and Always Timeout. **NOTE** This is the same as the timeout mode for the front panel.
HART Communications Timeout	Set the HART communications timeout. The HART communications timeout is not visible if timeout mode option selected is Never Timeout.
HART Version	Select HART version 5 from the drop-down menu.

If HART version 6 or 7 is selected, the screen appears as shown in Figure 375.

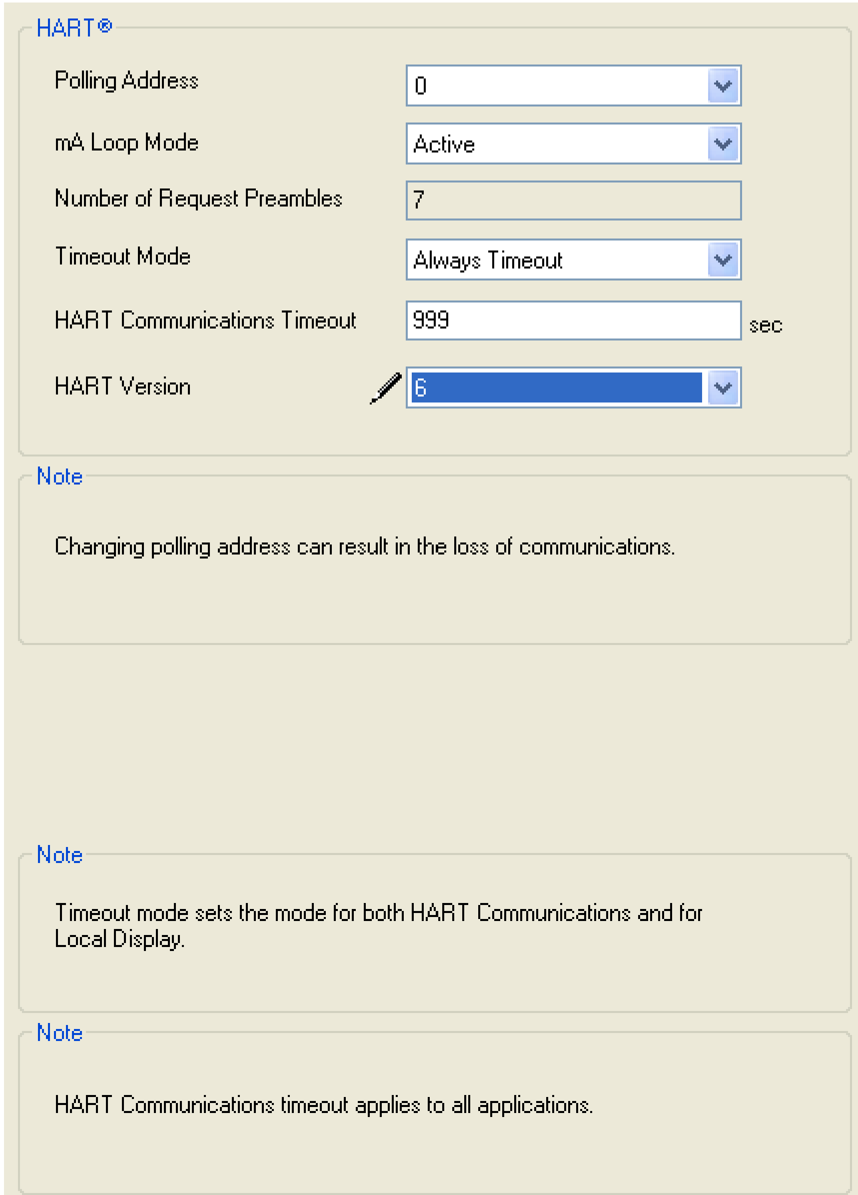


Figure 375. Sample 876EC Transmitter HART Output Screen (HART Version 6 or 7)

Field	Entry
Polling Address	Select the polling address from the drop-down menu. Choose any number from 0 to 63.
mA Loop Mode	Select the mA Loop Mode from the drop-down menu. Choose from Active and Multidrop.
Number of Request Preambles	Shows the number of preambles to be sent in response message from the transmitter to the host.
Timeout Mode	Select the timeout mode. Choose from Never Timeout, Online Timeout Only, and Always Timeout.

Field	Entry
HART Communications Timeout	Set the HART communications timeout. The HART communications timeout is not visible if the timeout mode option selected is Never Timeout.
HART Version	Select the HART version from the drop-down menu. Choose from 6 and 7. **NOTE** If you select HART 7, note that HART 7 wireless communication is not supported.

Auto Hold

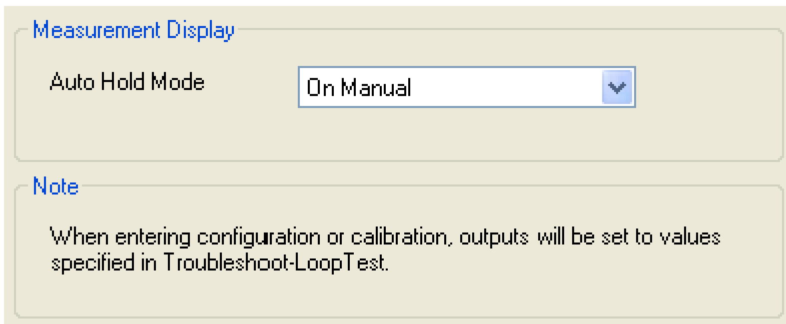


Figure 376. Sample 876EC Transmitter Auto Hold Output Screen

Field	Entry
Auto Hold Mode	Select the Auto Hold Mode from the drop-down menu. Choose from Off, On Present, or On Manual. Auto Hold Mode Off: If you enter into configuration or calibration mode, output will remain active. On Present: If you enter into configuration or calibration mode, output will remain at its current value. On Manual: If you enter into configuration or calibration mode, output will be set to values specified in troubleshoot-loop Test.

Diagnostic Configuration

The Diagnostic configuration enables you to configure the fault messages that appear on your display.

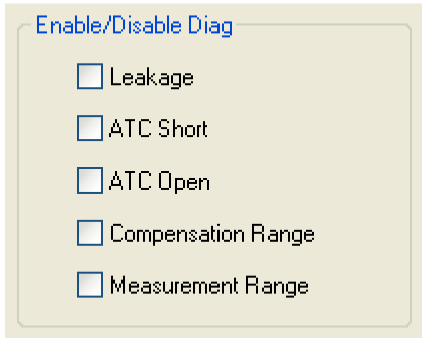


Figure 377. Sample 876EC Transmitter Diagnostic Configuration Screen

Passcode Access

The Passcode Access screen provides two levels of protection. Administrator access permits changing all parameters in the configuration, whereas User Code access permits changing and viewing access to those areas as specified by the administrator as shown in Figure .

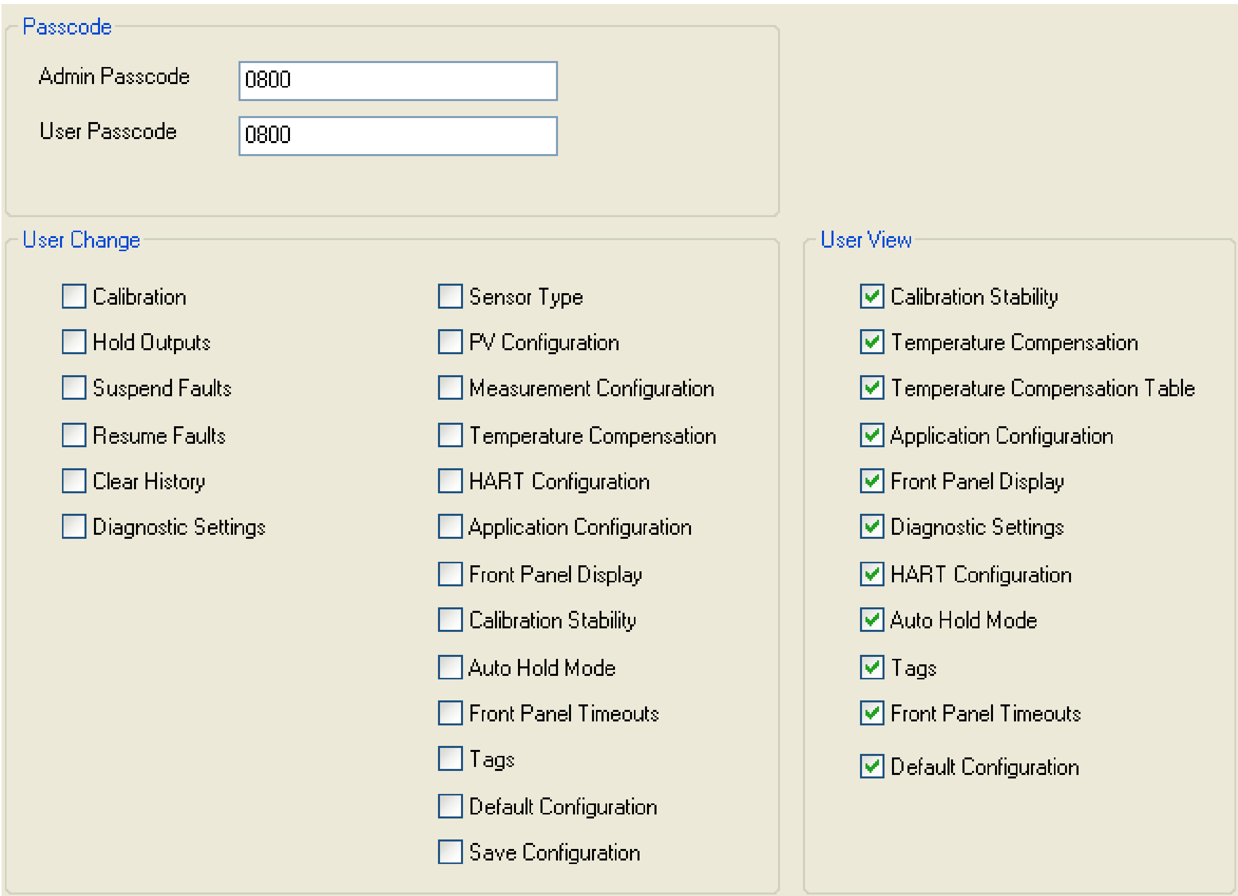


Figure 378. Sample 876EC Transmitter Diagnostics Configuration

Field	Entry
Admin Passcode	Set the administrator passcode.
User Passcode	Set the user passcode.
User Change Allowed	Select the check box against each of the individual parameters to allow the user to change it.
User View Access	Select the required check box against individual parameter to set access for a user to view the parameters.

Device Information

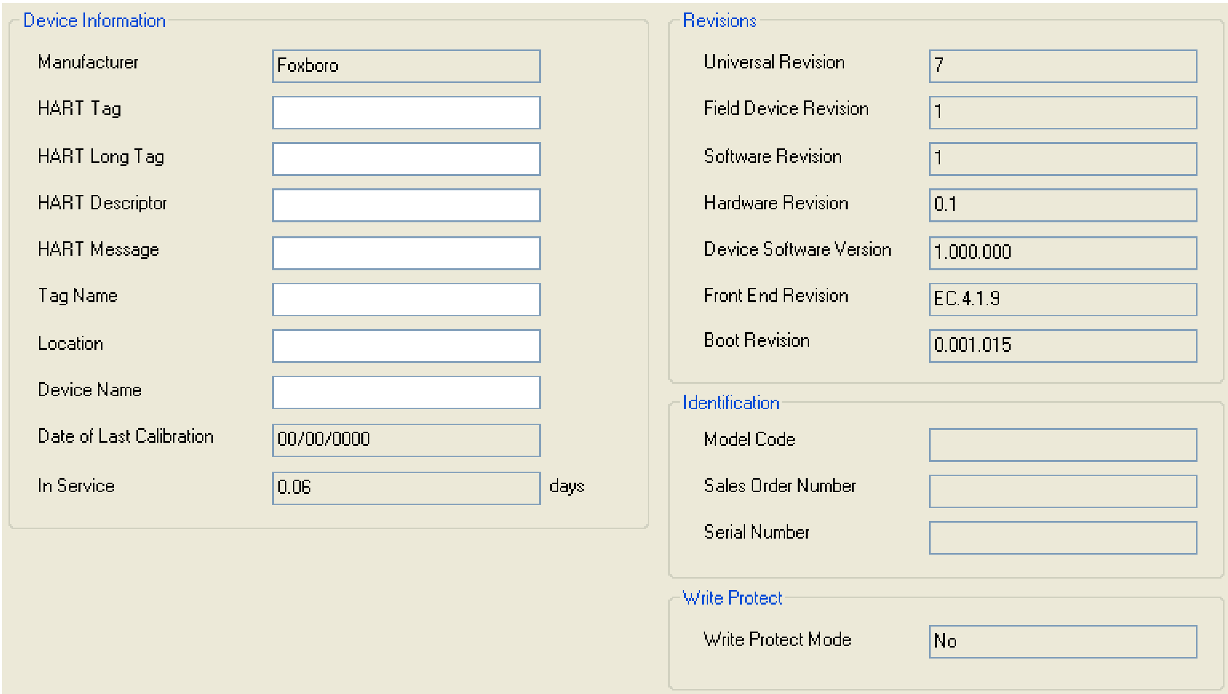


Figure 379. Sample 876EC Transmitter Device Information Screen

Field	Entry
Device Information	
Manufacturer	Displays the application manufacturer name.
HART Tag	Set the HART tag name.
HART Long Tag	Set the HART long tag name. It is displayed for HART version 6 or 7.
HART Descriptor	Set the HART descriptor.
HART Message	Set the HART message.
Tag Name	Set the tag name.
Location	Set the name of the location.
Device Name	Set the name of the device.
Date of Last Calibration	Shows the date of last calibration.
Write Protect Mode	Shows the Write Protect status of the device.

Save/Restore Configuration

The Save/Restore Configuration screen allows you to save and restore up to 2 user configurations as shown in Figure 380.

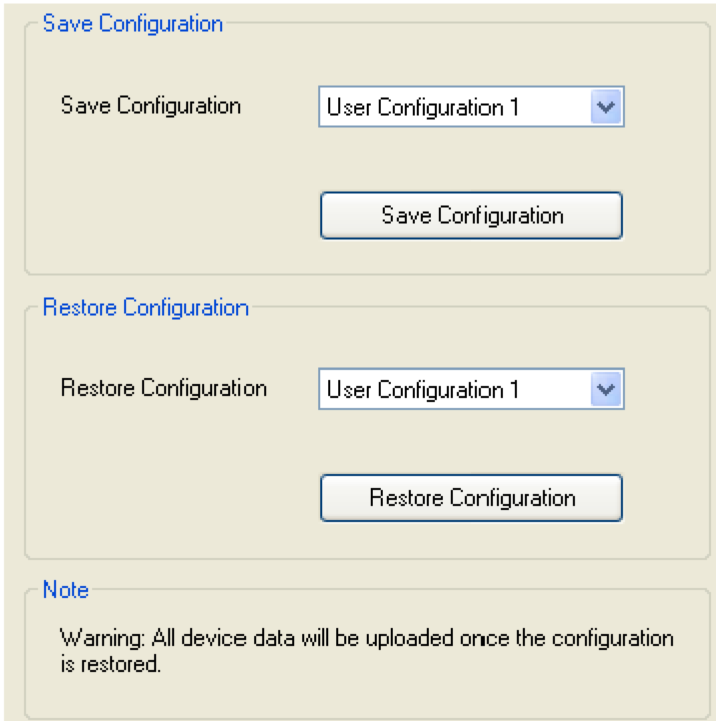


Figure 380. Sample 876EC Transmitter Save/Restore Configuration Screen

Field	Entry
Save/Restore Configuration	
Save Configuration	To save the current configuration: 1. Select User Configuration 1 or User Configuration 2 after you have configured all the DTM parameters. 2. Click Save Configuration. 3. Click OK.
Restore Configuration	To restore the current configuration: 1. Select User Configuration 1, User Configuration 2, or Factory Configuration depending on the configuration you want to restore. 2. Click Restore Configuration. 3. Click OK.

Device Status

HART Status

The HART Status screen shows the HART status as well as the field device status of the device. The status of each parameter is easily recognized by the use of a green check mark (good), a yellow triangle (warning), or a red cross mark (error). On most DTMs, if Configuration Changed does not show a green check mark, it can be reset by clicking the Reset Configuration Changed Flag button on the lower left side of the screen.

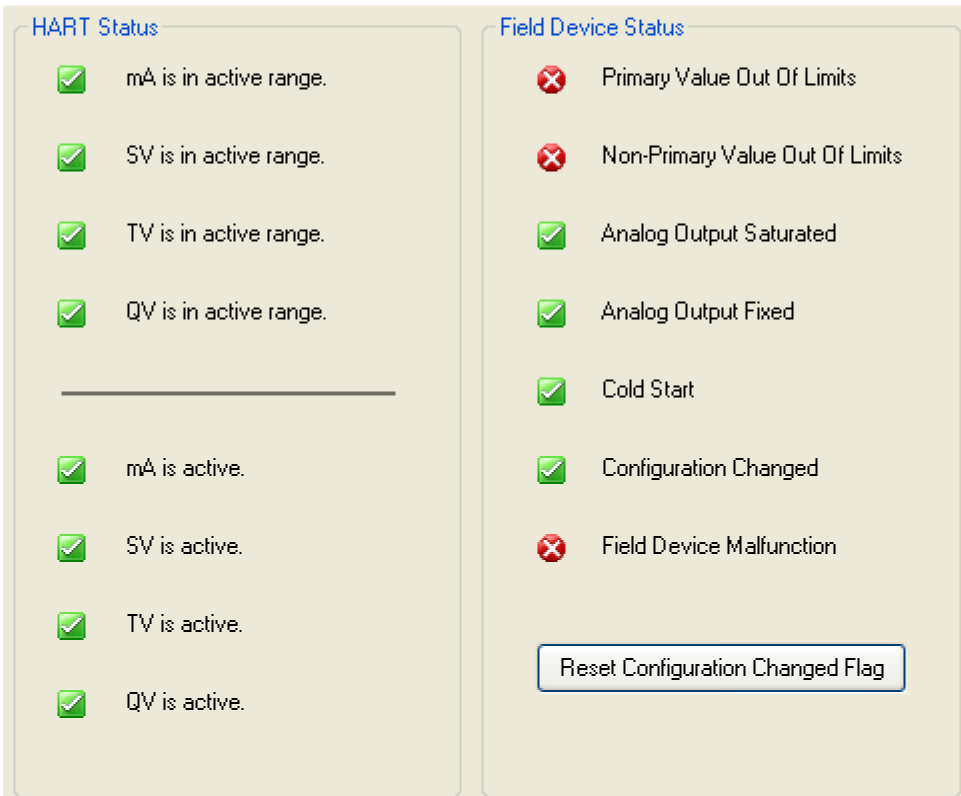


Figure 381. Sample 876EC Transmitter HART Status Screen

Device Status

The Device Status screen shows current status of the device. The status of each parameter is easily recognized by the use of a green check mark (good), a yellow triangle (warning), or a red cross mark (error).

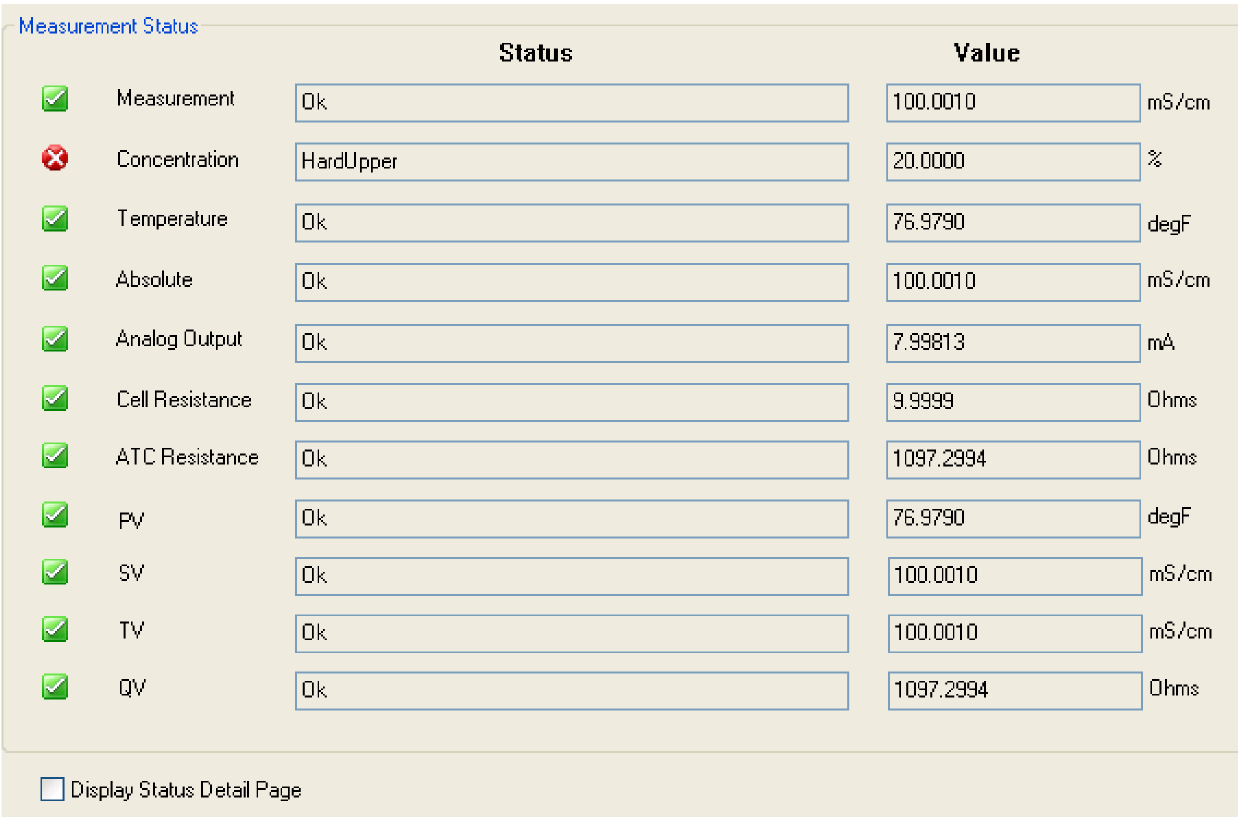


Figure 382. Sample 876EC Transmitter Device Status Screen

Field	Entry
Measurement Status	
Measurement	Shows the measurement status and value.
Temperature	Shows the Temperature status and value.
Absolute	Shows the Absolute parameter status and value.
Analog Output	Shows the Analog Output status and value.
ATC Resistance	Shows the ATC Resistance status and value.
Display Status Detail Page	Select this check box to display the Status Tree page.

Status Tree Screen

The Status Tree screen shows the device status and allows to diagnose the device failures. The screen shows various parameters and the status of each of these parameters can be easily recognized by their color. A green circle indicates the selected user configuration and a grey circle indicates parameters the user has not selected. A red circle indicates that there is an error.

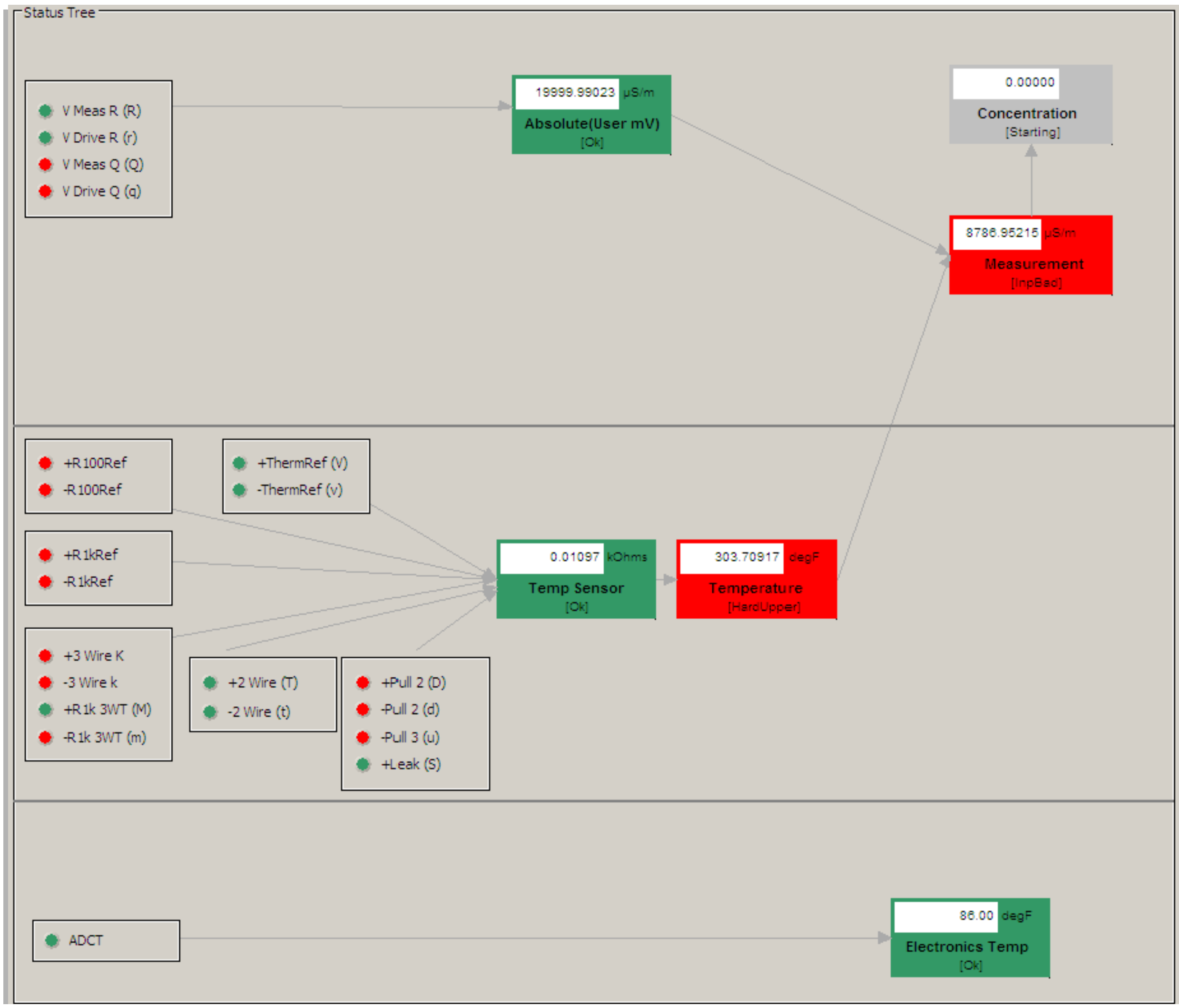


Figure 383. Sample 876EC Transmitter Status Tree Screen

Calibration

You can perform the following calibration procedures:

Parameters

The Cal Parameters screen allows you to set the Stability Factor in terms of percentage as shown in Figure 384.

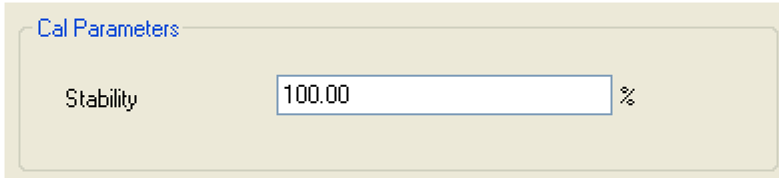


Figure 384. Sample 876EC Transmitter Cal Parameters Screen

Field	Entry
Stability	The Stability parameter sets the measurement and temperature stability. It can be set from 25 through 1000%. 25% produces the most stable measurement and temperature measurements. Therefore it causes the longest calibration time. Invensys recommends 100% for new installations.

Calibrate

The Calibrate screen enables you to calibrate a device as shown in Figure 385.

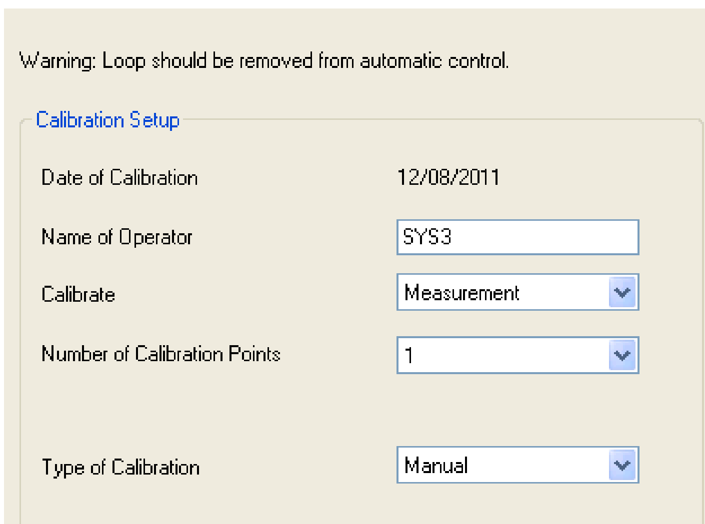


Figure 385. Sample 876EC Transmitter Calibration Setup Screen

Field	Entry
Date of Calibration	Shows the date of calibration.
Name of Operator	Set the name of the operator.
Calibrate	Select the Calibrate from the drop-down menu. Choose from Measurement and Temperature.
Number of Calibration Points	Select the number of calibration points from the drop-down menu.
Type of Calibration	Select the type of calibration from the drop-down menu. Choose from Process and Manual.

After you set the calibration values, click Next. The screen appears as shown in Figure 386.

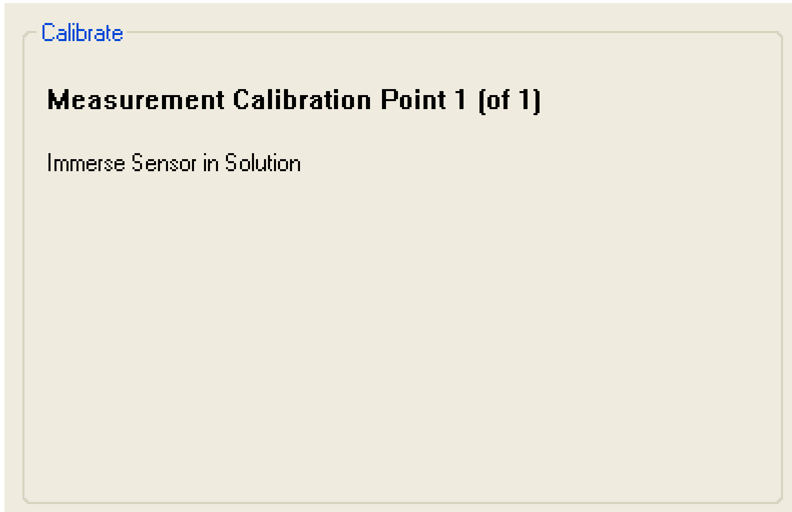


Figure 386. Sample 876EC Transmitter Calibration Setup Screen 2

Click Next, the screen appears as shown in Figure 387.

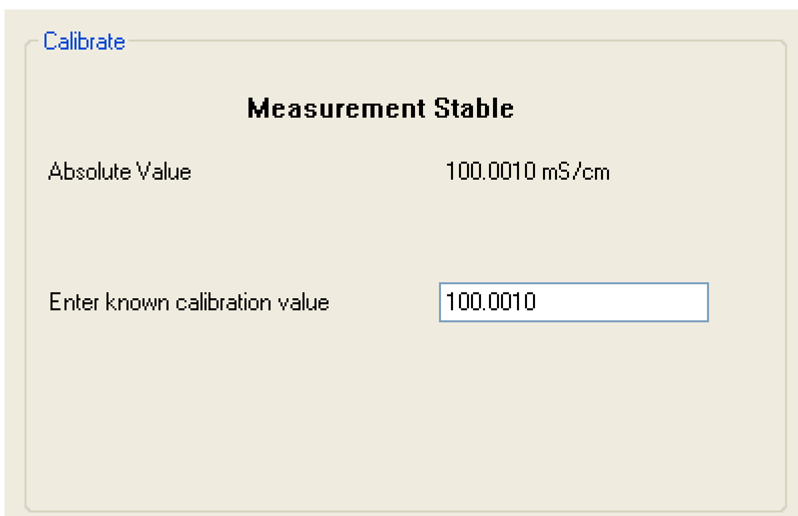


Figure 387. Sample 876EC Transmitter Calibration Setup Screen 3

Enter known calibration value and click Next, the screen appears as shown in Figure 388.

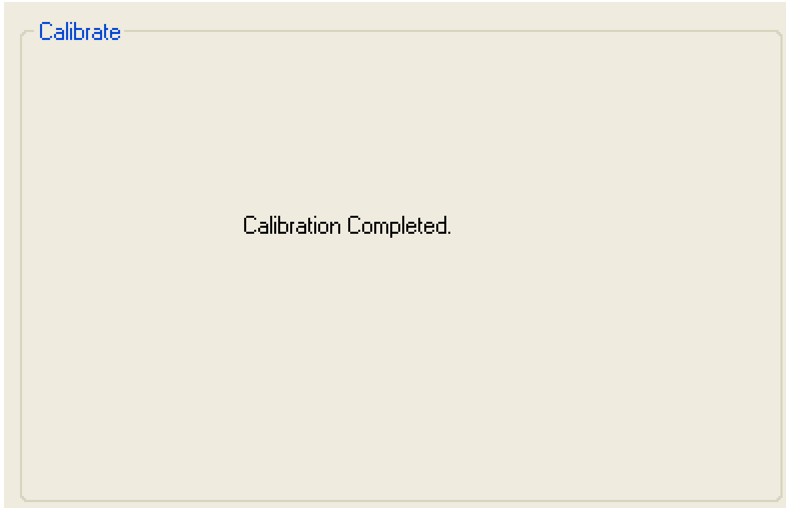


Figure 388. Sample 876EC Transmitter Calibration Setup Screen 4

DAC Trim

In this procedure, the transmitter controls the loop current to either 4 mA (zero) or 20 mA (span). By providing the inputs to the following screens, the values indicated by a suitable reference like a digital multimeter, the transmitter can trim its output. DAC Trim performs 4 mA and 20 mA calibration points.

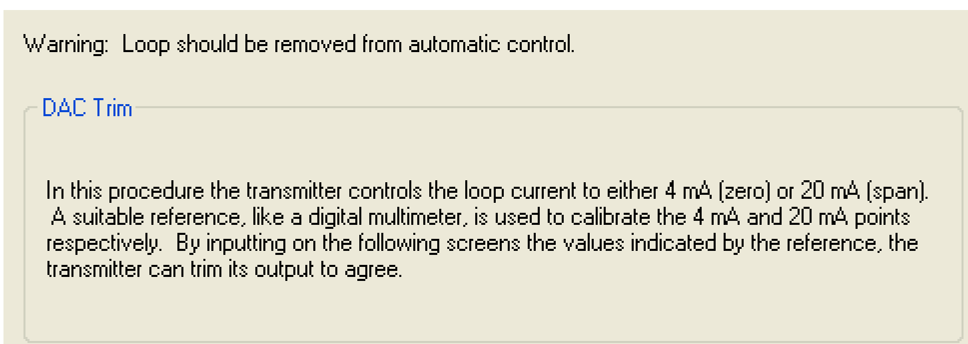


Figure 389. Sample 876EC Transmitter DAC Trim Screen

Troubleshooting

Faults

Fault status is displayed in the Troubleshooting menu. You can suspend faults from the measurement status for one hour and resume faults at any time. The Faults status screen appears as shown in Figure 390.

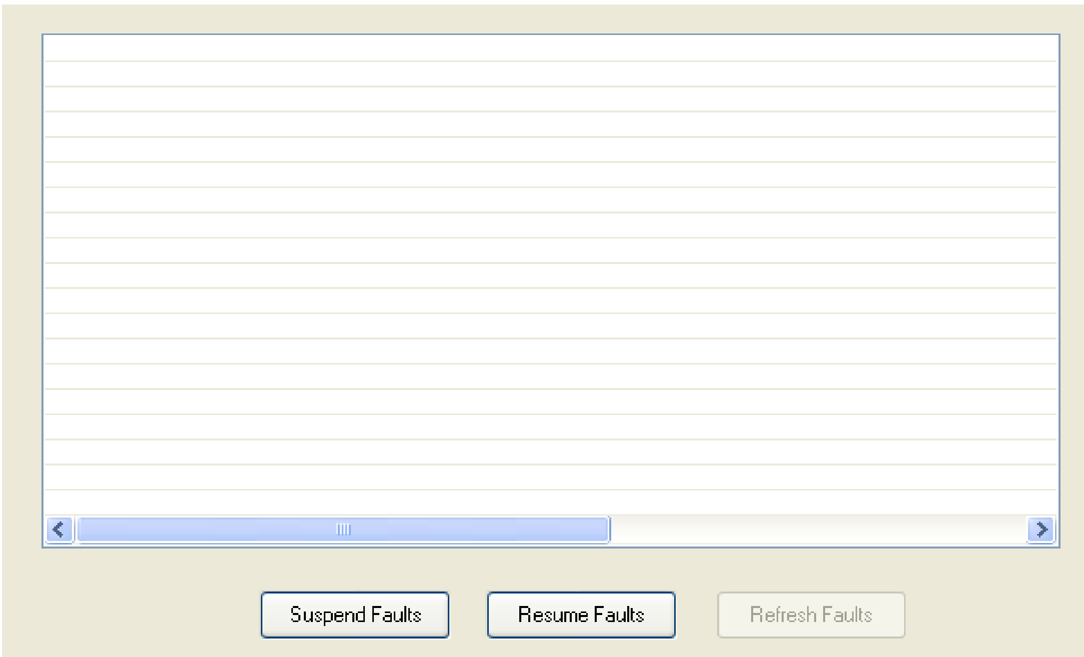


Figure 390. Sample 876EC Transmitter Faults Screen

History Log

The history log includes all the faults, power restore, entries and exits from Configuration, Calibration and Hold, and Faults that are temporarily suspended.

The history log appears as shown in Figure 391.

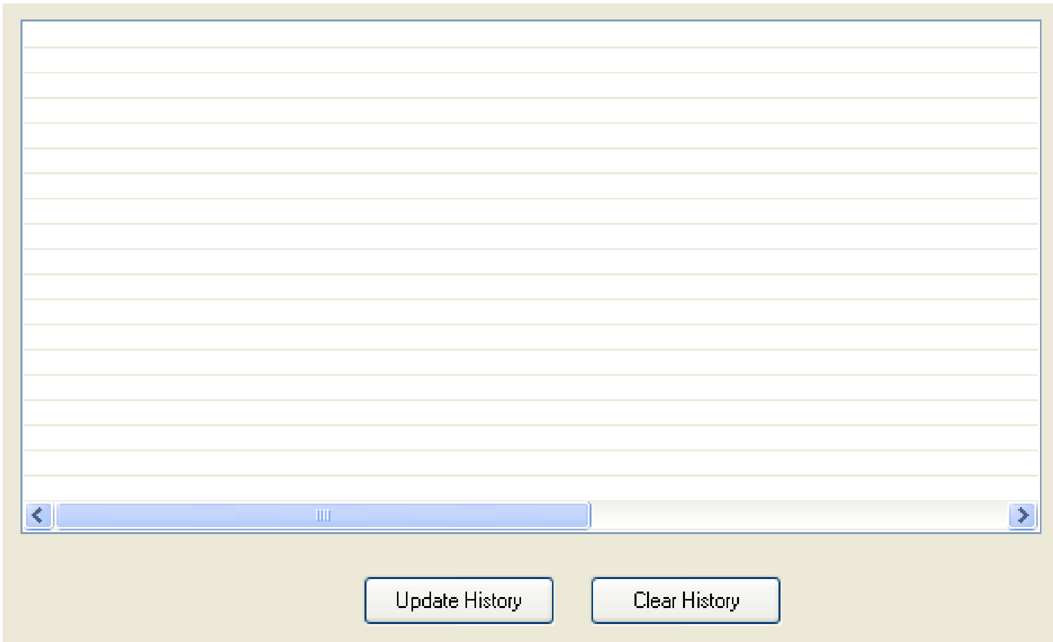


Figure 391. Sample 876EC Transmitter History Log Screen

Loop Test

The Loop Test is a procedure to use the analyzer as a calibration source for checking other instruments in the loop.

Off

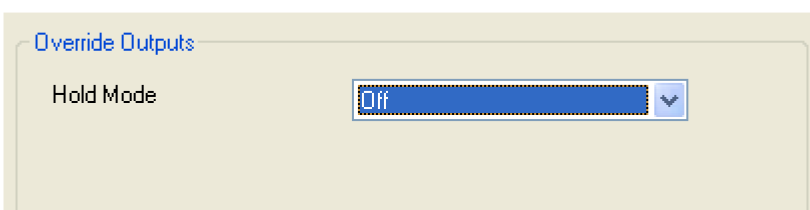


Figure 392. Sample 876EC Transmitter Loop Test Screen (Off)

Field	Entry
Hold Mode	Select the hold mode from the drop-down menu. Choose from Off, Hold Present Values, and Manual Hold.

Manual Hold

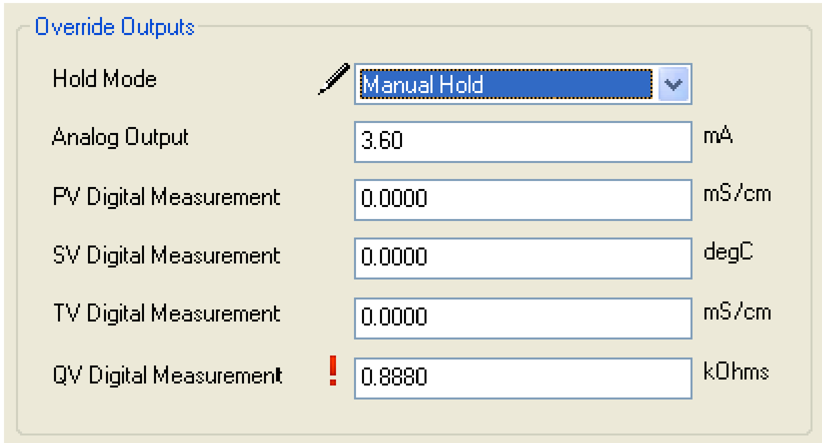


Figure 393. Sample 876EC Transmitter Loop Test Screen (Manual Hold)

Field	Entry
Hold Mode	Select Manual Hold option from the drop-down menu.
Analog Output	Set analog output reading. If the mA Loop Mode in the HART screen is selected as multidrop, then the Analog Output is not shown.
PV Digital Measurement	Set the PV digital measurement.
SV Digital Measurement	Set the SV digital measurement.
TV Digital Measurement	Set the TV digital measurement.
QV Digital Measurement	Set the QV digital measurement.

Firmware Upgrade

The Firmware Upgrade screen allows you to upgrade the firmware of device. The firmware upgrade page appears as shown in Figure 394.

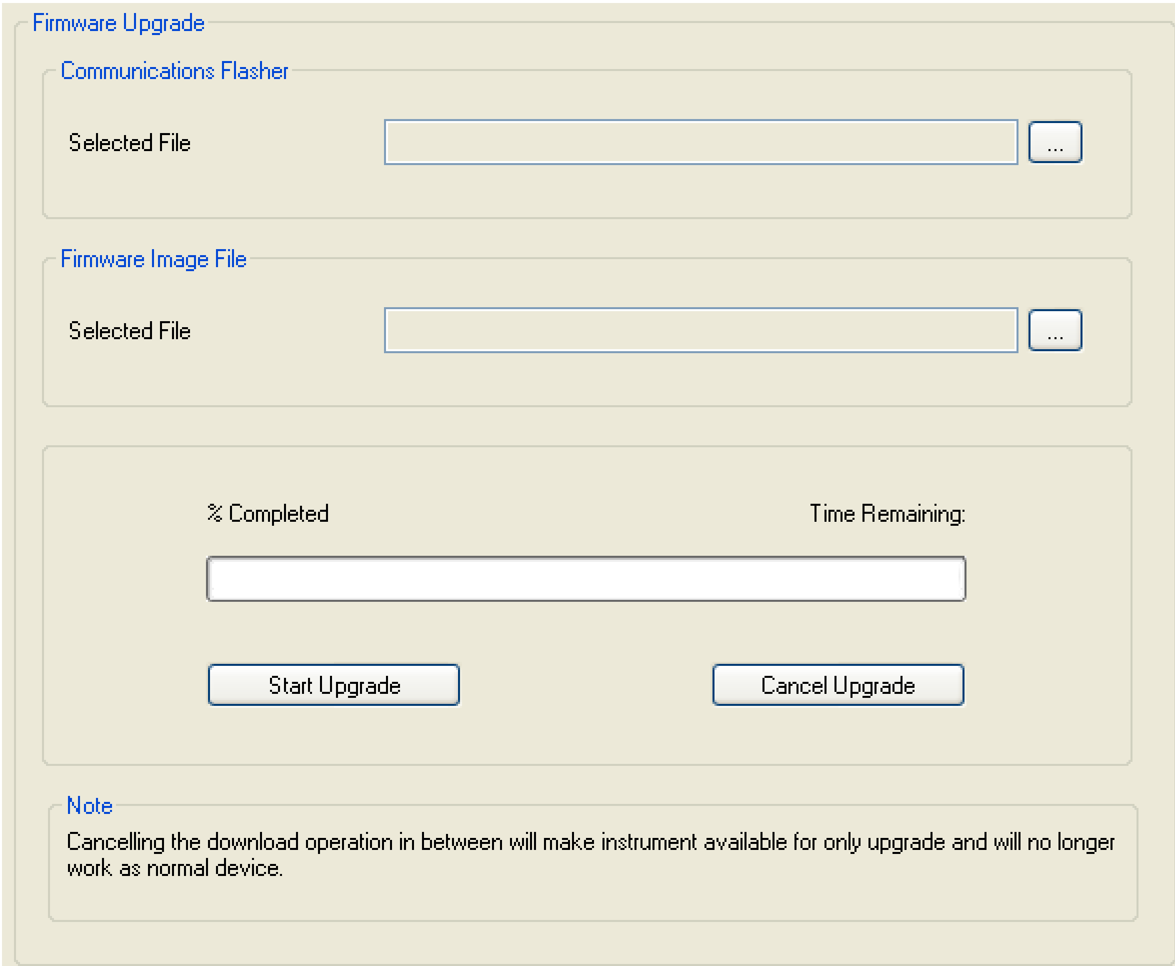


Figure 394. Sample 876EC Transmitter Firmware Upgrade Screen

Field	Entry
Communications Flasher	
Selected File	To upgrade device firmware: 1. Use the Browse button and select the communication flasher file. You need to select .rbin file type to upgrade the device.
Firmware Image File	
Selected File	2. Use the Browse button and select the firmware image file. You need to select .rbin file type to upgrade the device firmware. The Communications Flasher and Firmware Image File are necessary to upgrade the device firmware. 3. Click Start Upgrade.

The upgrade normally takes around 90 minutes to complete. The % Completed and the Time Remaining are shown on screen indicating the status of the device firmware upgrade.

WARNING

Do not cancel the upgrade process when the system is upgrading the device firmware. Interrupting the upgrade process may cause the instrument to be left in a state where it is only available for upgrades and may not operate normally.

10. 875CR Analyzer

This chapter provides information that is exclusive to using 875CR Analyzer with HART communication protocol. Additional information about this analyzer can be found in the following documents:

- MI 611-222 - Model 875CR Intelligent Electrochemical Analyzer for Contacting Conductivity and Resistivity Measurements
- MI 611-227 - 875 Series Intelligent Analyzers - Operation, Configuration, and Calibration Using a HART Communicator

Device Overview

The Device Overview screen displays the HART information and the device information. The current measurement, temperature, analog 1 output (PV) and HART analog (SV) data is represented in a graph.

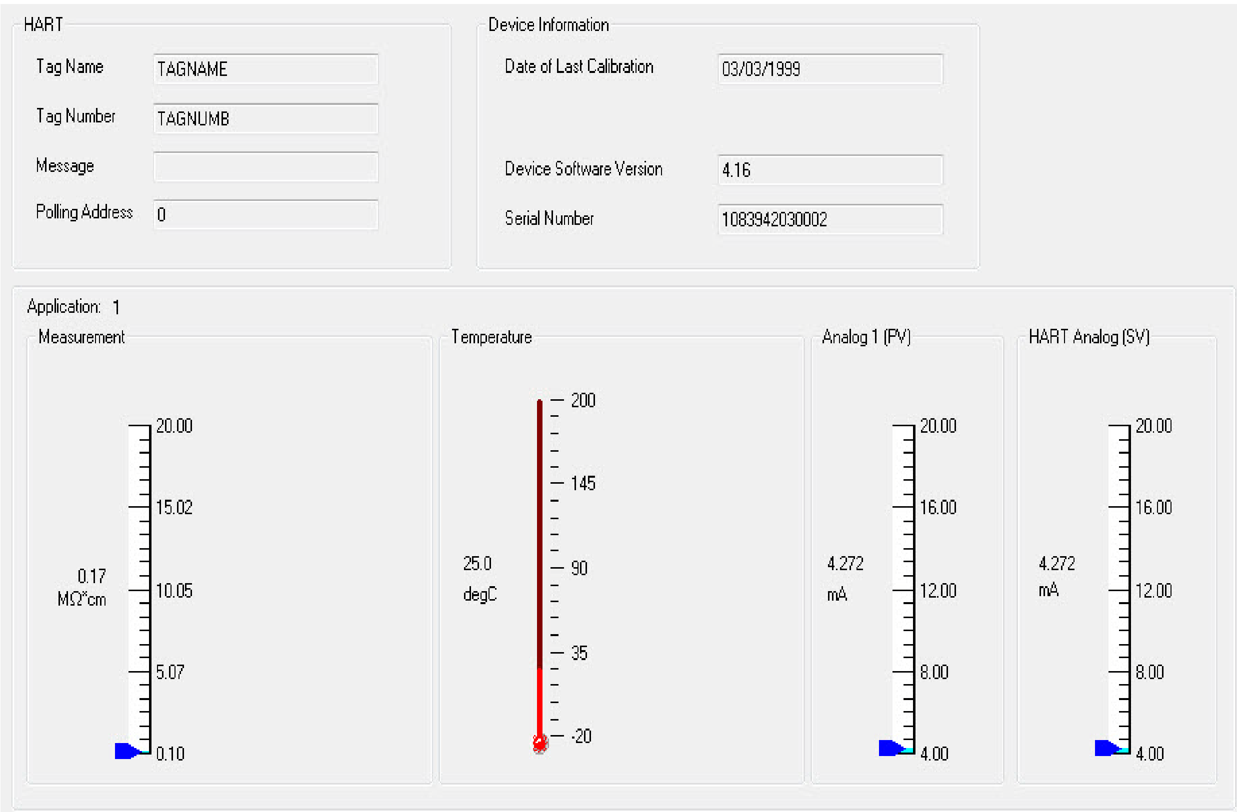


Figure 395. Sample 875CR Analyzer Device Overview Screen (Single Cell)

Field	Entry
HART	
Tag Name	Shows the HART tag which is the unique identifier of the device.
Tag Number	Shows the tag number.
Message	Shows the HART message that is sent from the device when requested. The message can have a maximum of 32 characters.
Polling Address	Shows the configured address of the device.
Device Information	
Date of Last Calibration	Shows the last calibrated date.
Device Software Version	Shows the software version of the device.
Serial Number	Shows the serial number of the device.

In Dual and Redundant cell configuration, the last calibration date of cell 1 as well as cell 2 are displayed; and the graph represents the current measurement, and temperature, of cell 1 and cell 2.

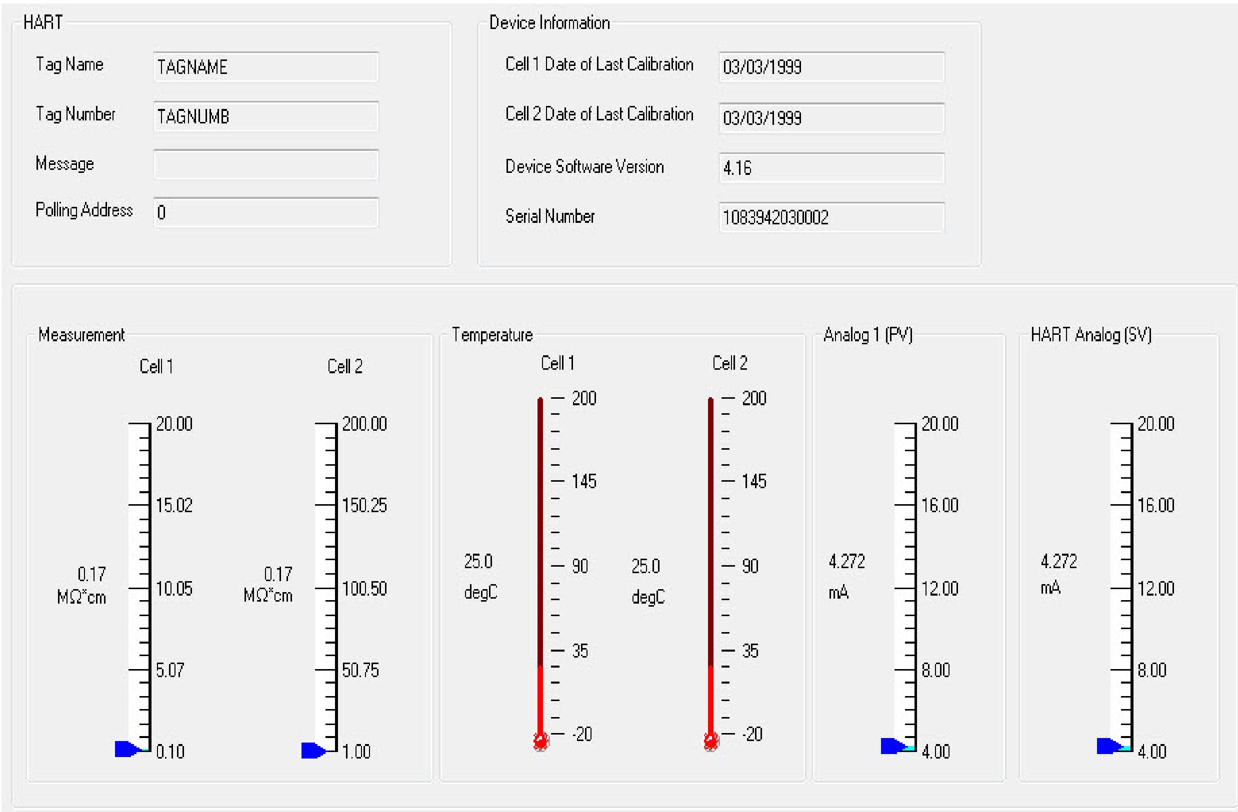


Figure 396. Sample 875CR Analyzer Device Overview Screen (Dual and Redundant Cell)

Field	Entry
Device Information	
Cell 1 Date of Last Calibration	Shows the date of last calibration of Cell 1.
Cell 2 Date of Last Calibration	Shows the date of last calibration of Cell 2.

Process Variables

The Process Variables screen displays the values of device variables and the measured values assigned to the device variables of the currently running application.

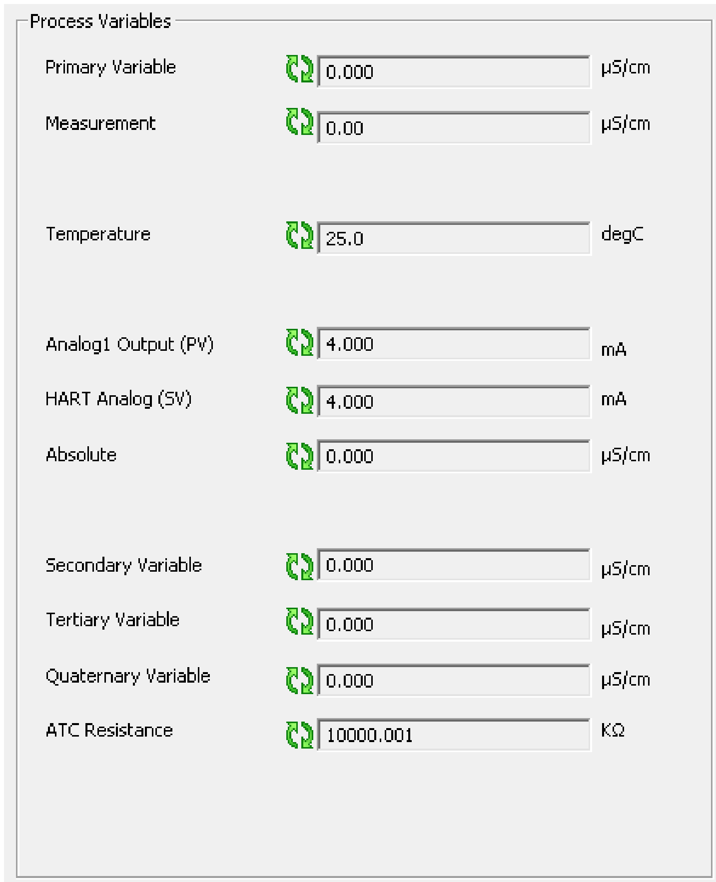


Figure 397. Sample 875CR Analyzer Process Variables Screen (Single Cell)

Field	Entry
Process Variables	
Primary Variable	Shows the current measurement mapped to primary variable.
Measurement	Shows the process measurement.
Temperature	Shows the process temperature.
Analog1 Output (PV)	Shows the current PV value in mA units.
HART Analog (SV)	Shows the current SV value in mA units.
Absolute	Shows the uncompensated conductivity or resistivity signal.
Secondary Variable	Shows the current measurement mapped to secondary variable.
Tertiary Variable	Shows the current measurement mapped to tertiary variable.
Quaternary Variable	Shows the current measurement mapped to quaternary variable.
ATC Resistance	Shows the resistance of temperature compensator from 0.0000 to 9999.9.

In Dual and Redundant cell configuration, the measurement, temperature, uncompensated conductivity, and the ATC resistance of cell 1 as well as cell 2 are displayed as shown below.

Figure 398. Sample 875CR Analyzer Process Variables Screen (Dual and Redundant Cell)

Device Configuration

General

The General screen is where you can specify a passcode that allows you to access the configurable device parameters. It also allows you to specify the parameters for the applications (such as 1, 2, or 3) that are preconfigured for the analyzer.

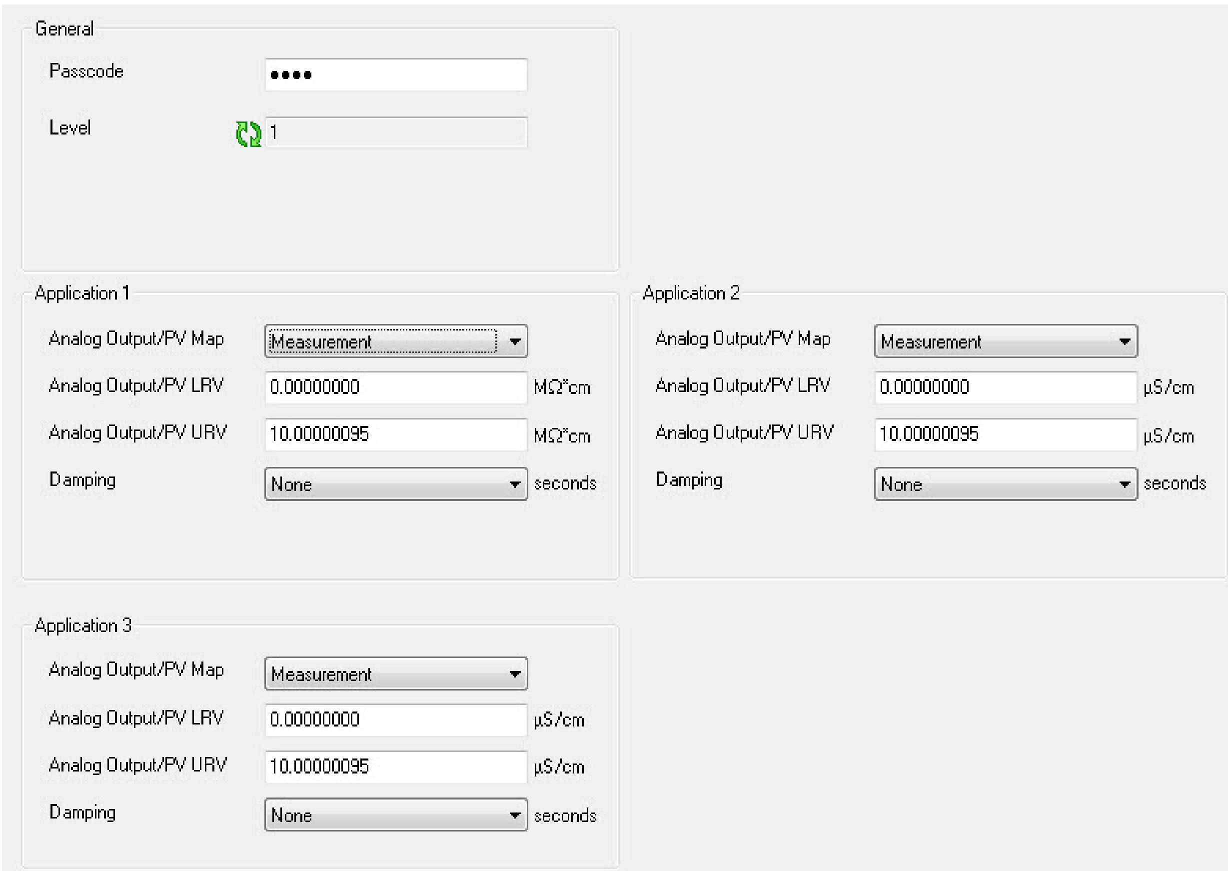


Figure 399. Sample 875CR Analyzer General Screen

Field	Entry
Passcode	
Passcode	Specify a valid passcode for configuring the device parameters. A Level 1 passcode allows you to modify all the configuration parameters and a Level 2 passcode allows you to modify only the basic configuration parameters. With a Level 3 passcode, you can only view the basic configuration parameters.
Level	Shows the passcode level.
Application 1, Application 2, and Application 3	
Analog Output/PV Map	Map a measurement for analog output. Choose from Measurement, Temperature, Absolute, and Off.

Field	Entry
Analog Output/PV LRV	Specify the lower range value for analog output.
Analog Output/PV URV	Specify the upper range value for analog output.
Damping	Select the damping time that is applied to the current output of the application. Choose from None, 5, 10, 20, 40, 120, and 300 seconds.

In case of Dual cell operation, enter damping time for cell 1 and cell 2.

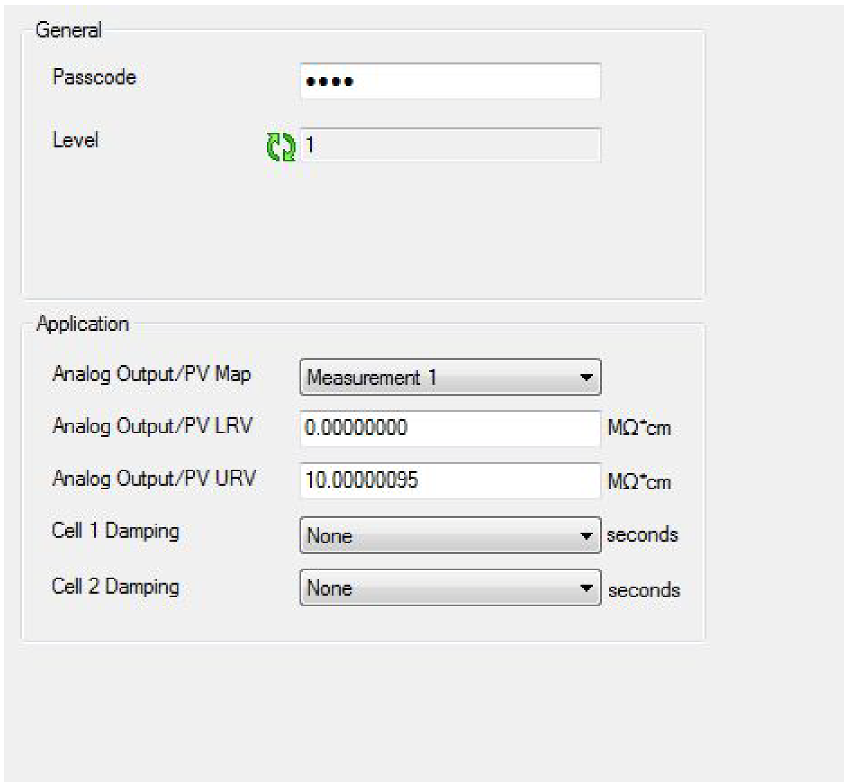


Figure 400. Sample 875CR Analyzer General Screen (Dual Cell)

Field	Entry
Application	
Analog Output/PV Map	Map a measurement for analog output. Choose from: Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, and Off.
Cell 1 Damping	Select the damping time for cell 1. Choose from None, 5, 10, 20, 40, 120, and 300 seconds.
Cell 2 Damping	Select the damping time for cell 2. Choose from None, 5, 10, 20, 40, 120, and 300 seconds.

Cell Configuration

The analyzer has a two cell capability. The Cell Configuration screen is where you can configure the analyzer for one of following three modes:

- Single
- Dual
- Redundant

Single mode operation allows up to three applications without math operations.

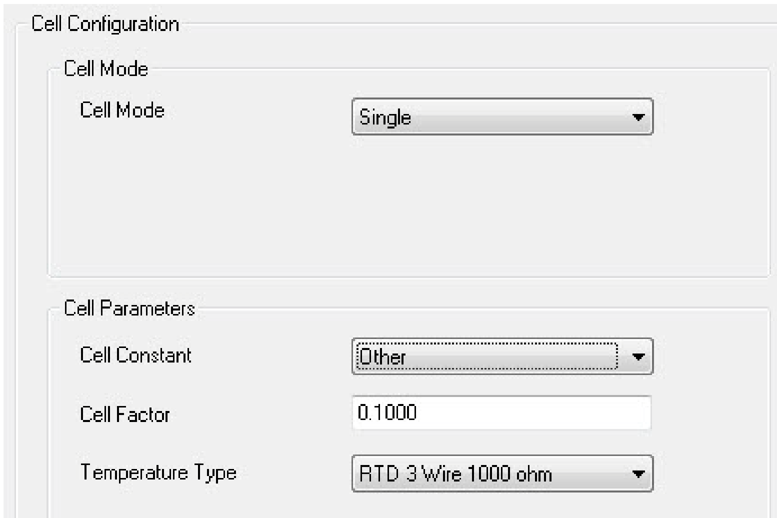


Figure 401. Sample 875CR Analyzer Cell Configuration Screen (Single Mode)

Field	Entry
Cell Configuration	
Cell Mode	Configure one of the following three modes: Single, Dual, or Redundant.
Cell Parameters	
Cell Constant	Specify the cell constant. Choose from 0.1, 10, or Other. If you choose Other, specify the cell factor.
Cell Factor	Specify the cell factor between 0.0001 and 99.999.
Temperature Type	Select the temperature type. Choose from 100K Thermistor, RTD 2 Wire 100 Ω, RTD 2 Wire 1000 Ω, RTD 3 Wire 100 Ω, RTD 3 Wire 1000 Ω, RTD 2 Wire MIL, RTD 3 Wire MIL.

For using cell 1 and cell 2 independently, select Dual cell operation. This selection allows each cell a single application with math operations (% rejection, ratio, measurement average, measurement difference, temperature difference).

In this mode, specify cell constant, cell factor, and cell temperature type for cell 1 and for cell 2.

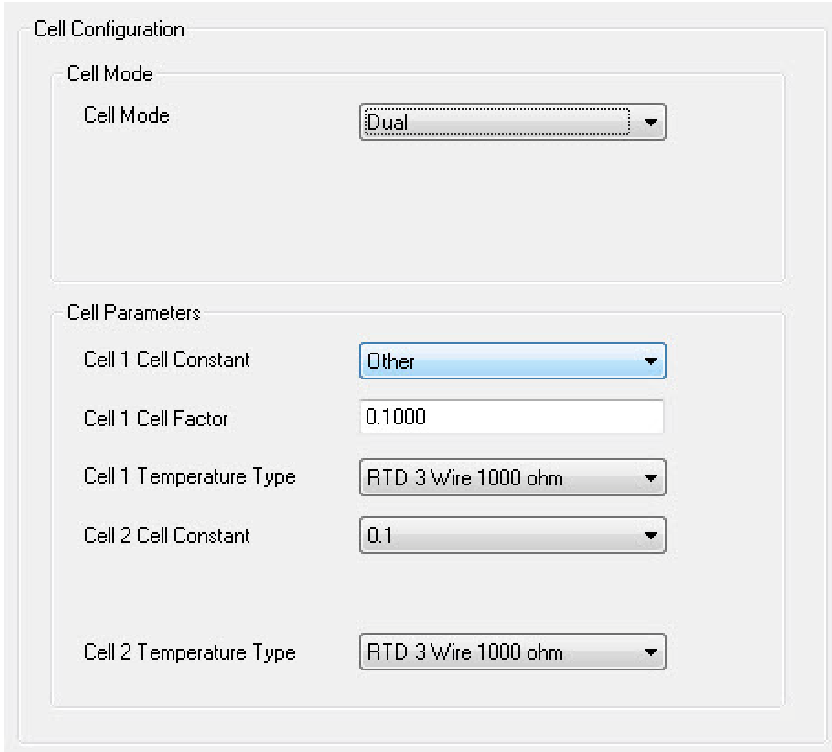


Figure 402. Sample 875CR Analyzer Cell Configuration Screen (Dual Mode)

The Redundant cell operation is used to switch over to the primary or backup cell in case of faults. One cell is designated as primary and the other is a backup. If the primary cell measurement becomes suspect or fails, the backup cell can take over. This mode allows up to three applications but both cells must be configured identically.

Configure the analyzer for either manual or automatic switchover.

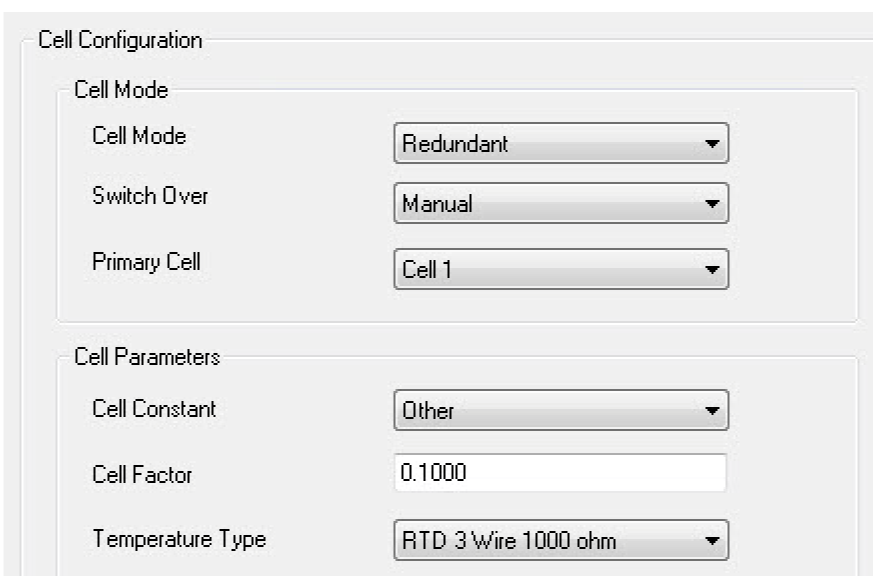


Figure 403. Sample 875CR Analyzer Cell Configuration Screen (Redundant Mode)

Field	Entry
Cell Configuration	
Switch Over	Configure the analyzer for Manual or Automatic switchover and specify one of the cells as primary cell. • Manual - the cell selected as the primary cell is analyzed until you manually change your configuration selection. • Automatic - a cell fault (leakage, ATC short, or ATC open) causes the configured backup cell to replace the primary cell.
Primary Cell	Configure either cell 1 or cell 2 as the primary cell. Then the other cell will act as a backup.

Temperature

The Temperature screen allows you to configure temperature parameters.

The temperature mode can be set to Manual or Auto. If set to Automatic mode, the temperature follows the temperature input RTD or thermistor “ATC” and you can set a temperature fail-safe signal value. If set to Manual mode, the temperature can be set at a fixed temperature value and resistance inputs on the temperature terminal are ignored.

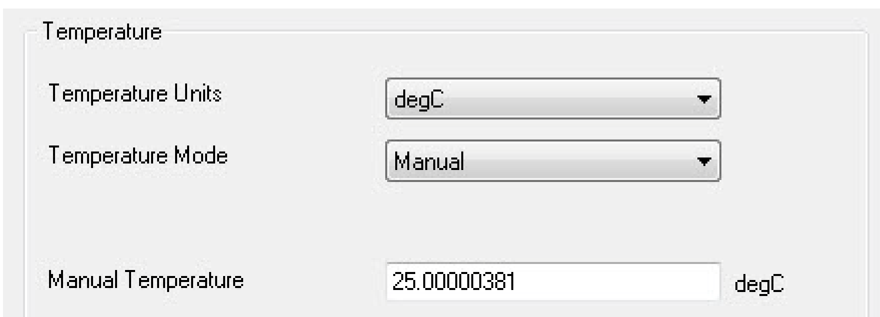


Figure 404. Sample 875CR Analyzer Temperature Screen (Temperature Mode as Manual)

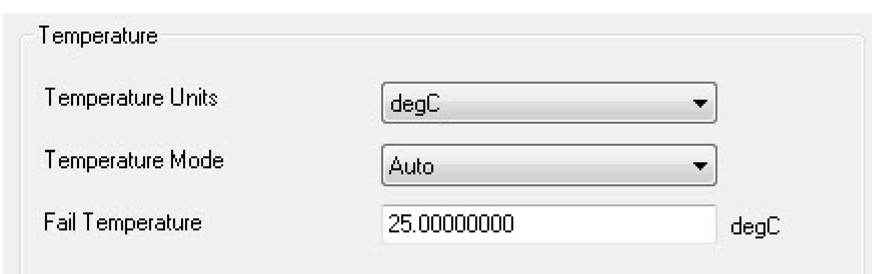


Figure 405. Sample 875CR Analyzer Temperature Screen (Temperature Mode as Auto)

Field	Entry
Temperature	
Temperature Units	Select the temperature units. Choose from degC or degF.
Temperature Mode	Select the temperature mode. Choose Manual or Auto.
Fail Temperature	Set the failsafe temperature at which you expect the process to be operating.
Manual Temperature	This parameter appears if the temperature mode is set to 'Manual'. Specify a fixed temperature value.

For Dual cell operation, configure temperature parameters for cell 1 and cell 2.

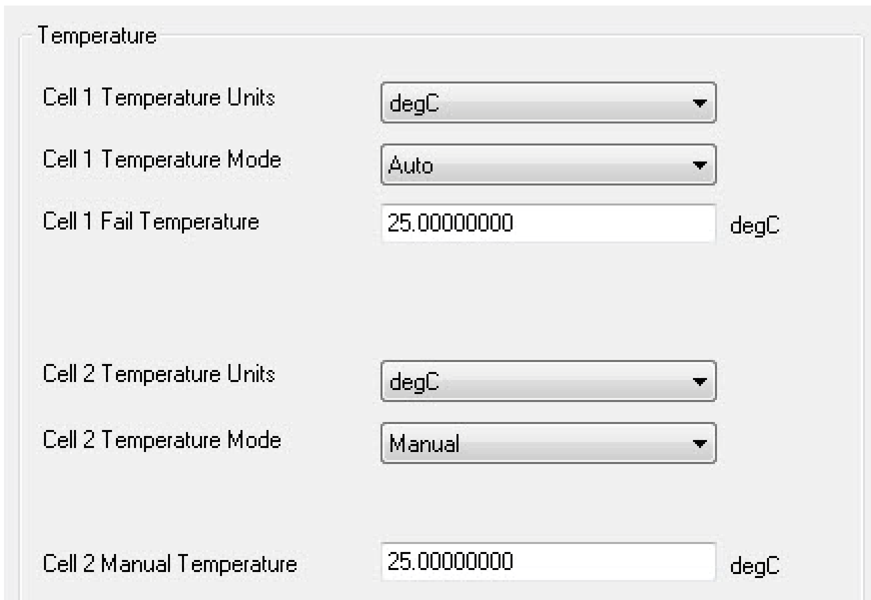


Figure 406. Sample 875CR Analyzer Temperature Screen (Dual Cell Configuration)

Application

You can preconfigure the analyzer for up to three distinct applications. Each application can have its own display, temperature compensation curve, chemical concentration curve (if applicable), output configuration, and alarm configuration. Each application is assigned an identification number such as 1, 2, or 3.

If you wish to change from one application to another, you can select the application 1, 2, or 3 in **Running Application**. The entire application switches to that preconfigured application. You can also choose **Auto** or **Signal** instead of an application number.

— **NOTE**
This section is not availabe for Dual cell configuration.

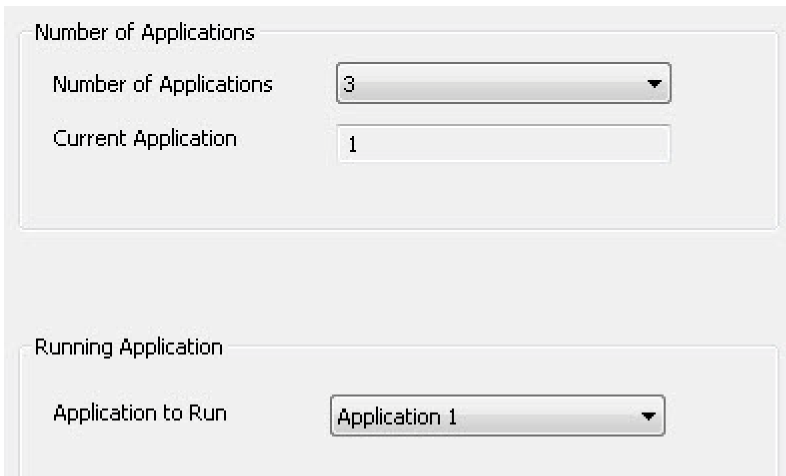


Figure 407. Sample 875CR Analyzer Application Screen

Field	Entry
Number of Applications	
Number of Applications	Select the application number. Choose 1, 2, or 3.
Current Application	Shows the current application that is running.
Running Application	
Application to Run	This parameter appears only if the analyzer is preconfigured with more than one application. Select the application you want to run. Choose from Application 1, Application 2, Application 3, Auto, or Signal.

Selecting **Auto** in **Application to Run** configures the analyzer to switch from one application to another when triggered by measurements above or below the established limits.

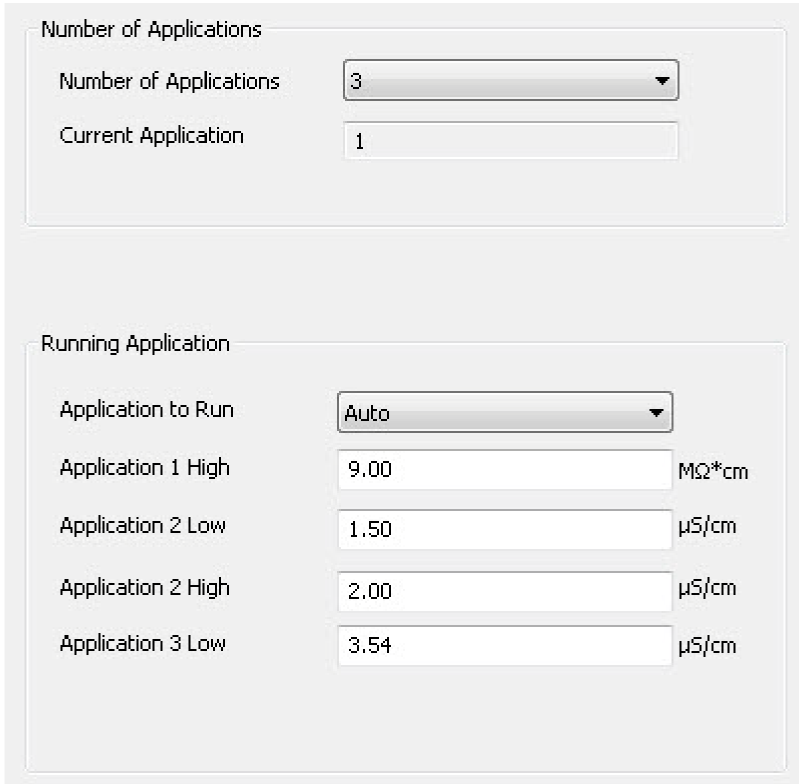


Figure 408. Sample 875CR Analyzer Application Screen (Auto Selection)

Field	Entry
Running Application	
Application to Run	Set **Application to Run** as **Auto**.
Application 1 High	Specify a value for application 1 high limit.
Application 2 Low	Specify a value for application 2 low limit.
Application 2 High	Specify a value for application 2 high limit.
Application 3 Low	Specify a value for application 3 low limit.

Selecting **Signal** in **Application to Run** configures the analyzer to change applications from an external device connected to the analyzer signal inputs.

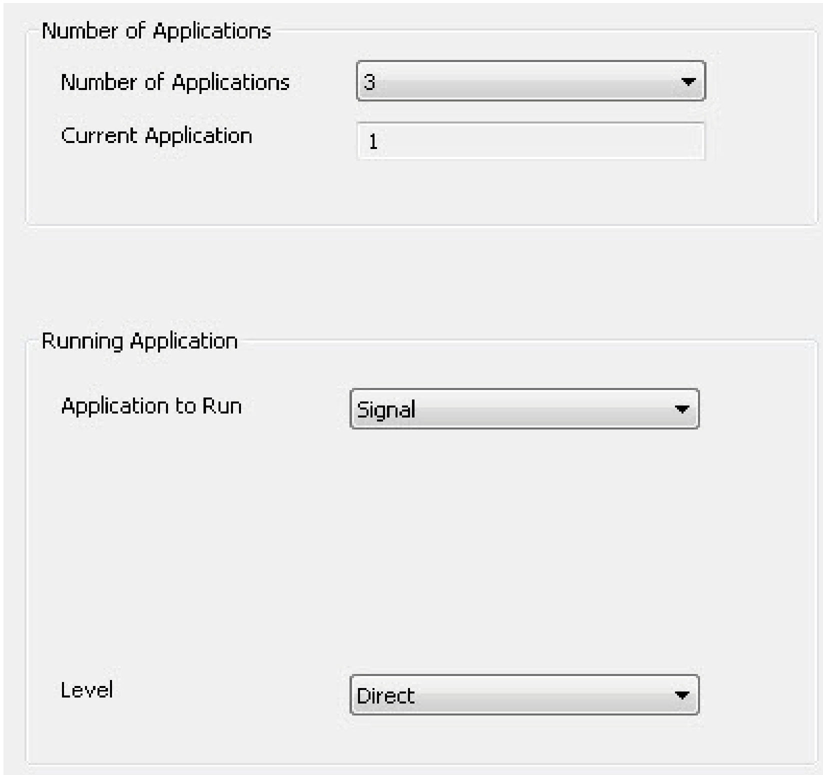


Figure 409. Sample 875CR Analyzer Application Screen (Signal Selection)

Field	Entry
Running Application	
Application to Run	Set **Application to Run** as **Signal**.
Level	Set the active state level to Direct or Inverted. • When set to **Direct**, the application becomes active when the input switch closes. • When set to **Inverted**, the application becomes active when the input switch opens.

Measurement

The Measurement screen allows you to specify the measurement units, scale, and damping time.

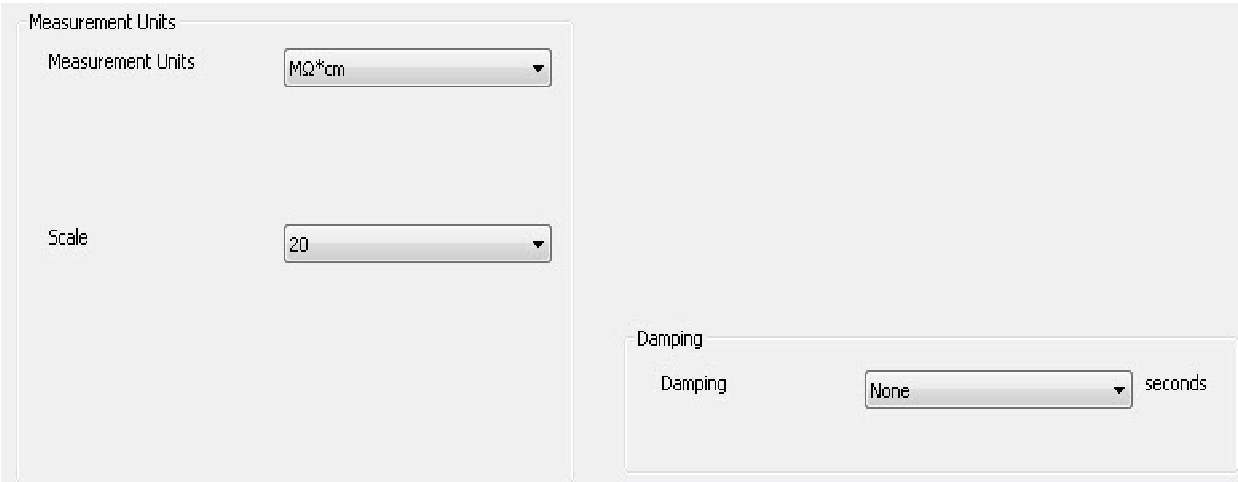


Figure 410. Sample 875CR Analyzer Measurement Screen

Field	Entry
Measurement Units	
Measurement Units	Select the measurement units. • If Cell Constant was configured as 0.1, choose from MΩ*cm, kΩ*cm, µS/cm, mS/cm, mS/m, and Custom. • If the Cell Constant was configured as 10, choose from kΩ*cm, µS/cm, mS/cm, mS/m, S/m, %, and Custom.
Scale	Select the scale for the measurement unit. The scale differs based on the Cell Constant and the Measurement Units selected.
Damping	
Damping	Set the damping response time. Choose from 5, 10, 20, 40, 120 and None.

— NOTE —
Damping applies only to measurement data, not to temperature data.

If **Measurement Units** = %, specify the maximum concentration according to the chemical being measured.

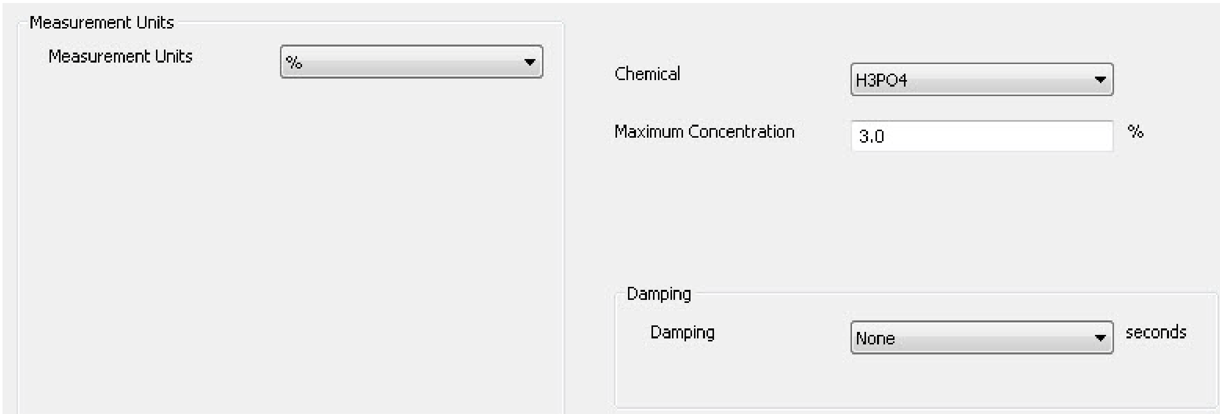


Figure 411. Sample 875CR Analyzer Measurement Screen (% Selection)

Field	Entry
Measurement Units	
Chemical	Select the chemical as H3PO4 or CH3COOH.
Maximum Concentration	Specify the maximum concentration for the selected chemical.

If **Measurement Units = Custom**, specify the chemical compensation, and the relationship between the base units and the custom units.

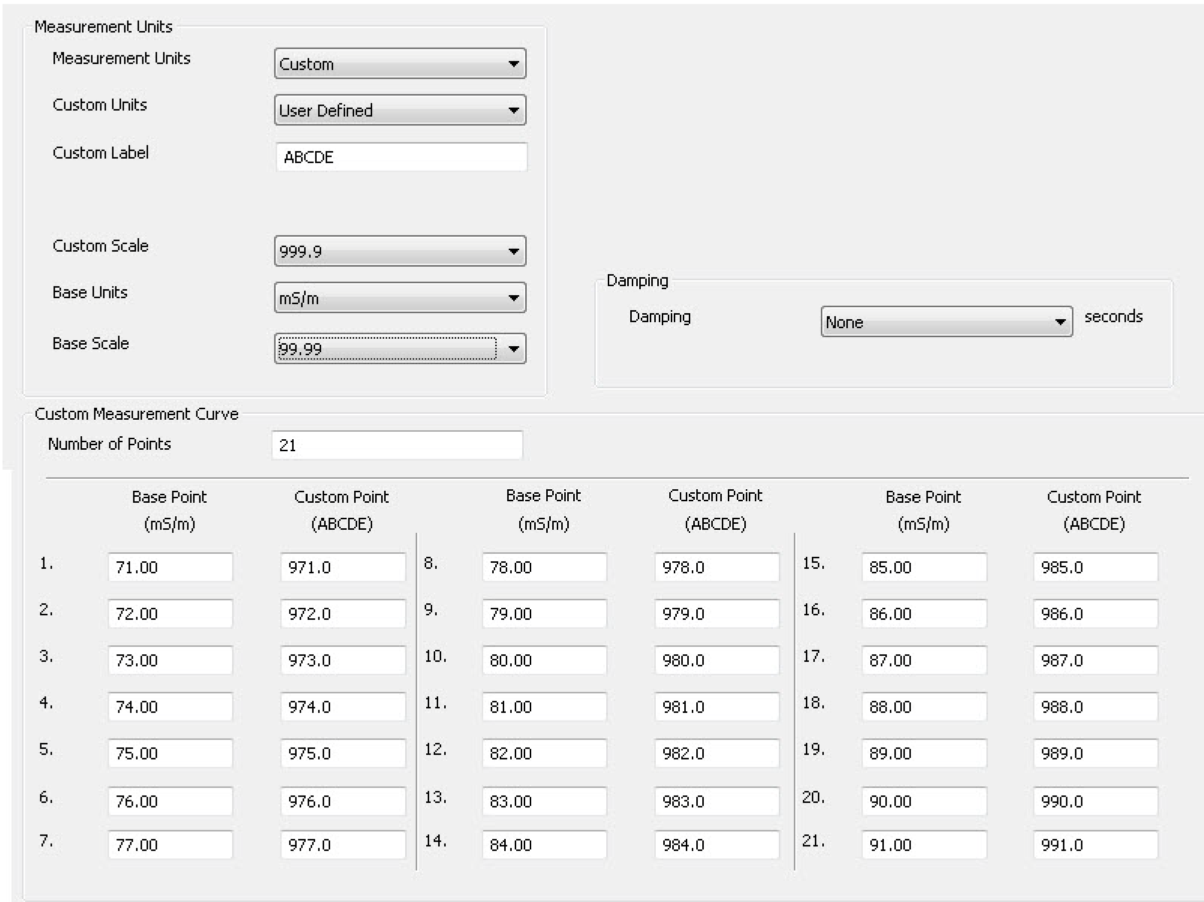


Figure 412. Sample 875CR Analyzer Measurement Screen (Custom Selection)

Field	Entry
Measurement Units	
Measurement Units	Select **Custom** as the Measurement Units.
Custom Units	Select the custom units. Choose from %, g/l, ppm, oz/gal, ppt, User Defined, and None.
Custom Label	Specify a name for the custom units.
Custom Scale	Set the custom scale. Choose from 0.9999, 9.999, 99.99, 999.9, and 9999.
Base Units	Select the base units. Choose from MΩ*cm, kΩ*cm, µS/cm, mS/cm, mS/m, or S/m.
Base Scale	Set the base scale. Choose from 0.9999, 9.999, 99.99, 999.9, and 9999. **— NOTE** Availability of the base scale options depends on the base units selected.

Field	Entry
Damping	
Damping	Set the damping response time. Choose from 5, 10, 20, 40, 120 and None.
Custom Measurement Curve	
Number of Points	Specify the number of points to plot the compensation curve. The number of points can be specified from 2 to 21. For each of the point specified to plot compensation curve, specify the base and custom points.
Base Point	Specify base point.
Custom Point	Specify custom point.

Temperature Compensation

The Temperature Compensation screen allows you to specify temperature compensation for your application. Temperature compensation adjusts the conductivity and resistivity measurements to a reading equivalent to that at the reference temperature.

Figure 413. Sample 875CR Analyzer Temperature Compensation Screen (Low Conductivity)

Field	Entry
Temperature Compensation	
Temperature Compensation	Specify the temperature compensation. • If Measurement Units = kΩ*cm, µS/cm, mS/cm, mS/m, or S/m, choose temperature compensation from one of the following options: Absolute, Low Conductivity, Cation, NaCl, Linear, H3PO4, CH3COOH, USP23/24, Ammonia, Morpholine, and Custom. • If Measurement Units = MΩ*cm, choose temperature compensation from the following options: Absolute, UltraPure, USP23/24, and Custom.
Low Conductivity (appears if Temperature Compensation = Low Conductivity)	Select the conductivity. Choose from Ions and Ions+H2O. • Ions - this selection causes the conductivity reading to remove the conductivity due to water • Ions + H2O - this selection causes the conductivity reading to include the conductivity due to water and impurities

Field	Entry
Ions + H2O (appears if Low Conductivity = Ions+H2O)	Specify the pure water curve. Choose from T.Light, Foxboro/Light, and M&S.

NOTE

1. If Cell Mode = Dual, Temperature Compensation 1 and Temperature Compensation 2 apply.
2. ‘Temperature Compensation’ does not appear if measurement units is configured as percent (%).

If the **Temperature Compensation** = **Linear**, enter the reference temperature and specify the slope of the linear compensation curve.

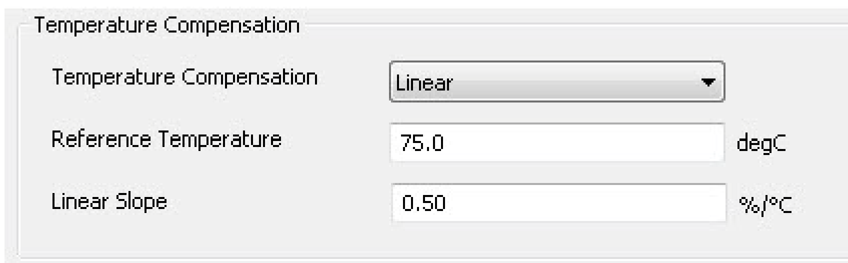


Figure 414. Sample 875CR Analyzer Temperature Compensation Screen (Linear)

Field	Entry
Temperature Compensation	
Temperature Compensation	Set Temperature Compensation to **Linear**.
Reference Temperature	Specify the reference temperature.
Linear Slope	Specify the slope of the linear compensation curve between 0.5%/°C and 5.0%/°C.

If the **Temperature Compensation = Ultra Pure**, specify one of the pure water curves.

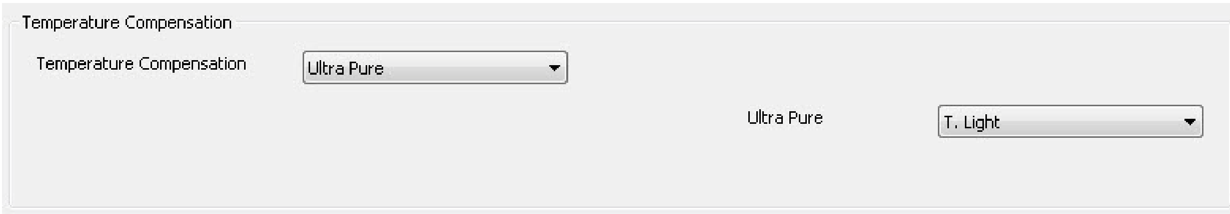


Figure 415. Sample 875CR Analyzer Temperature Compensation Screen (Ultra Pure)

Field	Entry
Temperature Compensation	
Temperature Compensation	Set Temperature Compensation to **Ultra Pure**.
UltraPure	Specify the pure water curve. Choose from T.Light, Foxboro/Light, M & S, and High Temp.

If **Temperature Compensation = Custom**, specify the number of points to plot the compensation curve. To prepare the curve, select a solution of typical concentration and measure its conductivity in precisely controlled temperature increments.

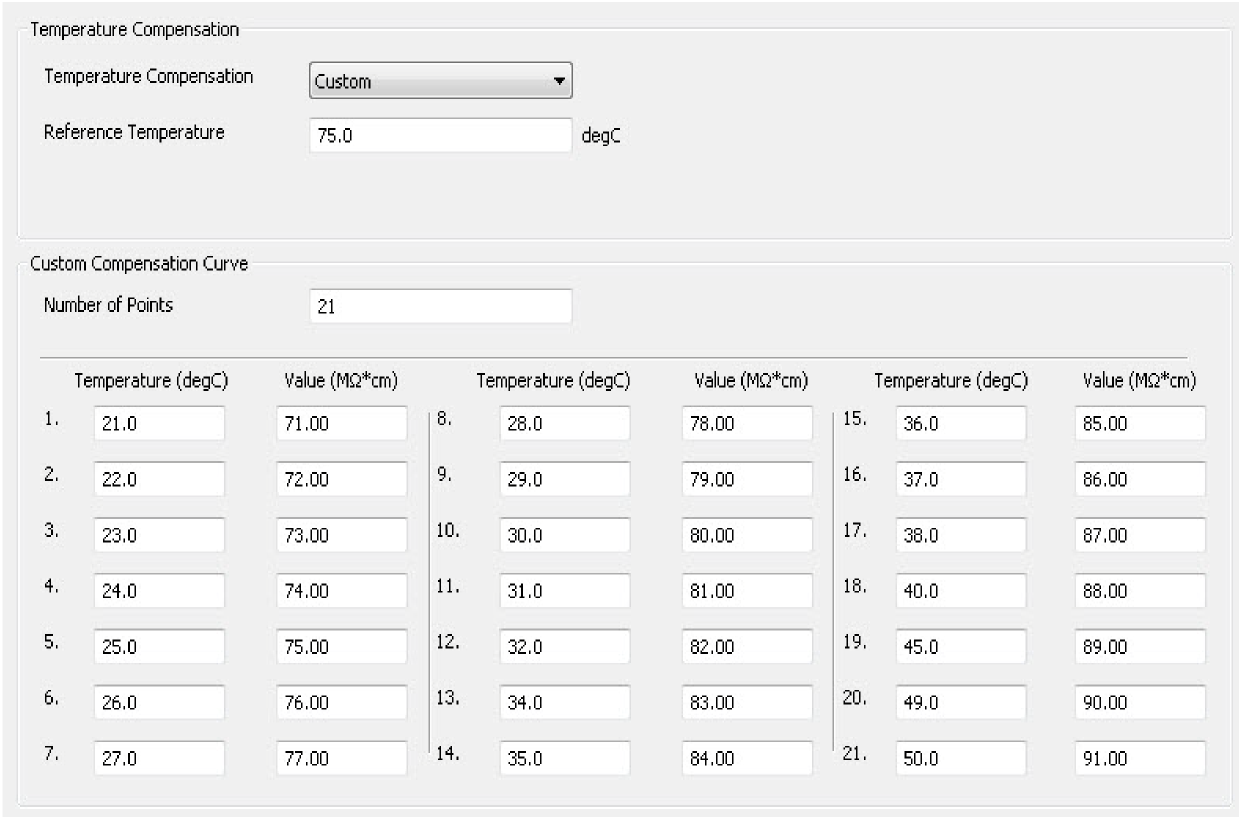


Figure 416. Sample 875CR Analyzer Temperature Compensation Screen (Custom)

Field	Entry
Temperature Compensation	
Temperature Compensation	Set Temperature Compensation to **Custom.**
Reference Temperature	Specify the reference temperature.
Custom Compensation Curve	
Number of Points	Specify the number of points from 2 to 21, to plot the compensation curve.
Temperature (Units)	Specify the temperature between -20 and +200°F or -4 to+392°C in 0.1° increments.
Value (Units)	Specify the value from 0 to 5 times the scale value chosen.

— NOTE

1. The compensation table is not saved to the database until the last point pair is entered.
2. The temperature values must be entered in increasing or decreasing order or the display will read Slope Error.

Output

Analog

The Analog screen allows you to configure the analog outputs, Analog Output 1 (PV) and HART Analog Output (SV), in the analyzer. Each analog output is configured independently. You can specify what measurement or calculation each analog output reflects, the minimum and maximum range values for the outputs specified, and a failsafe signal for each output.

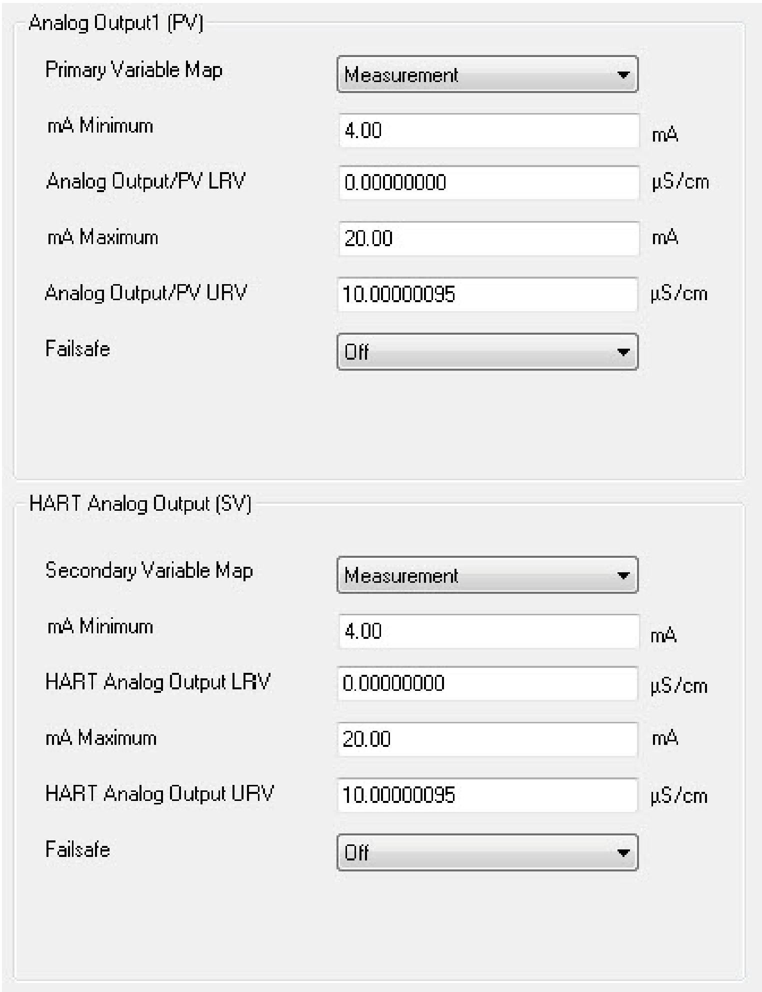


Figure 417. Sample 875CR Analyzer Analog Output Screen

Field	Entry
Analog Output 1 (PV)	
Primary Variable Map	Select a measurement to map the primary variable. Choose from Temperature, Measurement, Absolute, and Off. For **Dual** cell configuration, choose from Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, and Off. Select Off if you are not using the output.
mA Minimum	Specify mA minimum value between 4 mA and 20 mA.
Analog Output / PV LRV	Specify the lower range value for Analog Output 1.
mA Maximum	Specify mA maximum value between 4 mA and 20 mA.
Analog Output / PV URV	Specify the upper range value for Analog Output 1.
Failsafe	Select failsafe mode. Choose from On, Off, and Pulse.
HART Analog Output (SV)	
Secondary Variable Map	Select a measurement to map the secondary variable. Choose from Temperature, Measurement, Absolute, and Off. For **Dual** cell configuration, choose from Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, and Off. Select Off if you are not using the output.
mA Minimum	Specify mA minimum value between 4 mA and 20 mA.
HART Analog Output LRV	Specify the lower range value for HART Analog Output.
mA Maximum	Specify mA maximum value between 4 mA and 20 mA.
HART Analog Output URV	Specify the upper range value for HART Analog Output.
Failsafe	Select failsafe mode. Choose On or Off. **— NOTE** **Pulse** option is not available for HART Analog Output 1 (SV).

— NOTE

mA Minimum and mA Maximum are available only when

1. Number of Applications > 1
   AND
2. Cell Mode = **Single** or **Redundant**

You can configure the analyzer to deliver fail-safe outputs for all analyzer faults and for certain sensor diagnostic faults. Select Failsafe as **On** to specify a fixed output in a failed condition.

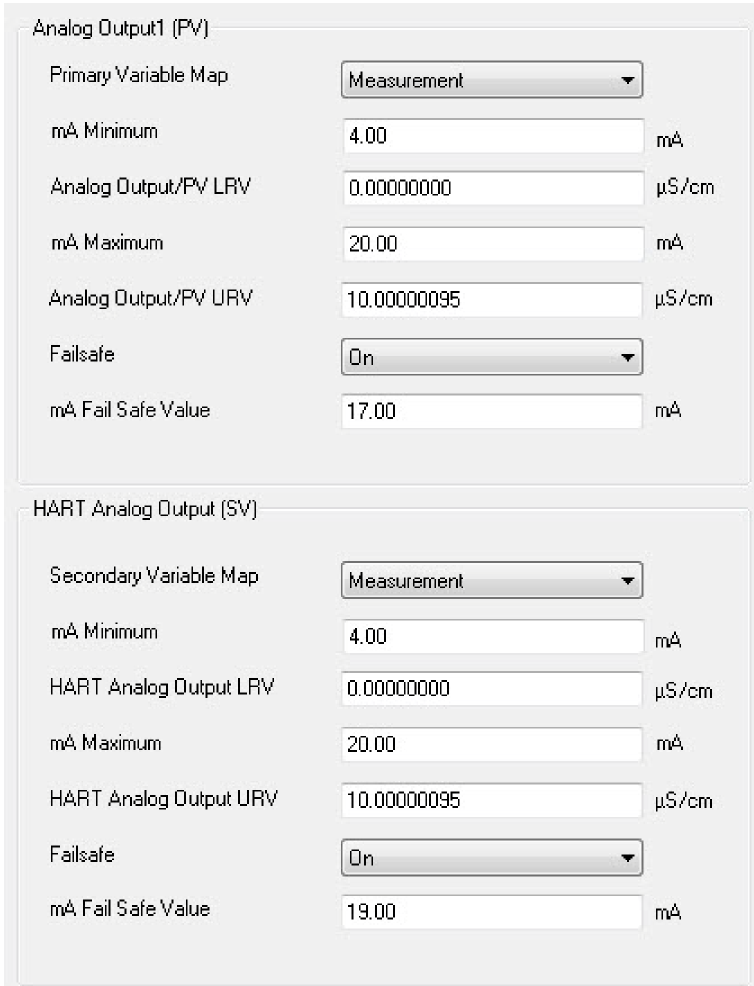


Figure 418. Sample 875CR Analyzer Analog Output Screen (Failsafe as On)

Field	Entry
Analog Output 1 (PV) and HART Analog Output (SV)	
mA Fail Safe Value	Specify DC mA/Analog output value between 3.8 and 20.5 mA.

Select Failsafe as **Pulse** if you want the signal outputted with a pulsed saw-tooth waveform of 0.5 mA for greater visibility on a chart recorder or data display.

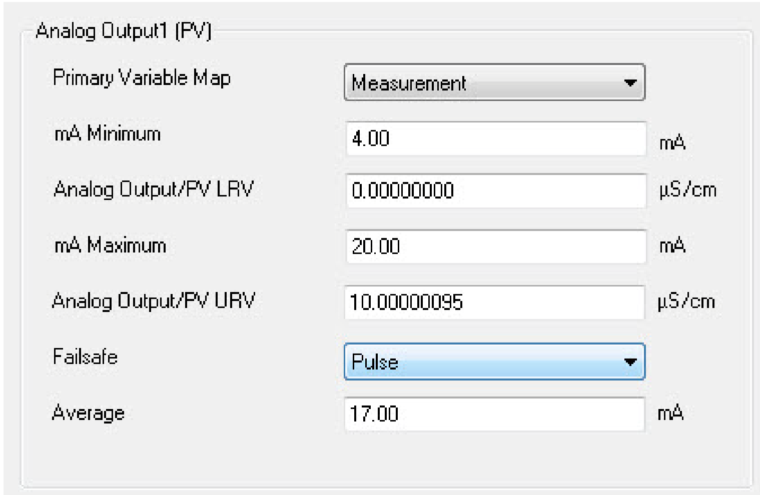


Figure 419. Sample 875CR Analyzer Analog Output Screen (Failsafe as Pulse)

Field	Entry
Analog Output 1 (PV)	
Average	Specify the Average mA/Analog output value between 3.8 and 20.5 mA.

HART

The HART screen allows you to specify the polling address and it shows the number of preambles in the response message.

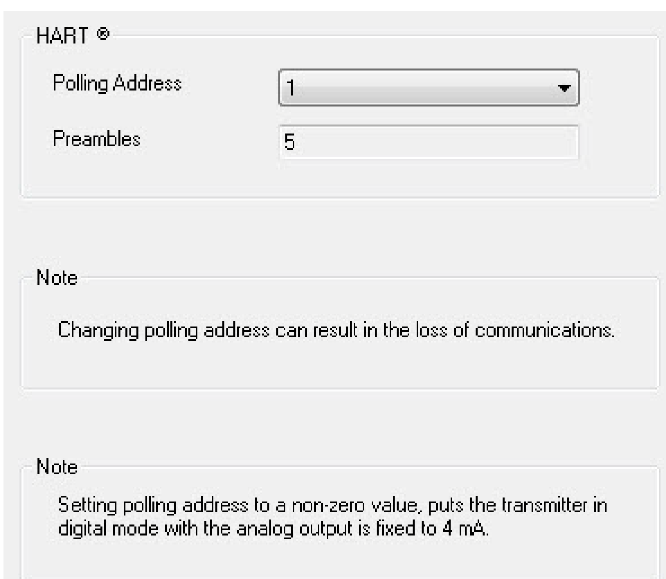


Figure 420. Sample 875CR Analyzer HART Output Screen

Field	Entry
HART	
Polling Address	Select a polling address between 0 and 15.
Preambles	This parameter shows the number of preambles in the response message. The preambles value is between 5 and 255.

Digital

The Digital screen allows you to map measurements to primary, secondary, tertiary, and quaternary variables.

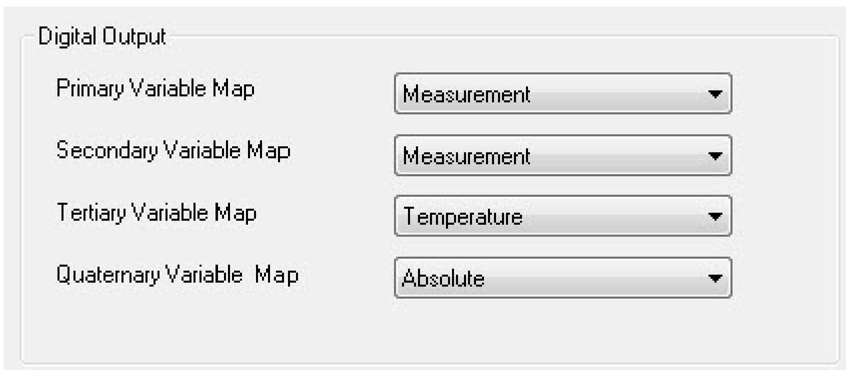


Figure 421. Sample 875CR Analyzer Digital Output Screen

Field	Entry
Digital Output	
Primary Variable Map	Configure a measurement for Analog 1. Choose from Measurement, Temperature, Absolute, and Off. For **Dual** cell configuration, choose from Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, and Off.
Secondary Variable Map	Configure a measurement for HART Analog. Choose from Measurement, Temperature, Absolute, and Off. For **Dual** cell configuration, choose from Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, and Off.
Tertiary Variable Map	Configure a measurement for Tertiary Variable. Choose from Measurement, Temperature, Absolute, and Off. For **Dual** cell configuration, choose from Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, and Off.

Field	Entry
Quaternary Variable Map	Configure a measurement for Quaternary Variable. Choose from Measurement, Temperature, Absolute, and Off. For **Dual** cell configuration, choose from Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, and Off.

Local Display

The Local Display screen is where you can configure the parameters for display.

For single cell configuration, select the measurements you want to show in line 1 of the display.

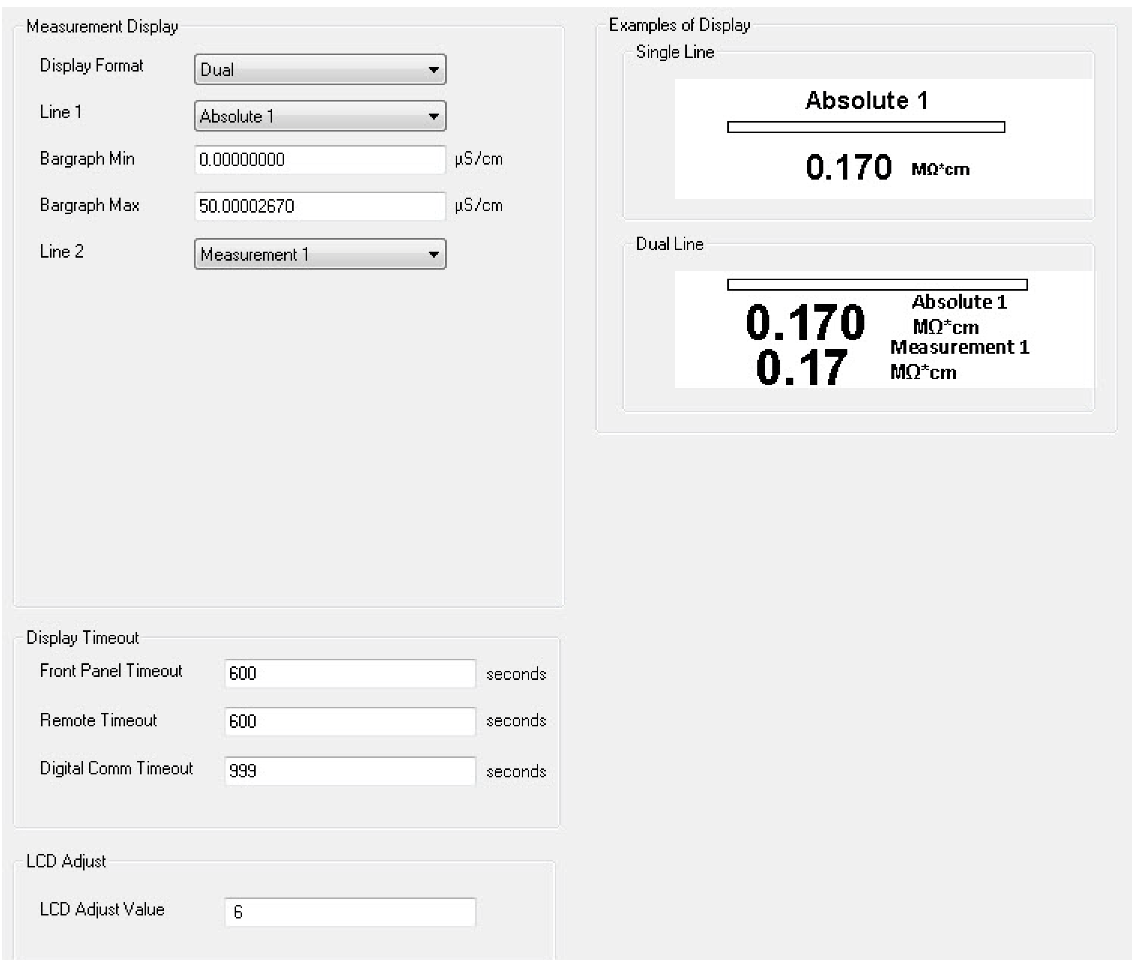


Figure 422. Sample 875CR Analyzer Local Display Screen (Dual Selection)

Field	Entry
Measurement Display	
Display Format	Select the display format. Choose from Dual, Single, or Scan. • Single: Displays a single measurement title, value, and unit on the local display. • Dual: Displays two measurement titles, values, and units on the local display. • Scan: Displays several selected measurements in sequence in a designated scan time.
Line 1	Select a measurement to be displayed in Line 1. Choose from Measurement, Temperature, Absolute, Analog 1, and HART. For Dual cell configuration, choose from: Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, Temperature Difference, Analog 1 (PV), and HART Analog (SV).
Bargraph Min	Specify the minimum bargraph value. This parameter does not appear if Line 1 is configured to Analog 1 or HART.
Bargraph Max	Specify the maximum bargraph value. This parameter does not appear if Line 1 is configured to Analog 1 or HART.
Line 2 (does not appear for single display format)	Select a measurement to be displayed in Line 2. Choose from Measurement, Temperature, Absolute, Analog 1, and HART. For Dual cell configuration, choose from: Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, Temperature Difference, Analog 1 (PV), and HART Analog (SV).
Display Timeout	
Front Panel Timeout	Configure front panel timeout between 5 and 999 seconds.
Remote Timeout	Configure remote timeout between 5 and 999 seconds.
Digital Comm Timeout	Configure digital communication timeout between 5 and 999 seconds.
LCD Adjust	
LCD Adjust Value	This parameter allows you to adjust the brightness of the display. The numbers (-9 to 0 to +9) shown on the display should only be used for darkening or lightening the display.

If you select **Scan** as the display format, specify which measurements you want to display in sequence, and the scan time.

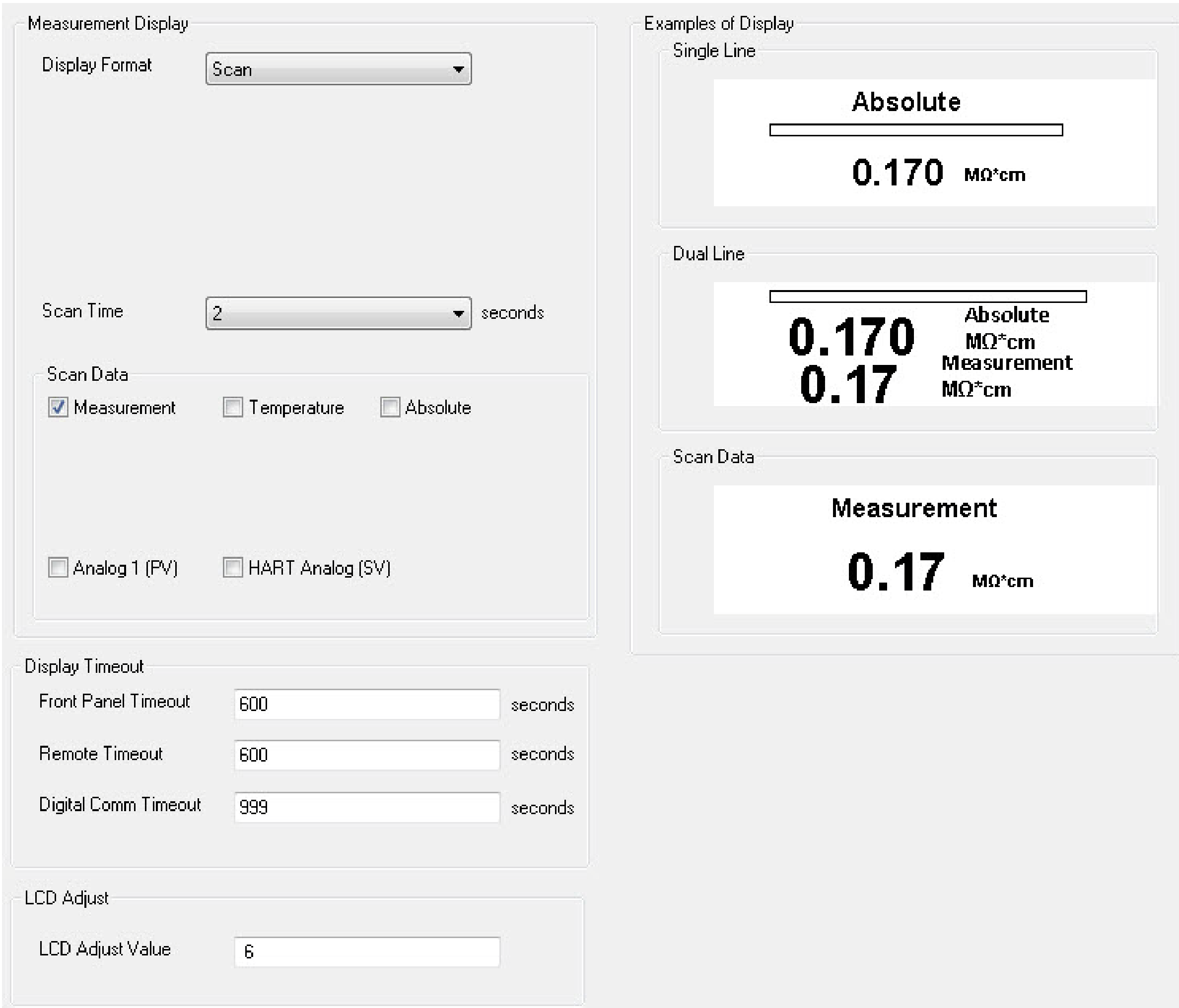


Figure 423. Sample 875CR Analyzer Local Display Screen (Scan Selection)

Field	Entry
Measurement Display	
Scan Time	Select the scan time. Choose from 2, 5, 10, and 20 seconds.
Scan Data	Select the measurements you want to display in sequence on the local display. Choose from Measurement, Temperature, Absolute, Analog 1 (PV), and HART Analog (SV). For Dual cell configuration, the options for Scan Data are: Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Measurement Average, Measurement Difference, Temperature Difference, Analog 1 (PV), and HART Analog (SV).

Auto Hold

The Auto Hold screen allows you to configure the analyzer to go into a Hold state when in Calibration or Configuration mode without setting the Hold each time. Hold is automatically removed when the Calibration or Configuration are done.

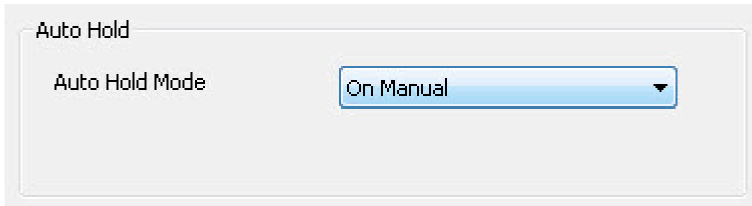


Figure 424. Sample 875CR Analyzer Auto Hold Screen

Field	Entry
Auto Hold	
Auto Hold Mode	Select the auto hold mode. Choose from: • On Present - to hold all values and states at their current level • On Manual - to hold all values and states at desired levels • Off - to release the analyzer from Hold state

Alarm 1

The Alarm screen allows you to specify the alarm to measurements, calculations, or conditions. The alarm reacts if the measurement exceeds the trip high point or drops below the trip low point.

It uses two controls - Hysteresis and Timed, to minimize chatter around the setpoint. Hysteresis does this by using the measurement; and Timed, by using time.

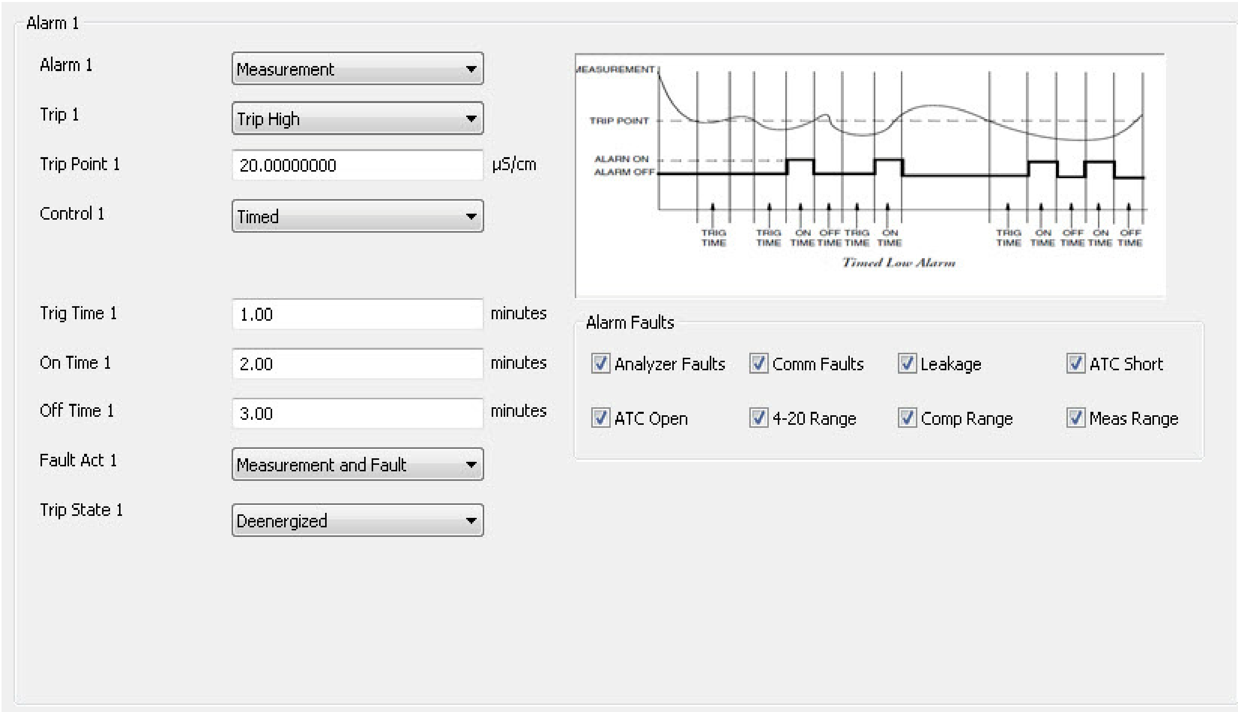


Figure 425. Sample 875CR Analyzer Alarm 1 Screen (Timed Selection)

Field	Entry
Alarm 1	
Alarm 1	Set the alarm 1 to one of the following: Measurement, Temperature, Absolute, On Fault, and Off. If the cell is configured to **Dual** mode, choose from Measurement 1, Temperature 1, Absolute 1, Measurement 2, Temperature 2, Absolute 2, % Rejection, Ratio, Meas Average, Measurement Difference, Temperature Difference, and On Fault. Select Off if you are not using the alarm.
Trip 1	Specify trip 1. Choose from: • Trip Low - to active alarm on a low going condition. • Trip High - to active alarm on a high going condition.
Trip Point 1	Specify the trip point 1 value.
Control 1	Select the Control as **Timed**.
Trig Time 1	Set the trig time from 00.00 to 99.99 minutes. When you specify a trig time, condition must exist continuously for the specified time period before the alarm condition is met.
On Time 1	Specify the alarm feed time from 00.00 to 99.99 minutes.
Off Time 1	This is the delay time before the alarm can trigger again. Specify the delay time from 00.00 to 99.99 minutes.

Field	Entry
Fault Act 1	Select the alarm fault action. Choose from: • Measurement Value - enables an alarm only when the measurement exceeds the alarm set point. • Valid Measurement - validates the cause for the alarm when the measurement exceeds the set point. If one of the selected faults is present but is not process related, the alarm is disabled. • Measurement and Fault - enables an alarm when the measurement exceeds the setpoint and/or if one of the selected faults is present. You can select the faults from the list of alarm faults that are displayed below the alarm graph.
Trip State 1	Select the trip state. Choose from: • Energized - provides a contact closure between 1C and 1NO (2C and 2NO) and an open contact between 1C and 1NC (2C and 2NC). • Deenergized - provides a contact closure between 1C and 1NC (2C and 2NC) and an open contact between 1C and 1NO (2C and 2NO).

— **NOTE**

The faults appear only when the alarm 1 is set to:

1. On Fault
2. Measurement or Temperature or Absolute and the Fault Act is set to ‘Measurement and Fault’.

Field	Entry
Alarm Faults	
Analyzer Faults	Select this check box to enable alarm in case of analyzer faults.
Comm Faults	Select this check box to enable alarm in case of communication faults.
Leakage	Select this check box to enable alarm in case of severe liquid leakage into the sensor.
ATC Short and ATC Open	Select these check boxes to enable alarm if the resistance of the temperature compensator is greater or less than the expected resistance of the device configured.
4-20 Range	Select this check box to enable alarm if the measurement mapped to the analog output is outside the range configured (4-20 mA).
Comp Range	Select this check box to enable alarm if the measured temperature or absolute conductivity or resistivity measurement is outside the temperature or chemical compensation curve configured for the currently running application.
Meas Range	Select this check box to enable alarm if the measurement is over or under the measurable range that is configured for the currently running application.

If the **Control** is specified as **Hysteresis**, enter the hysteresis value.

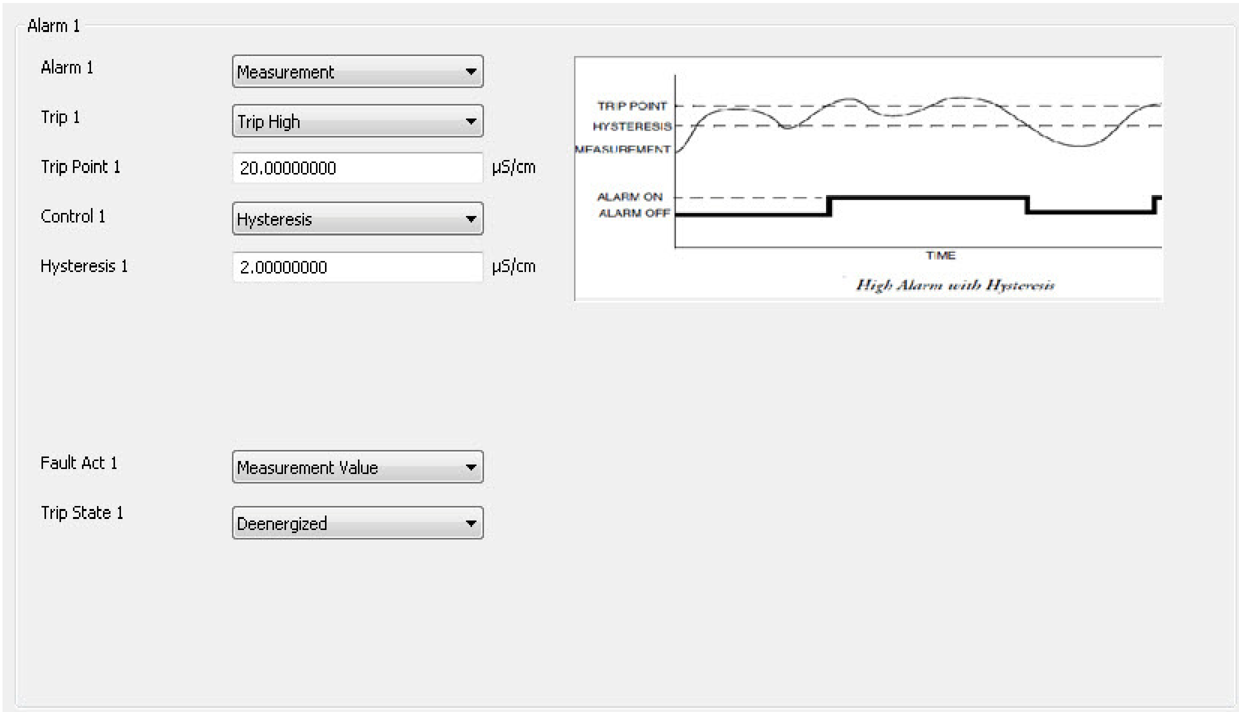


Figure 426. Sample 875CR Analyzer Alarm 1 Screen (Hysteresis Selection)

Field	Entry
Control 1	Select the Control as **Hysteresis**.
Hysteresis 1	Specify the hysteresis value.

Alarm 2

The Alarm 2 screen allows you to configure alarm 2 parameters to measurements, calculations, or conditions. For details of the parameters in this screen, refer to “Alarm 1” on page 344.

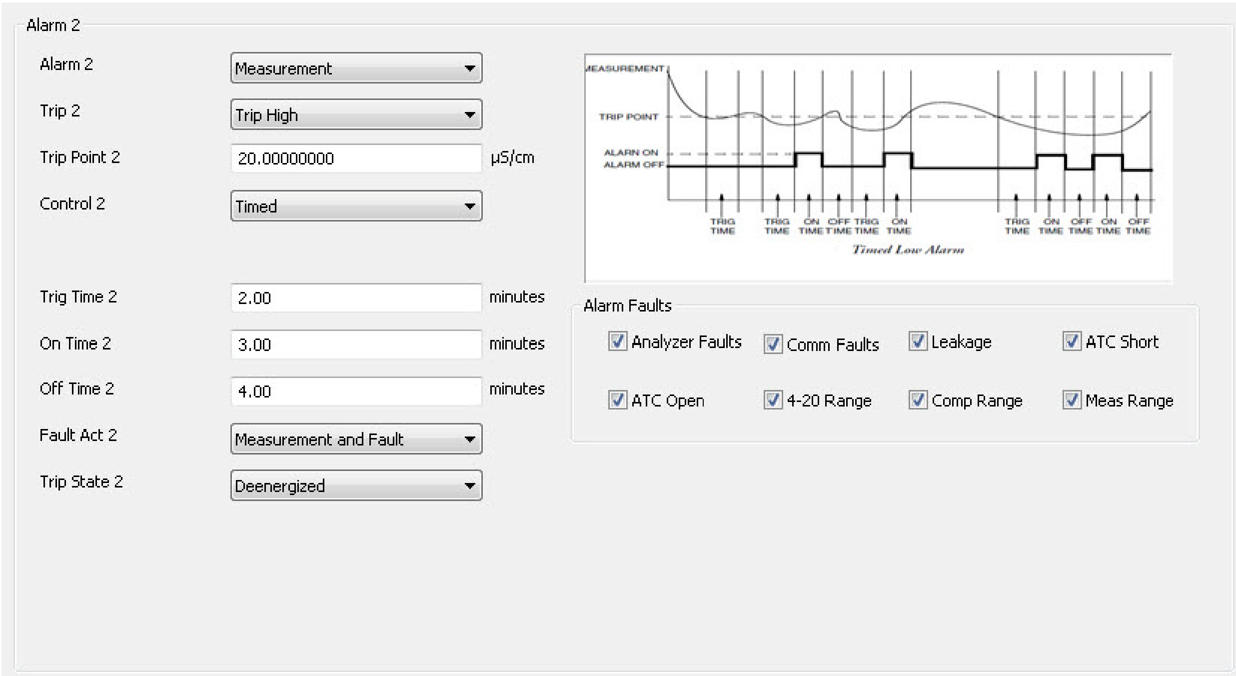


Figure 427. Sample 875CR Analyzer Alarm 2 Screen (Timed Selection)

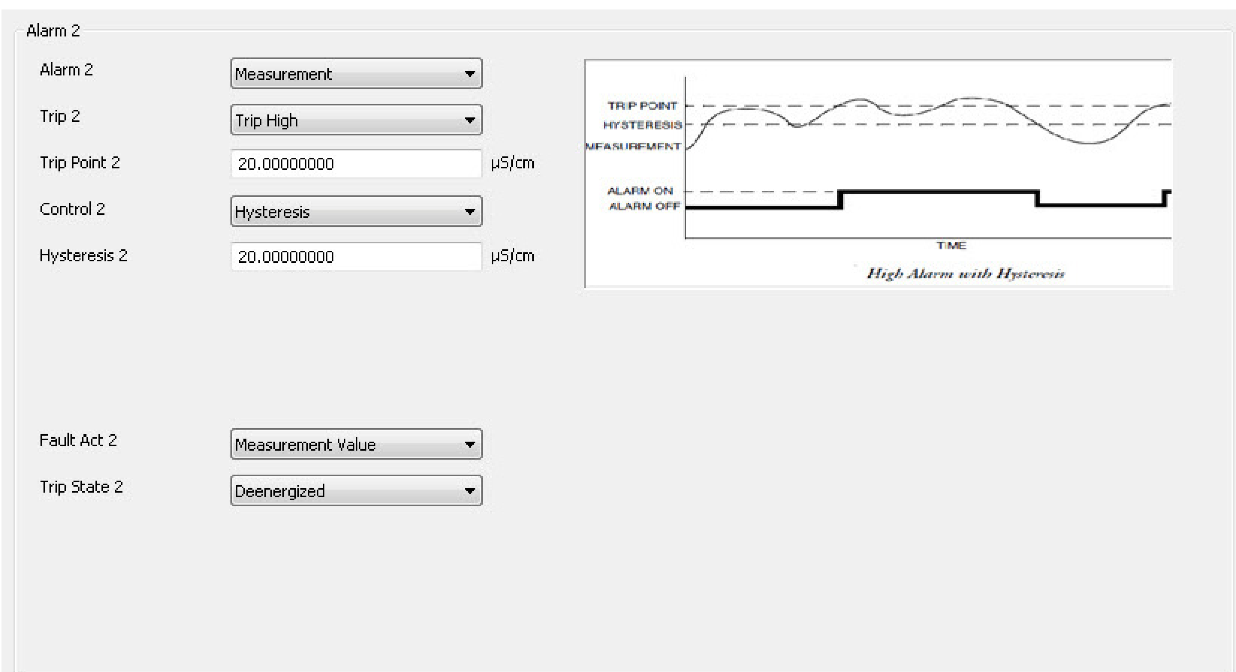


Figure 428. Sample 875CR Analyzer Alarm 2 Screen (Hysteresis Selection)

Remote

The Remote screen allows you to configure parameters so that the analyzer can be operated via a remote personal computer program on a PC.

The analyzer updates the remote port with measurement information at the configured update rate.

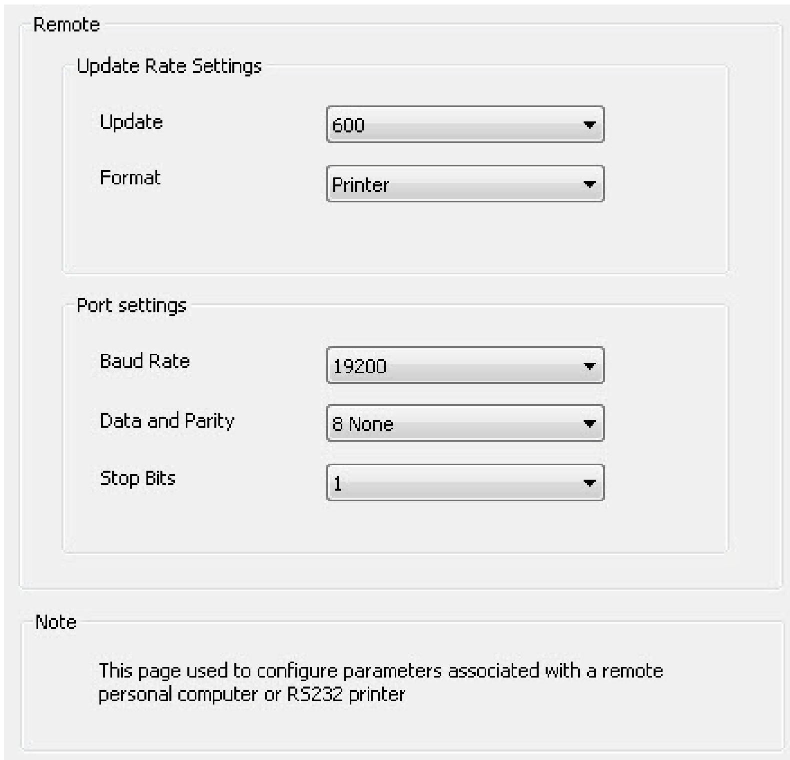


Figure 429. Sample 875CR Analyzer Remote Screen

Field	Entry
Remote	
Update Rate Settings	
Update	Set the update frequency. Choose from 5, 10, 30, 60, 120, 300, 600, 1200, or 3600 seconds.
Format	This parameter is used to produce a log of your measurements. Set the Format to Printer or Spreadsheet.
Port Settings	
Baud Rate	Set the Baud Rate to 300, 600, 1200, 2400, 4800, 9600, or 19200.
Data and Parity	Set the Data Parity to 7 Odd, 7 Even, 8 Odd, 8 Even, or 8 None.
Stop Bits	Set the Stop Bits to 1 or 2.

Diagnostic Configuration

The Diagnostic Configuration screen allows you to choose the faults for which you want the error messages to be displayed.

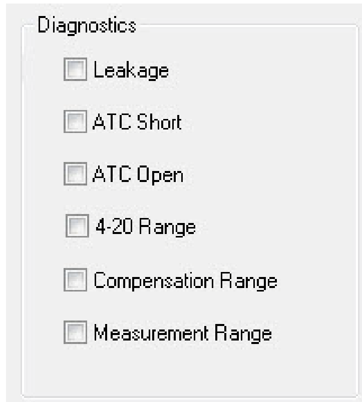
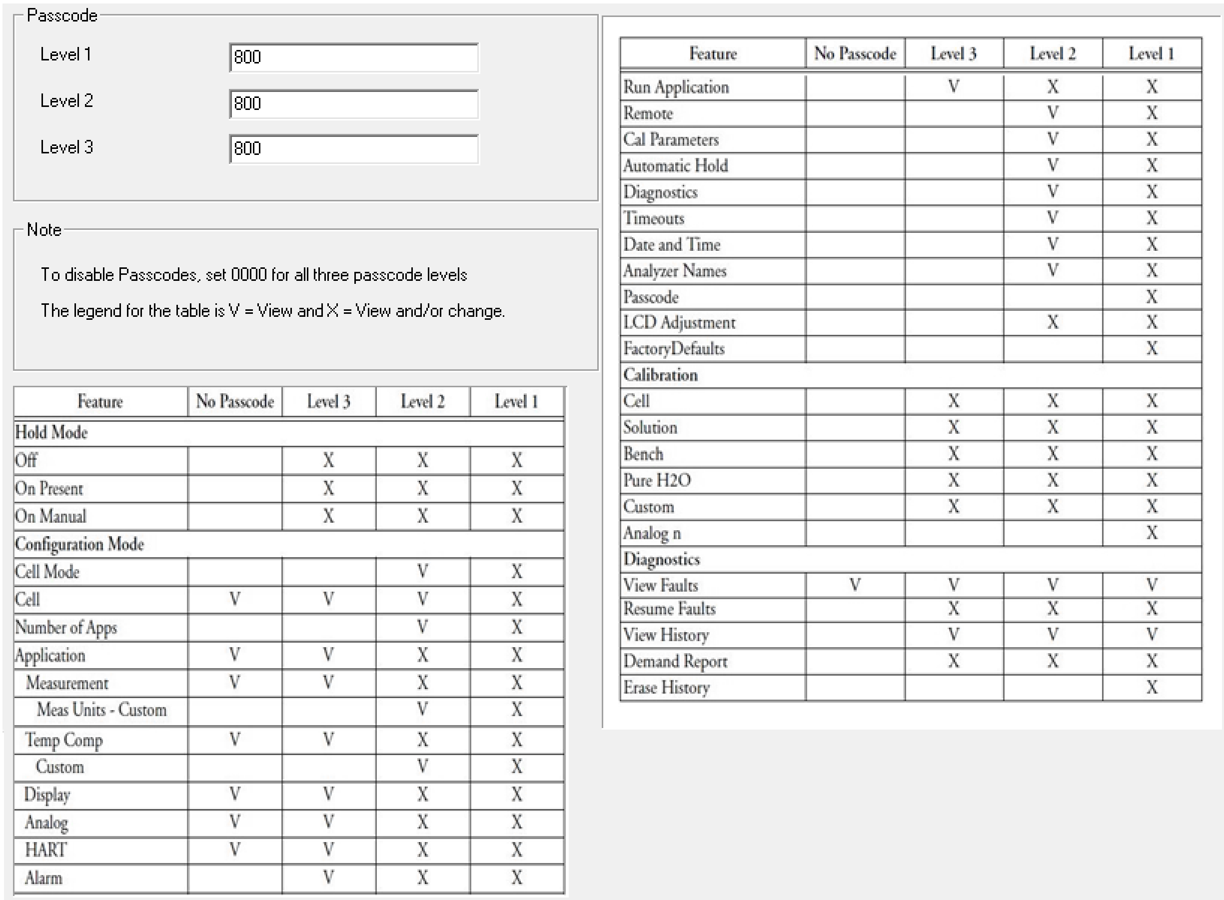


Figure 430. Sample 875CR Analyzer Diagnostic Configuration Screen

Passcode Access

The Passcode Access screen allows you to establish or change passcodes for the three levels of security provided to the analyzer through front panel, remote control, or digital communication interfaces. Users having access to Level 1 can set or modify these passcodes in configuration mode.



Feature	No Passcode	Level 3	Level 2	Level 1
Hold Mode				
Off		X	X	X
On Present		X	X	X
On Manual		X	X	X
Configuration Mode				
Cell Mode			V	X
Cell	V	V	V	X
Number of Apps			V	X
Application	V	V	X	X
Measurement	V	V	X	X
Meas Units - Custom			V	X
Temp Comp	V	V	X	X
Custom			V	X
Display	V	V	X	X
Analog	V	V	X	X
HART	V	V	X	X
Alarm		V	X	X

Feature	No Passcode	Level 3	Level 2	Level 1
Run Application		V	X	X
Remote			V	X
Cal Parameters			V	X
Automatic Hold			V	X
Diagnostics			V	X
Timeouts			V	X
Date and Time			V	X
Analyzer Names			V	X
Passcode				X
LCD Adjustment			X	X
FactoryDefaults				X
Calibration				
Cell		X	X	X
Solution		X	X	X
Bench		X	X	X
Pure H2O		X	X	X
Custom		X	X	X
Analog n				X
Diagnostics				
View Faults	V	V	V	V
Resume Faults		X	X	X
View History		V	V	V
Demand Report		X	X	X
Erase History				X

Figure 431. Sample 875CR Analyzer Passcode Access Screen

Field	Entry
Passcode	
Level 1	Specify the passcode for Level 1. It can be set from 0 to 9999.
Level 2	Specify the passcode for Level 2. It can be set from 0 to 9999.
Level 3	Specify the passcode for Level 3. It can be set from 0 to 9999.

— NOTE

1. The table in the screen shows the access permissions of the users to each of the screens. Access permissions are indicated by ‘X’ or ‘V’
   ‘X’ - user can edit
   ‘V’ - user can only view
2. The factory default pass code for all three levels is 0800.

Restore Configuration

The Restore Configuration screen allows you to reset all data to default values.

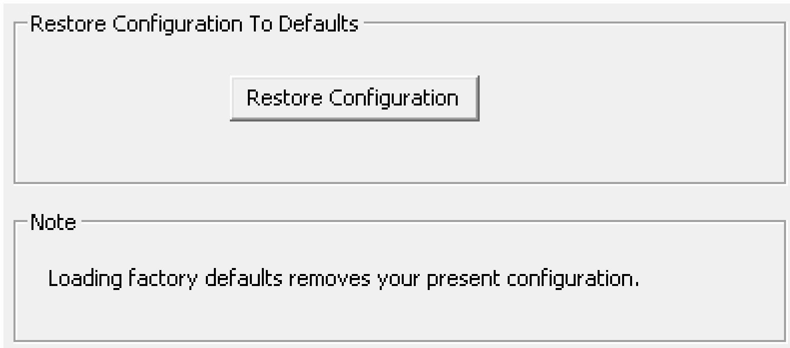


Figure 432. Sample 875CR Analyzer Restore Configuration Screen

Device Information

The Device Information screen complete information of the device. It allows you to set the tag name, tag number, HART message, location, device name, and date and time of last calibration.

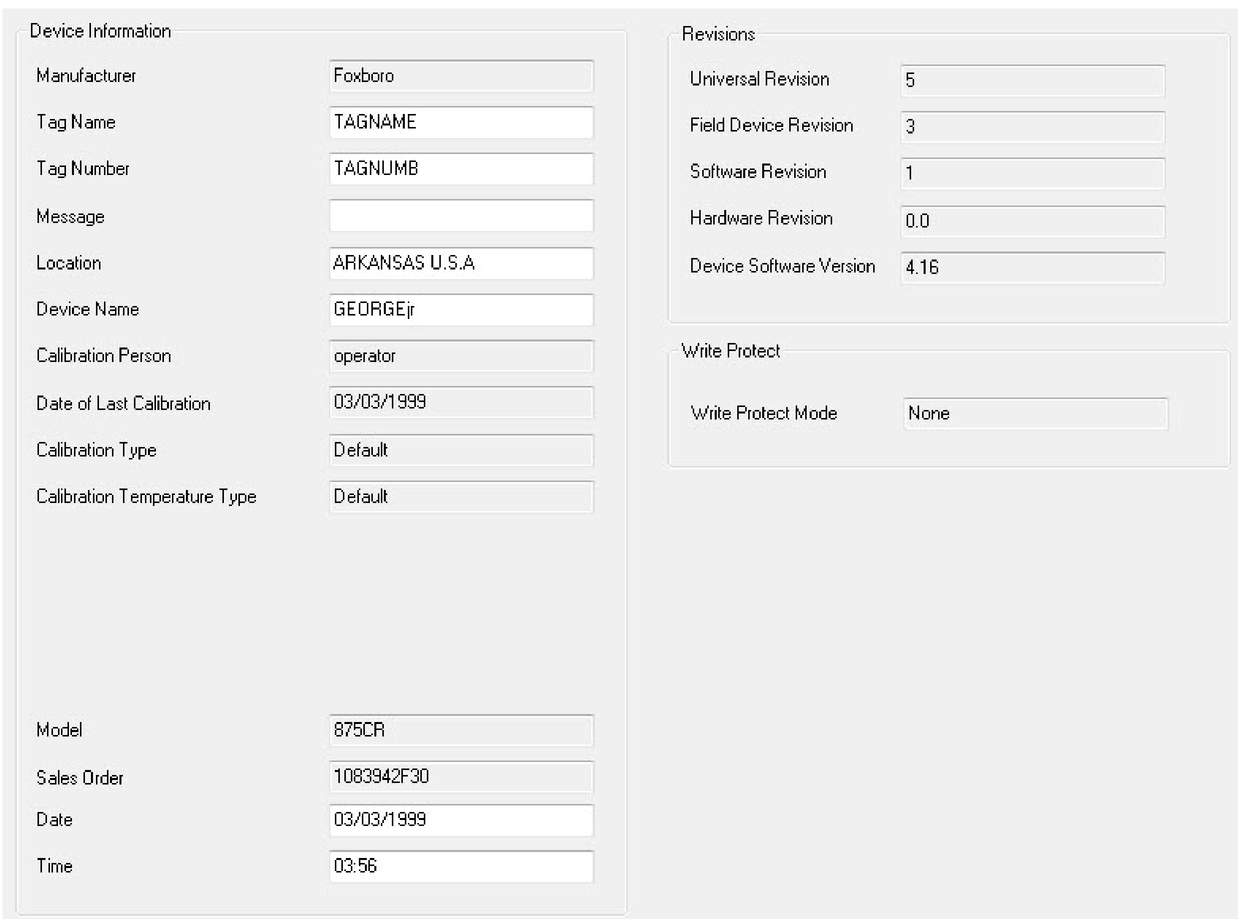


Figure 433. Sample 875CR Analyzer Device Information Screen (Single Cell)

Field	Entry
Device Information	
Manufacturer	Shows the name of the manufacturer of the device.
Tag Name	Specify a name for HART tag.
Tag Number	Specify the HART tag number.
Message	Specify the HART message.
Location	Specify the location where the measurements are done.
Device Name	Specify the name of the device.
Calibration Person	Shows the name of the last calibrator.
Date of Last Calibration	Set the date of last calibration.
Calibration Type	Shows the type of calibration (bench, solution, factory default).
Calibration Temperature Type	Shows the temperature calibration type of last calibration (default, custom, solution, failsafe, manual).
Model	Shows the model number of the analyzer.
Sales Order	Shows the analyzer sales order number.
Date	Set the current date.
Time	Set the current time.
Revisions	
Universal Revision	Shows the universal command set revision level.
Field Device Revision	Shows the field device revision level.
Software Revision	Shows the software revision level.
Hardware Revision	Shows the hardware revision level.
Device Software Revision	Shows the device software revision level.
Write Protect	
Write Protect Mode	Shows the write protect status.

For Dual cell configuration, the details of cell 1 and cell 2 are displayed as shown in the screen below.

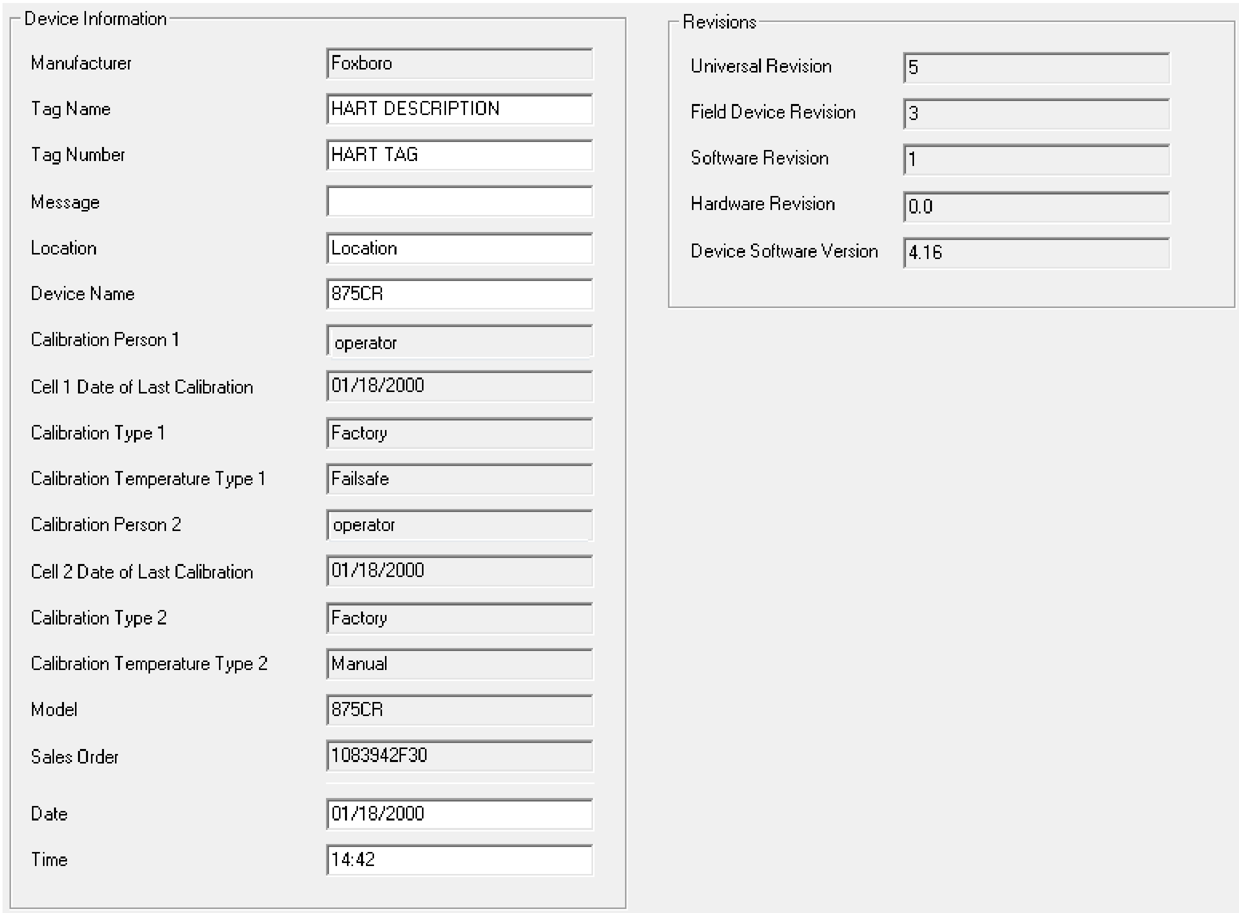


Figure 434. Sample 875CR Analyzer Device Information Screen (Dual and Redundant Cell)

Device Status

HART Status

The HART Status screen shows the HART status as well as the field device status of the device. The status of each parameter is easily recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

If Configuration Changed does not show a green check mark, it can be reset by clicking the Reset Configuration Changed Flag button on the lower right side of the screen.

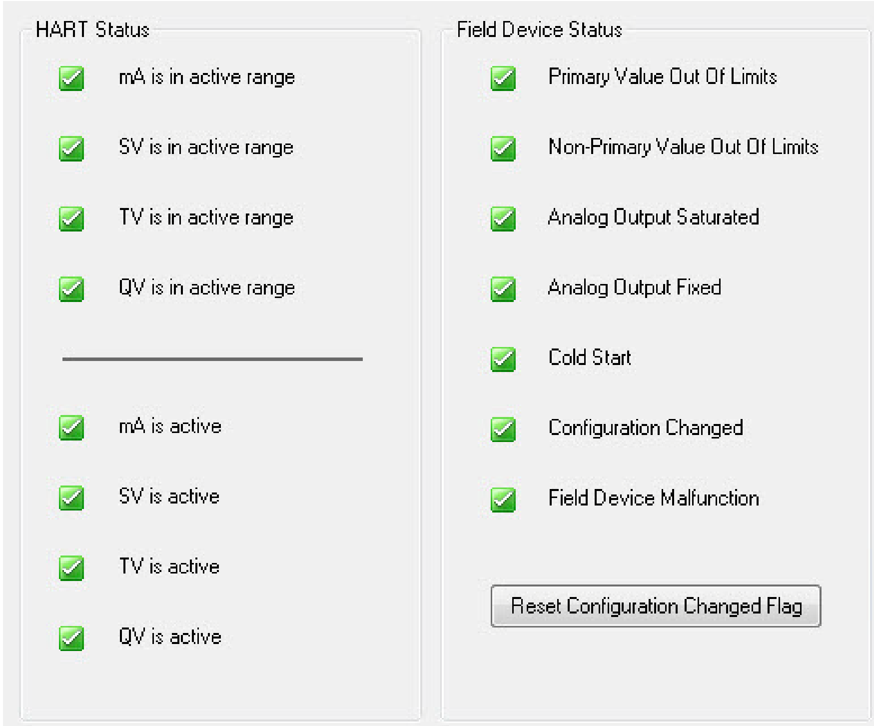


Figure 435. Sample 875CR Analyzer HART Status Screen

Calibration

Parameters

The Parameters calibration screen allows you to define the parameters used by the analyzer in checking for measurement and temperature stability when performing a calibration.

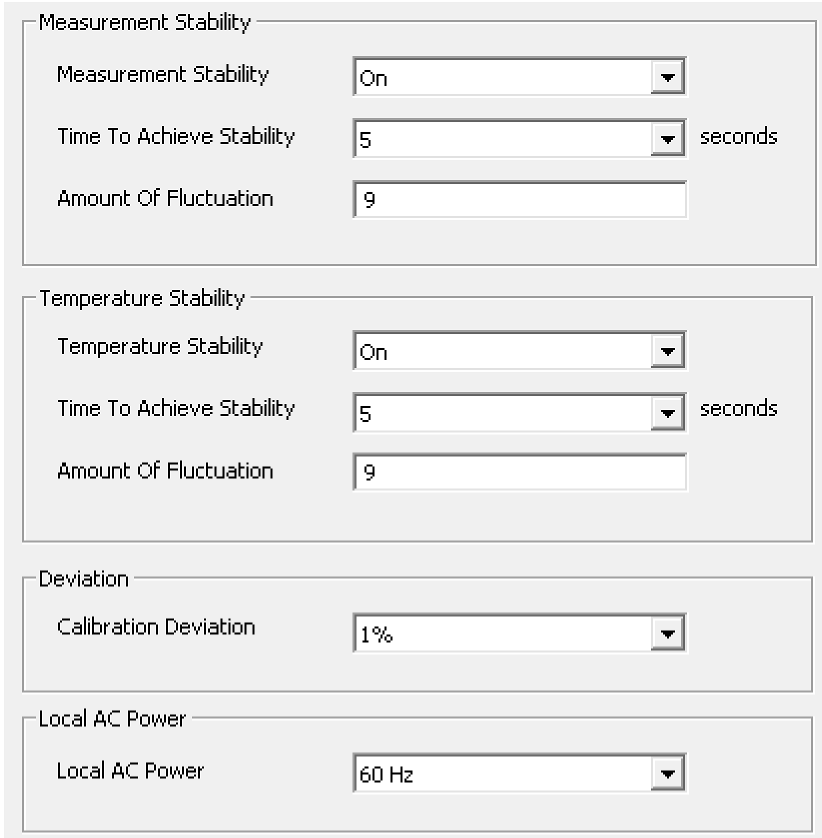


Figure 436. Sample 875CR Analyzer Parameters Calibration Screen

Field	Entry
Measurement Stability	
Measurement Stability	While performing calibration, the analyzer checks the stability in absolute measurement before accepting the change. Set the measurement stability as On or Off.
Time to Achieve Stability	This parameter is available if Measurement Stability is configured ‘On’. Specify the time between 5 and 60 seconds (in 5-second increments) to attain stability.
Amount of Fluctuation	This parameter is available if Measurement Stability is configured ‘On’. Specify the amount of fluctuation between 1 and 9. A longer time period and a smaller measurement value assures more stability during calibration.
Temperature Stability	
Temperature Stability	While performing calibration the analyzer checks the stability in temperature before accepting the change. Set the temperature stability as On or Off.
Time to Achieve Stability	This parameter is available if Temperature Stability is configured ‘On’. Specify the time between 5 and 60 seconds (in 5-second increments) to attain stability.

Field	Entry
Amount of Fluctuation	This parameter is available if Temperature Stability is configured ‘On’. Specify the amount of fluctuation between 1 and 9. A longer time period and a smaller measurement value assures more stability during calibration.
Deviation	
Calibration Deviation	Specify the amount of deviation from the factory calibration you can tolerate during your instrument calibration. Choose from 1%, 2%, 5%, 10%, or 20%. Choose Off to disengage this feature.
Local AC Power	
Local AC Power	If the analyzer uses 24 V dc supply voltage, specify the Local AC Power as 50 Hz or 60 Hz, to best filter the readings.

Bench

The Bench calibration is an analyzer only calibration and is accomplished with the use of discrete components or by returning to the stored “factory default” calibration.

Default Calibration

The Default Calibration screen allows you to return to the stored factory default calibration.

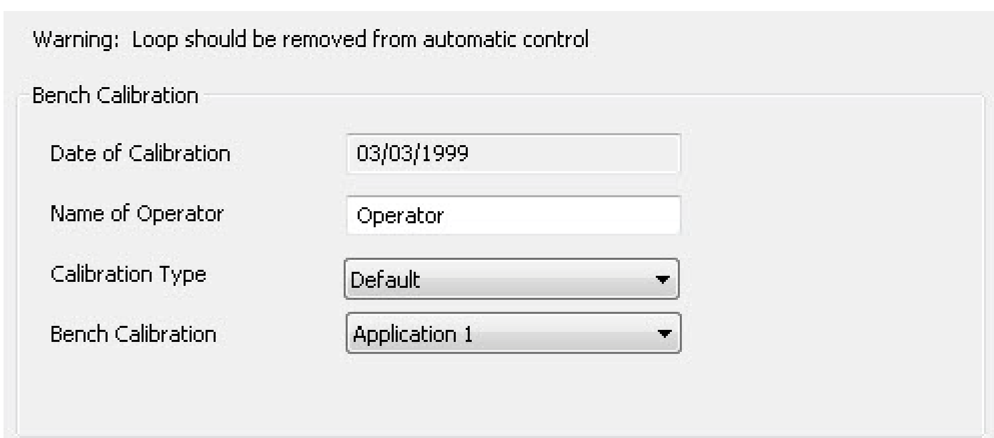


Figure 437. Sample 875CR Analyzer Default Calibration Screen 1

Field	Entry
Bench Calibration	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the operator.
Calibration Type	Select **Default** as the calibration type.
Bench Calibration	Select the application for calibration.

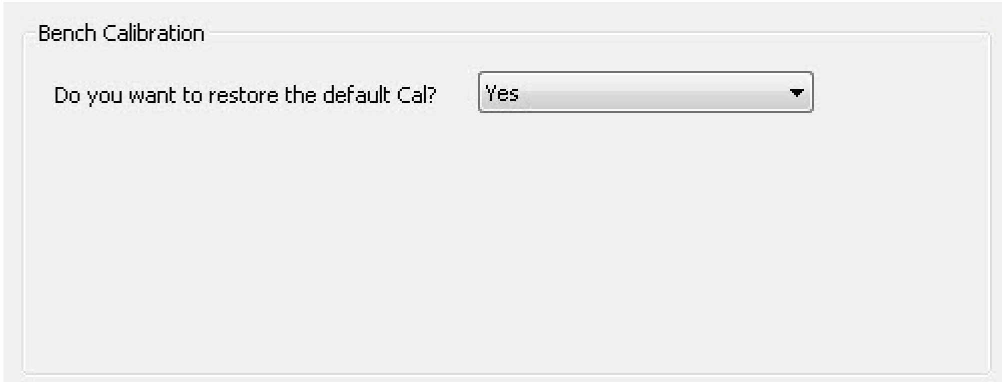


Figure 438. Sample 875CR Analyzer Default Calibration Screen 2

Select Yes if you want to restore the default calibration. Select No if you choose not to restore. If you have selected Yes, click **Next**.

Figure 439. Sample 875CR Analyzer Default Calibration Screen 3

Click **Next** again to complete the calibration process.

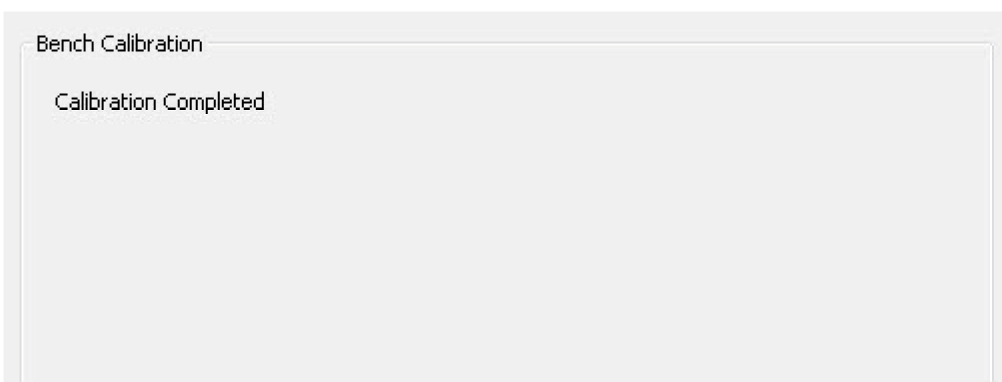


Figure 440. Sample 875CR Analyzer Default Calibration Screen 4

User Calibration

The User Calibration screen allows you to perform calibration by connecting your calibrating resistors to the analyzer.

Figure 441. Sample 875CR Analyzer User Calibration Screen 1

Field	Entry
Bench Calibration	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the operator.
Calibration Type	Select **User** as the calibration type.
Bench Calibration	Select the application for calibration.

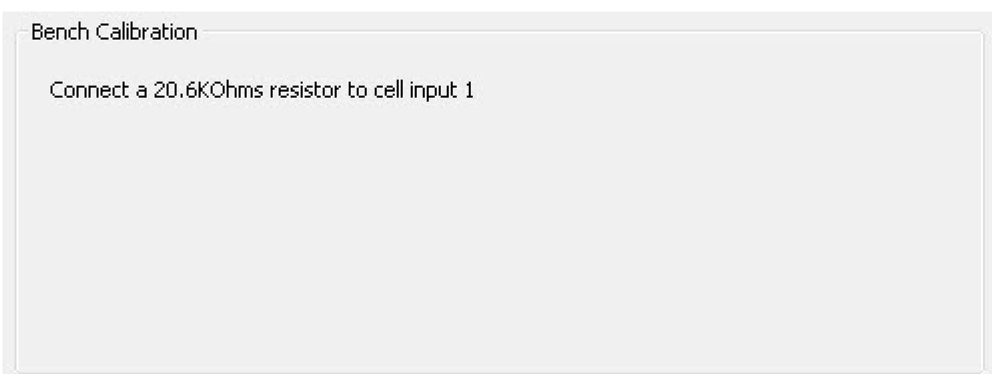


Figure 442. Sample 875CR Analyzer User Calibration Screen 2

Connect the resistor to cell input 1.

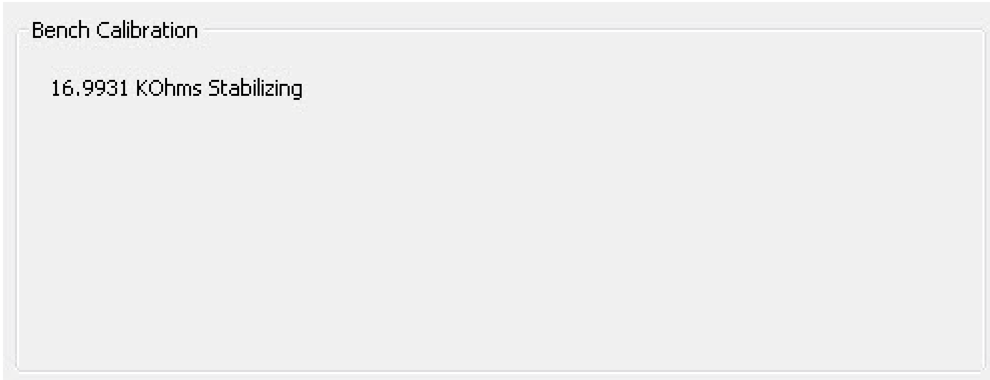


Figure 443. Sample 875CR Analyzer User Calibration Screen 3

If Measurement Stability is configured Off, watch for the measurement to stabilize before proceeding. If it is configured On, the display reads **Stabilizing** until stability is achieved. When the message disappears, click **Next**.

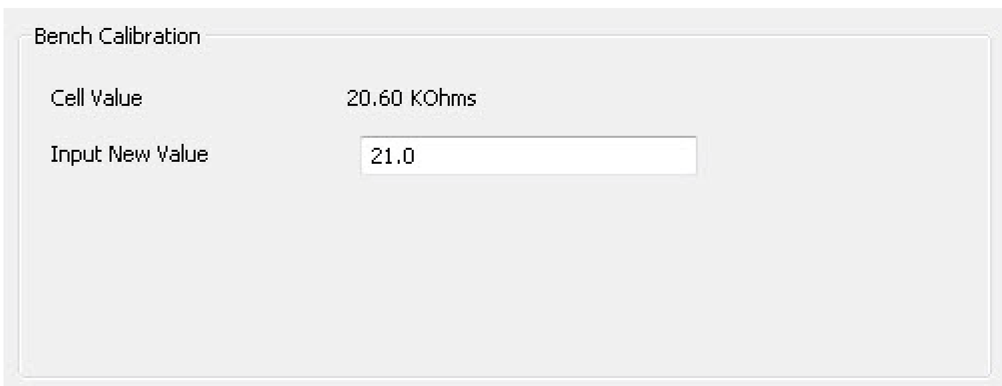


Figure 444. Sample 875CR Analyzer User Calibration Screen 4

Click **Next** again to complete the calibration process.

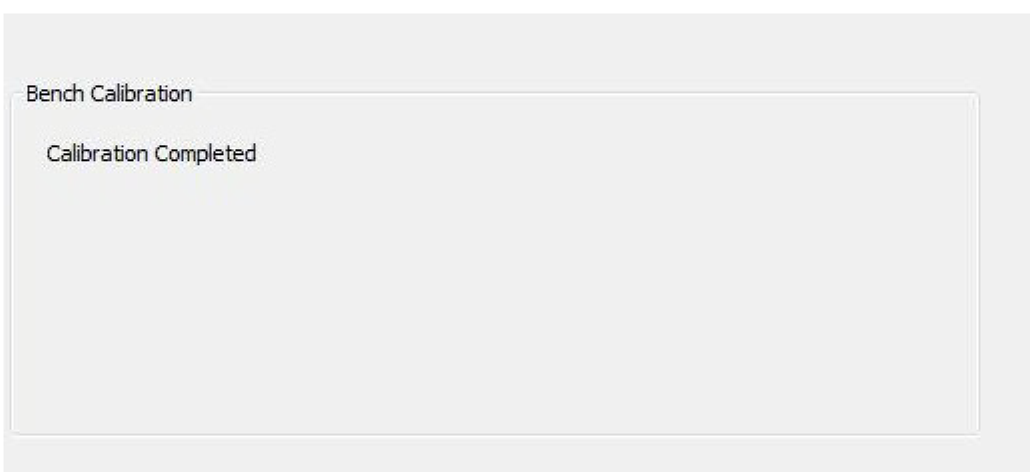


Figure 445. Sample 875CR Analyzer User Calibration Screen 5

Solution

The Solution screen allows you to perform a calibration using real solutions. This calibration can be done using 1 Pt Offset, 1 Pt Span, 2 Point, or Temp Adjust calibration types.

1 Pt Offset

This calibration is used if correcting for a shift in system zero.

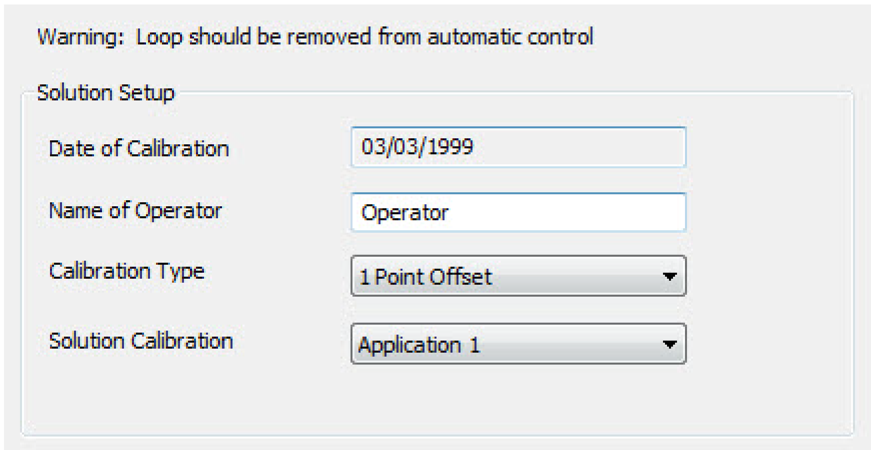


Figure 446. Sample 875CR Analyzer 1 Point Offset Calibration Screen 1

Field	Entry
Solution Setup	
Date of Last Calibration	Shows the date of last calibration.
Name of Operator	Specify the name of the calibrator.
Calibration Type	Select the calibration as ‘1 Pt Offset’.
Solution Calibration	From the drop-down list of preconfigured applications, select the application to perform the calibration.

Click **Next**. The Display advises to put the sensor in the solution.

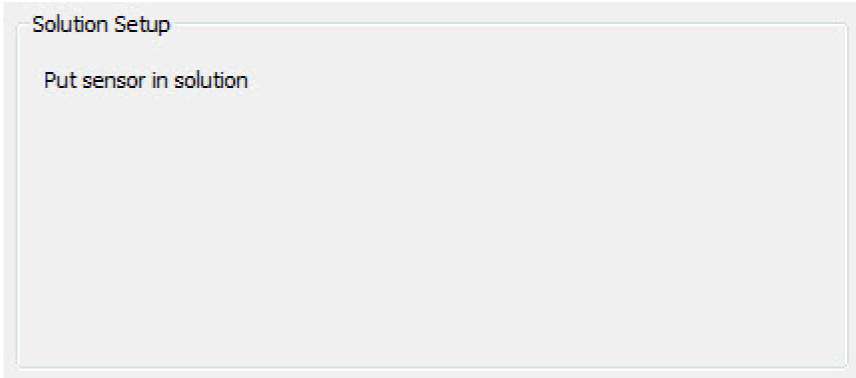


Figure 447. Sample 875CR Analyzer 1 Point Offset Calibration Screen 2

Put the sensor in the solution and click **Next**. The display reads **Stabilizing** until stability is achieved. Then the measurement value is displayed.

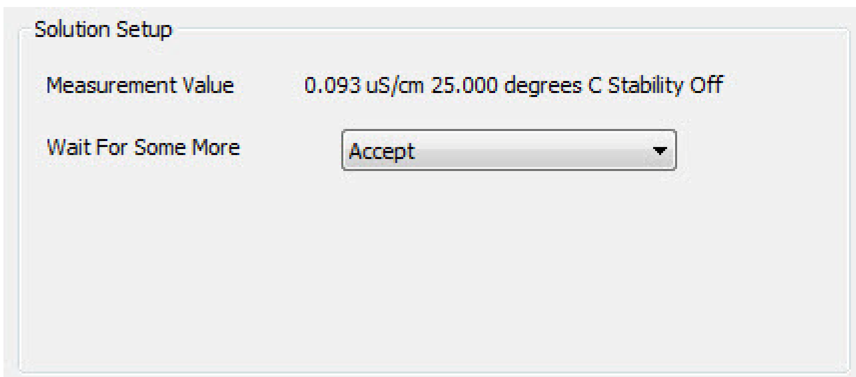


Figure 448. Sample 875CR Analyzer 1 Point Offset Calibration Screen 3

Select **Accept** to accept the stabilized value or select **Wait** to wait for another stabilized value and click **Next**.

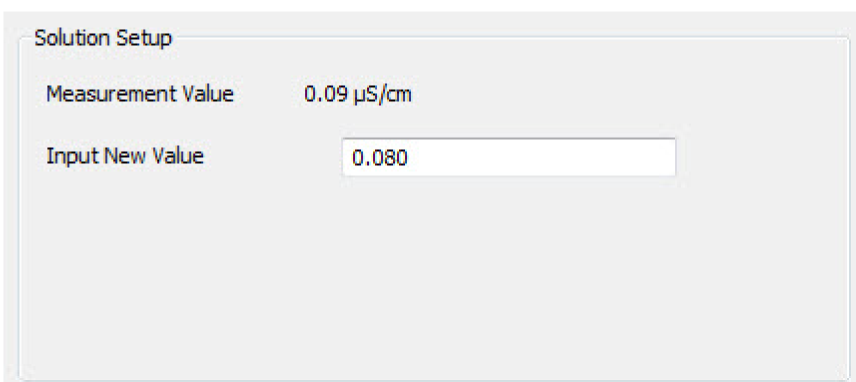


Figure 449. Sample 875CR Analyzer 1 Point Offset Calibration Screen 4

If the reading is not correct, edit it to the correct value and click **Next**.

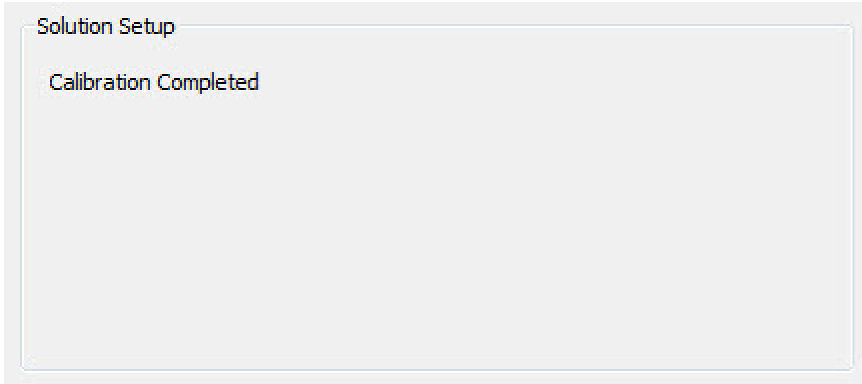


Figure 450. Sample 875CR Analyzer 1 Point Offset Calibration Screen 5

After the calibration is completed, click **OK** to return to Calibration menu.

1 Pt Span

1 Pt Span calibration is used to correct for a shift in system span and should be used at the higher end of the measurement range chosen.

Select the calibration type as '1 Pt Span' and follow the calibration steps mentioned for "1 Pt Offset" calibration.

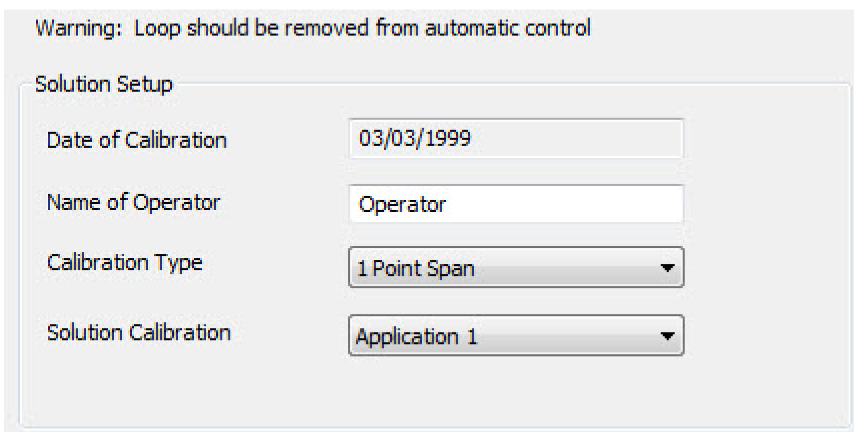


Figure 451. Sample 875CR Analyzer 1 Point Span Calibration Screen 1

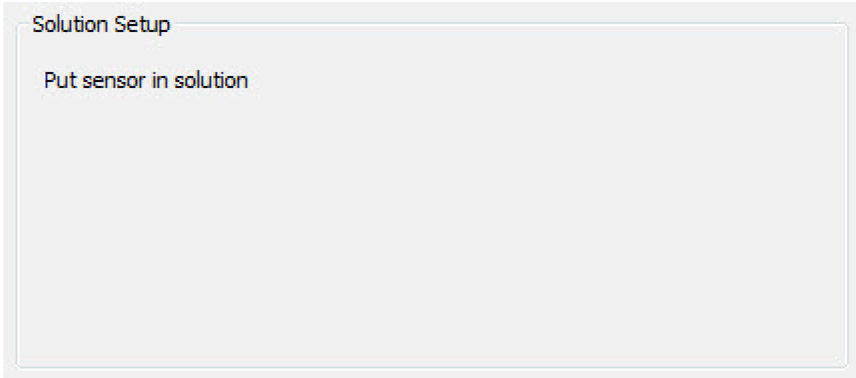


Figure 452. Sample 875CR Analyzer 1 Point Span Calibration Screen 2

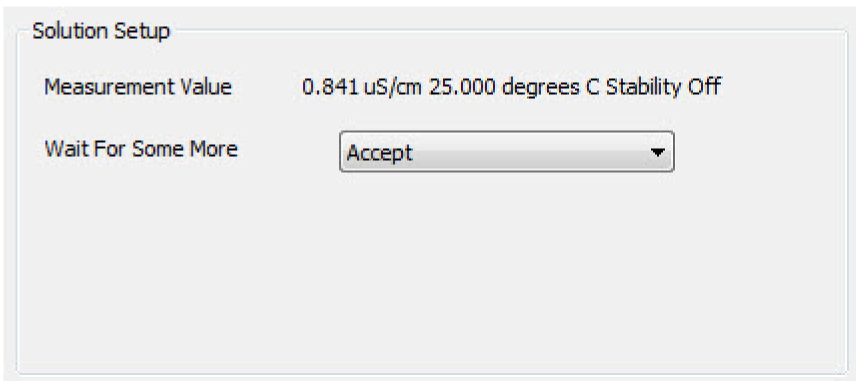


Figure 453. Sample 875CR Analyzer 1 Point Span Calibration Screen 3

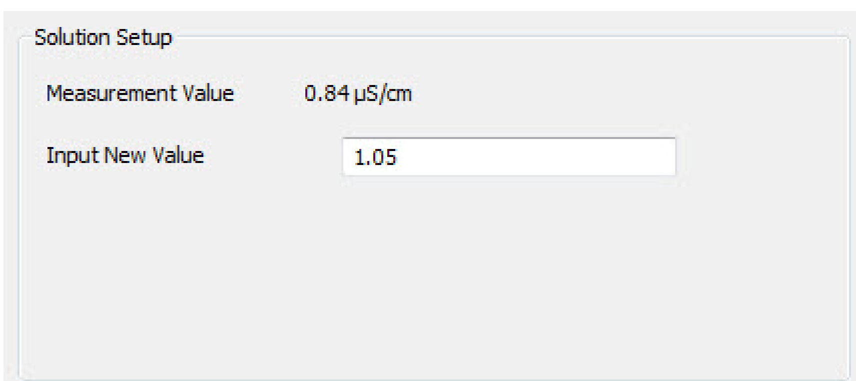


Figure 454. Sample 875CR Analyzer 1 Point Span Calibration Screen 4

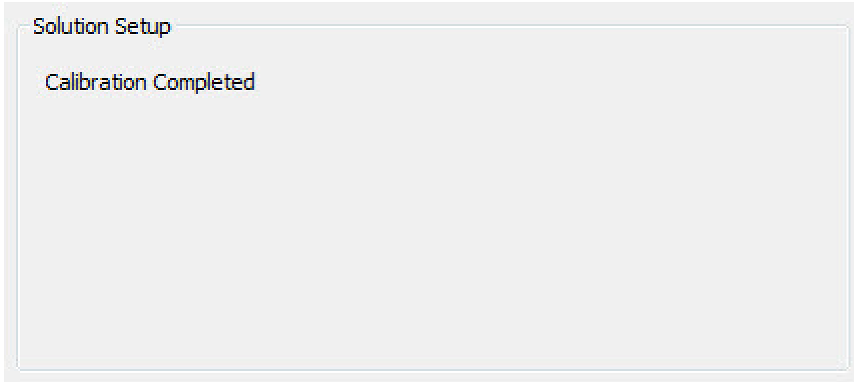


Figure 455. Sample 875CR Analyzer 1 Point Span Calibration Screen 5

2 Point

The 2 Point calibration allows calibration at 2 user entered values.

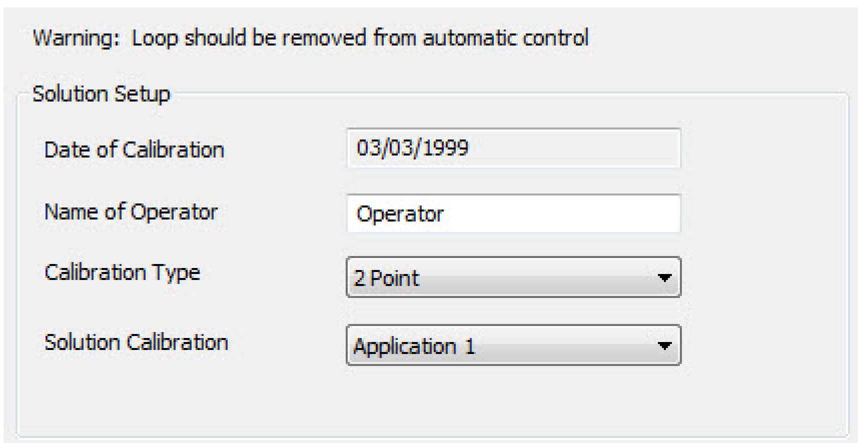


Figure 456. Sample 875CR Analyzer 2 Point Calibration Screen 1

Field	Entry
Solution Setup	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the calibrator.
Calibration Type	Select the calibration as **2 Point**.
Solution Calibration	From the drop-down list of preconfigured applications, select the application to perform the calibration.

Click **Next**. The Display advises to put the sensor in the solution 1.

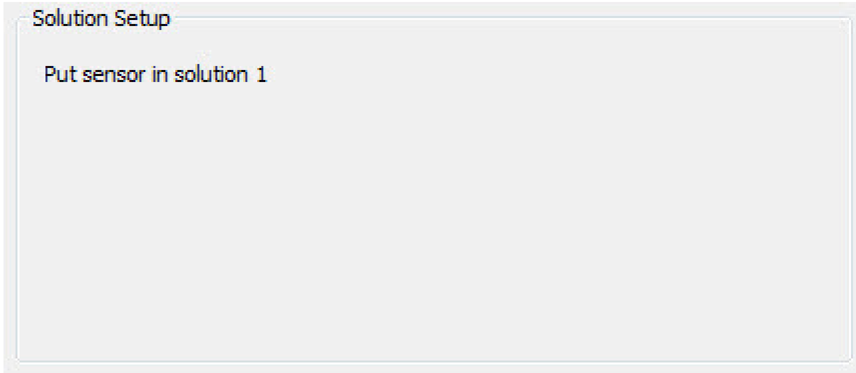


Figure 457. Sample 875CR Analyzer 2 Point Calibration Screen 2

Put sensor into solution 1 and click **Next**. The display reads **Stabilizing** until stability is achieved. Then the measurement value is displayed.

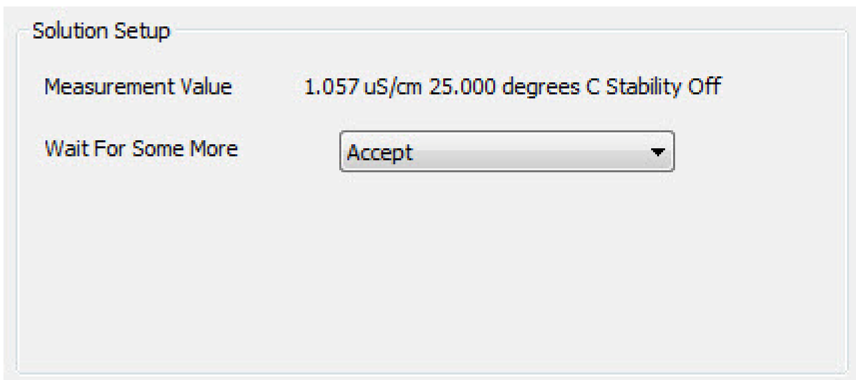


Figure 458. Sample 875CR Analyzer 2 Point Calibration Screen 3

Select **Accept** to accept the stabilized value or select **Wait** to wait for another stabilized value and click **Next**.

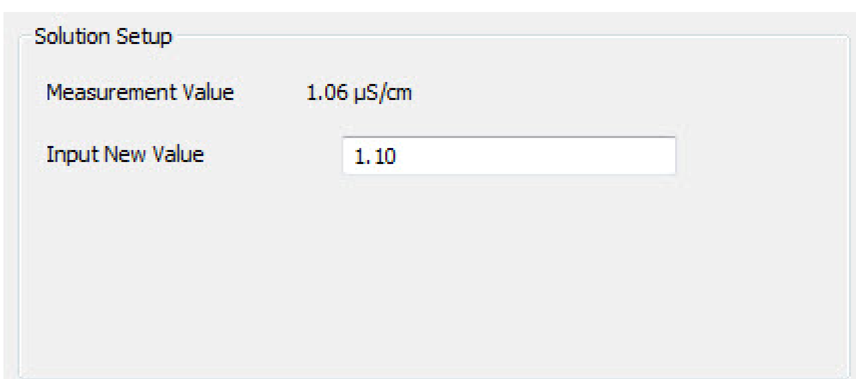


Figure 459. Sample 875CR Analyzer 2 Point Calibration Screen 4

If the reading is not correct, edit it to the correct value and click **Next**. The message advises to immerse your sensor into solution 2.

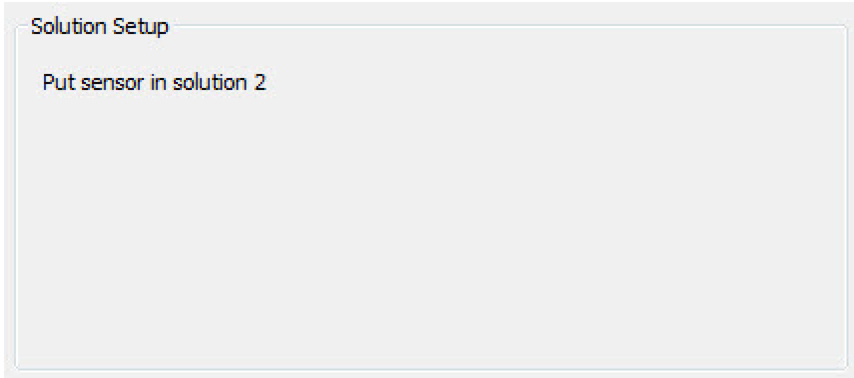


Figure 460. Sample 875CR Analyzer 2 Point Calibration Screen 5

Put the sensor in solution 2 and repeat the above steps for solution 2.

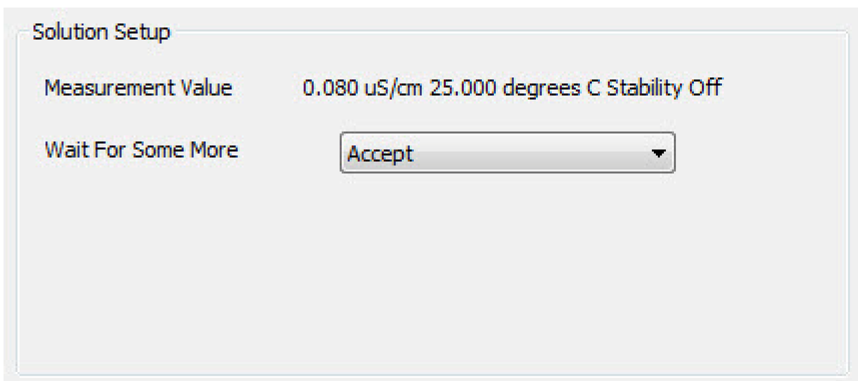


Figure 461. Sample 875CR Analyzer 2 Point Calibration Screen 6

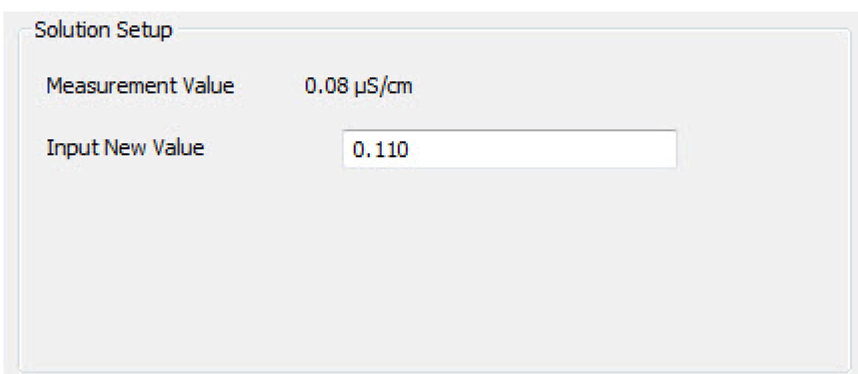


Figure 462. Sample 875CR Analyzer 2 Point Calibration Screen 7

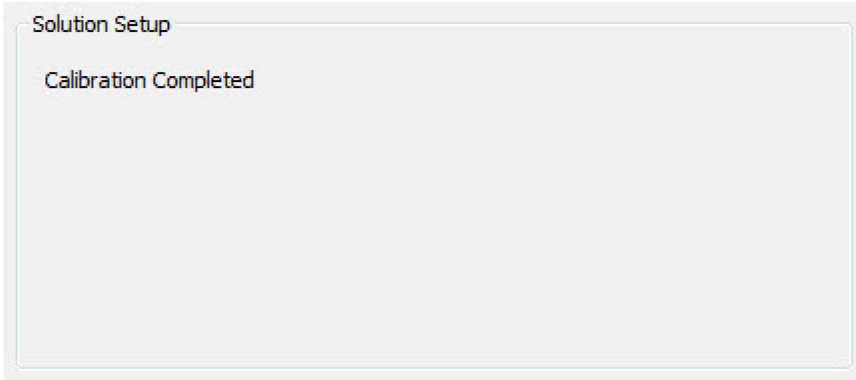


Figure 463. Sample 875CR Analyzer 2 Point Calibration Screen 8

After the calibration is completed, click **OK** to return to Calibration menu.

Temp Adjust

Temp Adjust calibration allows you to adjust a value if there is a difference in the temperature in Status mode and actual temperature of the solution. You can specify values between -20 to 200°C or -4 to +392°F.

Select the calibration type as 'Temp Adjust' and follow the calibration steps mentioned for "1 Pt Offset" calibration.

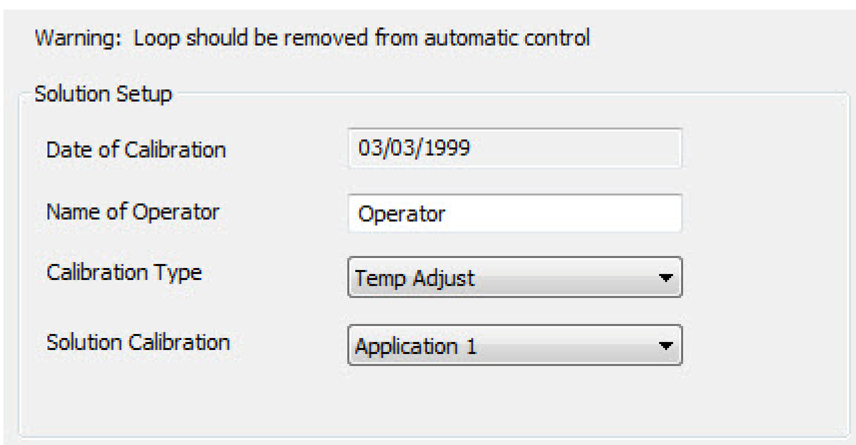


Figure 464. Sample 875CR Analyzer Temp Adjust Calibration Screen 1

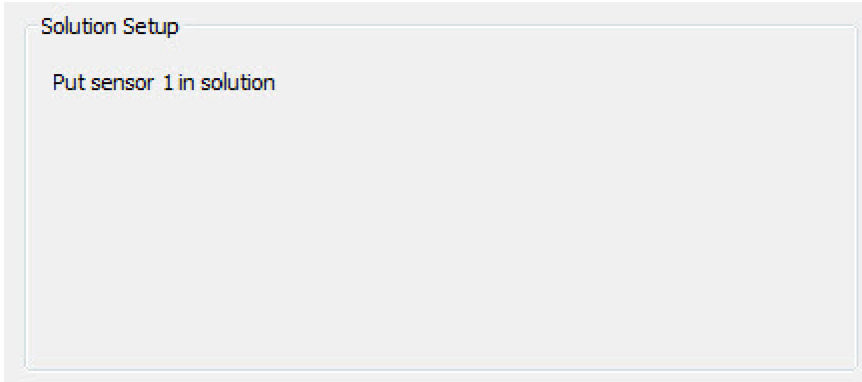


Figure 465. Sample 875CR Analyzer Temp Adjust Calibration Screen 2

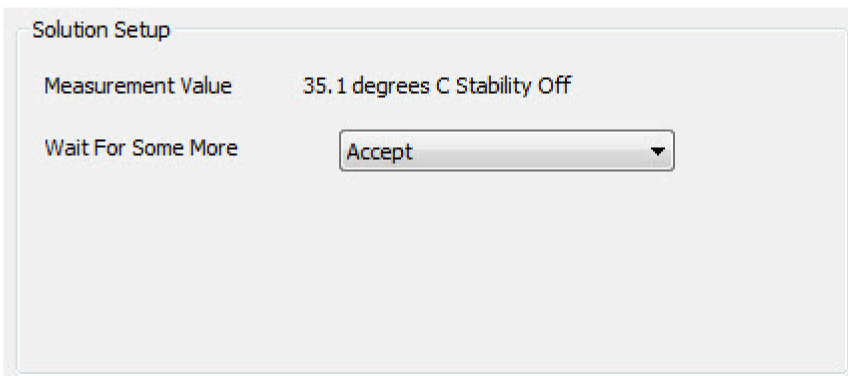


Figure 466. Sample 875CR Analyzer Temp Adjust Calibration Screen 3

Figure 467. Sample 875CR Analyzer Temp Adjust Calibration Screen 4

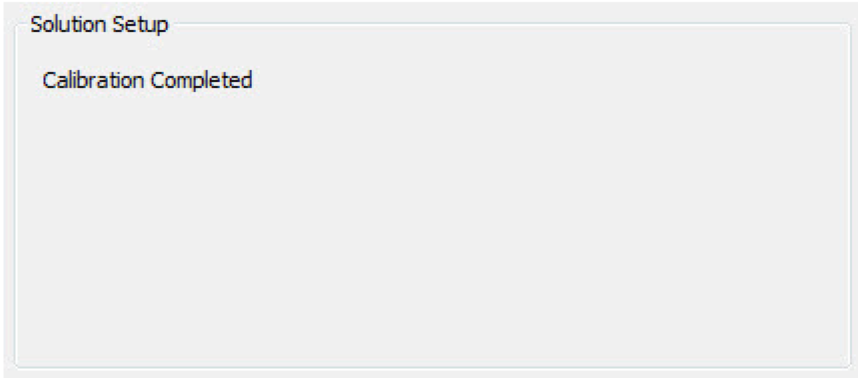


Figure 468. Sample 875CR Analyzer Temp Adjust Calibration Screen 5

Pure H2O

The Pure H2O calibration process allows you to measure purity of water by checking the conductivity in µS/cm or resistivity in MΩ*cm. It enables you to enter the specific cell factor and temperature cell factor calibration values of your sensor from qualification testing done at the factory.

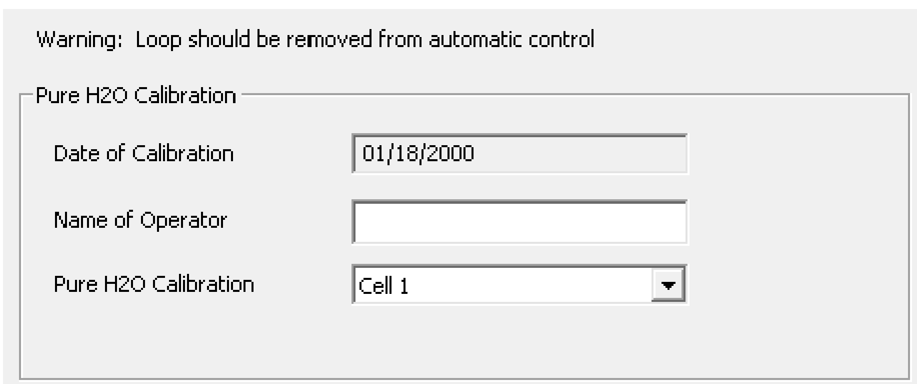


Figure 469. Sample 875CR Analyzer Pure H2O Calibration Screen 1

Field	Entry
Solution Setup	
Date of Last Calibration	This parameter shows the date of last calibration.
Name of Operator	Specify the name of the calibrator.
Pure H2O Calibration	Select application or cell for calibration.

Click **Next**. Change the temperature cell factor (TCF), and the cell factor (CF).

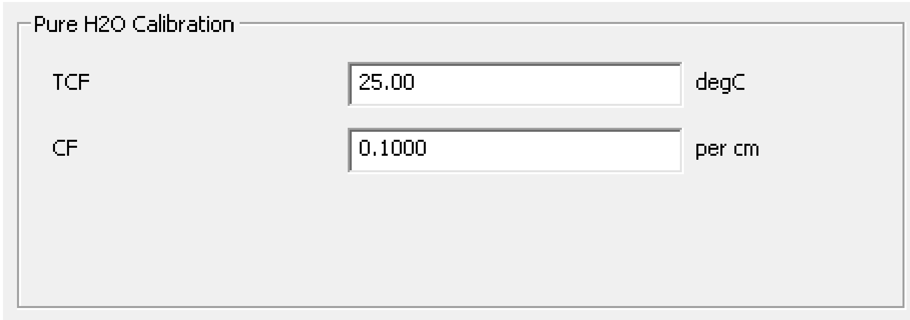


Figure 470. Sample 875CR Analyzer Pure H2O Calibration Screen 2

Click **Next** again to continue the calibration process.

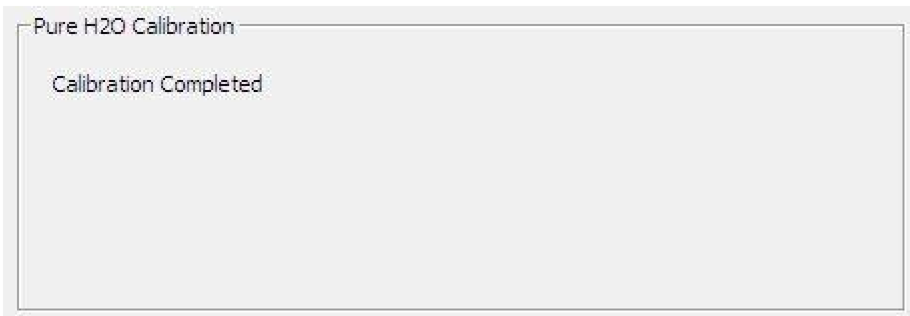


Figure 471. Sample 875CR Analyzer Pure H2O Calibration Screen 3

After the calibration is completed, click **OK** to return to Calibration menu.

Custom Temp

Custom Temp calibration can only be accessed via a Level 1 passcode.

Select the calibration type as 'Custom Temp' and follow the calibration steps mentioned for "2 Point" calibration.

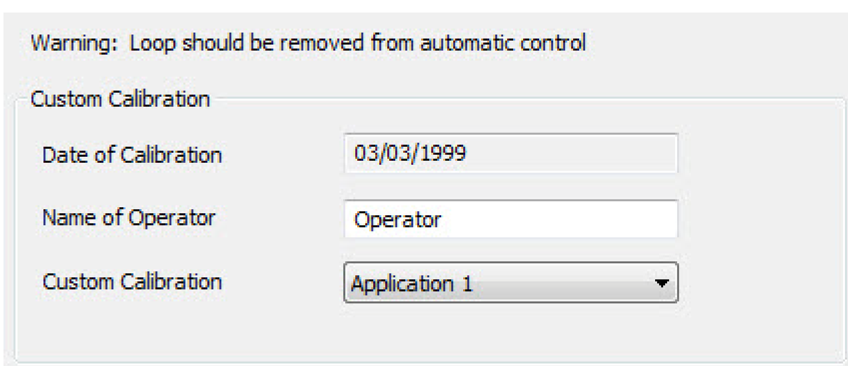


Figure 472. Sample 875CR Analyzer Custom Temp Calibration Screen 1

Figure 473. Sample 875CR Analyzer Custom Temp Calibration Screen 2

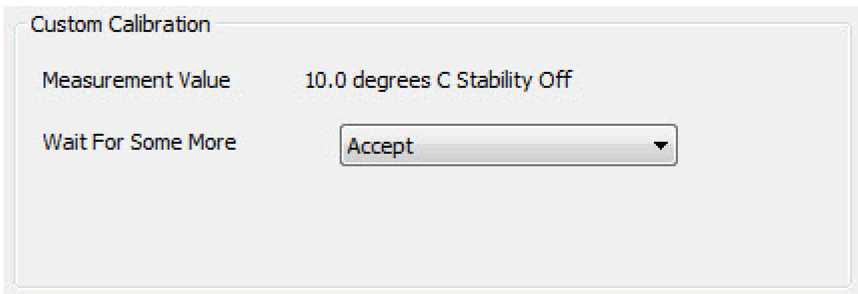


Figure 474. Sample 875CR Analyzer Custom Temp Calibration Screen 3

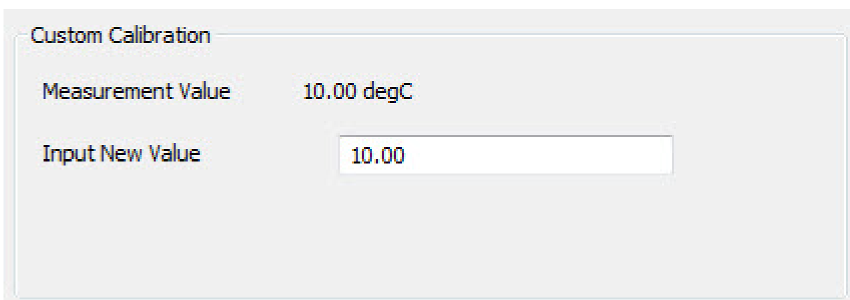


Figure 475. Sample 875CR Analyzer Custom Temp Calibration Screen 4

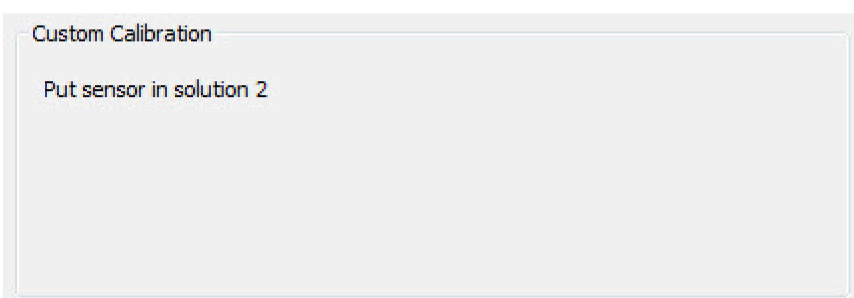


Figure 476. Sample 875CR Analyzer Custom Temp Calibration Screen 5

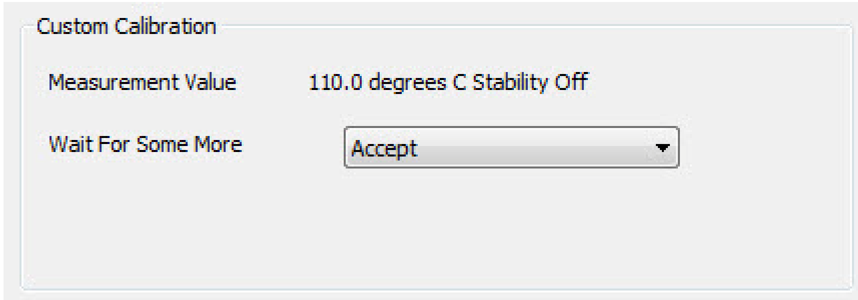


Figure 477. Sample 875CR Analyzer Custom Temp Calibration Screen 6

Figure 478. Sample 875CR Analyzer Custom Temp Calibration Screen 7

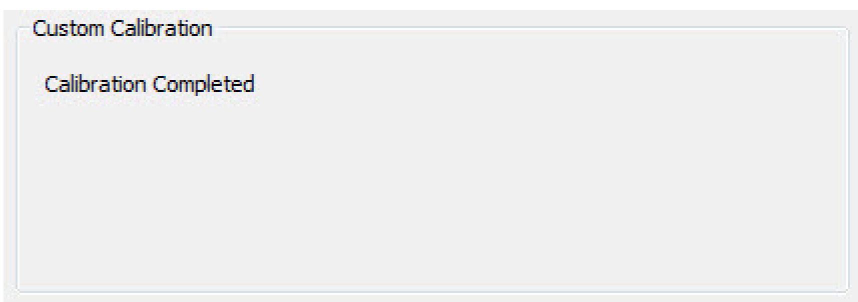


Figure 479. Sample 875CR Analyzer Custom Temp Calibration Screen 8

Analog

The Analog calibration allows you to tune the 4 mA and 20 mA values of the analog outputs.

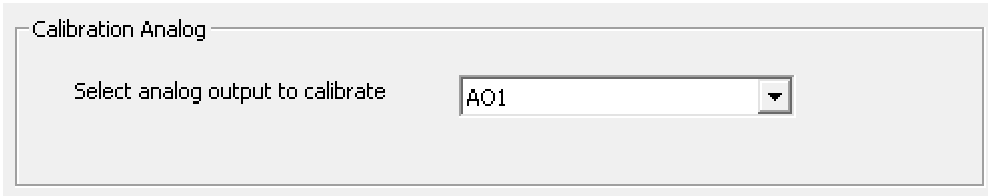


Figure 480. Sample 875CR Analyzer Analog Calibration Screen 1

Field	Entry
Calibration Analog	
Select Analog Output to Calibrate	Select the output. Choose from AO1 and HART ANALOG.

Click **Next** to continue the calibration process for analog 4 mA.

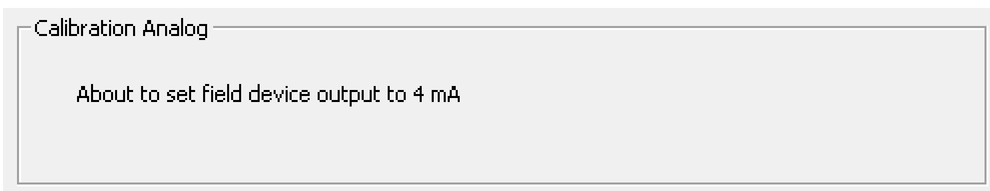


Figure 481. Sample 875CR Analyzer Analog Calibration Screen 2

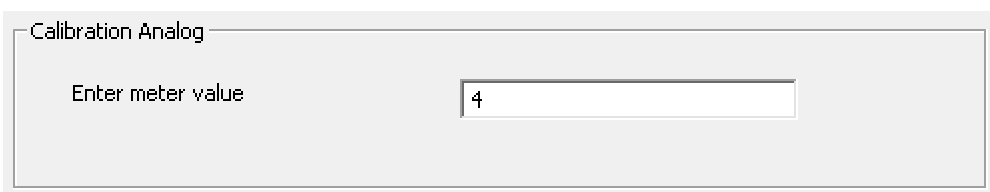


Figure 482. Sample 875CR Analyzer Analog Calibration Screen 3

Field	Entry
Calibration Analog	
Enter Meter Value	Specify a meter value.

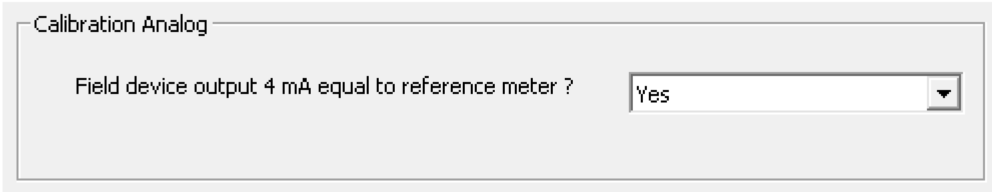


Figure 483. Sample 875CR Analyzer Analog Calibration Screen 4

Select Yes to continue the process. Calibration will be done for analog 20 mA.

If you select No, enter the reference meter value.

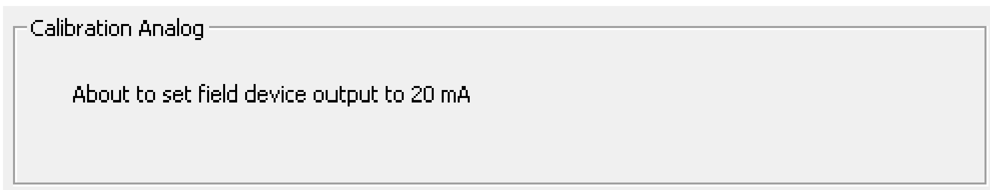


Figure 484. Sample 875CR Analyzer Analog Calibration Screen 5

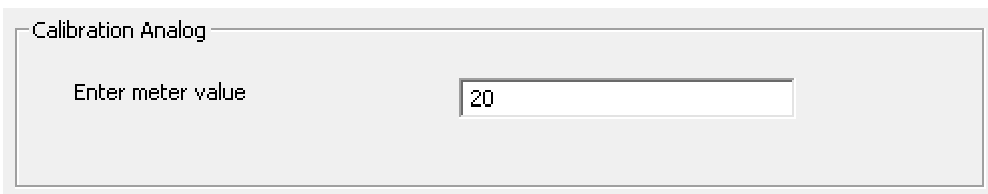


Figure 485. Sample 875CR Analyzer Analog Calibration Screen 6

Field	Entry
Calibration Analog	
Enter Meter Value	Specify a meter value.

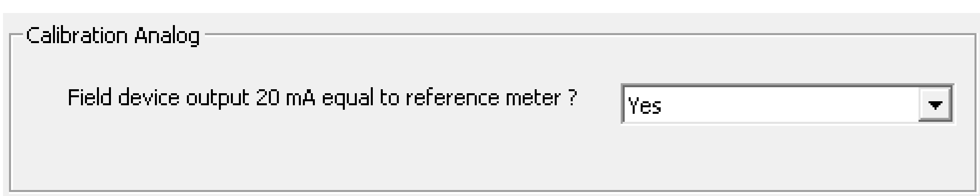


Figure 486. Sample 875CR Analyzer Analog Calibration Screen 7

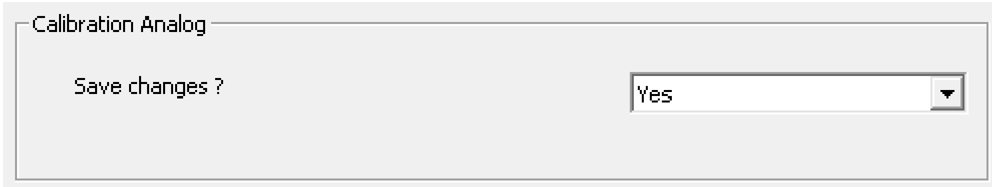


Figure 487. Sample 875CR Analyzer Analog Calibration Screen 8

Click Yes to save the changes, or No to abort the changes.

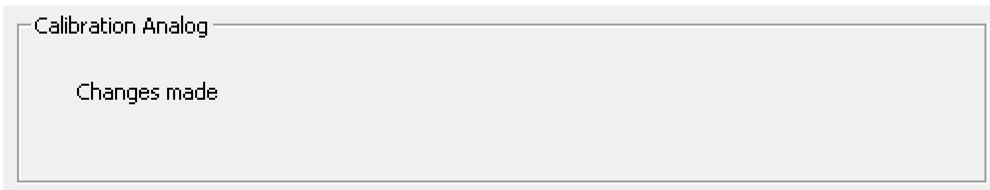


Figure 488. Sample 875CR Analyzer Analog Calibration Screen 9

Figure 489. Sample 875CR Analyzer Analog Calibration Screen 10

Click **OK** after the calibration is completed.

Troubleshooting

Faults

Fault status is displayed in the main Diagnostic Menu. You can suspend faults from the measurement status for one hour and resume faults at any time.

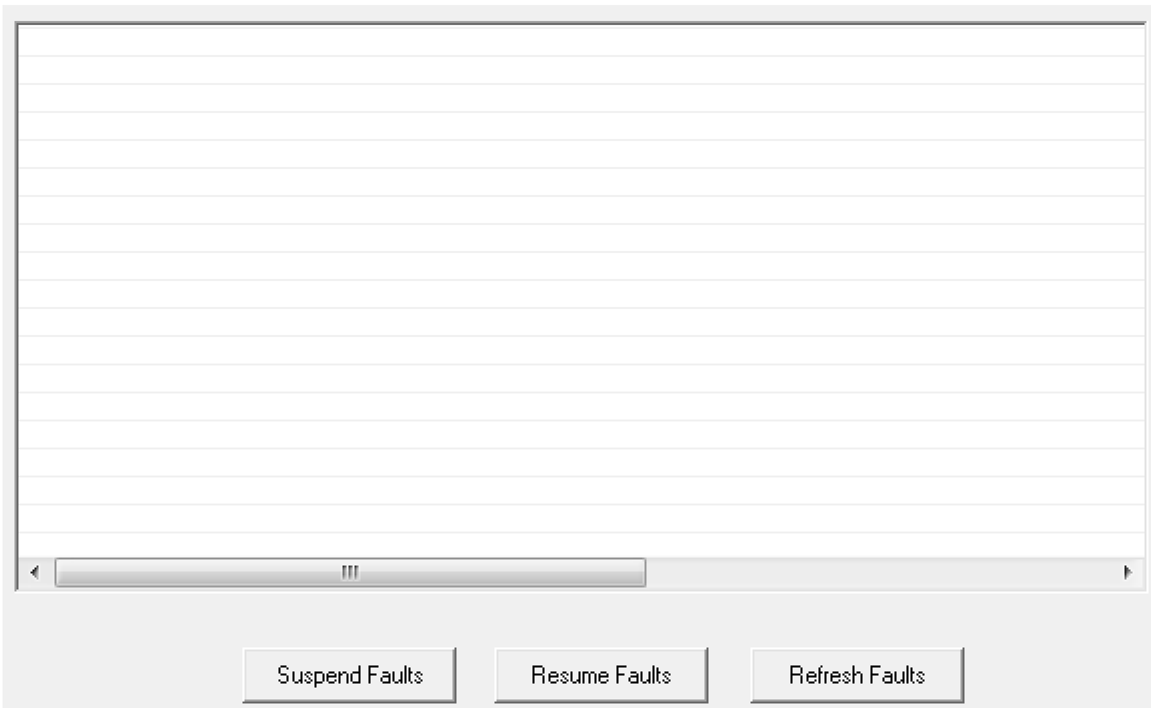


Figure 490. Sample 875CR Analyzer Faults Screen

— **NOTE**

This screen displays a maximum of 100 faults that occurred.

History

The history log includes all faults, power restore, entries and exits from Configuration, Calibration and Hold, and Faults temporarily suspended.

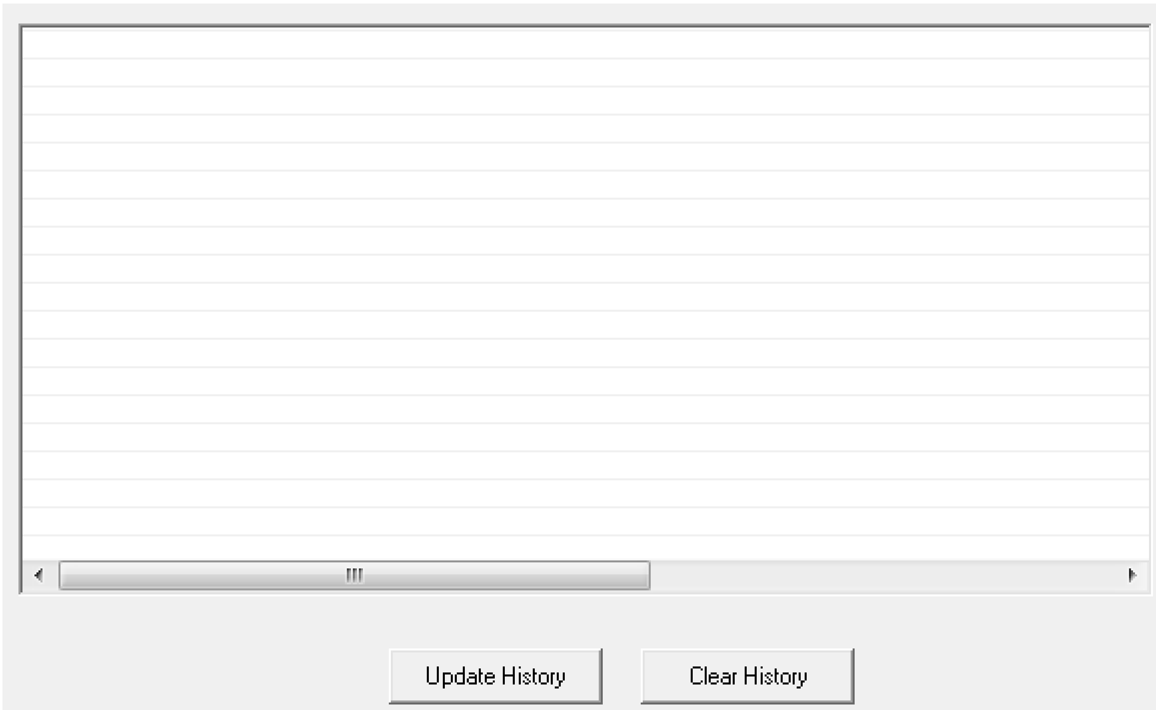


Figure 491. Sample 875CR Analyzer History Screen

— NOTE

This screen displays up to 100 of the most current history log entries.

11. 876CR Transmitter

This chapter provides information that is exclusive to using 876CR Transmitter with HART communication protocol. Additional information about these transmitters with HART communication is contained in the following document.

- MI 611-260 Model 876CR Intelligent Electrochemical Transmitter for Contacting Conductivity and Resistivity Measurements with HART Communications

Device Overview

The Device Overview screen displays HART information, Device Information, and current PV data.

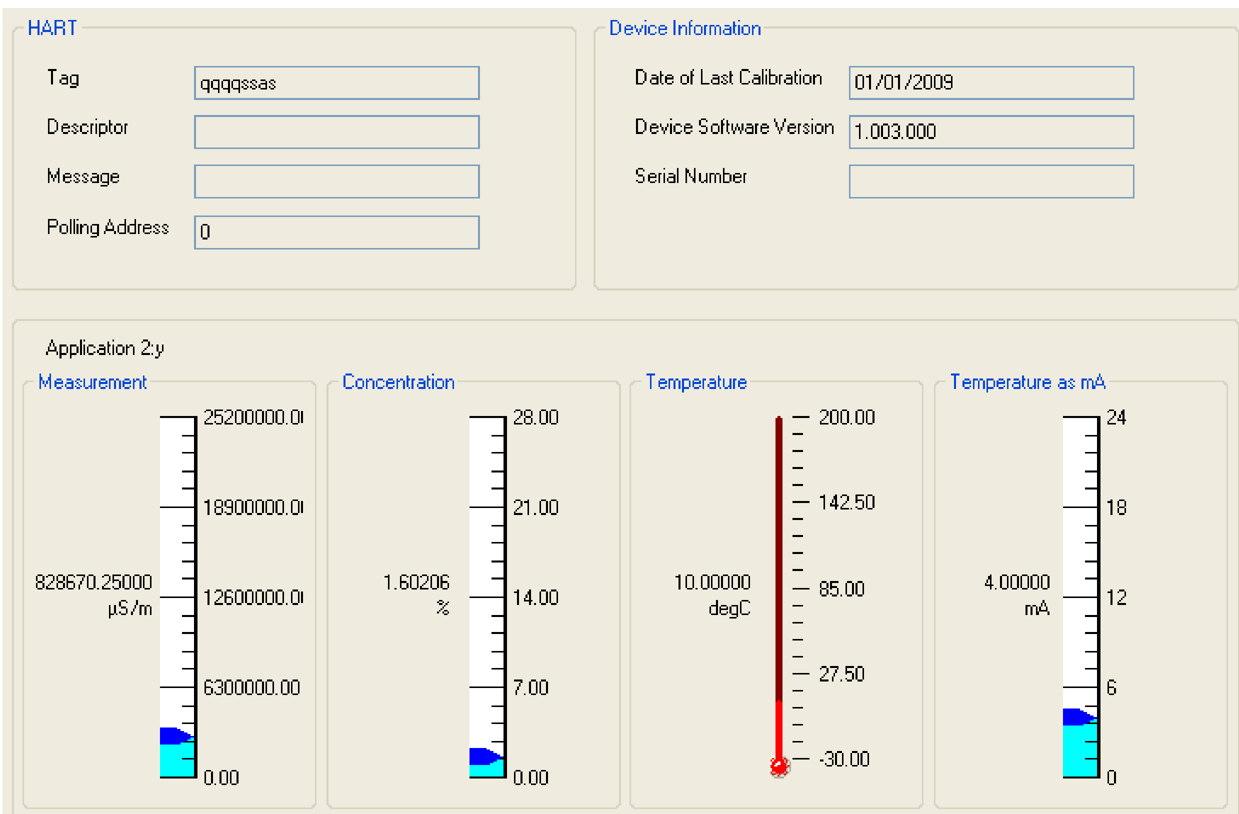


Figure 492. Sample 876CR Transmitter Device Overview Screen

Process Variables

The Process Variables screen displays the PV data that is available on the Device Overview screen and additional measurement information.

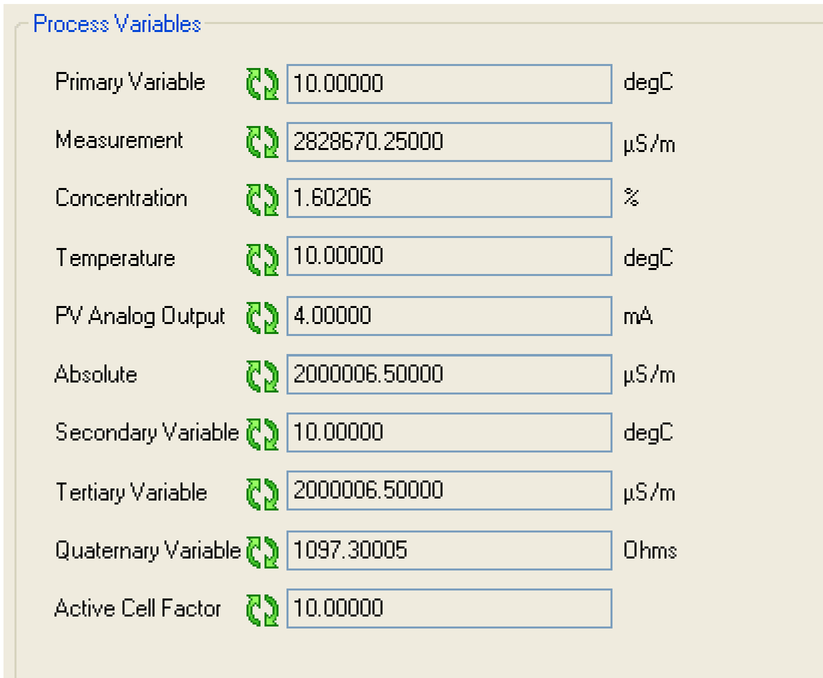


Figure 493. Sample 876CR Transmitter Process Variables Screen

Device Configuration

General

The General screen allows you to set Password, select the Cell Type and Temperature Type, and set the device tag. You can also set Analog Output and its lower and upper range values.

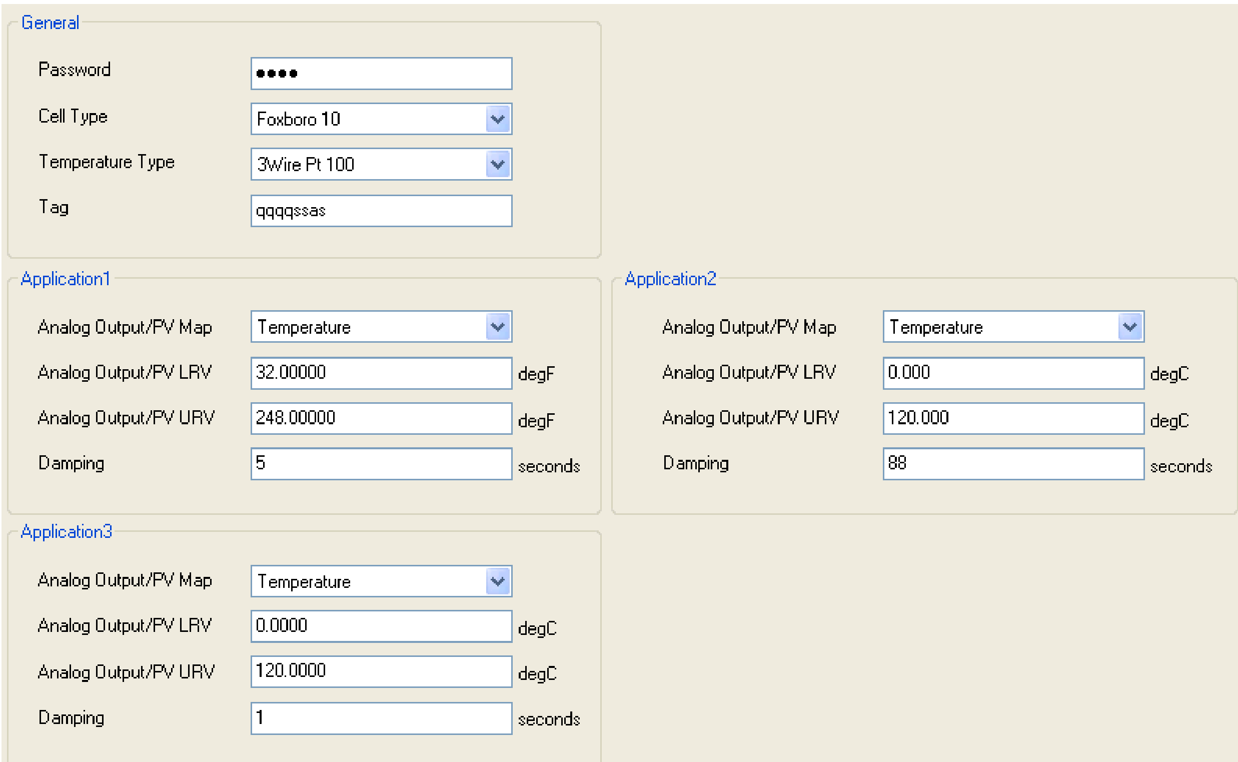


Figure 494. Sample 876CR Transmitter General Setup Screen

Field	Entry
General	
Password	Set the password.
Cell Type	Select the Cell Type. Choose from Foxboro 0.1, Foxboro 1.0, Foxboro 10, or Other.
Temperature Type	Select the Temperature Type. Choose from 10K Thermistor, 100K Thermistor, 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, or 3Wire Pt 1000.
Tag	Set the Tag name. You can enter up to 8 characters maximum.
Application 1/Application 2/Application 3[a]	
Analog Output/PV Map	Select the analog output. Choose from Measurement, Temperature, Absolute, ATC Resistance, or Cell Resistance.
Analog Output/PV LRV	Set the analog output/process variable lower range value.
Analog Output/PV URV	Set the analog output/process variable upper range value.

Field	Entry
Damping	Set the damping time in seconds.

a. The number of application that appear depends on the selection made in the Applications screen. For more information on selecting applications, see "Applications" on page 383.

Cell Configuration

Cell Configuration allows you to select Cell Type and Temperature Type.

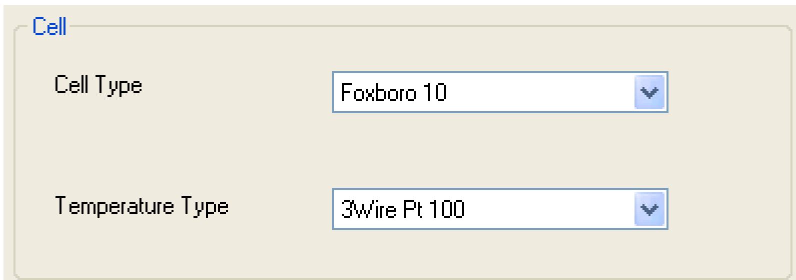


Figure 495. Sample 876CR Transmitter Cell Configuration Screen

Field	Entry
Cell Type	Select the Cell Type from the drop-down menu. Choose from Foxboro 0.1, Foxboro 1.0, Foxboro 10, or Other.
Temperature Type	Select the Temperature Type from the drop-down menu. Choose from 10K Thermistor, 100K Thermistor, 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, or 3Wire Pt 1000.

If you select Other as Cell Type, the Cell Configuration screen appears as shown in Figure 496.

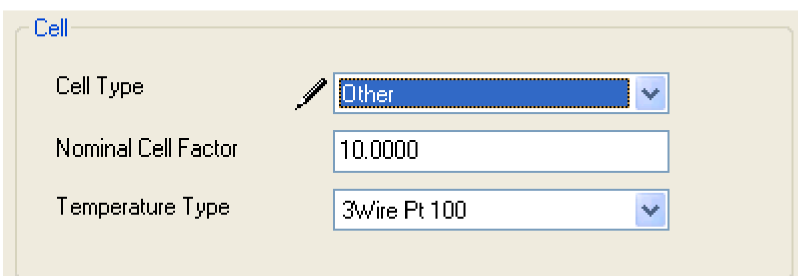


Figure 496. Sample 876CR Transmitter Cell Configuration Screen (Nominal Cell Factor)

Field	Entry
Cell Type	Choose Other from the Cell Type drop-down menu.
Nominal Cell Factor	Set the Nominal Cell Factor.

Field	Entry
Temperature Type	Select the temperature type from the drop-down menu. Choose from 10K Thermistor, 100K Thermistor, 2Wire Pt 100, 2Wire Pt 1000, 3Wire Pt 100, or 3Wire Pt 1000.

Applications

Applications screen allows you to select up to three distinct applications you wish to preconfigure. Each application has its own measurement, temperature configuration, temperature compensation curve, display, and output configuration.

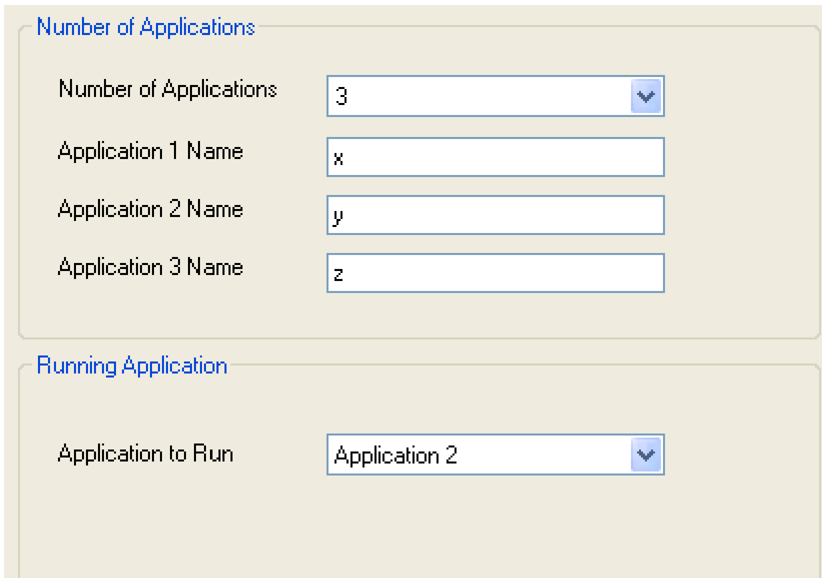


Figure 497. Sample 876CR Transmitter Number of Applications Screen

Field	Entry
Number of Applications	
Number of Applications[a]	Select the Number of Applications you want to preconfigure from the drop-down menu. Choose from 1, 2, and 3.
Application 1 Name	Enter the name for application 1.
Application 2 Name	Enter the name for application 2.
Application 3 Name	Enter the name for application 3[b].
Running Application	
Application to Run	Select the Application to Run from the drop-down menu. Choose from Application 1, Application 2, Application 3[c], or Auto.

a. The application name fields appear depending on the number of applications selected. If you select 1, then no application name fields appear, see Figure 499.

b. This field will not appear if the Number of Applications selected is 2.

c. This option will not appear if the number of applications is 2.

If you select Auto as Application to Run, the screen appears as shown in Figure 498.

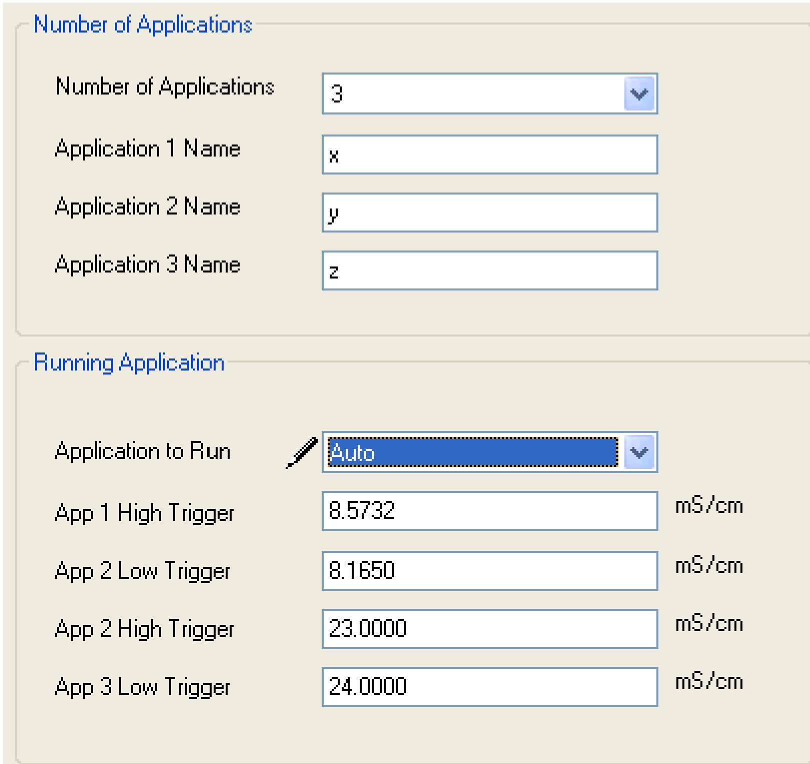


Figure 498. Sample 876CR Transmitter Number of Applications - Auto Selection Screen

Field	Entry
Running Application	
Application to Run	Select Auto from the Application to Run drop-down menu.
App 1 High Trigger	Establish the preset which triggers the application movement from one application to another. Enter the value for application 1 high limit. This is measured in mS/cm.
App 2 Low Trigger	Enter the value for application 2 lowest limit. This is measured in mS/cm.
App 2 High Trigger	Enter the value for application 2 highest limit. This is measured in mS/cm.
App 3 Low Trigger	Enter the value for application 3 lowest limit. This is measured in mS/cm.

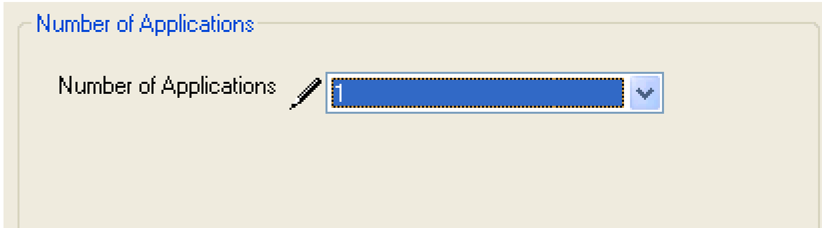


Figure 499. Sample 876CR Transmitter Number of Applications (1) Screen

Measurement

Measurement screen enables you to select the Measurement Unit, Base Display Scale, and Damping.

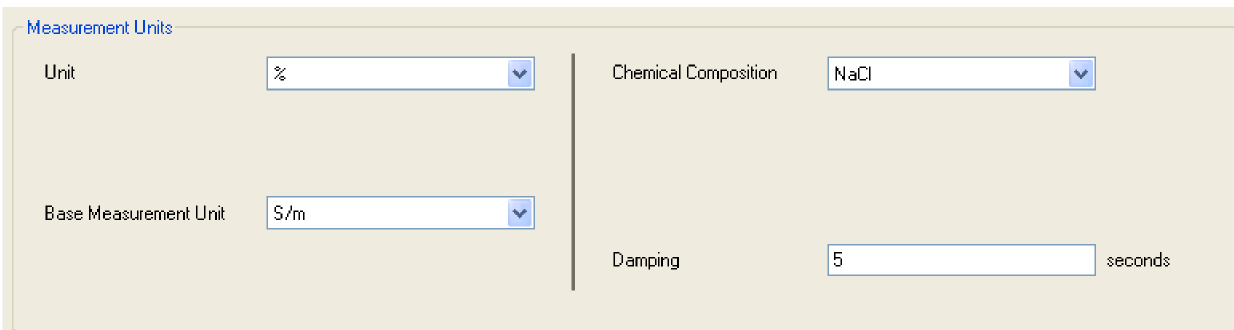


Figure 500. Sample 876CR Transmitter Measurement Units Screen

Field	Entry
Measurement Units	
Units	Select the Units from the drop-down menu. Choose from KO*cm, µS/cm, µS/m, mS/cm, mS/m, S/m, %, or Custom.
Base Display Scale [a]	Set Base Display Scale value from the drop-down menu. Choose from 0.9999, 9.999, 99.99, 999.9 or 9999.
Base Measurement Unit	Select Base Measurement Scale from the drop-down menu. Choose from KO*cm, µS/cm, µS/m, mS/cm, mS/m, or S/m.
Chemical Composition	Select the Chemical Composition from the drop-down menu. Choose from NaCl, KCl, CH_3COOH, or H_3PO_4.
Damping	Set the damping value in seconds.

a. This field appears if you select Measurement Units as KO*cm, µS/cm, µS/m, mS/cm, mS/m, or S/m. See Figure 501.

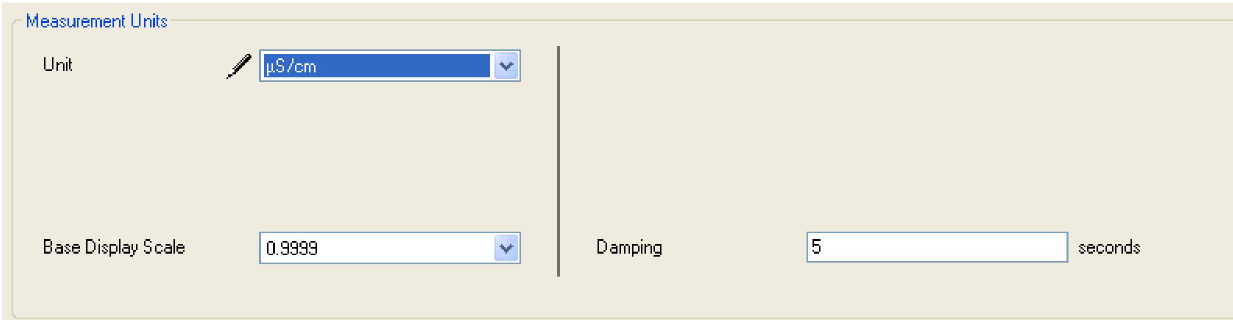


Figure 501. Sample 876CR Transmitter Measurement Units Screen (Base Display Scale)

If you select Measurement Units as Custom, the screen appears as shown in Figure 502.

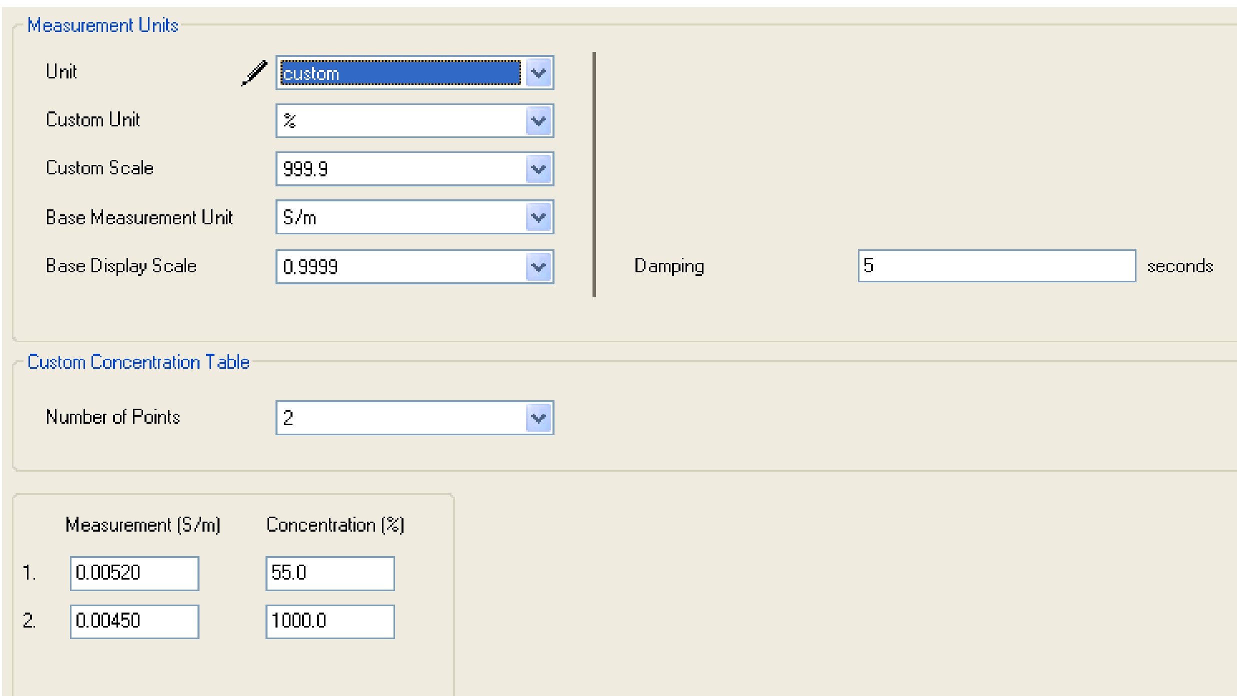


Figure 502. Sample 876CR Transmitter Measurement Units Screen (Number of Points Selection)

Field	Entry
Measurement Units	
Units	Select Units as Custom from the drop-down menu.
Custom Units	Select Custom Units from the drop-down menu. Choose from %, g/l, ppm, oz/gal, ppt, user defined, or none.
Custom Scale	Select Custom Scale from the drop-down menu. Choose from 0.9999, 0.99999, 9.999, 9.9999, 99.99, 99.999, 999.9, 999.99, 9999, 9999.9, or 99999.
Base Measurement Units	Select the Base Measurement Units from the drop-down menu. Choose from MO*cm, KO*cm, µS/cm, µS/m, mS/cm, mS/m, or S/m.

Field	Entry
Base Display Scale	Set Base Display Scale value from the drop-down menu. Choose from 0.9999, 9.999, 99.99, 999.9, or 9999.
Damping	Set the damping value in seconds.
Custom Concentration Table	
Number of Points	Specify number of points to plot the concentration curve. The Number of Points can be specified from 2 to 21.
Measurement	Enter the Measurement values.
Concentration	Enter the Concentration values.

If you select more than 2 as Number of Points, the screen appears as shown in Figure 503.

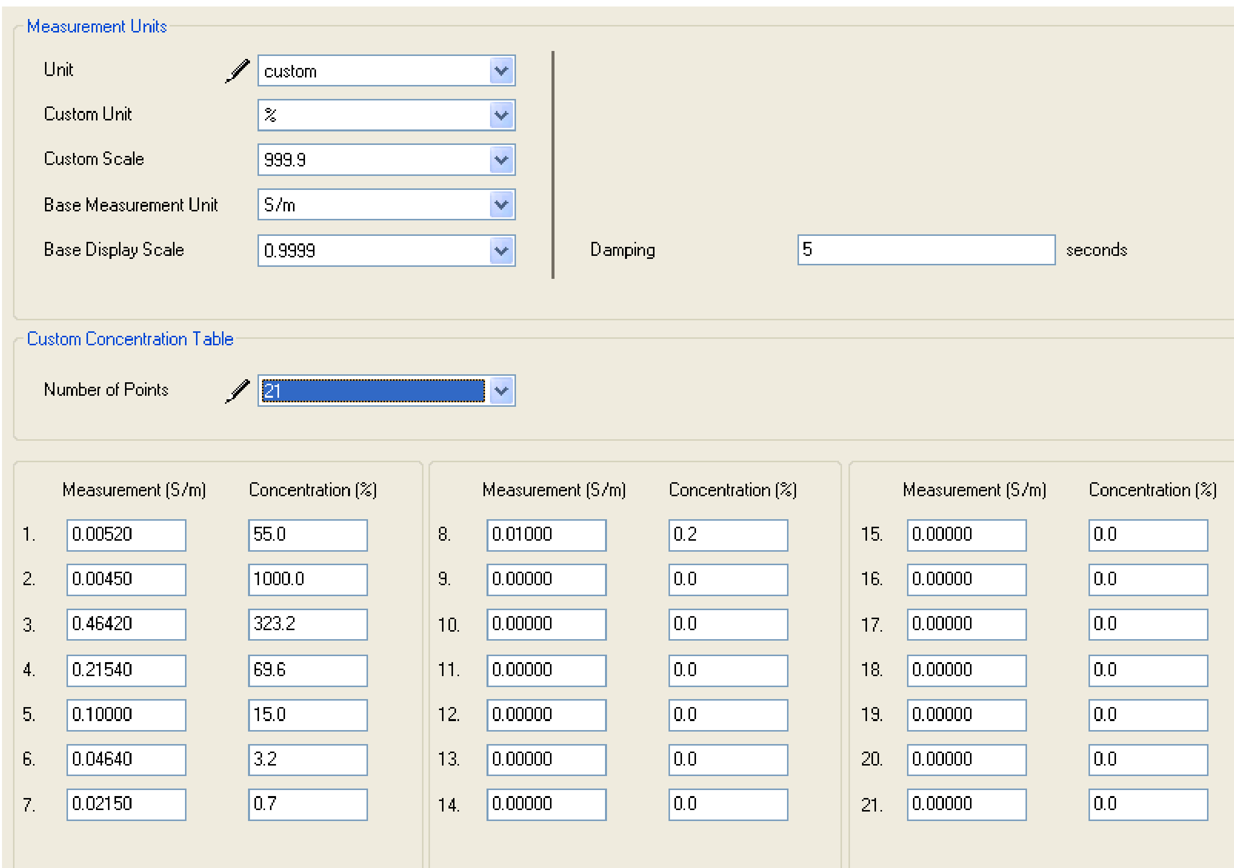


Figure 503. Sample 876CR Transmitter Measurement Units Screen (Measurement and Concentration)

Temperature

Temperature configuration screen allows you to select auto or manual temperature modes.

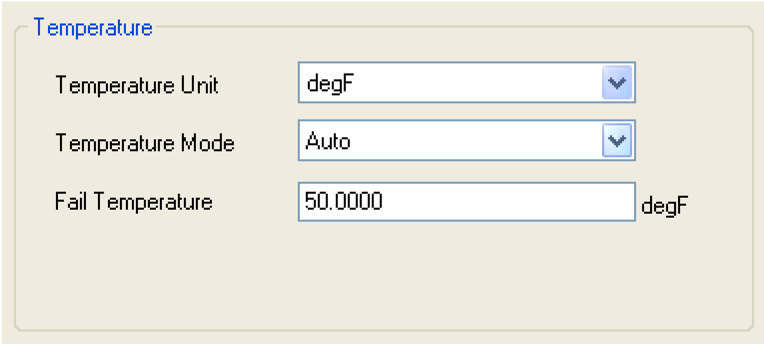


Figure 504. Sample 876CR Transmitter Temperature Screen (Temperature Mode as Auto)

Field	Entry
Temperature Unit	Select the Temperature Units from the drop-down menu. Choose from degC (Centigrade) or degF (Fahrenheit).
Temperature Mode	Select the Temperature Mode from the drop-down menu. Choose from Auto or Manual.
Fail Temperature	Set the Fail Temperature to the value at which you expect the process to operate if the RTD fails.

If you select Temperature Mode as Manual, the temperature screen appears as shown in Figure 505.

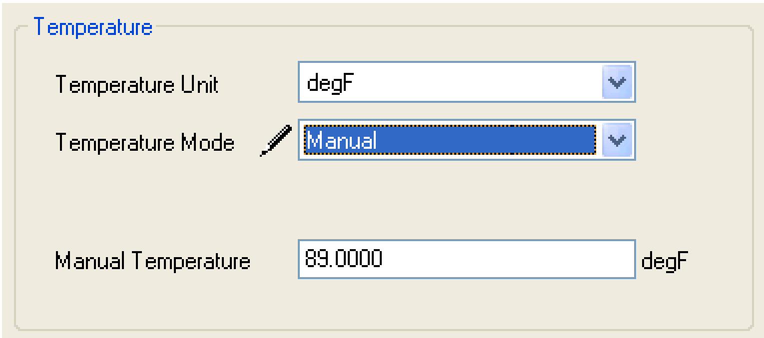


Figure 505. Sample 876CR Transmitter Temperature Screen (Temperature Mode as Manual)

Field	Entry
Manual Temperature	Set the temperature at a fixed temperature value.

Temperature Compensation

The Temperature Compensation screen allows you to select the appropriate temperature compensation.

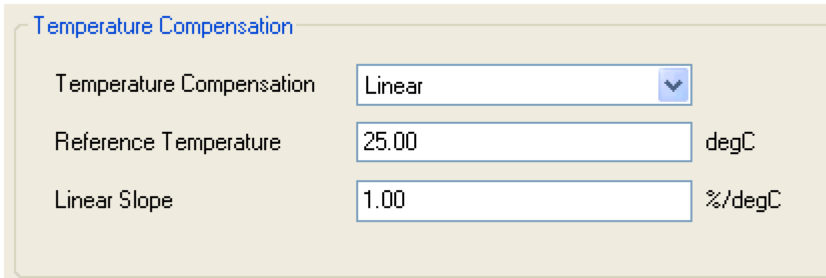


Figure 506. Sample 876CR Transmitter Temperature Compensation Screen

Field	Entry
Temperature Compensation	Select the Temperature Compensation from the drop-down menu. Choose from Absolute, NaCl, KCl, Ions Only, Cation, Linear, H_3PO_4, CH_3COOH, Ammonia, Morpholine, or Custom.
Reference Temperature[a]	Set the reference temperature.
Linear Slope[a]	Set the linear slope.

a. The Reference Temperature field appears if Linear is selected as Temperature Compensation.

If you select Custom as Temperature Compensation, the screen appears as shown in Figure 507.

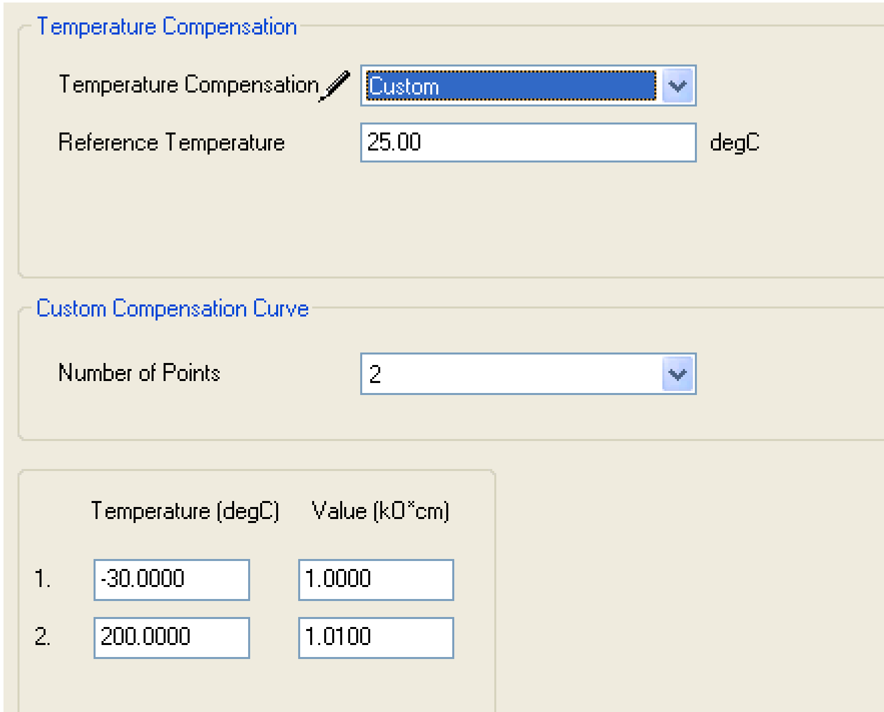


Figure 507. Sample 876CR Transmitter Temperature Compensation (Custom) Screen

Field	Entry
Temperature Compensation	
Temperature Compensation	Select Custom from the Temperature Compensation drop-down menu.
Reference Temperature	Set the reference temperature.
Custom Compensation Curve	
Number of Points	Specify number of points to plot the concentration curve. The Number of Points can be specified from 2 to 21.
Temperature	Enter the Measurement values.
Value	Enter the Concentration values.

Output

Digital

The Output - Digital screen allows you to select the primary, secondary, tertiary, and quaternary variable maps.

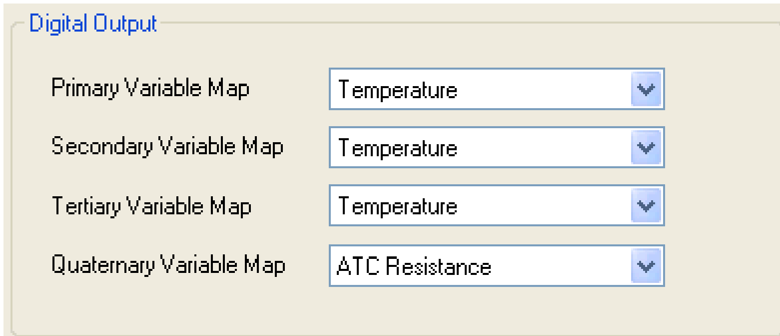


Figure 508. Sample 876CR Transmitter Digital Output Screen

Field	Entry
Primary Variable Map	Select the primary variable from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, ATC Resistance, or Cell Resistance.
Secondary Variable Map	Select the secondary variable from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, ATC Resistance, or Cell Resistance.
Tertiary Variable Map	Select the tertiary variable from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, ATC Resistance, or Cell Resistance.
Quaternary Variable Map	Select the quaternary variable from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, ATC Resistance or Cell Resistance.

Analog

The Output - Analog screen allows you to select the analog output, set minimum and maximum analog values, and set PV lower and upper range values.

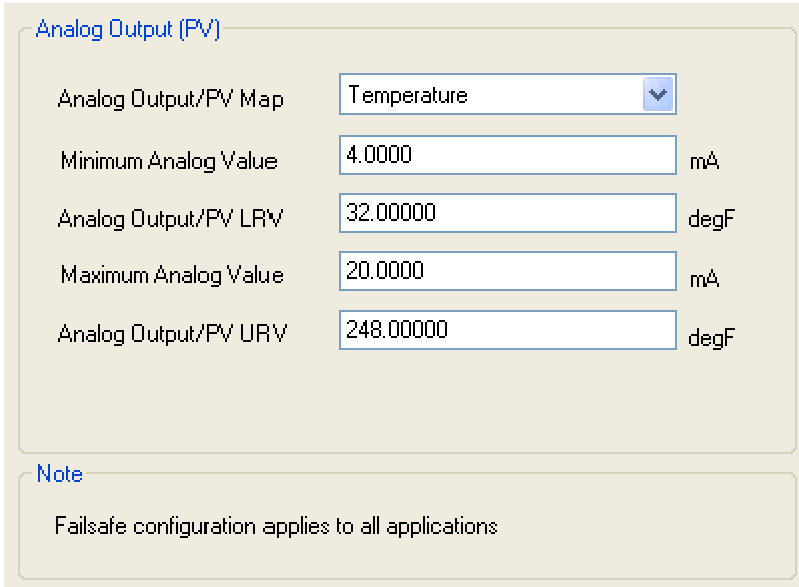


Figure 509. Sample 876CR Transmitter Analog Output Screen

Field	Entry
Analog Output/PV Map	Select analog output (PV Map) from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, ATC Resistance, or Cell Resistance.
Minimum Analog Value	Set the minimum analog value.
Analog Output/PV LRV	Set analog output (PV low range value).
Maximum Analog Value	Set the maximum analog value.
Analog Output/PV URV	Set analog output (PV upper range value).
Analog Output Failsafe	Select analog output failsafe value from the drop-down menu. Choose from Off, Fail Low, and Fail High. This is visible for HART version 5 if polling address is set to 0, or for HART version 6/7 if loop mode is in active state.

Measurement Display

The Measurement Display screen allows you to select the display format to be in single line, double line, or in triple line as shown in Figure 510.

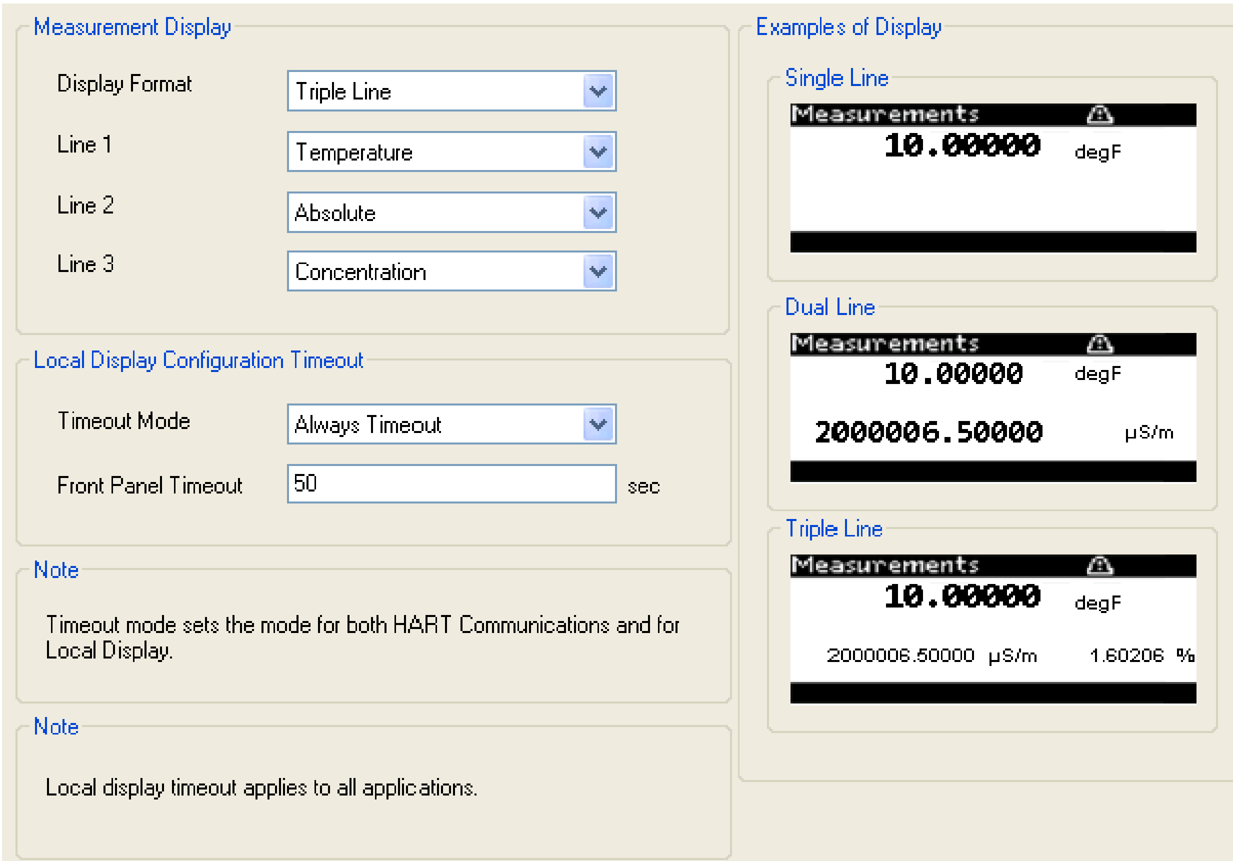


Figure 510. Sample 876CR Transmitter Local Display Output Screen

Field	Entry
Measurement Display	
Display Format	Select the Display Format from the drop-down menu. Choose from Single Line, Double Line, or Triple Line. (Examples of each of the display formats are shown on the right side of the screen.)
Line 1/Line 2/Line 3	Select the line reading to be displayed from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, or Analog Output.
Local Display Configuration Timeout	
Timeout Mode	Select the Timeout Mode from the drop-down menu. Choose from Never Timeout, Online Timeout Only, and Always Timeout.
Front Panel Timeout[a]	Enter the time in seconds, after which the transmitter reverts to measurement mode.

a. The Front Panel Timeout field will appear if you select Always Timeout as Timeout Mode.

If you select Single Line in the Display Format field, the Measurement Display screen appears as shown in Figure 511.

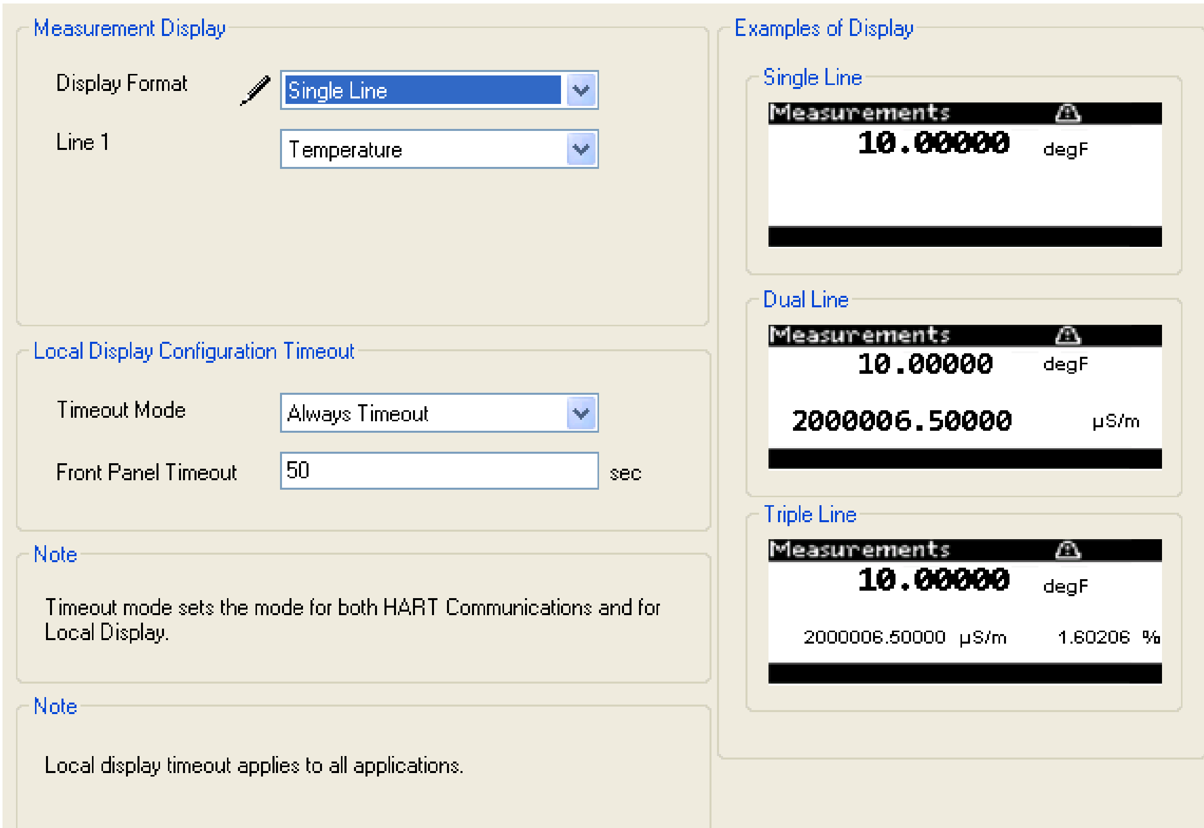


Figure 511. Sample 876CR Transmitter Local Display Output Screen (Single Line)

Field	Entry
Measurement Display	
Display Format	Select Single Line from the drop-down menu.
Line 1	Select the first line reading to be displayed from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, or Analog Output.
Local Display Configuration Timeout	
Timeout Mode	Select the Timeout Mode from the drop-down menu. Choose from Never Timeout, Online Timeout Only, or Always Timeout.
Front Panel Timeout[a]	Enter the time in seconds, after which the transmitter reverts to measurement mode.

a. The Front Panel Timeout field will appear if you select Always Timeout as Timeout Mode.

If you select Double Line in the Display Format field, the local display screen appears as shown in Figure 512.

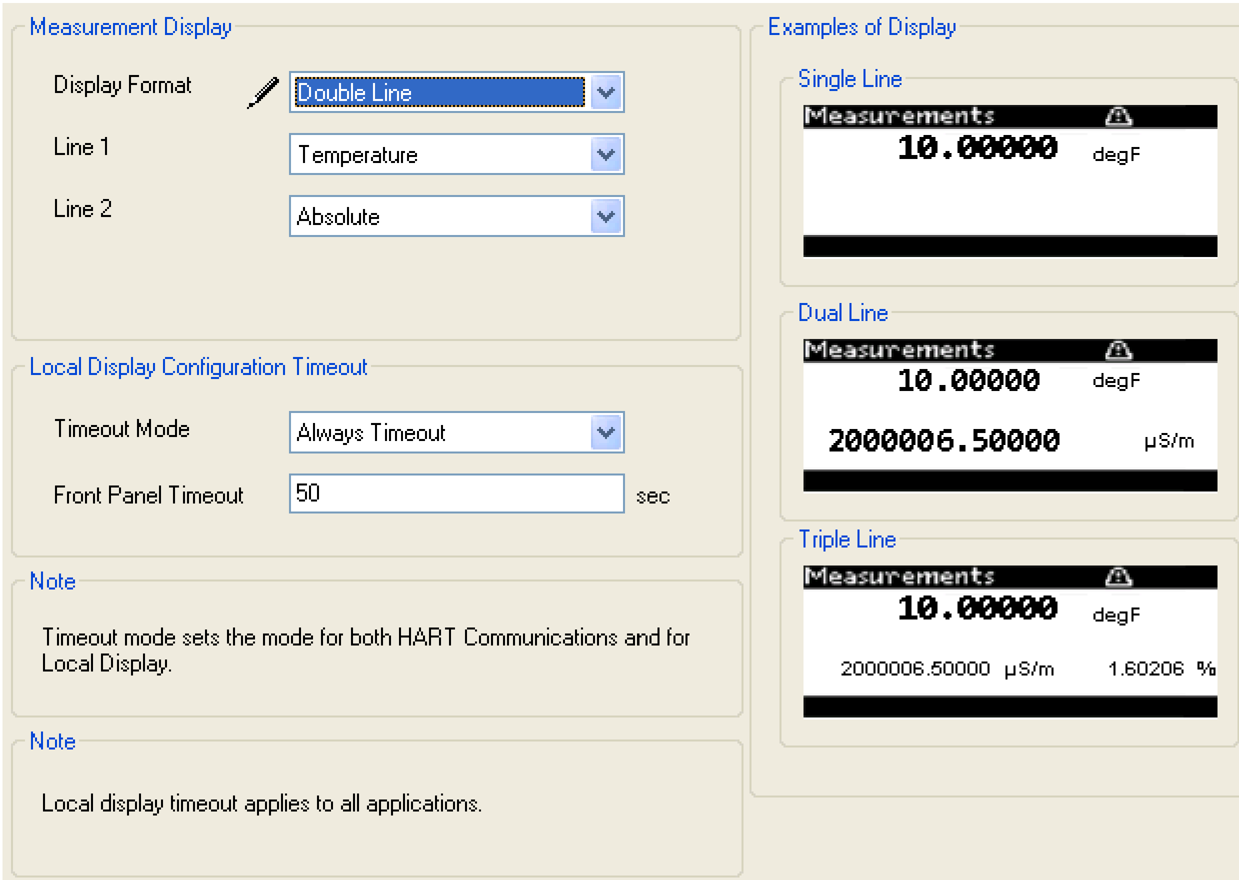


Figure 512. Sample 876CR Transmitter Local Display Output Screen (Double Line)

Field	Entry
Measurement Display	
Display Format	Select Double Line from the drop-down menu.
Line 1	Select the first line reading to be displayed from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, or Analog Output.
Line 2	Select the second line reading to be displayed from the drop-down menu. Choose from Measurement, Temperature, Absolute, Concentration, or Analog Output.
Local Display Configuration Timeout	
Timeout Mode	Select the Timeout Mode from the drop-down menu. Choose from Never Timeout, Online Timeout Only, or Always Timeout.
Front Panel Timeout[a]	Enter the time in seconds, after which the transmitter reverts to measurement mode.

a. The Front panel Timeout field will appear if you select Always Timeout as Timeout Mode.

HART

The HART screen allows you to select the Polling Address, mA Loop Mode, and Timeout Mode. It also allows you to set the HART timeout and select the HART version.

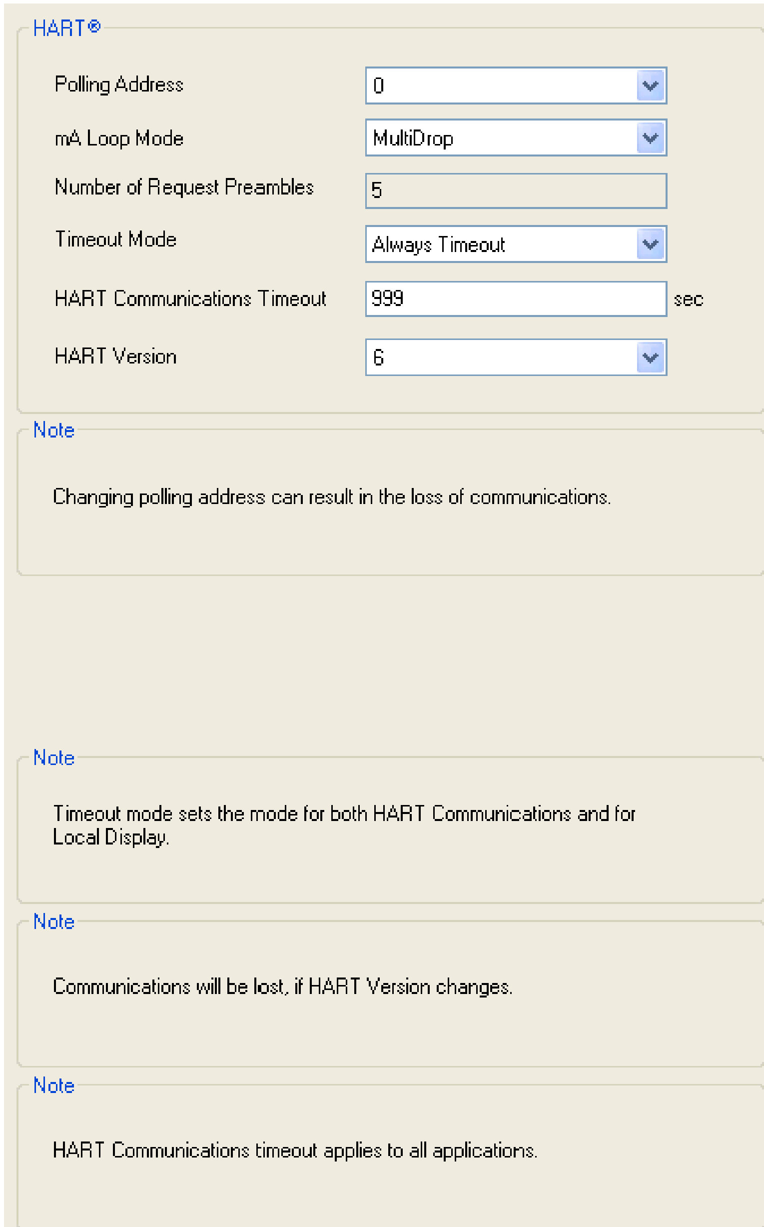


Figure 513. Sample 876CR Transmitter HART Output Screen (HART Version 5)

Field	Entry
Polling Address	Select the polling address from the drop-down menu. Choose any number from 0 to 15. If you select HART version as 6 or 7, choose any number from 0 to 63.
mA Loop Mode[a]	Select the loop mode from the drop-down menu. Choose from Multidrop or Active.
Number of Request Preambles	This field shows the number of preambles to be sent in response message from the transmitter to the host.
Timeout Mode	Select the timeout mode from the drop-down menu. Choose from Never Timeout, Online Timeout Only, or Always Timeout.
HART Communications Timeout	Set the HART communications timeout. The HART communications timeout is not visible if Timeout Mode is chosen as Never Timeout.
HART Version	Select HART Version from the drop-down menu. Choose from 5, 6, or 7.

a. The mA Loop Mode field appears if you select HART Version as 6 or 7.

Auto Hold

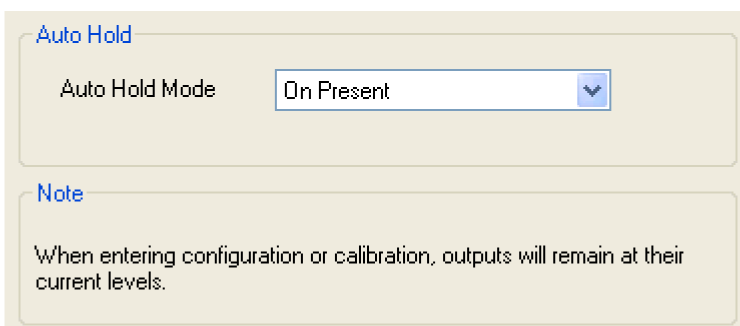


Figure 514. Sample 876CR Transmitter Output Auto Hold Screen

Field	Entry
Auto Hold Mode	Select the Auto Hold Mode from the drop-down menu. Select from Off, On Present, or On Manual.

Diagnostic Configuration

Diagnostic configuration screen allows you to configure the fault messages that appear on your display.

Figure 515. Sample 876CR Transmitter Diagnostics Configuration

Field	Entry
Diagnostics	Select the check boxes to set diagnostic parameters. You can select any or all of the following: Leakage, ATC Short, ATC Open, Compensation Range, Measurement Range, or USP 645 Diagnostic.

Passcode Access

Passcode Access screen provides two levels of permissions. Administrator access permits changing all parameters in configuration where as User Code access permits changing and viewing access to those areas as specified by the administrator.

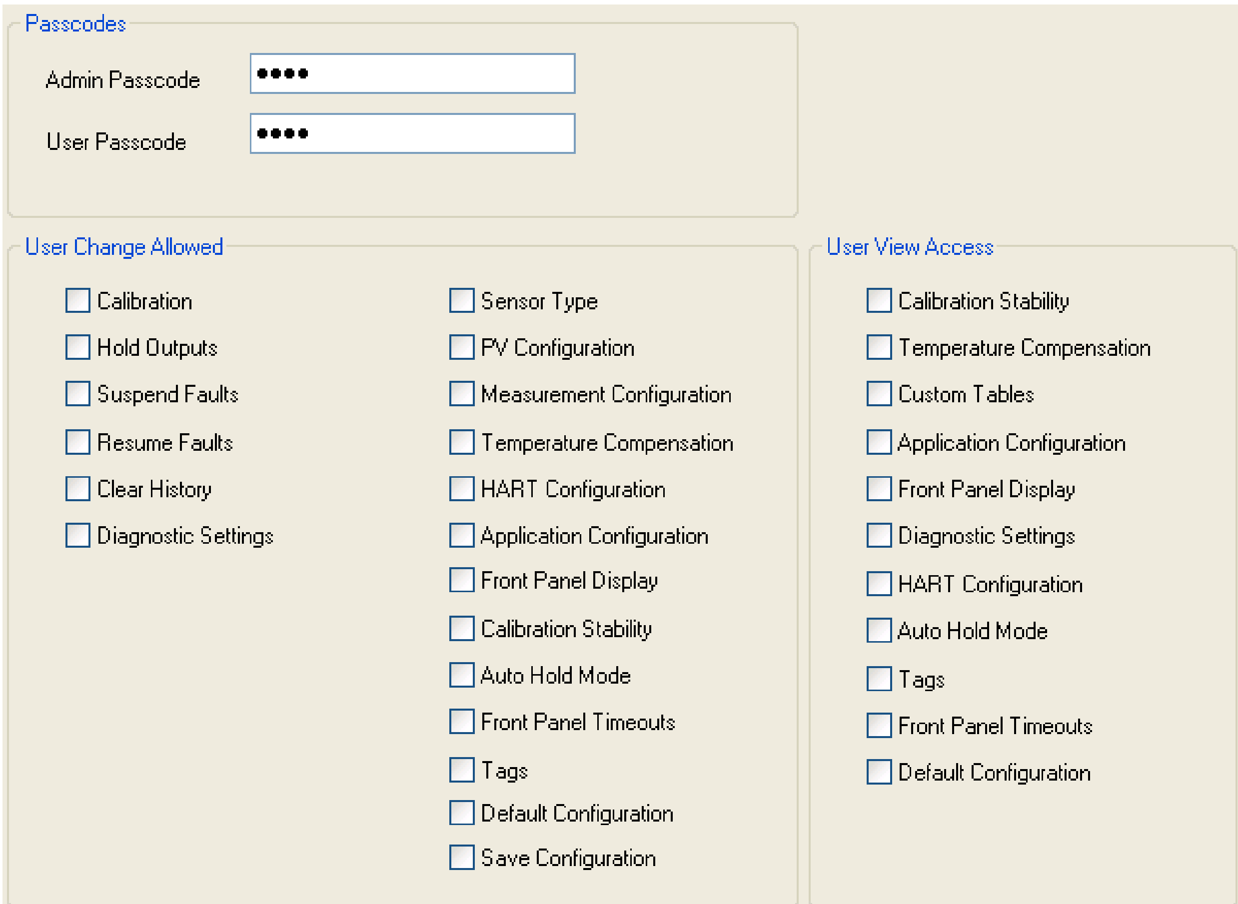


Figure 516. Sample 876CR Transmitter Passcode Access Screen

Field	Entry
Admin Passcode	Set the administrator passcode.
User Passcode	Set the user passcode.
User Change Allowed	To allow users to modify parameters, select the appropriate parameters in the User Change Allowed section.
User View Access	To allow users to view parameters (but not change them), select the appropriate parameters in the User View Access section.

Device Information

The Device Information screen allows you to set HART tags, descriptor, and message. It also displays the revision information.

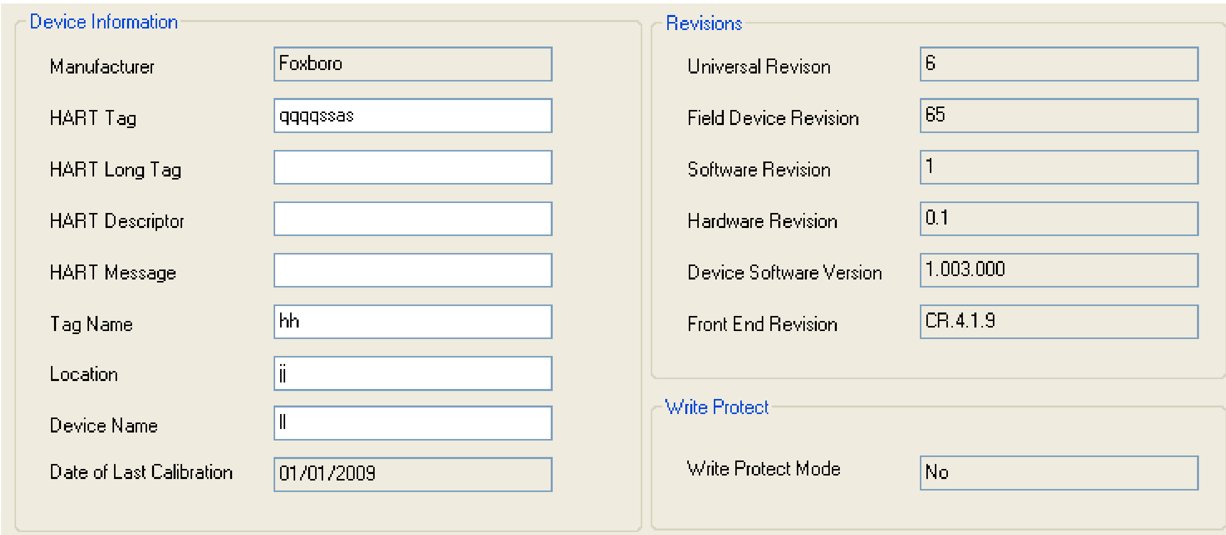


Figure 517. Sample 876CR Transmitter Device Information Screen

Field	Entry
Device Information	
Manufacturer	This field shows the application manufacturer name.
HART Tag	Set the HART tag name.
HART Long Tag	Set the HART long tag name. This field is only applicable for HART versions 6 and 7.
HART Descriptor	Set the HART descriptor.
HART Message	Set the HART message.
Tag Name	Set the tag name.
Location	Set the name of the location.
Device Name	Set the name of the device.
Date of Last Calibration	This field shows the date of last calibration.
Write Protect Mode	This field shows the Write Protect status of the device.

Save/Restore Configuration

The Save/Restore Configuration screen allows you to Save and Restore up to 2 user configurations as shown in Figure 518.

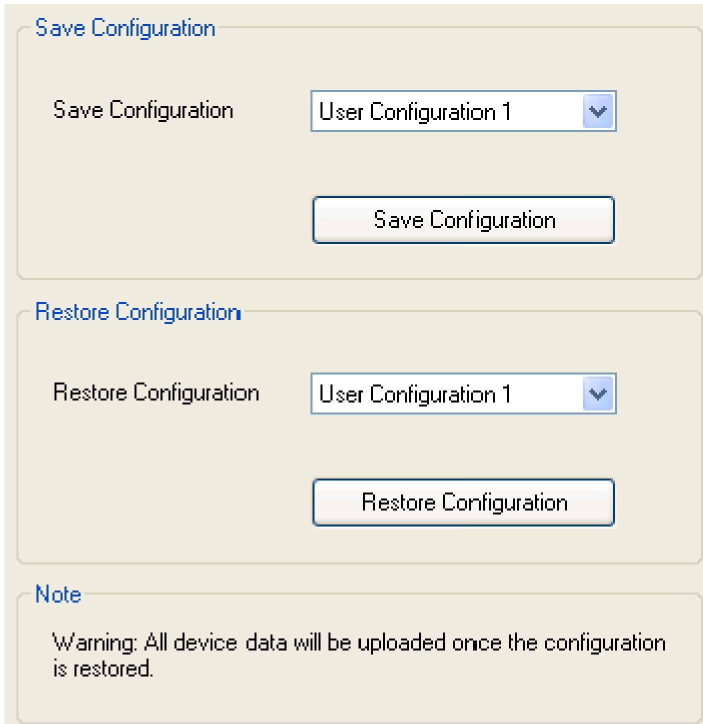


Figure 518. Sample 876CR Transmitter Save/Restore Configuration Screen

Field	Entry
Save/Restore Configuration	
Save Configuration	To save the current configuration: 1. Select User Configuration 1 or User Configuration 2 after you have configured all the DTM parameters. 2. Click Save Configuration. 3. Click OK.
Restore Configuration	To restore the current configuration: 1. Select User Configuration 1, User Configuration 2, or Factory Configuration depending on the configuration you want to restore. 2. Click Restore Configuration. 3. Click OK.

Device Status

HART Status

The HART Status screen shows the HART status as well as the field device status of the device. The status of each parameter is easily recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error). On most DTMs, if **Configuration Changed** does not show a green check mark, it can be reset by clicking the Reset Configuration Changed Flag button on the lower left side of the screen.

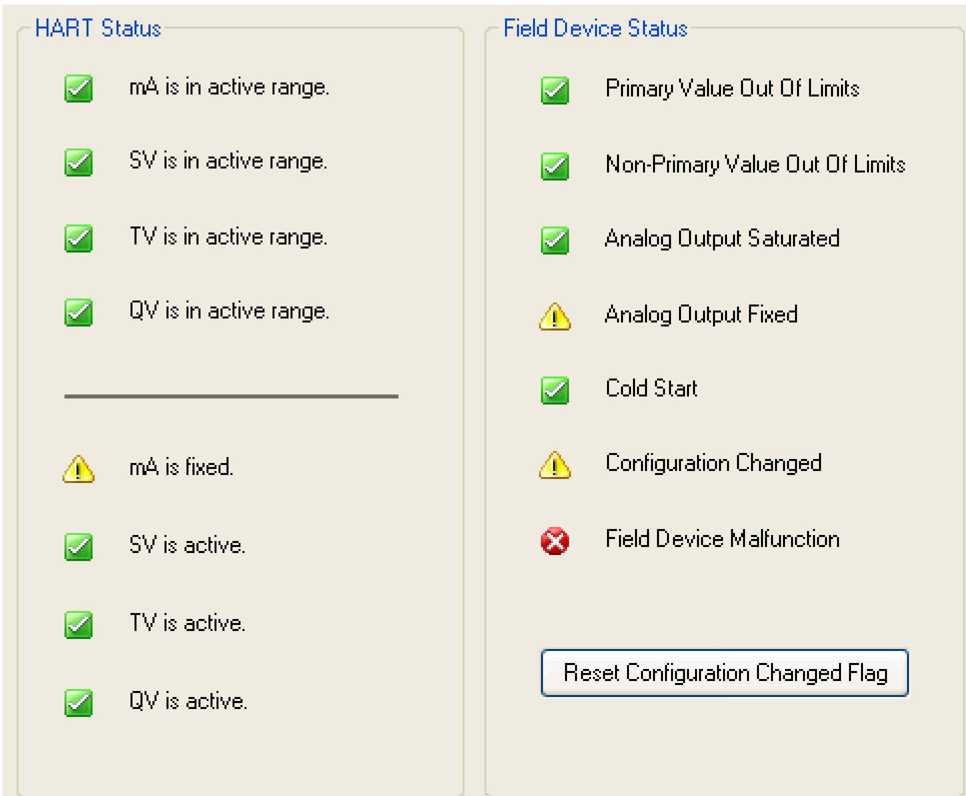


Figure 519. Sample 876CR Transmitter HART Status Screen

Device Status

The Device Status screen shows current status of the device. The status of each parameter is easily recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

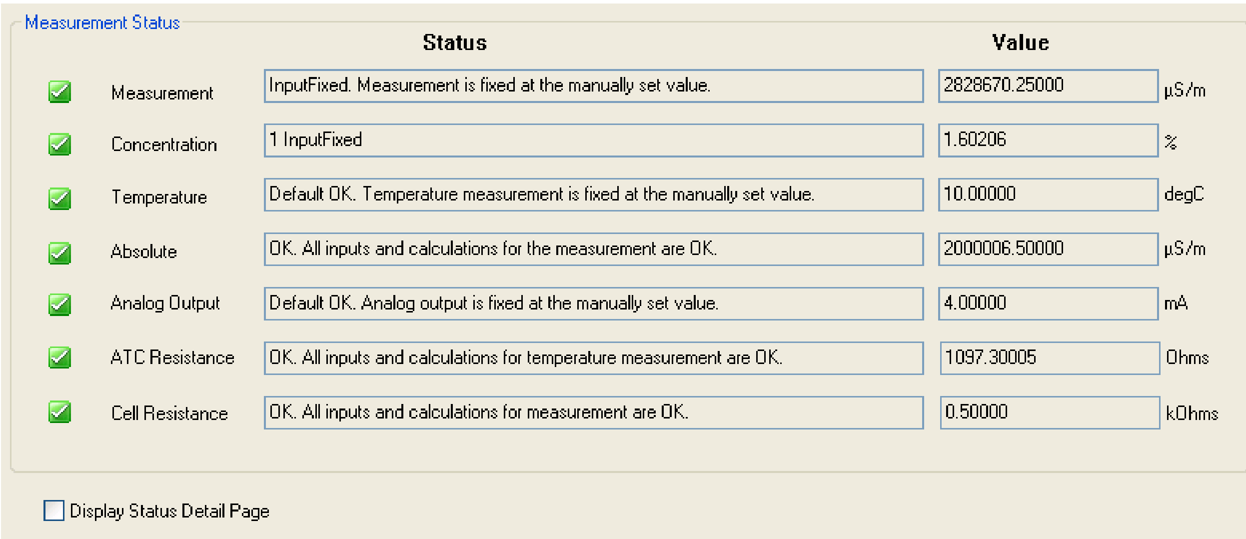


Figure 520. Sample 876CR Transmitter Device Status Screen

Field	Entry
Device Status for Measurement	
Measurement	This field shows the Measurement status and value.
Concentration	This field shows the Concentration status and value.
Temperature	This field shows the Temperature status and value.
Absolute	This field shows the Absolute parameter status and value.
Analog Output	This field shows the Analog Output status and value.
ATC Resistance	This field shows the ATC Resistance status and value.
Cell Resistance	This field shows the Cell Resistance status and value.
Display Status Detail Page	Select this check box to display the Status Tree page.

Status Tree Screen

The Status Tree screen shows the device status and allows to diagnose the device failures. The screen shows various parameters and the status of each of these parameters can be easily recognized by their color. A green circle indicates the selected user configuration and a grey circle indicates parameters the user has not selected. A red circle indicates that there is an error.

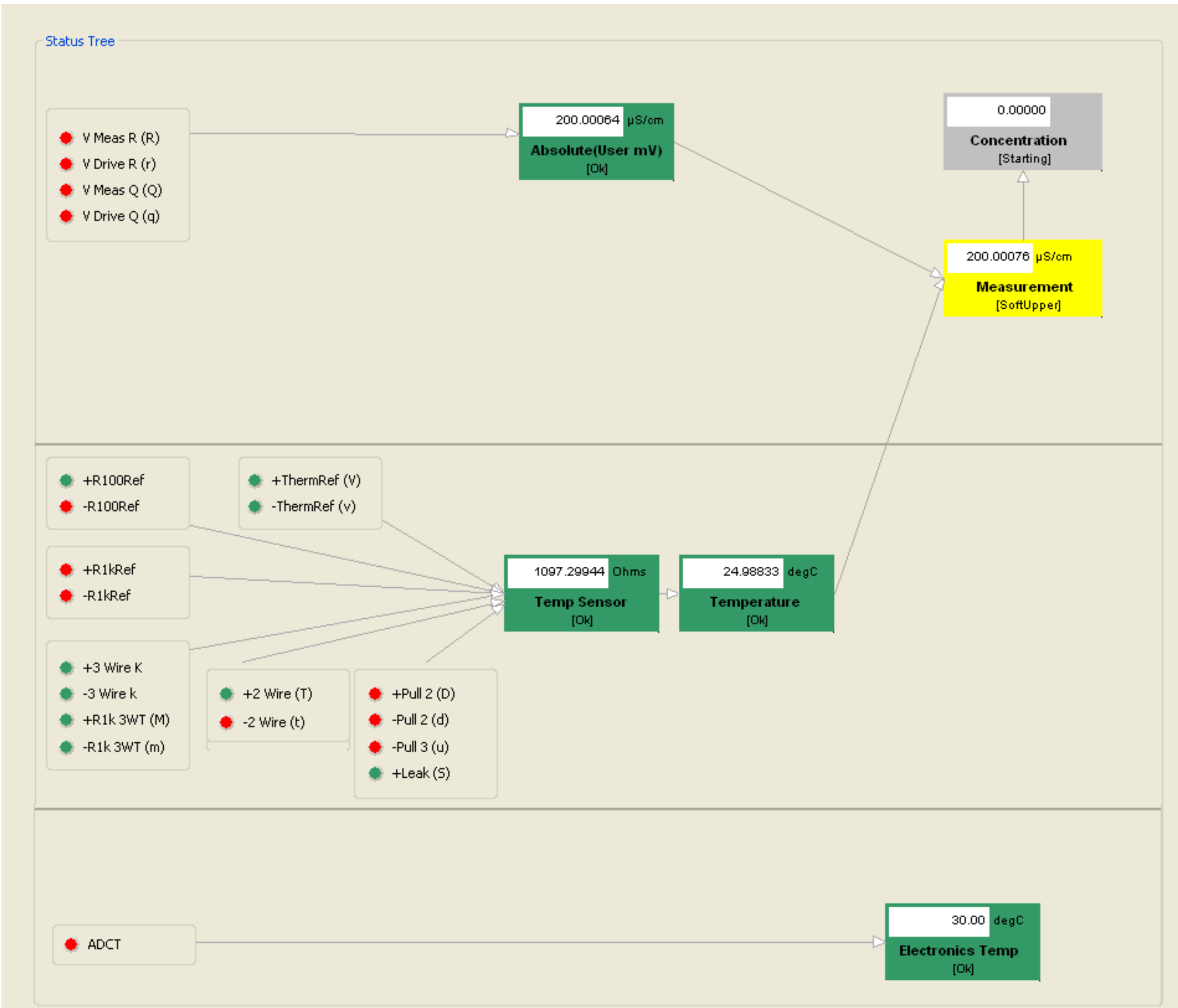


Figure 521. Sample 876CR Transmitter Status Tree Screen

Calibration

You can perform the following calibration procedures:

Parameters

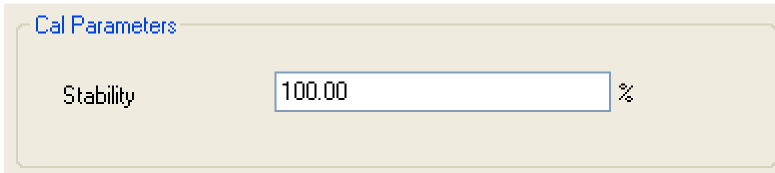


Figure 522. Sample 876CR Transmitter Cal Parameters Screen

Field	Entry
Stability	Set the stability value in percentage.

Calibrate

The Calibrate screen enables you to calibrate the device as shown in Figure 523.

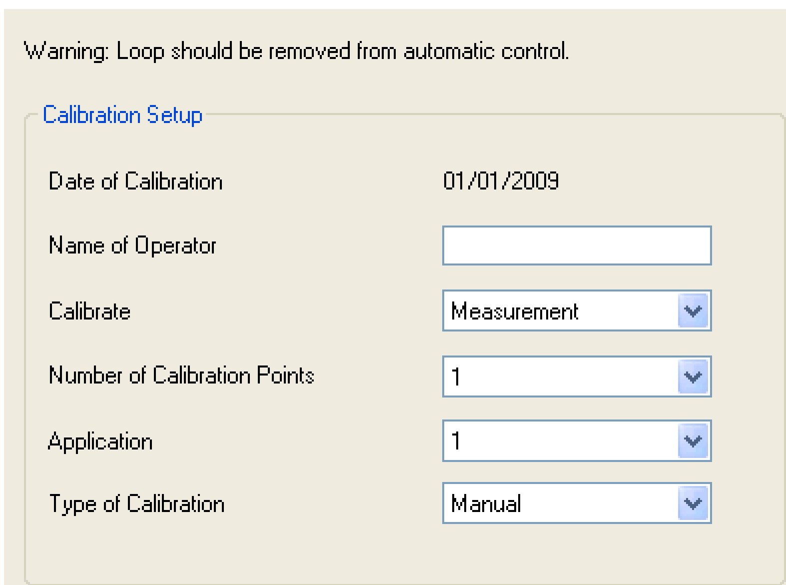


Figure 523. Sample 876CR Transmitter Calibration Setup Screen

Field	Entry
Date of Calibration	This field shows the date of calibration.
Name of Operator	Set the name of the operator.
Calibrate	Select the Calibrate option from the drop-down menu. Choose from Measurement or Temperature.

Field	Entry
Number of Calibration Points	Select the Number of Calibration Points from the drop-down menu. Choose from 1 or 2.
Application	Select the Application from the drop-down menu. Choose from 1, 2, or 3.
Type of Calibration	Select the Type of Calibration from the drop-down menu. Choose from Smart and Manual.

Calibrate - Pure H_2O

The Calibrate pure H_2O enables you to calibrate the device on pure water as shown in Figure 524.

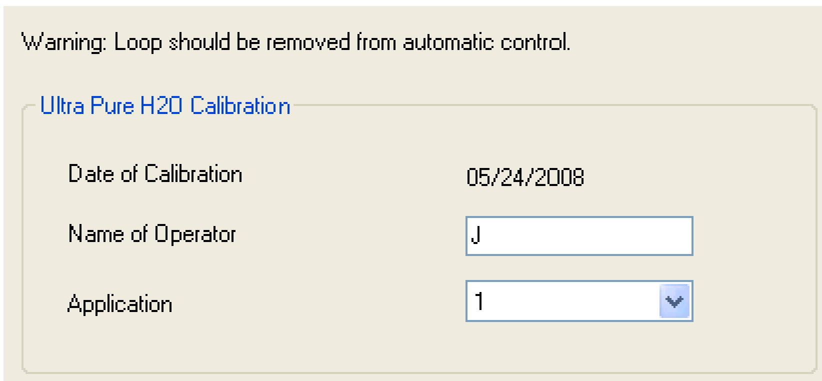


Figure 524. Sample 876CR Transmitter Calibrate Pure H_2O Calibration Screen

Field	Entry
Date of Calibration	This field shows the date of calibration.
Name of Operator	Set the name of the operator.
Application	Select the Application from the drop-down menu. Choose from 1, 2, or 3.

Troubleshooting

Faults

Fault status is displayed in the Troubleshooting Menu. You can suspend faults from the measurement status for one hour and resume faults at any time. The Faults status screen appears as shown in Figure 525.

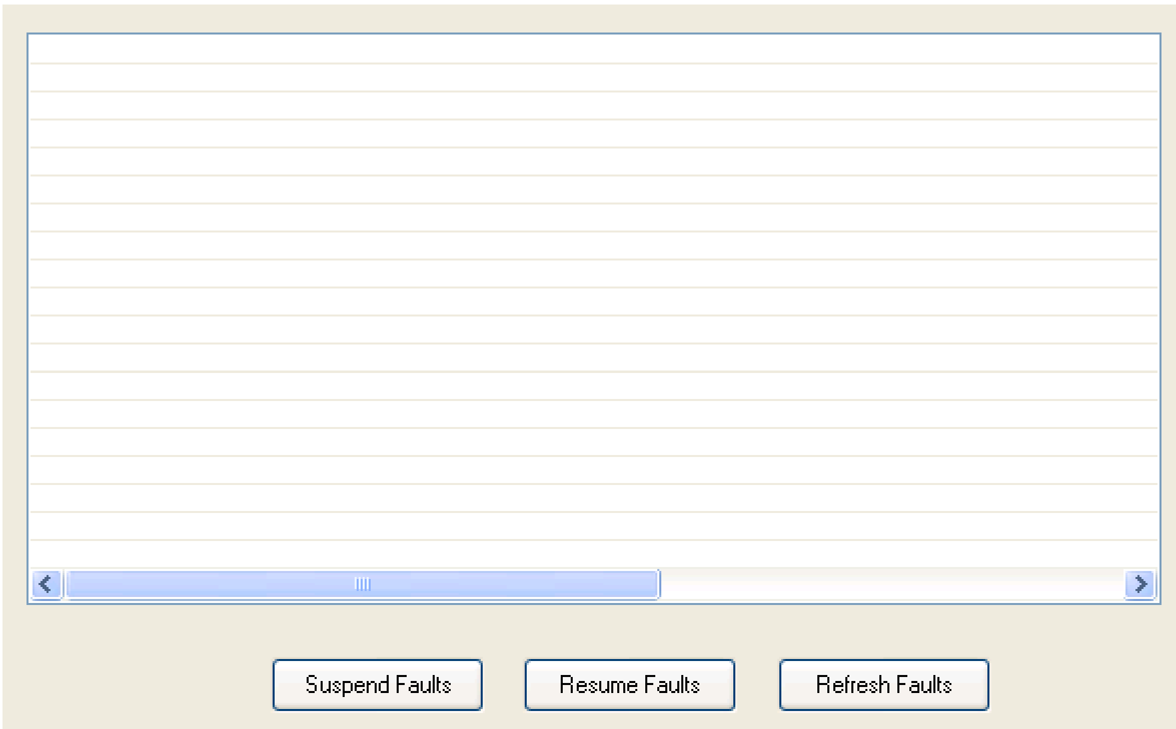


Figure 525. Sample 876CR Transmitter Faults Screen

Field	Entry
Suspend Faults	Click this button to suspend faults.
Resume Faults	Click this button to resume faults.

History Log

The history log includes all the faults, power restore, entries and exits from Configuration, Calibration and Hold, and Faults that are temporarily suspended.

The history log appears as shown in Figure 526.

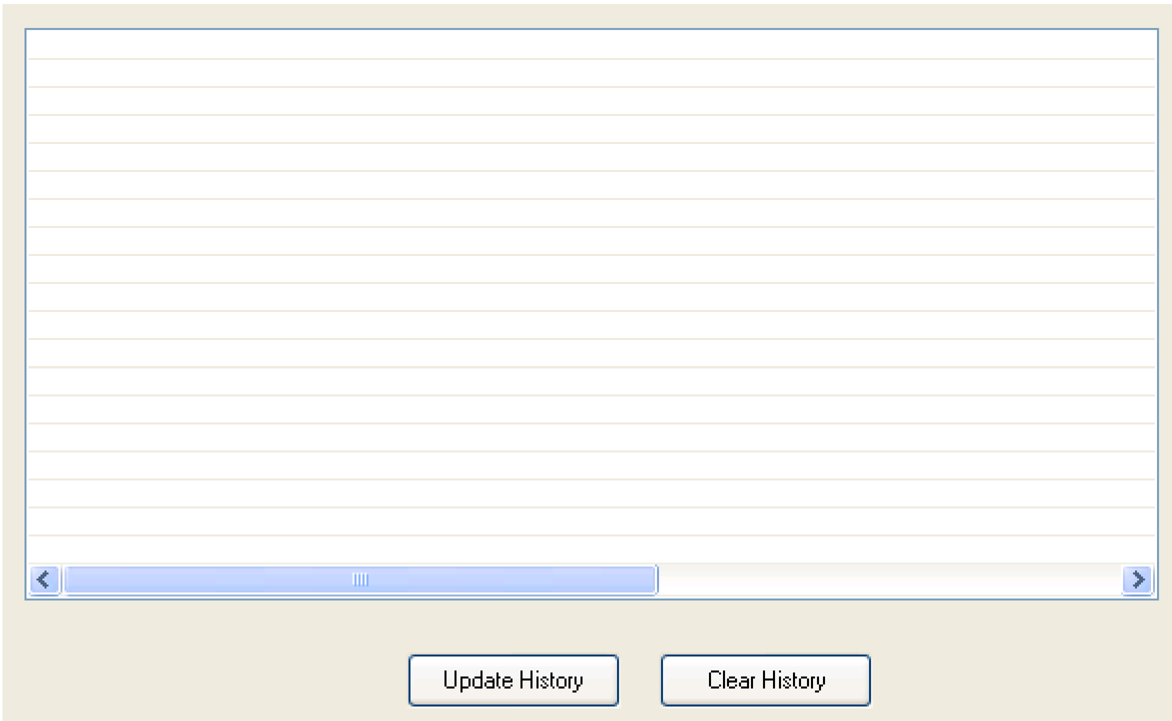


Figure 526. Sample 876CR Transmitter History Log Screen

Loop Test

The Loop Test is a procedure to use the analyzer, as a calibration source to check other instruments in the loop.

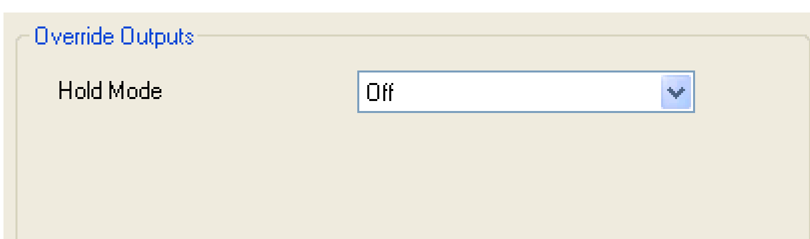


Figure 527. Sample 876CR Transmitter Loop Test Screen

Field	Entry
Hold Mode	Select the Hold Mode from the drop-down menu. Choose from Off, Hold Present Values, or Manual Hold.

If you select Manual Hold as Hold Mode, the screen appears as shown in Figure 528.

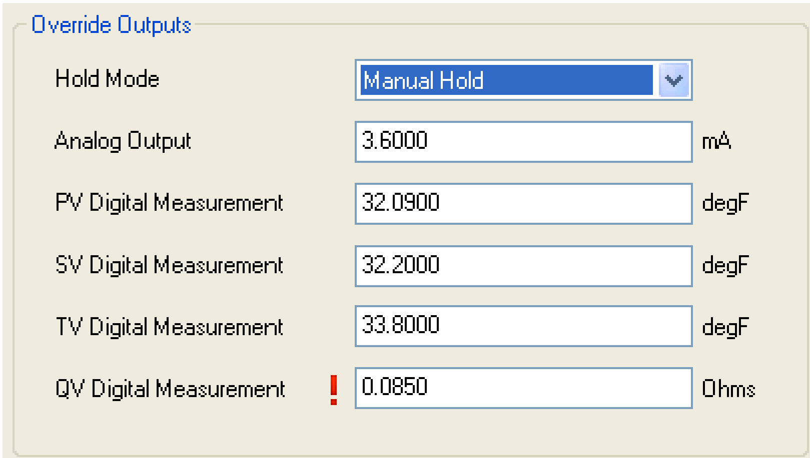


Figure 528. Sample 876CR Transmitter Loop Test Screen (Manual Hold)

Field	Entry
Hold Mode	Select Manual Hold option from the drop-down menu.
Analog Output[a]	Set analog output reading.
PV Digital Measurement	Set PV digital measurement.
SV Digital Measurement	Set SV digital measurement.
TV Digital Measurement	Set TV digital measurement.
QV Digital Measurement	Set QV digital measurement.

a. If mA Loop Mode is selected as Multidrop in the Output - HART screen, then Analog Output field does not appear.

12. I/A Series Pressure Transmitter

This chapter provides information that is exclusive to using the PC50 Field Device Tool with I/A Series Pressure Transmitter with HART communication protocol. Additional information about these transmitters and HART communication can be found in the following documents.

Table 6.

MI IDP10-T	IDP10-T Differential Pressure Transmitters
MI IAP10-T/IGP10-T	IAP10-T Absolute Pressure Transmitters and IGP10-T Gauge Pressure Transmitters
MI IAP20-T/IGP20-T	IAP20-T Absolute Pressure Transmitters and IGP20-T Gauge Pressure Transmitters
MI IDP25-T/IDP50-T	IDP25-T and IDP50-T Differential Pressure Transmitters
MI IGP25-T/IGP50-T	IGP25-T and IGP50-T Gauge Pressure Transmitters

Device Overview Screen

The Device Overview screen displays HART information, Device Information, and current PV data.

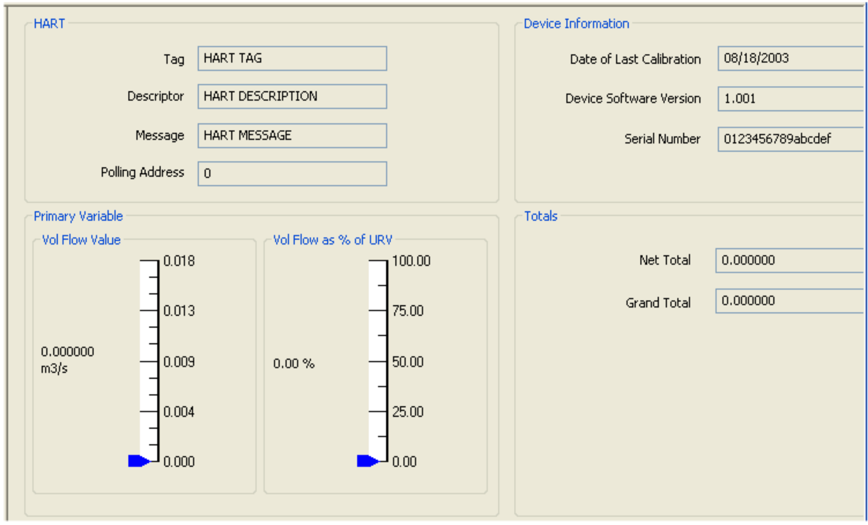


Figure 529. Sample I/A Series Pressure Transmitter Device Overview Screen

Process Variables Screen

The Process Variables screen provides the PV and totals data that was displayed on the Device Overview screen plus additional measurement and device information.

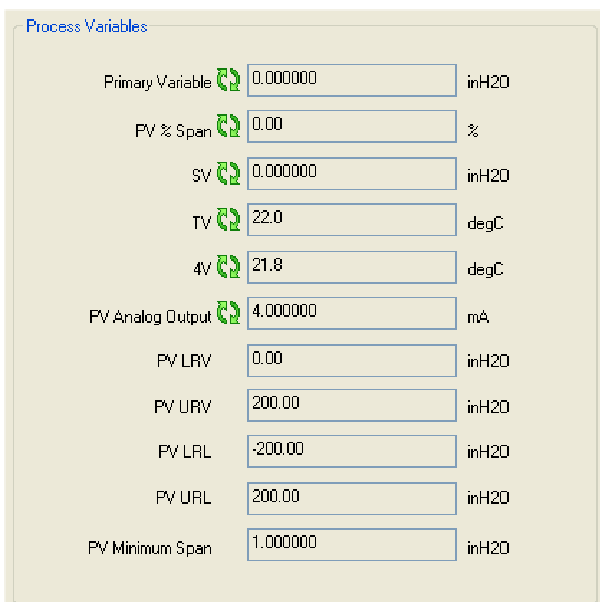


Figure 530. Sample I/A Series Pressure Transmitter Process Variables Screen

Device Status Screen

The Device Status screen shows the current status of the device. The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red X (error).

In the **Error Reason** section of the screen, the reason for the error is given.

NOTE

Error Reason indicates the last error reason. It is possible that the condition has since been cleared.

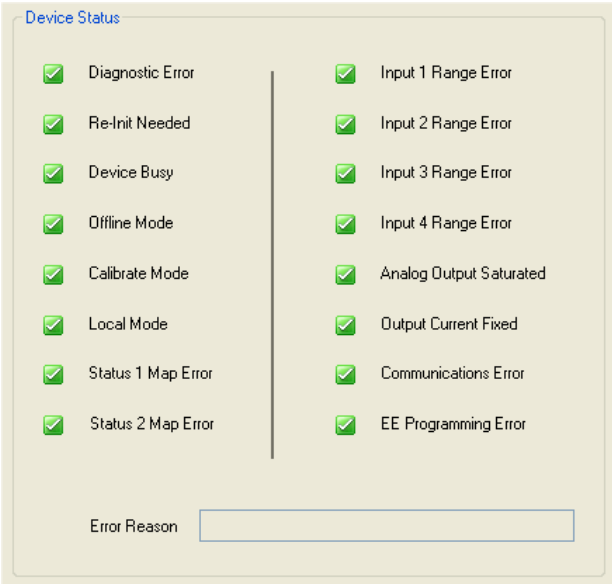


Figure 531. Sample I/A Series Pressure Transmitter Device Status Screen

Calibration

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

- PV Rerange
- SV Rerange
- Zero Trim
- Scaled DAC Trim
- Lower Sensor Trim
- Upper Sensor Trim

Setup

General Setup Screen

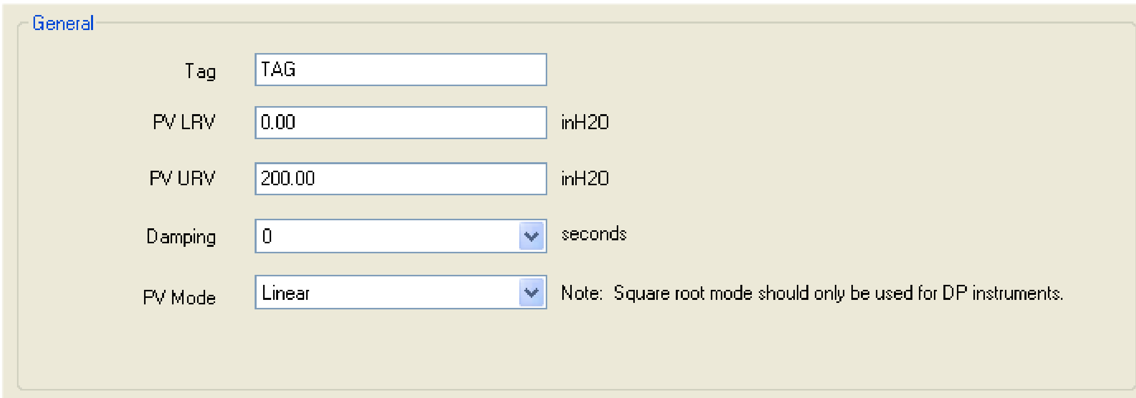


Figure 532. Sample I/A Series Pressure Transmitter General Setup Screen

Field	Entry
Tag	Enter maximum of 8 characters. Optional, used for reference only.
PV LRV	Enter the Lower Range Value.
PV URV	Enter the Upper Range Value.
Damping	Select the damping time between 0 and 32 seconds.
PV Mode	Select Linear, SqRt Cutoff <1% DP, SqRt Linear <4% DP, SqRt Cutoff 0-20% Flow.

Measurement Units Screen

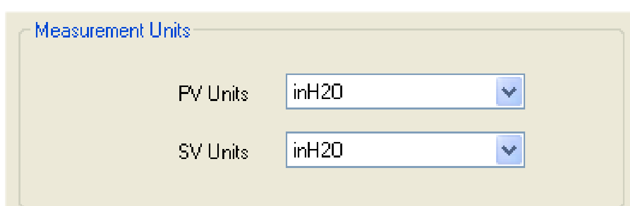


Figure 533. Sample I/A Series Pressure Transmitter Measurement Units Screen

Field	Entry
PV Units	Select the PV Units from the list presented.
SV Units	Select the SV Units from the list presented.

Process Parameters Screen

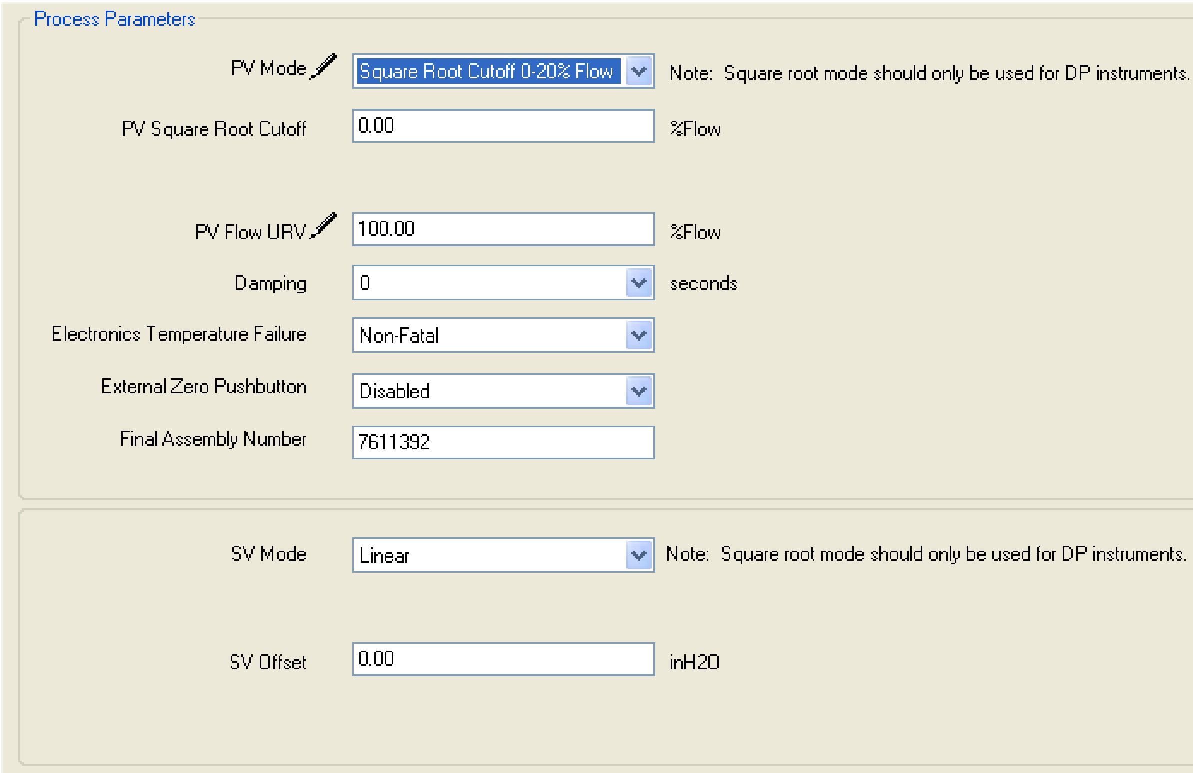


Figure 534. Sample I/A Series Pressure Transmitter Process Parameters Screen

Field	Entry
PV Mode	Select Linear, SqRt Cutoff <1% DP, SqRt Linear <4% DP, SqRt Cutoff 0-20% Flow.
PV Offset	Enter any PV Offset value (Linear mode only).
PV Square Root Cutoff	Enter the PV Square Root Cutoff in percent flow (Sq Rt Cutoff 0-20%Flow mode only).
PV Flow URV	Enter the PV Flow URV in percent flow (square root modes only).
Damping	Select the damping time between 0 and 32 seconds.
Electronics Temperature Failure	Select Fatal or Non-Fatal.
External Zero Pushbutton	Select Enabled or Disabled.
Final Assembly Number	Enter the Final Assembly Number (number associated with the overall transmitter).
SV Mode	Select Linear, SqRt Cutoff <1% DP, SqRt Linear <4% DP, SqRt Cutoff 0-20% Flow.
SV Offset	Enter any SV Offset value.

Field	Entry
SV Square Root Cutoff	Enter the SV Square Root Cutoff in percent flow (Sq Rt Cutoff 0-20%Flow mode only).
SV Flow URV	Enter the SV Flow URV in percent flow (square root modes only).

Analog Output Screen

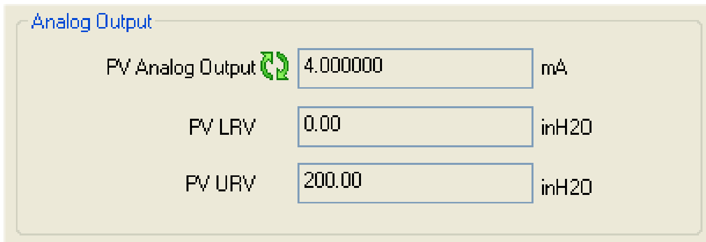


Figure 535. Sample I/A Series Pressure Transmitter Output Screen

Field	Entry
PV Analog Output	Shows the current PV Analog Output
PV LRV	Shows the PV LRV
PV URV	Shows the PV URV

Alarm Output Screen

In this parameter, select **Fail Low** or **Fail High** for output to go fully downscale or fully upscale in the event of a failure.

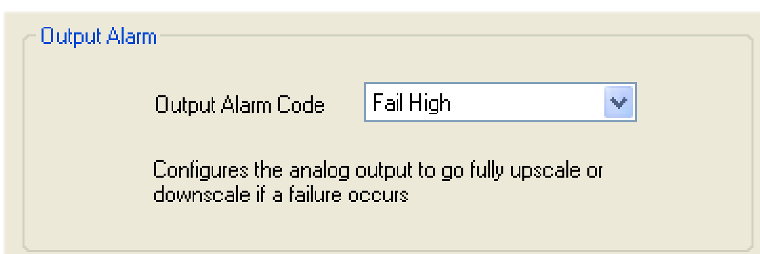


Figure 536. Sample I/A Series Pressure Transmitter Alarm Output Screen

Field	Entry
Output Alarm Code	Select Fail High or Fail Low.

HART Output Screen

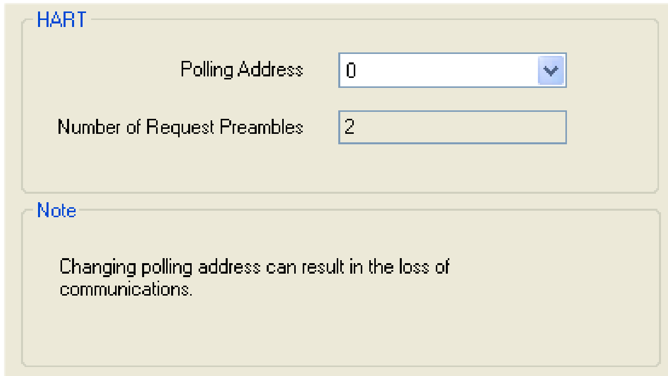


Figure 537. Sample I/A Series Pressure Transmitter HART Output Screen

Field	Entry
Polling Address	Select an address between 0 and 15. A nonzero number applies to multidrop applications.
Number of Request Preambles	Select a number of preambles to be sent in a response message from the flowmeter to the host of between 3 and 20.

Device Information

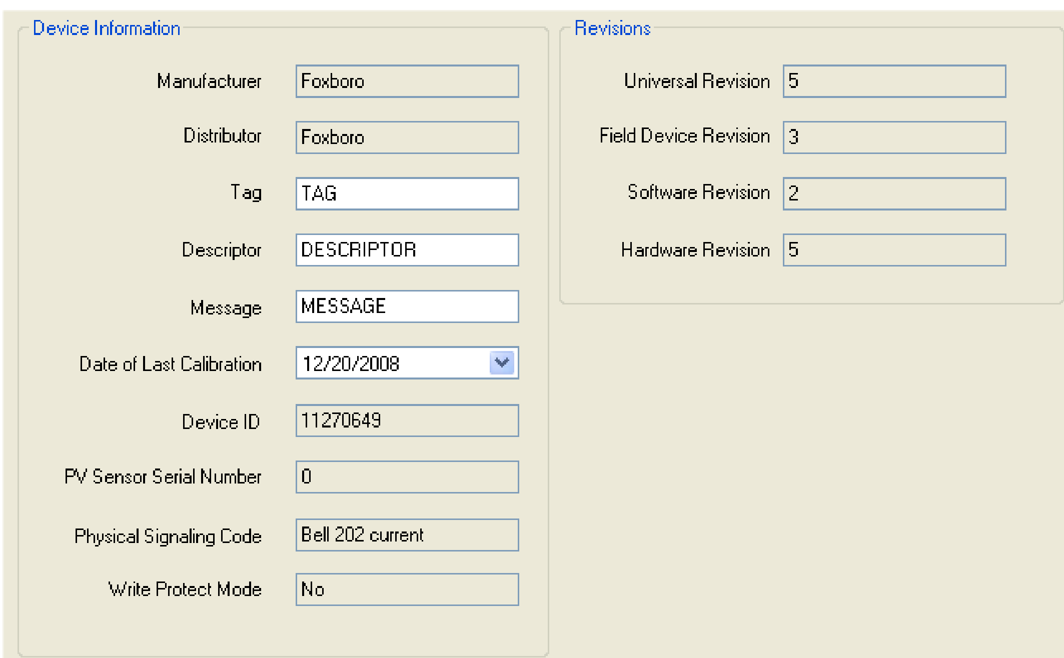


Figure 538. Sample I/A Series Pressure Transmitter Device Information Screen

Field	Entry
Manufacturer	Shows the manufacturer as Foxboro.
Distributor	Shows the distributor as Foxboro.
Tag	Enter the Tag (8 characters maximum).
Descriptor	Enter the Descriptor (16 characters maximum).
Message	Enter the Message (32 characters maximum).
Date of last Calibration	Select the Date of Last Calibration.
Device ID	Shows the Device ID.
PV Sensor Serial Number	Shows the PV Sensor Serial Number.
Physical Signaling Mode	Shows the Physical Signaling Mode.
Write Protect Mode	Shows whether the transmitter is write protected.

Troubleshooting

Loop Test

The Loop Test is a procedure to use the transmitter as a calibration source to check other instruments in the loop.

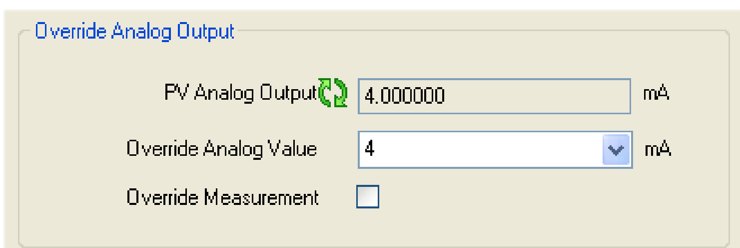


Figure 539. Sample I/A Series Pressure Transmitter Loop Test Screen

Field	Entry
PV Analog Output	Shows the current PV Analog Output in mA.
Override Analog Value	Select 4 mA or 20 mA.
Override Measurement	Check/uncheck to activate/end override of measurement.

13. I/A Series Advanced Pressure Transmitter

This chapter provides information that is exclusive to using I/A Series Advanced Pressure Transmitter with HART communication protocol. Additional information about these transmitters and their functions with HART communication can be found in the following document.

- MI 020-600   Enterprise Control System Component Pressure Transmitter Series - Models IDP15D, IDP31D, IDP32D, and IGP60G with HART Communication

Device Overview Screen

The Device Overview screen displays HART information, Device Information, current PV, PV as % of Span, and PV range data.

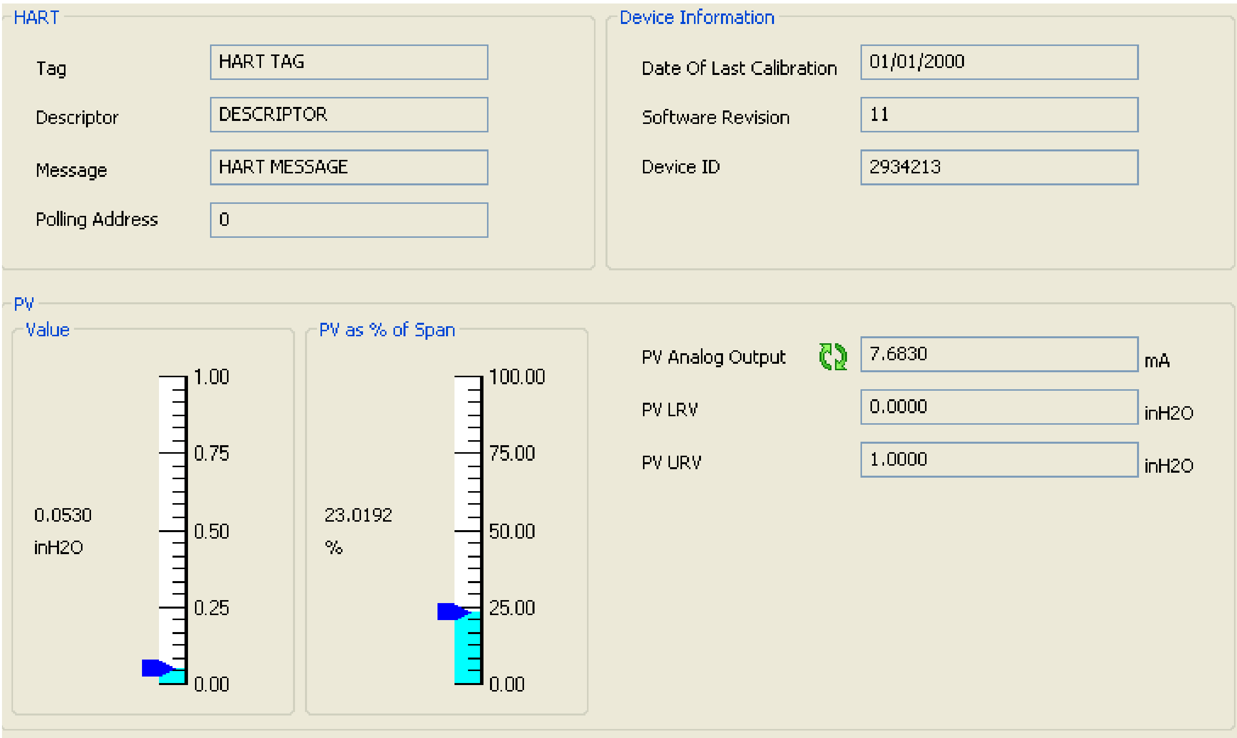


Figure 540. Sample I/A Series Advanced Pressure Transmitter Device Overview Screen

Process Variables Screen

The Process Variables screen displays the PV data such as primary variable, analog output, sensor temperature, PV range, and PV % range.

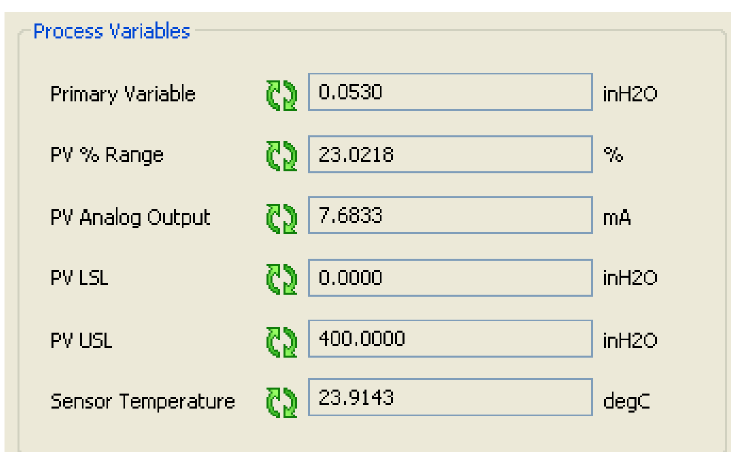


Figure 541. Sample I/A Series Advanced Pressure Transmitter Process Variables Screen

Device Configuration

General

The General screen displays the tag, PV range, damping, and PV mode.

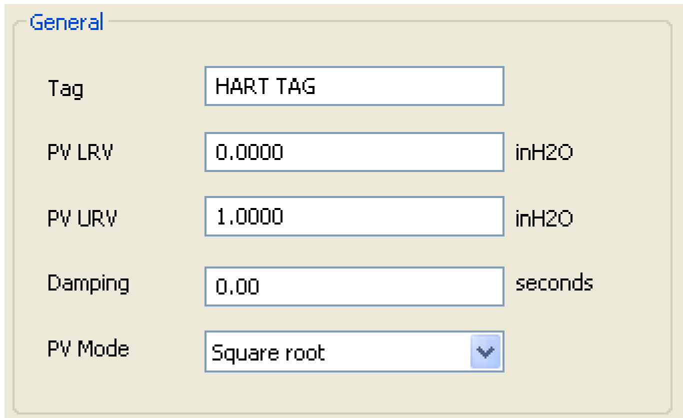


Figure 542. Sample I/A Series Advanced Pressure Transmitter General Configuration Screen

Field	Entry
Tag	Set the Tag name. You can enter up to 8 characters maximum.
PV LRV	Set the Process Variable Lower Range Value.
PV URV	Set the Process Variable Upper Range Value.
Damping	Set the Damping time between 0 to 128 seconds.
PV Mode	Select Linear or Square root from the drop-down menu.

Measurement Units

Measurement Units enables you to configure the pressure and temperature units.

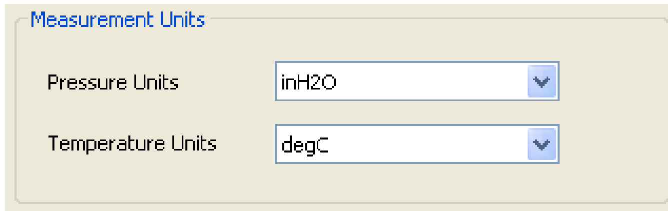


Figure 543. Sample I/A Series Advanced Pressure Transmitter Measurement Units

Field	Entry
Pressure Units	Select the pressure units from the drop-down menu. Choose from mmH_2O, mH_2O, inH_2O, kPa, MPa, Pa, hPa, bar, mbar, nmHg, inHg, g/cm^2, kg/cm^2, atm, Torr, and psi.
Temperature Units	Select the temperature units from the drop-down menu. Choose from degC, degF, degR, and Kelvin.

Signal Condition

Signals

Signals Condition screen displays the cutoff mode and cutoff point.

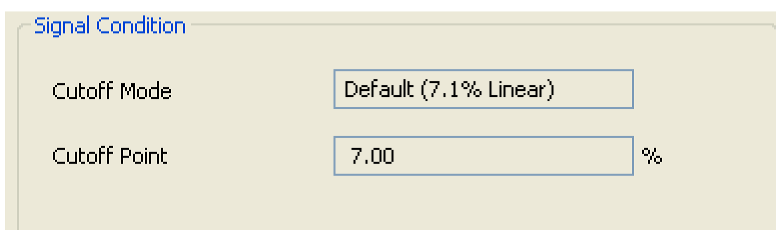


Figure 544. Sample I/A Series Advanced Pressure Transmitter Signals Screen

Field	Entry
Cutoff Mode	Shows the CutOff Mode.
Cutoff Point	Shows the Cutoff Point.

Cutoff Mode

Cutoff Mode screen enables you to run Cutoff Mode method.

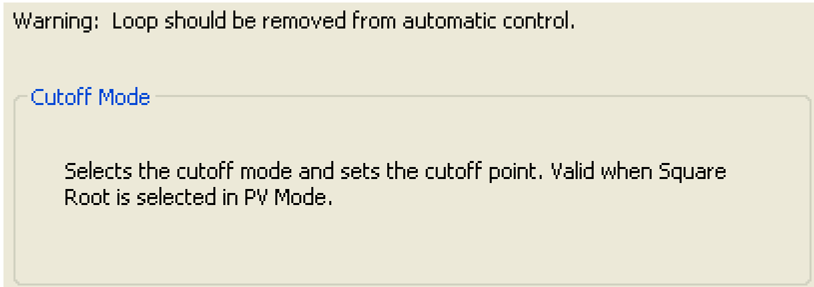


Figure 545. Sample I/A Series Advanced Pressure Transmitter Cutoff Mode Screen

Zero Value

Zero Value screen enables you to calibrate the 4 mA pressure value.

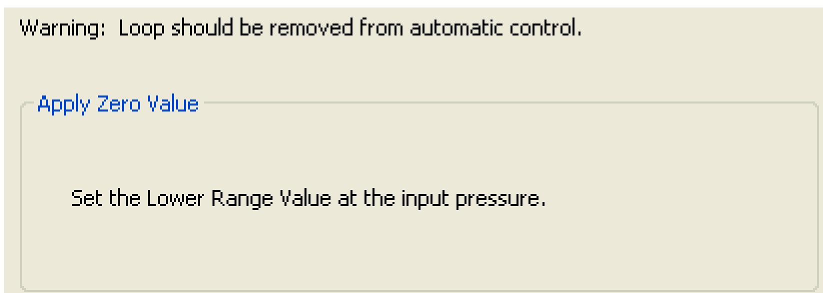


Figure 546. Sample I/A Series Advanced Pressure Transmitter Zero Value Screen

Span Value

Span Value screen enables you to calibrate the 20 mA pressure value.

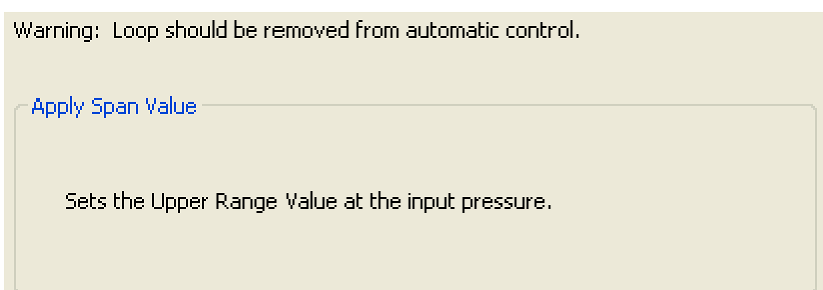


Figure 547. Sample I/A Series Advanced Pressure Transmitter Span Value Screen

Set LRV

Set LRV screen enables you to run Set LRV method.

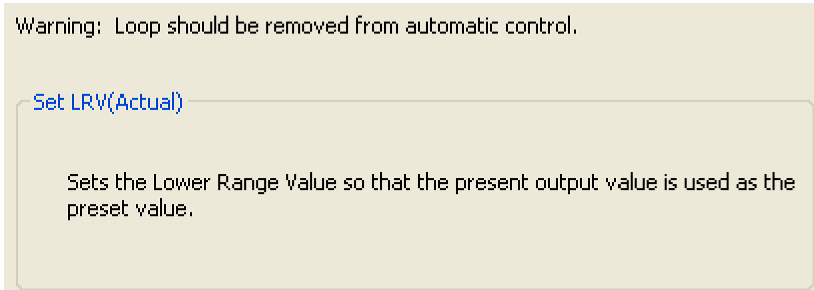


Figure 548. Sample I/A Series Advanced Pressure Transmitter Set LRV Screen

Alarm

Alarm screen enables you to configure the alarm output, and set the lower and upper output alarm values.

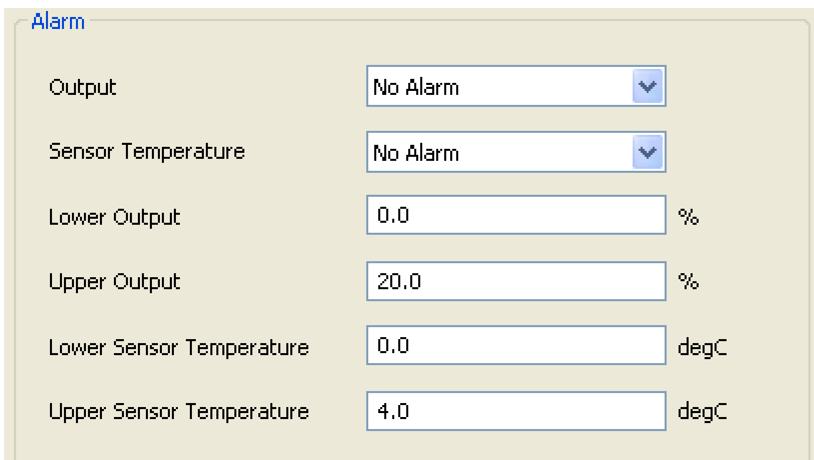


Figure 549. Sample I/A Series Advanced Pressure Transmitter Alarm Screen

Field	Entry
Output	Select the Output from the drop-down menu. Choose from No Alarm, Lower Limit, Upper Limit, and Lower/Upper Limit.
Sensor Temperature	Select the Sensor Temperature from the drop-down menu. Choose from No Alarm, Lower Limit, Upper Limit, and Lower/Upper Limit.
Lower Output	Set the Lower Output alarm value. This is measured in percentage.
Upper Output	Set the Upper Output alarm value. This is measured in percentage.
Lower Sensor Temperature	Set the Lower Sensor Temperature alarm value.
Upper Sensor Temperature	Set the Upper Sensor Temperature alarm value.

Simulation Mode

Failure Alarm

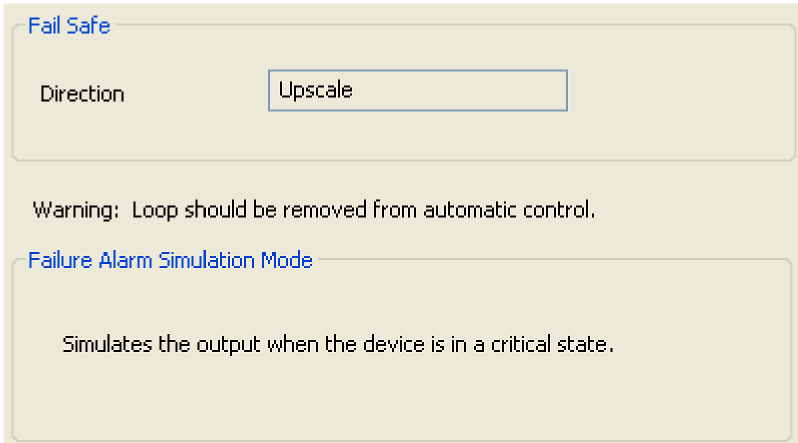


Figure 550. Sample I/A Series Advanced Pressure Transmitter Failure Alarm Screen

Field	Entry
Direction	Defines the Analog Output response when the Field Device detects the Analog Output is not tracking the associated Field Device Variable. Since the direction is read from the device, you cannot change the direction.
Failure Alarm Simulation Mode	Simulates the output when the device is in a critical state.

Output

Analog

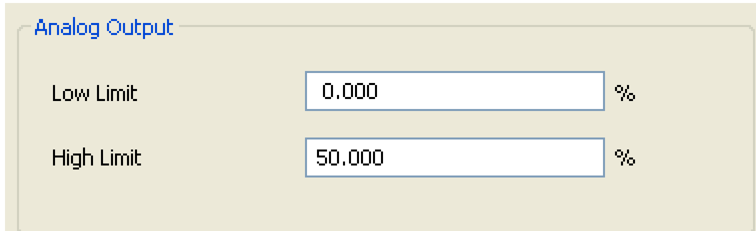


Figure 551. Sample I/A Series Advanced Pressure Transmitter Analog Output Screen

Field	Entry
Low Limit	Set the Lower limit value.
High Limit	Set the Higher limit value.

HART

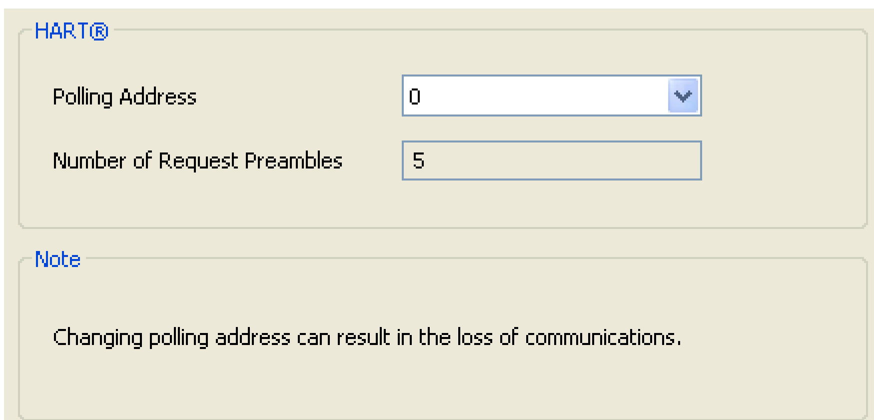


Figure 552. Sample I/A Series Advanced Pressure Transmitter HART Output Screen

Field	Entry
Polling Address	Select Polling Address between 0 and 15. A nonzero number applies to multidrop applications.
Number of Request Preambles	Shows the Number of Request Preambles to be sent in a response message from the flowmeter to the host of between 3 and 20.

Local Display

Local Display screen enables you to configure the local display of the device.

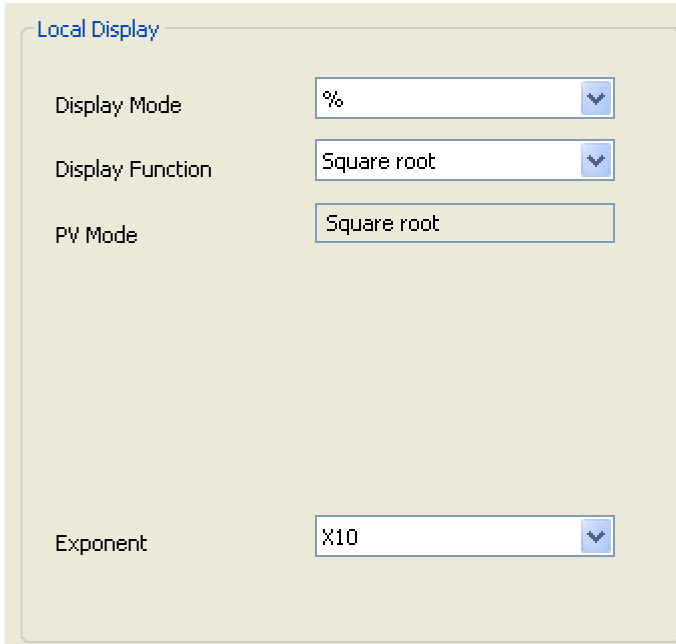


Figure 553. Sample I/A Series Advanced Pressure Transmitter Local Display Screen

Field	Entry
Display Mode	Select the Display Mode from the drop-down menu. Choose from %, Scale, and pressure.
Display Function	Select Display Function from the drop-down menu. Choose from Linear or Square root.
PV Mode	Shows the PV Mode.
Units Low	Set the Units Low value.
Units High	Set the Units High value.
Display Unit	Select the Display Unit from the drop-down menu. Choose from mmH_2O, mmAq, mH_2O, inH_2O, fTH_2O, kPa, MPa, Pa, hPa, kPaG, MPaG, kPa abs, Pa abs, hPa abs, bar, mbar, barG, mbarG, mmHg, inHg, mmHg, inHg, mmHg abs, gf/cm^2, kgf/cm^2, g/cm^2, kg/cm^2, kgf/cm^2G, kgf/cm^2 abs, atm, Torr, psi, g/cm^3, kg/m^3, m^3, I, kl, mi/h, l/h, kl/h, skl/h, Sm^3/h, t/h, kl/h, t/h, m^3/h, km^3/h, Nm^3/h, kNm^3/h, l/min, kl/min, m^3/min, Nml/min, kl/d, m^3/d, t/d, Nm^3/d, kg/h, gal/min, gal/h, mm, m, %, t, kg, None, and user defined unit.
User Unit	If the Display Unit is selected as user defined unit, enter the User Unit value.
Exponent	Select the Exponent from the drop-down menu. Choose from X1, X10, X100, and X1000.

Device Information

Device Information screen shows the complete device information configured.

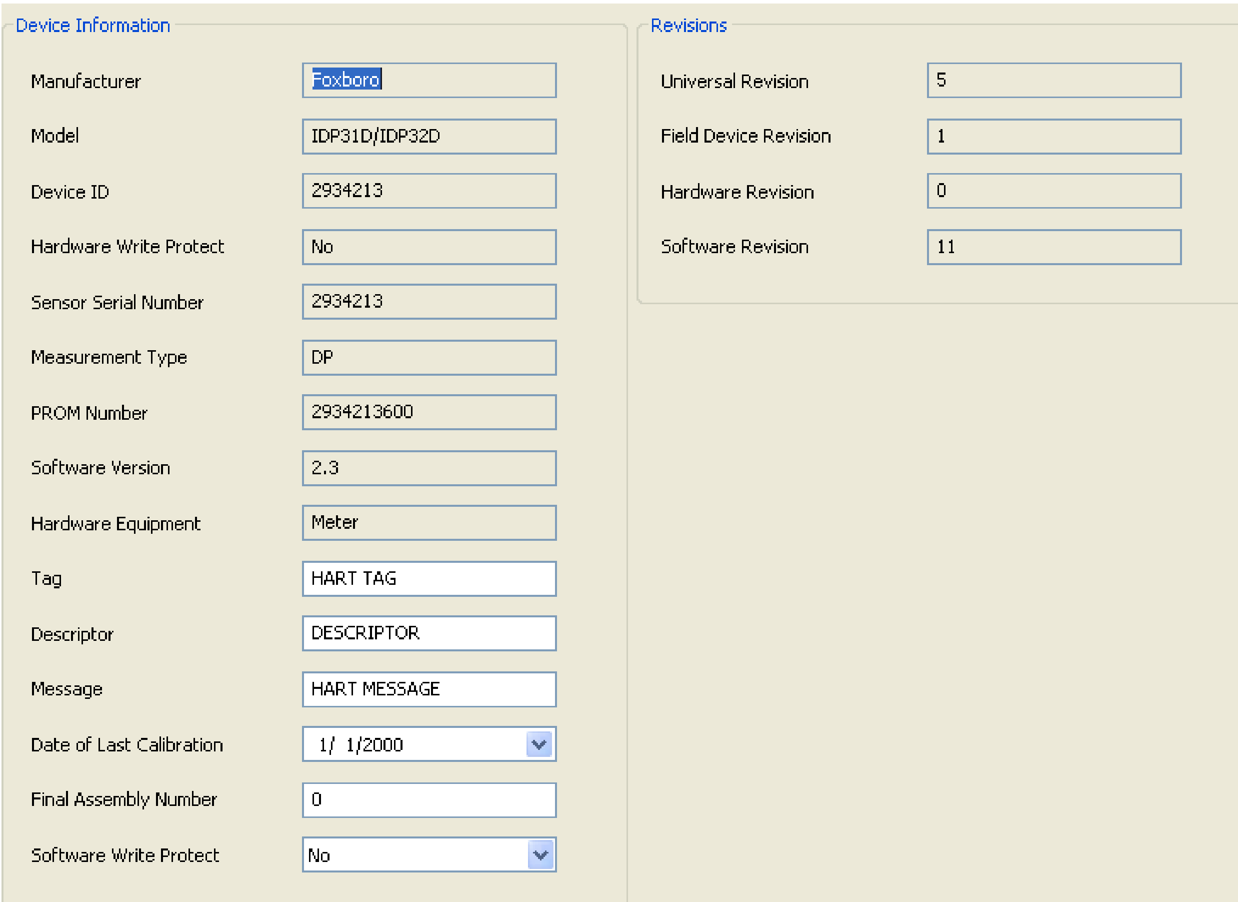


Figure 554. Sample I/A Series Advanced Pressure Transmitter Device Information Screen

Field	Entry
Manufacturer	Shows the manufacturer as Foxboro.
Model	Shows the Model Number.
Device ID	Shows the device identification number.
Hardware Write Protect	Shows the whether the hardware is write protected.
Sensor Serial Number	Shows the Serial Number of the Sensor.
Measurement Type	Shows the Measurement Type.
PROM Number	Shows the PROM number value.
Software Version	Shows the Software Version.
Hardware Equipment	Shows the Hardware Equipment.
Software Version	Shows the Software Version.
Descriptor	Enter the Descriptor (16 characters maximum).

Field	Entry
Tag	Enter the Tag (8 characters maximum).
Message	Enter the Message (32 characters maximum).
Date of last Calibration	Select the Date of Last Calibration.
Final Assembly Number	Shows the Final Assembly number
Software Write Protect	Shows whether the transmitter is write protected.

Device Status

The Device Status screen shows current status of the device. The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red X (error).

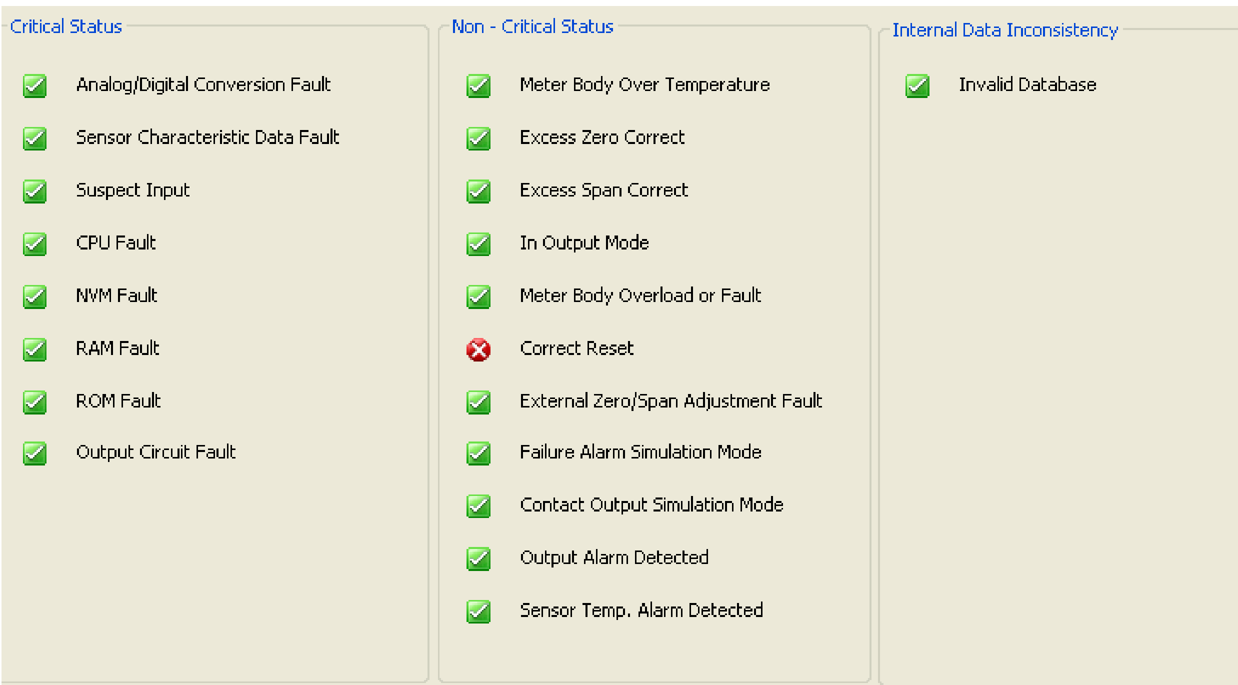


Figure 555. Sample I/A Series Advanced Pressure Transmitter Device Status Screen

HART Status

The HART Status screen shows the HART status as well as the field device status of the device. The status of various parameters is easily recognized by the use of a green checkmark (good), a yellow triangle (warning), or a red X (error). On most DTMs, if Configuration Changed does not show a green checkmark, it can be reset by clicking the Reset Configuration Changed Flag button on the lower left of the screen.

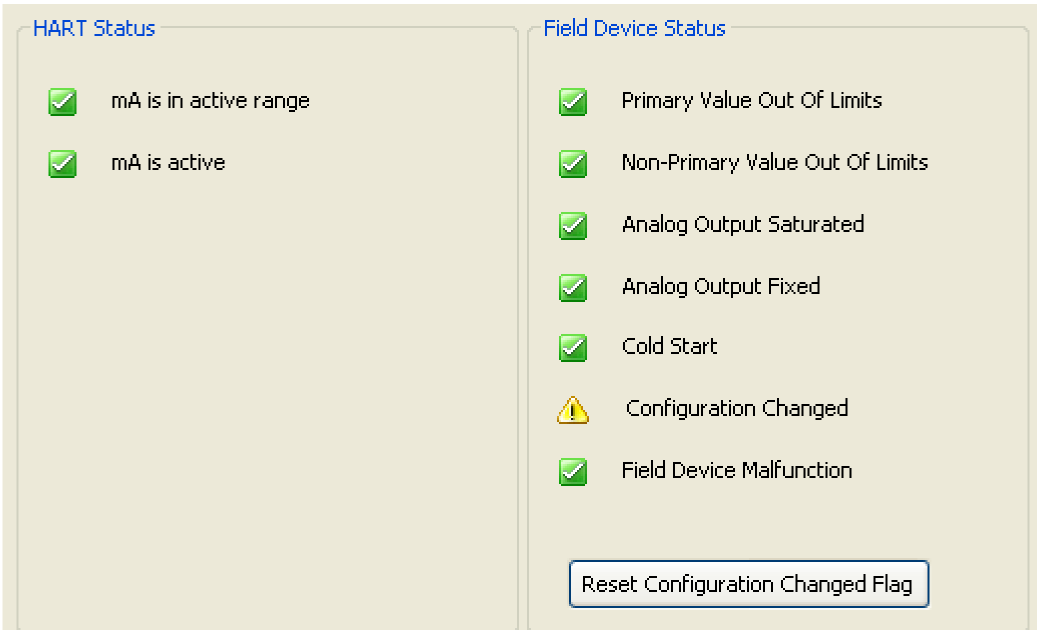


Figure 556. Sample I/A Series Advanced Pressure Transmitter HART Status Screen

Alarm Status

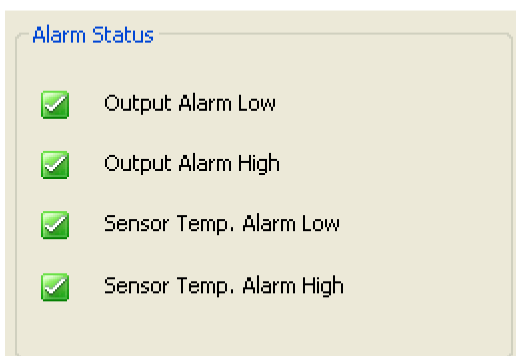


Figure 557. Sample I/A Series Advanced Pressure Transmitter Alarm Status Screen

Status Record

Status Record screen shows the status of the device.

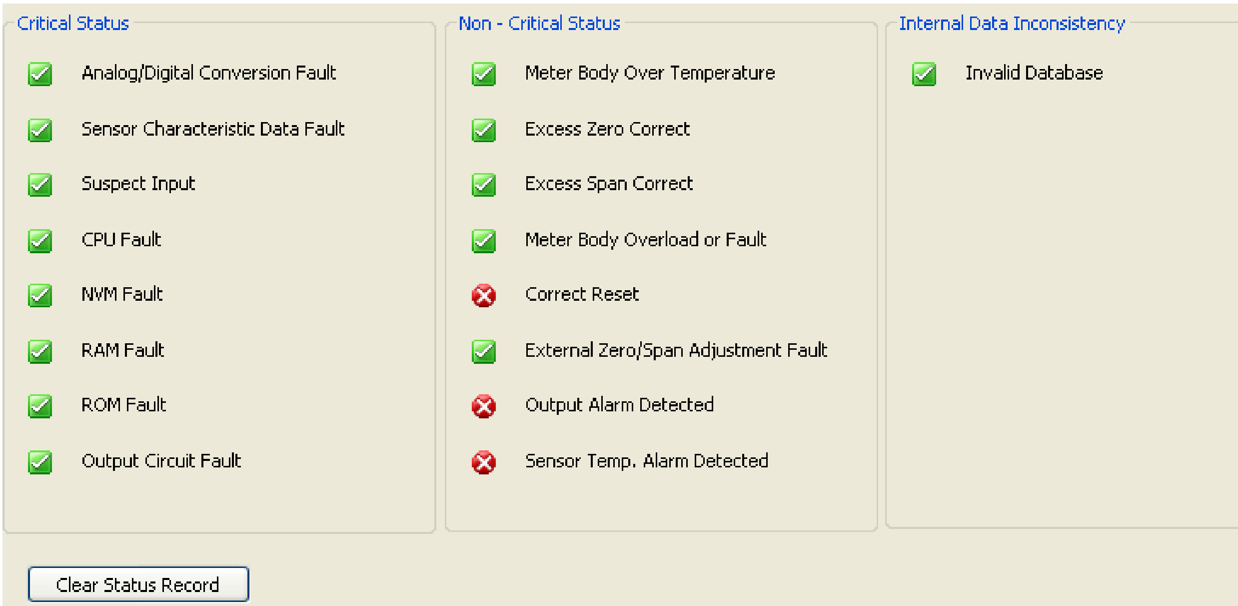


Figure 558. Sample I/A Series Advanced Pressure Transmitter Status Record Screen

Calibration

You can perform the following calibration procedures on an I/A Series Advanced Pressure Transmitter:

Zero Trim

Makes the sensor input to the new zero input reference. After Zero Trim calibration, the process variable is set to zero.

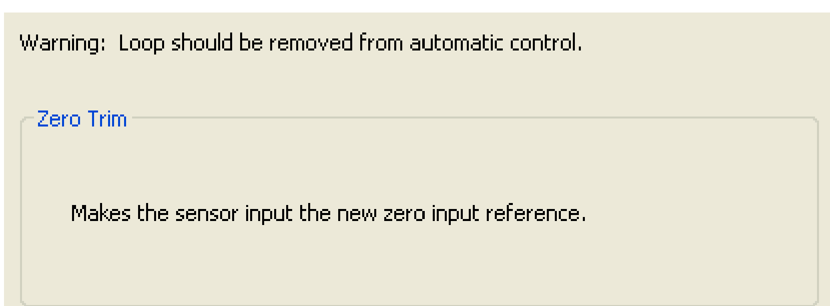


Figure 559. Sample I/A Series Advanced Pressure Transmitter Zero Trim Screen

Correct Input LRV

Calibrates LRV (Lower Range Value) based on current input value. After the Correct Input LRV calibration, the process variable is set to LRV.

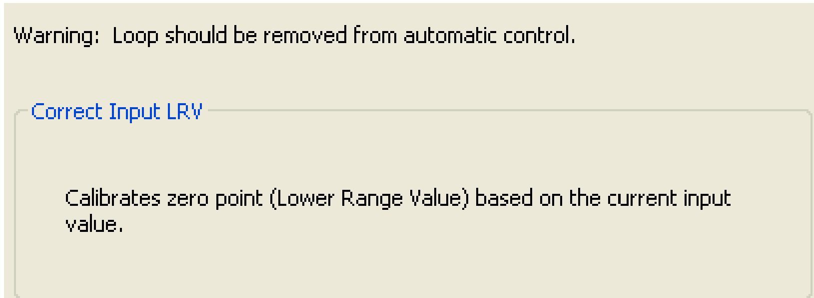


Figure 560. Sample I/A Series Advanced Pressure Transmitter Correct Input LRV Screen

Correct Input URV

Calibrates URV (Upper Range Value) based on current input value. After the Correct Input URV calibration, the process variable is set to URV.

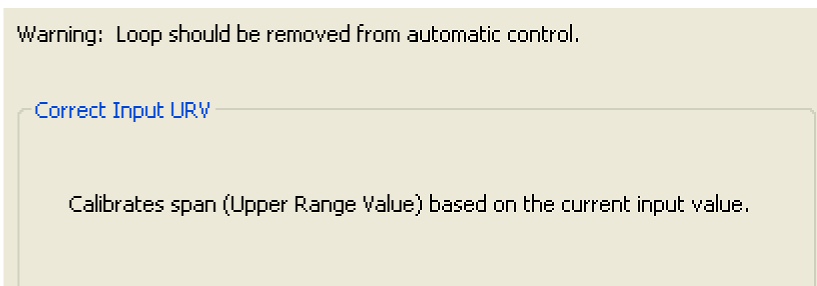


Figure 561. Sample I/A Series Advanced Pressure Transmitter Correct Input URV Screen

Reset Corrects

Discards the calibration data.

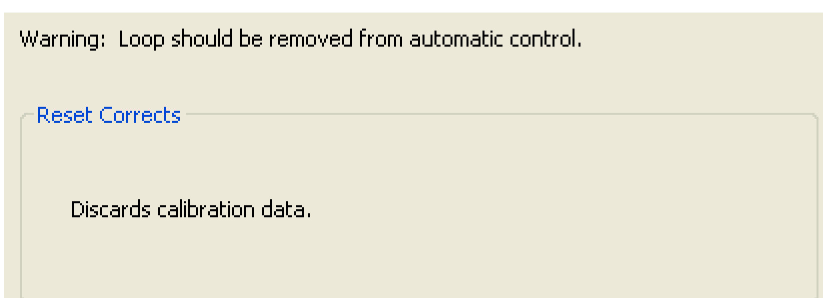


Figure 562. Sample I/A Series Advanced Pressure Transmitter Reset Corrects Screen

DAC Trim

This procedure is used to trim the 4 mA (zero) and 20 mA (span) output values of the device to match the output of a plant standard measurement device. A suitable reference, like a digital multimeter, is used to calibrate the 4 mA and 20 mA points respectively.

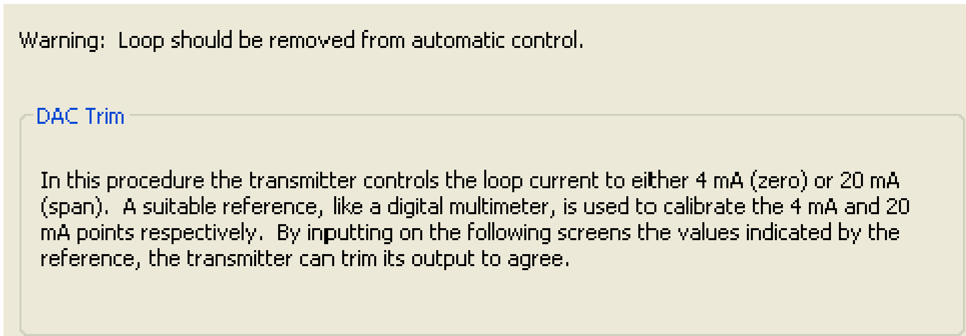


Figure 563. Sample I/A Series Advanced Pressure Transmitter DAC Trim Screen

Scaled DAC Trim

This procedure is the same as the DAC Trim procedure described above except that the 4 and 20 mA points are scaled to whatever units are required by the readout or control devices. For example, if the readout device is a voltmeter, across a 250 Ω resistor, the 4 and 20 mA points would correspond to 1 and 5 volts respectively.

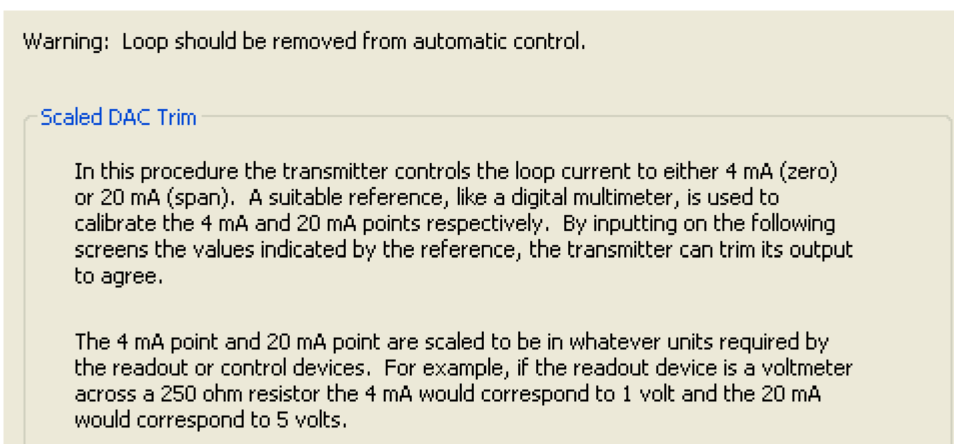


Figure 564. Sample I/A Series Advanced Pressure Transmitter Scaled DAC Trim Screen

Troubleshooting

Restore Factory Settings

The Restore Factory Settings resets all data to factory default values. This helps in troubleshooting the tasks.

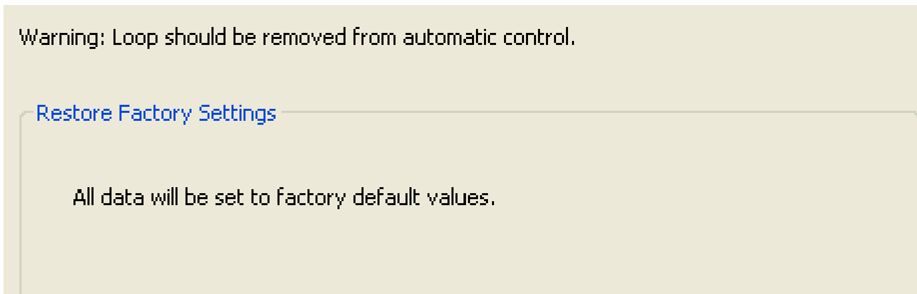


Figure 565. Sample I/A Series Advanced Pressure Transmitter Restore Factory Settings screen

Self Test

In the Troubleshooting parameter, press the Start button to perform the transmitter self test. It displays the status of the self-diagnosis of the device.

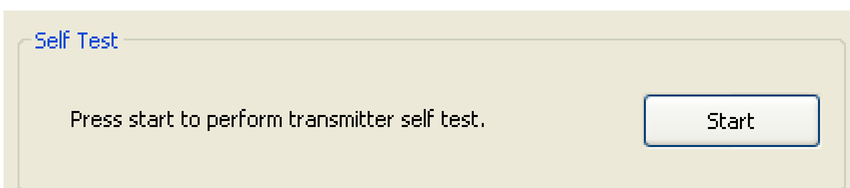


Figure 566. Sample I/A Series Advanced Pressure Transmitter Self Test Screen

Loop Test

The Loop Test is a procedure to override the analog output (mA) value.

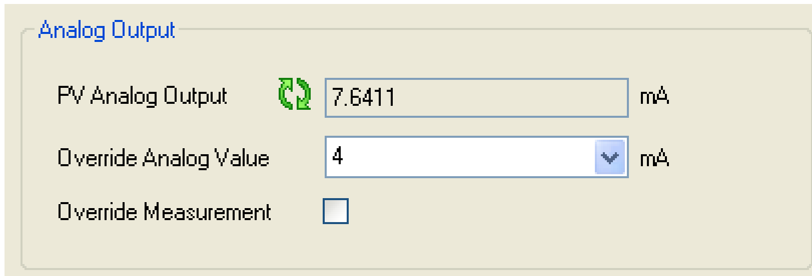


Figure 567. Sample I/A Series Advanced Pressure Transmitter Loop Test Screen

Field	Entry
PV Analog Output	Shows the current PV Analog Output in mA.
Override Analog Value	Set the Analog Value between 4 mA and 20 mA.
Override Measurement	Check/uncheck to activate/end override of measurement.

14. I/A Series Pressure S Series Transmitter

This chapter provides information that is exclusive to using the PC50 Field Device Tool with I/A Series Pressure S Series Transmitter with HART communication protocol. Additional information about this transmitter and HART communication is available in the following document:

- MI 020-601: IAP10S Absolute Pressure and IGP10S Gauge Pressure with HART Communication

Device Overview Screen

The Device Overview screen displays the HART information, the device information, and the current primary variable (PV) data. The PV graph shows the current PV value and the percentage of the PV value.

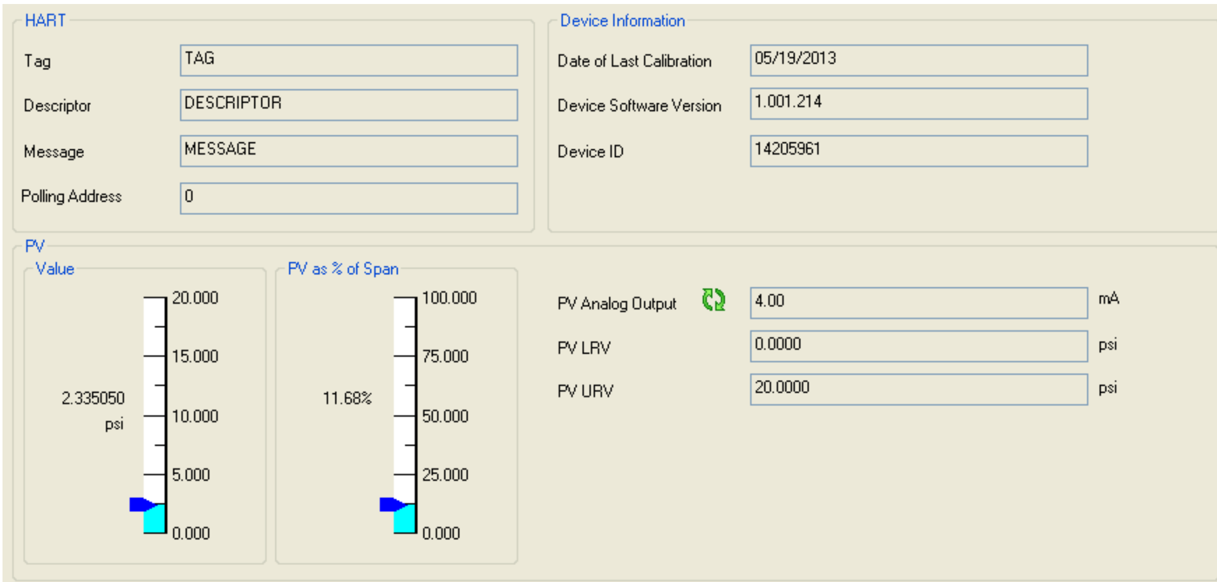


Figure 568. Sample I/A Series Pressure Transmitter Device Overview Screen

Field	Entry
HART	
Tag	Shows the HART tag which is the unique identifier of the device. The tag is limited to 8 characters.
Descriptor	Shows the HART description for the device. It can have a maximum of 16 characters.
Message	Shows the HART message that is sent from the device when requested. The message can have a maximum of 32 characters.
Polling Address	Shows the configured address of the device which can be between 0 to 63.
Device Information	
Date of Last Calibration	Shows the last calibrated date of the transmitter. **— NOTE —** The date of last calibration can be remotely displayed and reconfigured, using the PC-Based Configurator.
Device Software Version	Shows the software version of the device.

Field	Entry
Device ID	Shows the serial number of the device.
PV Analog Output	Shows the current PV analog output.
PV LRV	Shows the current lower range value of the primary variable.
PV URV	Shows the current upper range value of the primary variable.

Process Variables Screen

The Process Variables screen displays the values of device variables and the measured values assigned to the device variables.

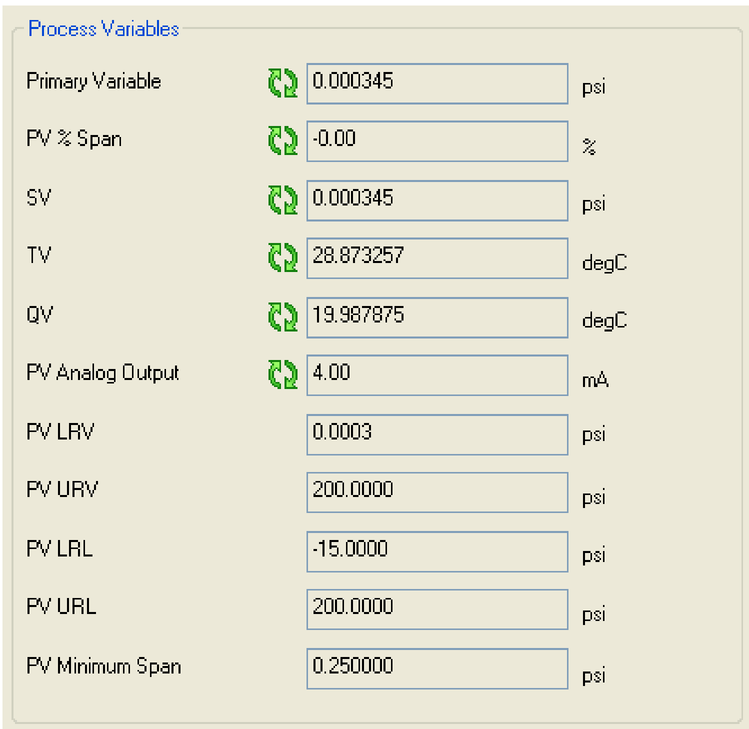


Figure 569. Sample I/A Series Pressure Transmitter Process Variables Screen

Field	Entry
Process Variables	
Primary Variable	Shows the value of the primary variable (PV).
PV% Span	Shows the current PV value in percentage.
SV	Shows the value of the secondary variable (SV).
TV	Shows the value of the tertiary variable.
QV	Shows the value of the quaternary variable.
PV Analog Output	Shows the current PV value in mA units.
PV LRV	Shows the PV lower range value.

Field	Entry
PV URV	Shows the PV upper range value.
PV LRL	Shows the PV lower range limit.
PV URL	Shows the PV upper range limit.
PV Minimum Span	Shows the smallest allowable difference between the upper and lower range values.

Device Configuration

General

The General screen is where you can specify the tag, and the upper and lower range values of the primary variable. You can also enter the damping time and the PV mode.

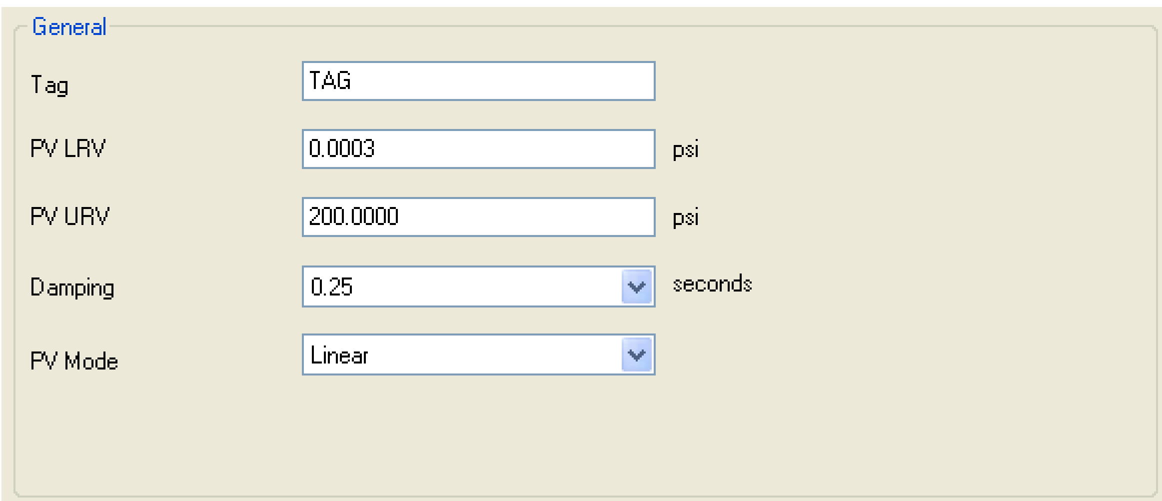


Figure 570. Sample I/A Series Pressure Transmitter General Screen

Field	Entry
General	
Tag	Enter the tag. You can use up to 8 characters.
PV LRV	Enter the lower range value.
PV URV	Enter the upper range value.
Damping	Select the damping time constant applied to both the digital value representation and the analog value of the respective analog output. Choose from 0, 0.25, 0.5, 1, 2, 4, 8, 16, or 32 seconds.
PV Mode	Select the PV mode as **Linear**.

Measurement Units

The Measurement Units screen allows you to set units for the primary and secondary variables.

Figure 571. Sample I/A Series Pressure Transmitter Measurement Units Screen

Field	Entry
Measurement Units	
PV Units	Select the PV units. Choose from the following: psi, inH2O, inHg, ftH2O, mmH2O, mmHg, bar, mbar, g/Sqcm, Pa, kPa, MPa, torr, atm, inH2O@60degF, mH2O, inH2O4, or mmH2O4.
SV Units	Select the SV units. Choose from the following: psi, inH2O, inHg, ftH2O, mmH2O, mmHg, bar, mbar, g/Sqcm, Pa, kPa, MPa, torr, atm, inH2O@60degF, mH2O, inH2O4, or mmH2O4.

Process Parameters

The Process Parameters screen allows you to configure the process parameters.

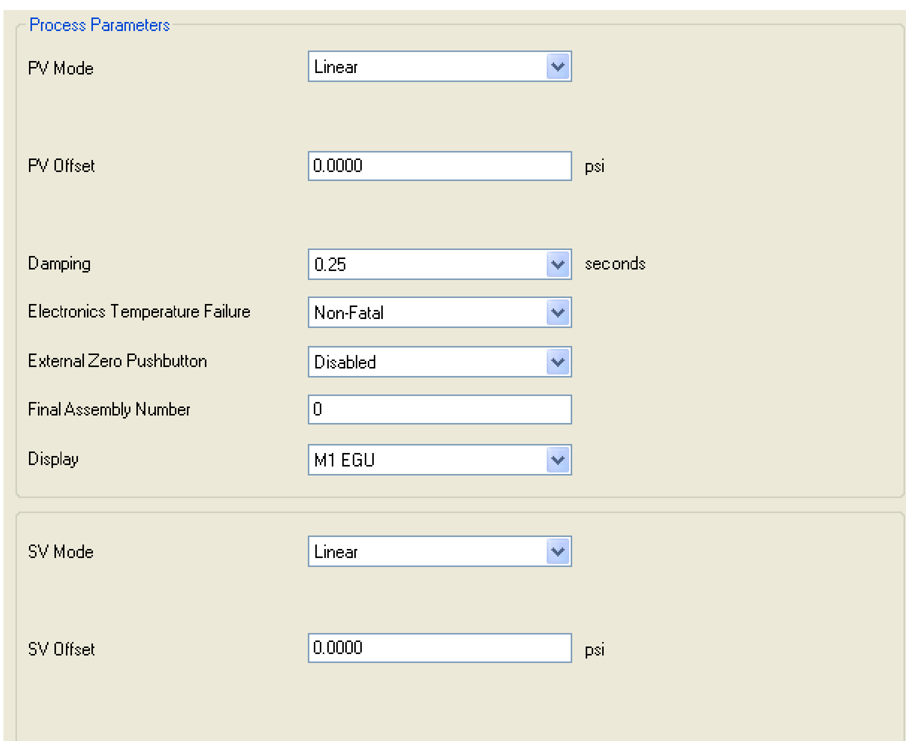


Figure 572. Sample I/A Series Pressure Transmitter Process Parameters Screen

Field	Entry
Process Parameters	
PV Mode	Select the PV mode as **Linear**.
PV Offset	Set the PV offset for display and digital output. The value can be edited only if both PV and SV are in linear mode, otherwise it must be 0.0.
Damping	Select the damping time constant applied to both the digital value representation and the analog value of the respective analog output. Choose from 0, 0.25, 0.5, 1, 2, 4, 8, 16, or 32 seconds.
Electronics Temperature Failure	This feature allows you to specify action (or no action) for the transmitter in case of electronics temperature circuit failure. • Select **Fatal** if you want the output go to the value configured in **Outfail**. • Select **Nonfatal** to continue operation with a temperature circuit failure.
External Zero Pushbutton	This feature allows calibration at zero pressure or at the lower range value pressure without removing the electronics compartment cover. Select **Enable** to use this feature or select **Disable** if the feature is not required.
Final Assembly Number	Enter the number associated with the overall transmitter.
Display	This parameter allows you to configure the local indicator display. Select one of the following options: • M1 EGU - to display the primary measurement values. • M2 EGU - to display the secondary measurement values. • Toggle - to toggle the display between primary and secondary measurement values.
SV Mode	Select the SV mode as **Linear**.
SV Offset	Set the SV offset for display and digital output. The value can be edited only if both PV and SV are in linear mode, otherwise it must be 0.0.

Output

Analog

The Analog Output screen displays the lower and upper range values of the PV and the current value of PV analog output.

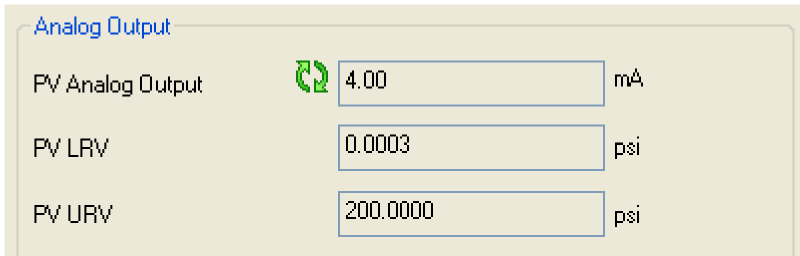


Figure 573. Sample I/A Series Pressure Transmitter Output Screen

Field	Entry
Analog Output	
PV Analog Output	Shows the current PV Analog Output.
PV LRV	Shows the lower range value of the primary variable.
PV URV	Shows the upper range value of the primary variable.

Alarm

The Alarm screen is where you can select **Fail Low** or **Fail High** for the output to go fully downscale or fully upscale in the event of a failure.

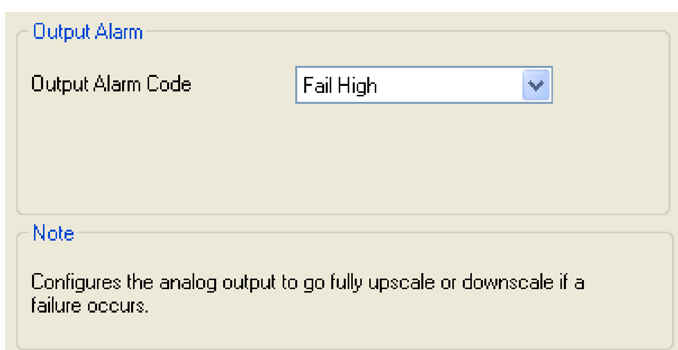


Figure 574. Sample I/A Series Pressure Transmitter Alarm Output Screen

Field	Entry
Output Alarm	
Output Alarm Code	Select **Fail High** or **Fail Low**.

HART

The HART screen allows you to specify the polling address, and set the mA loop mode. This screen also shows the number of preambles that are sent in the response message.

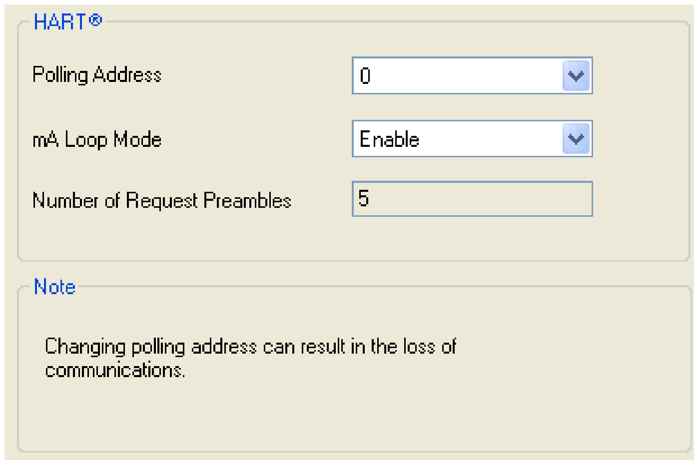


Figure 575. Sample I/A Series Pressure Transmitter HART Output Screen

Field	Entry
HART	
Polling Address	Select the transmitter polling address between 0 and 63. An address of 0 is used in a standard point-to-point configuration with a 4 to 20 mA output signal. Addresses 1 through 63 are used for multidrop mode.
mA Loop Mode	Select the mA loop mode as **Enable** or **Disable**. • If set to **Enable**, the transmitter will operate with a 4 to 20 mA output signal. • If set to **Disable** the transmitter’s milliamp output is locked at a fixed value of 4.0 mA.
Number of Request Preambles	Shows the number of preambles to be sent in a request message from the transmitter to the host.

Device Information

The Device Information screen displays the complete information of the device. It allows you to set the tag, long tag, descriptor, HART message, and date of last calibration.

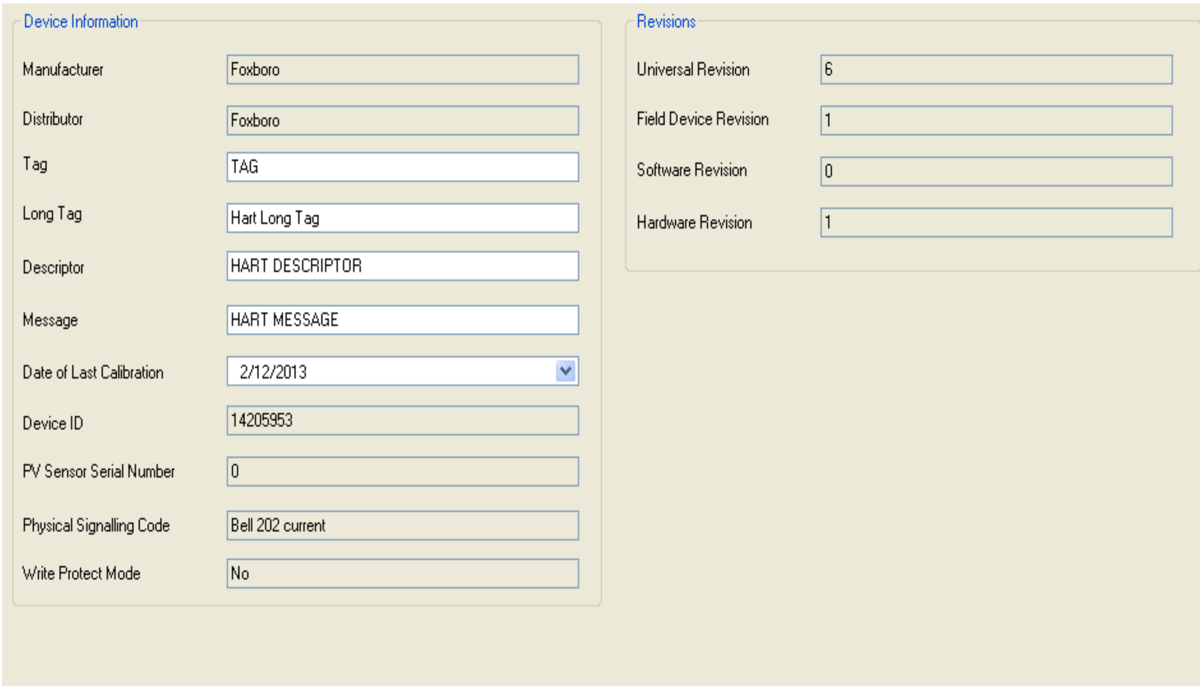


Figure 576. Sample I/A Series Pressure Transmitter Device Information Screen

Field	Entry
Device Information	
Manufacturer	Shows the name of the company that manufactured the transmitter.
Distributor	Shows the name of the distributor.
Tag	Enter the tag. The tag is the primary identifier when communicating with a transmitter using the HART communicator. It is limited to 8 characters.
Long Tag	Enter the long tag limited to 32 characters.
Descriptor	Enter the description limited to 16 characters.
Message	Enter the HART message limited to 32 characters.
Date of Last Calibration	Select the date of last calibration.
Device ID	Shows the identification number of the transmitter. This ID identifies the transmitter when combined with the manufacturer identification and device type.
PV Sensor Serial Number	Shows the serial number of the sensor from which the digital value representation or transmitter variable is primarily derived.

Field	Entry
Physical Signaling Code	Shows the type of physical layer that has been implemented in the hardware that is responsible for the HART communication port.
Write Protect Mode	Shows whether the transmitter is write protected.
Revisions	
Universal Revision	Shows the revision level of the universal device description that the transmitter conforms to.
Field Device Revision	Shows the revision level of the specific transmitter description.
Software Revision	Shows the software revision number.
Hardware Revision	Shows the hardware revision number.

Device Status

Device Status

The Device Status screen shows the current status of the device. The status of each parameter is recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

Figure 577. Sample I/A Series Pressure Transmitter Device Status Screen

HART Status

The HART Status screen shows the HART and the field device status. The status of each parameter is recognized by the use of a green check mark (good), a yellow triangle (warning), or a red cross mark (error). If **Configuration Changed** does not show a green check mark, click **Reset Configuration Changed Flag** button to reset the configuration.

Figure 578. Sample I/A Series Pressure Transmitter HART Status Screen

Calibration

PV Rerange

PV Rerange allows you to perform calibration by defining new values for the LRV and URV of the primary variable.

In this calibration you can modify the PV Offset which causes both the PV and mA output to have an offset without changing either the LRV or URV.

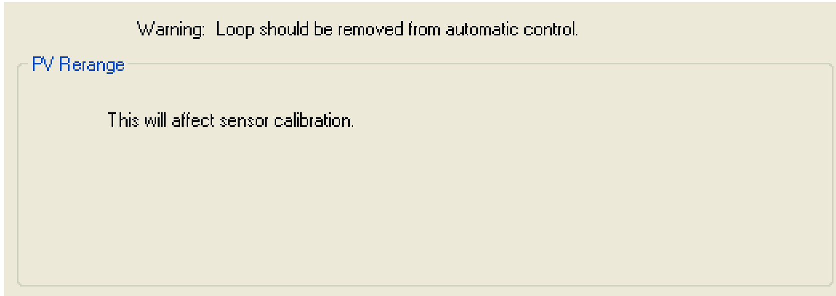


Figure 579. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 1

Click **Next**. The current lower and upper range values of the PV are displayed.

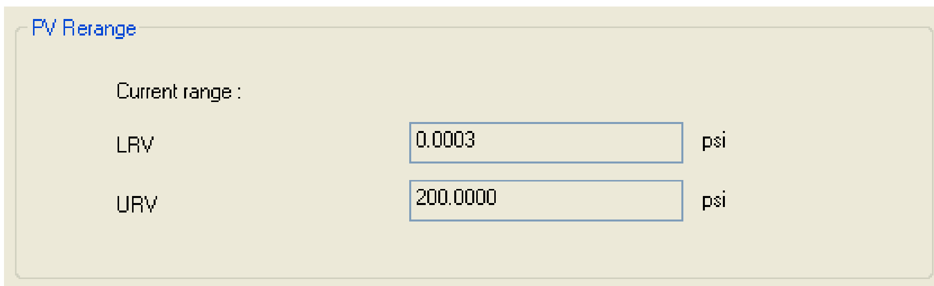


Figure 580. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 2

Click **Next**. The following screen is displayed.

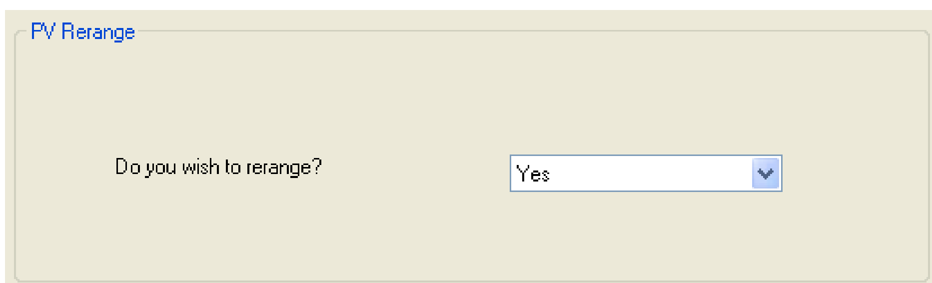


Figure 581. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 3

Select **Yes** to modify the LRV and URV. Then click **Next**.

NOTE

If you select **No**, you are prompted to enter PV offset and the last calibration date.

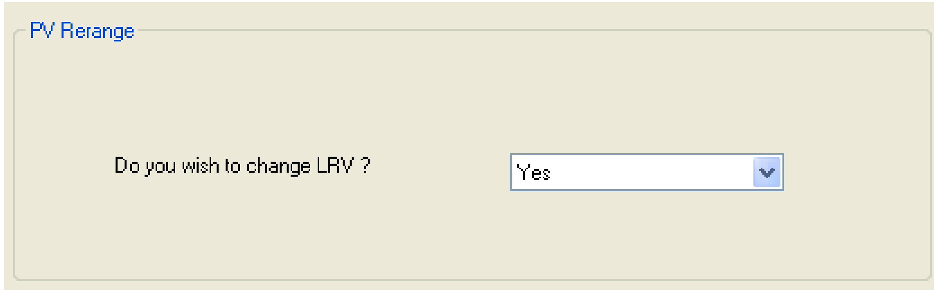


Figure 582. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 4

Select **Yes** to change the LRV and click **Next**.

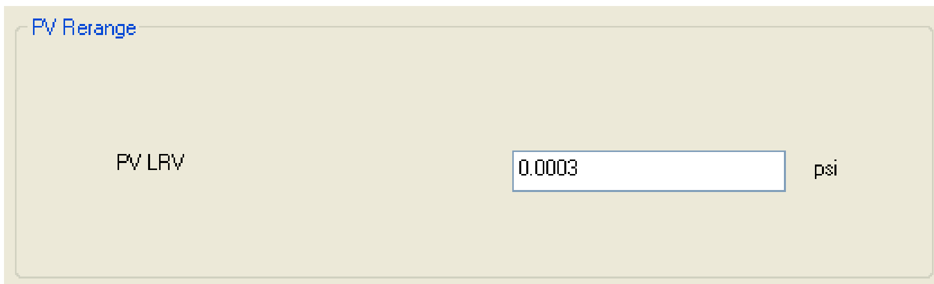


Figure 583. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 5

Enter the LRV and click **Next**.

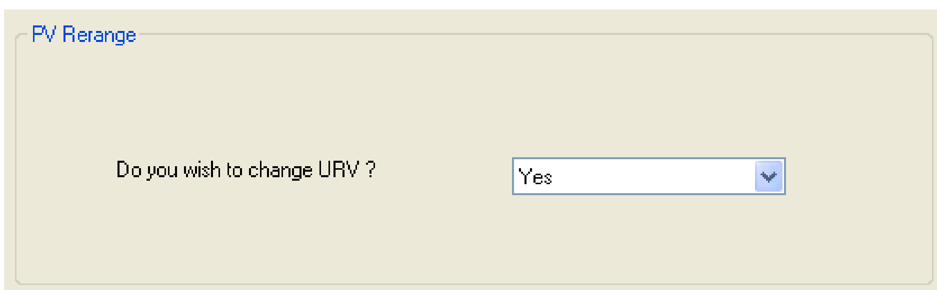


Figure 584. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 6

Select **Yes** to change the URV and click **Next**.

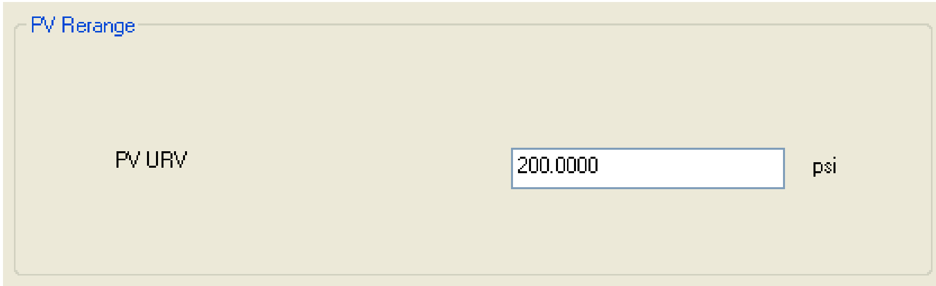


Figure 585. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 7

Enter the URV and click **Next**. PV Offset and PV Flow URV are displayed.

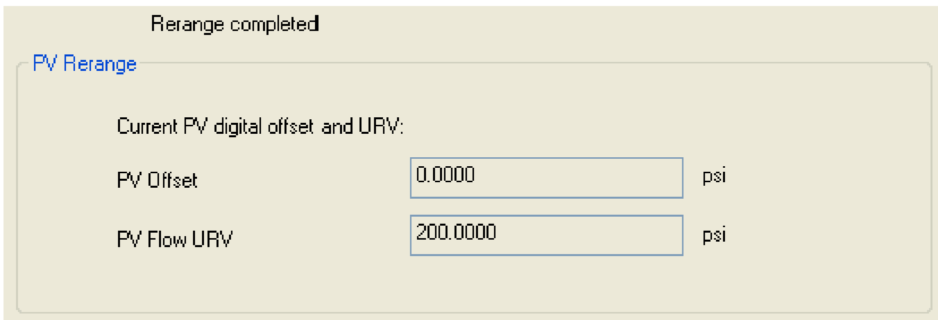


Figure 586. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 8

Click **Next** to advance to the subsequent screen.

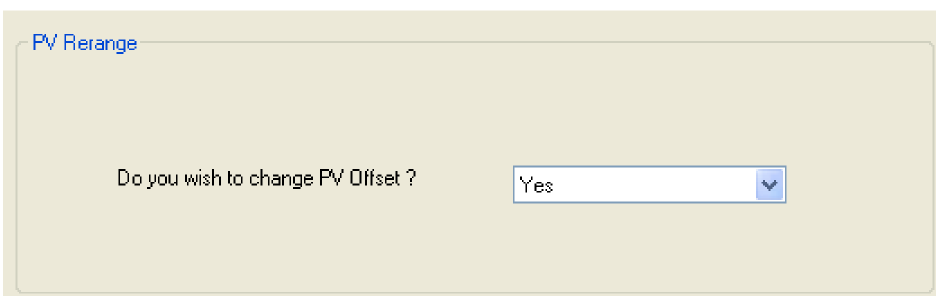


Figure 587. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 9

Select **Yes** if you want to change the PV Offset.

NOTE

If you select **No**, you are prompted to enter the date of last calibration.

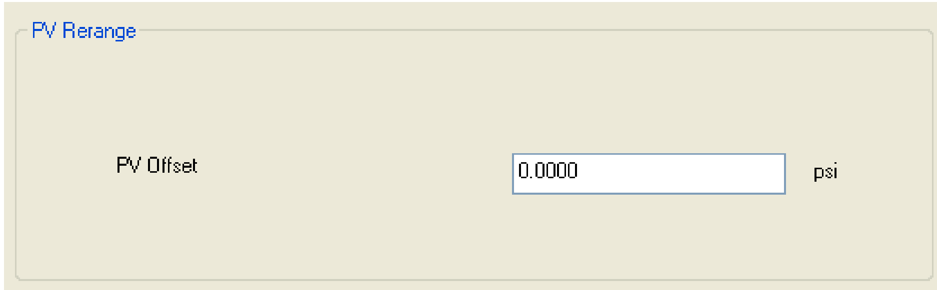


Figure 588. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 10

Enter the PV Offset value and click **Next**.

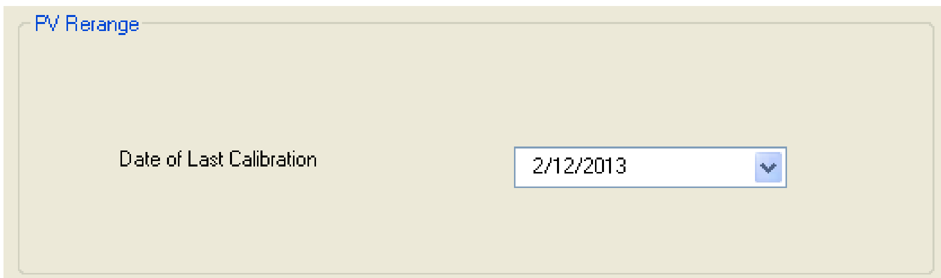


Figure 589. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 11

Select the date of last calibration and click **Next** to complete the calibration process.

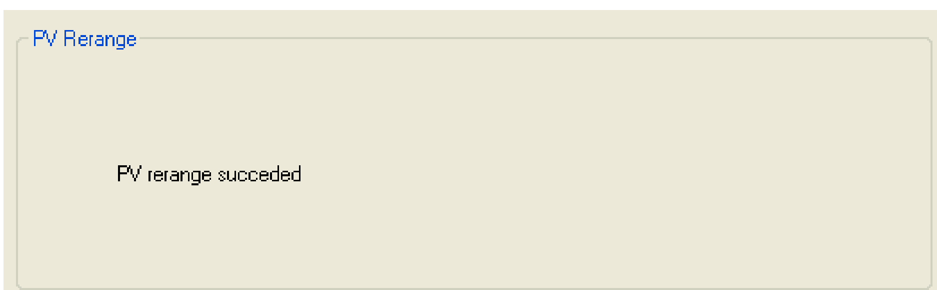


Figure 590. Sample I/A Series Pressure Transmitter PV Rerange Calibration Screen 12

Click **OK** when the calibration process is completed.

SV Rerange

In SV Rerange calibration, a new value is set for SV Offset to perform the calibration.

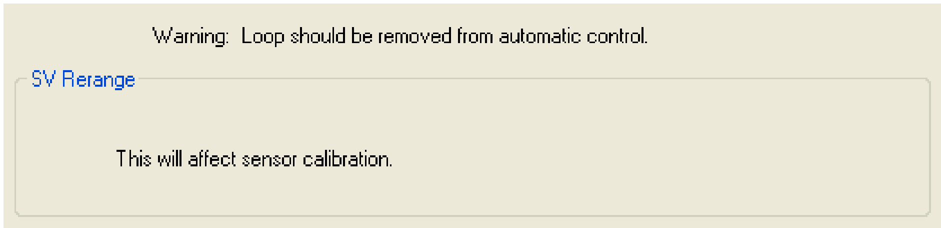


Figure 591. Sample I/A Series Pressure Transmitter SV Rerange Calibration Screen 1

Click **Next**. The current SV Offset value is displayed.

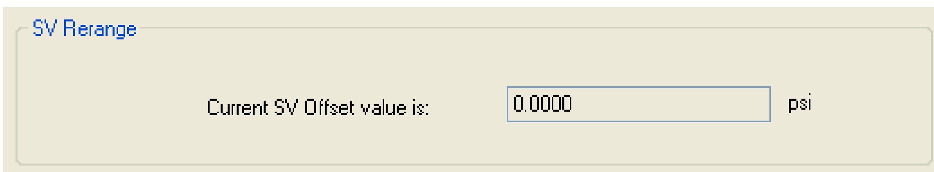


Figure 592. Sample I/A Series Pressure Transmitter SV Rerange Calibration Screen 2

Click **Next**. The following screen is displayed.

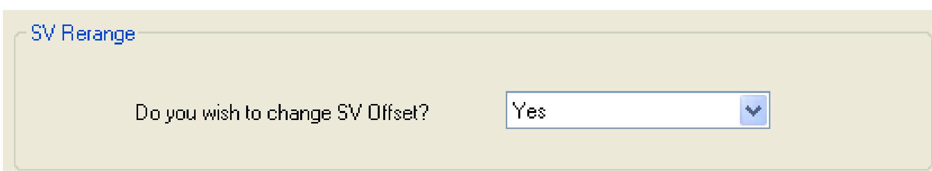


Figure 593. Sample I/A Series Pressure Transmitter SV Rerange Calibration Screen 3

Select **Yes** to change the SV Offset value. Then click **Next**.

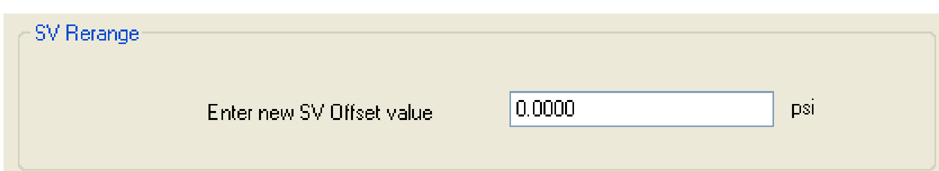


Figure 594. Sample I/A Series Pressure Transmitter SV Rerange Calibration Screen 4

Enter the SV Offset value and click **Next.**

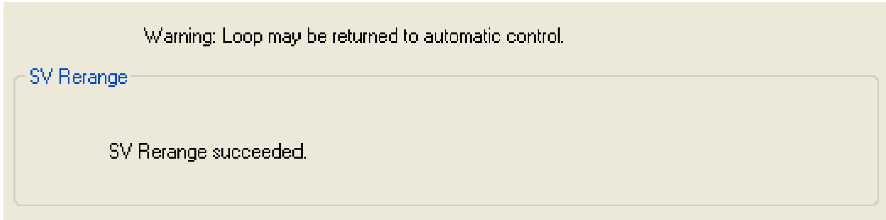


Figure 595. Sample I/A Series Pressure Transmitter SV Rerange Calibration Screen 5

Click **OK** after the calibration process is completed.

Zero Trim

The Zero Trim calibration procedure is used for adjusting the lower trim point to compensate for positioning effects.

Zero trim has no effect on the LRV.

— NOTE

Do not use Zero Trim on an absolute pressure transmitter unless the transmitter has full vacuum applied.

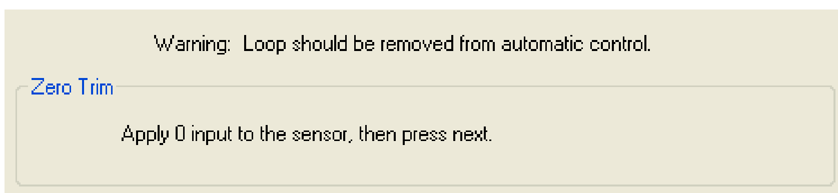


Figure 596. Sample I/A Series Pressure Transmitter Zero Trim Calibration Screen 1

Click **Next.** The sensor is stabilized to zero.

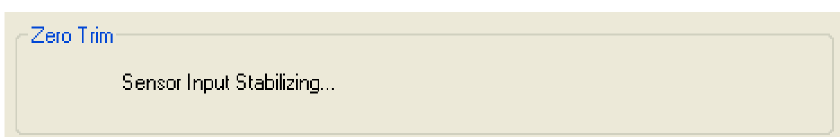


Figure 597. Sample I/A Series Pressure Transmitter Zero Trim Calibration Screen 2

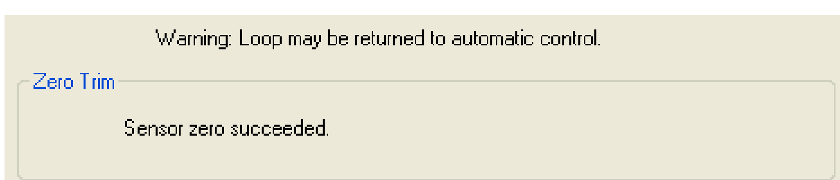


Figure 598. Sample I/A Series Pressure Transmitter Zero Trim Calibration Screen 3

Click **OK** when the calibration is completed.

Scaled DAC Trim

The Scaled DAC Trim procedure is used to trim the 4 and 20 mA points to whatever units are required by the readout or control devices. For example, if the readout device is a voltmeter, across a 250 Ω resistor, the 4 and 20 mA points would correspond to 1 and 5 volts respectively.

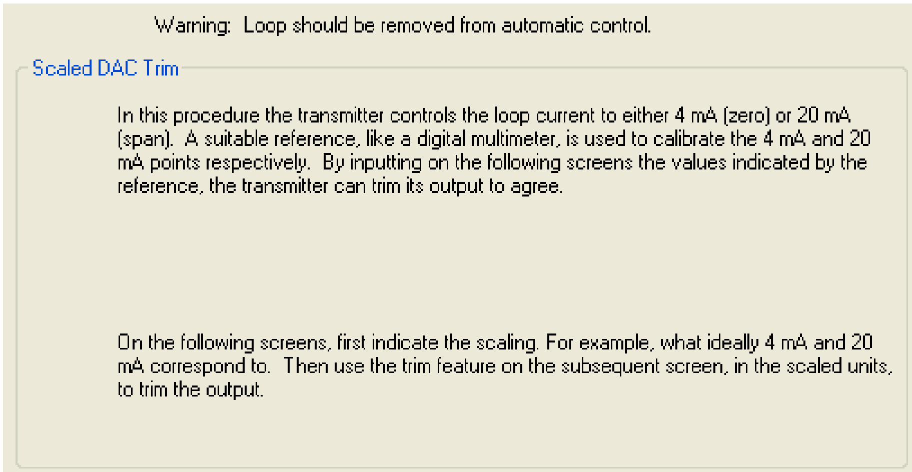


Figure 599. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 1

Click **Next**. The mA low output value as 4 mA and mA high output value as 20 mA. You can edit these values as required.

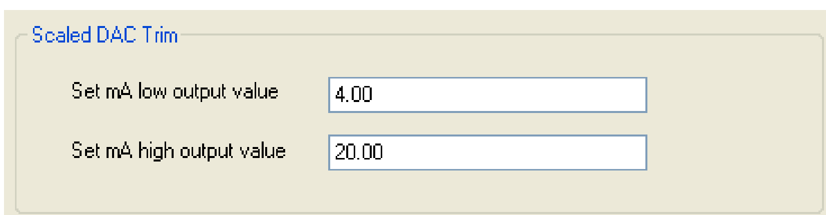


Figure 600. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 2

Click **Next** in the subsequent screens to continue the calibration process.

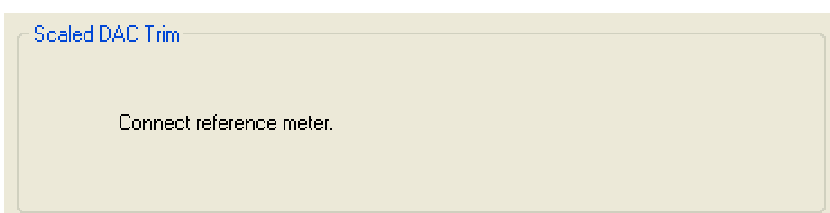


Figure 601. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 3

Figure 602. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 4

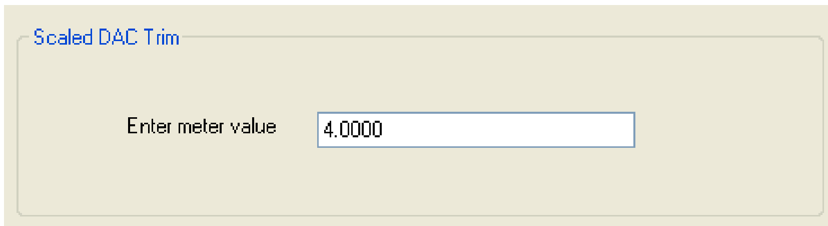


Figure 603. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 5

Enter the meter value (low) for scaled DAC trim and click **Next**.

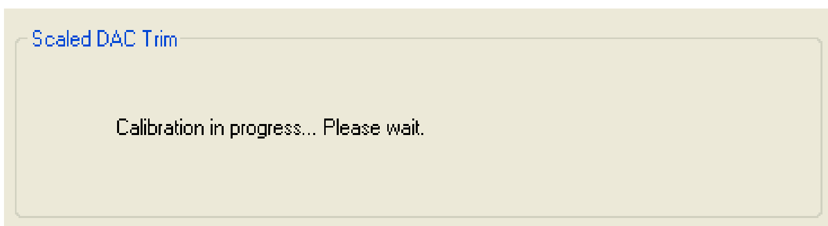


Figure 604. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 6

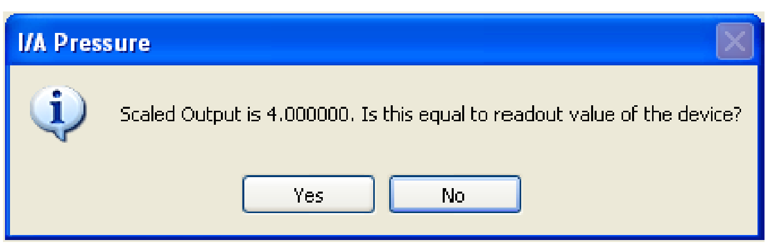


Figure 605. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 7

Click **Yes** if the meter value matches the scaled output value, and then click **Next** to continue the calibration process.

Figure 606. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 8

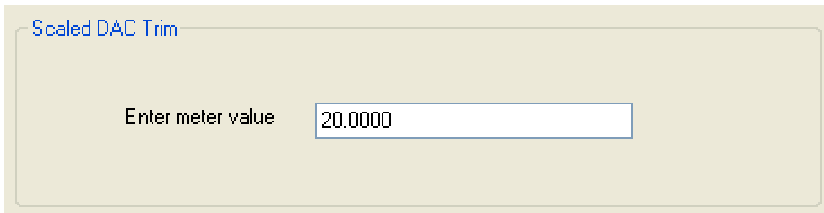


Figure 607. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 9

Enter the meter value (high) for scaled DAC trim and click **Next**.

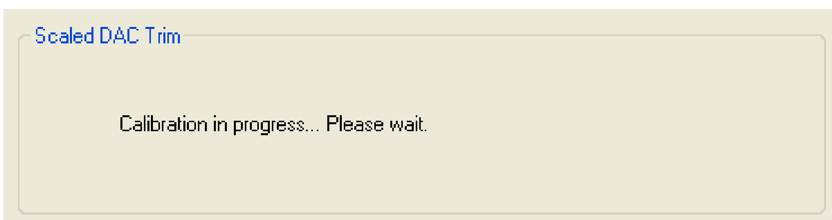


Figure 608. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 10

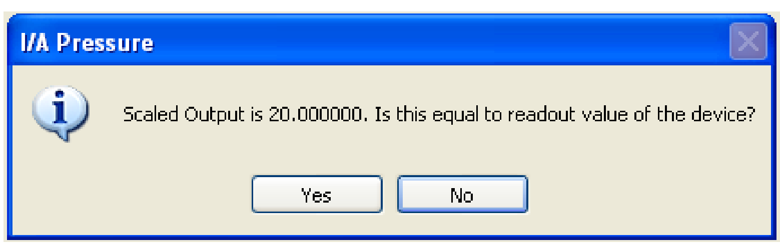


Figure 609. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 11

Click **Yes** if the meter value matches the scaled output value, and then click **Next** to continue the calibration process.

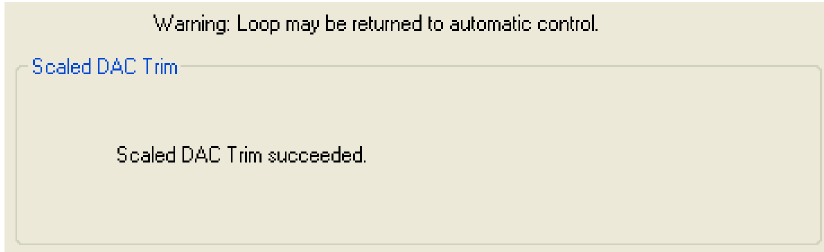


Figure 610. Sample I/A Series Pressure Transmitter Scaled DAC Trim Calibration Screen 12

Click **OK** when the calibration is completed.

Lower Sensor Trim

This calibration procedure is used to trim the LRV and perform calibration at the applied pressure value.

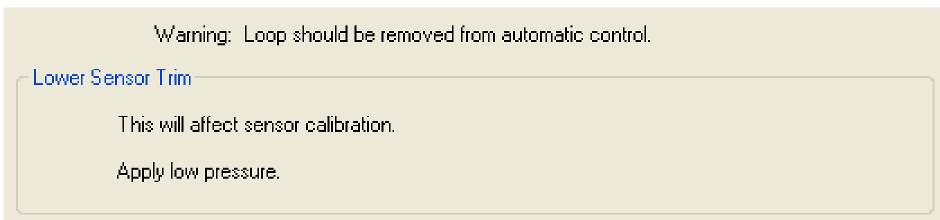


Figure 611. Sample I/A Series Pressure Transmitter Lower Sensor Trim Calibration Screen 1

Click **Next**. The current PV LRV is displayed.

Figure 612. Sample I/A Series Pressure Transmitter Lower Sensor Trim Calibration Screen 2

Click **Next**. You are prompted to enter the applied pressure value.

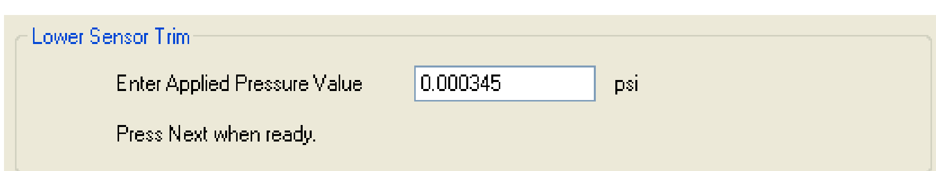


Figure 613. Sample I/A Series Pressure Transmitter Lower Sensor Trim Calibration Screen 3

Enter the applied pressure value and click **Next** in the subsequent screens to continue the calibration process.

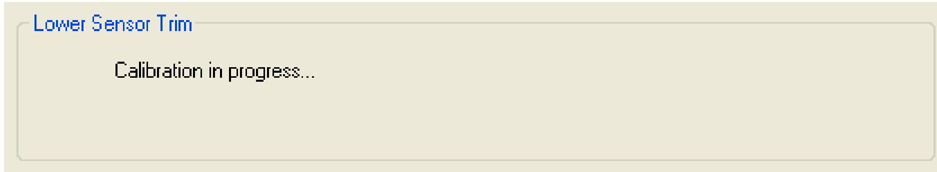


Figure 614. Sample I/A Series Pressure Transmitter Lower Sensor Trim Calibration Screen 4

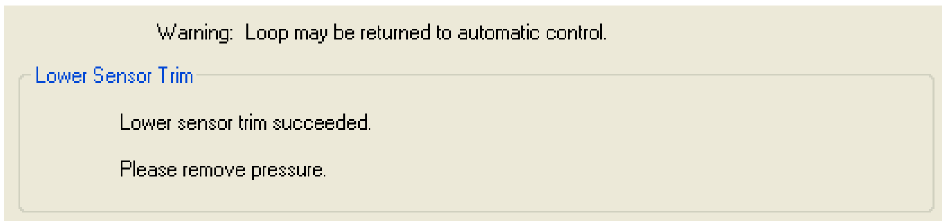


Figure 615. Sample I/A Series Pressure Transmitter Lower Sensor Trim Calibration Screen 5

Click **OK** when the calibration is completed.

Upper Sensor Trim

This calibration can be used to trim the URV and perform calibration at the applied pressure value.

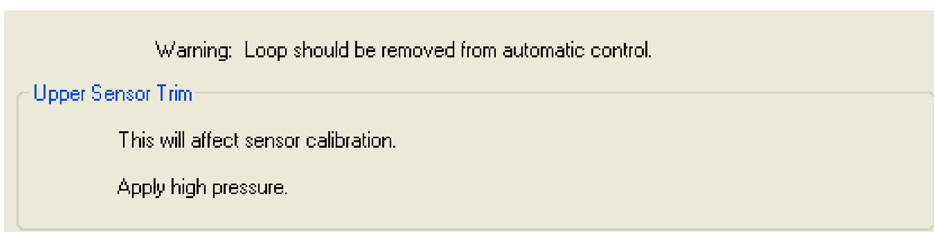


Figure 616. Sample I/A Series Pressure Transmitter Upper Sensor Trim Calibration Screen 1

Click **Next**. The current PV URV is displayed.

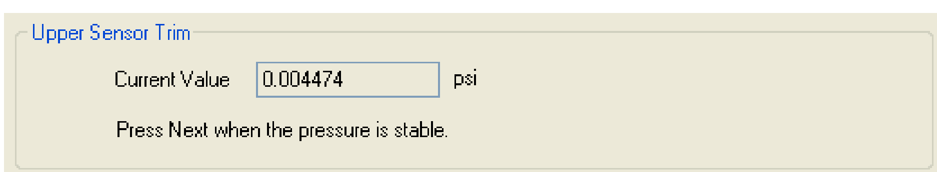


Figure 617. Sample I/A Series Pressure Transmitter Upper Sensor Trim Calibration Screen 2

Click **Next**. You are prompted to enter the applied pressure value.

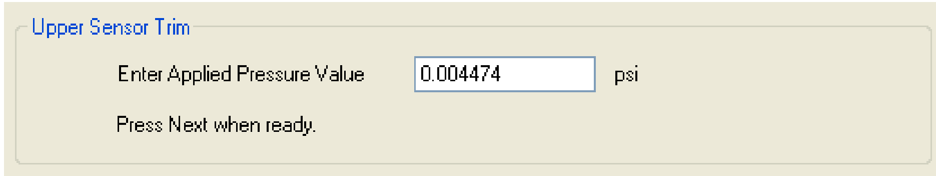


Figure 618. Sample I/A Series Pressure Transmitter Upper Sensor Trim Calibration Screen 3

Enter the applied pressure value and click **Next** in the subsequent screens to continue the calibration process.

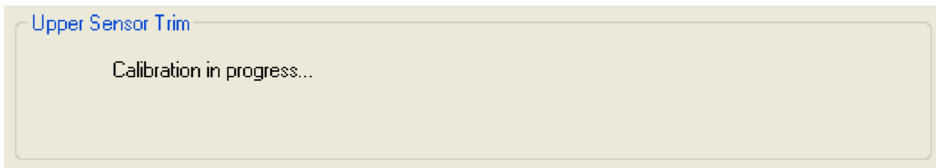


Figure 619. Sample I/A Series Pressure Transmitter Upper Sensor Trim Calibration Screen 4

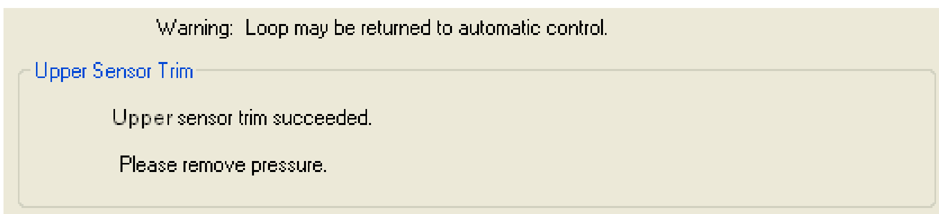


Figure 620. Sample I/A Series Pressure Transmitter Upper Sensor Trim Calibration Screen 5

Click **OK** when the calibration is completed.

NOTE

If you perform Upper Sensor Trim Calibration while the Multiple Calibration is **On**, Multiple Calibration turns **Off** automatically.

Time in Service Meter

The Time in Service Meter calibration process is used to track the time that a particular transmitter has been in service. The time can be tracked in two ways:

- Total Days
- User Days

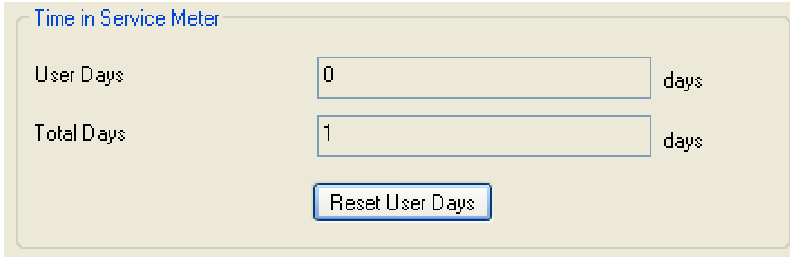


Figure 621. Sample I/A Series Pressure Transmitter Time in Service Meter Calibration Screen

Field	Entry
Time in Service Meter	
User Days	Is the number of days the transmitter has been powered up since the last Time in Service meter reset.
Total Days	Is a non-configurable value that represents the number of days the transmitter has been powered up in the field over its lifetime.
Reset User Days	Click **Reset User Days** to reset the user days to ‘0’.

Multiple Calibration

The Multiple Calibration feature enables the transmitters to use multiple calibrated ranges that are stored in on-board memory to perform the calibration. The calibrated ranges are preset in the factory and cover the full pressure range of the transmitter. During operation, a real-time, seamless transition from one calibrated range to another maintains digital accuracy as a percent of reading from 3% to 100% of the upper range limit (URL).

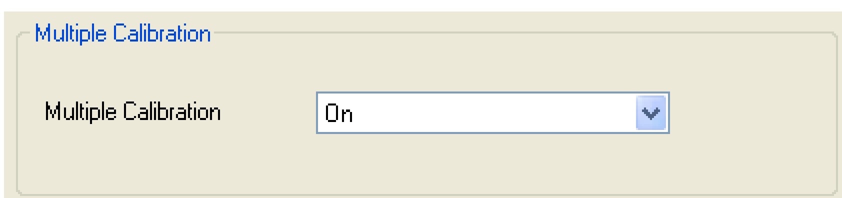


Figure 622. Sample I/A Series Pressure Transmitter Multiple Calibration Screen

Field	Entry
Multiple Calibration	
Multiple Calibration	Select **On** to enable, or **Off** to disable the Multiple Calibration.

— NOTE

If you perform Upper Sensor Trim Calibration while the Multiple Calibration is **On**, Multiple Calibration turns **Off** automatically.

Troubleshooting

Loop Test

Analog Output

The Analog Output screen allows you to override analog value, and the measurement.

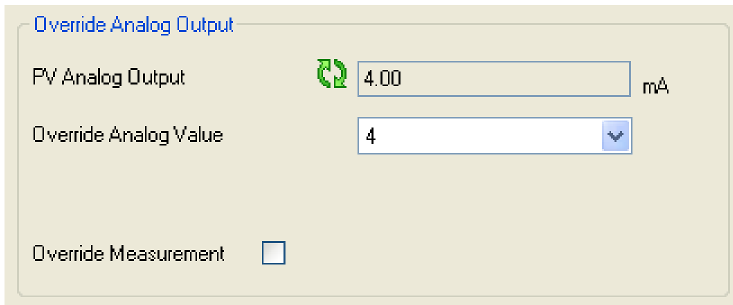


Figure 623. Sample I/A Series Pressure Transmitter Override Analog Output Screen

Field	Entry
Override Analog Output	
PV Analog Output	This field shows the current PV Analog Output in mA.
Override Analog Value	Specify a value that overrides the analog value.
Override Measurement	Select this check box to override the analog value. Deselect it if override is not required.

15. IMV25 and IMV31 Series Transmitters

This chapter provides information that is exclusive to using IMV25 and IMV31 Transmitters with HART communication protocol. The IMV25 Multivariable Transmitter measures absolute and differential pressure, sensor and electronic temperature, and process temperature from an RTD. It also provides transmission of all the measured values. The IMV31 Electronic Multivariable Level Transmitter measures absolute and differential pressure, sensor and electronics temperature, and process temperature (from an RTD). When used for level measurement, it calculates level compensated for density changes that occur due to pressure and temperature changes and provides transmission of all the measured and calculated values.

Additional information about these transmitters with HART communication is available in the following documents.

- MI 020-382 - I/A Series® Intelligent Electronic Multivariable Transmitters IMV25-T and IMV30-T with HART or 4 to 20 mA Output Signals Installation, Calibration, Configuration, and Maintenance Style A
- MI 020-383 - I/A Series® Intelligent Electronic Multivariable Transmitter IMV31-T Density Compensated Level Transmitters with HART or 4 to 20 mA Output Signals
- MI 020-496 - PCMV Intelligent Field Device Configurator for use with IMV25-D, IMV25-T, IMV30-D, and IMV30-T Multivariable Transmitters
- MI 020-497 - PCMV Intelligent Field Device Configurator for use with IMV31 Density Compensated Level Transmitters

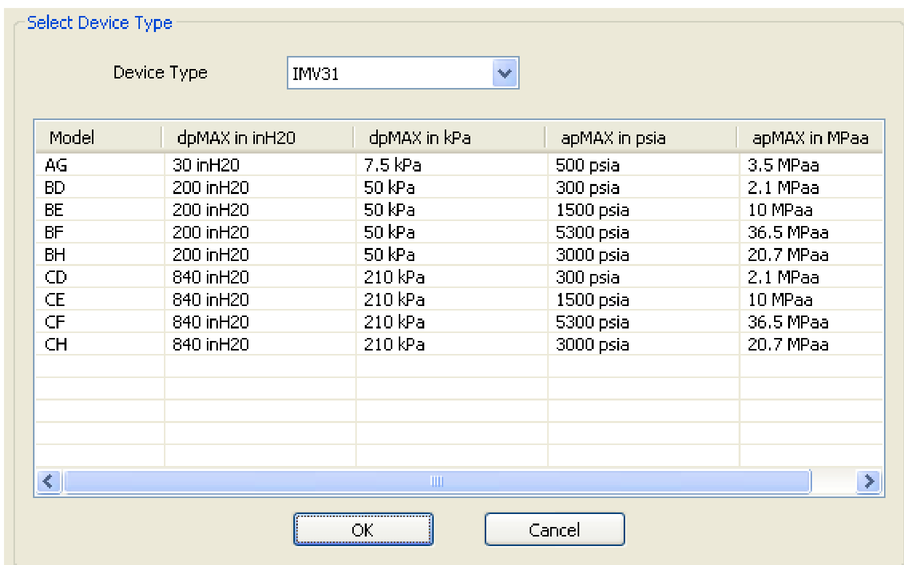
Create Pre-Configuration File

The Pre-Configuration screen enables you to create a new configuration file from one of several default databases, or from the configuration of a connected device. You can then download the new configuration to a connected device or save it to a file.

Follow the steps given below to create a new configuration file:

1. Double click the IMV series Device DTM. Create Pre-Configuration File window appears.
2. Select the Device Type from the drop-down list and select the device model.
3. Click OK. The device DTM appears.
4. Configure the selected device parameters.
5. To save the configuration use Save As in the File menu and save the configuration with .PW4 file extension.

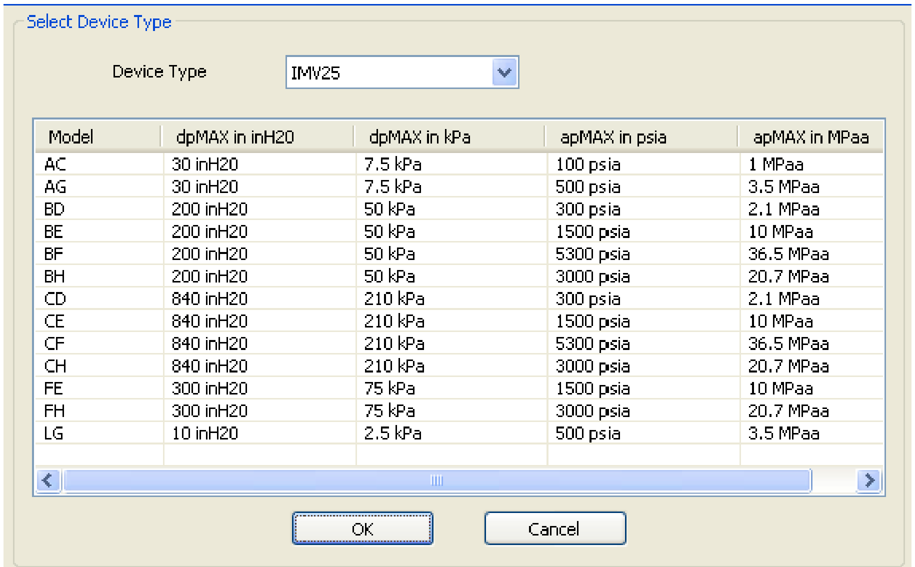
The following figure shows the Pre-Configuration screen for the IMV31.



Model	dpMAX in inH20	dpMAX in kPa	apMAX in psia	apMAX in MPaa
AG	30 inH20	7.5 kPa	500 psia	3.5 MPaa
BD	200 inH20	50 kPa	300 psia	2.1 MPaa
BE	200 inH20	50 kPa	1500 psia	10 MPaa
BF	200 inH20	50 kPa	5300 psia	36.5 MPaa
BH	200 inH20	50 kPa	3000 psia	20.7 MPaa
CD	840 inH20	210 kPa	300 psia	2.1 MPaa
CE	840 inH20	210 kPa	1500 psia	10 MPaa
CF	840 inH20	210 kPa	5300 psia	36.5 MPaa
CH	840 inH20	210 kPa	3000 psia	20.7 MPaa

Figure 624. Sample IMV31 Transmitter Create Pre-Configuration File

The following figure shows the Pre-Configuration screen for the IMV25.



Model	dpMAX in inH20	dpMAX in kPa	apMAX in psia	apMAX in MPaa
AC	30 inH20	7.5 kPa	100 psia	1 MPaa
AG	30 inH20	7.5 kPa	500 psia	3.5 MPaa
BD	200 inH20	50 kPa	300 psia	2.1 MPaa
BE	200 inH20	50 kPa	1500 psia	10 MPaa
BF	200 inH20	50 kPa	5300 psia	36.5 MPaa
BH	200 inH20	50 kPa	3000 psia	20.7 MPaa
CD	840 inH20	210 kPa	300 psia	2.1 MPaa
CE	840 inH20	210 kPa	1500 psia	10 MPaa
CF	840 inH20	210 kPa	5300 psia	36.5 MPaa
CH	840 inH20	210 kPa	3000 psia	20.7 MPaa
FE	300 inH20	75 kPa	1500 psia	10 MPaa
FH	300 inH20	75 kPa	3000 psia	20.7 MPaa
LG	10 inH20	2.5 kPa	500 psia	3.5 MPaa

Figure 625. Sample IMV25 Transmitter Create PreConfiguration File

— NOTE

To access a pre-configuration file you must not be connected to a device.

Device Overview

The Device Overview screen displays the HART information, device information, and the current primary variable (PV) data. Each time the PV is mapped to a different measurement the PV data and the graphical representation of the PV data are updated accordingly.

The following figure shows the Device Overview screen for the IMV31.

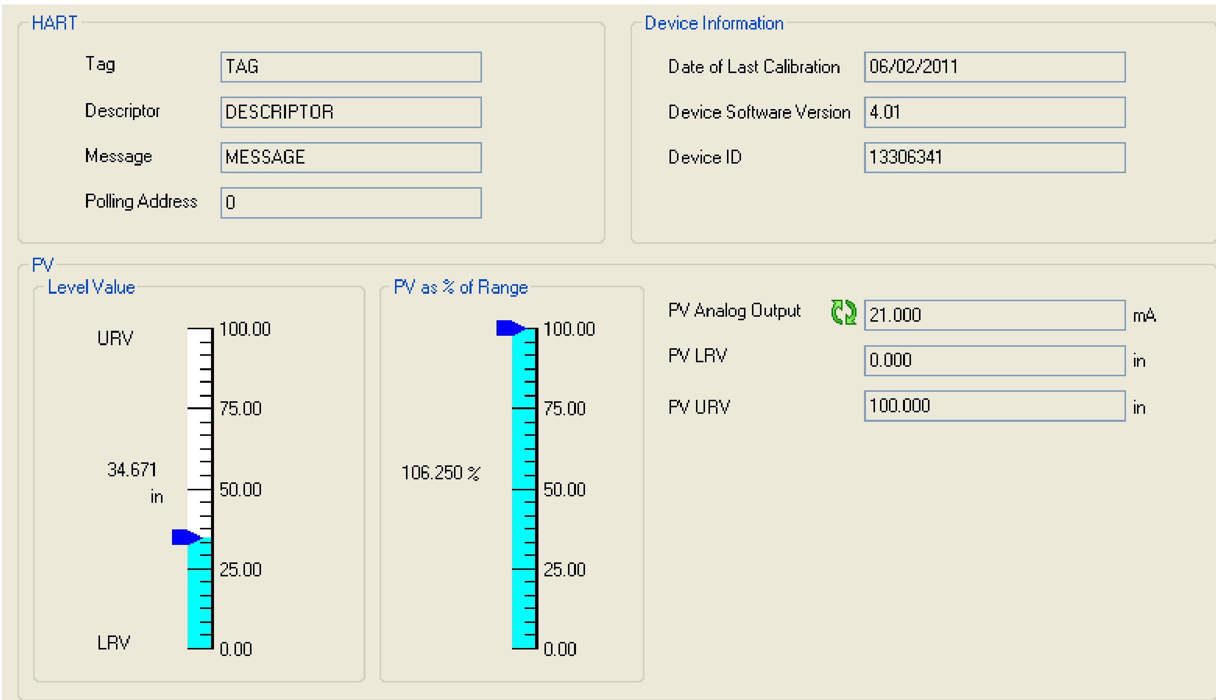


Figure 626. Sample IMV31 Transmitter Device Overview Screen

The following figure shows the Device Overview screen for the IMV25.

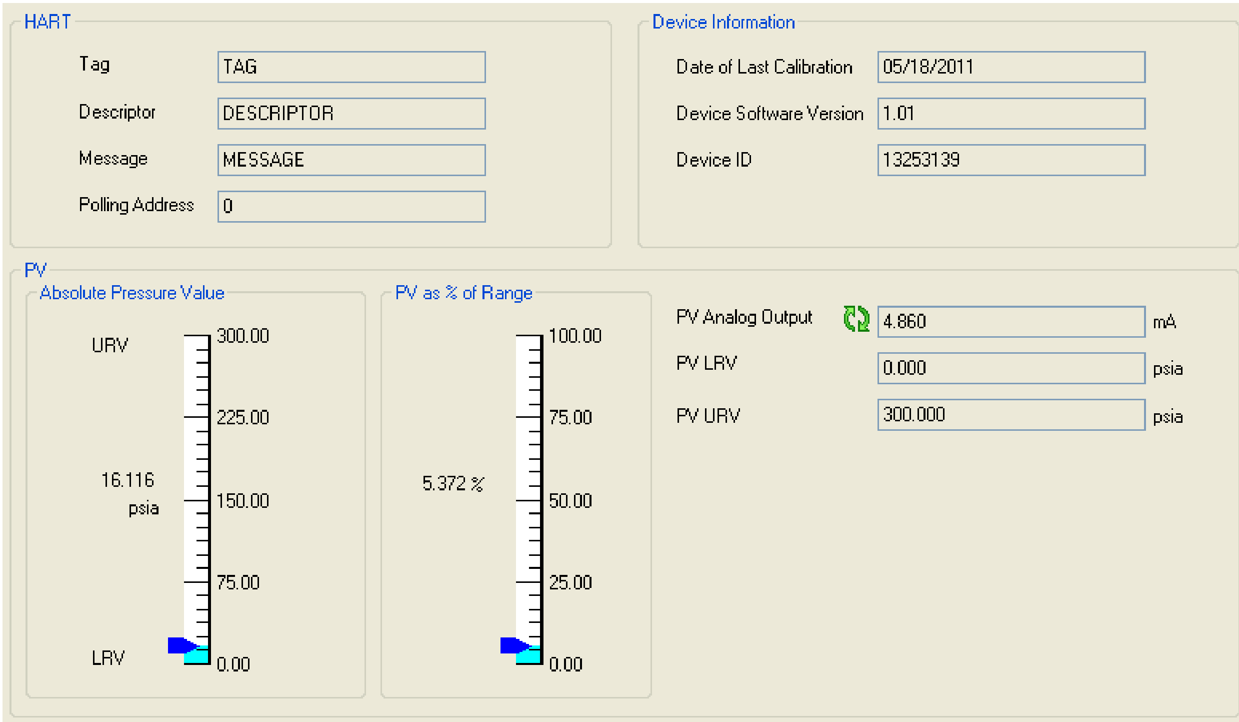


Figure 627. Sample IMV25 Transmitter Device Overview Screen

Field	Entry
HART	
Tag	This field shows the HART tag which is the unique identifier of the device. The tag name has a character limit of maximum 8 characters.
Descriptor	This field shows the HART descriptor. The descriptor has a character limit of maximum 16 characters.
Message	This field shows the HART message that is sent from the device when requested. The message has a character limit of maximum 32 characters.
Polling Address	This field shows the configured address of the device.
Device Information	
Date of Last Calibration	This field shows the last calibrated date of the transmitter. **NOTE** You can change the calibration date in “Device Information”.
Device Software Version	This field shows the software version of the device.
Device ID	This field shows the unique identification number of the device.

Field	Entry
Primary Variable	
PV Analog Output	This field shows the current PV analog output in mA.
PV LRV	This field shows the lower range value of the measurement that is mapped to PV in the selected measurement units.
PV URV	This field shows the upper range value of the measurement that is mapped to PV in the selected measurement units.

— NOTE
The Upper Range Value (URV) and Lower Range Value (LRV) are displayed in the measurement units that are selected for the PV. If you change the measurement units for PV, the LRV and URV are converted to the units that are selected.

Process Variables

The Process Variables screen displays the values of device variables, and the measured values assigned to the device variables in the selected engineering units.

The following figure shows the Process Variables screen for the IMV31.

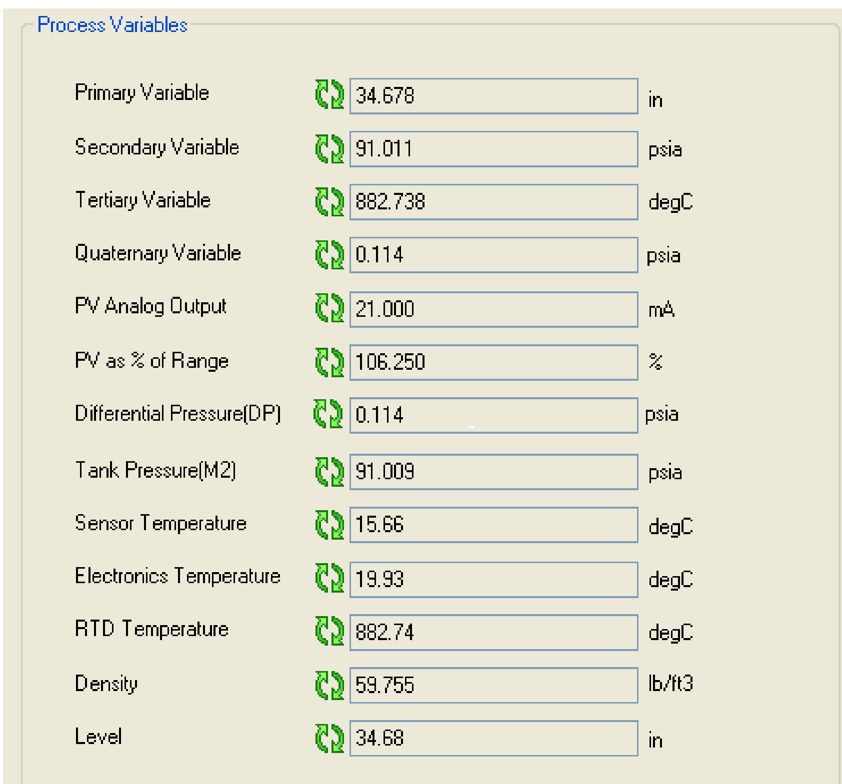


Figure 628. Sample IMV31 Transmitter Process Variables Screen

The following figure shows the Process Variables screen for the IMV25.

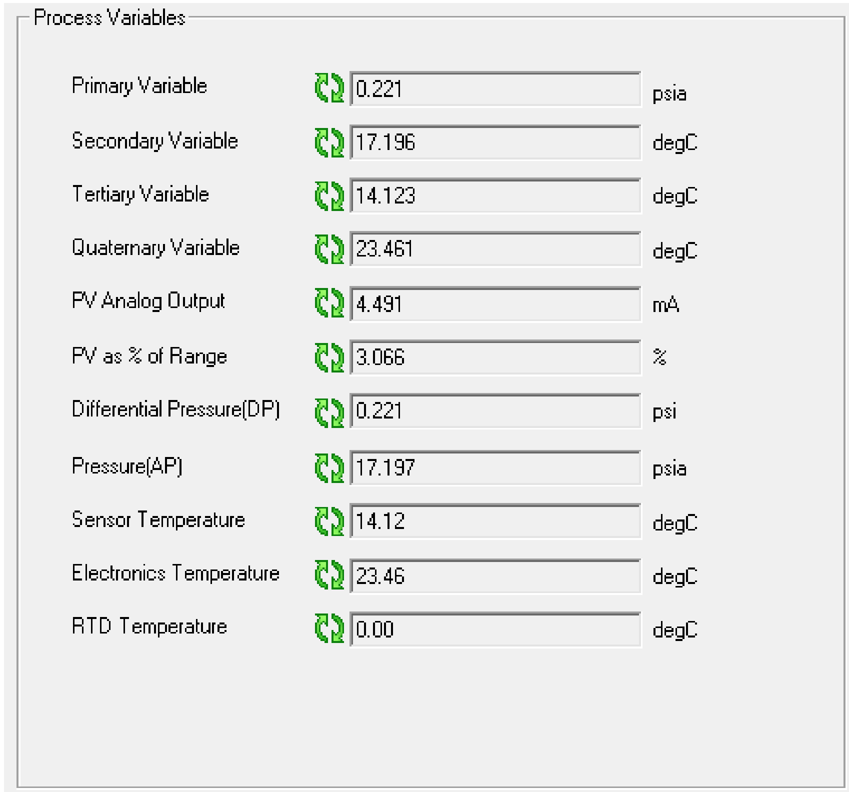


Figure 629. Sample IMV25 Transmitter Process Variables Screen

— NOTE

The measurements for the primary, secondary, tertiary, and quaternary variables are mapped in the "General" screen, and the units for the measurements are selected in the "Measurement Units" screen.

Field	Entry
Process Variables	
Primary Variable	This field shows the value of the measurement mapped to primary variable.
Secondary Variable	This field shows the value of the measurement mapped to secondary variable.
Tertiary Variable	This field shows the value of the measurement mapped to tertiary variable.
Quaternary Variable	This field shows the value of the measurement mapped to quaternary variable.
PV Analog Output	This field shows the PV analog output value.
PV as % of Range	This field shows the current PV value in percentage with respect to the range defined by LRV and URV.

Field	Entry
Differential Pressure (DP)	This field shows differential pressure measurement.
Pressure (AP) (IMV25 only)	This field shows the absolute pressure measurement.
Tank Pressure (M2) (IMV31 only)	This field shows the tank pressure measurement. This is different from absolute pressure because it is density compensated.
Sensor Temperature	This field shows the sensor temperature measurement.
Electronics Temperature	This field shows the electronics temperature measurement.
RTD Temperature	This field shows the RTD temperature measurement.
Density (IMV31 only)	This field shows the density measurement of the fluid.
Level (IMV31 only)	This field shows the fluid level measurement.

Device Configuration

General

The General screen allows you to map measurements to primary, secondary, tertiary, and quaternary variables. It displays the upper and lower range limits and the upper and lower range values of the measurement mapped to the PV.

The upper range value (URV) and lower range value (LRV) are configurable. You can set values within the configurable limits for these parameters.

The following figure shows the General screen for the IMV31.

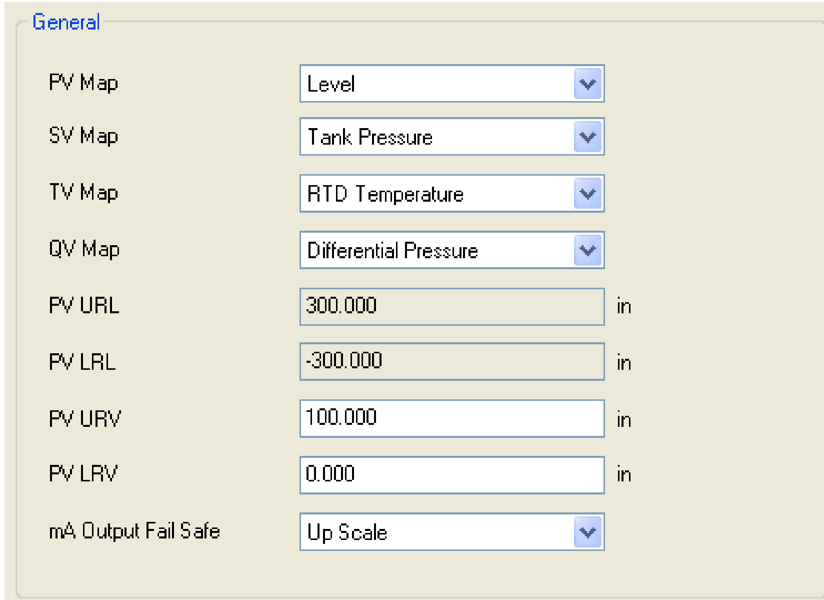


Figure 630. Sample IMV31 Transmitter General Screen

The following figure shows the General screen for the IMV25.

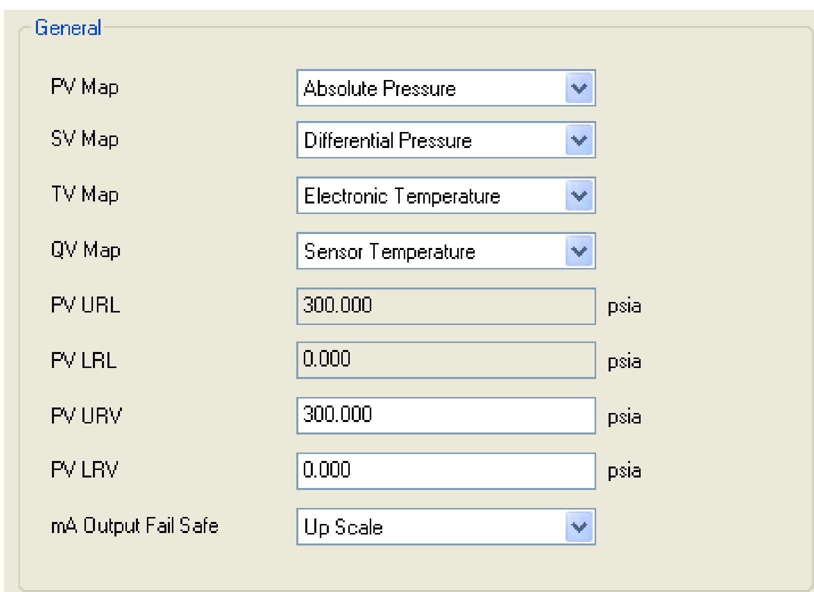


Figure 631. Sample IMV25 Transmitter General Screen

Field	Entry
General	
PV Map	Select a measurement for PV mapping from the drop-down list. For IMV31, choose from Differential Pressure, Tank Pressure, Level, and Density. 4-20 mA output of PV map should always be Level. For IMV25, choose from Differential Pressure, Absolute Pressure, Sensor Temperature, Electronic Temperature, and RTD Temperature.
SV Map	Select a measurement for SV mapping from the drop-down list. For IMV31, choose from Differential Pressure, Tank Pressure, Sensor Temperature, Electronic Temperature, RTD[a], Level, and Density. For IMV25, choose from Differential Pressure, Absolute Pressure, Sensor Temperature, Electronic Temperature, and RTD Temperature.
TV Map	Select a measurement for TV mapping from the drop-down list. For IMV31, choose from Differential Pressure, Tank Pressure, Sensor Temperature, Electronic Temperature, RTD, Level, and Density. For IMV25, choose from Differential Pressure, Absolute Pressure, Sensor Temperature, Electronic Temperature, and RTD Temperature.
QV Map	Select a measurement for QV mapping from the drop-down list. For IMV31, choose from Differential Pressure, Tank Pressure, Sensor Temperature, Electronic Temperature, RTD, Level, and Density. For IMV25, choose from Differential Pressure, Absolute Pressure, Sensor Temperature, Electronic Temperature, and RTD Temperature.
PV URL	This field shows the upper range limit of the measurement mapped to primary variable.
PV LRL	This field shows the lower range limit of the measurement mapped to primary variable.
PV URV	Specify the PV upper range value within the specified limits for PV.
PV LRV	Specify the PV lower range value within the specified limits for PV.
mA Output Failsafe	This is the mA output delivered for transmitter faults and critical sensor faults. Choose Up Scale or Down Scale from the drop-down list.

a. RTD measurement will be available in IMV31 if RTD is turned "on". Do not map RTD if the measurement is turned "off".

— NOTE

The measurement units for PV URL, PV LRL, PV URV, and PV LRV are updated each time you change the measurement units for the primary variable.

Measurement Units

The Measurement Units screen allows you to set engineering units for each process parameter in the device. It also allows you to define custom units.

The following figure shows Measurement Units screen for IMV31.

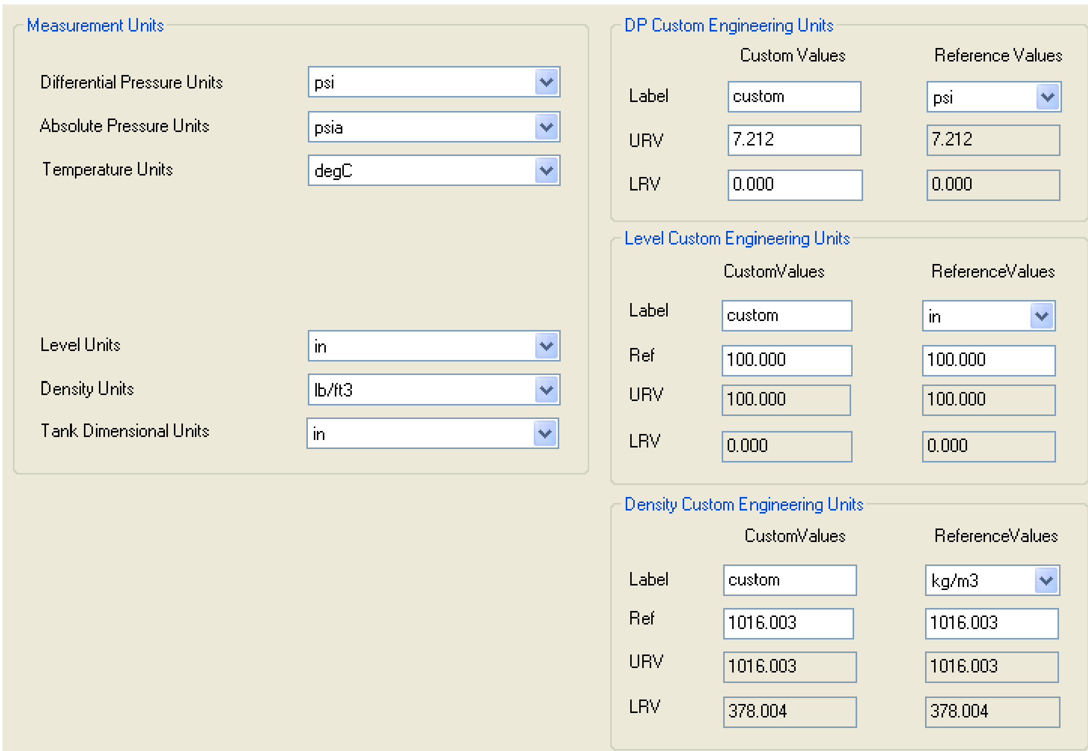


Figure 632. Sample IMV31 Transmitter Measurement Units Screen

The following figure shows Measurement Units screen for IMV25.

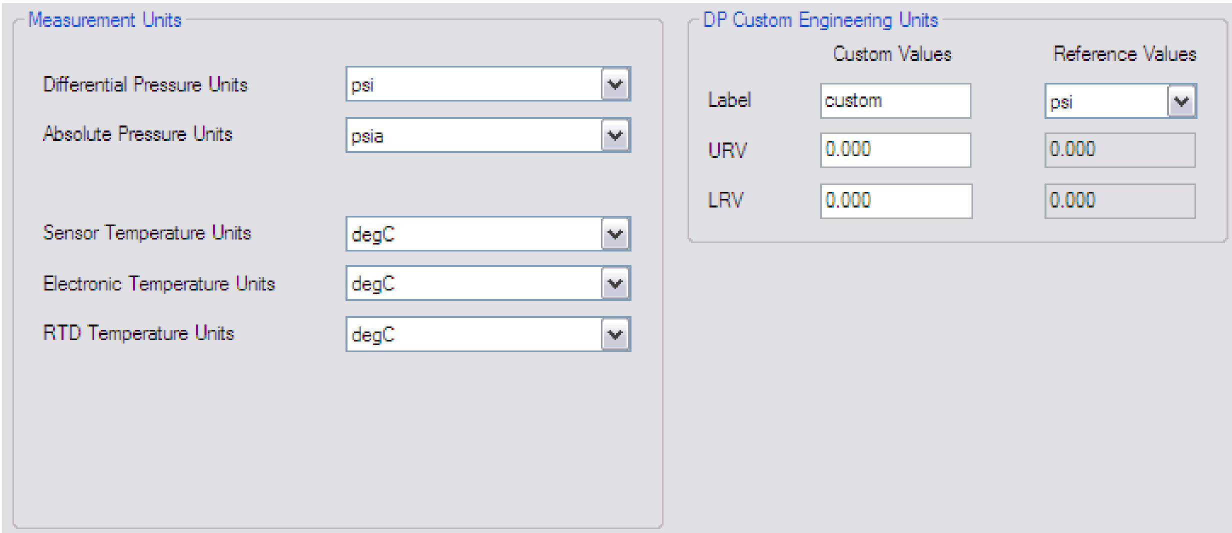


Figure 633. Sample IMV25 Transmitter Measurement Units Screen

Field	Entry
Measurement Units	
Differential Pressure Units	Select the differential pressure units from the drop-down list. Choose from psi, inHg, ftH_2O, inH_2O, atm, bar, mbar, MPa, kPa, Pa, kg/Sqcm, g/Sqcm, cmHg, mmHg, torr, mH_2O, cmH_2O, mmH_2O, and hW60.
Absolute Pressure Units	Select the absolute pressure units from the drop-down list. Choose from psia, inHga, ftH_2Oa, inH_2Oa, atma, bara, mbara, MPaa, kPaa, Paa, kg/Sqcma, g/Sqcma, cmHga, mmHga, torra, mH_2Oa, cmH_2Oa, mmH_2Oa, and hW60a. If you select the Pressure Type as 'Gauge' the above list of options changes accordingly. For 'Gauge' pressure type, choose from psi, inHg, ftH_2O, inH_2O, atm, bar, mbar, MPa, kPa, Pa, kg/Sqcm, g/Sqcm, cmHg, mmHg, torr, mH_2O, cmH_2O, mmH_2O, and hW60.
Temperature Units (IMV31 only)	Select the temperature units from the drop-down list. Choose from degC, K, degF, and degR.
Sensor Temperature Units (IMV25 only)	Select the sensor temperature units from the drop-down list. Choose from degC, K, degF, and degR.
Electronic Temperature Units (IMV25 only)	Select the electronic temperature units from the drop-down list. Choose from degC, K, degF, and degR.
RTD Temperature Units (IMV25 only)	Select the RTD temperature units from the drop-down list. Choose from degC, K, degF, and degR.

Field	Entry
Level Units (IMV31 only)	Select the units to measure level. Select one of the following options from the drop-down list: in, ft, mm, cm, and m.
Density Units (IMV31 only)	Select the units to measure density. Select one of the following options from the drop-down list: kg/m3, g/cm^3, oz/in^3, lb/ft^3, lb/yd^3, LT/yd^3, ST/yd^3, lb/gal, and kg/l.
Tank Dimensional Units (IMV31 only)	Select units to measure tank dimensions. Select one of the following options from the drop-down list: in, ft, mm, cm, and m.
DP Custom Engineering Units	
Label - Custom Values	Specify a label for the custom units. The label specified will be added to the Differential Pressure drop-down list.
Label - Reference Values	Select a reference unit that is convenient for conversion to the custom unit.
URV - Custom Values	Specify the value in custom units equal to the URV value in the reference units selected.
URV - Reference Values	This field displays the upper range reference value.
LRV - Custom Values	Specify the value in custom units equal to the LRV value in the reference units selected.
LRV - Reference Values	This field displays the lower range reference value.
Level Custom Engineering Units and Density Custom Engineering Units (IMV31 only)	
Label - Custom Values	Specify a name for the custom units.
Label - Reference Values	Select a reference unit that is convenient for conversion to your custom unit.
Ref - Custom Values	Specify the value in custom units equal to the reference value in reference units.
Ref - Reference Values	The value of the URV in the units selected appears as a default value. You can change this to a number that is convenient for your conversion.
URV - Custom Values	Specify the URV custom value.
URV - Reference Values	Specify the URV reference value.
LRV - Custom Values	Specify the LRV custom value.
LRV - Reference Values	Specify the LRV reference value.

Differential Pressure

The Differential Pressure screen displays the upper and lower range values and the upper and lower range limits set for the differential pressure.

The upper and lower range values are configurable and can be set within the limits specified for URL and LRL.

The following screen shows Differential Pressure(DP) screen for IMV31.

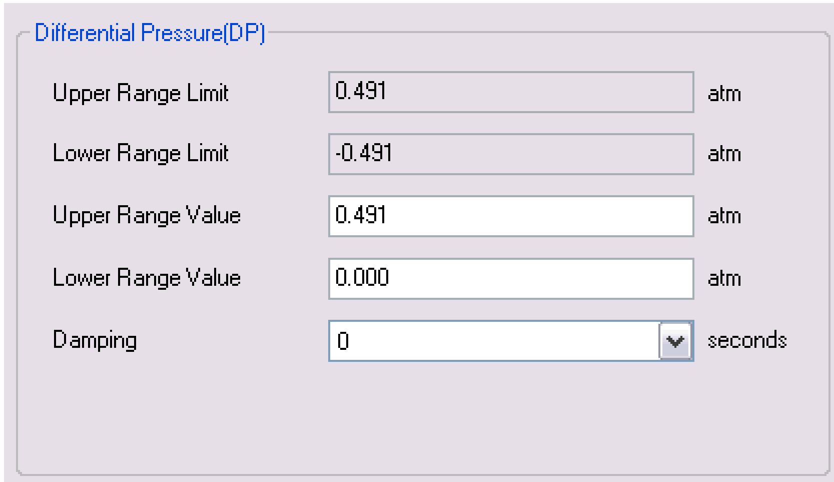


Figure 634. Sample IMV31 Transmitter Absolute Pressure Screen

The following screen shows Differential Pressure(DP) screen for IMV25.

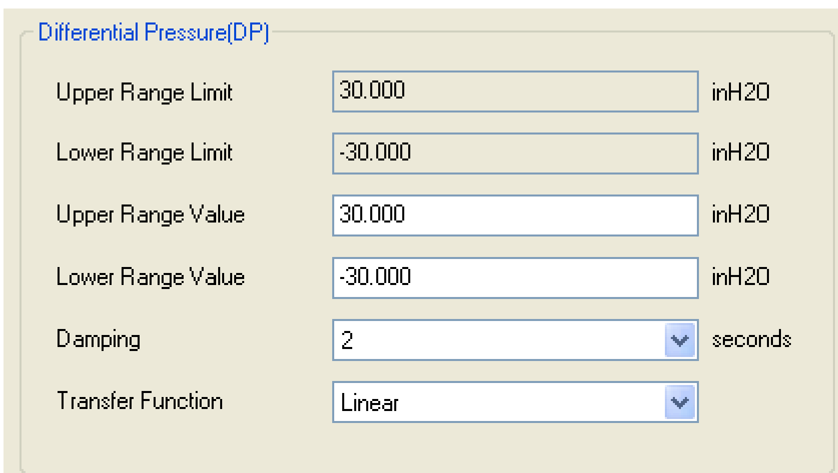


Figure 635. Sample IMV25 Transmitter Absolute Pressure Screen

Field	Entry
Differential Pressure	
Upper Range Limit	This field shows the upper range limit.
Lower Range Limit	This field shows the lower range limit.
Upper Range Value	Specify the upper range value.
Lower Range Value	Specify the lower range value.
Damping	Select the damping time. Choose from 0, 0.25, 0.5, 1, 2, 4, 8, 16, and 32 seconds.

Field	Entry
Transfer Function (IMV25 only)	Select the differential mode from the following drop-down list: • Linear • Square Root Linear < 20% Flow • Square Root Cutoff < 10% Flow

Absolute Pressure

The Absolute Pressure screen displays the upper and lower range limits and values for the absolute pressure.

The upper and lower range values are configurable and can be set within the limits specified for URL and LRL.

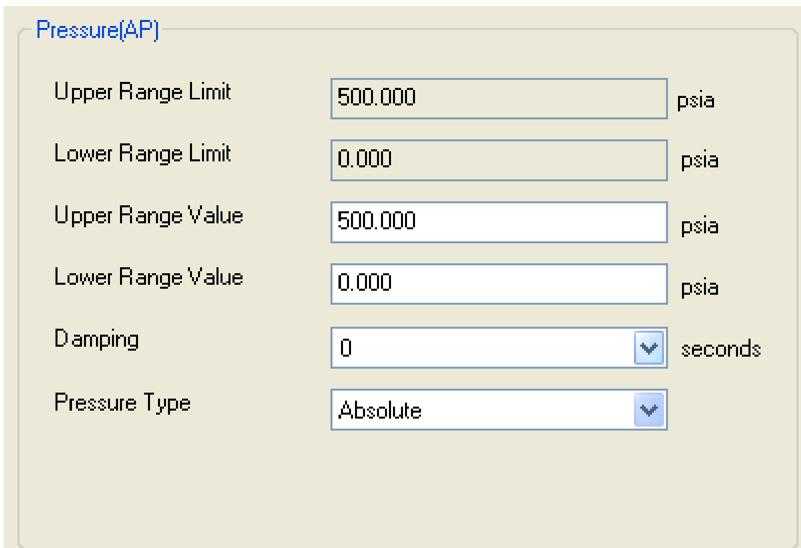


Figure 636. Sample IMV25/IMV31 Transmitter Absolute Pressure Screen (IMV31 shown)

Field	Entry
Pressure (AP)	
Upper Range Limit	This field shows the upper range limit.
Lower Range Limit	This field shows the lower range limit.
Upper Range Value	Specify the upper range value.
Lower Range Value	Specify the lower range value.
Damping	Select the absolute pressure damping time. Choose from 0, 0.25, 0.5, 1, 2, 4, 8, 16, and 32 seconds.
Pressure Type	Select the pressure type from the drop-down list. Choose from Absolute or Gauge.
Absolute Reference ATM Pressure	This field is enabled only when Gauge is selected as the pressure type. Specify the ambient atmospheric pressure.

— NOTE —
Gauge pressure is equal to the measured absolute pressure minus the value entered in Reference ATM Pressure. It is not referenced to varying atmospheric pressure.

Sensor Temperature (IMV25 Only)

The Sensor Temperature screen displays the upper and lower range limits and values for the sensor temperature.

The upper and lower range values are configurable and can be set within the limits specified for URL and LRL.

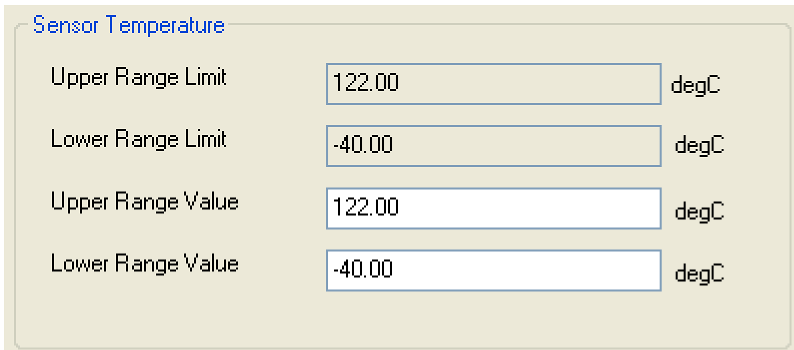


Figure 637. Sample IMV25 Transmitter Sensor Temperature Screen

Field	Entry
Sensor Temperature	
Upper Range Limit	This field shows the upper range limit.
Lower Range Limit	This field shows the lower range limit.
Upper Range Value	Specify the upper range value.
Lower Range Value	Specify the lower range value.

Electronics Temperature (IMV25 Only)

The Electronics Temperature screen displays the upper and lower range limits and values for the electronics temperature.

The upper and lower range values are configurable and can be set within the limits specified for URL and LRL.

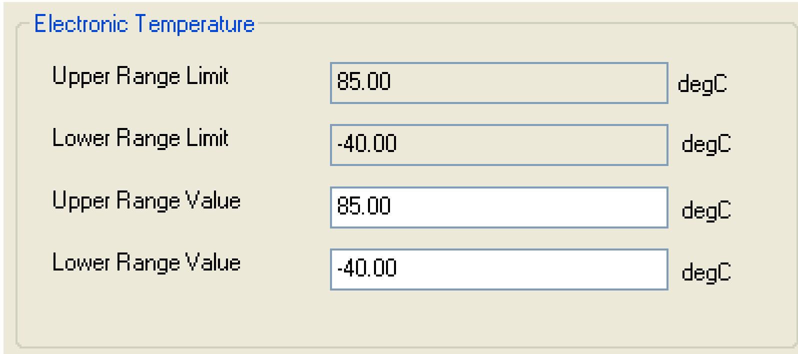


Figure 638. Sample IMV25 Transmitter Electronic Temperature Screen

Field	Entry
Electronics Temperature	
Upper Range Limit	This field shows the upper range limit.
Lower Range Limit	This field shows the lower range limit.
Upper Range Value	Specify the upper range value.
Lower Range Value	Specify the lower range value.

RTD Temperature (IMV25 Only)

The RTD Temperature screen displays the upper and lower range limits for the RTD temperature, and allows you to set the upper and lower values to measure RTD temperature.

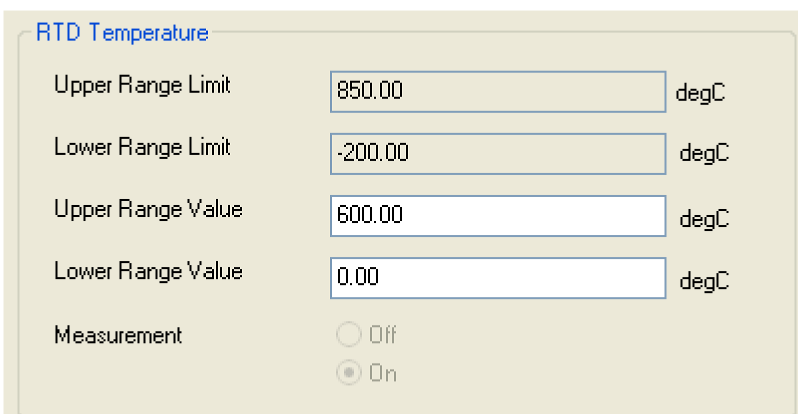


Figure 639. Sample IMV25 Transmitter RTD Temperature Screen

Field	Entry
RTD Temperature	
Upper Range Limit	This field shows the upper range limit for the RTD temperature.
Lower Range Limit	This field shows the lower range limit for the RTD temperature.
Upper Range Value	Specify the upper range value for RTD temperature.
Lower Range Value	Specify the lower range value for RTD temperature.
Measurement	Select On to turn on the RTD measurement, and Off to turn off the RTD measurement.

Temperature (IMV31 Only)

The Temperature screen displays the status of the RTD measurement. You can turn on or turn off the RTD measurement. You can also set a default value for the device to use in case of RTD failure.

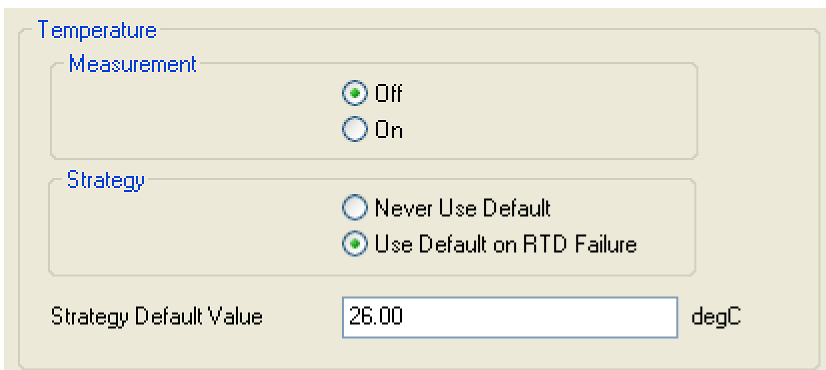


Figure 640. Sample IMV31 Transmitter Temperature Screen

Field	Entry
Temperature	
Measurement	Select one of the options - On or Off to turn on or turn off the RTD measurement. **— NOTE —** The On and Off options are dimmed if the RTD is selected as source in “Application Design Conditions (IMV31 Only)”.
Strategy	Select one of the following options for the device to react in case of RTD failure: • Never Use Default - device will not use the default value • Use Default on RTD Failure - device uses the default value specified.
Strategy Default Value	Specify the default value for RTD failure.

— NOTE —
RTD measurement will be available in IMV31 if RTD is turned "on". Do not map RTD if the measurement is turned "off".

Density (IMV31 Only)

The Density screen displays the upper and lower range limits for density measurement, and allows you to set upper and lower range values to measure density.

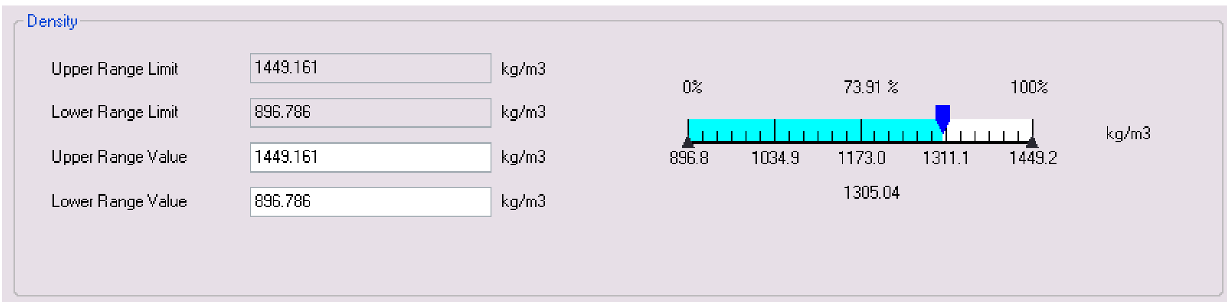


Figure 641. Sample IMV31 Transmitter Density Screen

Field	Entry
Density	
Upper Range Limit	This field shows the upper range limit for the density measurement.
Lower Range Limit	This field shows the lower range limit for the density measurement.
Upper Range Value	Specify the upper range value for density measurement.
Lower Range Value	Specify the lower range value for density measurement.

Level (IMV31 Only)

The Level screen displays the upper and lower range limits for level measurement, and allows you to set upper and lower range values. Setting the upper and lower range values defines the 4 and 20 mA span limits for liquid level applications.

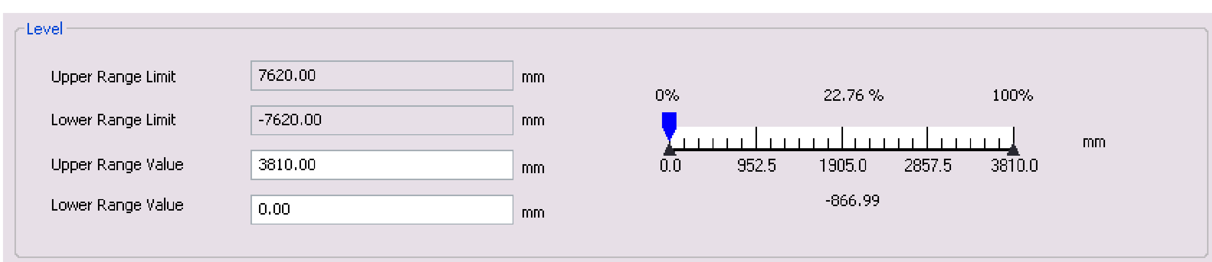


Figure 642. Sample IMV31 Transmitter Level Screen

Field	Entry
Level	
Upper Range Limit	This field shows the upper range limit to measure the level of the fluid.
Lower Range Limit	This field shows the lower range limit to measure the level of the fluid.
Upper Range Value	Specify the upper range value to measure level of the fluid.
Lower Range Value	Specify the lower range value to measure level of the fluid.

— NOTE

The graphical representation shows the percentage of the upper and lower range values set for level measurement.

Output

HART

The HART screen allows you to select HART polling address. It displays the number of request preambles, and allows you to enter the response preambles.

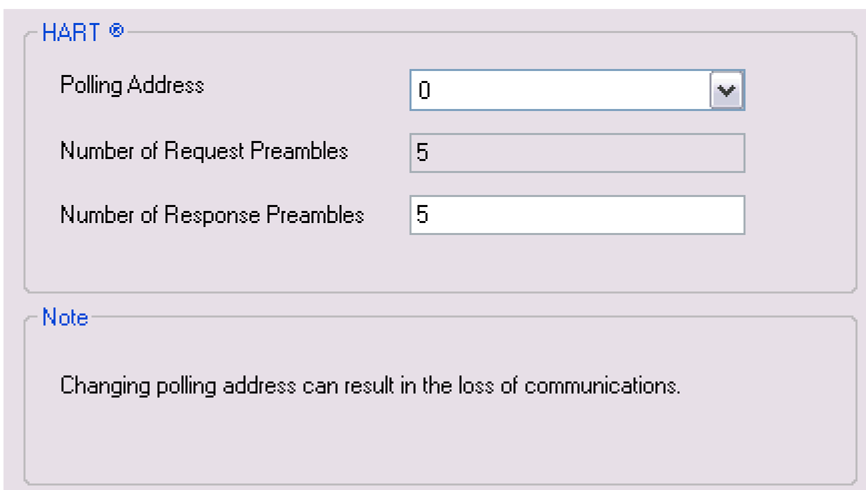


Figure 643. Sample IMV25/IMV31 Transmitter Output HART Screen (IMV31 shown)

Field	Entry
HART	
Polling Address	Select the HART polling address from the drop-down list. You can select from a range of 0 to 15.
Number of Request Preambles	This field shows the number of preambles to be sent in a response message from the transmitter to the host.
Number of Response Preambles	Specify the number of response preambles.

Local Display Access

The Local Display Access screen is where you can set password that allows you to change the configuration and calibration at the local display.

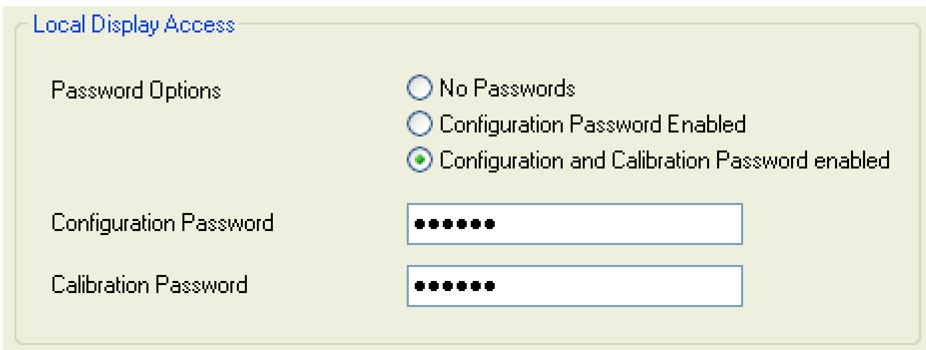


Figure 644. Sample IMV25/IMV31 Transmitter Local Display Access Screen (IMV31 shown)

Field	Entry
Local Display Access	
Password Options	Select a password option. Choose from No Passwords, Configuration Password Enabled, and Configuration and Calibration Password enabled.
Configuration Password	This field appears when you select **Configuration Password Enabled** from the password options. Specify the password that allows you to change the configuration from the local display.
Calibration Password	This field appears when you select **Configuration and Calibration Password enabled** from the password options. Specify the password that allows you to change the calibration from the local display.

Device Information

The Device Information screen displays the complete information of the device. It allows you to configure the final assembly number, tag, descriptor, message, and date of last calibration of the device.

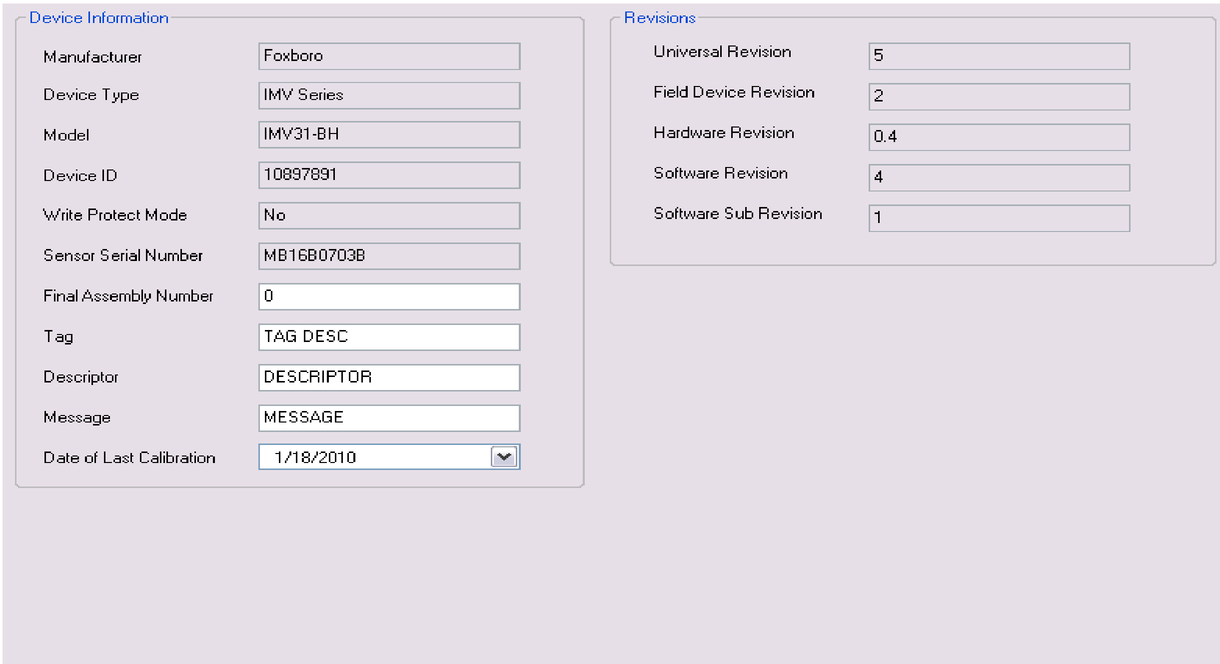


Figure 645. Sample IMV25/IMV31 Transmitter Device Information Screen (IMV31 shown)

Field	Entry
Device Information	
Manufacturer	This field shows the name of the manufacturer of the device.
Device Type	This field shows the device type that is registered with the HART Communication Foundation.
Model	This field shows the model of the device.
Device ID	This field shows the identification number of the device.
Write Protect Mode	This field shows whether variables can be written to the field device or whether commands that cause actions to be performed in the field device can or cannot occur.
Sensor Serial Number	This field shows the serial number of the sensor.
Final Assembly Number	Specify the Final Assembly Number. This is the number associated with the overall transmitter.
Tag	Specify the HART tag.
Descriptor	Specify the HART descriptor.
Message	Specify the HART message that is sent from the device when requested.
Date of Last Calibration	Select the date of last calibration from the calendar.

Field	Entry
Revisions	
Universal Revision	This field shows the universal command set revision level.
Field Device Revision	This field shows the field device revision level.
Hardware Revision	This field shows the hardware revision level.
Software Revision	This field shows the software revision level.
Software Sub Revision	This field shows the software sub revision level.

Device Status

Device Status

The Device Status screen shows the current status of the device. The status of each parameter is recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

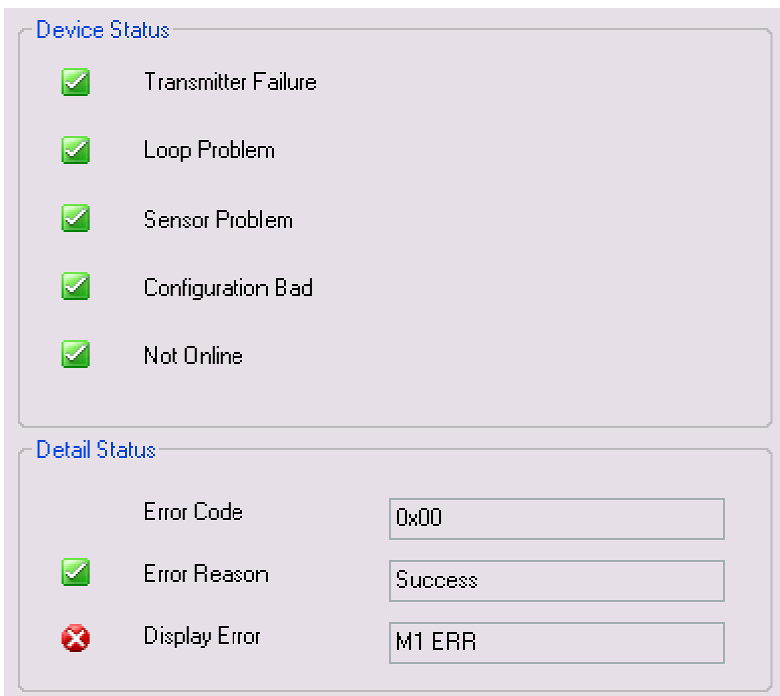


Figure 646. Sample IMV25/IMV31 Transmitter Device Status Screen (IMV31 shown)

Calibration

DAC Trim

DAC Trim calibration allows you to set the loop current to either 4 mA (zero) or 20 mA (span). By providing the inputs to the following screens, the values indicated by a suitable reference like a digital multimeter, the transmitter can trim its output. DAC Trim performs 4 mA and 20 mA calibration points respectively.

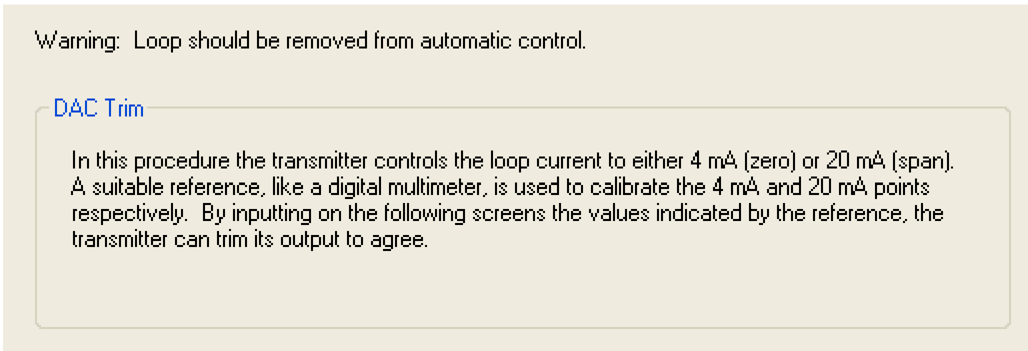


Figure 647. Sample IMV25/IMV31 Transmitter DAC Trim Screen 1 (IMV31 shown)

NOTE
DAC Trim calibration is allowed only when the mA is active in HART status and the polling address is set to zero.

Click Next in the following screens to continue the calibration process.

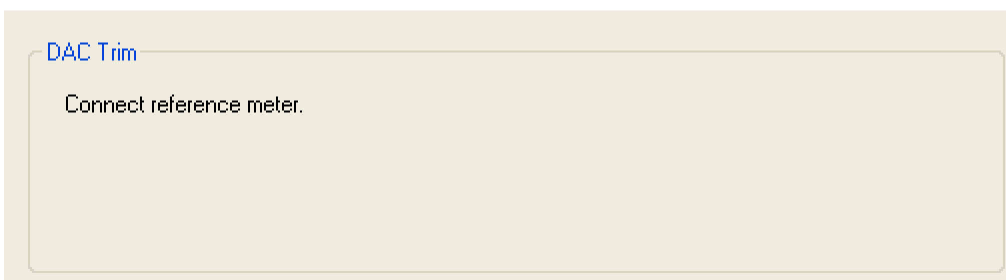


Figure 648. Sample IMV25/IMV31 Transmitter DAC Trim Screen 2 (IMV31 shown)

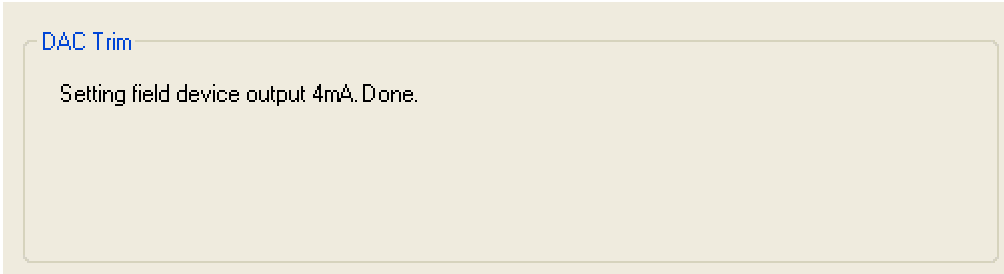


Figure 649. Sample IMV25/IMV31 Transmitter DAC Trim Screen 3 (IMV31 shown)

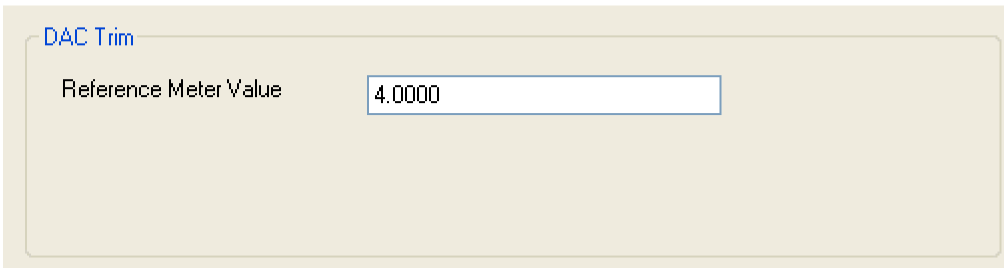


Figure 650. Sample IMV25/IMV31 Transmitter DAC Trim Screen 4 (IMV31 shown)

Field	Entry
DAC Trim	
Reference Meter Value	Specify the value for the reference meter.

Click Next, and the following screen appears.

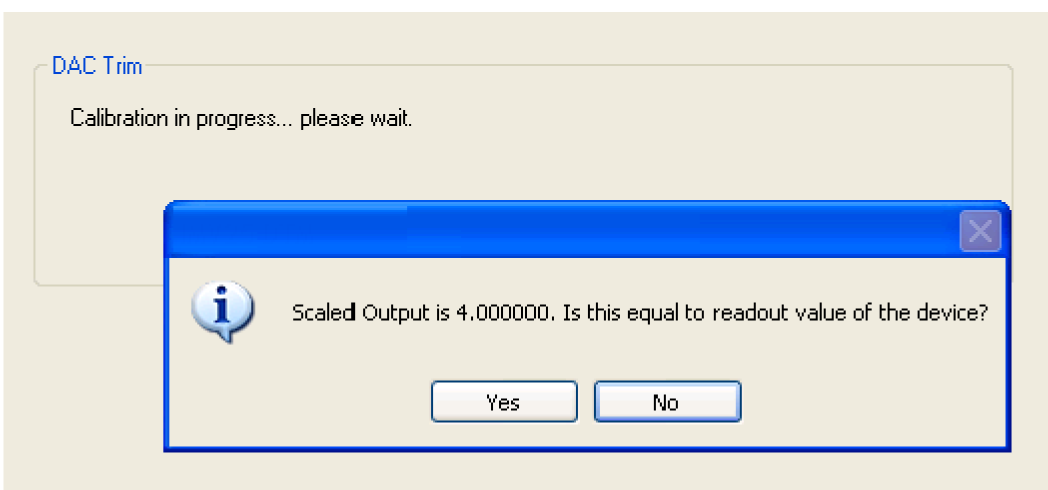


Figure 651. Sample IMV25/IMV31 Transmitter DAC Trim Screen 5 (IMV31 shown)

Click Yes to continue the calibration process. The following screen appears. If you click No, enter a value from the reference meter. Refer to Figure 653.

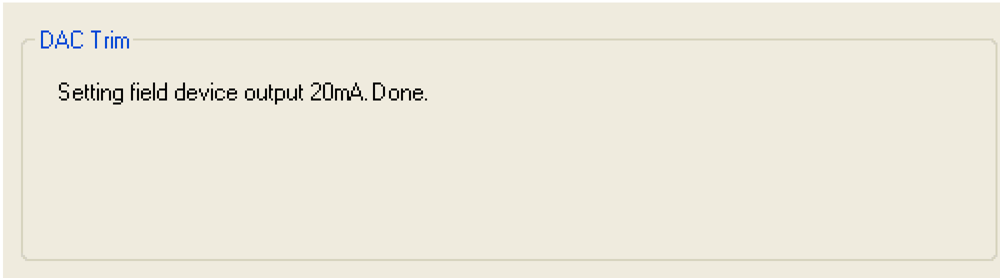


Figure 652. Sample IMV25/IMV31Transmitter DAC Trim Screen 6 (IMV31 shown)

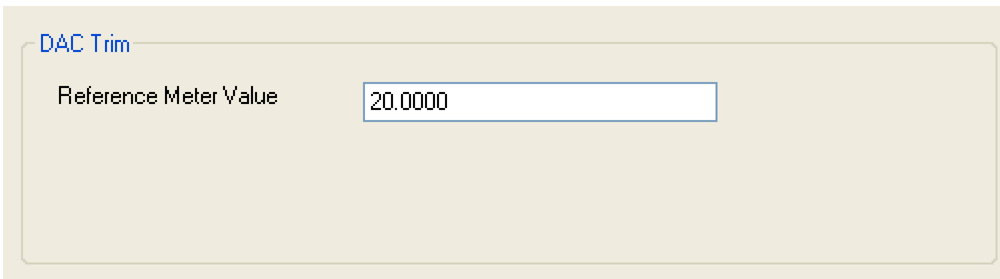


Figure 653. Sample IMV25/IMV31 Transmitter DAC Trim Screen 7 (IMV31 shown)

Field	Entry
DAC Trim	
Reference Meter Value	Specify a value from the reference meter.

Click Next, and the following screen appears.

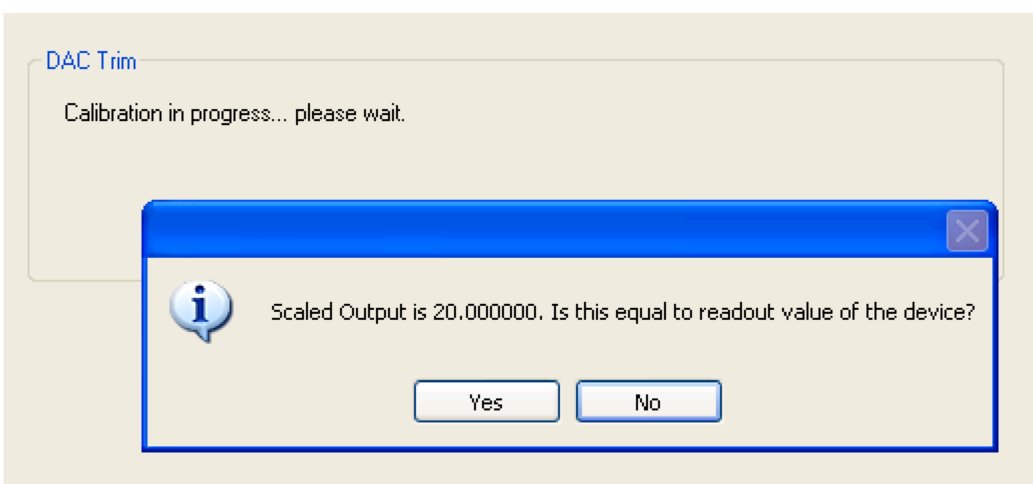


Figure 654. Sample IMV25/IMV31 Transmitter DAC Trim Screen 8 (IMV31 shown)

Click Yes to complete the DAC trim calibration.

If you click No, enter a value for reference meter.

The following screen appears if the DAC Trim calibration is completed successfully.

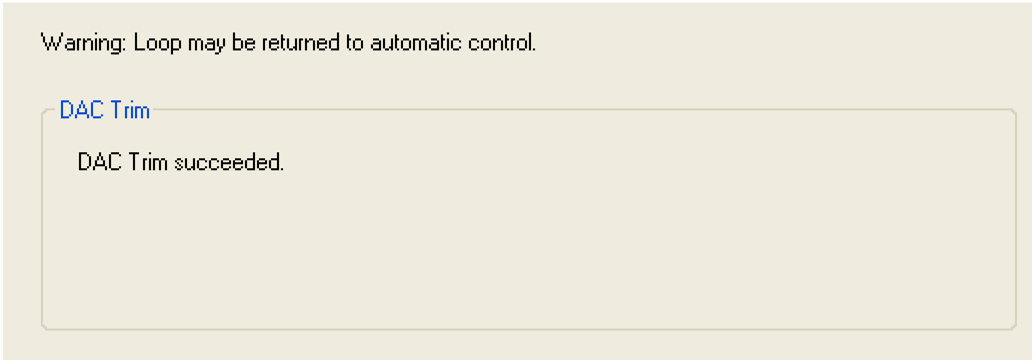


Figure 655. Sample IMV25/IMV31 Transmitter DAC Trim Screen 9 (IMV31 shown)

Scaled DAC Trim

This procedure is the same as the DAC Trim procedure described in the previous section except that the 4 and 20 mA points are scaled to whatever units are required by the readout or control devices. For example, if the readout device is a voltmeter, across a 250 Ω resistor, the 4 and 20 mA points would correspond to 1 and 5 volts, respectively.

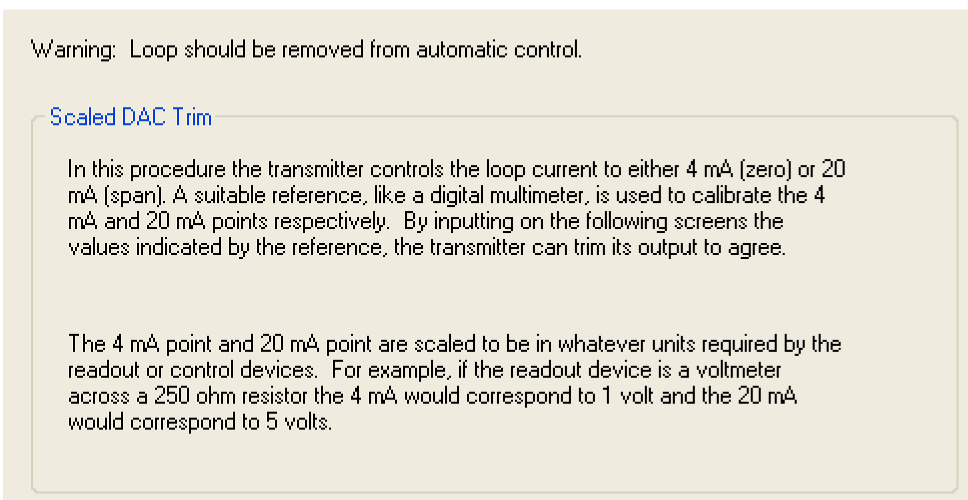


Figure 656. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 1 (IMV31 shown)

NOTE

Scaled DAC Trim calibration is allowed only when the mA is active in HART status and the polling address is set to zero.

Click Next. The following screen appears.

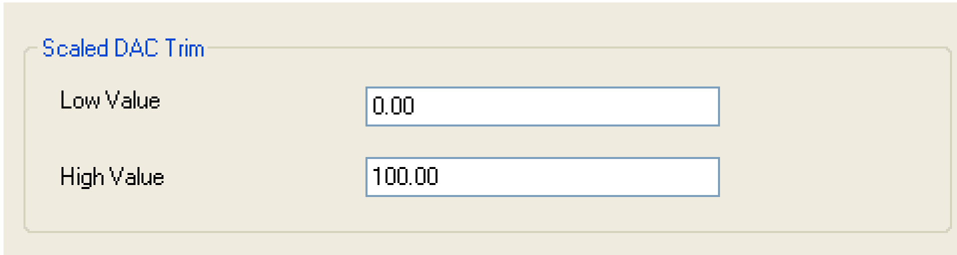


Figure 657. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 2 (IMV31 shown)

Field	Entry
Scaled DAC Trim	
Low Value	Specify the scaled value that will be mapped to 4 mA.
High Value	Specify the scaled value that will be mapped to 20 mA.

Click Next in the following screens to continue the calibration process.

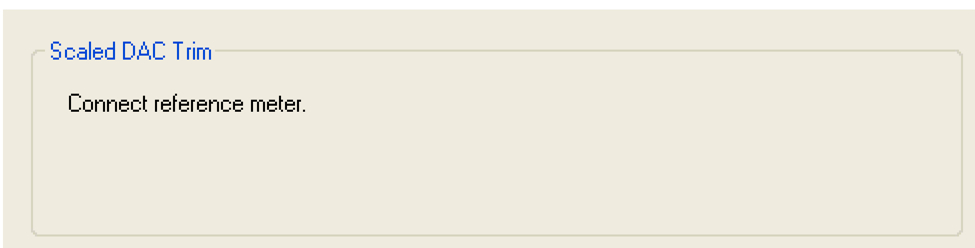


Figure 658. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 3 (IMV31 shown)

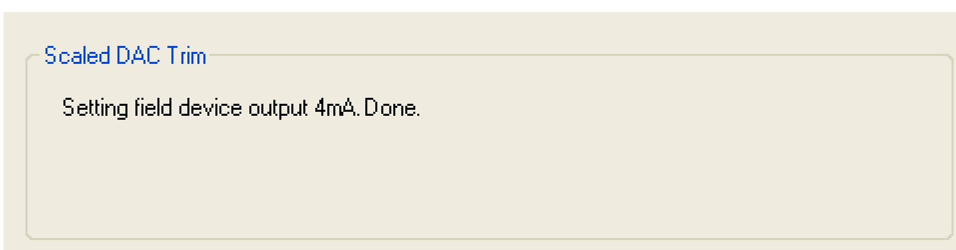


Figure 659. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 4 (IMV31 shown)

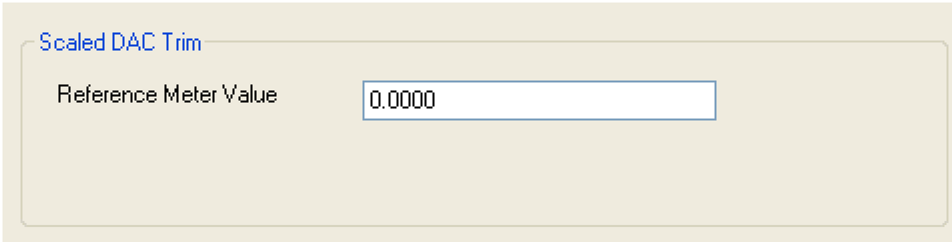


Figure 660. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 5 (IMV31 shown)

Field	Entry
Scaled DAC Trim	
Reference Meter Value	Specify the reference meter value for scaled DAC trim at the 4 mA point.

Click Next, and the following screen appears.

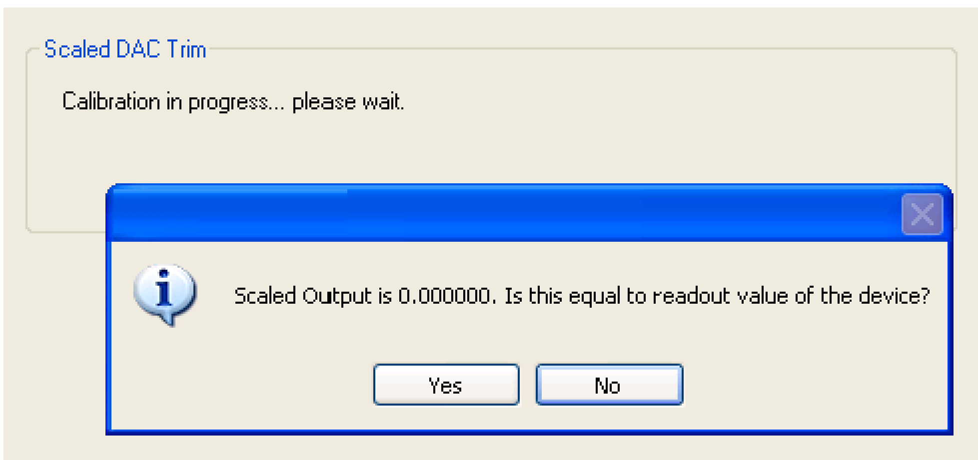


Figure 661. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 6 (IMV31 shown)

Click Yes, and then click Next to continue the calibration process. The screen appears as shown in Figure 662. If you click No, the screen appears as shown in Figure 663.

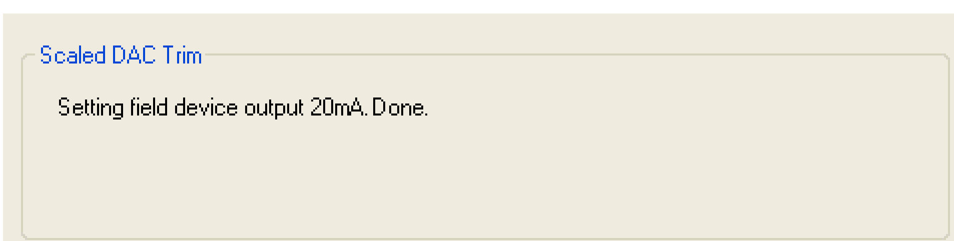


Figure 662. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 7 (IMV31 shown)

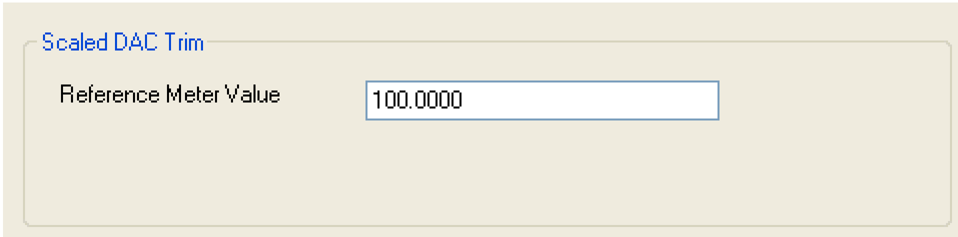


Figure 663. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 8 (IMV31 shown)

Field	Entry
Scaled DAC Trim	
Reference Meter Value	Specify the reference meter value for DAC trim at the 20 mA point.

Click Next, and the following screen appears.

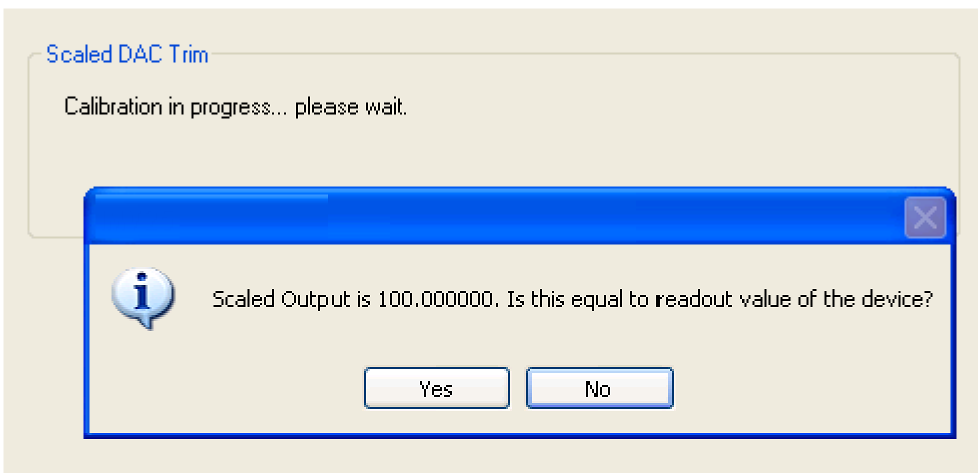


Figure 664. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 9 (IMV31 shown)

Click Yes to complete the Scaled DAC trim calibration. If you click No, enter the reference meter value and continue the calibration process.

The following screen appears if the DAC Trim calibration is completed successfully.

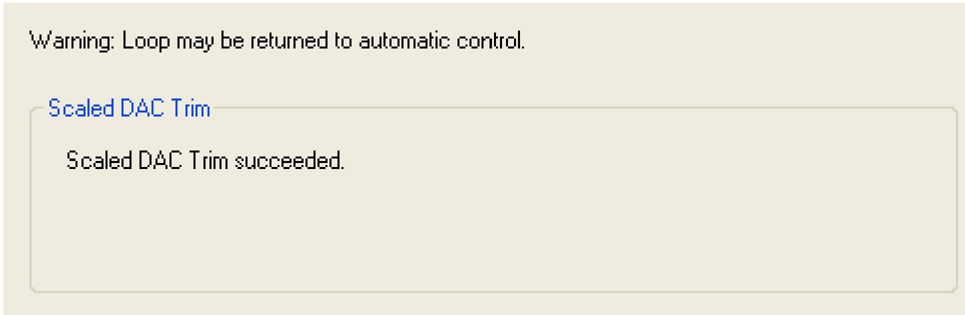


Figure 665. Sample IMV25/IMV31 Transmitter Scaled DAC Trim Screen 10 (IMV31 shown)

Differential Pressure

The Differential Pressure screen allows you to calibrate differential pressure at zero value, LRV, URV, 1 user point, and 2 user points.

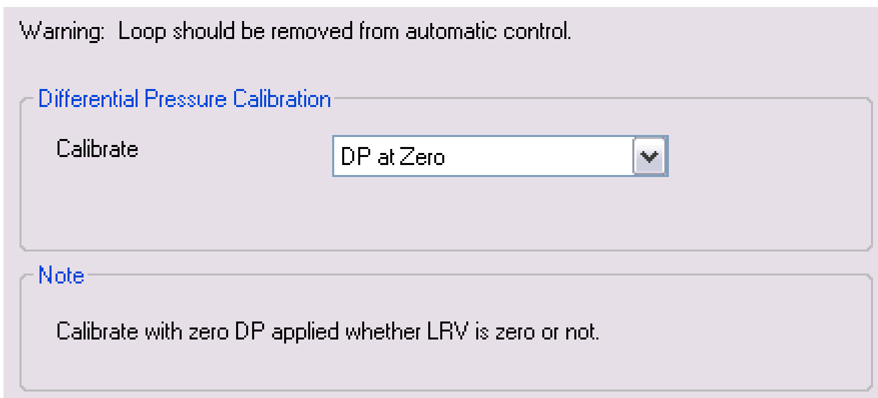


Figure 666. Sample IMV25/IMV31 Transmitter Differential Pressure Calibration Screen 1 (IMV31 shown)

Field	Entry
Differential Pressure Calibration	
Calibrate	Select an option from the drop-down list to calibrate differential pressure. Choose from DP at Zero, DP at LRV, DP at URV, DP at 1 User Point, and DP at 2 User Points.

NOTE

If you select:
DP at 1 User Point - Calibration is performed at 1 user entered point.
DP at 2 User Points - Calibration is performed at 2 user entered points.

Click Next to start the calibration process.

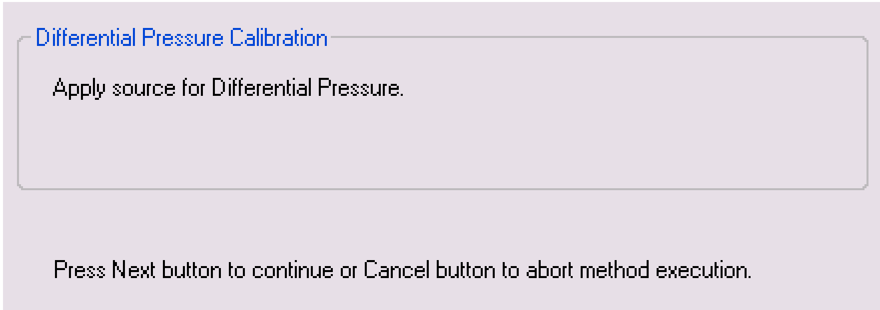


Figure 667. Sample IMV25/IMV31 Transmitter Differential Pressure Calibration Screen 2 (IMV31 shown)

Click Next in the following screens to continue the calibration process.

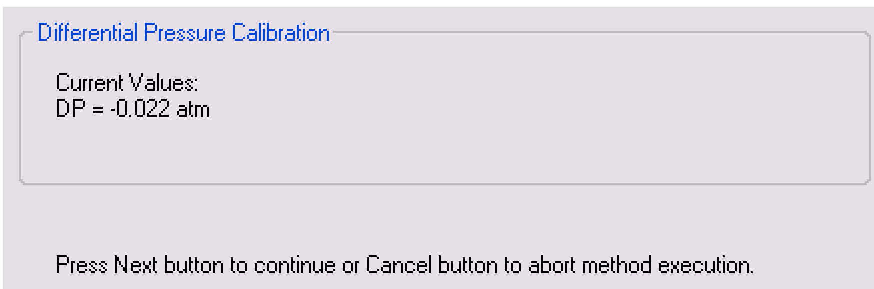


Figure 668. Sample IMV25/IMV31 Transmitter Differential Pressure Calibration Screen 3 (IMV31 shown)

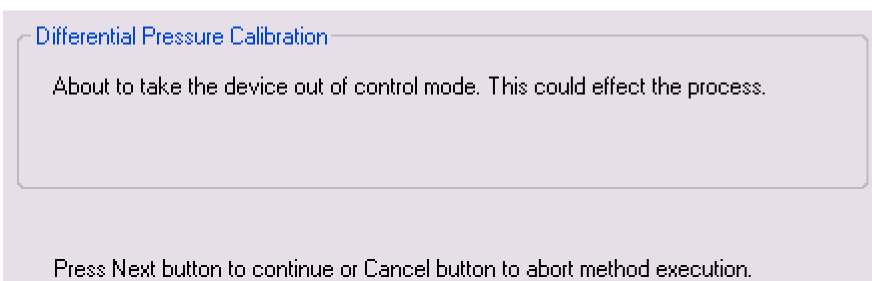


Figure 669. Sample IMV25/IMV31 Transmitter Differential Pressure Calibration Screen 4 (IMV31 shown)

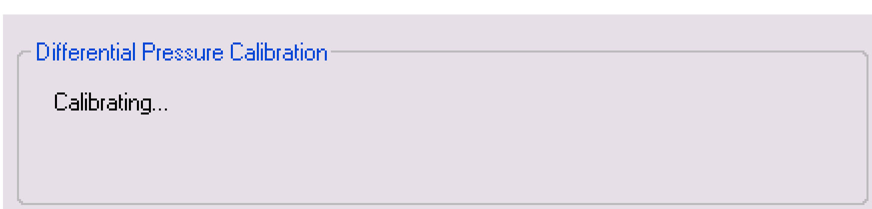


Figure 670. Sample IMV25/IMV31 Transmitter Differential Pressure Calibration Screen 5 (IMV31 shown)

When the calibration is completed successfully, the following screen appears. Click OK.

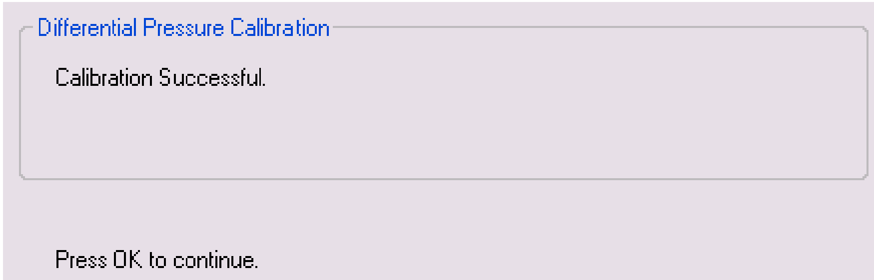


Figure 671. Sample IMV25/IMV31 Transmitter Differential Pressure Calibration Screen 6 (IMV31 shown)

Absolute Pressure

Absolute Pressure is the pressure at the sensor connection. For the IMV31, the Pressure (AP) Calibration screen allows you to calibrate absolute pressure at 1 user point, 2 user points, and M2 at 1 User Point. For the IMV25, the Pressure (AP) Calibration screen allows you to calibrate absolute pressure at pressure, the lower range value, the upper range value, 1 user point, and 2 user points.

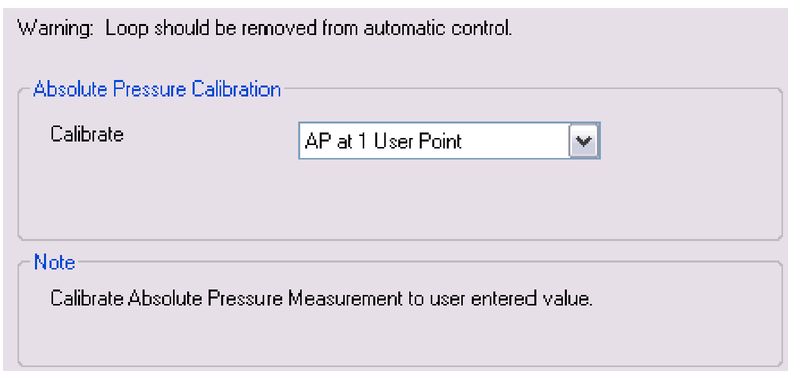


Figure 672. Sample IMV25/IMV31 Transmitter Absolute Pressure Calibration Screen 1 (IMV31 shown)

Field	Entry
Absolute Pressure Calibration	
Calibrate	Select an option from the drop-down list to calibrate absolute pressure. For IMV31, choose from AP at 1 User Point, AP at 2 User Points and M2 at 1 User Point. For IMV25, choose from AP at Pressure, AP at LRV, AP at URV, AP at 1 User Point, and AP at 2 User Points. • AP at Pressure - allows calibration at specified pressure • AP at LRV - allows calibration at specified lower range value • AP at URV - allows calibration at specified upper range value • AP at 1 User Point - allows bench pressure calibration at 1 user determined point • AP at 2 User Points - allows bench pressure calibration at 2 user determined points • M2 at 1 User Point - allows you to perform a 1-point calibration while the transmitter is installed on the tank

Click Next to start the calibration process.

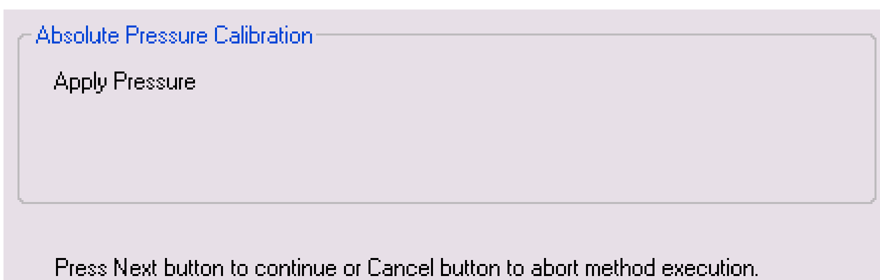


Figure 673. Sample IMV25/IMV31 Transmitter Absolute Pressure Calibration Screen 2 (IMV31 shown)

Click Next in the following screens to continue the calibration process.

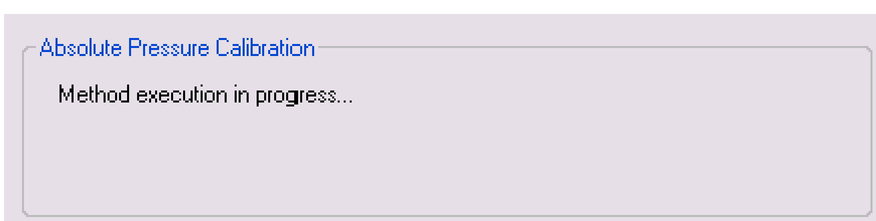


Figure 674. Sample IMV25/IMV31 Transmitter Absolute Pressure Calibration Screen 3 (IMV31 shown)

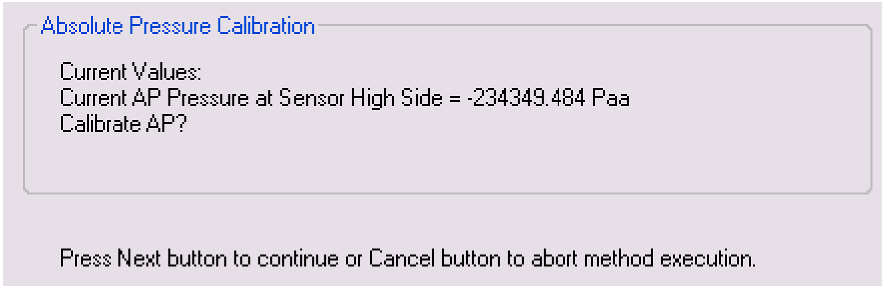


Figure 675. Sample IMV25/IMV31 Transmitter Absolute Pressure Calibration Screen 4 (IMV31 shown)

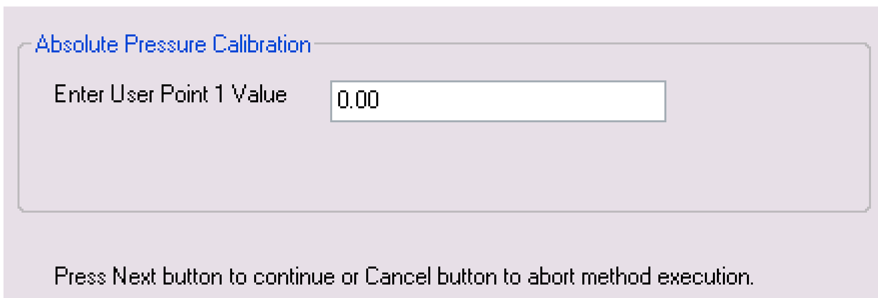


Figure 676. Sample IMV25/IMV31 Transmitter Absolute Pressure Calibration Screen 5 (IMV31 shown)

Field	Entry
Absolute Pressure Calibration	
Enter User Point 1 Value[a]	Specify a value for absolute pressure calibration.

a. This parameter varies based on the option selected for AP calibration. If you select 'AP at 2 User Points', you need to enter two values for calibration.

Click Next in the following screens to continue the calibration process.

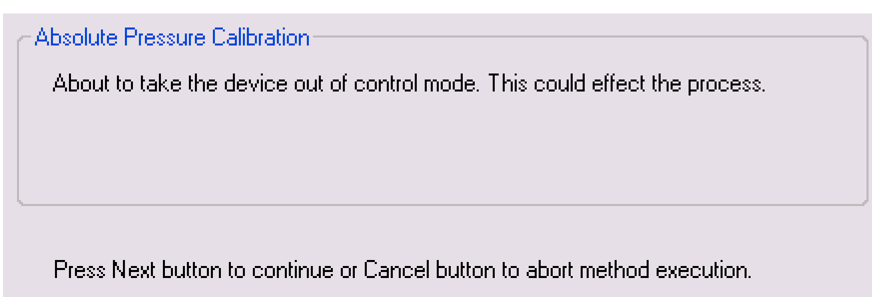


Figure 677. Sample IMV25/IMV31 Transmitter Absolute Pressure Calibration Screen 6 (IMV31 shown)

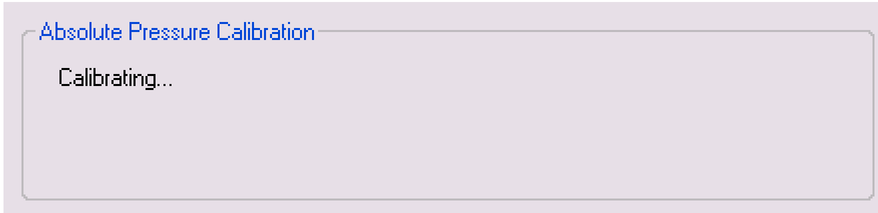


Figure 678. Sample IMV25/IMV31 Transmitter Absolute Pressure Calibration Screen 7 (IMV31 shown)

When the calibration is completed successfully, the following screen appears. Click OK.

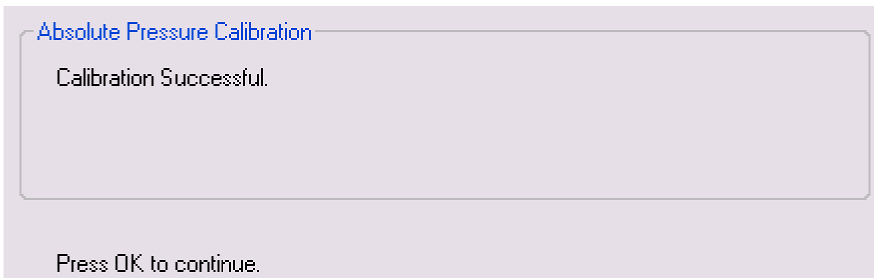


Figure 679. Sample IMV25/IMV31 Transmitter Absolute Pressure Calibration Screen 8 (IMV31 shown)

Sensor Temperature (IMV31 Only)

The Sensor Temperature Calibration screen allows you to calibrate sensor temperature at user-defined points.

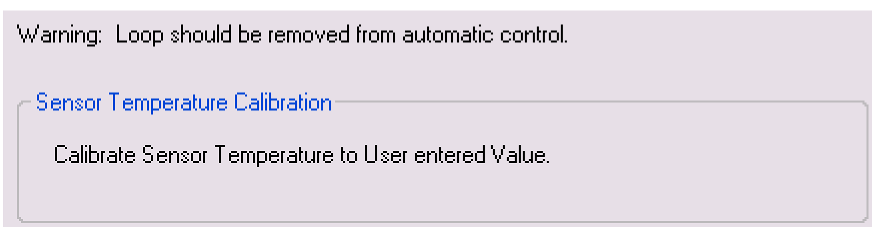


Figure 680. Sample IMV31 Transmitter Sensor Temperature Calibration Screen 1

Click Next to start the calibration process.

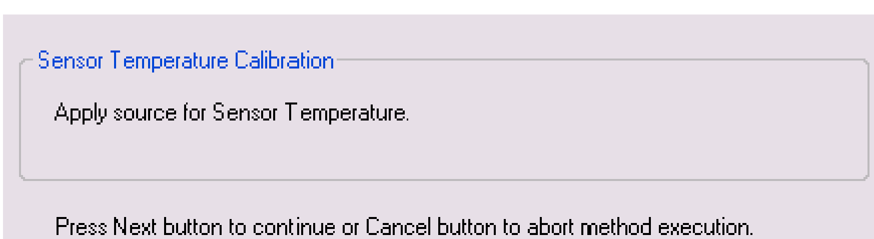


Figure 681. Sample IMV31 Transmitter Sensor Temperature Calibration Screen 2

Click Next in the following screens to continue the calibration process.

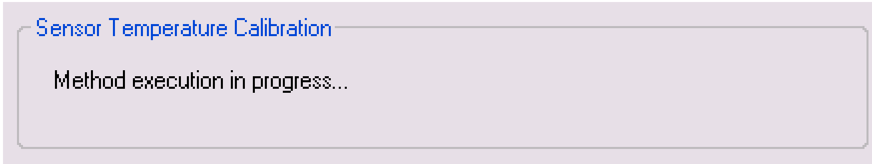


Figure 682. Sample IMV31 Transmitter Sensor Temperature Calibration Screen 3

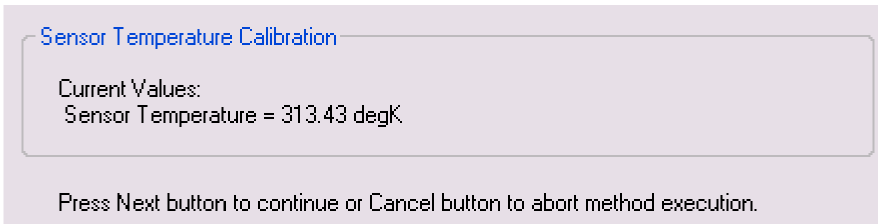


Figure 683. Sample IMV31 Transmitter Sensor Temperature Calibration Screen 4

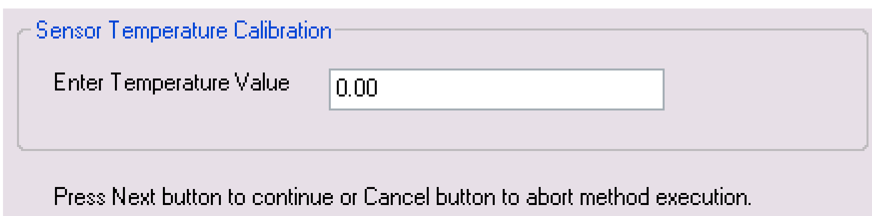


Figure 684. Sample IMV31 Transmitter Sensor Temperature Calibration Screen 5

Field	Entry
Sensor Temperature Calibration	
Enter Temperature Value	Specify a value for sensor temperature calibration.

Click Next in the following screens to continue the calibration process.

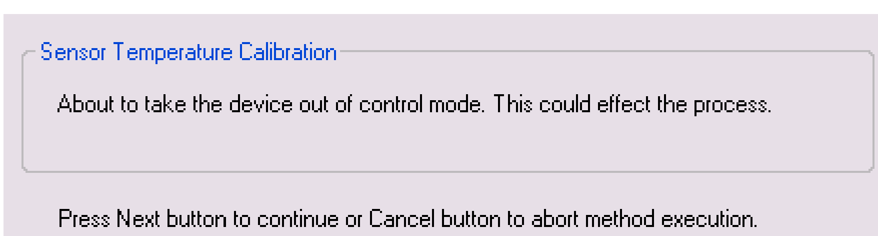


Figure 685. Sample IMV31 Transmitter Sensor Temperature Calibration Screen 6

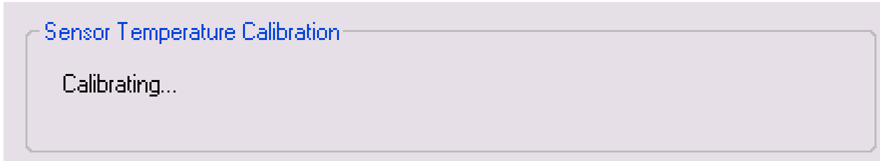


Figure 686. Sample IMV31 Transmitter Sensor Temperature Calibration Screen 7

Click OK when the calibration is completed.

Electronics Temperature (IMV31 Only)

The Electronics Temperature Calibration screen allows you to calibrate electronics temperature at user-defined points.

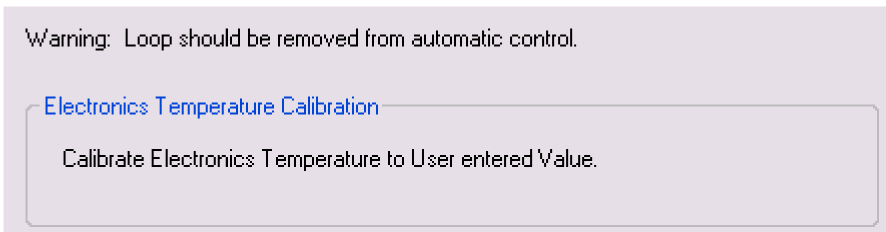


Figure 687. Sample IMV31 Transmitter Electronics Temperature Calibration Screen 1

Click Next to start the calibration process.

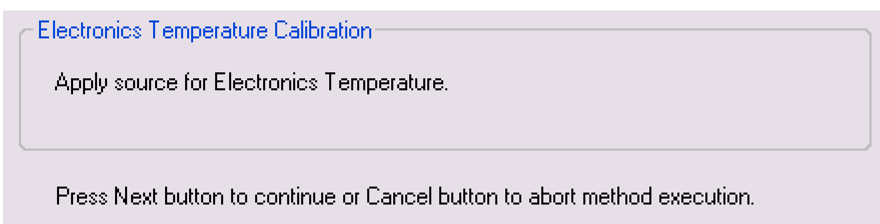


Figure 688. Sample IMV31 Transmitter Electronics Temperature Calibration Screen 2

Click Next in the following screens to continue the calibration process.

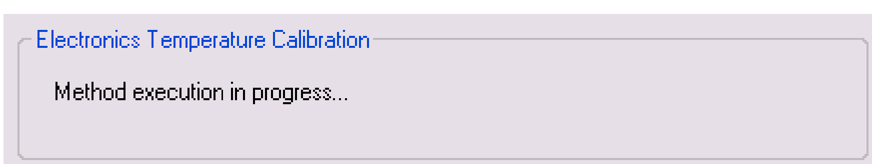


Figure 689. Sample IMV31 Transmitter Electronics Temperature Calibration Screen 2

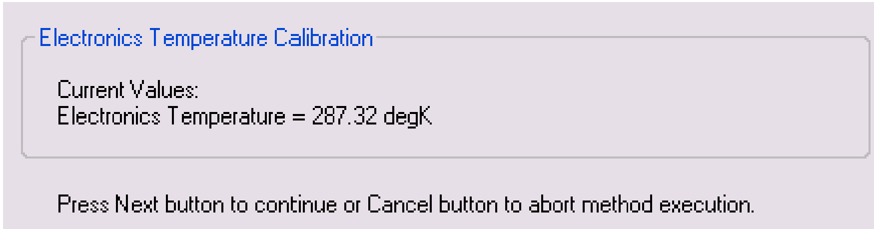


Figure 690. Sample IMV31 Transmitter Electronics Temperature Calibration Screen 3

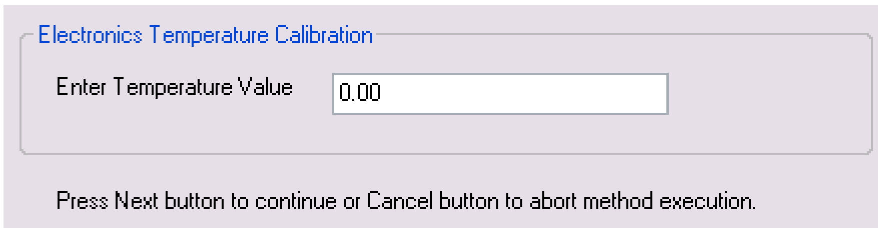


Figure 691. Sample IMV31 Transmitter Electronics Temperature Calibration Screen 4

Field	Entry
Electronics Temperature Calibration	
Enter Temperature Value	Specify a value for electronics temperature calibration.

Click Next in the following screens to continue the calibration process.

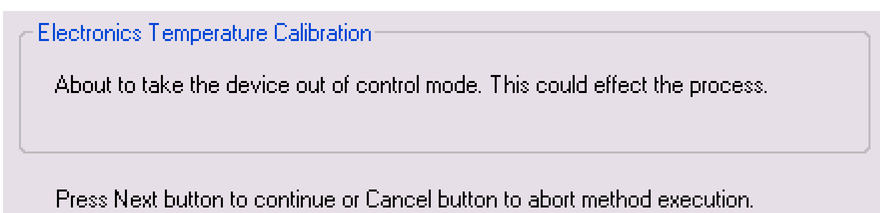


Figure 692. Sample IMV31 Transmitter Electronics Temperature Calibration Screen 5

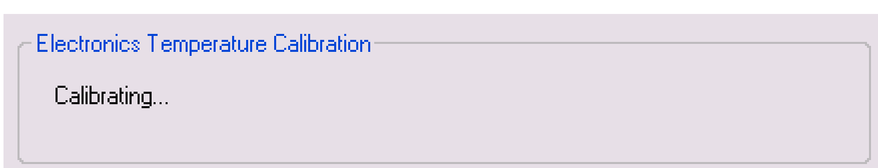


Figure 693. Sample IMV31 Transmitter Electronics Temperature Calibration Screen 6

When the calibration is completed successfully, the following screen appears. Click OK.

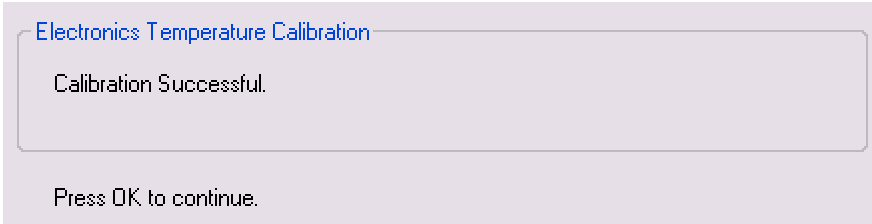


Figure 694. Sample IMV31 Transmitter Electronics Temperature Calibration Screen 7

RTD Temperature

The RTD Temperature Calibration screen allows you to calibrate the RTD temperature at user-defined points.

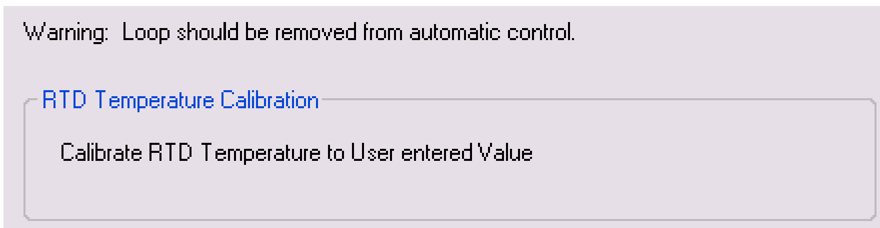


Figure 695. Sample IMV25/IMV31 Transmitter RTD Temperature Calibration Screen 1 (IMV31 shown)

Click Next to start the calibration process.

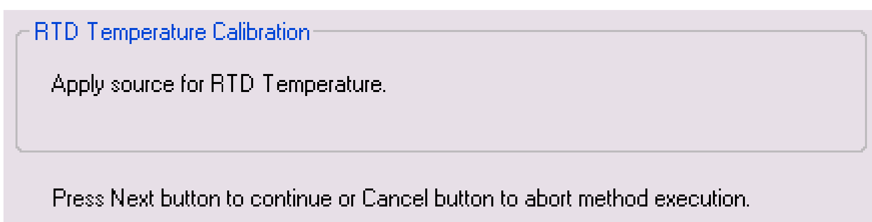


Figure 696. Sample IMV25/IMV31 Transmitter RTD Temperature Calibration Screen 2 (IMV31 shown)

Click Next in the following screens to continue the calibration process.

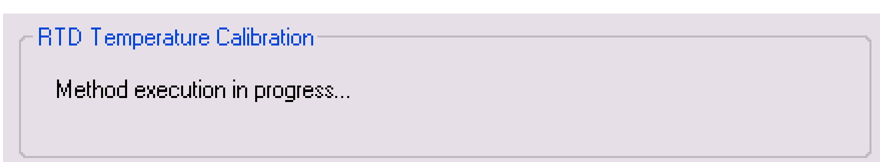


Figure 697. Sample IMV25/IMV31 Transmitter RTD Temperature Calibration Screen 3 (IMV31 shown)

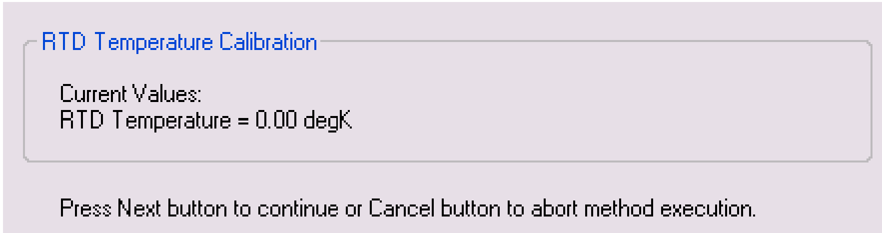


Figure 698. Sample IMV25/IMV31 Transmitter RTD Temperature Calibration Screen 4 (IMV31 shown)

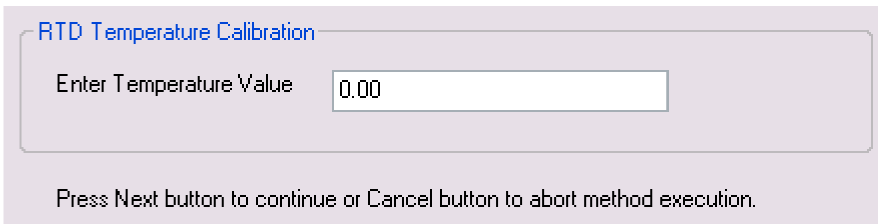


Figure 699. Sample IMV25/IMV31 Transmitter RTD Temperature Calibration Screen 5 (IMV31 shown)

Field	Entry
RTD Temperature Calibration	
Enter Temperature Value	Specify a value for RTD temperature calibration.

Click Next in the following screens to continue the calibration process.

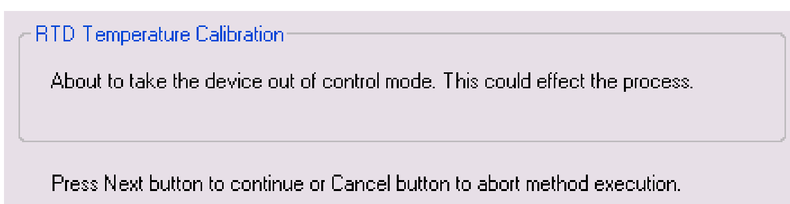


Figure 700. Sample IMV25/IMV31 Transmitter RTD Temperature Calibration Screen 6 (IMV31 shown)

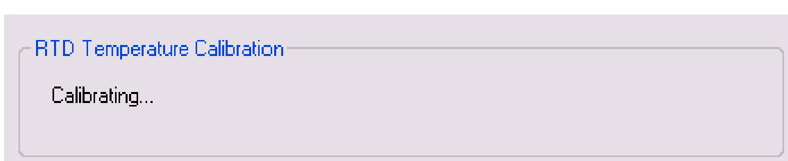


Figure 701. Sample IMV25/IMV31 Transmitter RTD Temperature Calibration Screen 7 (IMV31 shown)

Click OK to complete the calibration.

Level (IMV31 Only)

Level calibration is a field calibration procedure done at the tank. It can be done at one or two user-defined points.

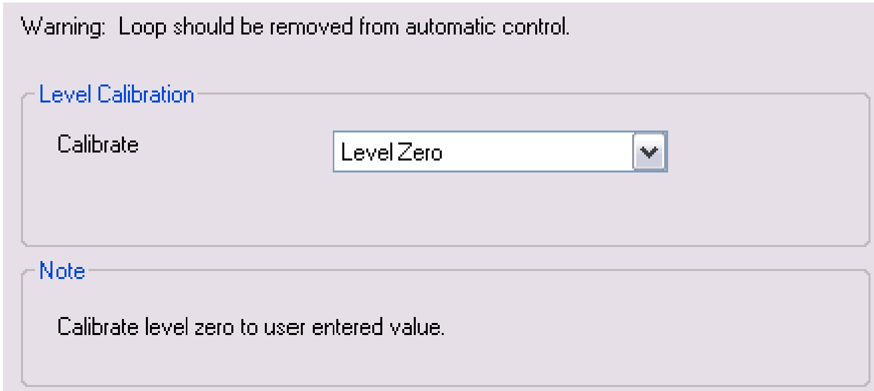


Figure 702. Sample IMV31 Transmitter Level Calibration Screen 1

Field	Entry
Level Calibration	
Calibrate	Select an option from the drop-down list for level calibration. Choose from Level Zero and Level Span.

Click Next to start the calibration process.

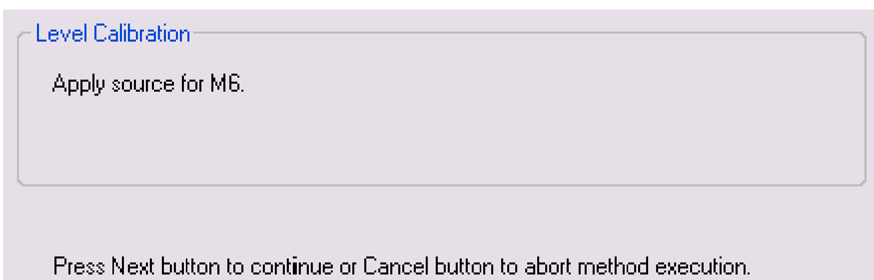


Figure 703. Sample IMV31 Transmitter Level Calibration Screen 2

Click Next in the following screens to continue the calibration process.

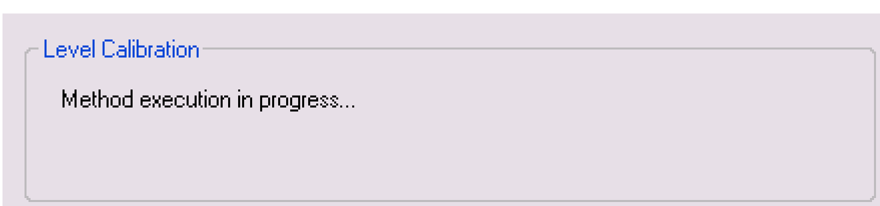


Figure 704. Sample IMV31 Transmitter Level Calibration Screen 3

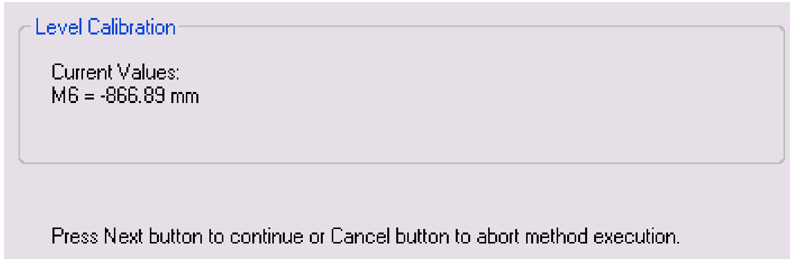


Figure 705. Sample IMV31 Transmitter Level Calibration Screen 4

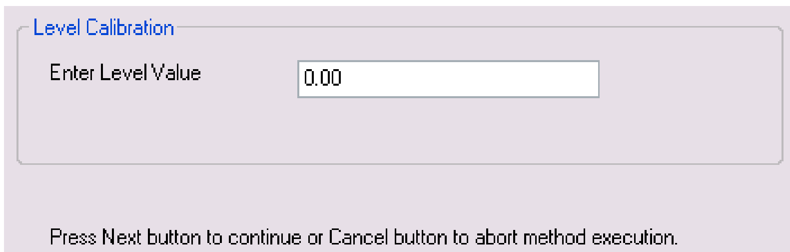


Figure 706. Sample IMV31 Transmitter Level Calibration Screen 5

Field	Entry
Level Calibration	
Enter Level Value	Specify a value for level calibration.

Click Next in the following screens to continue the calibration process.

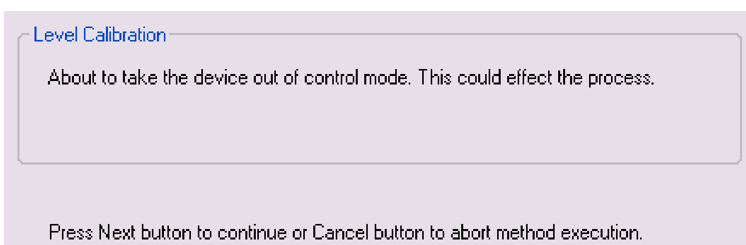


Figure 707. Sample IMV31 Transmitter Level Calibration Screen 6

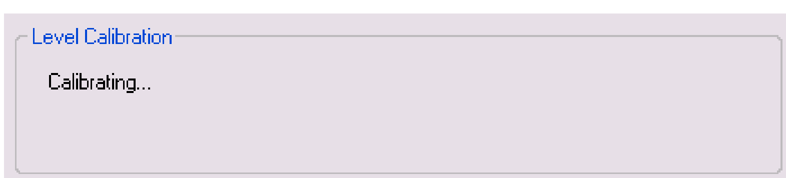


Figure 708. Sample IMV31 Transmitter Level Calibration Screen 7

Click OK to complete the calibration.

Application Design Conditions (IMV31 Only)

The Application Design Conditions screen is where you can start the tank level configuration process. To start the process, you can specify parameters such as tank type, tank pressure, head dimensions, temperature sources, and maximum and minimum values of operating conditions.

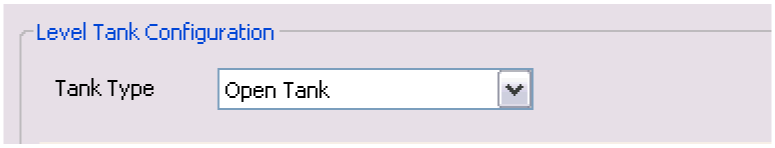


Figure 709. Sample IMV31 Transmitter Application Design Conditions (Tank Type Selection)

Field	Entry
Level Tank Configuration	
Tank Type	Select the tank type from the drop-down list. Choose from: • Open Tank • Closed Tank, Dry Leg • Closed Tank, Wet Leg • Boiler Drum

Open Tank

The Open Tank configuration allows you to calculate density of fluids in the tank.

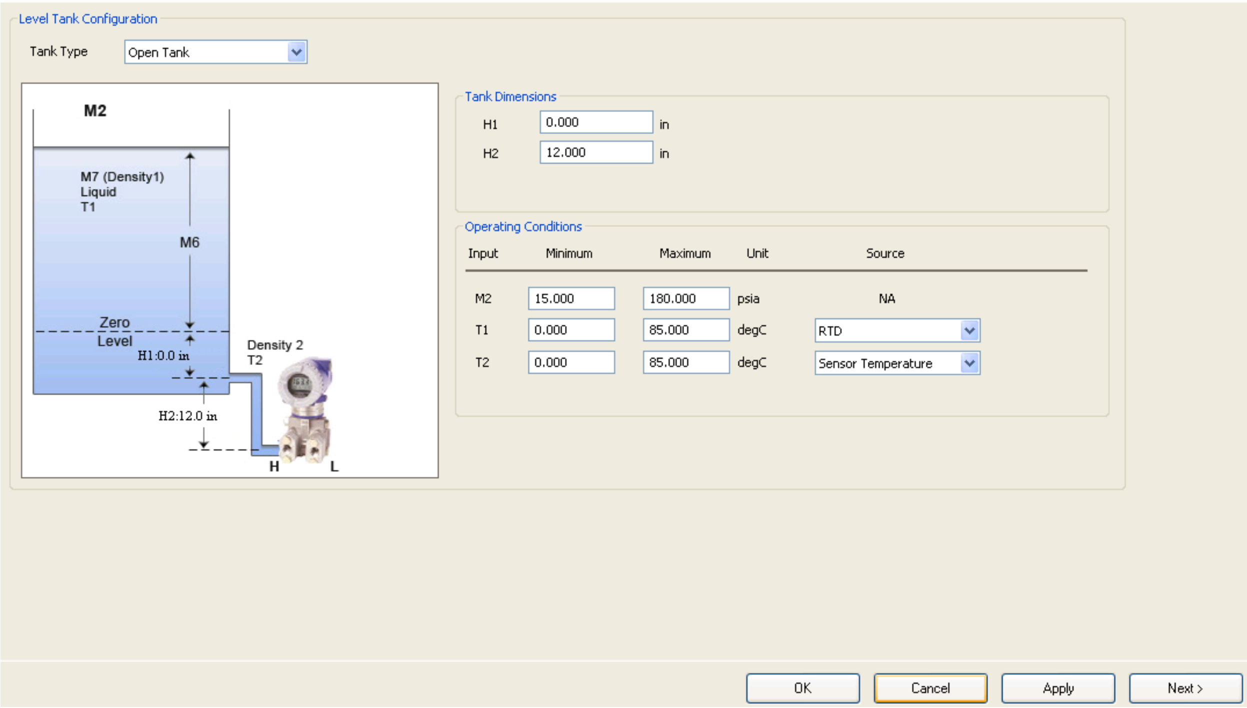


Figure 710. Sample IMV31 Transmitter Application Design Conditions Open Tank Selection Screen

Field	Entry
Level Tank Configuration	
Tank Type	Select the tank type as Open Tank from the drop-down list.
Tank Dimensions	
H1	Specify the height from lower leg tap to zero level point.
H2	Specify the height from transmitter connection to the lower leg tap.
Operating Conditions	
M2 - Minimum	Specify the minimum operating value to measure tank pressure.
M2 - Maximum	Specify the maximum operating value to measure tank pressure.
T1 - Minimum	Specify the minimum operating value for T1 (tank liquid temperature).
T1 - Maximum	Specify the maximum operating value for T1 (tank liquid temperature).
T1 - Source	Select the source for tank liquid temperature from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select ‘User Value’ as temperature source, specify a value in the adjacent text box that is displayed.

Field	Entry
T2 - Minimum	Specify the minimum operating value for T2 (high-side leg temperature).
T2 - Maximum	Specify the maximum operating value for T2 (high-side leg temperature).
T2 - Source	Select the source for high-side leg temperature from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select 'User Value' as temperature source, specify a value in the adjacent text box that is displayed.
Next	Click Next to advance to subsequent screen.

The subsequent screen allows you to select the tank liquid and calculate its density at the given pressure and temperature values. Select the liquid from the following tank liquid options:

1. Water or Steam
2. AlChE 250+ Fluids
3. Standard Fluids
4. Enter Fluid Properties

Tank Liquid - Water or Steam

This screen allows you to calculate density of liquid in the tank when the liquid type is Water or Steam.

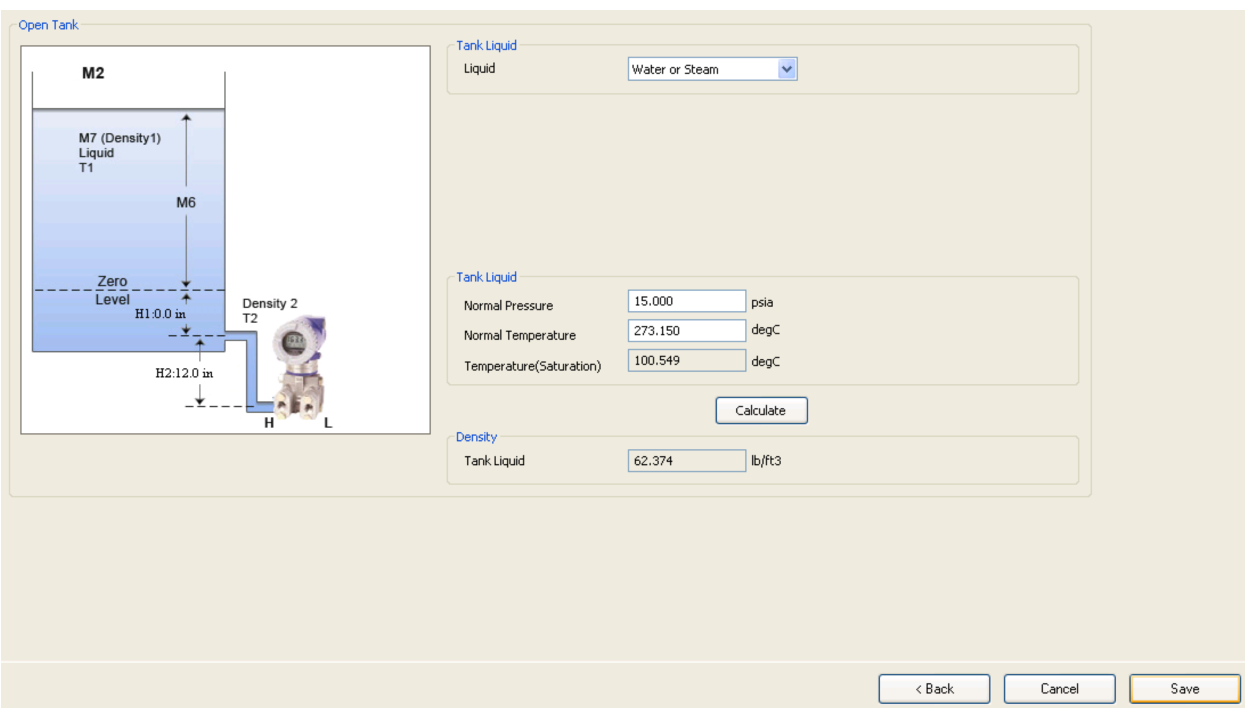


Figure 711. Sample IMV31 Transmitter Application Design Conditions - Open Tank - Tank Liquid - Water or Steam

Field	Entry
Tank Liquid	
Liquid	Select the liquid as Water or Steam from the drop-down list.
Tank Liquid	
Normal Pressure	Specify the normal operating pressure of the tank liquid.
Normal Temperature	Specify the normal operating temperature of the tank liquid.
Temperature (Saturation)	This field shows the saturation temperature of the tank liquid.
Calculate	Click Calculate to calculate the density of the tank liquid at the given pressure and temperature values.
Density	
Tank Liquid	This field shows the density calculated in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Tank Liquid - AlChE 250+ Fluids

This screen allows you to calculate density liquid in the tank when the liquid type is AlChE 250+ Fluids. Selection of this option displays a drop-down list of 250 fluids next to the liquid selection.

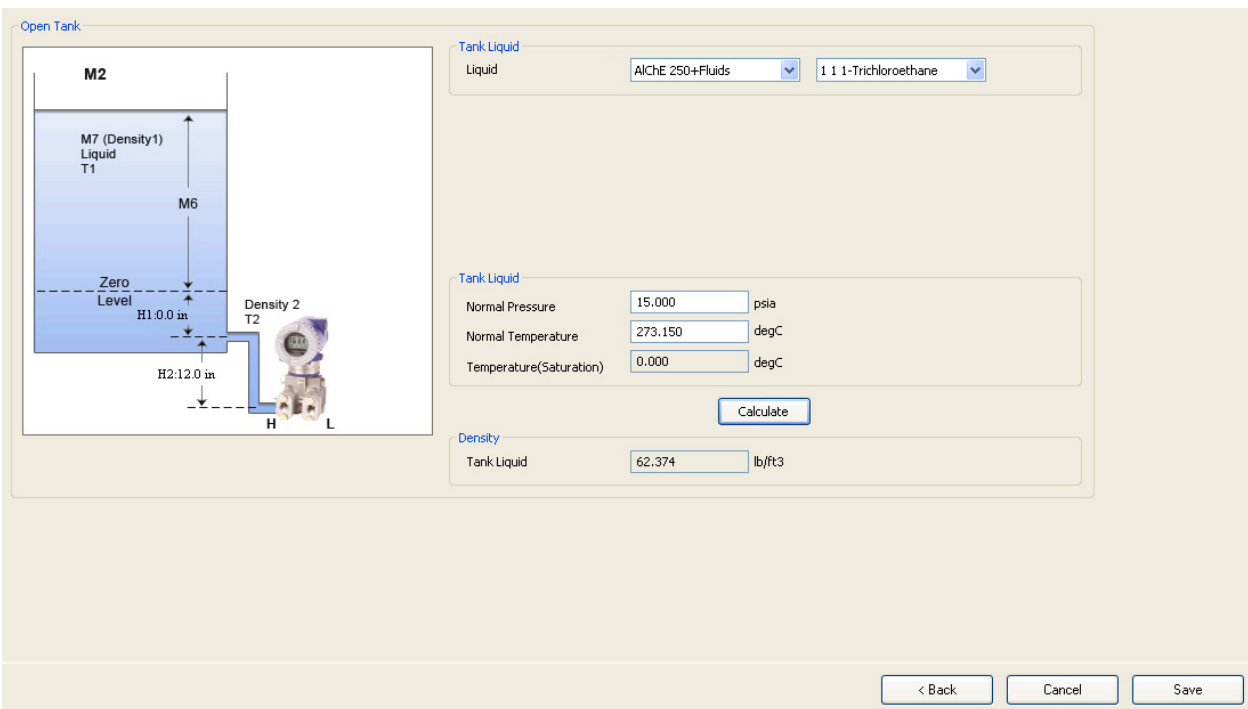


Figure 712. Sample IMV31 Transmitter Application Design Conditions - Open Tank - Tank Liquid - AlChE 250+ Fluids Selection

Field	Entry
Tank Liquid	
Liquid	Select the liquid as AlChE 250+ Fluids and then select a fluid from drop-down list displayed next to the liquid selection.
Tank Liquid	
Normal Pressure	Specify the normal operating pressure of the tank liquid.
Normal Temperature	Specify the normal operating temperature of the tank liquid.
Temperature (Saturation)	This field shows the saturation temperature of the tank liquid.
Calculate	Click Calculate to calculate the density of the tank liquid at the given pressure and temperature values.
Density	
Tank Liquid	This field shows the density calculated in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Tank Liquid - Standard Fluids

This screen allows you to calculate density of liquid in the tank when the liquid type is Standard Fluids. Selection of this option displays a drop-down list of standard fluids next to the liquid selection.

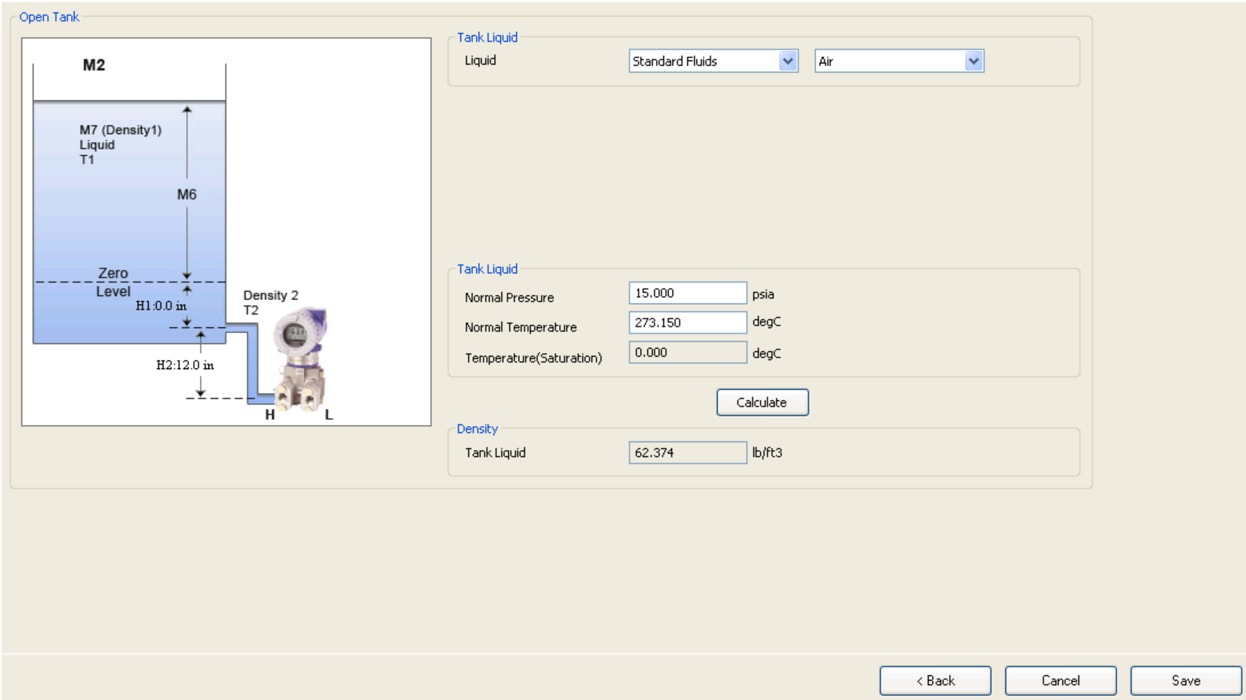


Figure 713. Sample IMV31 Transmitter Application Design Conditions - Open Tank - Tank Liquid - Standard Fluids Selection

Field	Entry
Tank Liquid	
Liquid	Select the liquid as Standard Fluids and then select a fluid from drop-down list displayed next to the liquid selection.
Tank Liquid	
Normal Pressure	Specify the normal operating pressure of the tank liquid.
Normal Temperature	Specify the normal operating temperature of the tank liquid.
Temperature (Saturation)	This field shows the saturation temperature of the tank liquid.
Calculate	Click Calculate to calculate the density of the tank liquid at the given pressure and temperature values.
Density	
Tank Liquid	This field shows the density calculated in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Tank Liquid - Enter Fluid Properties

This screen allows you to calculate density of the liquid in the tank for the customized fluid.

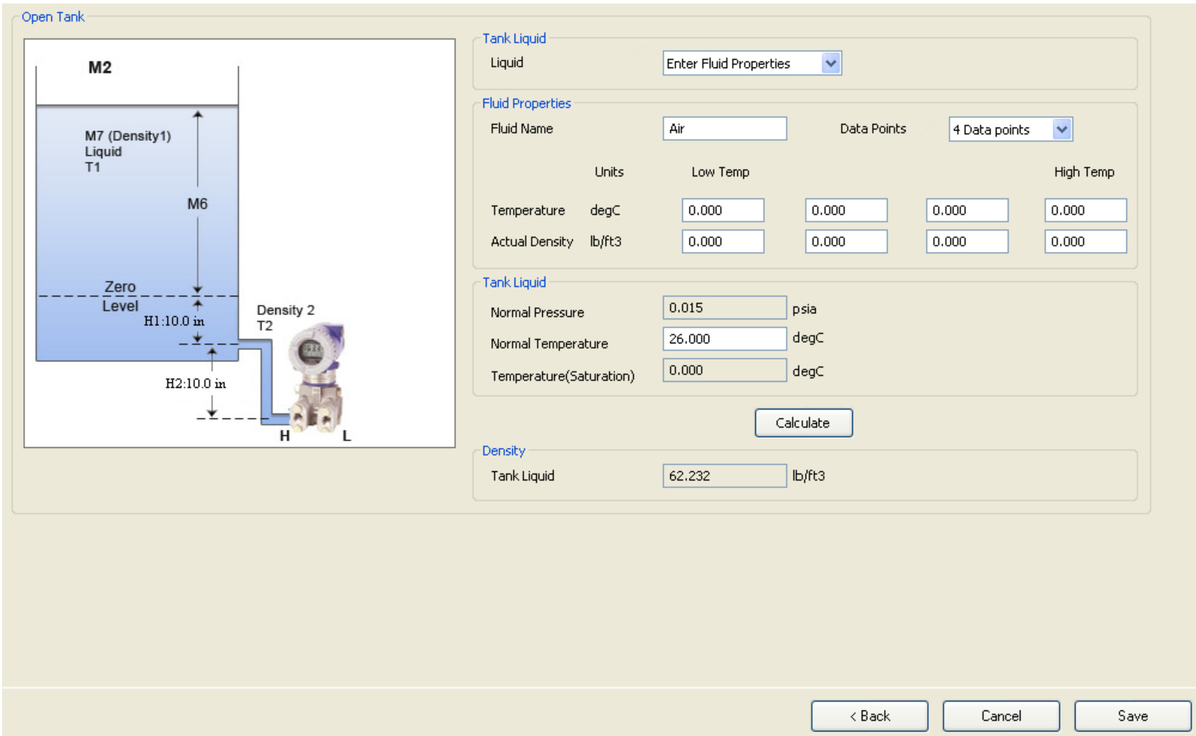


Figure 714. Sample IMV31 Transmitter Application Design Conditions - Open Tank - Tank Liquid - Enter Fluid Properties Selection

Field	Entry
Tank Liquid	
Liquid	Select the liquid as Enter Fluid Properties from the drop-down list.
Fluid Properties	
Fluid Name	Specify the fluid name.
Temperature (Normal)	Specify the normal operating temperature of the fluid.
Data Points	Select the number of data points for temperature and density measurements. Choose from: • 1 Data Point • 2 Data Points • 3 Data Points • 4 Data Points Based on the number of data points you select, you can specify the low/high reference points.
Temperature	Based on the number of data points selected this parameter allows you to specify the data points (low and high) for temperature measurement.

Field	Entry
Actual Density	Based on the number of data points selected this parameter allows you to specify the data points for density measurement.
Tank Liquid	
Normal Pressure	Specify the normal operating pressure for the tank liquid.
Normal Temperature	Specify the normal operating temperature for the tank liquid.
Temperature (Saturation)	This field shows the saturation temperature of the tank liquid.
Calculate	Click Calculate to calculate the density of the tank liquid for the given pressure and temperature values.
Density	
Tank Liquid	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Closed Tank, Dry Leg

The Closed Tank Dry Leg configuration allows you to calculate density of fluids in the tank and the density of gas/vapor in the upper leg.

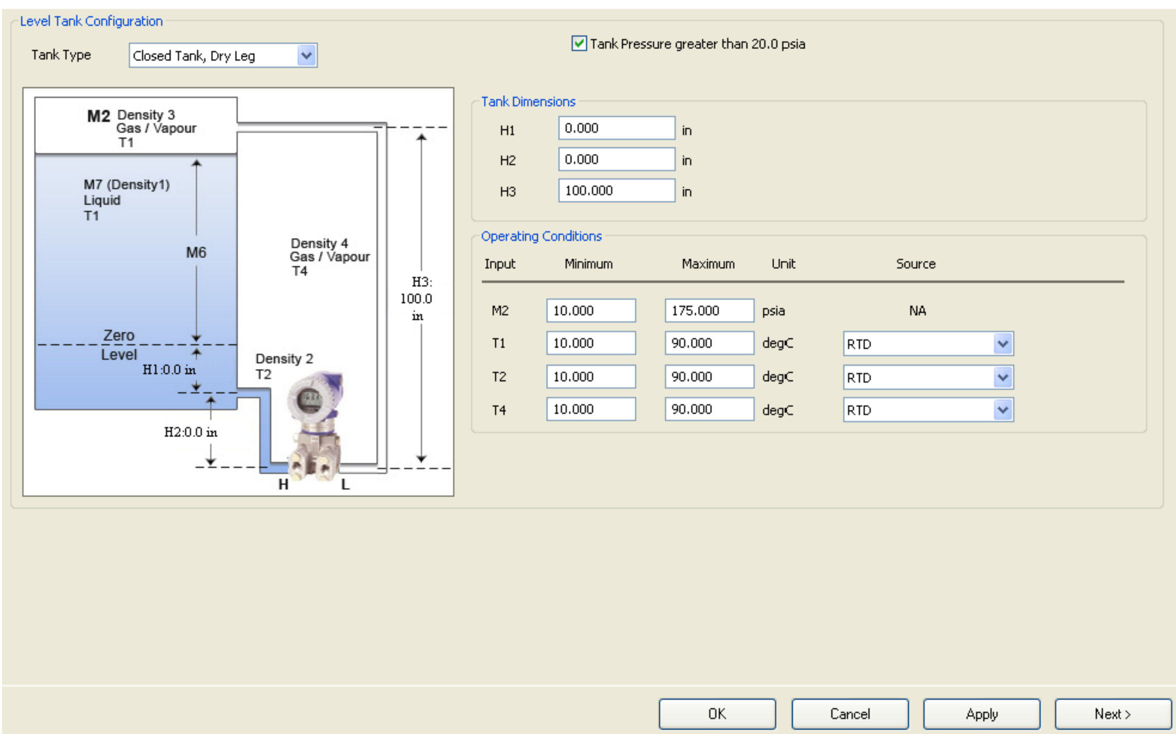


Figure 715. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg

Field	Entry
Level Tank Configuration	
Tank Type	Select the tank type as Closed Tank, Dry Leg from the drop-down list.
Tank Pressure Greater than 20 psia	The value and the measurement units for this parameter are updated based on the measurement units selected for absolute pressure. Selection of this check box allows you to specify the following: • H3 - height from transmitter connection to upper leg tap • T4 - temperature 4
Tank Dimensions	
H1	Specify the height from lower leg tap to zero level point.
H2	Specify the height from transmitter connection to the lower leg tap.
H3	Specify the height from transmitter connection to upper leg tap.
Operating Conditions	
M2 - Minimum	Specify the minimum operating value to measure tank pressure.
M2 - Maximum	Specify the maximum operating value to measure tank pressure.
T1 - Minimum	Specify the minimum operating value for temperature 1.
T1 - Maximum	Specify the maximum operating value for temperature 1.
T1 - Source	Select the source for temperature 1 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select ‘User Value’ as temperature source, specify a value in the adjacent text box that is displayed.
T2 - Minimum	Specify the minimum operating value for temperature 2.
T2 - Maximum	Specify the maximum operating value for temperature 2.
T2 - Source	Select the source for temperature 2 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select ‘User Value’ as temperature source, specify a value in the adjacent text box that is displayed.
T4 - Minimum	Specify the minimum operating value for temperature 4.
T4 - Maximum	Specify the maximum operating value for temperature 4.
T4 - Source	Select the source for temperature 4 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select ‘User Value’ as temperature source, specify a value in the adjacent text box that is displayed.
Next	Click Next to advance to subsequent screen.

The subsequent screen allows you to select the tank liquid and calculate its density at the given pressure and temperature values. Select the liquid from the following tank liquid options:

1. Water or Steam
2. AlChE 250+ Fluids
3. Standard Fluids

Tank Liquid - Water or Steam

This screen allows you to calculate density of the tank liquid if the liquid is Water or Steam.

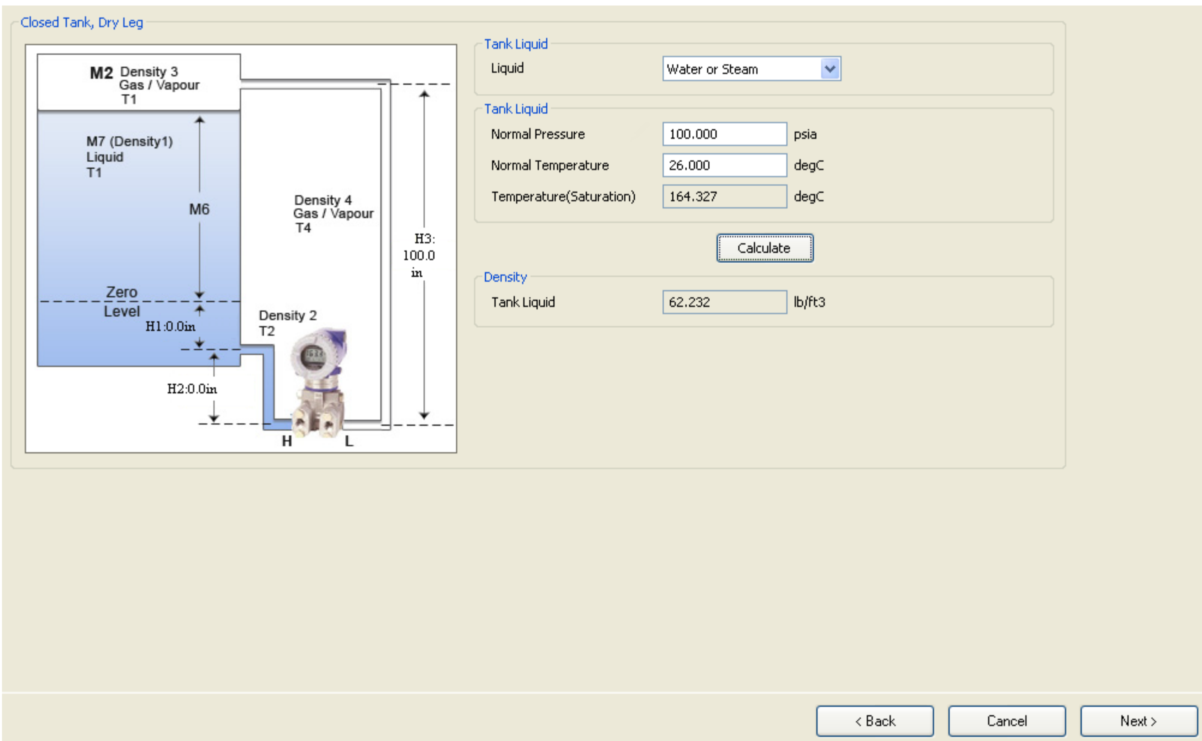


Figure 716. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Tank Liquid - Water or Steam

Field	Entry
Tank Liquid	
Liquid	Select Water or Stream from the drop-down list.
Tank Liquid	
Normal Pressure	Specify the normal operating pressure for the tank liquid.
Normal Temperature	Specify the normal operating temperature for the tank liquid.
Temperature (Saturation)	This field shows the saturation temperature of the tank liquid.
Calculate	Click Calculate to calculate the density of the tank liquid for the given pressure and temperature values.
Density	
Tank Liquid	This field shows the calculated density in the selected engineering units.
Next	Click Next to advance to subsequent screen where you can calculate density of gas/vapor in the upper leg.

Upper Leg Gas/Vapor - Water or Steam

This screen allows you to calculate density of gas/vapor in the upper leg if the vapor is Water or Steam.

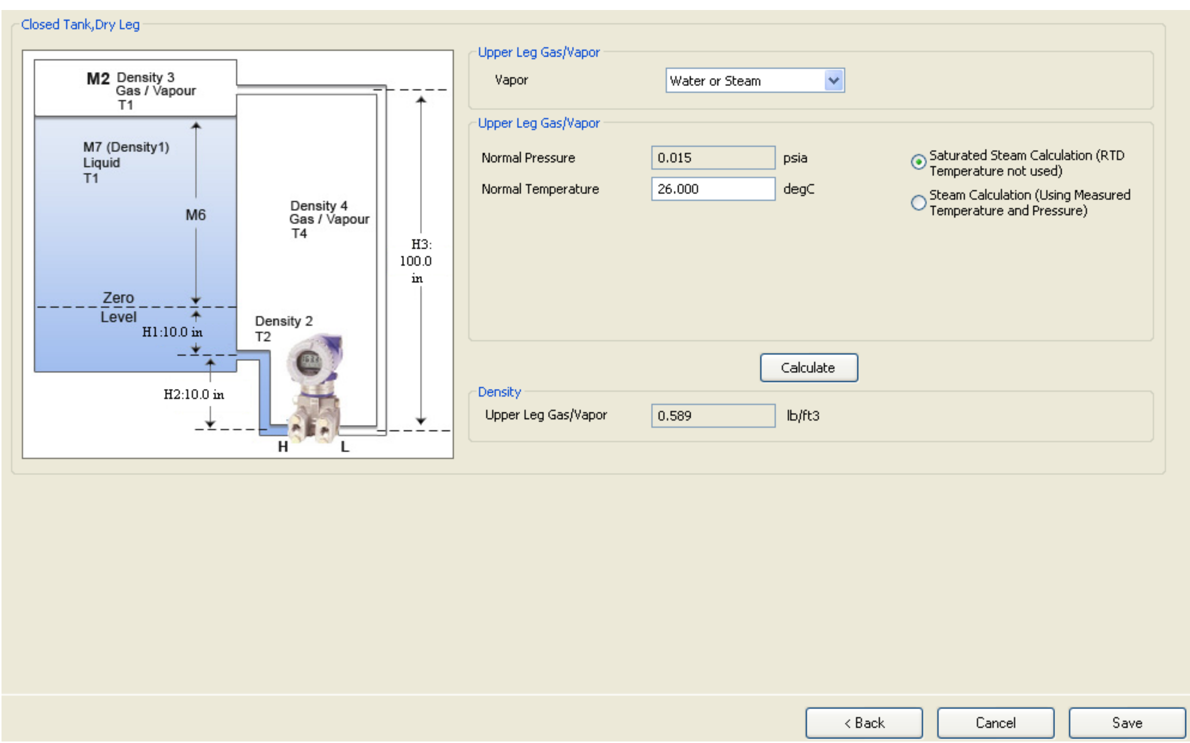


Figure 717. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Water or Steam

Field	Entry
Upper Leg Gas/Vapor	
Vapor	Select the vapor as Water or Stream from the drop-down list.
Upper Leg Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure in the upper leg.
Normal Temperature	Specify the normal operating temperature in the upper leg.
Saturated Steam Calculation (RTD Temperature not used)	Select this option to calculate saturated steam without using the RTD temperature.
Steam Calculation (Using measured temperature and pressure)	Select this option to calculate steam using measured temperature and pressure.
Calculate	Click Calculate to calculate density for the given pressure and temperature values.
Density	
Upper Leg Gas/Vapor	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Tank Liquid - AlChE 250+ Fluids

This screen allows you to calculate the density of tank liquid if the liquid is AlChE 250+ Fluids. Selection of this option displays a drop-down list of 250 fluids next to the liquid selection.

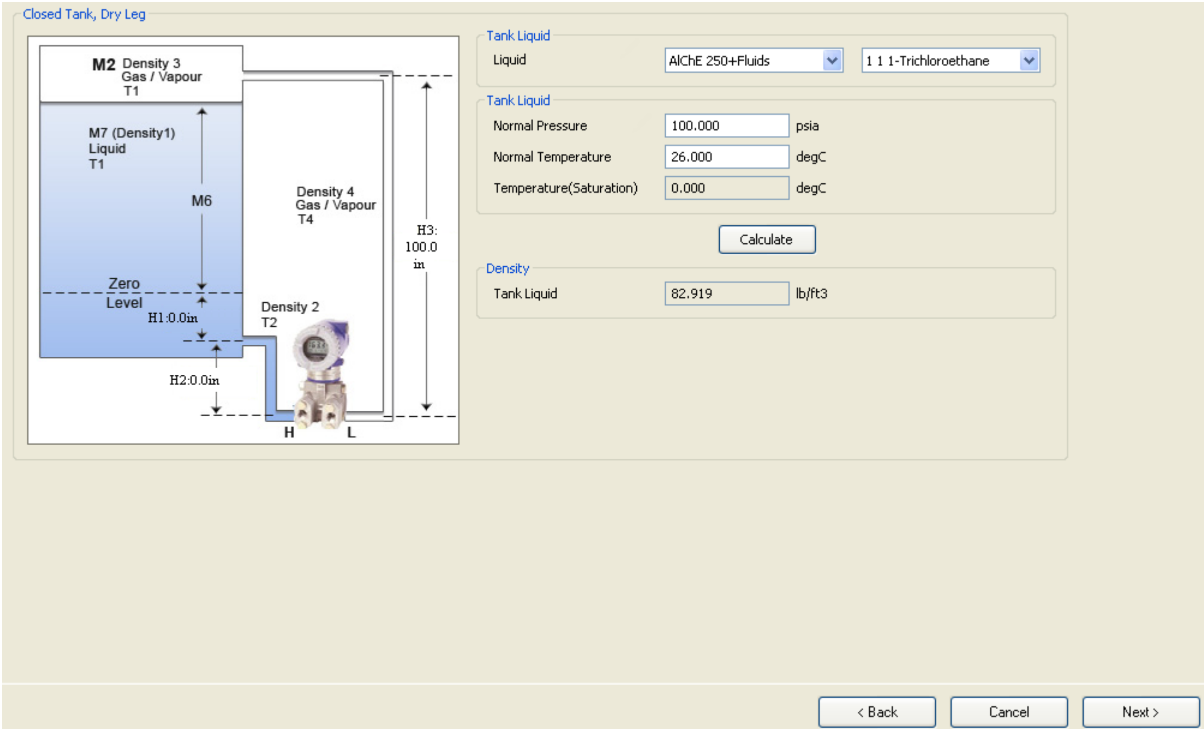


Figure 718. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Tank Liquid - AlChE 250+ Fluids

Field	Entry
Tank Liquid	
Liquid	Select the liquid as AlChE 250+ Fluids and then select a fluid from drop-down list displayed next to the liquid selection.
Tank Liquid	
Normal Pressure	Specify the normal operating pressure for the tank liquid.
Normal Temperature	Specify the normal operating temperature for the tank liquid.
Temperature (Saturation)	This field shows the saturation temperature of the tank liquid.
Calculate	Click Calculate to calculate the density of the tank liquid at the given pressure and temperature values.
Density	
Tank Liquid	This field shows the calculated density in the selected engineering units.
Next	Click Next to advance to subsequent screen where you can calculate density of gas/vapor in the upper leg.

Upper Leg Gas/Vapor - AlChE 250+ Fluids

This screen allows you to calculate density of gas/vapor in the upper leg if the liquid is AlChE 250+ Fluids.

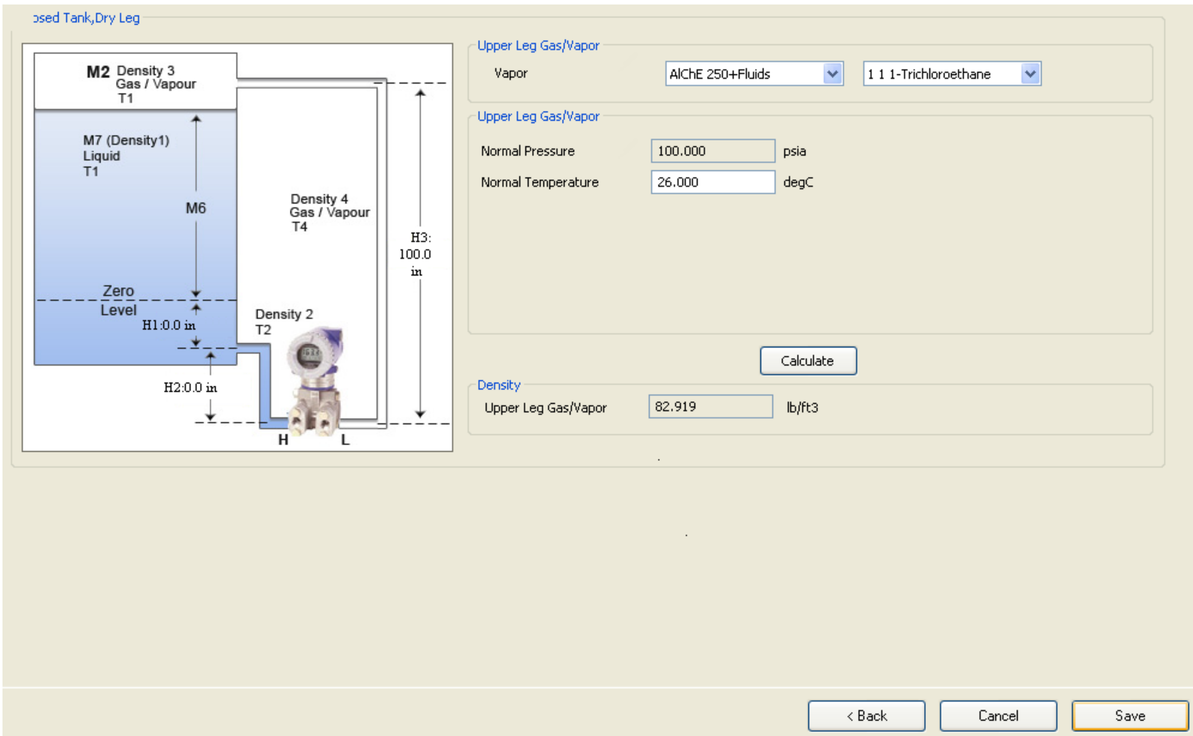


Figure 719. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - AlChE 250+ Fluids

Field	Entry
Upper Leg Gas/Vapor	
Vapor	Select the vapor as AlChE 250+ Fluids and then select a fluid from drop-down list displayed next to the vapor selection.
Upper Leg Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure in the upper leg.
Normal Temperature	Specify the normal operating temperature in the upper leg.
Calculate	Click Calculate to calculate the density of the gas/vapor in the upper leg at the given pressure and temperature values.
Density	
Upper Leg Gas/Vapor	This field shows the density calculated in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Tank Liquid - Standard Fluids

This screen allows you to calculate the density of tank liquid if the liquid is Standard Fluids. Selection of this option displays a drop-down list fluids next to the liquid selection. Select the liquid as Standard Fluids and then select a fluid from drop-down list displayed next to the liquid selection. For the detailed description of other parameters in this screen, refer to “Tank Liquid - AlChE 250+ Fluids” on page 517.

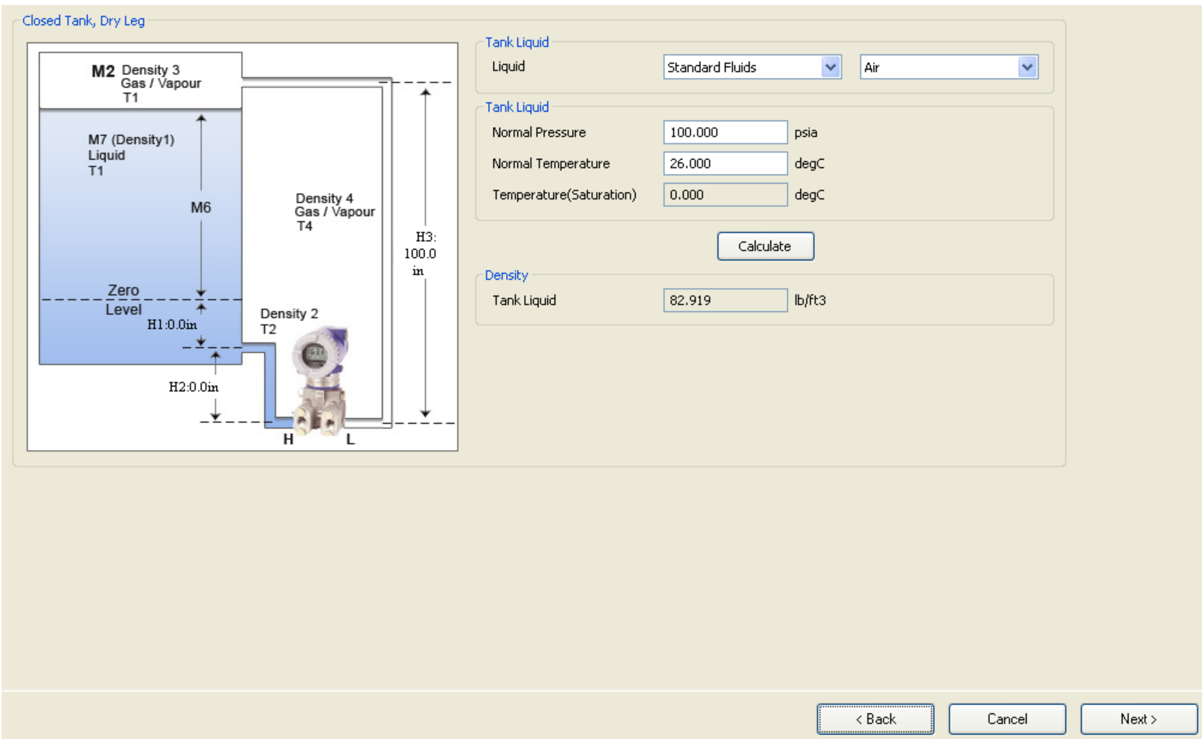


Figure 720. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Tank Liquid - Standard Fluids

Upper Leg Gas/Vapor - Standard Fluids

This screen allows you to calculate density of the gas/vapor in the upper leg if the vapor is Standard Fluids. Select the vapor as Standard Fluids and then select a fluid from drop-down list displayed next to the vapor selection. For the detailed description of other parameters in this screen, refer to "Upper Leg Gas/Vapor - AlChE 250+ Fluids" on page 519.

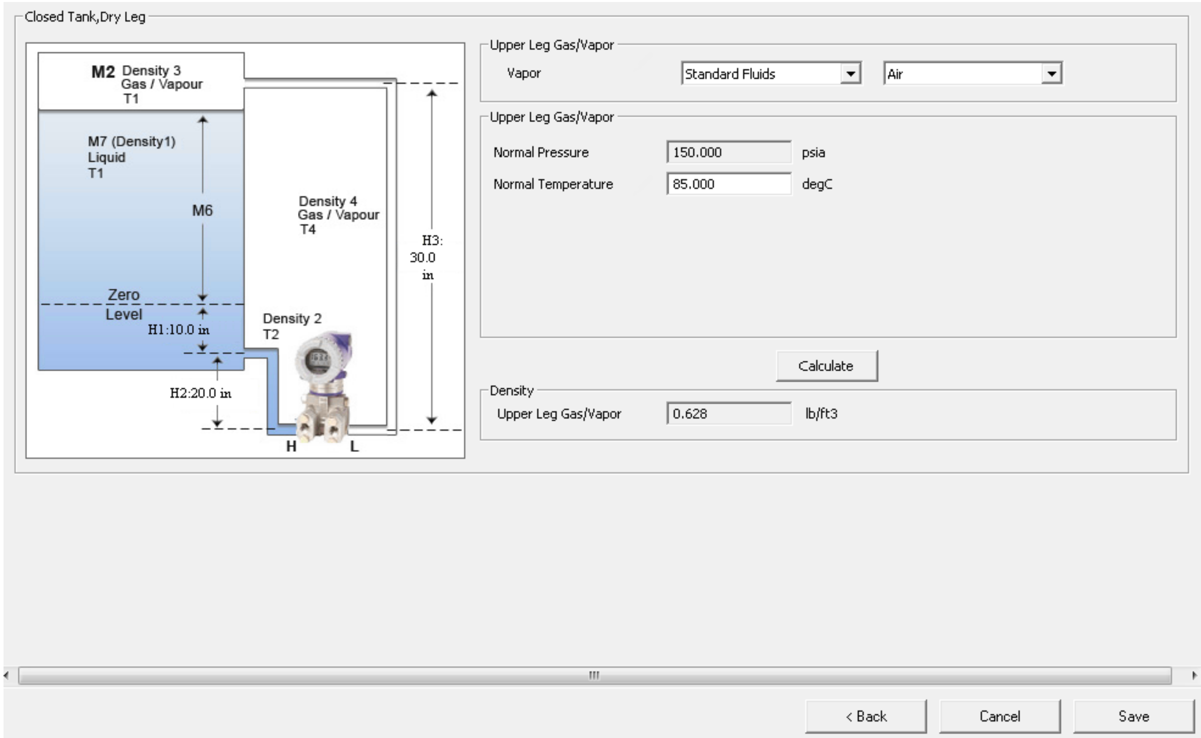


Figure 721. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Standard Fluids

Upper Leg Gas/Vapor - Natural Gases

This screen allows you to calculate density of gas/vapor if the vapor is Natural Gases. Select a tank liquid and then select the vapor as Natural Gases. A drop-down list of the following methods is displayed next to the vapor selection:

1. NX-19
2. AGA-8 Gr, N2 and CO2
3. AGA-8 Heating Value, Gr and CO2 Inputs
4. AGA-8 Detailed Method, Input Mole Fractions
5. S-GERG Heating Value, Gr and CO2 Inputs

Select a method and calculate the density of gas/vapor for the given values.

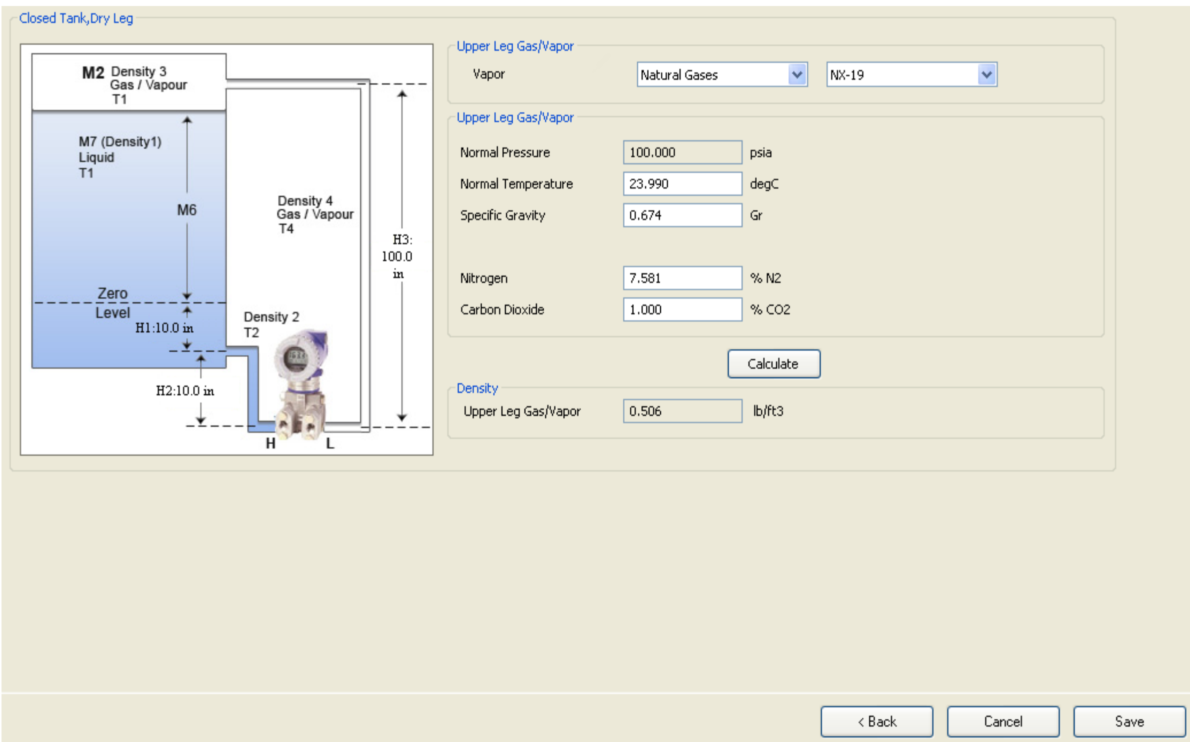


Figure 722. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Natural Gases Screen (NX-19 Selection)

Field	Entry
Upper Leg Gas/Vapor	
Vapor	Select the vapor as Natural Gases and then select NX-19 from the drop-down list.
Upper Leg Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure for gas/vapor in the upper leg.

Field	Entry
Normal Temperature	Specify the normal operating temperature for gas/vapor in the upper leg.
Specific Gravity	Enter the specific gravity of the gas/vapor in the upper leg.
Nitrogen	Specify the percentage of nitrogen in the upper leg gas/vapor.
Carbon Dioxide	Specify the percentage of carbon dioxide in the upper leg gas/vapor.
Calculate	Click Calculate to calculate the density of gas/vapor in the upper leg at the given temperature and pressure measurements.
Density	
Upper Leg Gas/Vapor	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

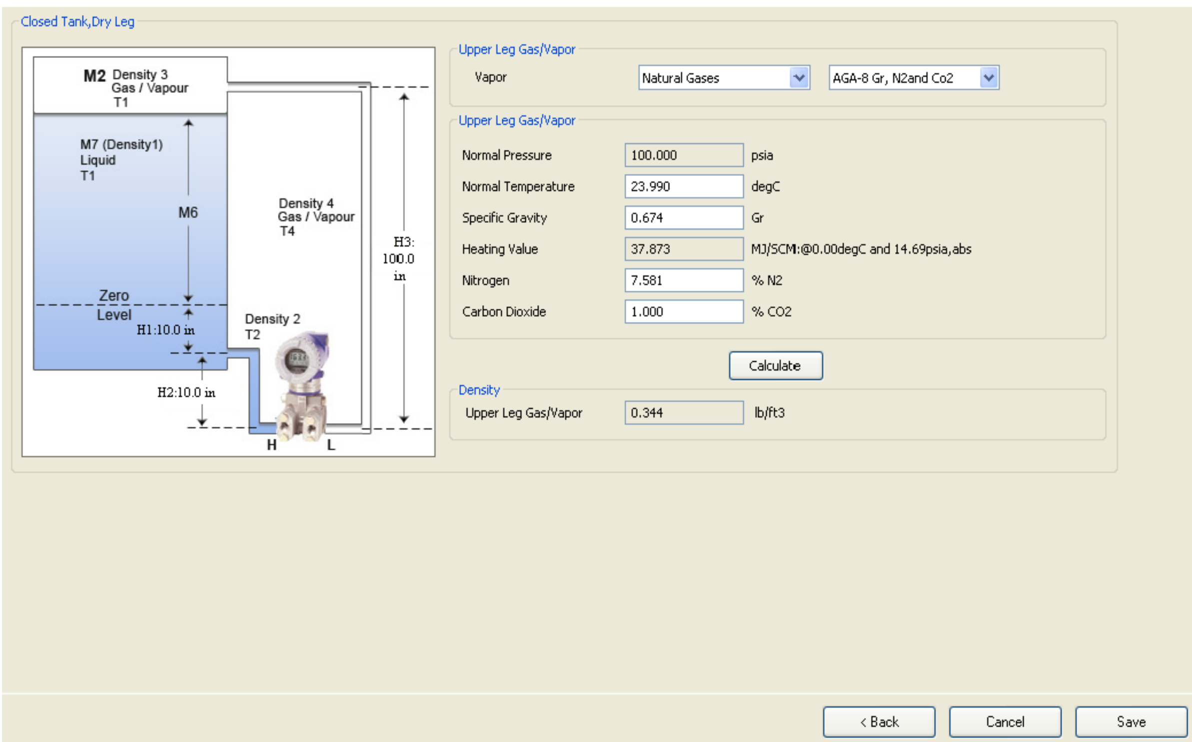


Figure 723. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Natural Gases Screen (AGA-8 Gr Selection)

Field	Entry
Upper Leg Gas/Vapor	
Vapor	Select the vapor as Natural Gases and then select AGA-8 Gr from the drop-down list.
Upper Leg Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure for gas/vapor in the upper leg.
Normal Temperature	Specify the normal operating temperature for gas/vapor in the upper leg.
Specific Gravity	Enter the specific gravity of the gas/vapor in the upper leg.
Heating Value	This field shows the heating value of the selected gas.
Nitrogen	Specify the percentage of nitrogen in the gas/vapor.
Carbon dioxide	Specify the percentage of carbon dioxide in the gas/vapor.
Calculate	Click Calculate to calculate the density of gas/vapor in the upper leg.
Density	
Upper Leg Gas/Vapor	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

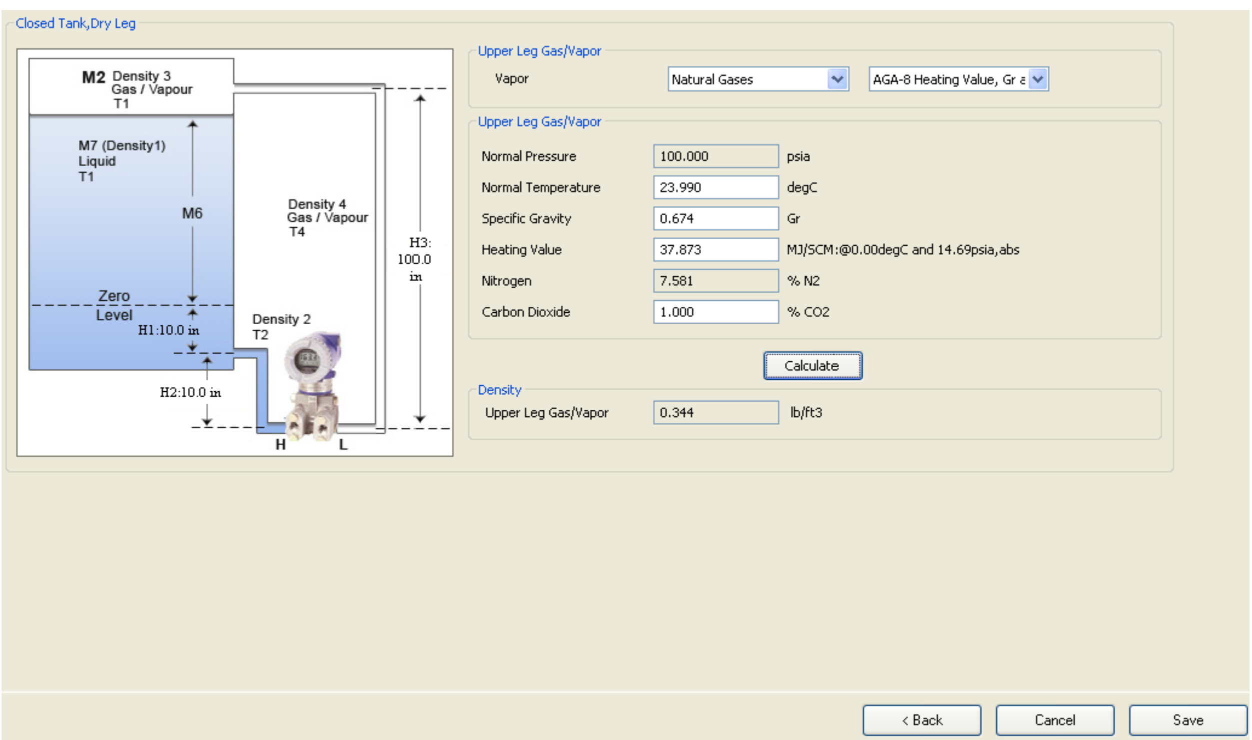


Figure 724. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Natural Gases Screen (AGA-8 Heating Value Selection)

Field	Entry
Upper Leg Gas/Vapor	
Vapor	Select the vapor as Natural Gases and then select AGA-8 Heating Value Gr from the drop-down list.
Upper Leg Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure for gas/vapor in the upper leg.
Normal Temperature	Specify the normal operating temperature for gas/vapor in the upper leg.
Specific Gravity	Enter the specific gravity of the gas/vapor in the upper leg.
Heating Value	Specify the heating value of the selected gas.
Nitrogen	This field shows the percentage of nitrogen in the upper leg gas/vapor.
Carbon Dioxide	Specify the percentage of carbon dioxide in the upper leg gas/vapor.
Calculate	Click Calculate to calculate the density of gas/vapor in the upper leg.
Density	
Upper Leg Gas/Vapor	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

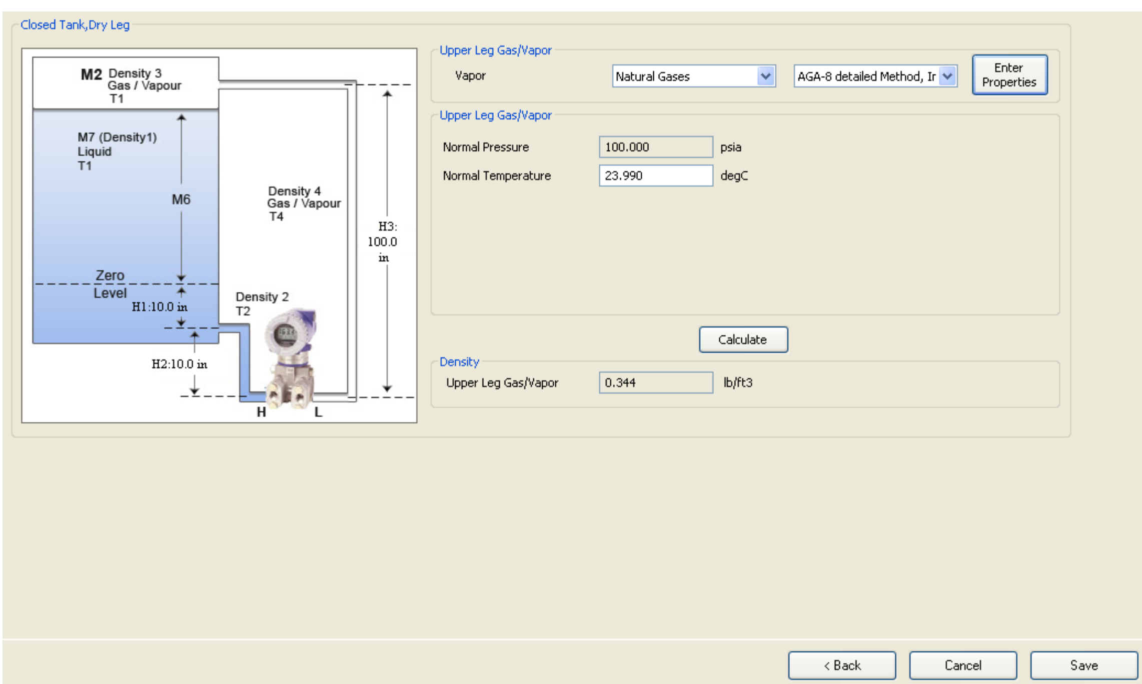


Figure 725. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Natural Gases Screen (AGA-8 Detailed Method Selection)

Field	Entry
Upper Leg Gas/Vapor	
Vapor	Select the vapor as Natural Gases and then select AGA-8 Detailed Method from the drop-down list. Enter Properties button appears.
Enter Properties	Click Enter Properties to select the gases and enter mole percent (refer to Figure 726). The total mole percent for the gases selected should not exceed 100%.
Upper Leg Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure for gas/vapor in the upper leg.
Normal Temperature	Specify the normal operating temperature for gas/vapor in the upper leg.
Calculate	Click Calculate to calculate the density of gas/vapor in the upper leg.
Density	
Upper Leg Gas/Vapor	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

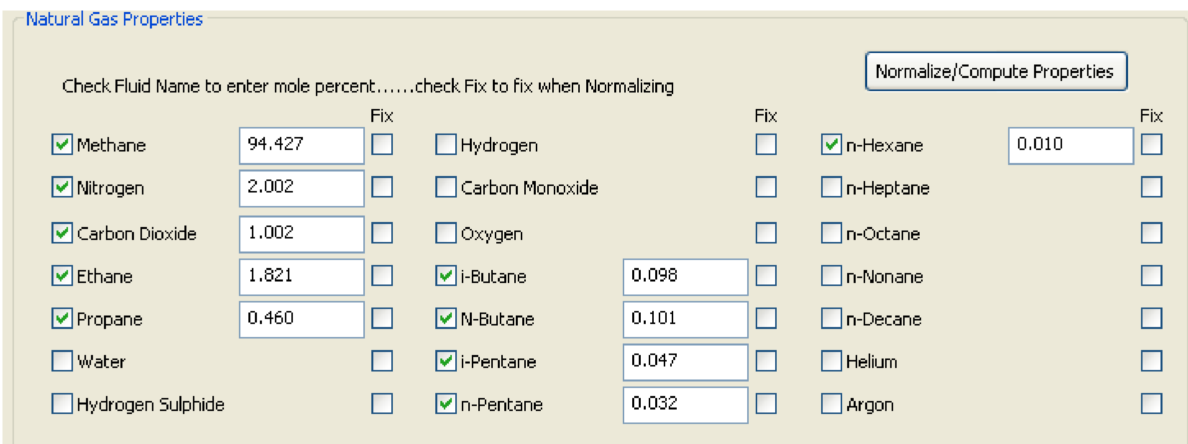


Figure 726. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Natural Gas - Natural Gas Properties

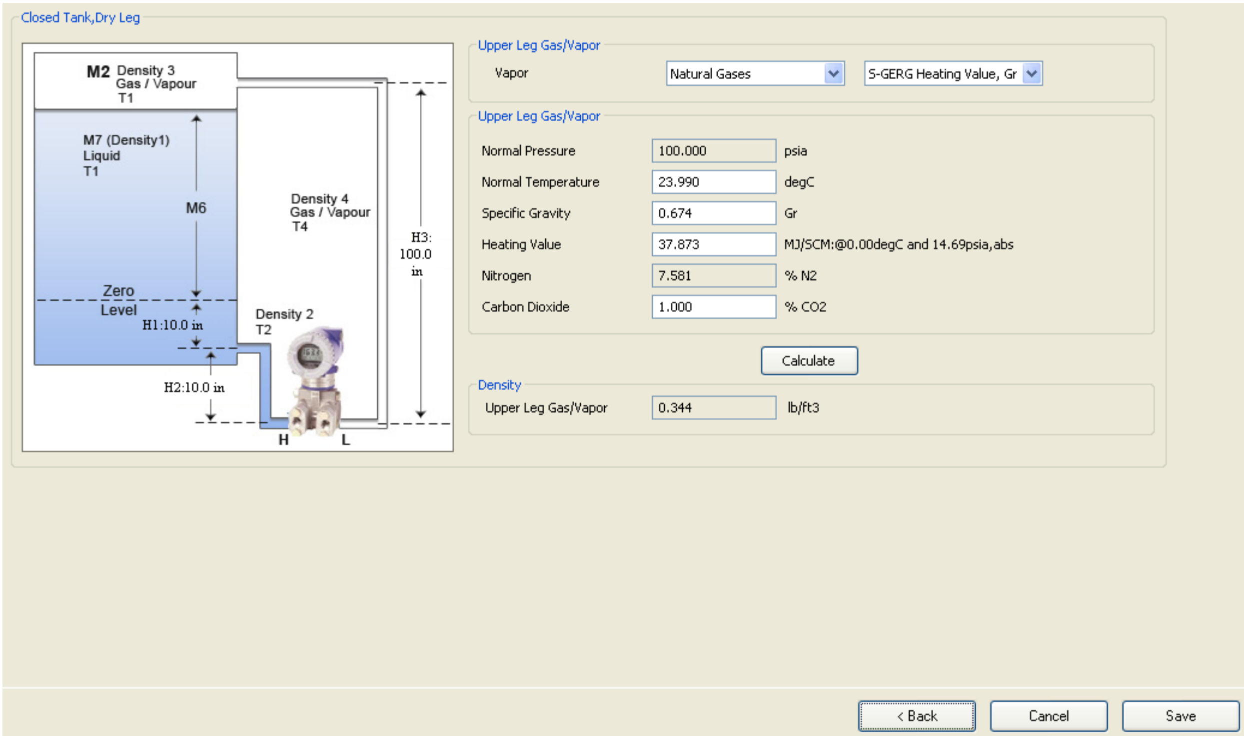


Figure 727. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Natural Gases Screen (S-GERG Heating Value Selection)

Field	Entry
Upper Leg Gas/Vapor	
Vapor	Select the vapor as Natural Gases and then select S-GERG Heating Value Gr from the drop-down list.
Upper Leg Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure for gas/vapor in the upper leg.
Normal Temperature	Specify the normal operating temperature for gas/vapor in the upper leg.
Specific Gravity	Enter the specific gravity of the gas/vapor in the upper leg.
Heating Value	Specify the heating value of the selected gas.
Nitrogen	This field shows the percentage of nitrogen in the upper leg gas/vapor.
Carbon dioxide	Specify the percentage of carbon dioxide in the upper leg gas/vapor.
Calculate	Click Calculate to calculate the density of gas/vapor in the upper leg.

Field	Entry
Density	
Upper Leg Gas/Vapor	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

If you choose vapor as Mixtures, enter mixture properties.

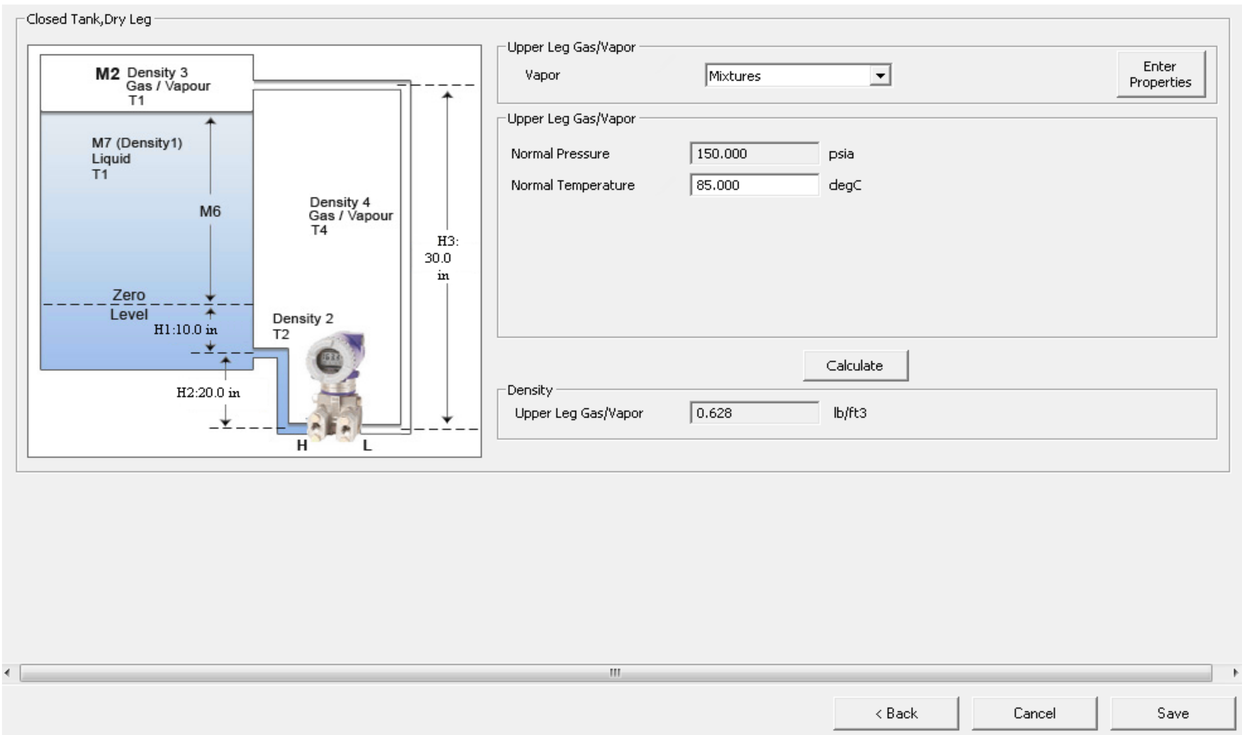


Figure 728. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Mixtures Screen

Field	Entry
Upper Leg Gas/Vapor	
Vapor	Select the vapor as Mixtures. Enter Properties button appears.
Enter Properties	Click Enter Properties to select the gases and enter mole percent (refer to Figure 729). The total mole percent for all the gases selected should not exceed 100%.
Upper Leg Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure for gas/vapor in the upper leg.
Normal Temperature	Specify the normal operating temperature for gas/vapor in the upper leg.
Calculate	Click Calculate to calculate the density of gas/vapor in the upper leg.
Density	
Upper Leg Gas/Vapor	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Mixture Properties

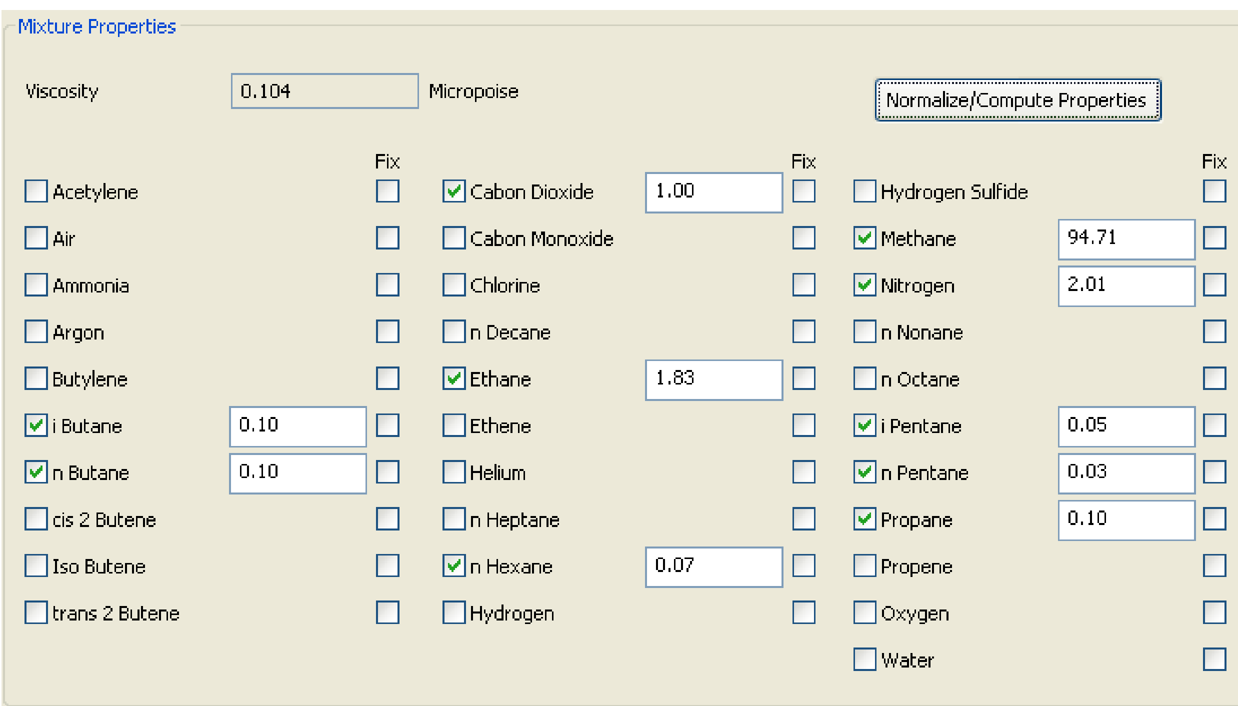


Figure 729. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Dry Leg - Upper Leg Gas/Vapor - Mixture Properties Screen

Closed Tank, Wet Leg

The Closed Tank, Wet Leg configuration allows you to calculate density of fluids in the tank and in the upper leg and the density of gas/vapor in the tank.

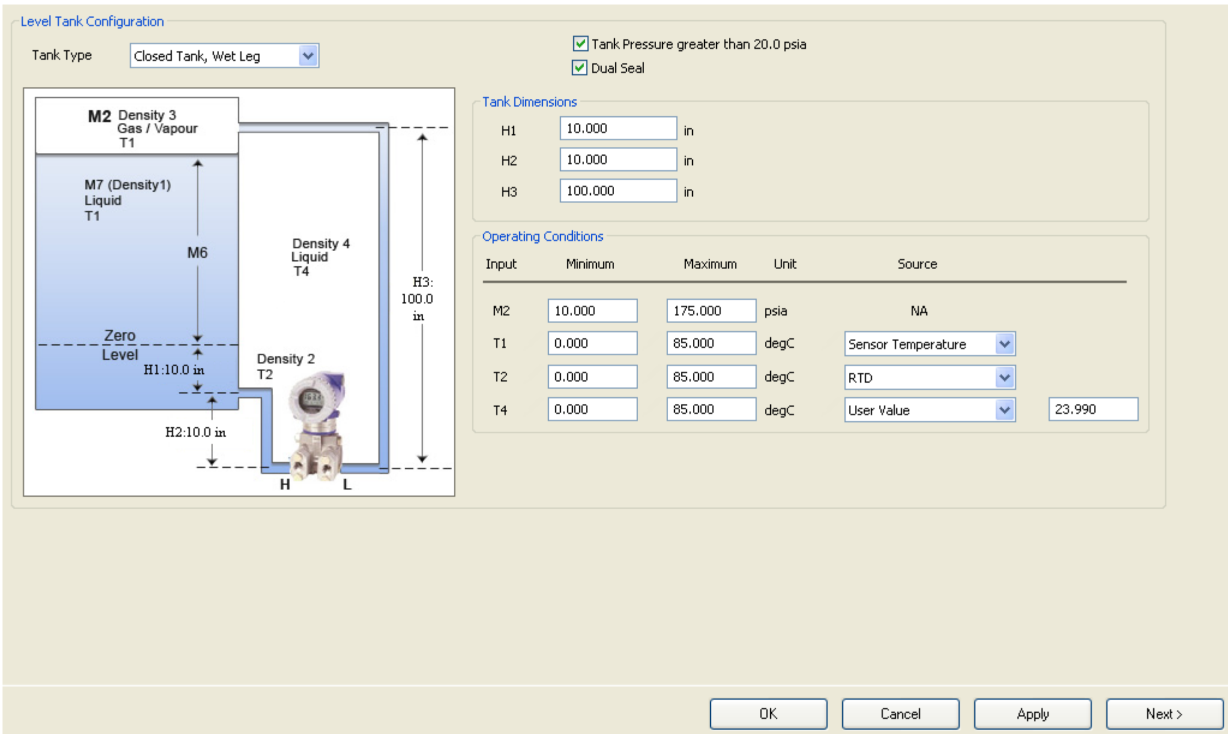


Figure 730. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg

Field	Entry
Level Tank Configuration	
Tank Type	Select the tank type as Closed Tank, Wet Leg from the drop-down list.
Tank Pressure Greater than 20 psia	The value and the measurement units for this parameter are updated based on the measurement units selected for absolute pressure. Selection of this check box allows you to specify the following: • H3 - height from transmitter connection to upper leg tap • T4 - temperature 4
Dual Seal	Select Dual Seal to measure the height from the bottom of the tank.
Tank Dimensions	
H1	Specify the height from lower leg tap to zero level point.
H2	Specify the height from transmitter connection to the lower leg tap.
H3	Specify the height from transmitter connection to upper leg tap.
Operating Conditions	
M2 - Minimum	Specify the minimum operating value to measure tank pressure.

Field	Entry
M2 - Maximum	Specify the maximum operating value to measure tank pressure.
T1 - Minimum	Specify the minimum operating value for temperature 1.
T1 - Maximum	Specify the maximum operating value for temperature 1.
T1 - Source	Select the source for temperature 1 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select 'User Value' as temperature source, specify a value in the adjacent text box that is displayed.
T2 - Minimum	Specify the minimum operating value for temperature 2.
T2 - Maximum	Specify the maximum operating value for temperature 2.
T2 - Source	Select the source for temperature 2 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select 'User Value' as temperature source, specify a value in the adjacent text box that is displayed.
T4 - Minimum	Specify the minimum operating value for temperature 4.
T4 - Maximum	Specify the maximum operating value for temperature 4.
T4 - Source	Select the source for temperature 4 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select 'User Value' as temperature source, specify a value in the adjacent text box that is displayed.
Next	Click Next to advance to subsequent screen.

The subsequent screen allows you to select the tank liquid and calculate its density at the given pressure and temperature values. Select the liquid from the following tank liquid options:

1. Water or Steam
2. AlChE 250+ Fluids
3. Standard Fluids

Tank Liquid - Water or Steam

This screen allows you to calculate density of the tank liquid if the liquid is Water or Steam.

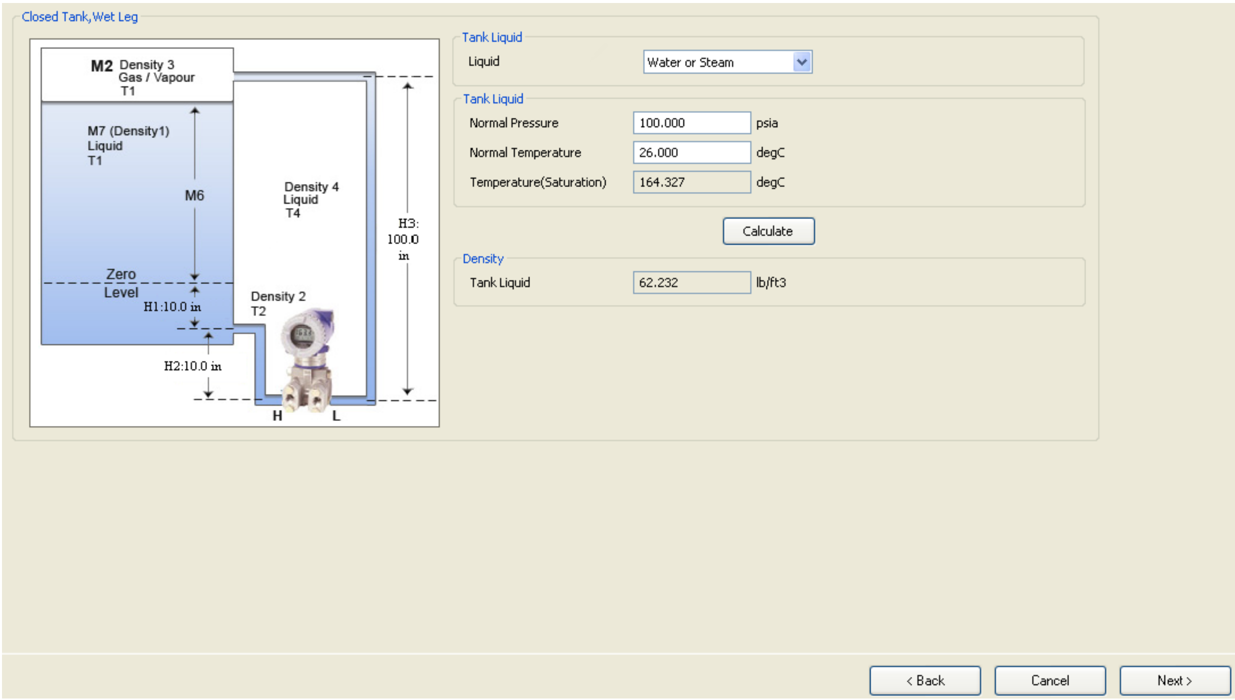


Figure 731. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Tank Liquid - Water or Steam

Field	Entry
Tank Liquid	
Liquid	Select the liquid as Water or Stream from the drop-down list.
Tank Liquid	
Normal Pressure	Specify the normal operating pressure for the tank liquid.
Normal Temperature	Specify the normal operating temperature for the tank liquid.
Temperature (Saturation)	This field shows the saturation temperature of the tank liquid.
Calculate	Click Calculate to calculate the density of the tank liquid for the given pressure and temperature values.
Density	
Tank Liquid	This field shows the calculated density in the selected engineering units.
Next	Click Next to advance to subsequent screen where you can calculate density of gas/vapor in the tank.

Tank Gas/Vapor - Water or Steam

This screen allows you to calculate density of gas/vapor in the tank if the vapor is Water or Steam.

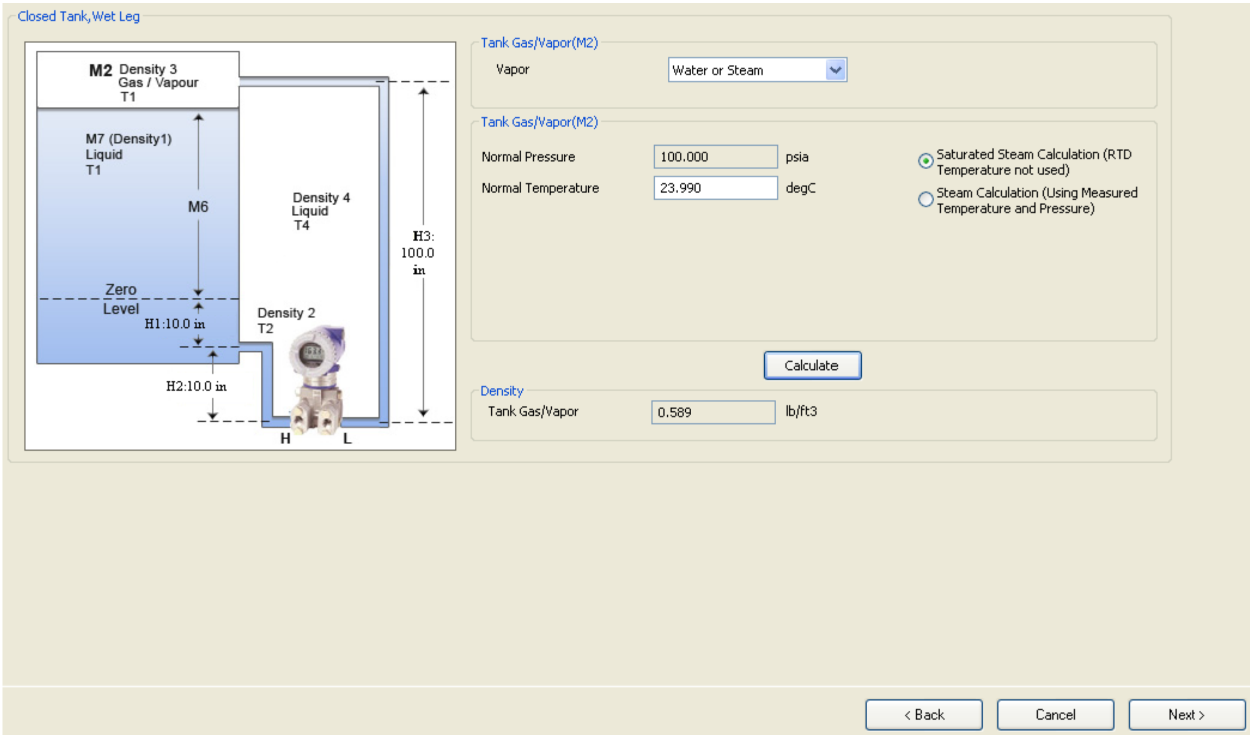


Figure 732. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Tank Gas/Vapor - Water or Steam

Field	Entry
Tank Gas/Vapor(M2)	
Vapor	Select the vapor as Water or Stream from the drop-down list.
Tank Gas/Vapor(M2)	
Normal Pressure	This field shows the normal operating pressure in the upper leg.
Normal Temperature	Specify the normal operating temperature in the upper leg.
Saturated Steam Calculation (RTD Temperature not used)	Select this option to calculate saturated steam without using the RTD temperature.
Steam Calculation (Using measured temperature and pressure)	Select this option to calculate steam using measured temperature and pressure.
Next	Click Next to advance to subsequent screen where you can calculate density of liquid in the upper leg.

Upper Leg Liquid - Water or Steam

This screen allows you to calculate density of liquid in the upper leg if the liquid is Water or Steam.

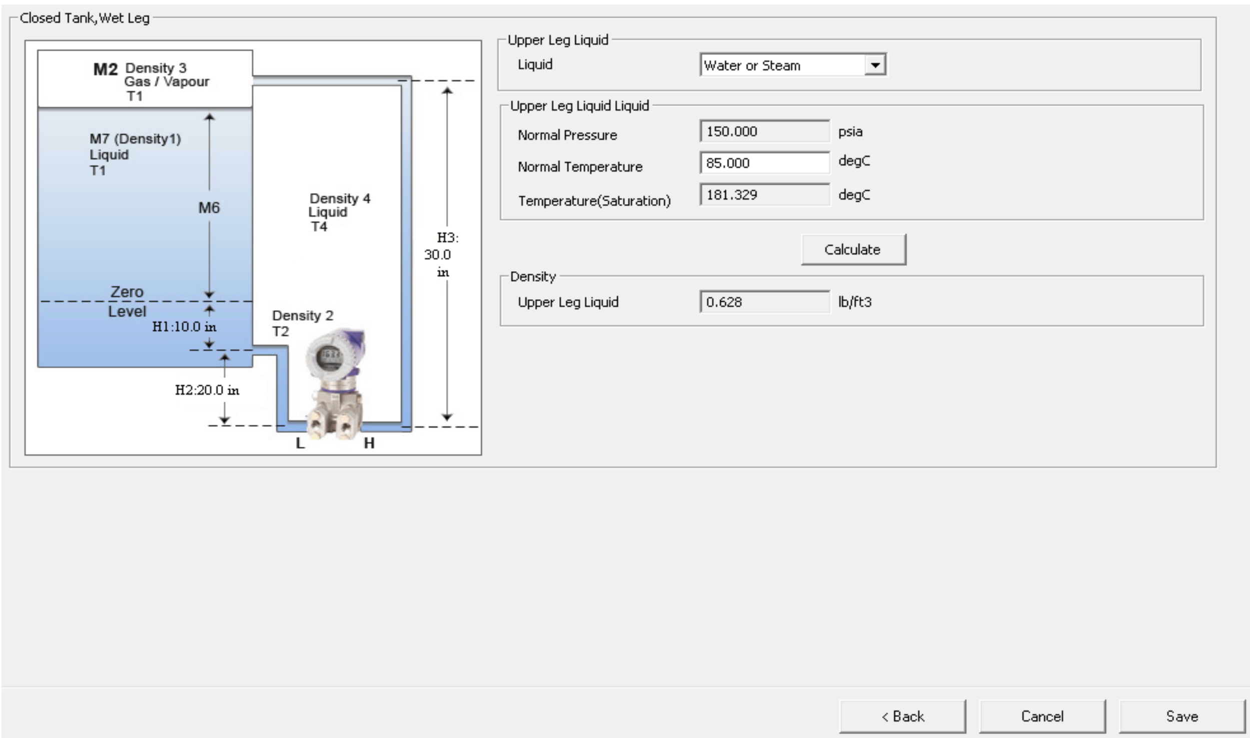


Figure 733. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Liquid - Water or Steam

Field	Entry
Upper Leg Liquid	
Liquid	Select the liquid as Water or Steam from the drop-down list.
Upper Leg Liquid	
Normal Pressure	Specify the normal operating pressure in the upper leg.
Normal Temperature	Specify the normal operating temperature in the upper leg.
Temperature (Saturation)	This field shows the saturation temperature of the upper leg liquid.
Calculate	Click Calculate to calculate the density for the given pressure and temperature values.
Density	
Upper Leg Liquid	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Tank Liquid - AlChE 250+ Fluids

This screen allows you to calculate density of the liquid in the tank if the liquid is AlChE 250+ Fluids. Selection of this option displays a drop-down list of 250 fluids next to the liquid selection.

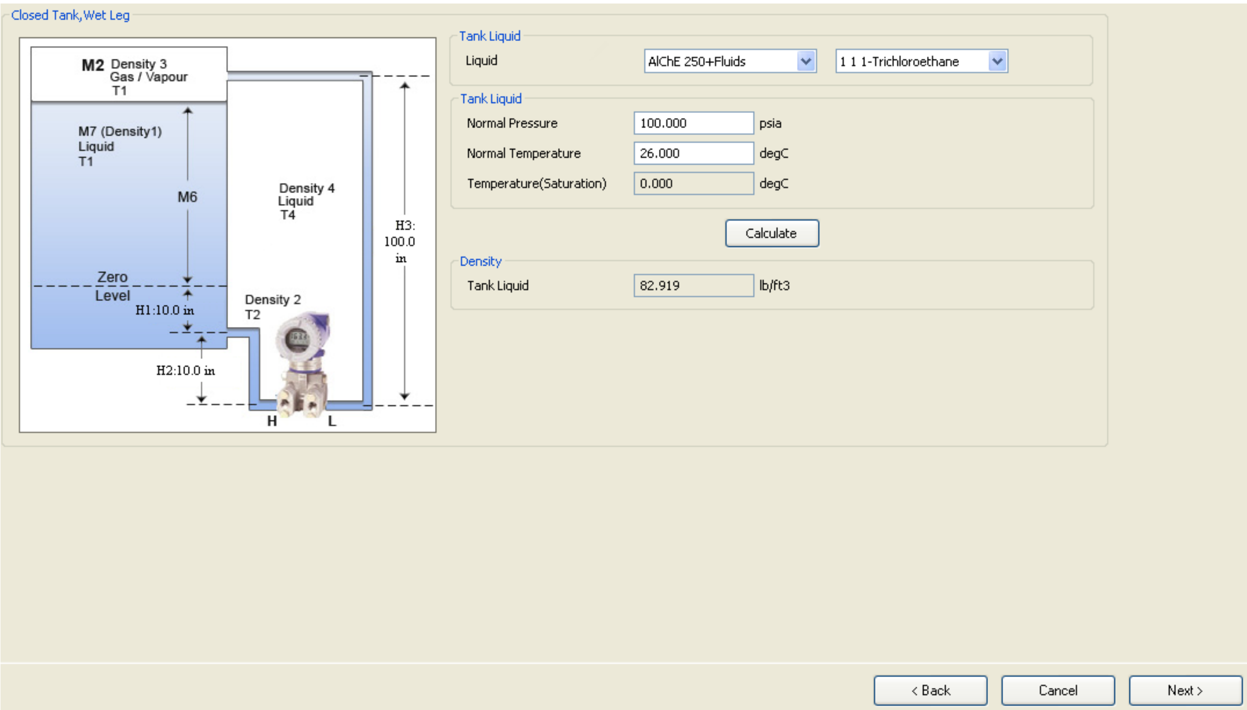


Figure 734. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Tank Liquid - Al ChE 250+ Fluids

Field	Entry
Tank Liquid	
Liquid	Select the liquid as AlChE 250+ Fluids and then select a fluid from drop-down list displayed next to the liquid selection.
Tank Liquid	
Normal Pressure	Specify the normal operating pressure for the tank liquid.
Normal Temperature	Specify the normal operating temperature for the tank liquid.
Temperature (Saturation)	This field shows the saturation temperature of the tank liquid.
Calculate	Click Calculate to calculate the density at the given pressure and temperature values.
Density	
Tank Liquid	This field shows the calculated density in the selected engineering units.
Next	Click Next to advance to subsequent screen where you can calculate density of gas/vapor in the tank.

Tank Gas/Vapor - AlChE 250+ Fluids

This screen allows you to calculate density of gas/vapor in the tank if the vapor is AlChE 250+ Fluids. Selection of this option displays a drop-down list of 250 fluids next to the vapor selection.

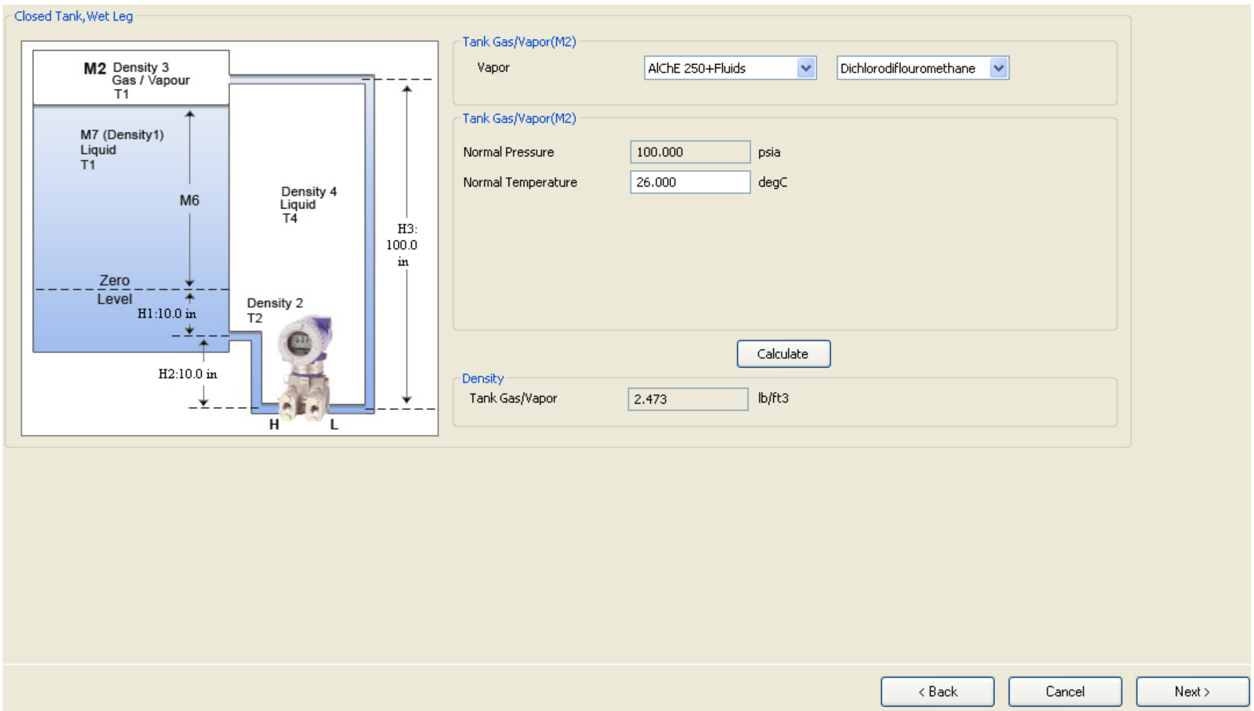


Figure 735. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Tank Gas/Vapor - AlChE 250+ Fluids

Field	Entry
Tank Gas/Vapor(M2)	
Vapor	Select the vapor as AlChE 250+ Fluids and then select a fluid from drop-down list displayed next to the vapor selection.
Tank Gas/Vapor	
Normal Pressure	This field shows the normal operating pressure in the tank.
Normal Temperature	Specify the normal operating temperature in the tank.
Calculate	Click Calculate to calculate the density of the gas/vapor in the tank at the given pressure and temperature values.
Density	
Tank Gas/Vapor	This field shows the density calculated in the selected engineering units.
Next	Click Next to advance to subsequent screen where you can calculate density of liquid in the upper leg.

Upper Leg Liquid - AlChE 250+ Fluids

This screen allows you to calculate density of liquid in the upper leg if the liquid is AlChE 250+ Fluids. Selection of this option displays a drop-down list of 250 fluids next to the liquid selection.

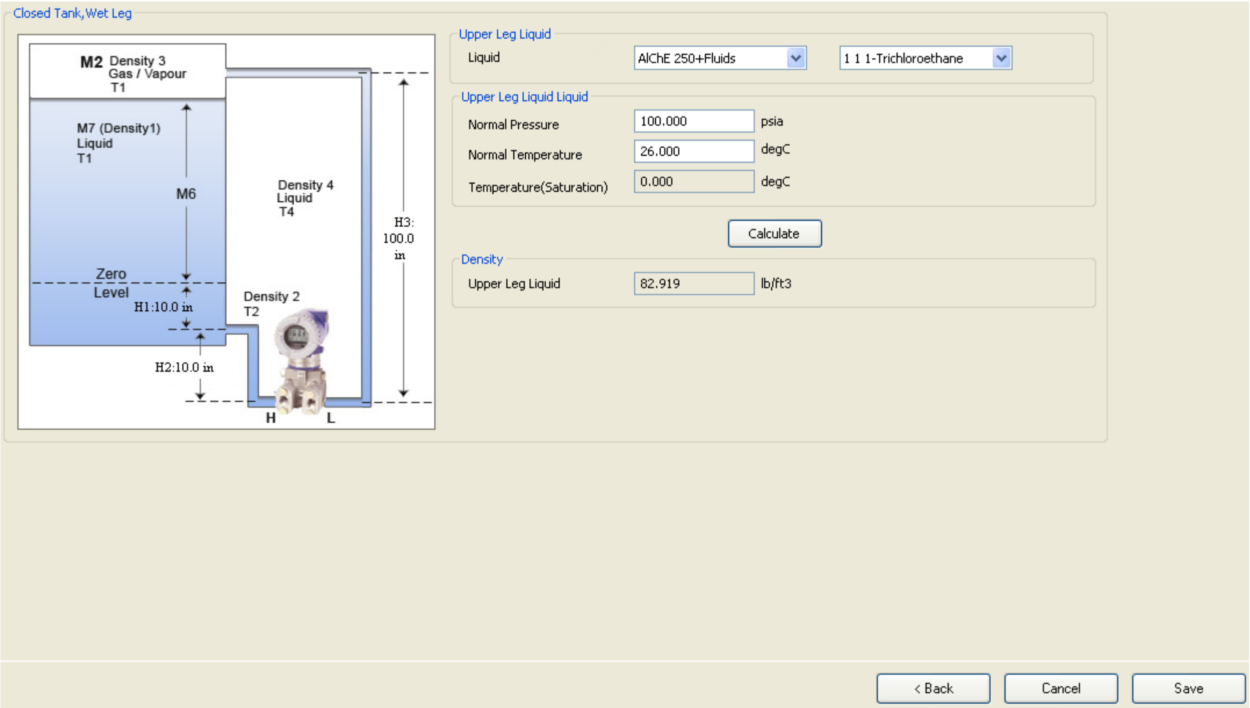


Figure 736. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Liquid - AlChE 250+ Fluids

Field	Entry
Upper Leg Liquid	
Liquid	Select the liquid as AlChE 250+ Fluids and then select a fluid from drop-down list displayed next to the liquid selection.
Upper Leg Liquid	
Normal Pressure	Specify the normal operating pressure in the upper leg liquid.
Normal Temperature	Specify the normal operating temperature in the upper leg liquid.
Temperature (Saturation)	This field shows the saturation temperature of the upper leg liquid.
Calculate	Click Calculate to calculate the density of the liquid in the upper leg at the given pressure and temperature values.
Density	
Upper Leg Liquid	This field shows the calculated density in the selected engineering units.
Save	Click Save to save the configuration to the transmitter.

Tank Liquid - Standard Fluids

This screen allows you to calculate density of the tank liquid if the liquid is Standard Fluids. Selection of this option displays a drop-down list fluids next to the liquid selection. Select the liquid as Standard Fluids and then select a fluid from drop-down list displayed next to the liquid selection. For the description of other parameters in this screen, refer to "Tank Liquid - AlChE 250+ Fluids" on page 535.

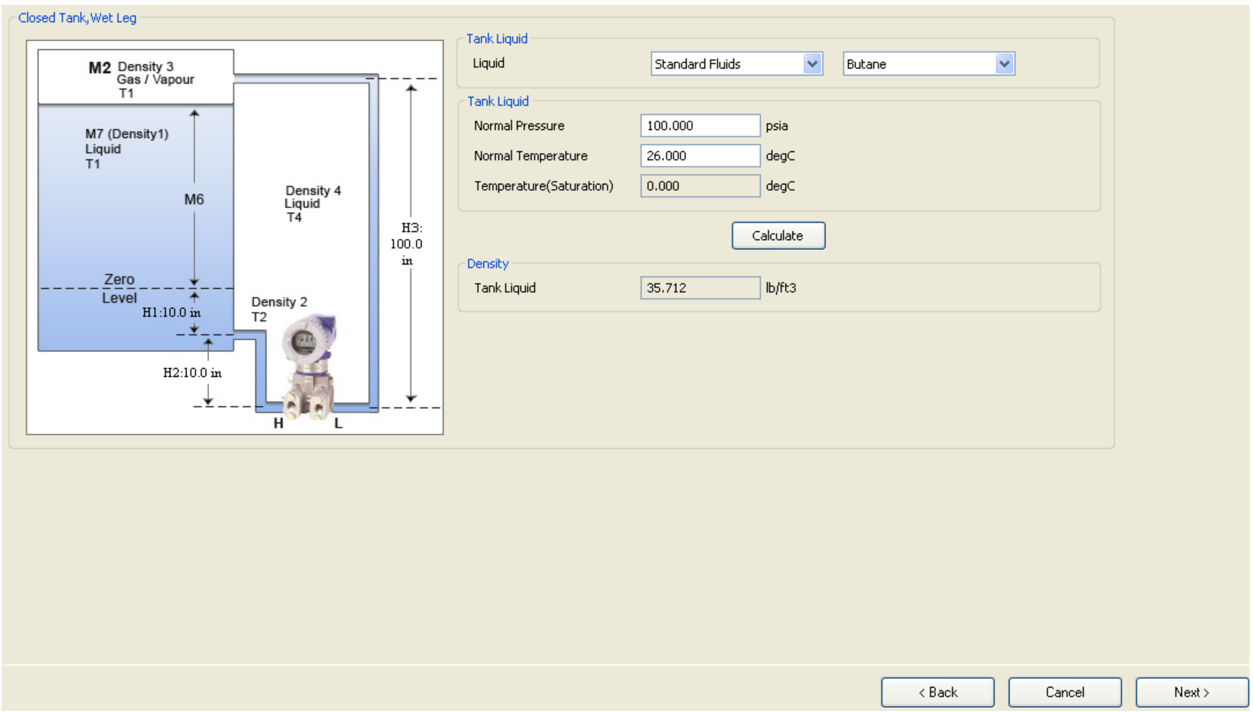


Figure 737. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Tank Liquid - Standard Fluids

Tank Gas/Vapor - Standard Fluids

This screen allows you to calculate density of gas/vapor in the tank if the vapor is Standard Fluids. Selection of this option displays a drop-down list of fluids next to the vapor selection. Select the vapor as AlChE 250+ Fluids and then select a fluid from drop-down list displayed next to the vapor selection. For the description of other parameters in this screen, refer to “Tank Gas/Vapor - AlChE 250+ Fluids” on page 536.

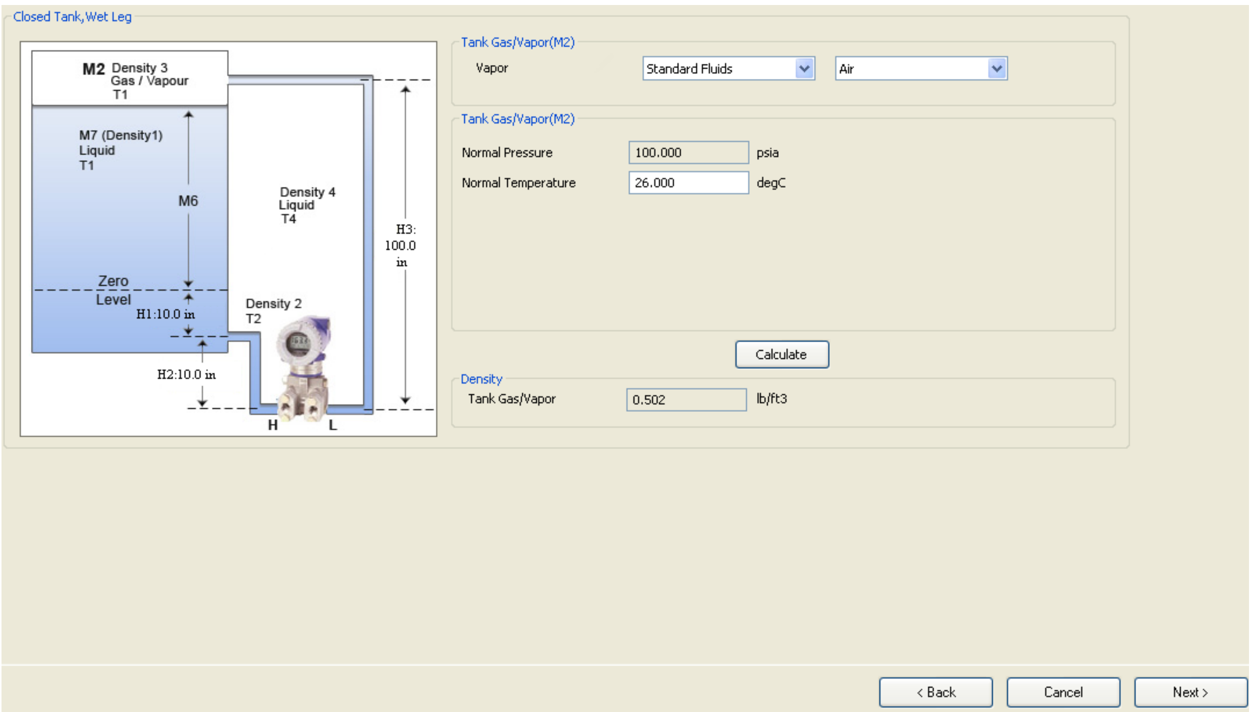


Figure 738. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Tank Gas/Vapor - Standard Fluids

Upper Leg Liquid - Standard Fluids

This screen allows you to calculate density of the liquid in the upper leg if the liquid is Standard Fluids. Selection of this option displays a drop-down list of fluids next to the liquid selection. Select the liquid as Standard Fluids and then select a fluid from drop-down list displayed next to the liquid selection. For the description of other parameters in this screen, refer to “Upper Leg Liquid - AlChE 250+ Fluids” on page 537.

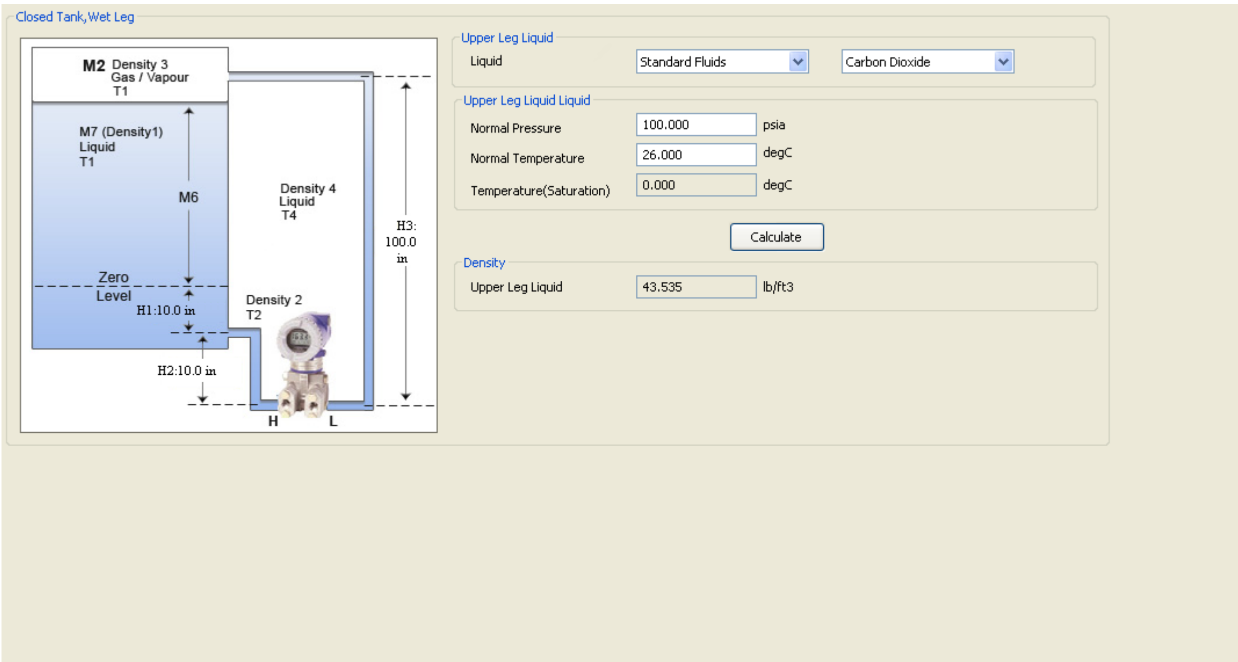


Figure 739. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Liquid - Standard Fluids

Upper Leg Gas/Vapor - Natural Gases

This screen allows you to calculate the density of gas/vapor if the vapor is Natural Gases. Select a tank liquid and then select the vapor as Natural Gases. A drop-down list of the following methods is displayed next to the vapor selection:

1. NX-19
2. AGA-8 Gr, N2 and CO2
3. AGA-8 Heating Value, Gr and CO2 Inputs
4. AGA-8 Detailed Method, Input Mole Fractions
5. S-GERG Heating Value, Gr and CO2 Inputs

Select a method and calculate the density of gas/vapor for the given values. For detailed description of the parameters in the following screens, refer to "Upper Leg Gas/Vapor - Natural Gases" on page 522.

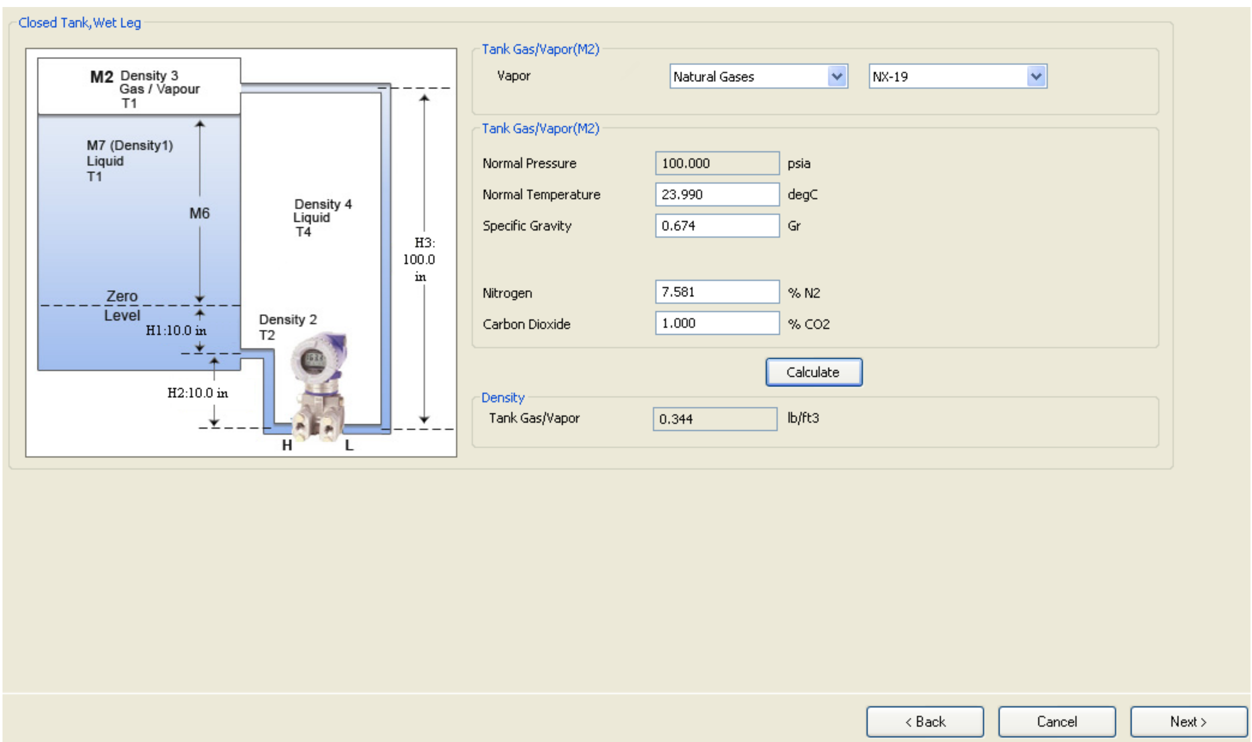


Figure 740. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Gas/Vapor - Natural Gases Screen (NX-19 Selection)

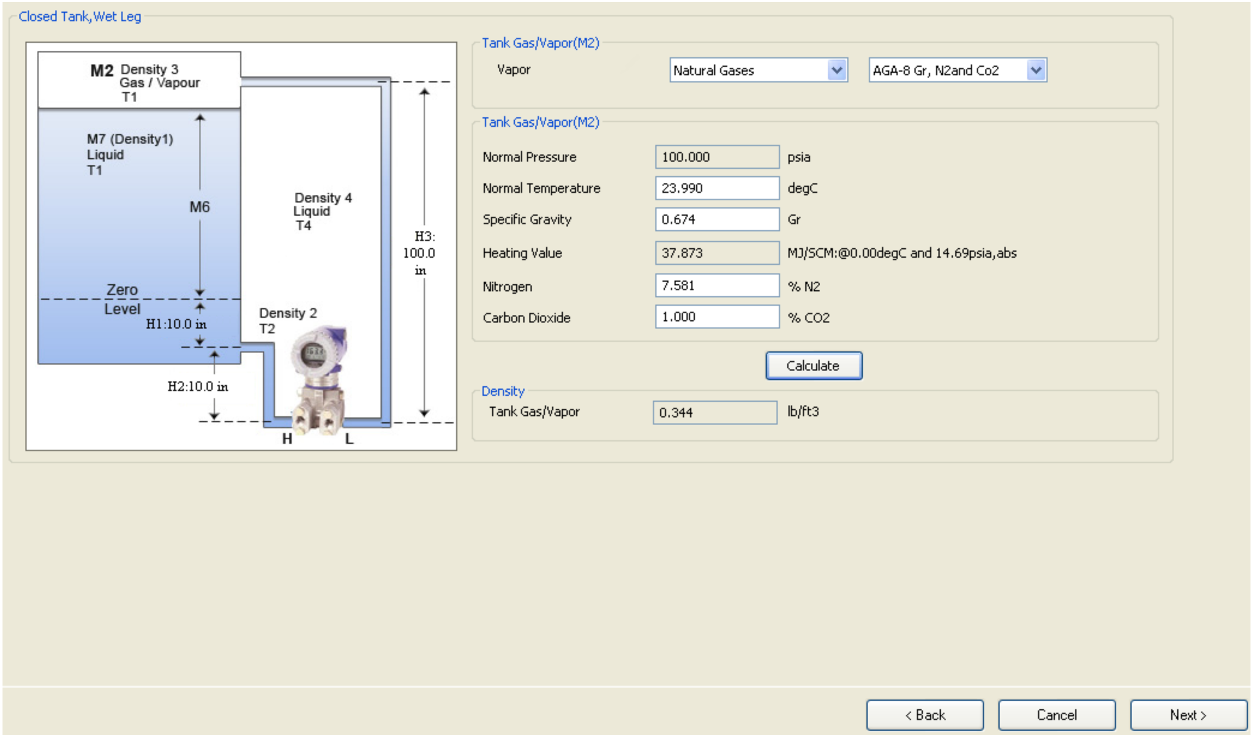


Figure 741. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Gas/Vapor - Natural Gases Screen (AGA-8 Gr Selection)

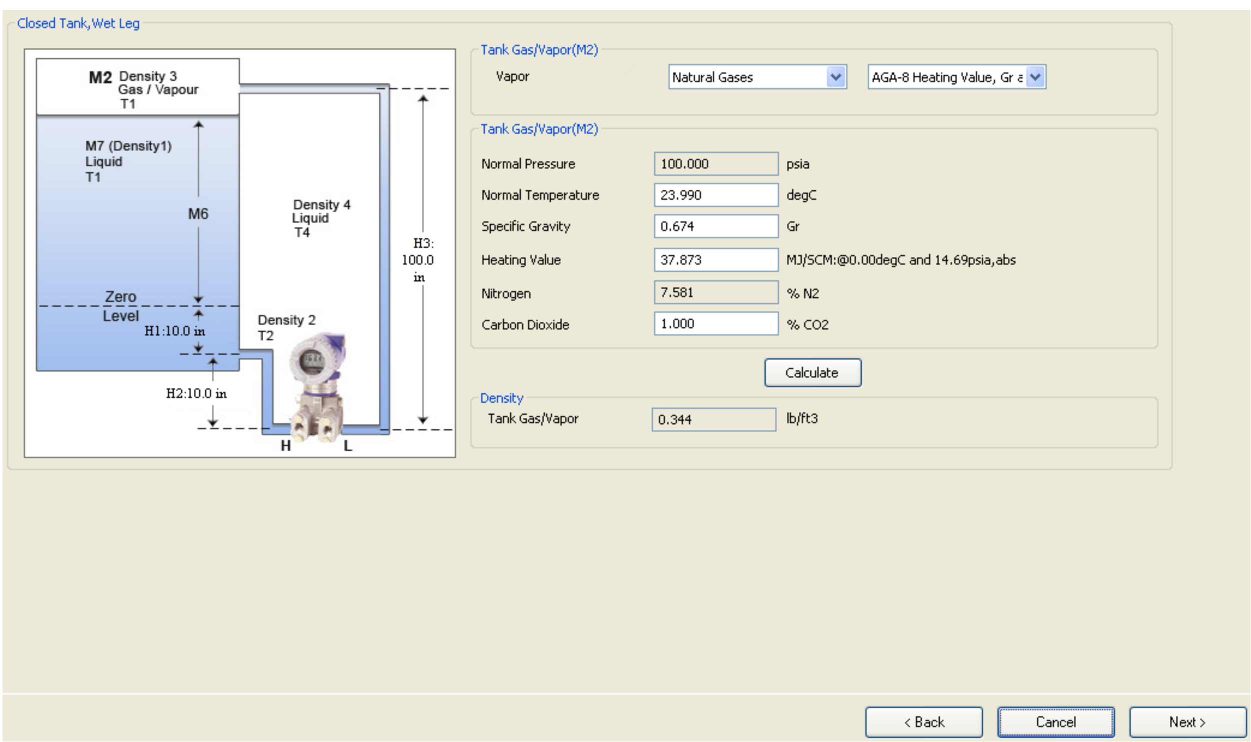


Figure 742. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Gas/Vapor - Natural Gases Screen (AGA-8 Heating Value Selection)

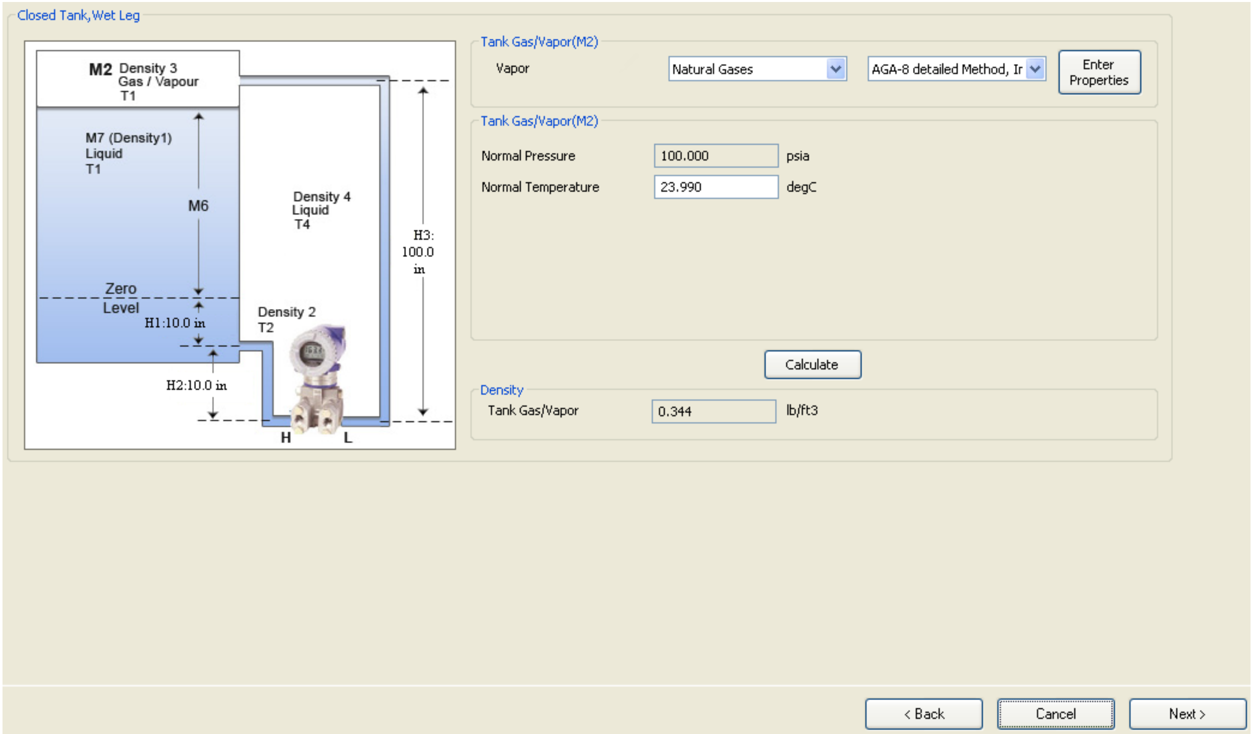


Figure 743. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Gas/Vapor - Natural Gases Screen (AGA-8 Detailed Method Selection)

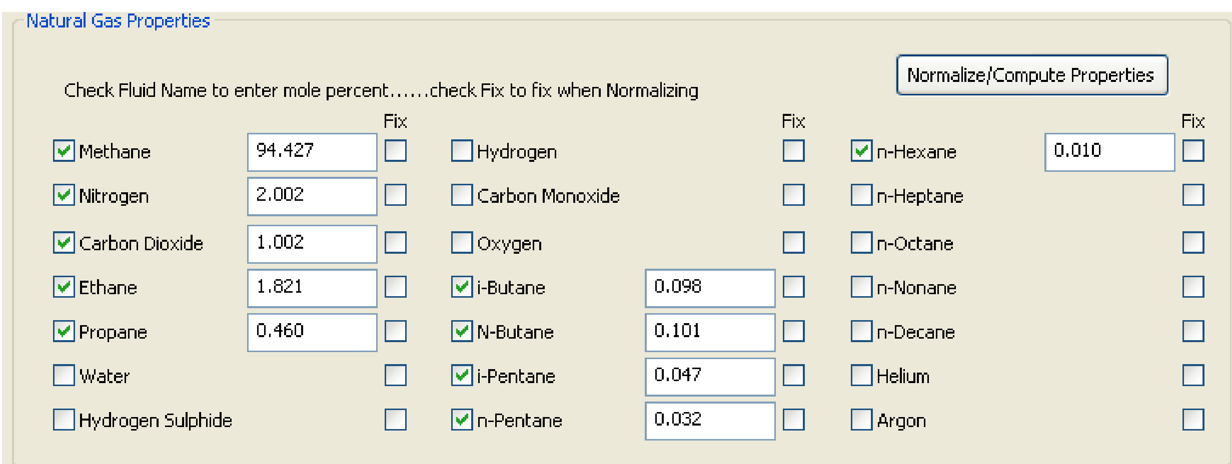


Figure 744. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Gas/Vapor - Natural Gas Properties

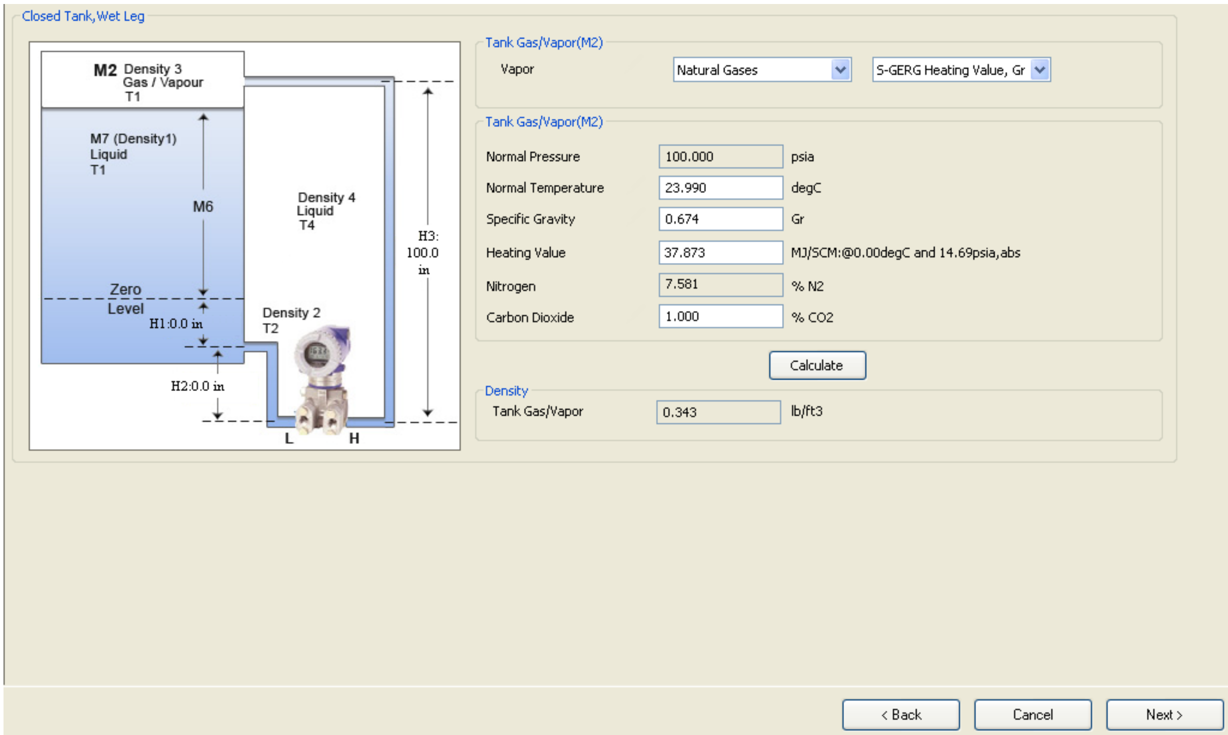


Figure 745. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Gas/Vapor - Natural Gases Screen (S-GERG Heating Value Selection)

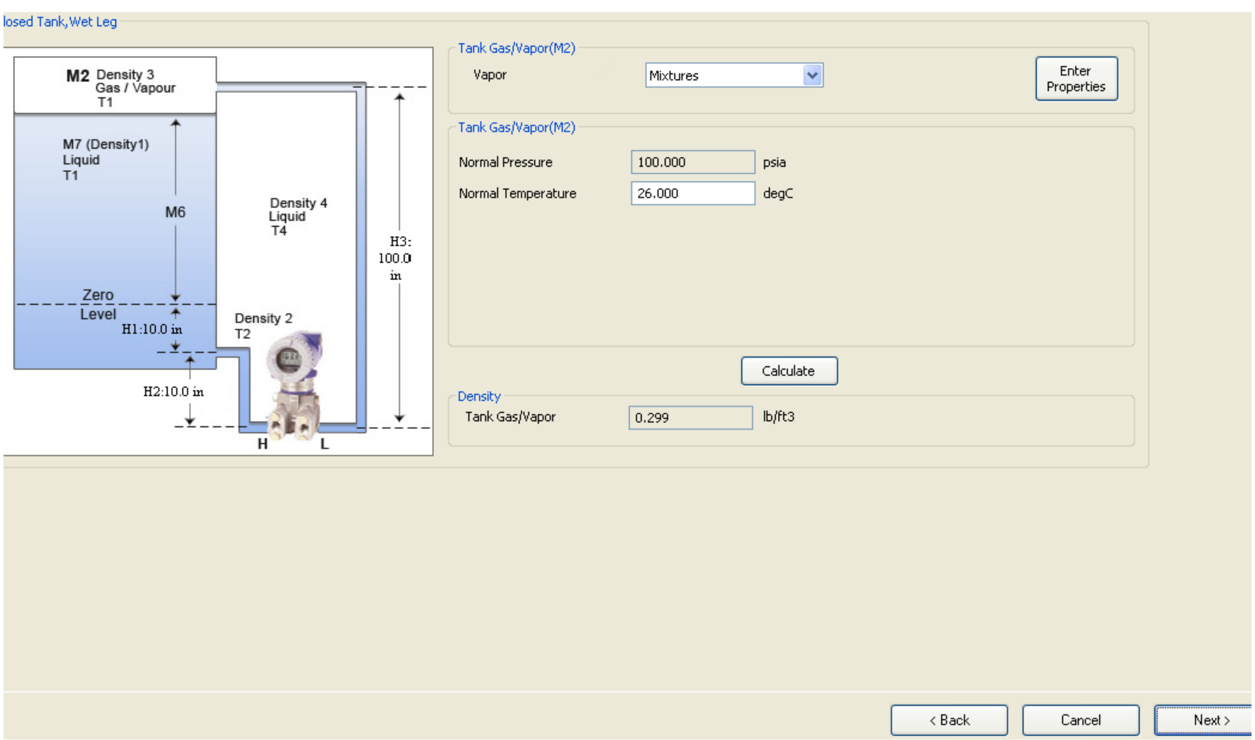


Figure 746. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Gas/Vapor - Mixtures Screen

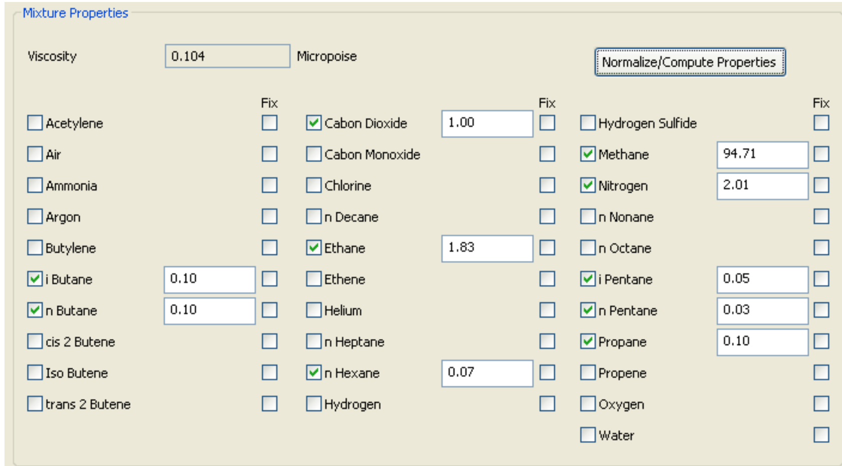


Figure 747. Sample IMV31 Transmitter Application Design Conditions - Closed Tank Wet Leg - Upper Leg Gas/Vapor - Mixture Properties Screen

Boiler Drum

The Boiler Drum configuration allows you to calculate density of water in the drum and in the upper leg.

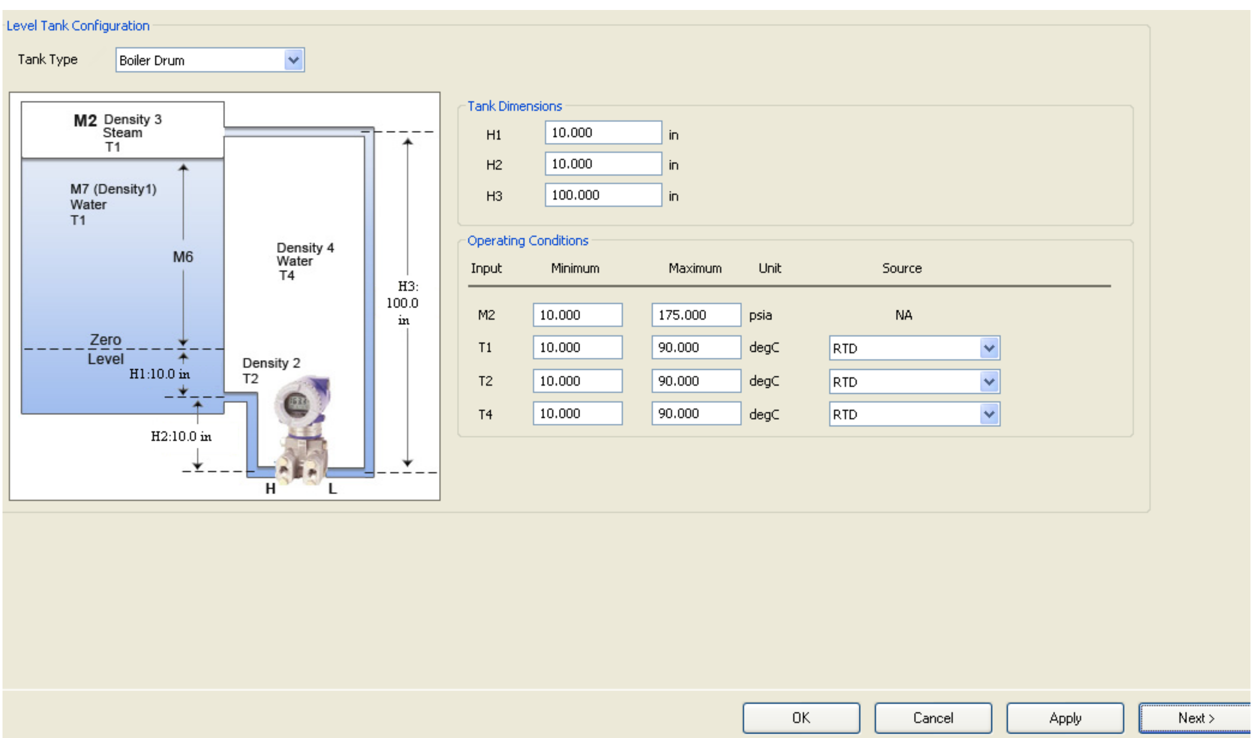


Figure 748. Sample IMV31 Transmitter Application Design Conditions - Boiler Drum Screen 1

Field	Entry
Level Tank Configuration	
Tank Type	Select the tank type as Boiler Drum from the drop-down list.
Tank Dimensions	
H1	Specify the height from lower leg tap to zero level point.
H2	Specify the height from transmitter connection to the lower leg tap.
H3	Specify the height from transmitter connection to upper leg tap.
Operating Conditions	
M2 - Minimum	Specify the minimum operating value to measure tank pressure.
M2 - Maximum	Specify the maximum operating value to measure tank pressure.
T1 - Minimum	Specify the minimum operating value for temperature 1.
T1 - Maximum	Specify the maximum operating value for temperature 1.
T1 - Source	Select the source for temperature 1 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select 'User Value' as temperature source, specify a value in the adjacent text box that is displayed.
T2 - Minimum	Specify the minimum operating value for temperature 2.
T2 - Maximum	Specify the maximum operating value for temperature 2.
T2 - Source	Select the source for temperature 2 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select 'User Value' as temperature source, specify a value in the adjacent text box that is displayed.
T4 - Minimum	Specify the minimum operating value for temperature 4.
T4 - Maximum	Specify the maximum operating value for temperature 4.
T4 - Source	Select the source for temperature 4 from the drop-down list. Choose from RTD, Sensor Temp, Electronic Temp, and User Value. If you select 'User Value' as temperature source, specify a value in the adjacent text box that is displayed.
Next	Click Next to advance to subsequent screen where you can calculate density of water in the drum and in the upper leg.

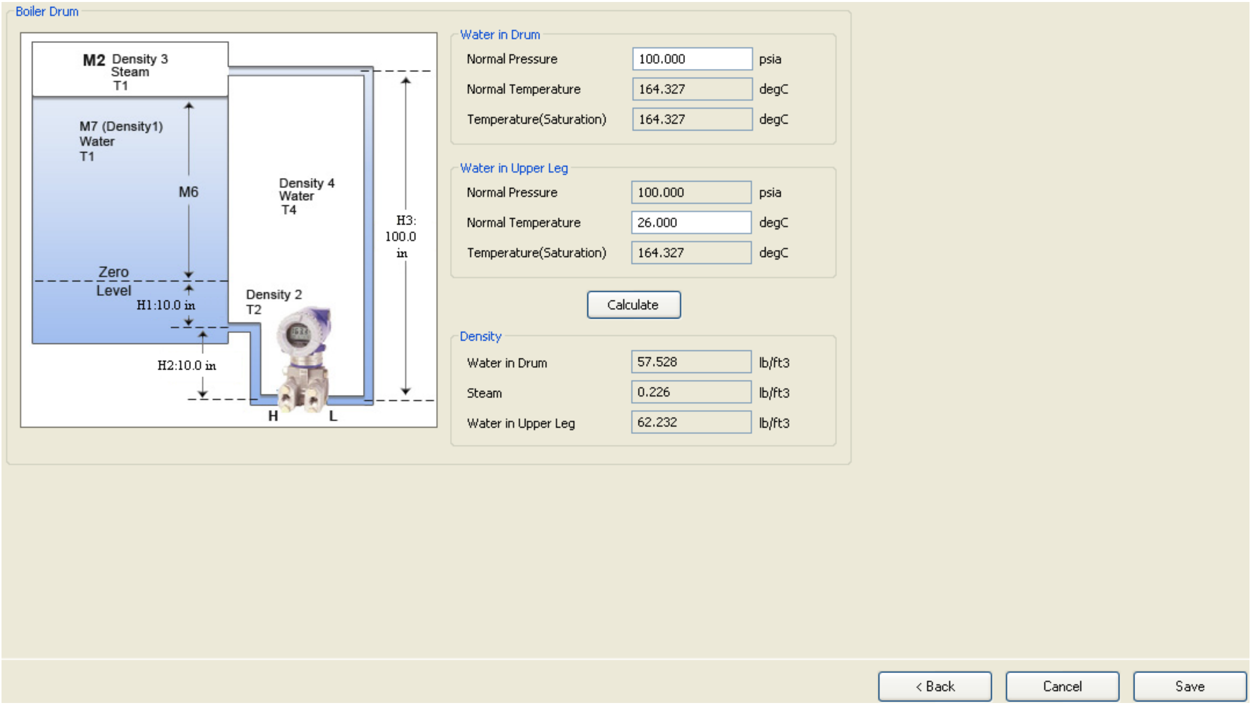


Figure 749. Sample IMV31 Transmitter Application Design Conditions - Boiler Drum Screen 2

Field	Entry
Water in Drum	
Normal Pressure	Specify the normal operating pressure for the water in the drum.
Normal Temperature	This field displays the normal operating temperature for the water in the drum.
Temperature (Saturation)	This field shows the saturation temperature for the water in the drum.
Water in Upper Leg	
Normal Pressure	This field shows the normal operating pressure for the water in upper leg.
Normal Temperature	Specify the normal operating temperature for the water in upper leg.
Temperature (Saturation)	This field shows the saturation temperature of the water in upper leg.
Calculate	Click Calculate to calculate the density at the given pressure and temperature values.
Density	
Water in Drum	This field shows the calculated density of the water in drum.
Steam	This field shows the calculated density of the steam in upper leg.
Water in Upper Leg	This field shows the calculated density of the water in upper leg.
Save	Click Save to save the configuration to the transmitter.

Test Device Equations

The Test Device Equations screen enables you to test the tank configuration for raw sensor inputs and displays the calculated level data (density, pressure and level values) outputted from the transmitter. To use this function, enter test values Raw Inputs fields and click Apply. The level data calculated for the given inputs is displayed below.

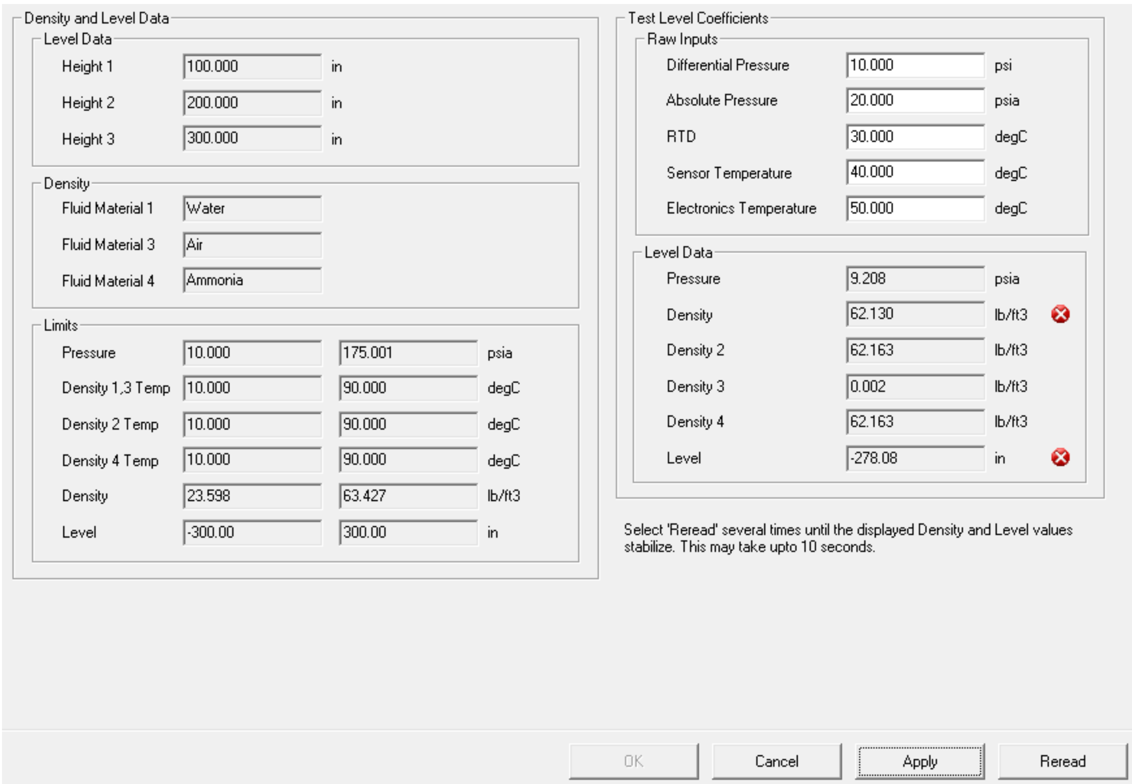


Figure 750. Sample IMV31 Transmitter Test Device Equations Screen

Field	Entry
Density and Level Data	
Level Data	
Height 1	This field shows Height 1.
Height 2	This field shows Height 2.
Height 3	This field shows Height 3.
Density	
Fluid Material 1	This field shows the density calculated for the fluid 1.
Fluid Material 3	This field shows the density calculated for the fluid 3.
Fluid Material 4	This field shows the density calculated for the fluid 4.
Limits	
Pressure	This field shows the upper and lower range limits set for pressure measurement.

Field	Entry
Density 1,3 Temp	This field shows the upper and lower range limits set for temperature 1 and 3.
Density 2 Temp	This field shows the upper and lower range limits set for temperature 2.
Density 4 Temp	This field shows the upper and lower range limits set for temperature 4.
Density	This field shows the upper and lower range limits set for density measurement.
Level	This field shows the upper and lower range limits set for level measurement.
Test Level Coefficients	
Raw Inputs	
Differential Pressure	Specify a value for the transmitter to calculate differential pressure.
Absolute Pressure	Specify a value for the transmitter to calculate absolute pressure.
RTD	Specify a value for the transmitter to calculate RTD.
Sensor Temperature	Specify a value for the transmitter to calculate sensor temperature.
Electronics Temperature	Specify a value for the transmitter to calculate electronic temperature.
Level Data	
Pressure	This field shows the pressure calculated by the transmitter for the given input.
Density	This field shows the density calculated by the transmitter for the given input.
Density 2	This field shows the density 2 calculated by the transmitter for the given input.
Density 3	This field shows the density 3 calculated by the transmitter for the given input.
Density 4	This field shows the density 4 calculated by the transmitter for the given input.
Level	This field shows the level calculated by the transmitter for the given input.
Apply	After you enter the raw inputs, click Apply for the transmitter to calculate density and level for the given inputs.
Reread	Click Reread to read stabilized values from the transmitter.

Troubleshooting

Loop Test

Analog Output

The Analog Output screen allows you to override analog value, and measurement.

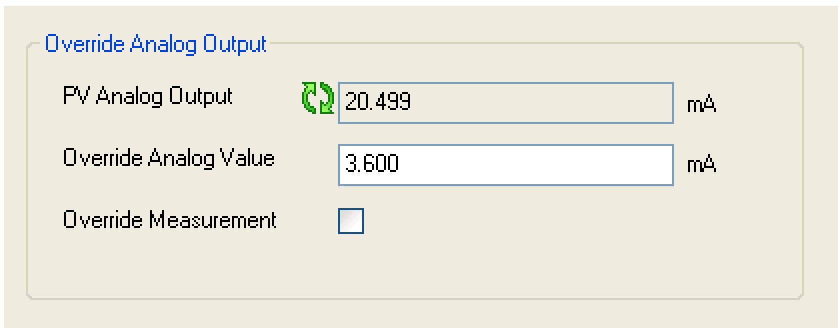


Figure 751. Sample IMV25/IMV31 Transmitter Loop Test Analog Output Screen (IMV31 shown)

Field	Entry
Override Analog Output	
PV Analog Output	This field shows the current PV Analog Output in mA.
Override Analog Value	Specify a value that overrides the analog value.
Override Measurement	Select this check box to override the analog value. Deselect it if override is not required.

Digital Output

The Digital Output screen allows you to select a variable with which you want to override the digital output, and set the override value.

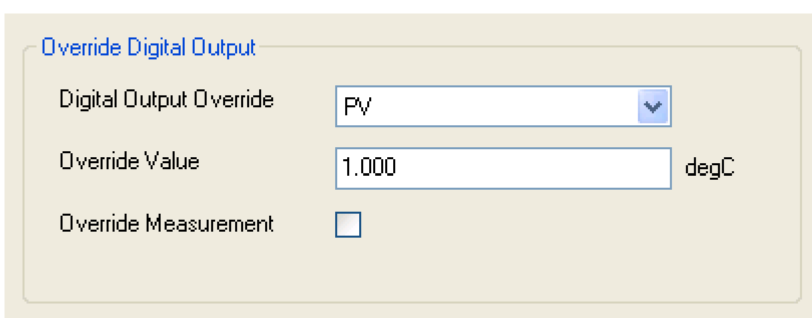


Figure 752. Sample IMV25/IMV31 Transmitter Loop Test Digital Output Screen (IMV31 shown)

Field	Entry
Override Digital Output	
Digital Output Override	Select a measured variable with which you want to override the digital output value from the drop-down list. Choose from PV, SV, TV, and QV.
Override Value	Specify a value to override the digital output.
Override Measurement	Select this check box to override the digital output. Deselect it if override is not required.

16. IMV30 Transmitter

The IMV30 Electronic Multivariable Transmitter measures absolute and differential pressure, sensor and electronics temperature, and process temperature (from an RTD). It also calculates process density and flow rate and provides transmission of all the measured and calculated values.

IMV30 transmitter allows direct analog connection to common receivers while still providing intelligent transmitter digital communications using a HART Communicator. Additional information is available in the following document:

- MI 020-382 I/A Series® Intelligent Electronic Multivariable Transmitters IMV25-T and IMV30-T with HART or 4 to 20 mA Output Signals

The DTM does not do complete configuration of an IMV30 transmitter. For that you need PCMV. This DTM will allow a user to change HART configuration and parameters related to range values, units and 4-20 mA span.

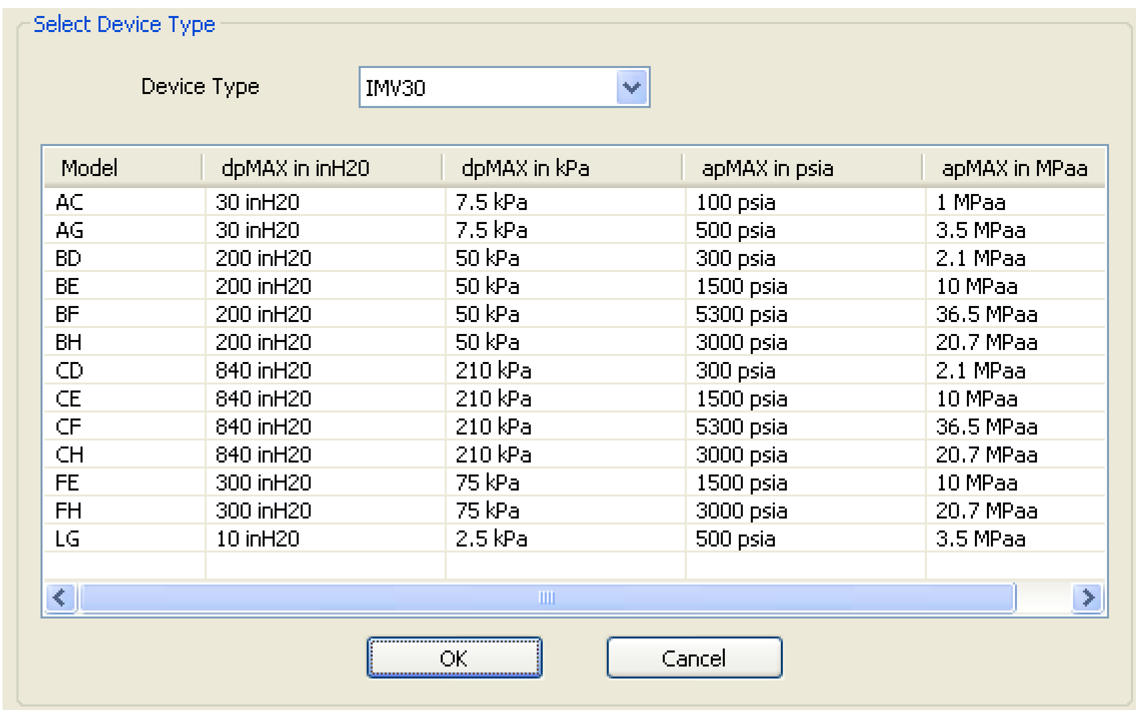
Create Pre-Configuration File

The Pre-Configuration screen enables you to create a new configuration file from one of several default databases, or from the configuration of a connected device. You can then download the new configuration to a connected device or save it to a file.

Follow the steps given below to create a new configuration file:

1. Double click the IMV series Device DTM. Create Pre-Configuration File window appears.
2. Select the Device Type from the drop-down list and select the device model.
3. Click OK. The device DTM appears.
4. Configure the selected device parameters.
5. To save the configuration use Save As in the File menu and save the configuration with .PW4 file extension.

The following figure shows the Pre-Configuration screen for the IMV30.



Model	dpMAX in inH20	dpMAX in kPa	apMAX in psia	apMAX in MPaa
AC	30 inH20	7.5 kPa	100 psia	1 MPaa
AG	30 inH20	7.5 kPa	500 psia	3.5 MPaa
BD	200 inH20	50 kPa	300 psia	2.1 MPaa
BE	200 inH20	50 kPa	1500 psia	10 MPaa
BF	200 inH20	50 kPa	5300 psia	36.5 MPaa
BH	200 inH20	50 kPa	3000 psia	20.7 MPaa
CD	840 inH20	210 kPa	300 psia	2.1 MPaa
CE	840 inH20	210 kPa	1500 psia	10 MPaa
CF	840 inH20	210 kPa	5300 psia	36.5 MPaa
CH	840 inH20	210 kPa	3000 psia	20.7 MPaa
FE	300 inH20	75 kPa	1500 psia	10 MPaa
FH	300 inH20	75 kPa	3000 psia	20.7 MPaa
LG	10 inH20	2.5 kPa	500 psia	3.5 MPaa

Figure 753. Sensor Range Selection Screen

Device Overview

The Device Overview screen displays the HART information, device information and the current PV data. Each time the PV is mapped to a measurement the PV data and the graphical representation of the PV data are updated accordingly.

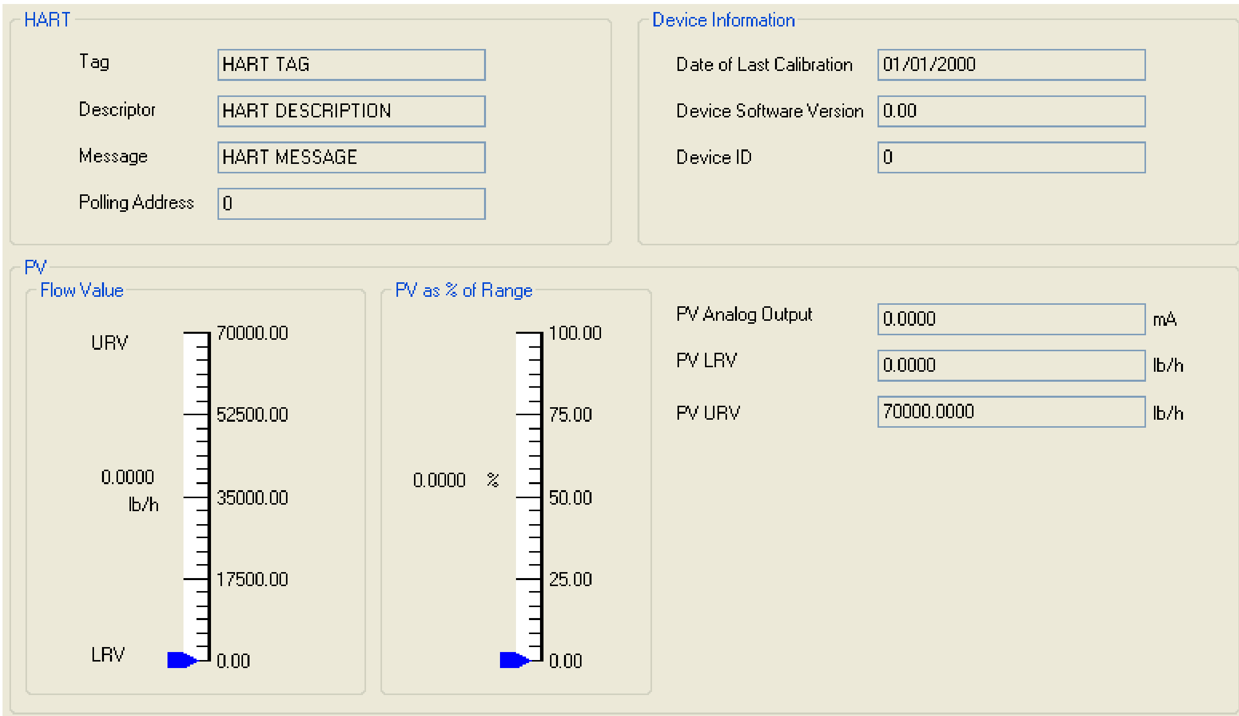


Figure 754. Sample IMV30 Transmitter Device Overview Screen

Field	Entry
HART	
Tag	Shows the HART tag which is the unique identifier of the device.
Descriptor	Shows the HART descriptor used to define a description for the device. It can have a maximum of 16 characters.
Message	Shows the HART message that is sent from the device when requested. The message can have a maximum of 32 characters.
Polling Address	Shows the configured address of the device.
Device Information	
Date of Last Calibration	Shows the last calibrated date of the transmitter. **NOTE** The date of last calibration can be remotely displayed and reconfigured, using the PC-Based Configurator.
Device Software Version	Shows the software version of the device.
Device ID	Shows the serial number of the device.

Device Configuration

General

The General screen allows you to map measurements to primary, secondary, tertiary, and the quaternary variables. It displays the upper and lower range limits and the upper and lower range values of the measurement mapped to the PV.

You need to set the upper range value (URV) and lower range value (LRV) within the configurable limits.

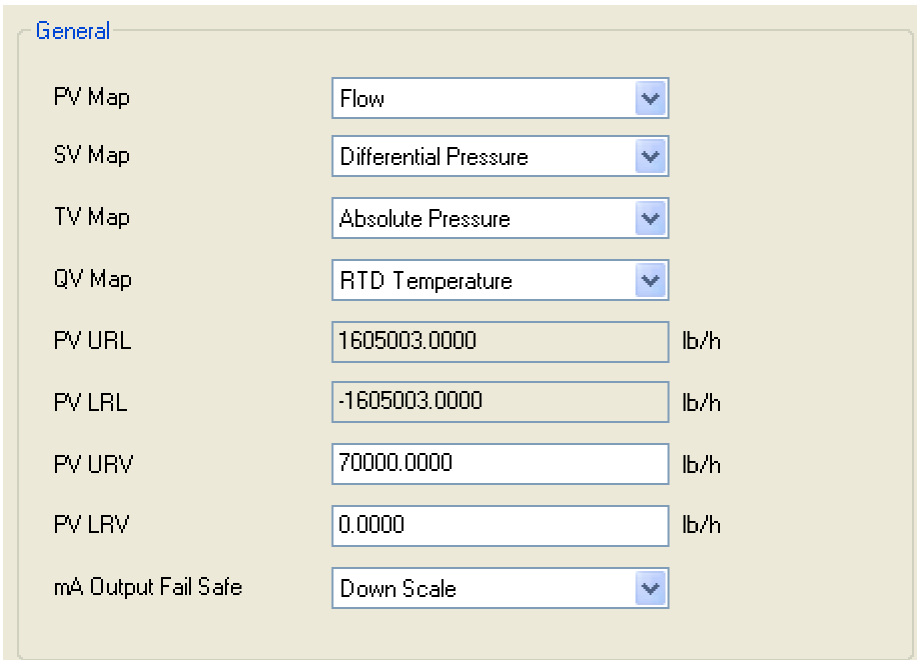


Figure 755. Sample IMV30 Transmitter General Screen

Field	Entry
General	
PV Map	Map primary variable to one of the measurements displayed in the drop-down list. Choose from Differential Pressure, Absolute Pressure, Sensor Temperature, Electronic Temperature, RTD Temperature, Flow, and Density.
SV Map	Map secondary variable to one of the measurements displayed in the drop-down list. Choose from Differential Pressure, Absolute Pressure, Sensor Temperature, Electronic Temperature, RTD Temperature, Flow, and Density.
TV Map	Map tertiary variable to one of the measurements displayed in the drop-down list. Choose from Differential Pressure, Absolute Pressure, Sensor Temperature, Electronic Temperature, RTD Temperature, Flow, and Density.

Field	Entry
QV Map	Map quaternary variable to one of the measurements displayed in the drop-down list. Choose from Differential Pressure, Absolute Pressure, Sensor Temperature, Electronic Temperature, RTD Temperature, Flow, and Density.
PV URL	Shows the upper range limit of the measurement mapped to the primary variable.
PV LRL	Shows the lower range limit of the measurement mapped to the primary variable.
PV URV	Specify the upper range value for the primary variable.
PV LRV	Specify the lower range value for the primary variable.
mA Output Fail Safe	This is the mA output delivered for transmitter faults and critical sensor faults. Choose Up Scale or Down Scale from the drop-down list.

Measurement Units

The Measurement Units screen allows you to set engineering units for each process parameter in the device. You also have the option to define custom units.

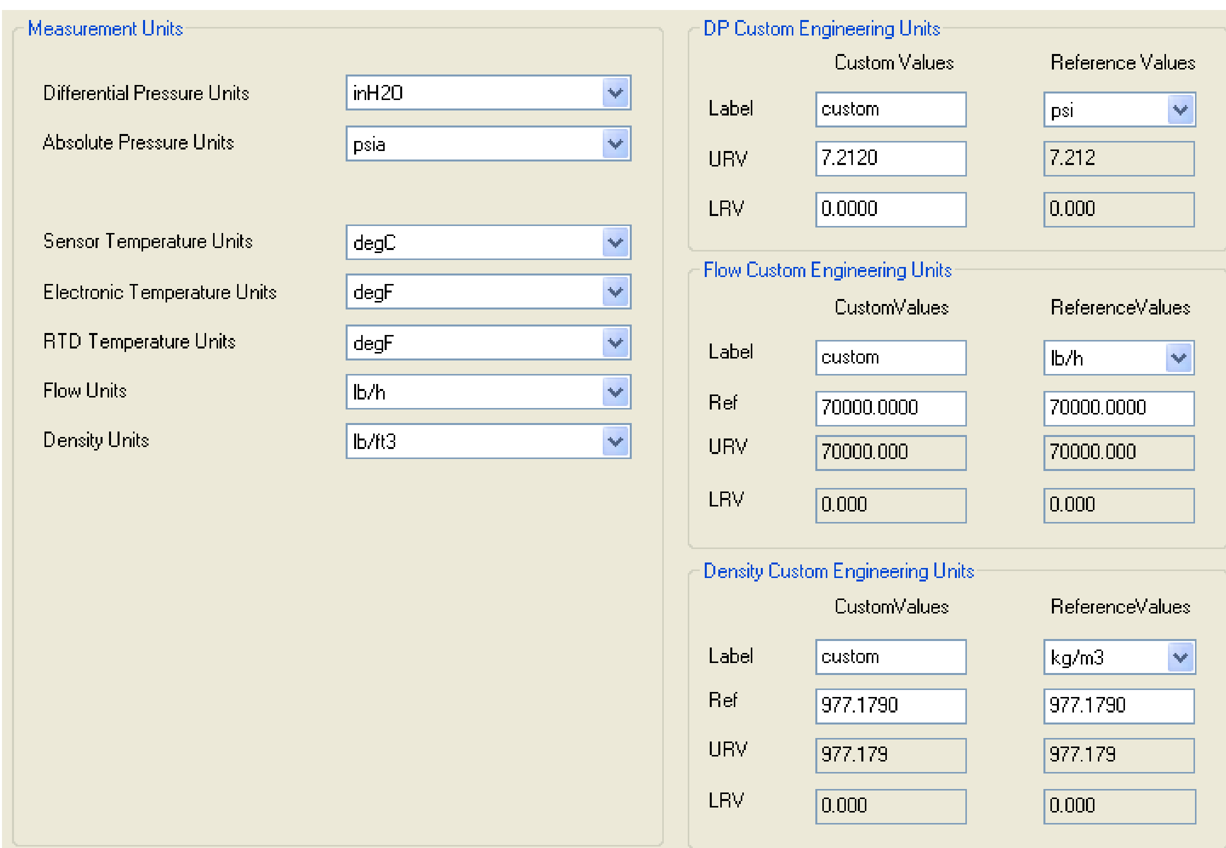


Figure 756. Sample IMV30 Transmitter Measurement Units Screen

Field	Entry
Measurement Units	
Differential Pressure Units	Select the units for differential pressure. Choose from psi, inHg, ftH2O, inH2O, atm, bar, mbar, MPa, kPa, Pa, Kgcm2, gcm2, cmHg, mmHg, torr, mH2O, cmH2O, mmH2O, and hW60.
Absolute Pressure Units	Select the units for absolute pressure. Choose from psi, inHg, ftH2O, inH2O, atm, bar, mbar, MPa, kPa, Pa, Kgcm2, gcm2, cmHg, mmHg, torr, mH2O, cmH2O, mmH2O, and hW60.
Sensor Temperature Units	Select the units for sensor temperature. Choose from degC, K, degF, and degR.
Electronic Temperature Units	Select the units for electronic temperature. Choose from degC, K, degF, and degR.
RTD Temperature Units	Select the units for RTD temperature. Choose from degC, K, degF, and degR.
Flow Units	Select the units for flow measurement. • If the flow is mapped to Mass Flow, choose units from the following list: kg/s, kg/m, kg/h, kg/d, lb/s, lb/m, lb/h, lb/d, g/s, g/m, g/h, g/d, t/h, t/d, STon/h, STon/d, LTon/h, and LTon/d. • If the flow is mapped to Volume, choose units from the following list: M3/s, M3/m, M3/h, M3/d, Ft3/s, Ft3/m, Ft3/h, Ft3/d, Gal/s, Gal/m, Gal/h, Gal/d, Bbl3/s, Bbl3/m, Bbl3/h, Bbl3/d, Bbl4/s, Bbl4/m, Bbl4/h, Bbl4/d, l/s, l/m, l/h, l/d, MI/h, MI/d, Mgal/h, Mgal/d, Mcfd, and Mmcfd. • If the flow is mapped to Standard Volume, choose units from the following list: Sm3/s, Sm3/m, Sm3/h, Sm3/d, Nm3/s, Nm3/m, Nm3/h, Nm3/d, Sft3/s, Sft3/m, Sft3/h, Sft3/d, Sgal/s, Sgal/m, Sgal/h, Sgal/d, Sbl3/s, Sbl3/m, Sbl3/h, Sbl3/d, Sbl4/s, Sbl4/m, Sbl4/h, Sbl4/d, Nl/s, Nl/m, Nl/h, Nl/d, mScfd, and mmScfd
Density Units	Select the units for density measurement. Choose from lb/ft3, lb/gal, oz/in3, kg/m3, g/cm3, lb/yd3, LT/yd3, ST/yd3, and kg/l.
DP Custom Engineering Units	
Label - Custom Values	Specify a label for the custom units. The label specified will be added to the Differential Pressure drop-down list.
Label - Reference Values	Select a reference unit that is convenient for conversion to the custom unit.
URV - Custom Values	Specify a value in custom units equal to the URV in the reference units selected.
URV - Reference Values	Displays the upper range reference value.
LRV - Custom Values	Specify a value in custom units equal to the LRV in the reference units selected.
LRV - Reference Values	Displays the lower range reference value.

Field	Entry
Flow Custom Engineering Units	
Label - Custom Values	Specify a name for the custom units.
Label - Reference Values	Select a reference unit that is convenient for conversion to the custom unit.
Ref - Custom Values	Specify the value in custom units equal to the reference value in reference units.
Ref - Reference Values	The value of the URV appears as the default value. You can change this to a number that is convenient for conversion.
URV - Custom Values	Specify the URV custom value.
URV - Reference Values	Specify the URV reference value.
LRV - Custom Values	Specify the LRV custom value.
LRV - Reference Values	Specify the LRV reference value.
Density Custom Engineering Units	
Label - Custom Values	Specify a name for the custom units.
Label - Reference Values	Select a reference unit that is convenient for conversion to the custom unit.
Ref - Custom Values	Specify the value in custom units equal to the reference value in reference units.
Ref - Reference Values	The value of the URV appears as a default value. You can change this to a number that is convenient for conversion.
URV - Custom Values	Specify the URV custom value.
URV - Reference Values	Specify the URV reference value.
LRV - Custom Values	Specify the LRV custom value.
LRV - Reference Values	Specify the LRV reference value.

Differential Pressure

The Differential Pressure screen displays the upper and lower range values, and the upper and lower range limits set for the differential pressure.

The upper and lower range values are configurable and can be set within the limits specified for the URL and LRL.

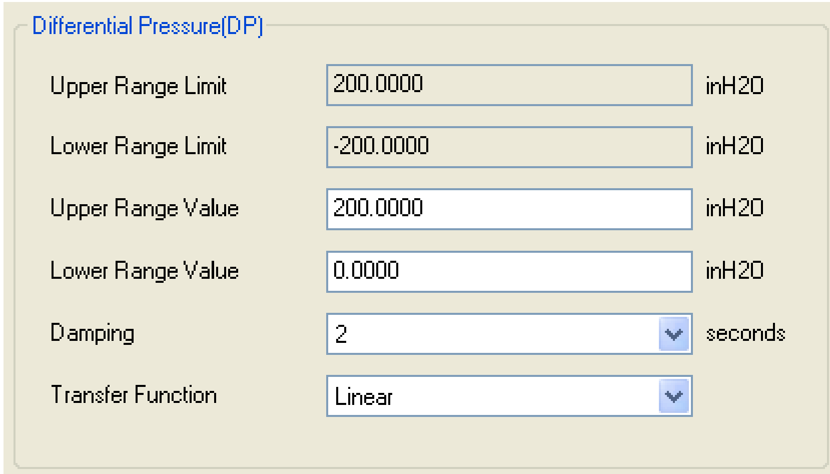


Figure 757. Sample IMV30 Transmitter Differential Pressure Screen

Field	Entry
Differential Pressure (DP)	
Upper Range Limit	Shows the upper range limit.
Lower Range Limit	Shows the lower range limit.
Upper Range Value	Specify the upper range value.
Lower Range Value	Specify the lower range value.
Damping	Select the damping time. Choose from 0, 0.25, 0.5, 1, 2, 4, 8, 16, and 32 seconds.
Transfer Function	Select the transfer function from the following options: • Linear • Square Root Linear < 20% Flow • Square Root Cutoff < 10% Flow

Absolute Pressure

The Absolute Pressure screen displays the upper and lower range limits and values for the differential pressure.

The upper and lower range values are configurable and can be set within the limits specified for the URL and LRL.

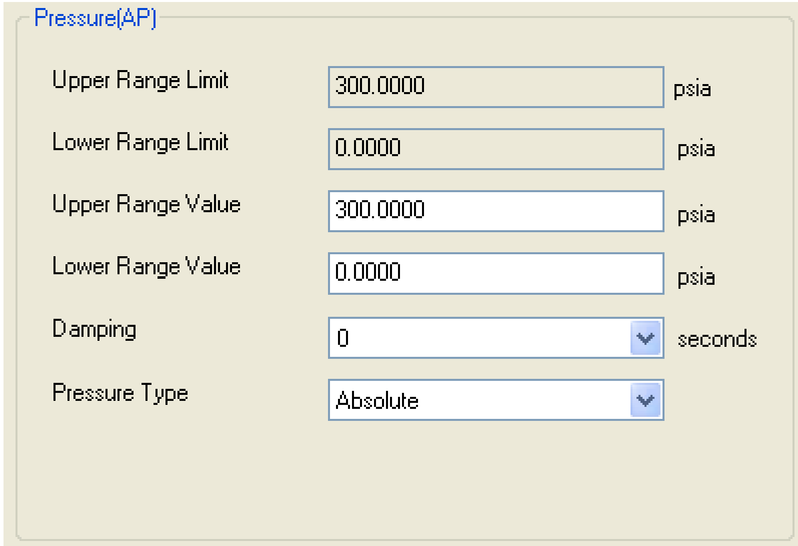


Figure 758. Sample IMV30 Transmitter Absolute Pressure Screen

Field	Entry
Pressure (AP)	
Upper Range Limit	Shows the upper range limit.
Lower Range Limit	Shows the lower range limit.
Upper Range Value	Specify the upper range value.
Lower Range Value	Specify the lower range value.
Damping	Select the absolute pressure damping time. Choose from 0, 0.25, 0.5, 1, 2, 4, 8, 16, and 32 seconds.
Pressure Type	Select the pressure type. Choose from Absolute or Gauge.

Sensor Temperature

The Sensor Temperature screen displays the upper and lower range limits and values for the sensor temperature.

The upper and lower range values are configurable and can be set within the limits specified for the URL and LRL.

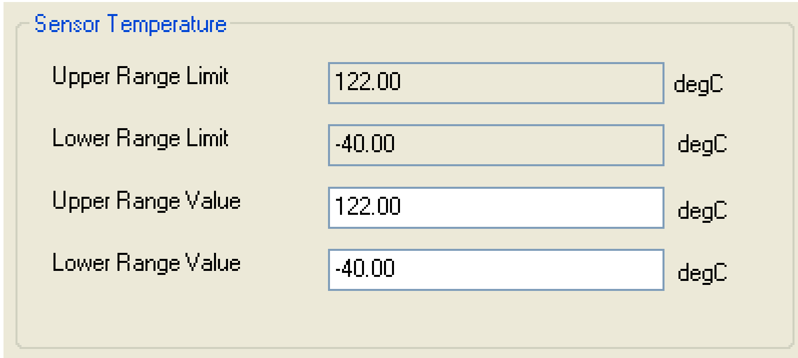


Figure 759. Sample IMV30 Transmitter Sensor Temperature Screen

Field	Entry
Sensor Temperature	
Upper Range Limit	Shows the upper range limit.
Lower Range Limit	Shows the lower range limit.
Upper Range Value	Specify the upper range value.
Lower Range Value	Specify the lower range value.

Electronic Temperature

The Electronic Temperature screen displays the upper and lower range limits and values for the electronics temperature.

The upper and lower range values can be set within the limits specified for the URL and the LRL.

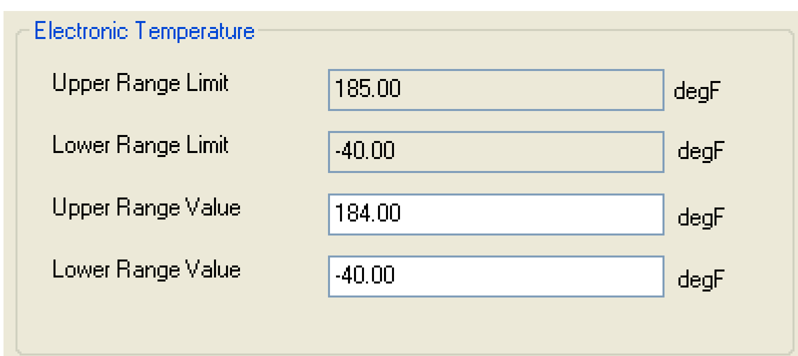


Figure 760. Sample IMV30 Transmitter Electronic Temperature Screen

Field	Entry
Electronic Temperature	
Upper Range Limit	Shows the upper range limit.
Lower Range Limit	Shows the lower range limit.
Upper Range Value	Specify the upper range value.
Lower Range Value	Specify the lower range value.

RTD Temperature

The RTD Temperature screen displays the upper and lower range limits for the RTD temperature, and allows you to set the upper and lower values to measure RTD temperature.

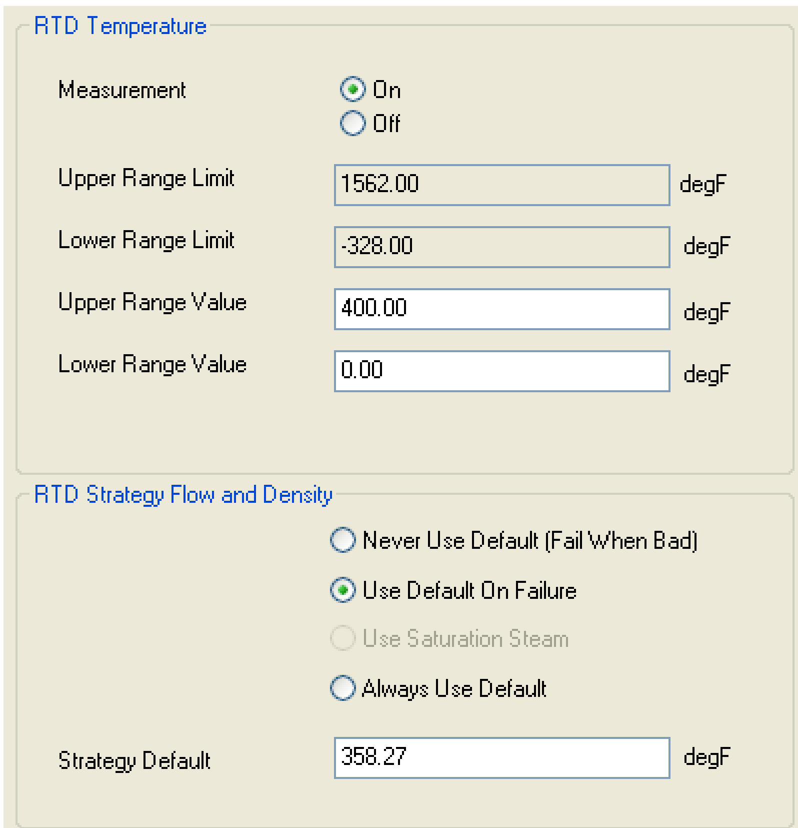


Figure 761. Sample IMV30 Transmitter RTD Temperature Screen

Field	Entry
RTD Temperature	
Measurement	Select On to turn on or Off to turn off the RTD measurement.
Upper Range Limit	Shows the upper range limit for the RTD temperature.
Lower Range Limit	Shows the lower range limit for the RTD temperature.
Upper Range Value	Specify the upper range value for RTD temperature.

Field	Entry
Lower Range Value	Specify the lower range value for RTD temperature.
RTD Strategy Flow and Density	
RTD Strategy Flow and Density	Select an option for RTD strategy. • Never Use Default (Fail When Bad) - select if you choose not to use the default value • Use Default on Failure - select if you choose to use default value on RTD failure • Use Saturation Steam - this is enable if you choose to calculate saturated steam without using RTD temperature • Always Use Default - select if you choose to use a default value
Strategy Default	This parameter is enabled in the event of an RTD sensor failure. Specify the RTD strategy default value.

Density

The Density screen displays the upper and lower range limits for density measurement, and allows you to set upper and lower range values to measure density.

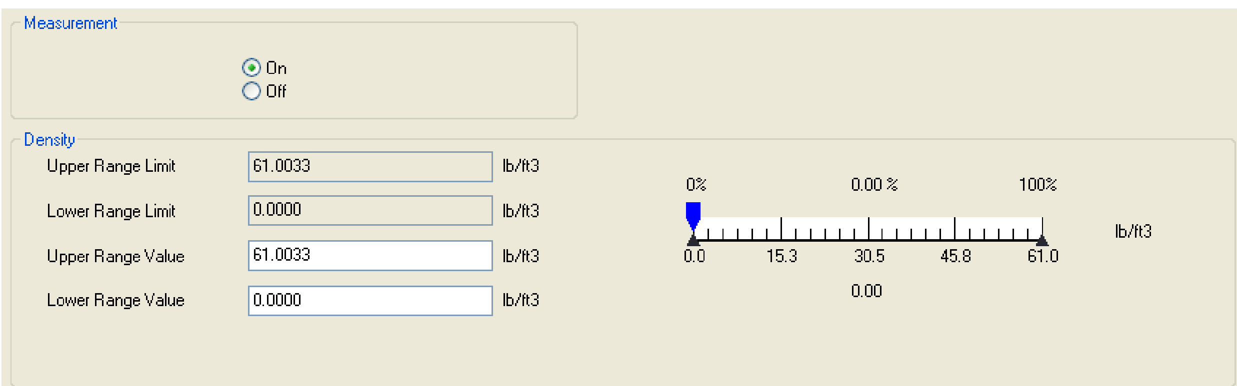


Figure 762. Sample IMV30 Transmitter Density Screen

Field	Entry
Measurement	
Measurement	Select On to turn on or Off to turn off the density measurement.
Upper Range Limit	Shows the upper range limit for the density measurement.
Lower Range Limit	Shows the lower range limit for the density measurement.
Upper Range Value	Specify the upper range value for density measurement.
Lower Range Value	Specify the lower range value for density measurement.

Flow

The Flow screen displays the upper and lower range limits to measure the flow, and allows you to set upper and lower range values for flow measurement.

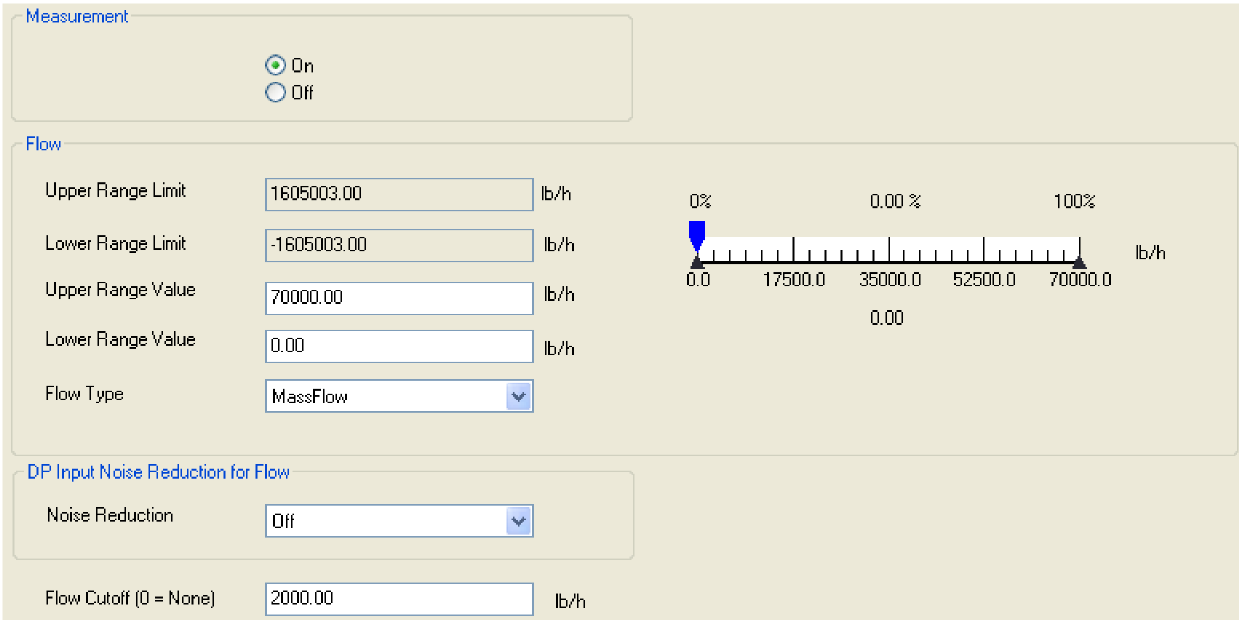


Figure 763. Sample IMV30 Transmitter Flow Screen

Field	Entry
Measurement	
Measurement	Select On to turn on or Off to turn off the flow measurement.
Flow	
Upper Range Limit	Shows the upper range limit to measure flow.
Lower Range Limit	Shows the lower range limit to measure flow.
Upper Range Value	Specify the upper range value to measure flow.
Lower Range Value	Specify the lower range value to measure flow.
Flow Type	Select the flow type. Choose from MassFlow, Volume, and Standard Volume.
DP Input Noise Reduction for Flow	
Noise Reduction	Select On to turn on or Off to turn off the noise reduction feature.
Flow Cutoff (0=None)	Specify the flow cutoff value.

Display Flow Data

The Display Flow Data screen is used to display all the details of the flow rate application, including fluid, primary device type, flow measurement standard, pipe and primary device materials, pipe and primary device bore sizes, and so forth. It also displays the calculated density and flow rate at normal operating conditions.

— NOTE

The configuration of this flow data must be accomplished using PCMV.

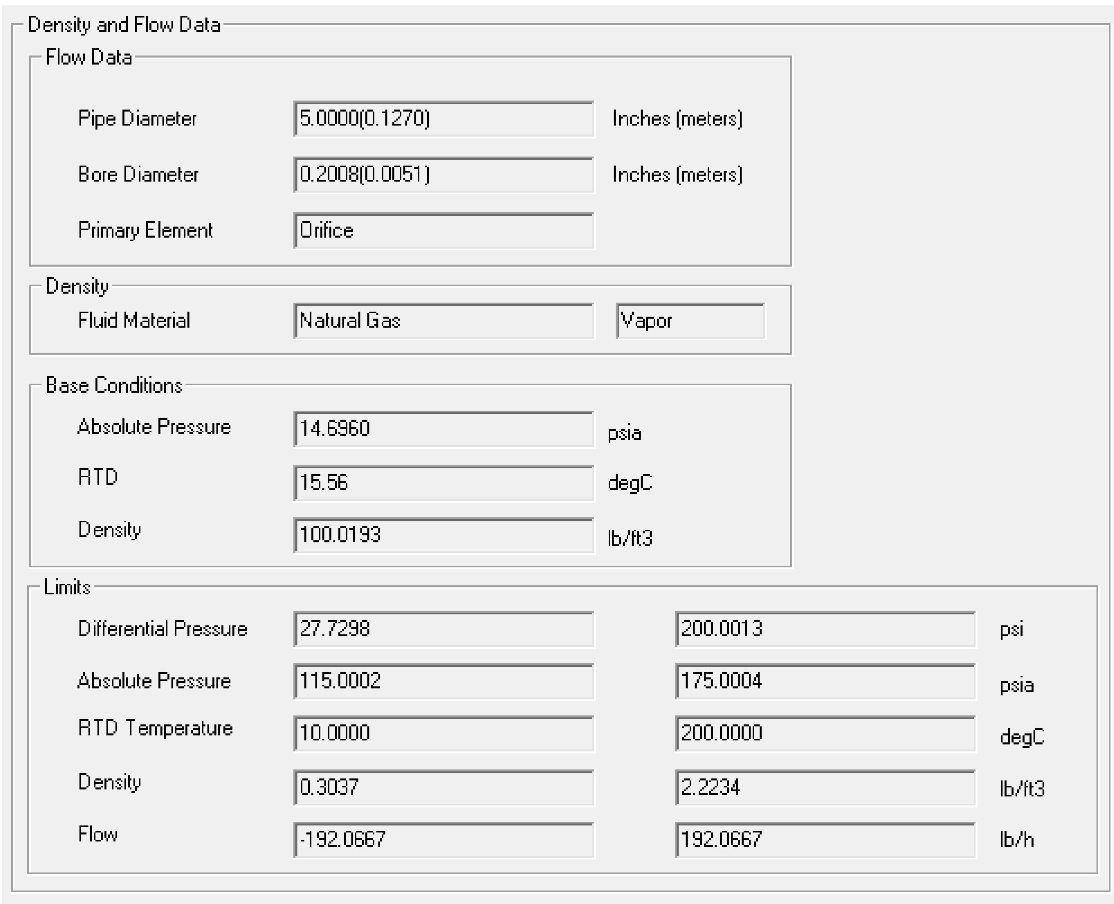


Figure 764. Sample IMV30 Transmitter Display Flow Data Screen

Field	Entry
Density and Flow Data	
Flow Data	
Pipe Diameter	Shows the diameter of the pipe.
Bore Diameter	Shows the diameter of the bore.
Primary Element	Shows the primary element of the orifice plate.
Density	
Fluid Material	Shows the fluid and the fluid state.

Field	Entry
Base Conditions	
Absolute Pressure	Shows the absolute pressure.
RTD Temperature	Shows the RTD temperature.
Density	Shows the density.
Limits	
Differential Pressure	Shows the differential pressure limits in the selected engineering units.
Absolute Pressure	Shows the absolute pressure limits in the selected engineering units.
RTD Temperature	Shows the RTD temperature limits in the selected engineering units.
Density	Shows the limits for density measurement in the selected engineering units.
Flow	Shows the limits for flow measurement in the selected engineering units.

Output

HART

The HART screen allows you to set HART polling address, and the number of response preambles. It also displays the number of request preambles in the HART message.

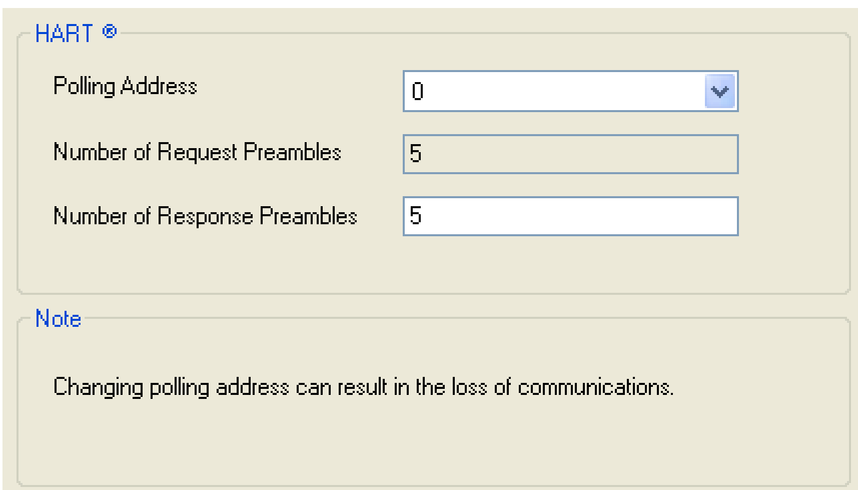


Figure 765. Sample IMV30 Transmitter HART Output Screen

Field	Entry
HART	
Polling Address	Select the HART polling address from a range of 0 to 15.
Number of Request Preambles	Shows the number of preambles to be sent in a request message from the transmitter to the host.
Number of Response Preambles	Specify the number of response preambles.

Local Display Access

The Local Display Access screen is where you can set password that allows you to change the configuration and calibration at the local display.

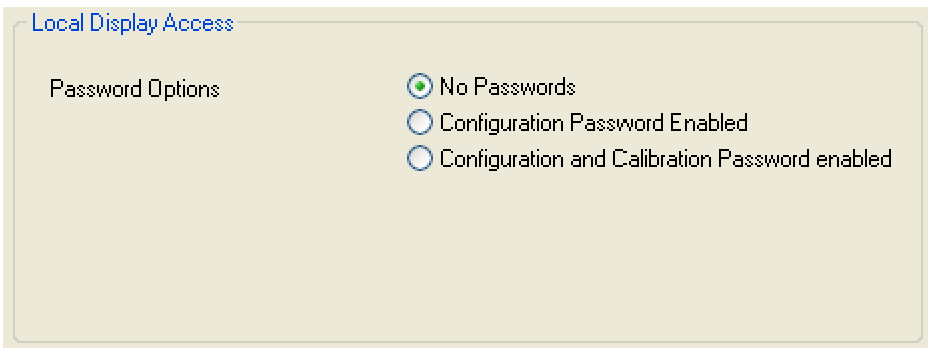


Figure 766. Sample IMV30 Transmitter Local Display Access Screen

Field	Entry
Local Display Access	
Password Options	Select a password option. Choose from No Passwords, Configuration Password Enabled, and Configuration and Calibration Password enabled.

Device Information

The Device Information screen displays the complete information of the device. The final assembly number, tag, descriptor, message, and date of last calibration of the device can be set as per the user preference.

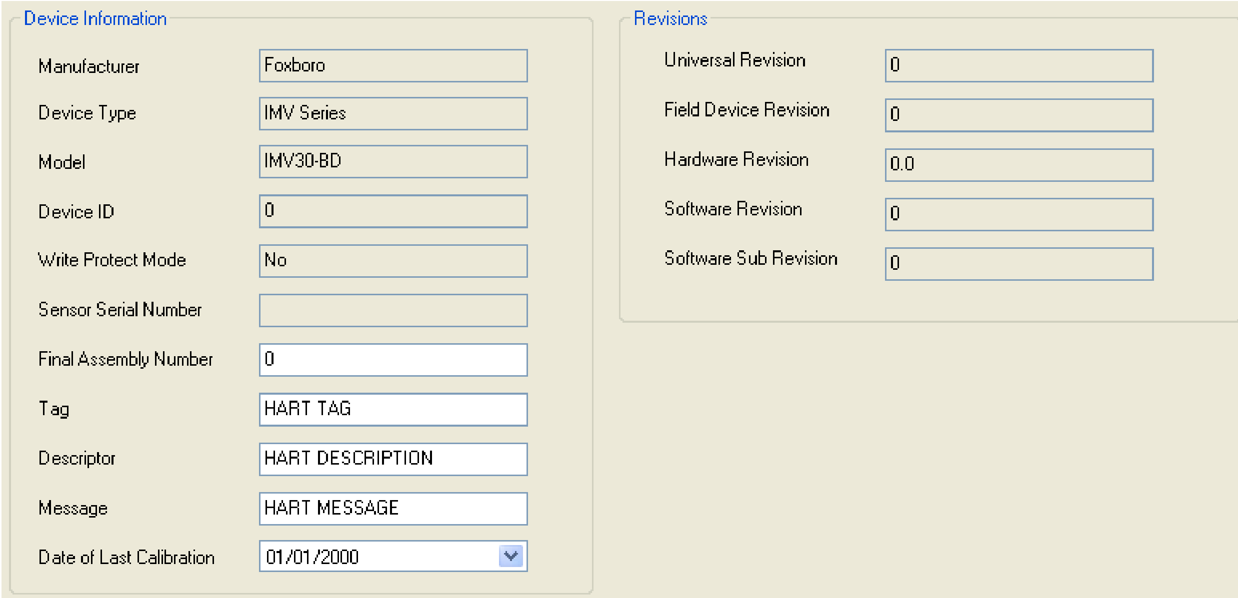


Figure 767. Sample IMV30 Transmitter Device Information Screen

Field	Entry
Device Information	
Manufacturer	Shows the name of the manufacturer of the device.
Device Type	Shows the device type.
Model	Shows the model number and sensor code of the device.
Device ID	Shows the device ID.
Write Protect Mode	Shows whether variables can be written to the field device or whether commands that cause actions to be performed in the field device can or cannot occur.
Sensor Serial Number	Shows the serial number of the device.
Final Assembly Number	Specify the final assembly number of the device.
Tag	Specify a unique name for the device tag. You can use up to 8 characters.
Descriptor	Specify a description for the device. You can use up to 16 characters.
Message	Specify the HART message. You can use up to 32 characters.
Date of Last Calibration	Specify the date of last calibration.
Revisions	
Universal Revision	Shows the universal command set revision level.
Field Device Revision	Shows the field device revision level.
Hardware Revision	Shows the hardware revision level.
Software Revision	Shows the software revision level.
Software Sub Revision	Shows the software sub revision level.

Device Status

Device Status

The Device Status screen shows the current status of the device. The status of each parameter is recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

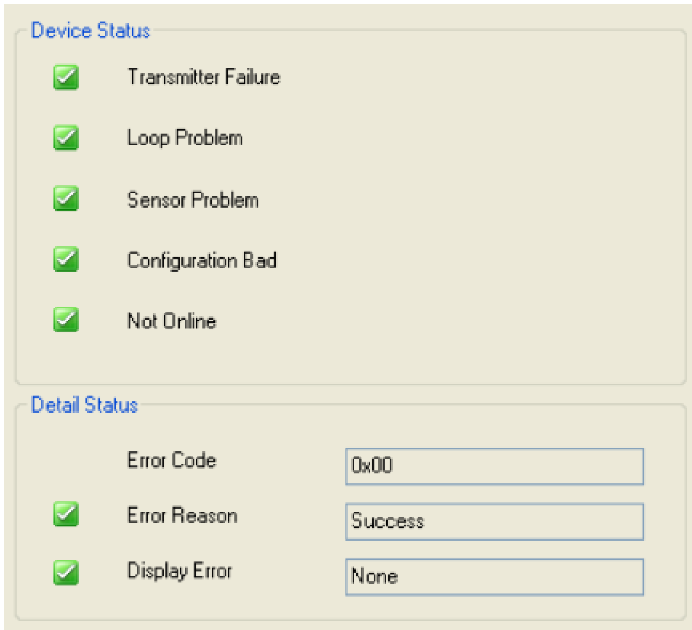


Figure 768. Sample IMV30 Transmitter Device Status Screen

HART Status

The HART Status screen shows the HART status as well as the field device status.

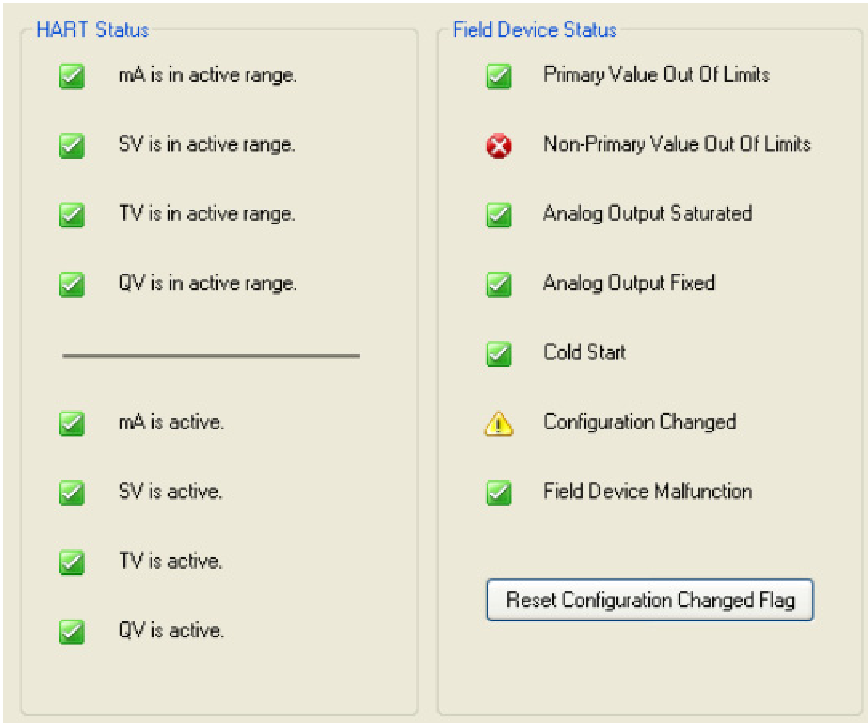


Figure 769. Sample IMV30 Transmitter HART Status Screen

Calibration

DAC Trim

DAC Trim calibration allows you to set the loop current to either 4 mA (zero) or 20 mA (span). By providing the inputs to the following screens, the values indicated by a suitable reference like a digital multimeter, the transmitter can trim its output. DAC Trim performs 4 mA and 20 mA calibration points respectively.

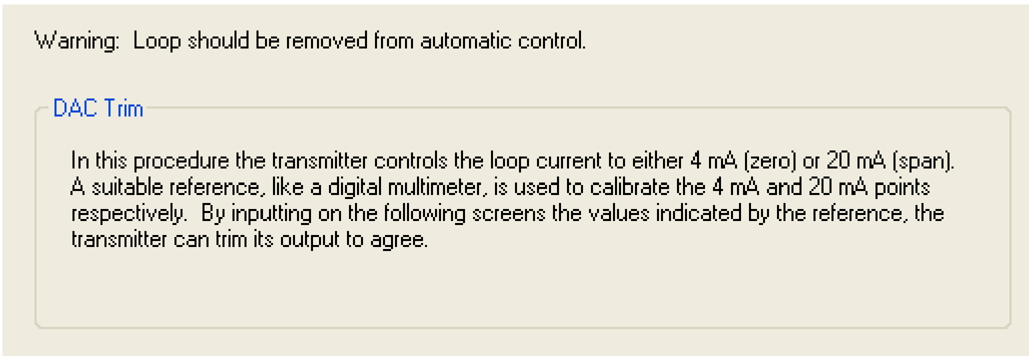


Figure 770. Sample IMV30 Transmitter DAC Trim Screen 1

NOTE

DAC Trim calibration is allowed only when the mA is active in HART status and the polling address is set to zero.

Click Next in the following screens to continue the calibration process.

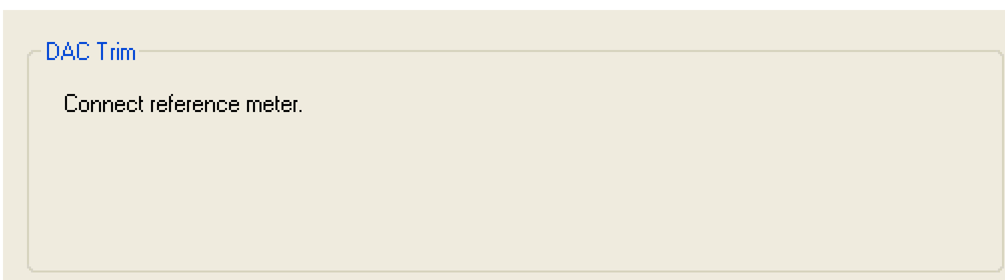


Figure 771. Sample IMV30 Transmitter DAC Trim Screen 2

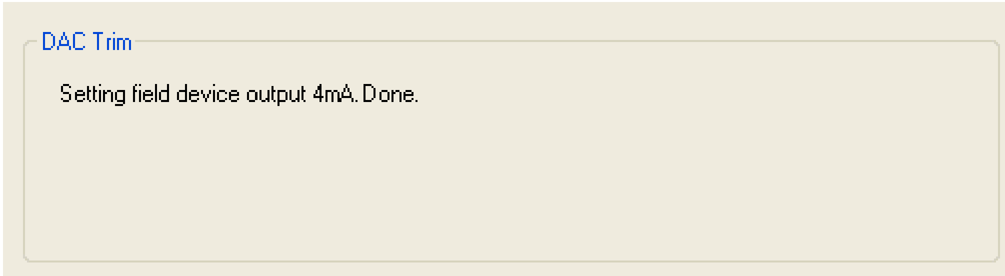


Figure 772. Sample IMV30 Transmitter DAC Trim Screen 3

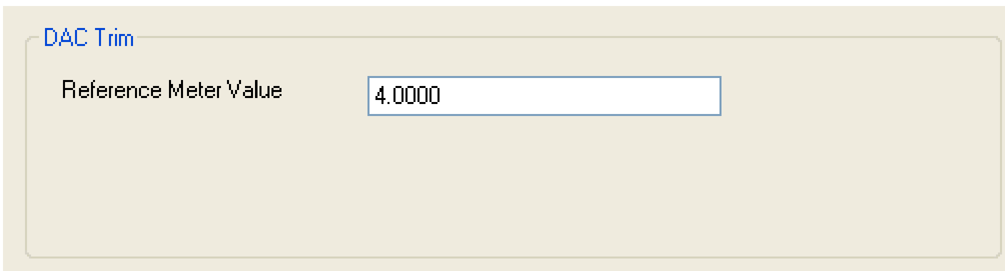


Figure 773. Sample IMV30 Transmitter DAC Trim Screen 4

Field	Entry
DAC Trim	
Reference Meter Value	Specify the value for the reference meter.

Click Next, and the following screen appears.

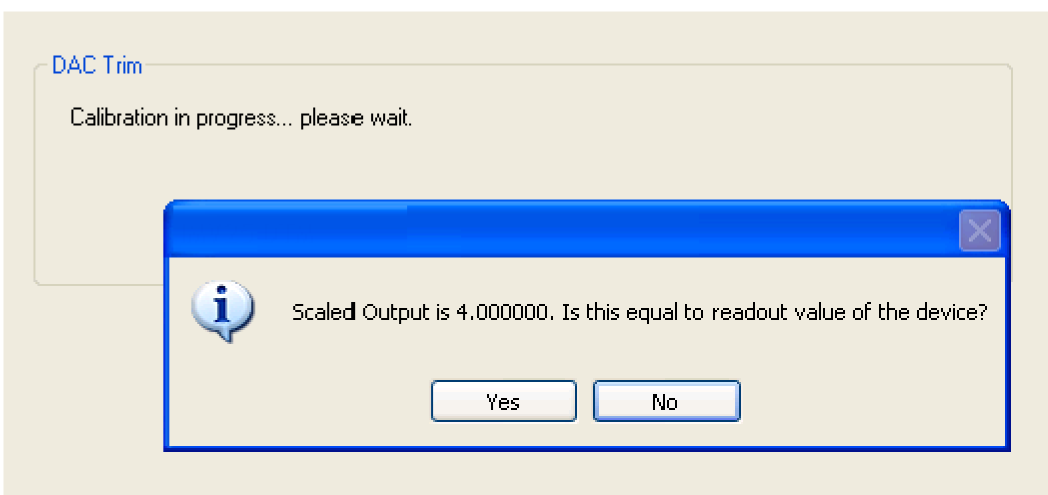


Figure 774. Sample IMV30 Transmitter DAC Trim Screen 5

Click Yes to continue the calibration process. The following screen appears. If you click No, enter a value from the reference meter. Refer to Figure 776.

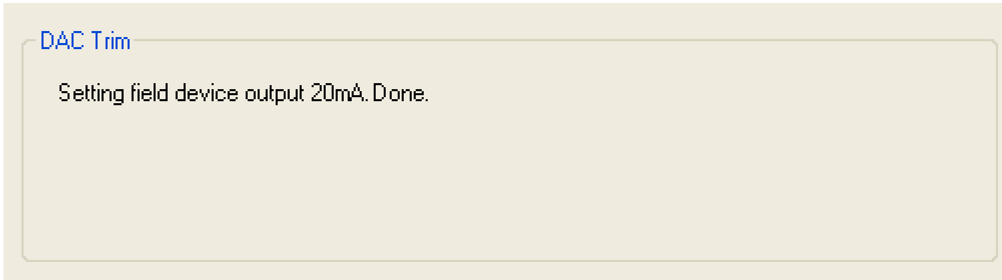


Figure 775. Sample IMV30 Transmitter DAC Trim Screen 6

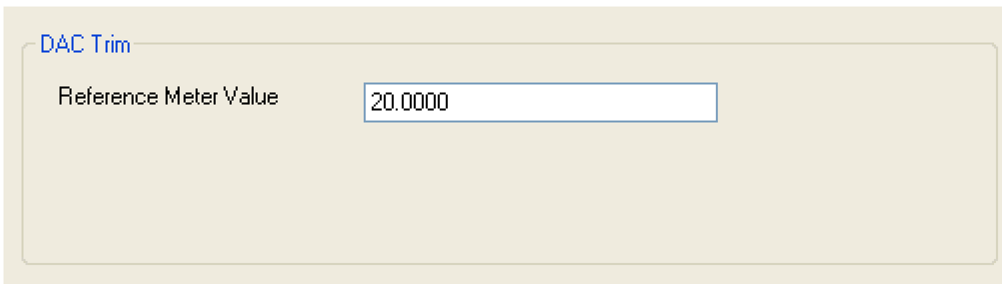


Figure 776. Sample IMV30 Transmitter DAC Trim Screen 7

Field	Entry
DAC Trim	
Reference Meter Value	Specify a value from the reference meter.

Click Next, and the following screen appears.

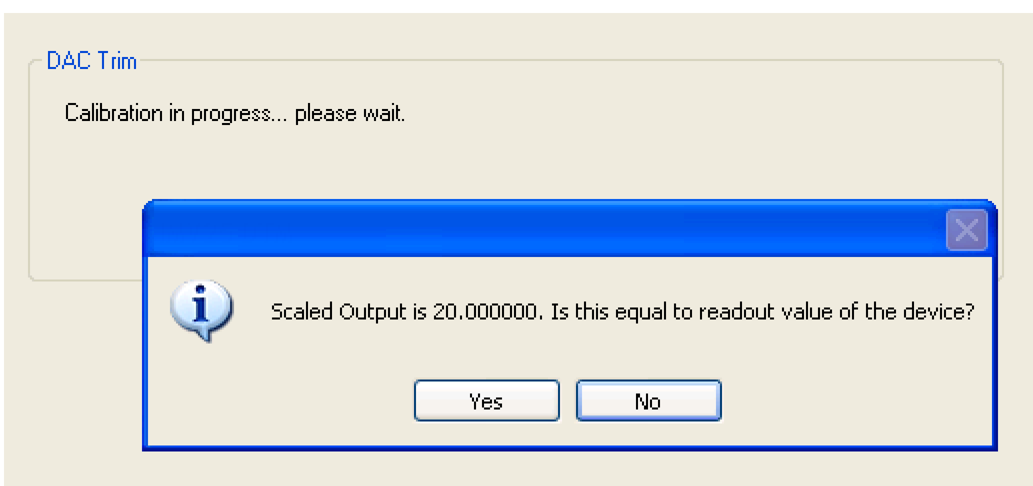


Figure 777. Sample IMV30 Transmitter DAC Trim Screen 8

Click Yes to complete the DAC trim calibration.

If you click No, enter a value for reference meter.

The following screen appears if the DAC Trim calibration is completed successfully.

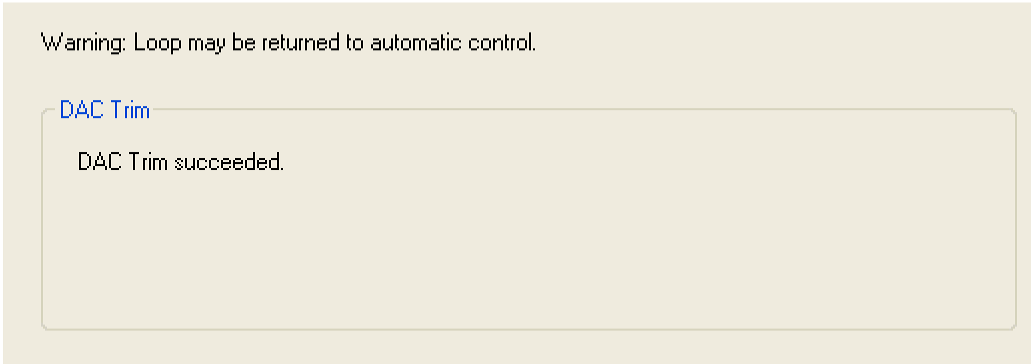


Figure 778. Sample IMV30 Transmitter DAC Trim Screen 9

Scaled DAC Trim

This procedure is the same as the DAC Trim procedure described in the previous section except that the 4 and 20 mA points are scaled to whatever units are required by the readout or control devices. For example, if the readout device is a voltmeter, across a 250 Ω resistor, the 4 and 20 mA points would correspond to 1 and 5 volts, respectively.

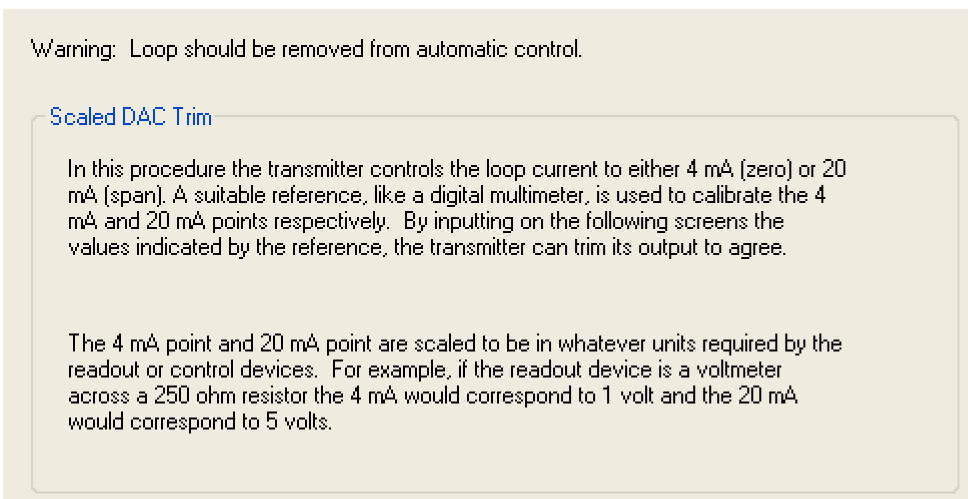


Figure 779. Sample IMV30 Transmitter Scaled DAC Trim Screen 1

NOTE

Scaled DAC Trim calibration is allowed only when the mA is active in HART status and the polling address is set to zero.

Click Next. The following screen appears.

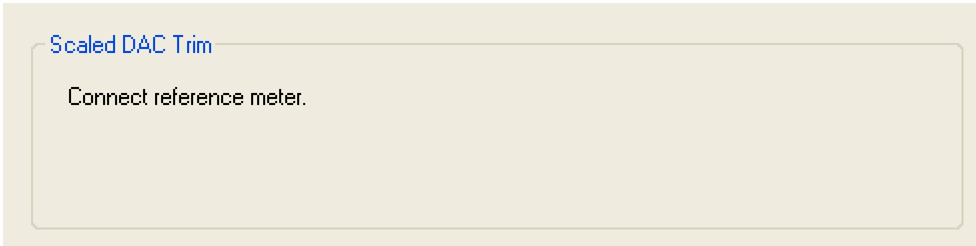


Figure 780. Sample IMV30 Transmitter Scaled DAC Trim Screen 2

Field	Entry
Scaled DAC Trim	
Low Value	Specify the scaled value that will be mapped to 4 mA.
High Value	Specify the scaled value that will be mapped to 20 mA.

Click Next in the following screens to continue the calibration process.

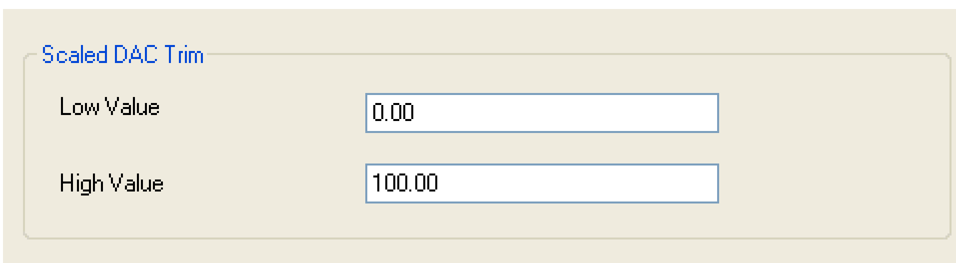


Figure 781. Sample IMV30 Transmitter Scaled DAC Trim Screen 3

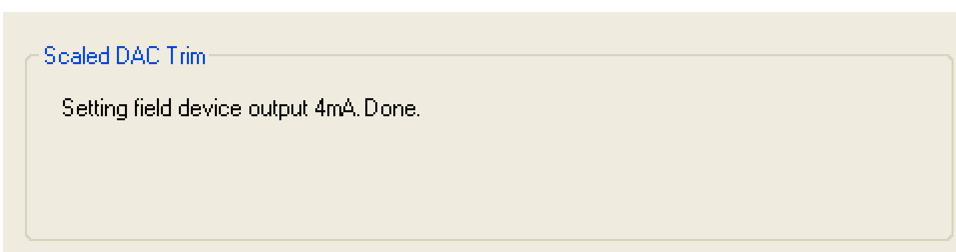


Figure 782. Sample IMV30 Transmitter Scaled DAC Trim Screen 4

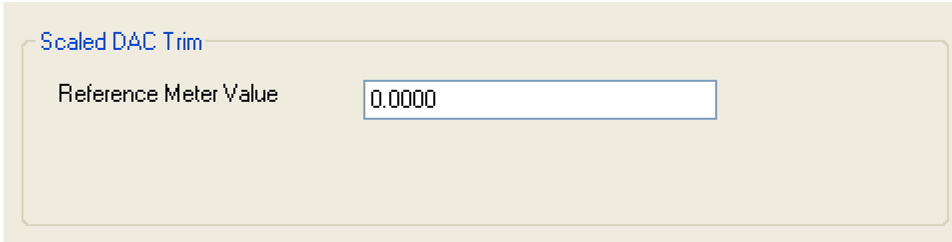


Figure 783. Sample IMV30 Transmitter Scaled DAC Trim Screen 5

Field	Entry
Scaled DAC Trim	
Reference Meter Value	Specify the reference meter value for scaled DAC trim at the 4 mA point.

Click Next, and the following screen appears.

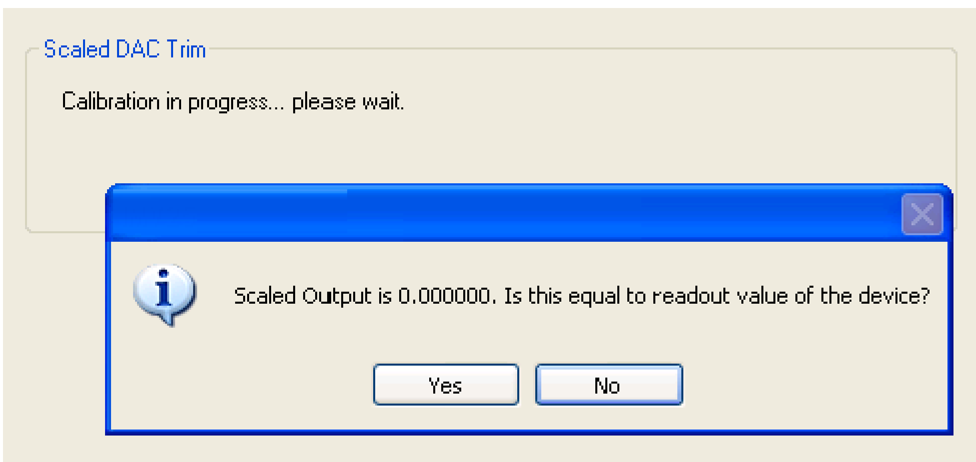


Figure 784. Sample IMV30 Transmitter Scaled DAC Trim Screen 6

Click Yes, and then click Next to continue the calibration process. The screen appears as shown in Figure 785. If you click No, the screen appears as shown in Figure 786.

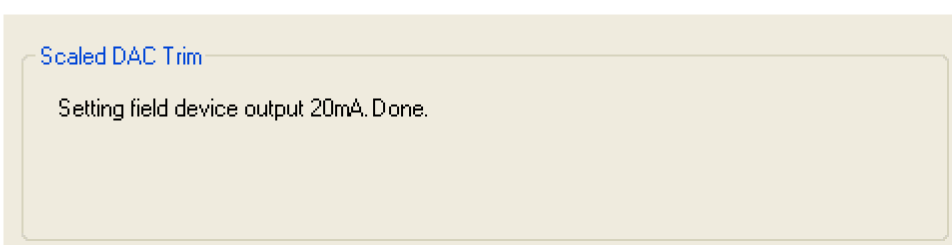


Figure 785. Sample IMV30 Transmitter Scaled DAC Trim Screen 7

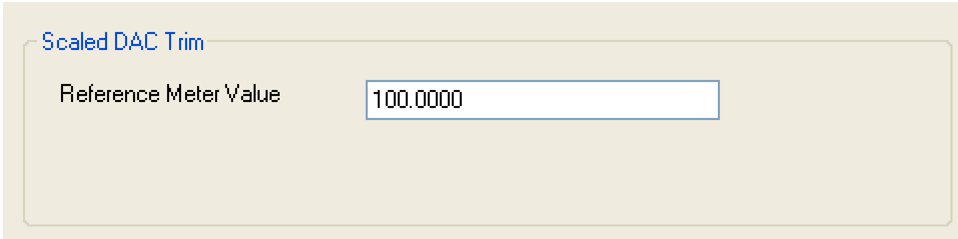


Figure 786. Sample IMV30 Transmitter Scaled DAC Trim Screen 8

Field	Entry
Scaled DAC Trim	
Reference Meter Value	Specify the reference meter value for DAC trim at the 20 mA point.

Click Next, and the following screen appears.

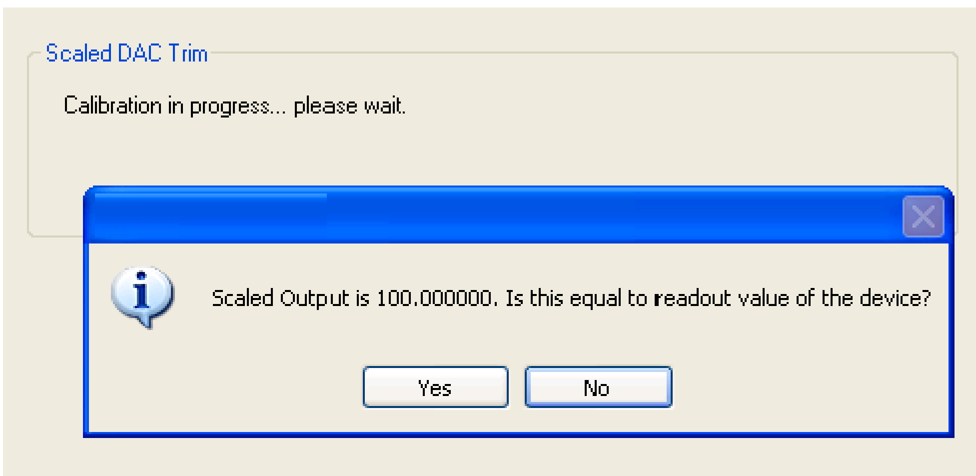


Figure 787. Sample IMV30 Transmitter Scaled DAC Trim Screen 9

Click Yes to complete the Scaled DAC trim calibration. If you click No, enter the reference meter value and continue the calibration process.

The following screen appears if the DAC Trim calibration is completed successfully.

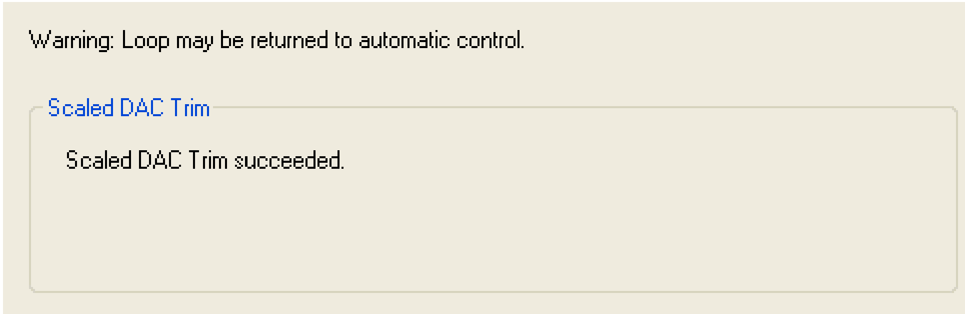


Figure 788. Sample IMV30 Transmitter Scaled DAC Trim Screen 10

Differential Pressure

The Differential Pressure screen allows you to calibrate differential pressure at zero value, LRV, URV, 1 user point, and 2 user points.

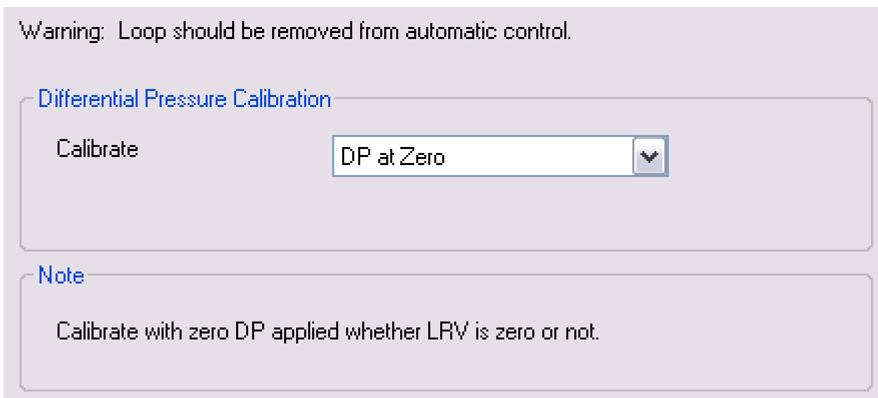


Figure 789. Sample IMV30 Transmitter Differential Pressure Calibration Screen 1

Field	Entry
Differential Pressure Calibration	
Calibrate	Select an option from the drop-down list to calibrate differential pressure. Choose from DP at Zero, DP at LRV, DP at URV, DP at 1 User Point, and DP at 2 User Points.

— NOTE —
If you select:
DP at 1 User Point - Calibration is performed at 1 user entered point.
DP at 2 User Points - Calibration is performed at 2 user entered points.

Click Next to start the calibration process.

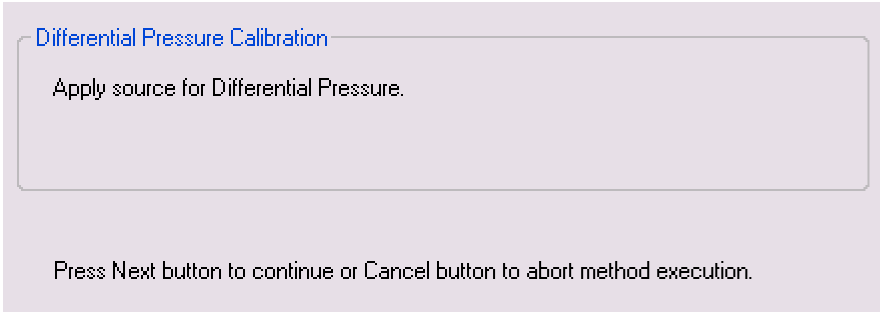


Figure 790. Sample IMV30 Transmitter Differential Pressure Calibration Screen 2

Click Next in the following screens to continue the calibration process.

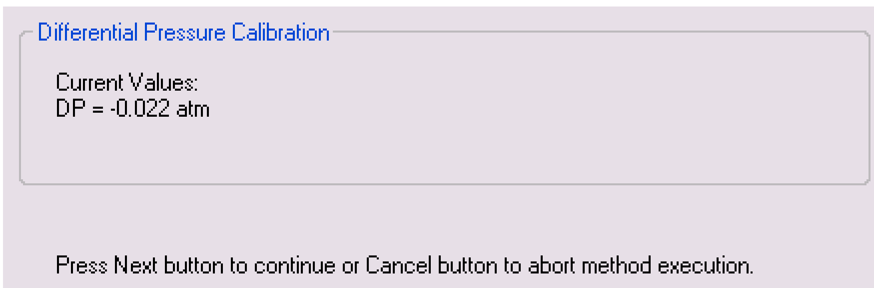


Figure 791. Sample IMV30 Transmitter Differential Pressure Calibration Screen 3

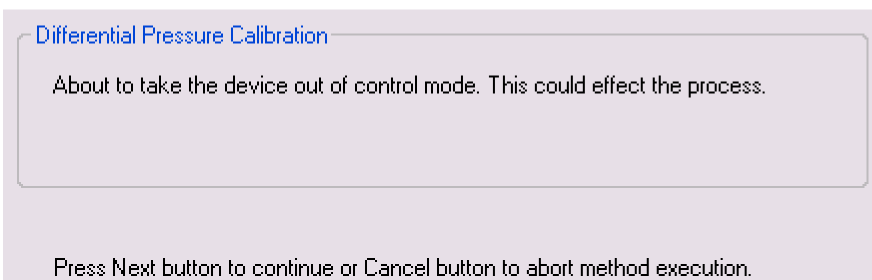


Figure 792. Sample IMV30 Transmitter Differential Pressure Calibration Screen 4

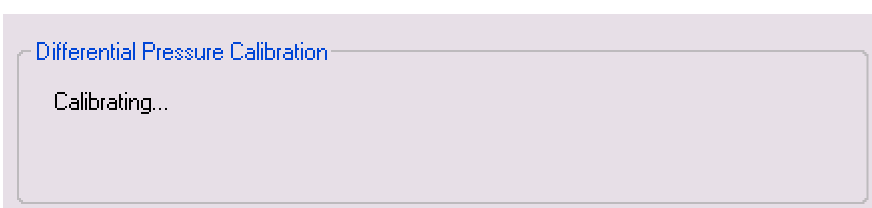


Figure 793. Sample IMV30 Transmitter Differential Pressure Calibration Screen 5

When the calibration is completed successfully, the following screen appears. Click OK.

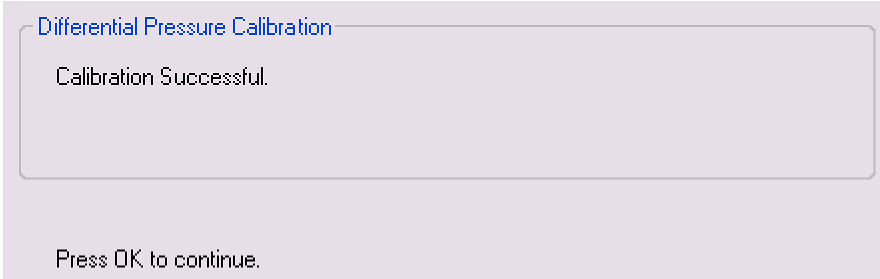


Figure 794. Sample IMV30 Transmitter Differential Pressure Calibration Screen 6

Absolute Pressure

Absolute Pressure is the pressure at the sensor connection. This screen allows you to calibrate absolute pressure at pressure, the lower range value, the upper range value, 1 user point, and 2 user points.

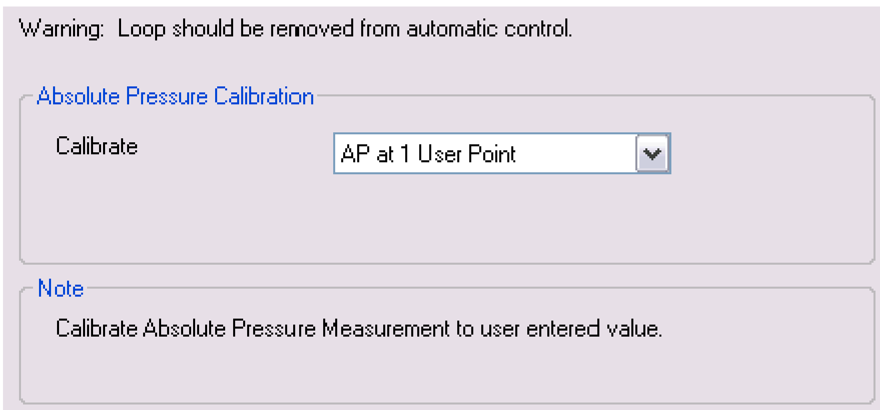


Figure 795. Sample IMV30 Transmitter Absolute Pressure Calibration Screen 1

Field	Entry
Absolute Pressure Calibration	
Calibrate	Select an option from the drop-down list to calibrate absolute pressure. Choose from AP at Pressure, AP at LRV, AP at URV, AP at 1 User Point, and AP at 2 User Points. • AP at Pressure - allows calibration at specified pressure • AP at LRV - allows calibration at specified lower range value • AP at URV - allows calibration at specified upper range value • AP at 1 User Point - allows bench pressure calibration at 1 user determined point • AP at 2 User Points - allows bench pressure calibration at 2 user determined points

Click Next to start the calibration process.

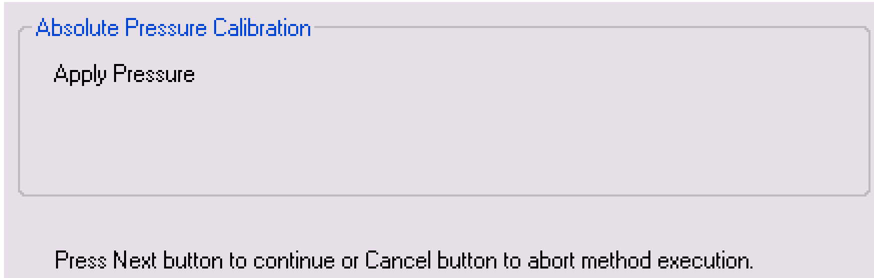


Figure 796. Sample IMV30 Transmitter Absolute Pressure Calibration Screen 2

Click Next in the following screens to continue the calibration process.

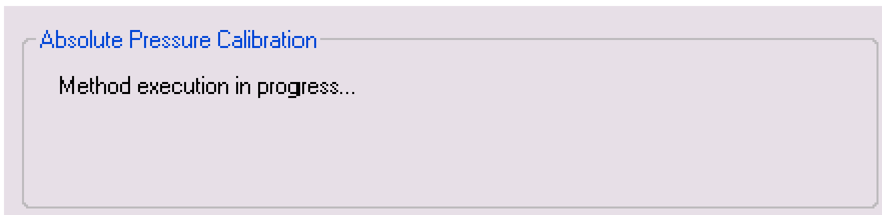


Figure 797. Sample IMV30 Transmitter Absolute Pressure Calibration Screen 3

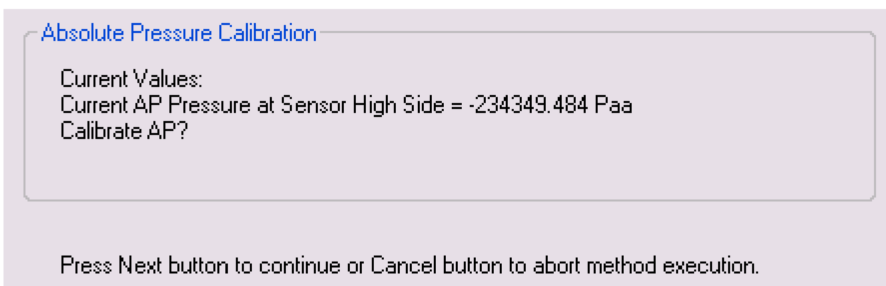


Figure 798. Sample IMV30 Transmitter Absolute Pressure Calibration Screen 4

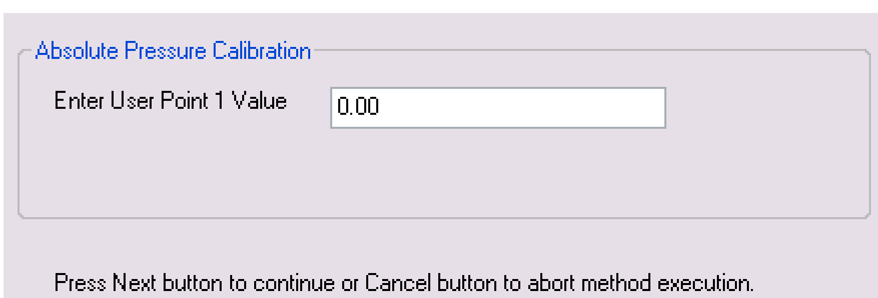


Figure 799. Sample IMV30 Transmitter Absolute Pressure Calibration Screen 5

Field	Entry
Absolute Pressure Calibration	
Enter User Point 1 Value[a]	Specify a value for absolute pressure calibration.

a. This parameter varies based on the option selected for AP calibration. If you select ‘AP at 2 User Points’, you need to enter two values for calibration.

Click Next in the following screens to continue the calibration process.

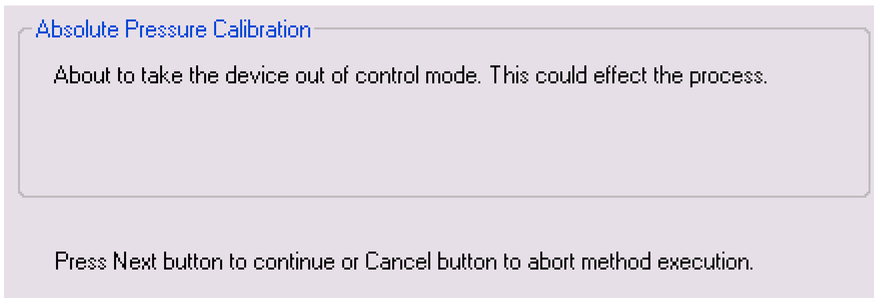


Figure 800. Sample IMV30 Transmitter Absolute Pressure Calibration Screen 6

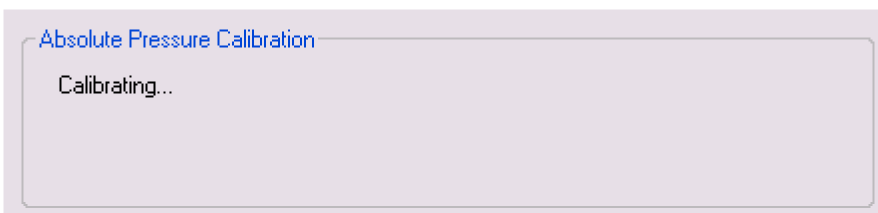


Figure 801. Sample IMV30 Transmitter Absolute Pressure Calibration Screen 7

When the calibration is completed successfully, the following screen appears. Click OK.

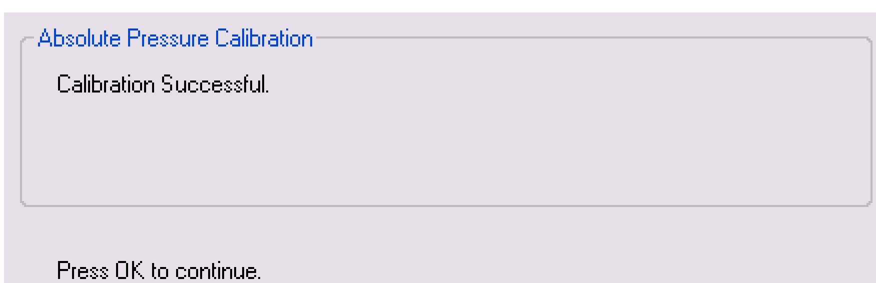


Figure 802. Sample IMV30 Transmitter Absolute Pressure Calibration Screen 8

RTD Temperature

The RTD Temperature Calibration screen allows you to calibrate the RTD temperature at user-defined points.

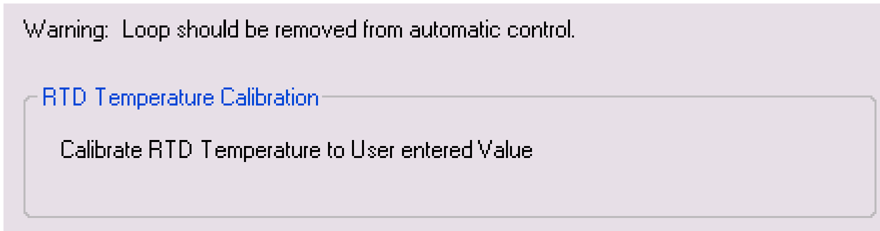


Figure 803. Sample IMV30 Transmitter RTD Temperature Calibration Screen 1

Click Next to start the calibration process.

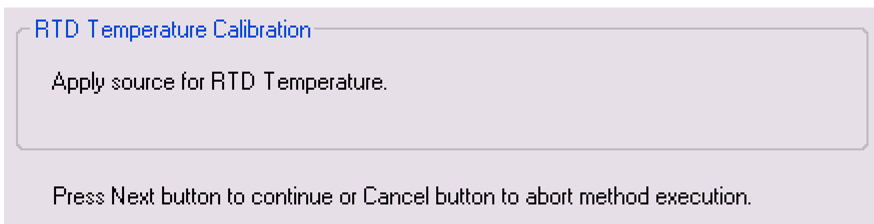


Figure 804. Sample IMV30 Transmitter RTD Temperature Calibration Screen 2

Click Next in the following screens to continue the calibration process.

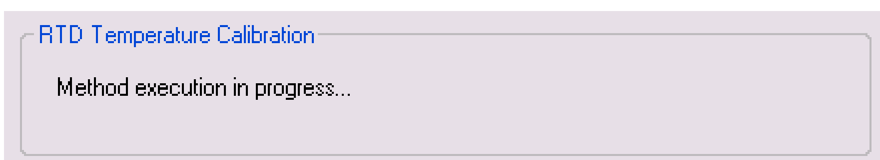


Figure 805. Sample IMV30 Transmitter RTD Temperature Calibration Screen 3

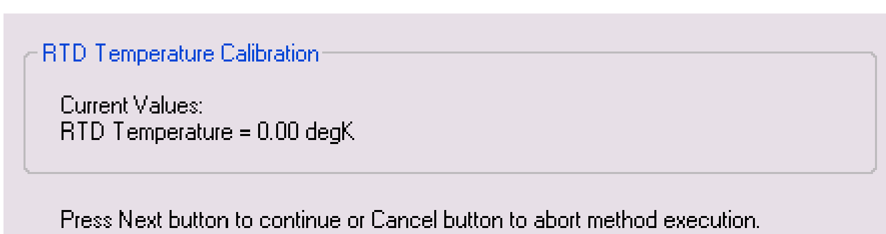


Figure 806. Sample IMV30 Transmitter RTD Temperature Calibration Screen 4

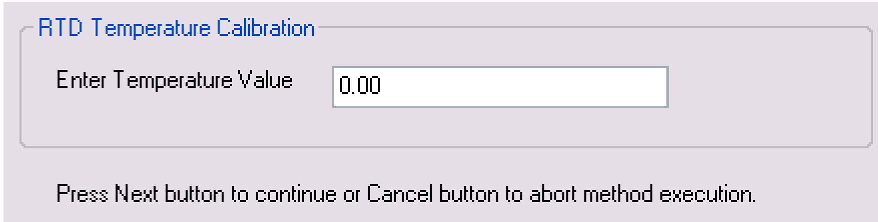


Figure 807. Sample IMV30 Transmitter RTD Temperature Calibration Screen 5

Field	Entry
RTD Temperature Calibration	
Enter Temperature Value	Specify a value for RTD temperature calibration.

Click Next in the following screens to continue the calibration process.

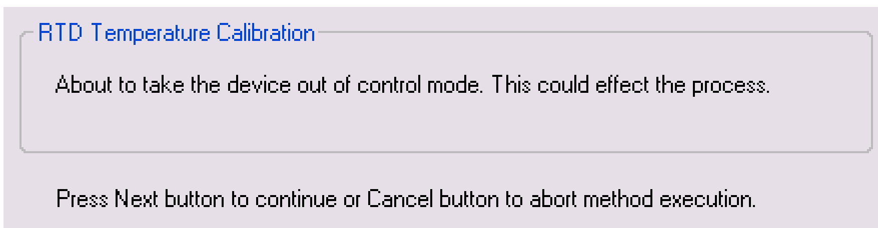


Figure 808. Sample IMV30 Transmitter RTD Temperature Calibration Screen 6

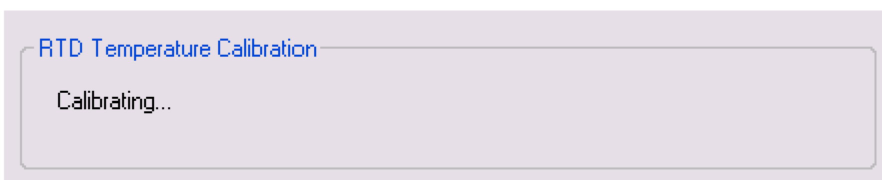


Figure 809. Sample IMV30 Transmitter RTD Temperature Calibration Screen 7

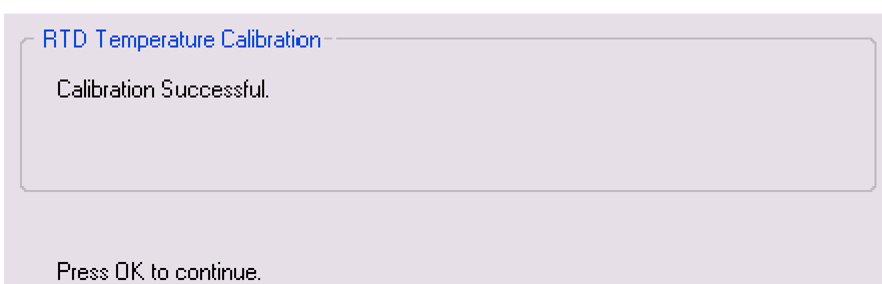


Figure 810. Sample IMV30 Transmitter RTD Temperature Calibration Screen 8

Click OK to complete the calibration.

Test Device Equations

The Test Device Equations screen enables you to test the tank configuration for raw sensor inputs and displays the calculated level data (density, pressure and level values) outputted from the transmitter. To use this function, enter test values Raw Inputs fields and click Apply. The level data calculated for the given inputs is displayed below.

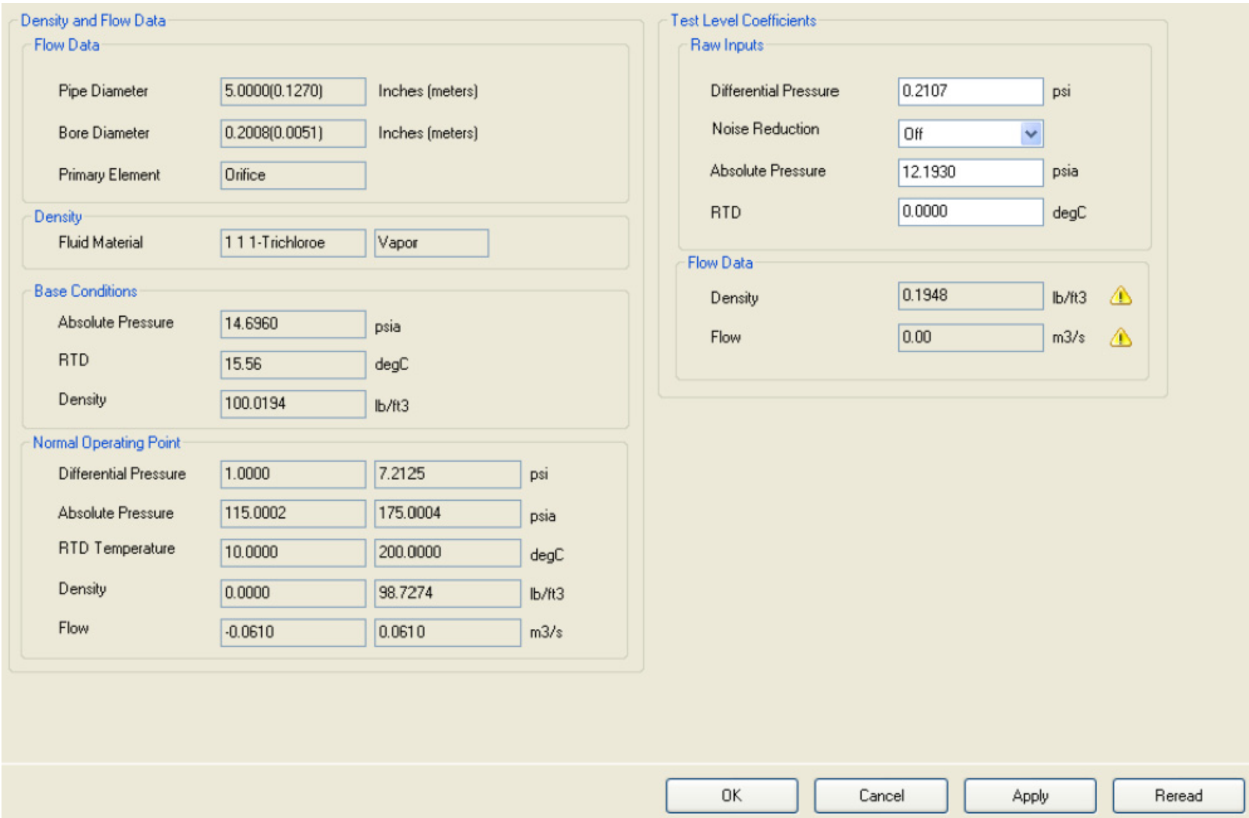


Figure 811. Sample IMV30 Transmitter Test Device Equations Screen

Field	Entry
Density and Flow Data	
Flow Data	
Pipe Diameter	Shows the diameter of the pipe.
Bore Diameter	Shows the diameter of the bore.
Primary Element	Shows the primary element of the orifice plate.
Density	
Fluid Material	Shows the fluid and the fluid state.
Base Conditions	
Absolute Pressure	Shows the absolute pressure.
RTD Temperature	Shows the RTD temperature.
Density	Shows the density.

Field	Entry
Normal Operating Point	
Differential Pressure	Shows the differential pressure limits in the selected engineering units.
Absolute Pressure	Shows the absolute pressure limits in the selected engineering units.
RTD Temperature	Shows the RTD temperature limits in the selected engineering units.
Density	Shows the limits for density measurement in the selected engineering units.
Flow	Shows the limits for flow measurement in the selected engineering units.
Raw Inputs	
Differential Pressure	Shows the differential pressure.
Noise Reduction	Select On to turn on or Off to turn off the noise reduction feature.
Absolute Pressure	Shows the absolute pressure.
RTD	Shows the RTD temperature.
Flow Data	
Density	Shows the calculated flowing density in the selected engineering units.
Flow	Shows the calculated flow rate in the selected engineering units.
Apply	After you enter the raw inputs, click Apply for the transmitter to calculate density and level for the given inputs.
Reread	Click Reread to read stabilized values from the transmitter.

Troubleshooting

Loop Test

Analog Output

The Analog Output screen allows you to override analog value, and measurement.

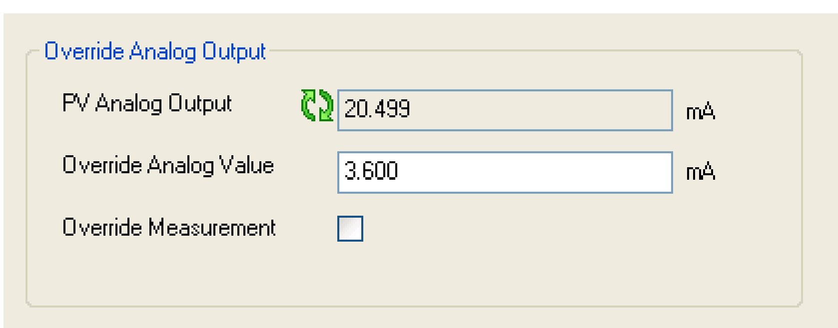


Figure 812. Sample IMV30 Transmitter Loop Test Analog Output Screen

Field	Entry
Override Analog Output	
PV Analog Output	This field shows the current PV Analog Output in mA.
Override Analog Value	Specify a value that overrides the analog value.
Override Measurement	Select this check box to override the analog value. Deselect it if override is not required.

Digital Output

The Digital Output screen allows you to select a variable with which you want to override the digital output, and set the override value.

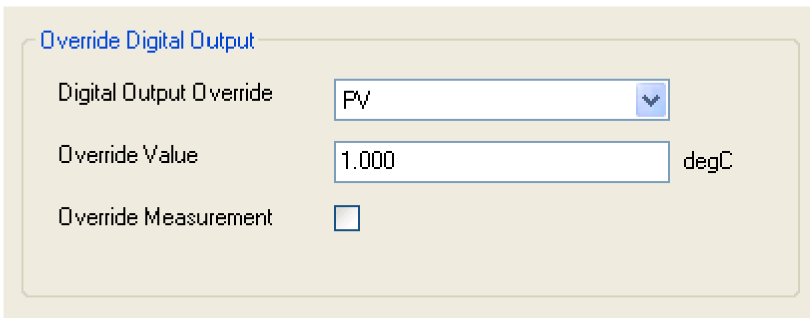


Figure 813. Sample IMV30 Transmitter Loop Test Digital Output Screen

Field	Entry
Override Digital Output	
Digital Output Override	Select a measured variable with which you want to override the digital output value from the drop-down list. Choose from PV, SV, TV, and QV.
Override Value	Specify a value to override the digital output.
Override Measurement	Select this check box to override the digital output. Deselect it if override is not required.

17. RTT15 Transmitter

The RTT15 Temperature Transmitter is a microprocessor-based temperature transmitter that receives input signals from thermocouples, RTDs, resistance (ohms), or millivolt sources. This chapter provides information that is exclusive to using RTT15 Transmitter with HART communication protocol.

Additional information about this transmitter is available in the following document:

- MI 020-463 RTT15-T I/A Series® Temperature Transmitter with HART® Protocol

NOTE

Use of a USB HART modem is not recommended with this DTM. Read and write commands may time out resulting in nuisance error messages.

Device Overview

The Device Overview screen displays the HART information, the device information, and the current data of the primary variable (PV).

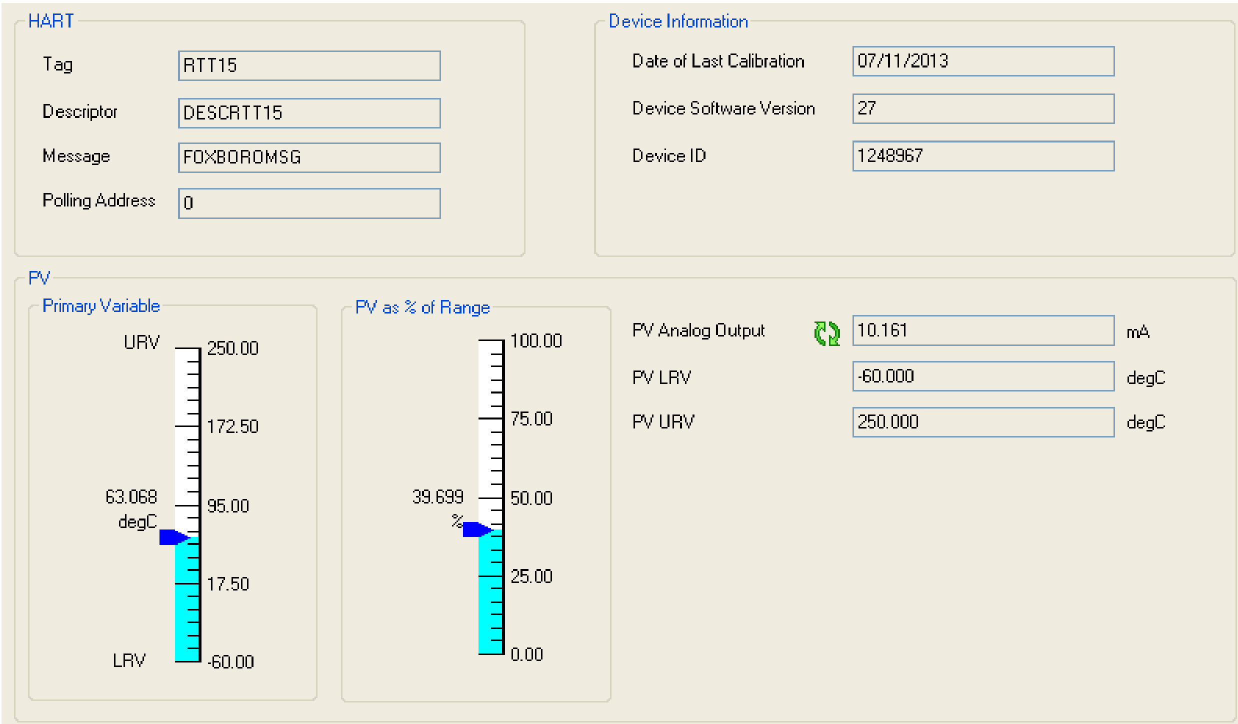


Figure 814. Sample RTT15 Transmitter Device Overview Screen

Field	Entry
HART	
Tag	Shows the HART tag which is the primary identifier of the device (maximum of 8 characters).
Descriptor	Shows the HART descriptor used to define a description for the device (maximum of 16 characters).
Message	Shows the HART message (maximum of 32 characters).
Polling Address	Shows the configured address of the device. In the standard point to point, 2-wire analog mode, the polling address can be ‘0’. For multidrop operation it can vary from 1 through 15.
Device Information	
Date of Last Calibration	Shows the last calibrated date of the transmitter.
Device Software Version	Shows the software version of the device.
Device ID	Shows the serial number of the device.

Field	Entry
PV	
PV Analog Output	Shows the current PV analog output in mA.
PV LRV	Shows the current lower range value of the primary variable.
PV URV	Shows the current upper range value of the primary variable.

Process Variables

The Process Variables screen displays the values of device variables.

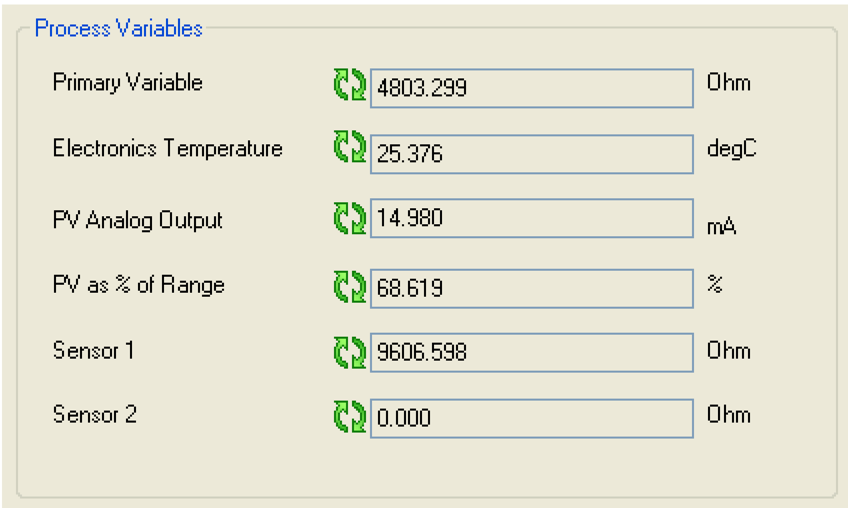


Figure 815. Sample RTT15 Transmitter Process Variables Screen

Field	Entry
Process Variables	
Primary Variable	Shows the current value of the primary variable.
Electronics Temperature	Shows the current electronics temperature.
PV Analog Output	Shows the current PV analog output.
PV as % of Range	Shows the current PV value in percent of range.
The Sensor 1 and Sensor 2 parameters are available if the **Connection Type** is **2-wire diff** or **2-wire average**, and the **Sensor Measurement Type** is **Differential** or **Average**.	
Sensor 1	Shows the value of Sensor 1.
Sensor 2	Shows the value of Sensor 2.

Device Configuration

General

The General screen allows you to enter the upper and the lower range values of the primary variable and the damping time.

It also displays the sensor details. The upper and lower limits of the sensor are displayed from the device.

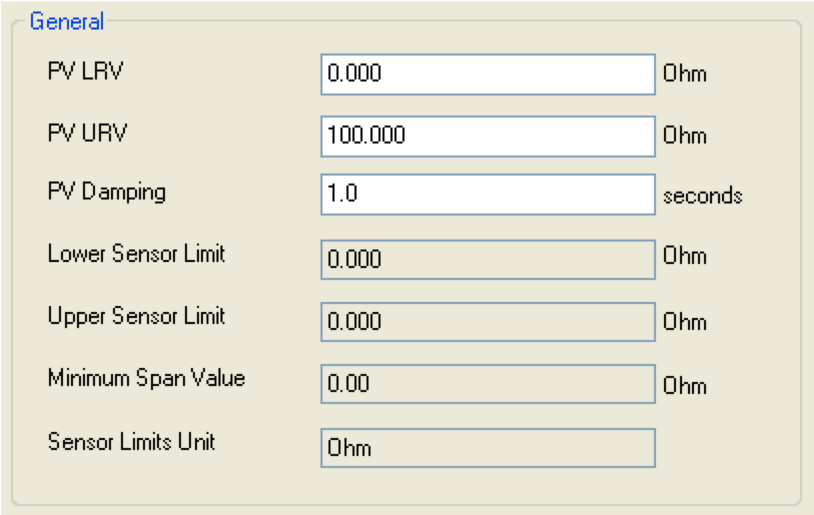


Figure 816. Sample RTT15 Transmitter General Screen

Field	Entry
General	
PV LRV	Enter the lower range value of the primary variable.
PV URV	Enter the upper range value of the primary variable.
PV Damping	Enter the damping time.
Lower Sensor Limit	Shows the sensor lower limit read from the device.
Upper Sensor Limit	Shows the sensor upper limit read from the device.
Minimum Span Limit	Shows the minimum span between the upper and lower limits of the sensor.
Sensor Limits Unit	Shows the units configured for the sensor limits.

Measurement Units

The Measurement Units screen allows you to configure units for the primary variable.

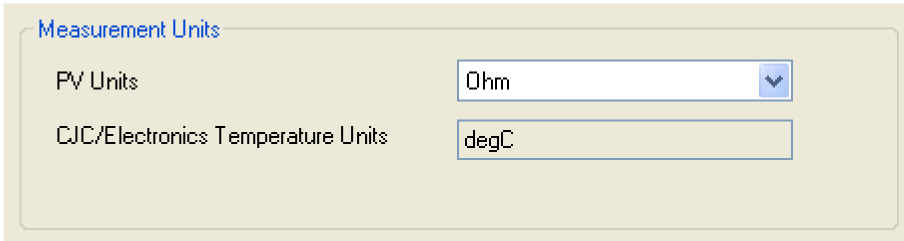


Figure 817. Sample RTT15 Transmitter Measurement Units Screen

Field	Entry
Measurement Units	
PV Units	Select measurement units for the primary variable. Choose from degC, degF, degR, Kelvin, mV, V, Ohm, KO, or %.
CJC/Electronics Temperature Units	Shows the measurement units for cold junction compensation (CJC) or electronics temperature.

Sensor

The Sensor screen allows you to configure sensor parameters.

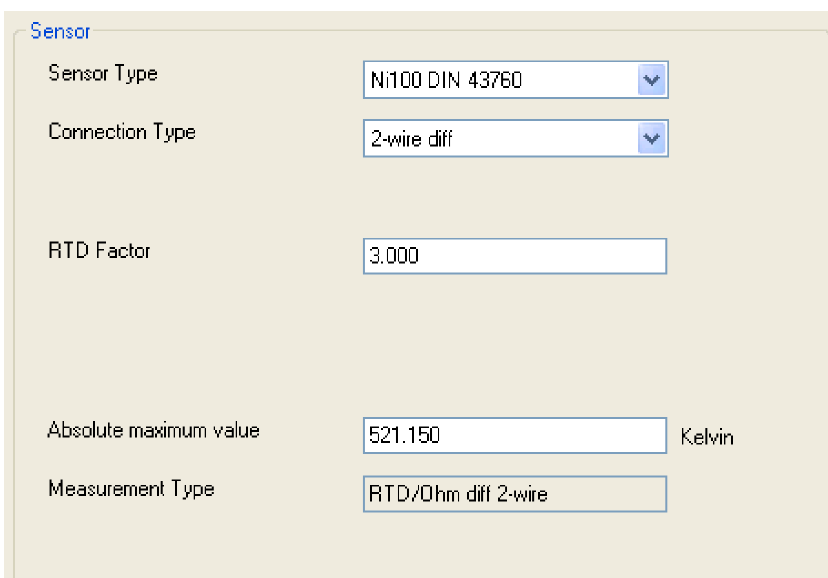


Figure 818. Sample RTT15 Transmitter Sensor Screen 1

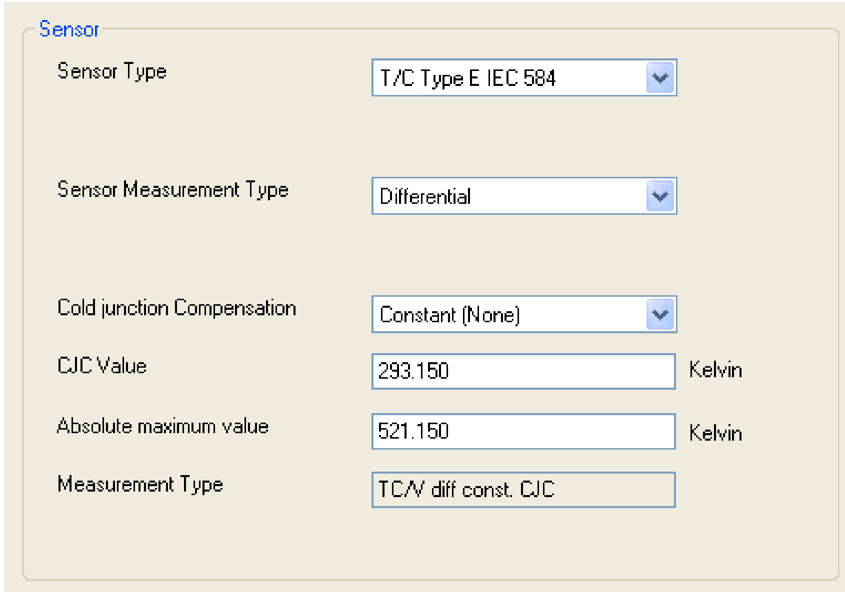


Figure 819. Sample RTT15 Transmitter Sensor Screen 2

Field	Entry
Sensor	
Sensor Type	Select a sensor from the list available as follows: • Ohms • Pt100 IEC 751 • Ni100 DIN 43760 • Spcl RTD • Millivolts • T/C Type B IEC 584 • T/C Type E IEC 584 • T/C Type J IEC 584 • T/C Type K IEC 584 • T/C Type L DIN 43710 • T/C Type N IEC 584 • T/C Type R IEC 584 • T/C Type S IEC 584 • T/C Type T IEC 584 • T/C Type U IEC 584 • T/C Type W3 ASTM • T/C Type W5 ASTM • Spcl T/C

Field	Entry
Connection Type	Select the connection type if you are using RTD. Choose from 2-wire, 3-wire, 4-wire, 2-wire diff, and 2-wire average. This parameter is available if the sensor selected is one of the following: • Ohms • Pt100 IEC 751 • Ni100 DIN 43760 • Spcl RTD
RTD Factor	If RTDs other than 100 ohm resistance are used with your transmitter, enter the RTD factor. The RTD Factor parameter is available if the sensor selected is one of the following: • Pt100 IEC 751 • Ni100 DIN 43760 • Spcl RTD
Sensor Measurement Type	Select the Sensor Measurement Type if RTD is not used. Choose from Single, Differential, or Average. This parameter is available for the following sensors: • Millivolts • T/C Type B IEC 584 • T/C Type E IEC 584 • T/C Type J IEC 584 • T/C Type K IEC 584 • T/C Type L DIN 43710 • T/C Type N IEC 584 • T/C Type R IEC 584 • T/C Type S IEC 584 • T/C Type T IEC 584 • T/C Type U IEC 584 • T/C Type W3 ASTM • T/C Type W5 ASTM • Spcl T/C
Cold Junction Compensation	Specify the cold junction compensation (CJC) if the sensor chosen is a T/C type sensor. Choose from the following available options: • Internal Sensor • External Pt100 • External Ni100 • Constant (None)
CJC Value	Enter a constant value for CJC. This parameter is available if CJC is chosen as **Constant** (**None**).

Field	Entry
Absolute Maximum Value	Enter the absolute maximum value on individual sensors for differential measurements. This parameter is available if: • the **Sensor Type** is **Ohms**, **Pt100 IEC 751**, **Ni100 DIN 43760**, or **Spcl RTD**; and the **Connection Type** is **Differential**. • the **Sensor Type** is **Millivolts** and the **Sensor Measurement Type** is **Differential**. • the Sensor is one of the T/C types; the **Sensor Measurement Type** is **Differential**; and the **Cold Junction Compensation** is **Internal Sensor** or **Constant** (**None**).
Measurement Type	Shows the type of measurement.

Cable Resistance

Enter Value

The **Enter Value** screen allows you to configure a value for cable resistance when using the transmitter with a 2-wire RTD.

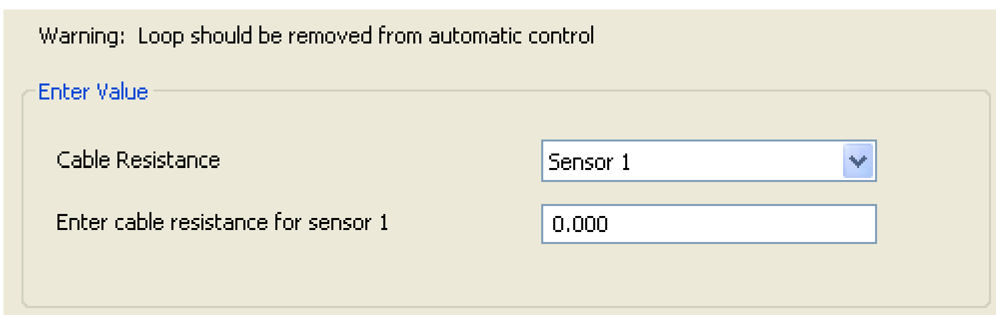


Figure 820. Sample RTT15 Transmitter Enter Value Screen 1

Field	Entry
Enter Value	
Cable Resistance	Select the sensor for which you want to enter the cable resistance. Choose from Sensor 1 and Sensor 2. This parameter is available when the **Measurement Type** is **RTD/Ohm diff 2-wire** or **RTD/Ohm avg 2-wire**.
Enter cable resistance for sensor	Enter cable resistance value for the selected sensor. This parameter is available if the **Sensor Type** is **Ohms, Pt100 IEC 751, Ni100 DIN 43760, Spcl RTD,** or **Millivolts;** and the **Connection Type** is **2-wire**, **3-wire**, or **4-wire**.

Field	Entry
Enter cable resistance for external CJC sensor	Enter cable resistance value for external CJC sensor. This parameter is available for T/C type sensors and when the **CJC** is **External Pt100** or **External Ni100**.

Enter the cable resistance value for the selected sensor and click **Next.** The following screen appears which shows the completion of the process.

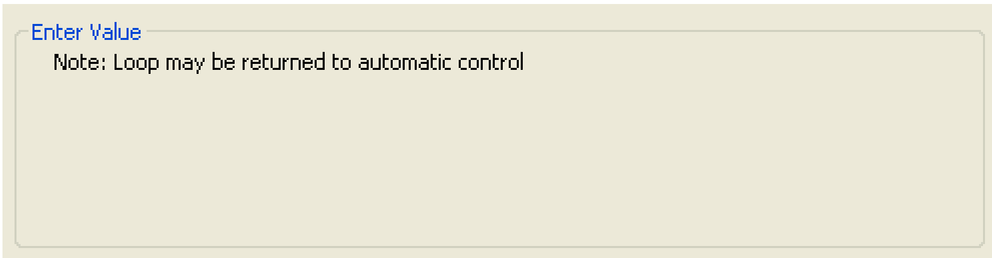


Figure 821. Sample RTT15 Transmitter Enter Value Screen 2

Measure Value

The **Measure Value** screen allows you to configure the transmitter to measure and enter the cable resistance if it is not known in case of 2-wire RTD.

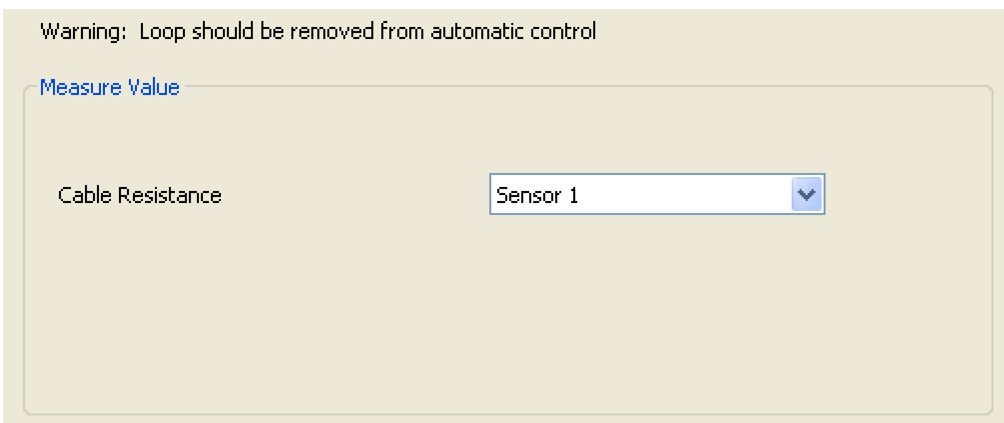


Figure 822. Sample RTT15 Transmitter Measure Value Screen 1

Select the sensor to enter or measure the cable resistance and click **Next** in the subsequent screens.

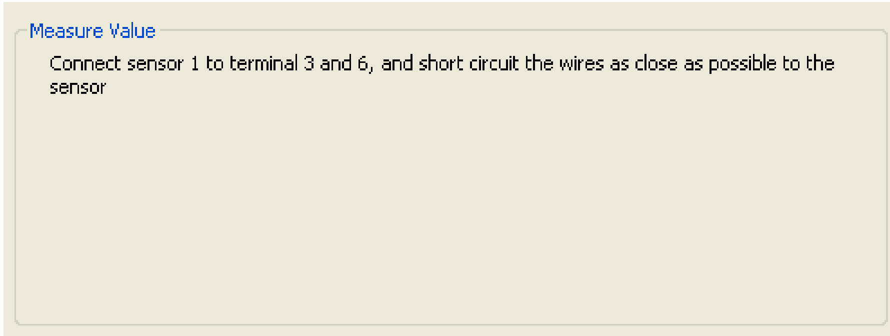


Figure 823. Sample RTT15 Transmitter Measure Value Screen 2

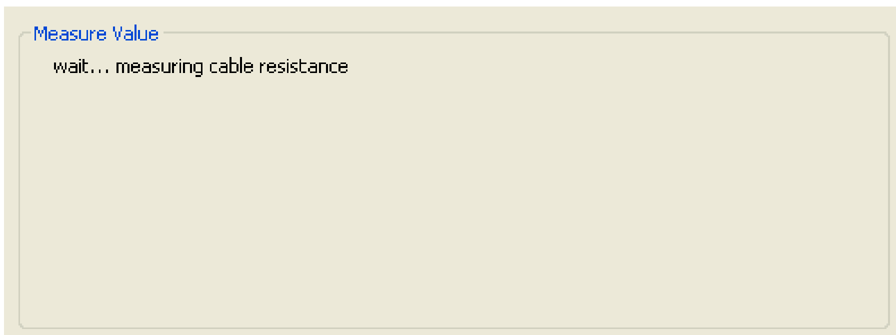


Figure 824. Sample RTT15 Transmitter Measure Value Screen 3

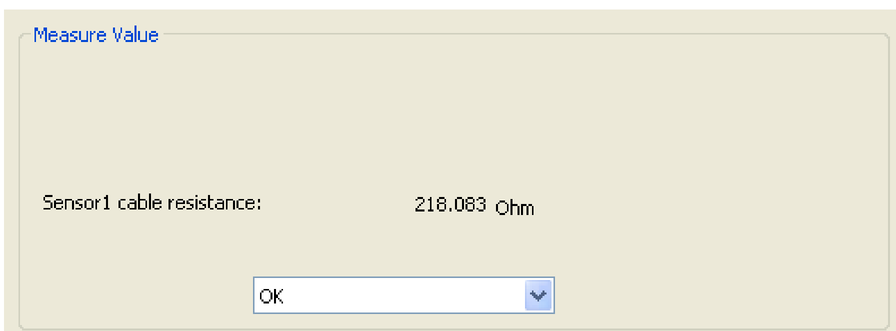


Figure 825. Sample RTT15 Transmitter Measure Value Screen 4

When the cable resistance for the selected sensor is displayed, choose one of the options from the drop-down

- OK - to proceed with the cable resistance value that is displayed
- Original value - for original cable resistance value
- Read new value - for a new cable resistance value

Click **Next** to complete the process.

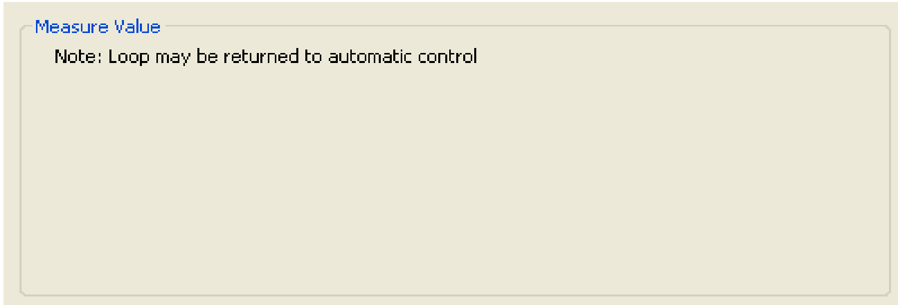


Figure 826. Sample RTT15 Transmitter Measure Value Screen 5

The following screen appears if the configuration of the device is corrupted.

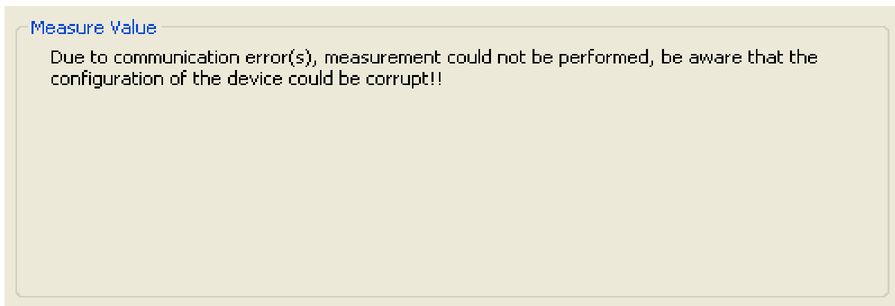


Figure 827. Sample RTT15 Transmitter Measure Value Screen 6

Sensor Error Values

The Sensor Error Values screen shows the output that is set to a predetermined mA value if a broken or shorted sensor is detected.

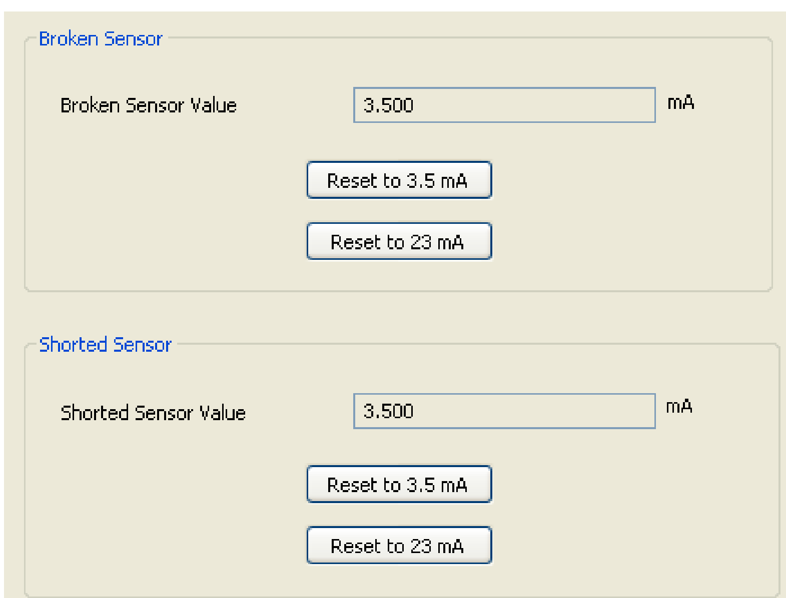


Figure 828. Sample RTT15 Transmitter Sensor Error Values Screen

Field	Entry
Broken Sensor	
Broken Sensor Value	Shows the value that output goes to in case of a broken sensor (which can be configured between 3.5 and 23 mA).
Reset to 3.5 mA	Click to set the output to go to 3.5 mA in case of broken sensor.
Reset to 23 mA	Click to set the output to go to 23 mA in case of broken sensor.
Shorted Sensor	
Shorted Sensor Value	Shows the value that output goes to in case of a shorted sensor (between 3.5 and 23 mA).
Reset to 3.5 mA	Click to set the output to go to 3.5 mA in case of shorted sensor.
Reset to 23 mA	Click to set the output to go to 23 mA in case of shorted sensor.

Min Max Values

The Min Max Values screen shows the minimum and maximum logged values based on the measurement units configured.

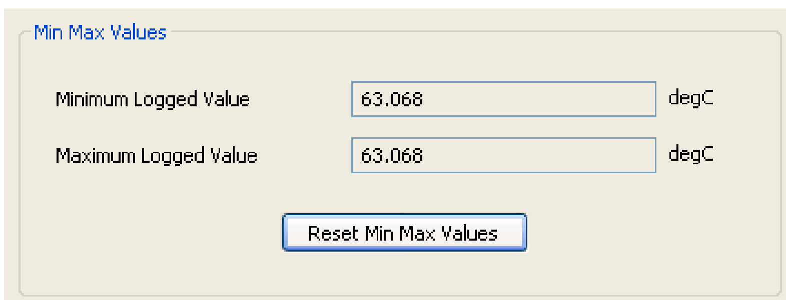


Figure 829. Sample RTT15 Transmitter Min Max Values Screen

Field	Entry
Min Max Values	
Minimum Logged Value	Shows the minimum logged value of the current measurement.
Maximum Logged Value	Shows the minimum logged value of the current measurement.
Reset Min Max Values	Resets the maximum/minimum log to actual measured values.

Output

Analog

The Analog Output screen allows you to configure the parameters for analog output.

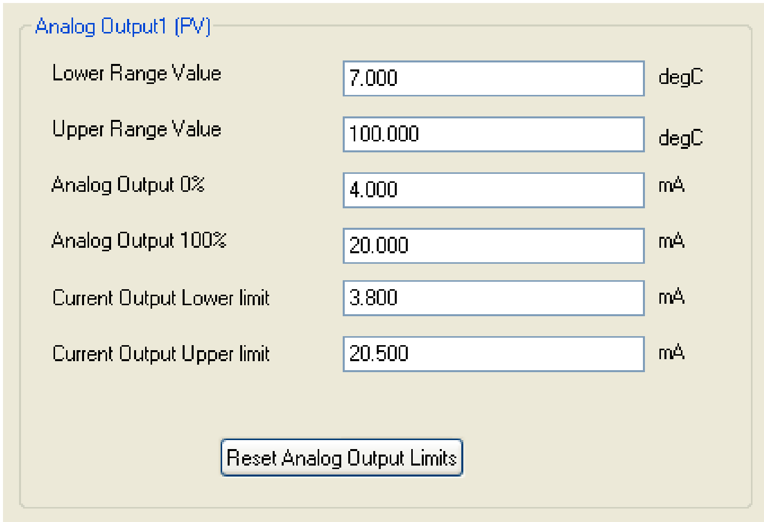


Figure 830. Sample RTT15 Transmitter Analog Output Screen

Field	Entry
Analog Output1 (PV)	
Lower Range Value	Enter the lower range value for the primary variable.
Upper Range Value	Enter the upper range value for the primary variable.
Analog Output 0%	Enter the mA output at 0% of range.
Analog Output 100%	Enter the mA output at 100% of range.
Current Output Lower Limit	Enter the lower limit of the analog output.
Current Output Upper Limit	Enter the upper limit of the analog output.
Reset Analog Output Limits	Click to reset analog output limits to the default settings.

HART

The HART screen allows you to set HART polling address, and the number of response preambles. It also displays the number of request preambles in the HART message.

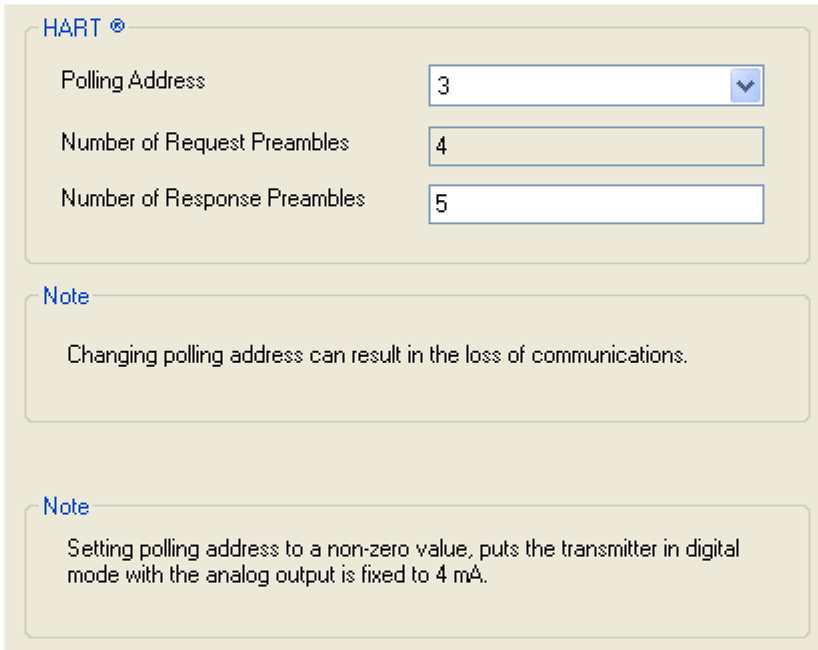


Figure 831. Sample RTT15 Transmitter HART Screen

— NOTE
The DAC Trim and the Override DAC Trim calibrations are not available if the polling address is configured to a non-zero value.

Field	Entry
HART	
Polling Address	Select the HART polling address from a range of 0 to 15.
Number of Request Preambles	Shows the number of preambles to be sent in a request message from the transmitter to the host.
Number of Response Preambles	Specify the number of response preambles between 5 to 20.

Diagnostic Configuration

The Diagnostic Configuration screen allows you to configure the transmitter to check for sensor errors.

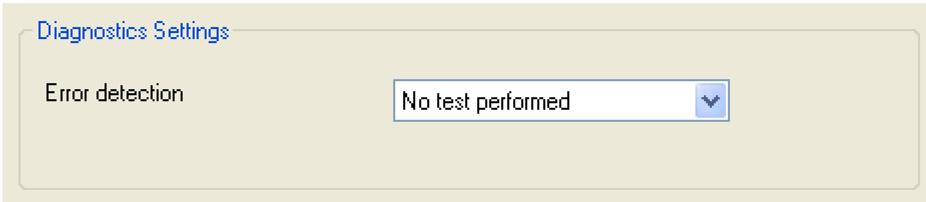


Figure 832. Sample RTT15 Transmitter Diagnostic Configuration Screen

Field	Entry
Diagnostic Settings	
Error Detection	Select a procedure to check for a sensor error. Choose from the following options: • No test performed - not to perform sensor error detection test • broken sensor - to test for broken sensor • shorted sensor - to test for shorted sensor • broken and shorted - to test for broken and shorted sensor

Access

The **Access** screen is where you can activate or deactivate write protection, and enter or change the write protection password.

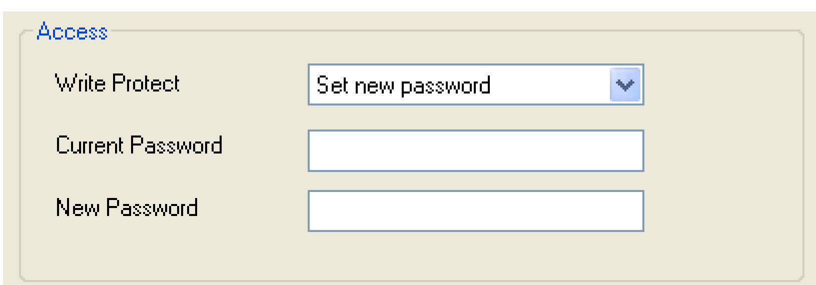


Figure 833. Sample RTT15 Transmitter Access Screen 1

Field	Entry
Access	
Write Protect	Configure the write protect status. Choose from Enable write protected, Disable write protected, and Set new password.
The below two parameters are available if Write Protect = Set new password	
Current Password	Enter the current write protection password (up to 8 characters).
New Password	Enter the new write protection password (up to 8 characters).

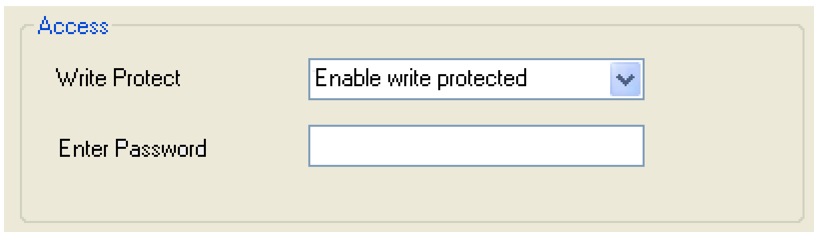


Figure 834. Sample RTT15 Transmitter Access Screen 2

Field	Entry
Access	
Enter Password	Enter write protect password (up to 8 characters). This parameter is available if Write Protect = Enable write protected.

Device Information

The Device Information screen displays complete information of the device. It allows you to set the tag name, descriptor, HART message, final assembly number, and date of last calibration.

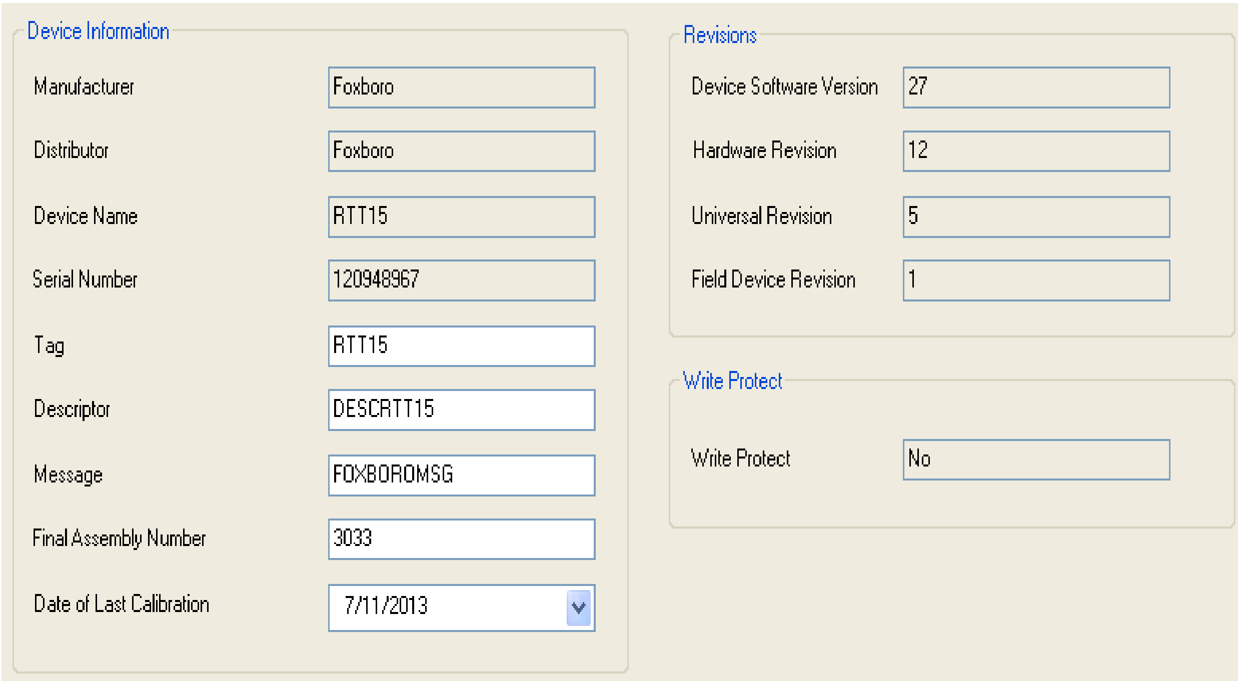


Figure 835. Sample RTT15 Transmitter Device Information Screen

Field	Entry
Device Information	
Manufacturer	Shows the name of the manufacturer of the device.
Distributor	Shows the name of the distributor of the device.
Device Name	Shows the name of the device which is the unique identifier.
Serial Number	Shows the sensor serial number.
Tag	Enter the tag (up to 8 characters).
Descriptor	Enter the descriptor (up to 16 characters).
Message	Enter the HART message (up to 32 characters).
Final Assembly Number	Enter the assembly number of the device that is connected.
Date of Calibration	Enter the date of last calibration.
Revisions	
Device Software Revision	Shows the device software revision level.
Hardware Revision	Shows the hardware revision level.

Field	Entry
Universal Revision	Shows the universal command set revision level.
Field Device Revision	Shows the field device revision level.
Write Protect	
Write Protect Mode	Shows the write protect status.

Device Status

Device Status

The Device Status screen shows the current status of the device. The status of various parameters is recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

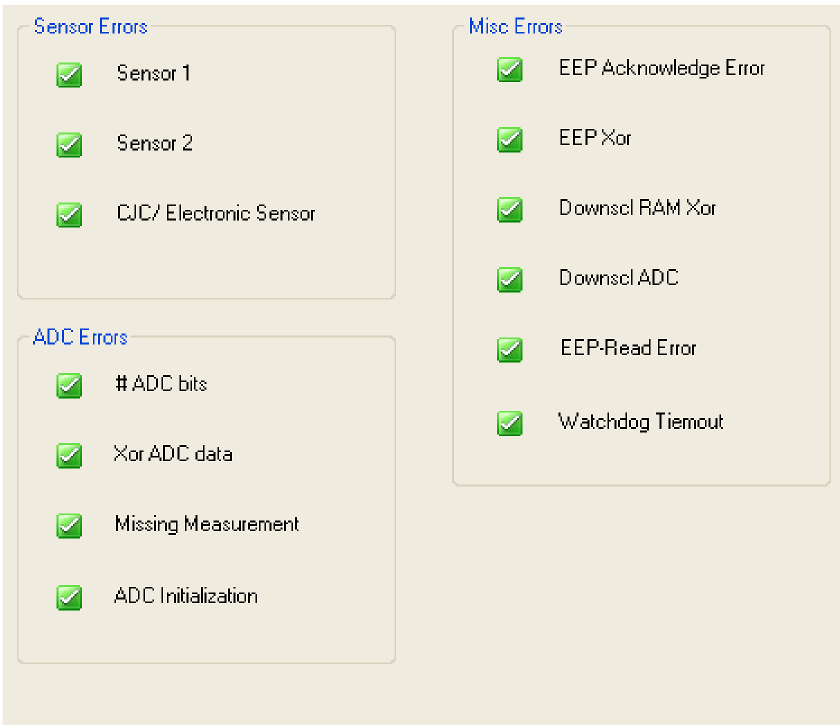


Figure 836. Sample RTT15 Transmitter Device Status Screen

HART Status

The HART Status screen shows the HART status as well as the field device status of the device.

The status of each parameter is easily recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

If Configuration Changed does not show a green check mark, it can be reset by clicking the Reset Configuration Changed Flag button on the lower right side of the screen.

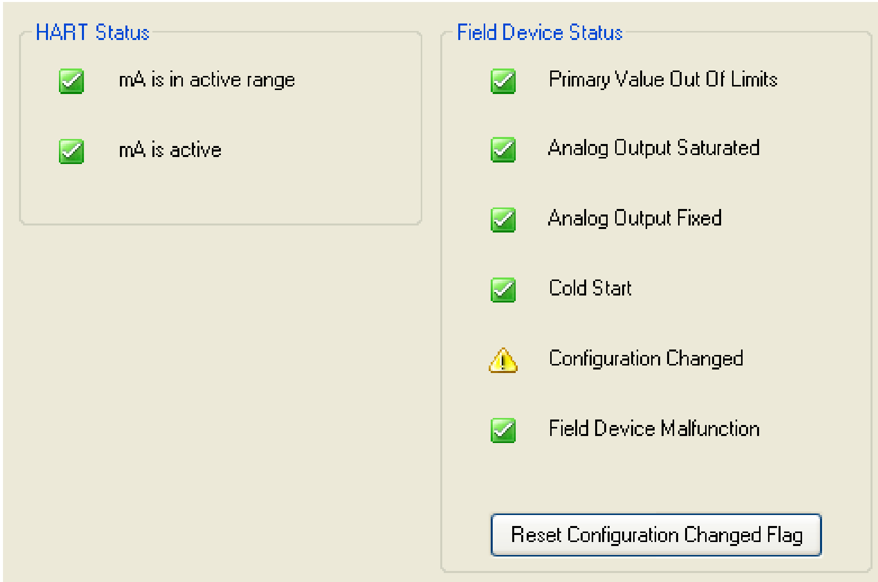


Figure 837. Sample RTT15 Transmitter HART Status Screen

Calibration

DAC Trim

The DAC Trim is used to trim the 4 and 20 mA output values of the transmitter to match the output of a plant standard measurement device.

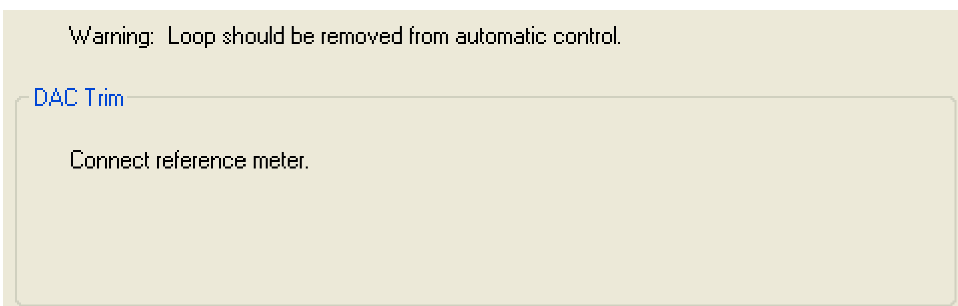


Figure 838. Sample RTT15 Transmitter DAC Trim Calibration Screen 1

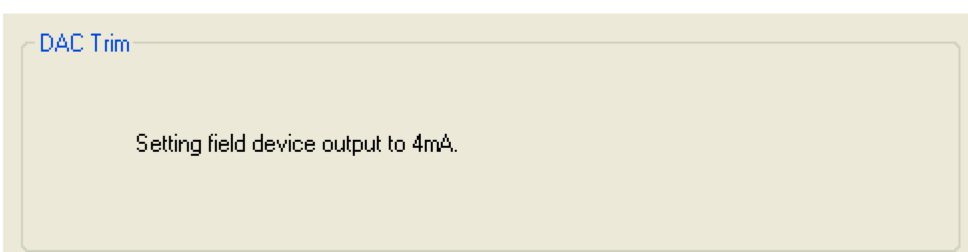


Figure 839. Sample RTT15 Transmitter DAC Trim Calibration Screen 2

After the connection to the reference meter is established, the device output is configured to 4 mA. Enter meter value if you wish to change it and click **Next.**

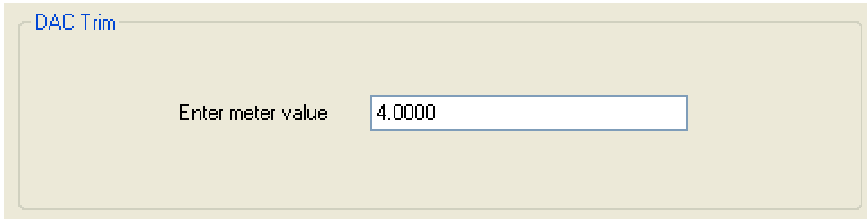


Figure 840. Sample RTT15 Transmitter DAC Trim Calibration Screen 3

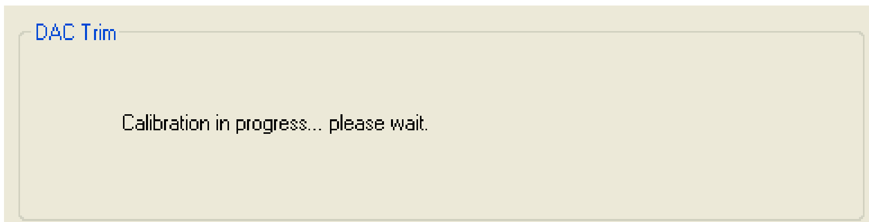


Figure 841. Sample RTT15 Transmitter DAC Trim Calibration Screen 4

Click **Next** and you are prompted for a confirmation to proceed with 4 mA output.

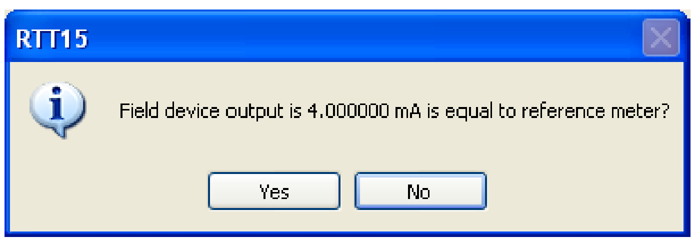


Figure 842. Sample RTT15 Transmitter DAC Trim Calibration Screen 5

If you click **No**, you will be prompted to enter the reference meter value.

If you click **Yes**, you will be prompted to tune the value for 20 mA output.

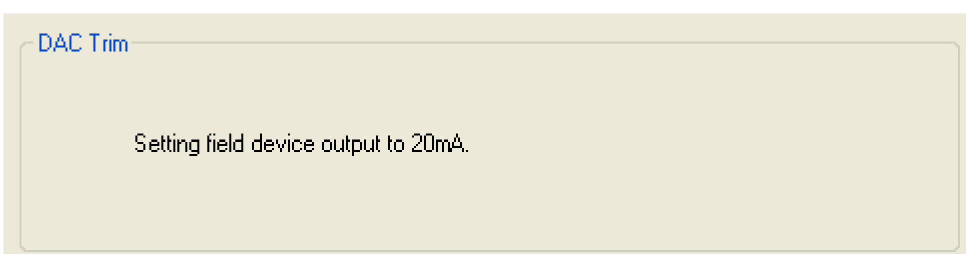


Figure 843. Sample RTT15 Transmitter DAC Trim Calibration Screen 6

The device output is set to 20 mA. Enter meter value if you wish to change it and click **Next.**

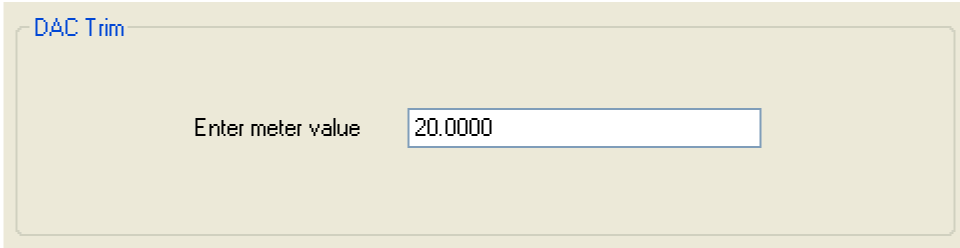


Figure 844. Sample RTT15 Transmitter DAC Trim Calibration Screen 7

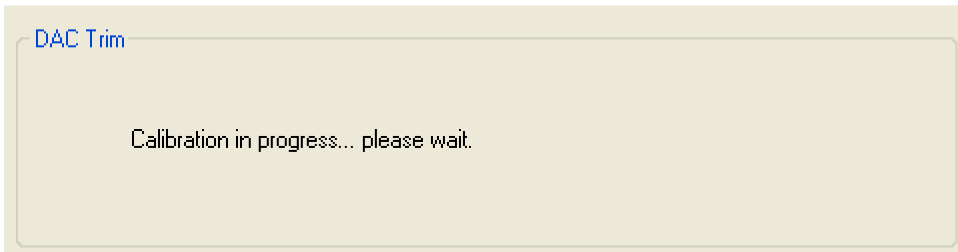


Figure 845. Sample RTT15 Transmitter DAC Trim Calibration Screen 8

Click **Next** and you are prompted for a confirmation to proceed with 20 mA output.

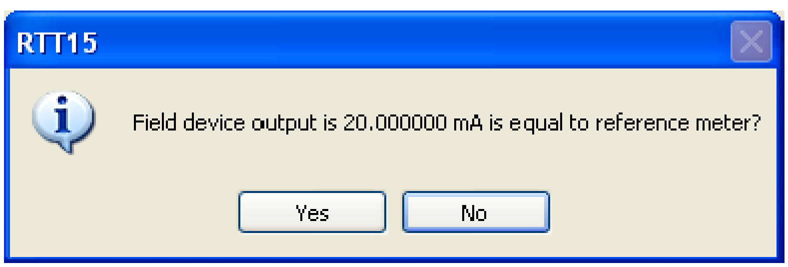


Figure 846. Sample RTT15 Transmitter DAC Trim Calibration Screen 9

If you click **No**, you will be prompted to enter the reference meter value.

If you click **Yes**, the calibration process will be continued.

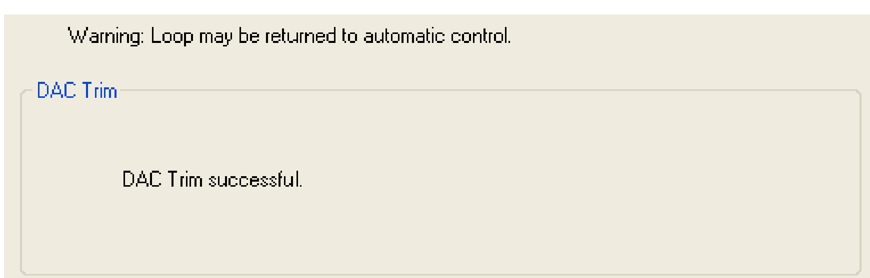


Figure 847. Sample RTT15 Transmitter DAC Trim Calibration Screen 10

Click **OK** after the calibration is done.

Scaled DAC Trim

The Scaled DAC Trim is used to trim the scaled mA output values of the transmitter to match the output of a plant standard measurement device.

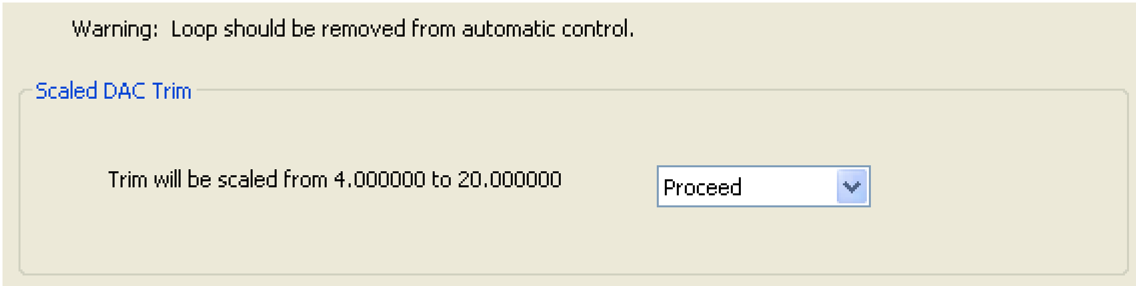


Figure 848. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 1

Field	Entry
Scaled DAC Trim	
Trim will be scaled from 4 to 20	Choose **Proceed** from the drop-down to proceed with the 4 to 20 limits or choose **Change** to enter user defined limits.

If you choose **Proceed**, calibration is done for the 4 and 20 mA output values. Refer to “DAC Trim” on page 607 for the procedure.

If you choose **Change**, the following screen is displayed.

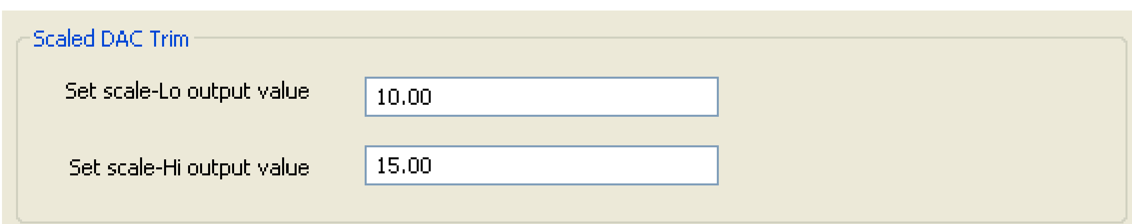


Figure 849. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 2

Enter the lower and upper limits for the mA output and click **Next**. You are again prompted for a confirmation. Choose **Proceed** to proceed with the limits specified or choose **Change** to reenter the limits for mA output.

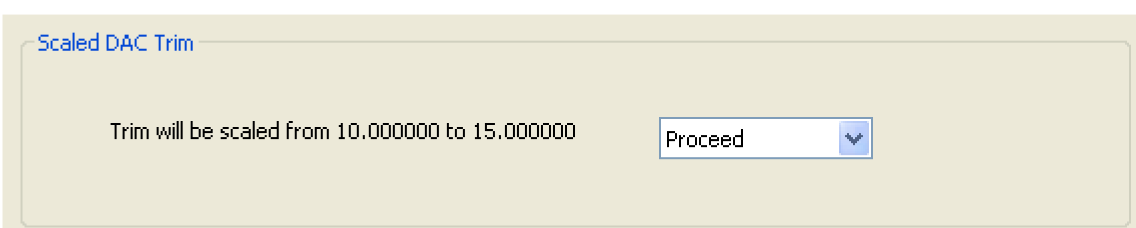


Figure 850. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 3

If you choose **Proceed,** the connection to the reference meter is established, and the device output is configured to 4 mA.

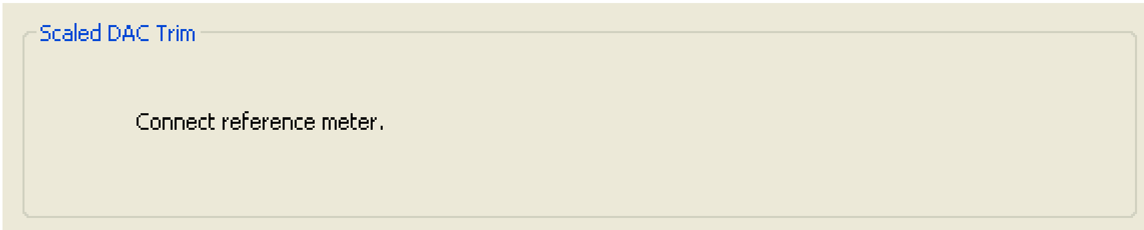


Figure 851. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 4

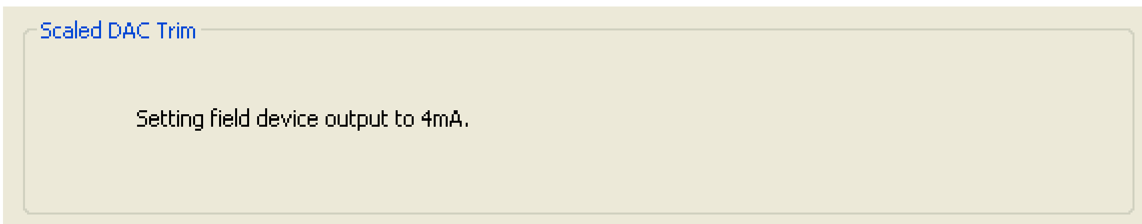


Figure 852. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 5

Click **Next**. The lower limit of the mA is displayed. You can change it if required.

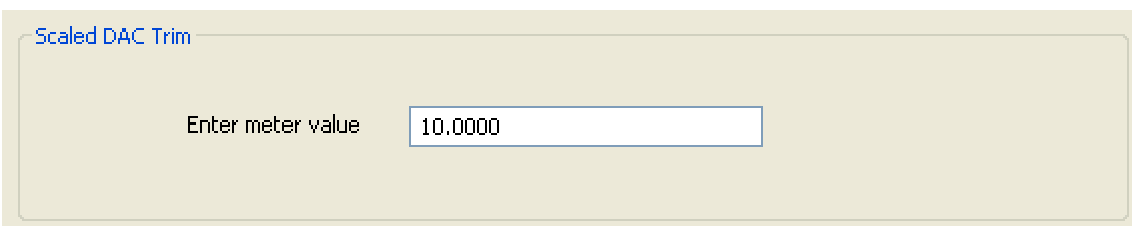


Figure 853. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 6

Click **Next.** You are prompted for a confirmation to proceed with lower limit of the mA output.

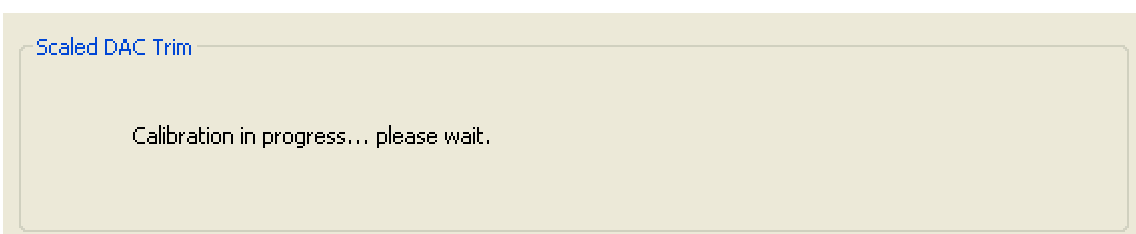


Figure 854. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 7

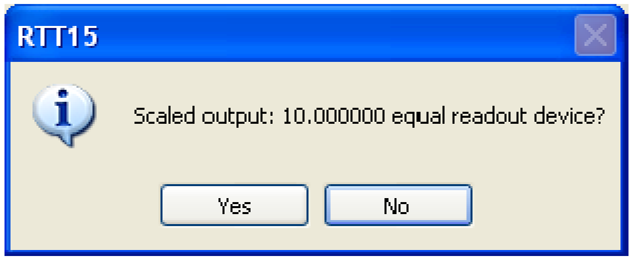


Figure 855. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 8

If you click **No**, you will be prompted to enter the lower limit.

If you click **Yes**, the device output will be configured to 20 mA.

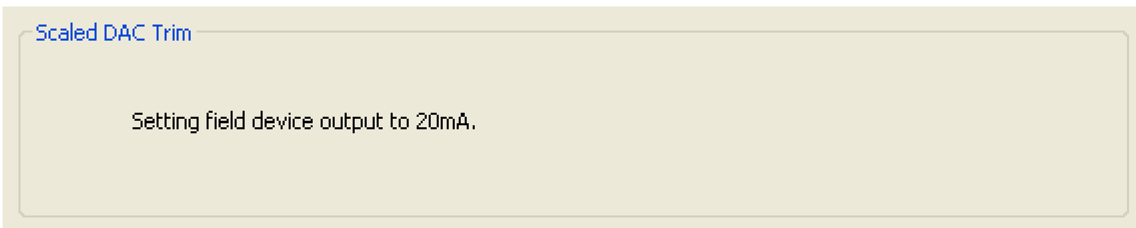


Figure 856. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 9

Click **Next**, the upper limit of the mA is displayed. You can change it if required.

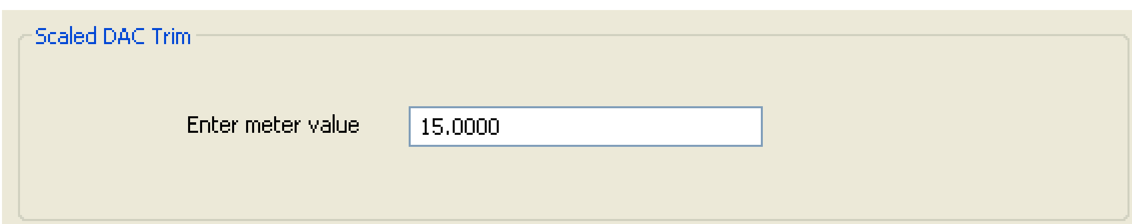


Figure 857. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 10

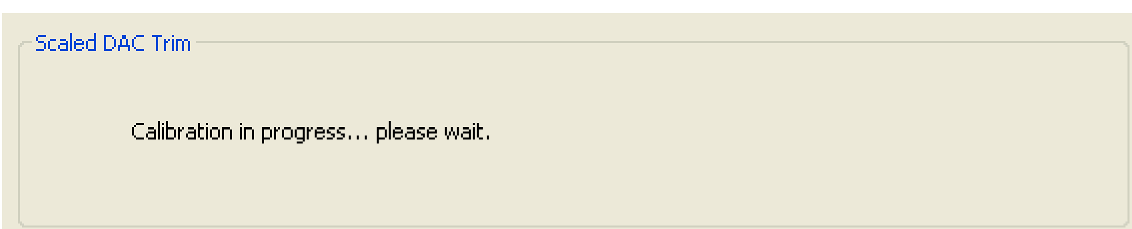


Figure 858. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 11

Click **Next** and you are prompted for a confirmation to proceed with upper limit.

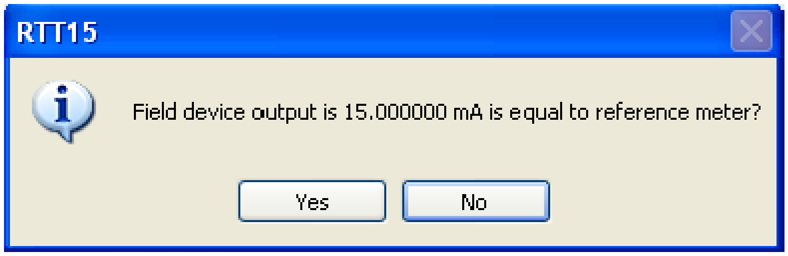


Figure 859. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 12

If you click **No**, you will be prompted to enter the upper limit.

If you click **Yes**, the calibration process will be continued.

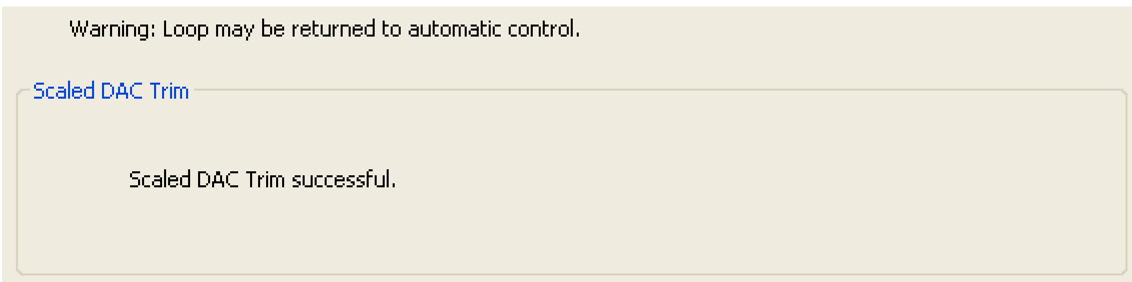


Figure 860. Sample RTT15 Transmitter Scaled DAC Trim Calibration Screen 13

Click **OK** after the calibration is done.

Override DAC Trim

The Override DAC Trim allows you to override any configured DAC trim and restore factory calibration setting.

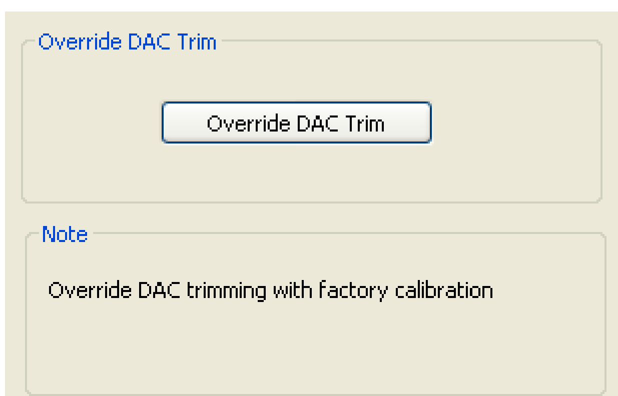


Figure 861. Sample RTT15 Transmitter Override DAC Trim Calibration Screen 1

Click **Override DAC Trim**. The default calibration settings are restored.

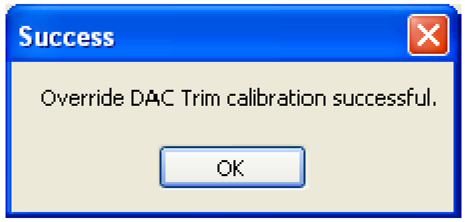


Figure 862. Sample RTT15 Transmitter Override DAC Trim Calibration Screen 2

Troubleshooting

Loop Test

The Loop Test screen allows you to override current analog output value.

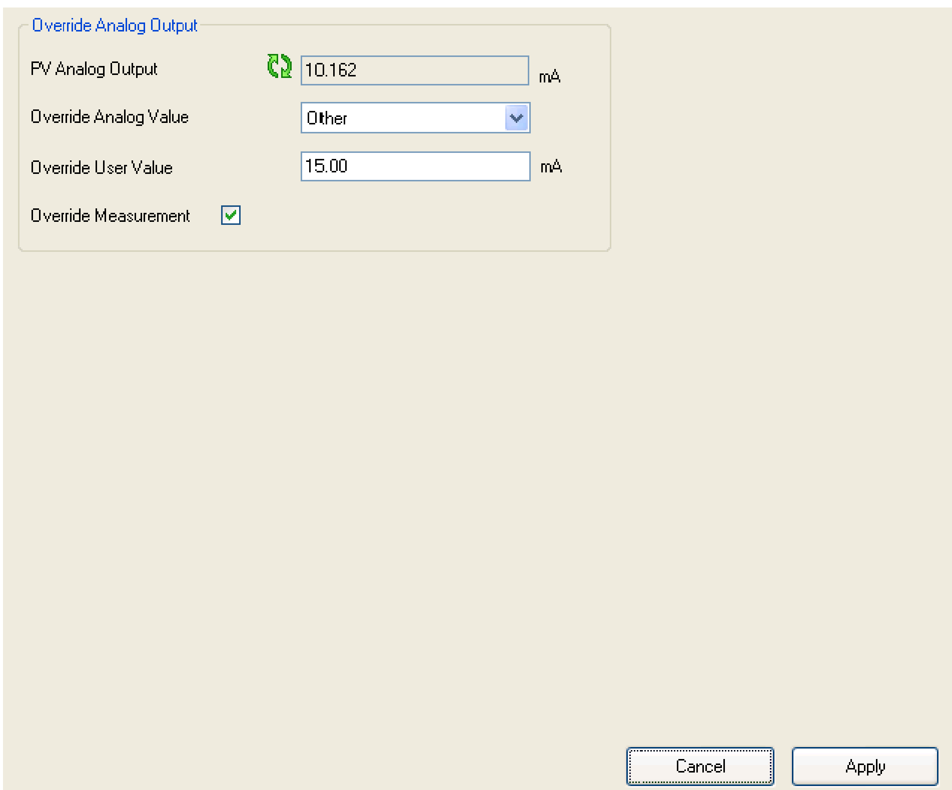


Figure 863. Sample RTT15 Transmitter Loop Test Screen

Field	Entry
Override Analog Output	
PV Analog Output	Shows the current analog output value.
Override Analog Value	Select a value to override the current analog output. Choose from 4, 20, and Other. If you choose **Other**, you can enter a value of your choice which should be between 4 and 20 mA.
Override User Value	Enter a value between 4 to 20 mA to override the current analog output. This parameter is available only if **Override Analog Value** is chosen as **Other**.
Override Measurement	Select the check box and click **Apply** to override the analog value. Clear the check box and click **Apply** to disable the override process. You can also click **Cancel** to disable the override process.

18. RTT80 Transmitter

This chapter provides information that is exclusive to using RTT80 Transmitter with HART communication protocol. Additional information about this transmitter is available in the following documents:

- MI 020-582 RTT80 I/A Series® Temperature Transmitter with HART® Protocol Installation, Operations, Configuration, and Maintenance
- PSS 2A-1F8 A RTT80 Intelligent Temperature Transmitter with HART Communication Protocol
- MI 020-580 I/A Series Temperature Transmitter Intrinsic Safety (CSA/FM) Connection Diagrams
- MI 020-581 I/A Series Temperature Transmitter Intrinsic Safety (ATEX/IECEx) Connection Diagrams
- DP 020-580 I/A Series Temperature Transmitter
- PL 008-680 I/A Series Intelligent Temperature Transmitter

The following figure shows the menu structure of the DTM.

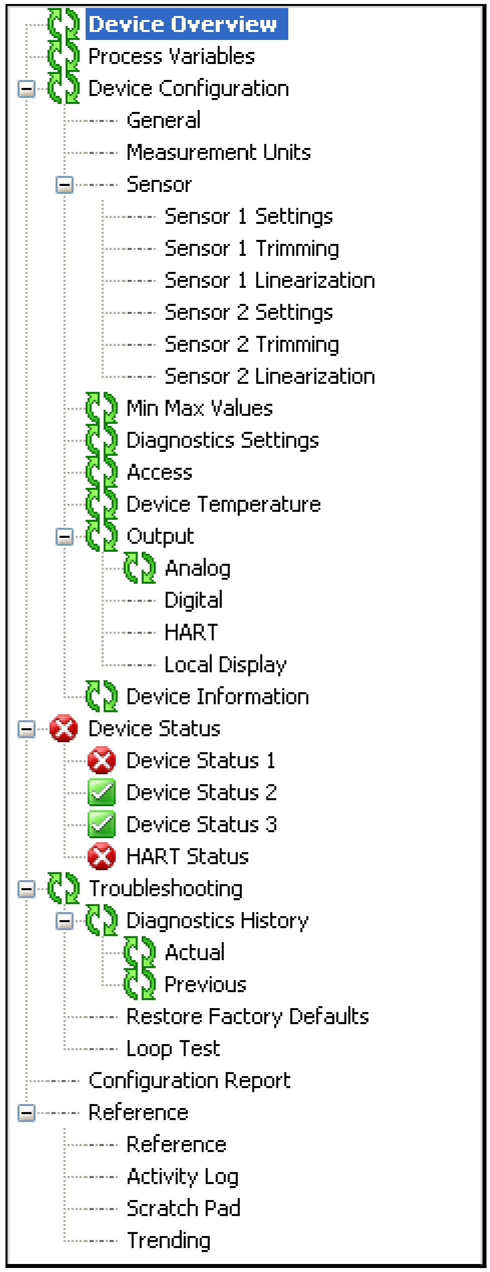


Figure 864. Sample RTT80 Transmitter Menu Structure Screen

Device Overview

The Device Overview screen displays the HART information, device information, and the current PV data.

The PV as % of Range block shows the current PV value in percentage.

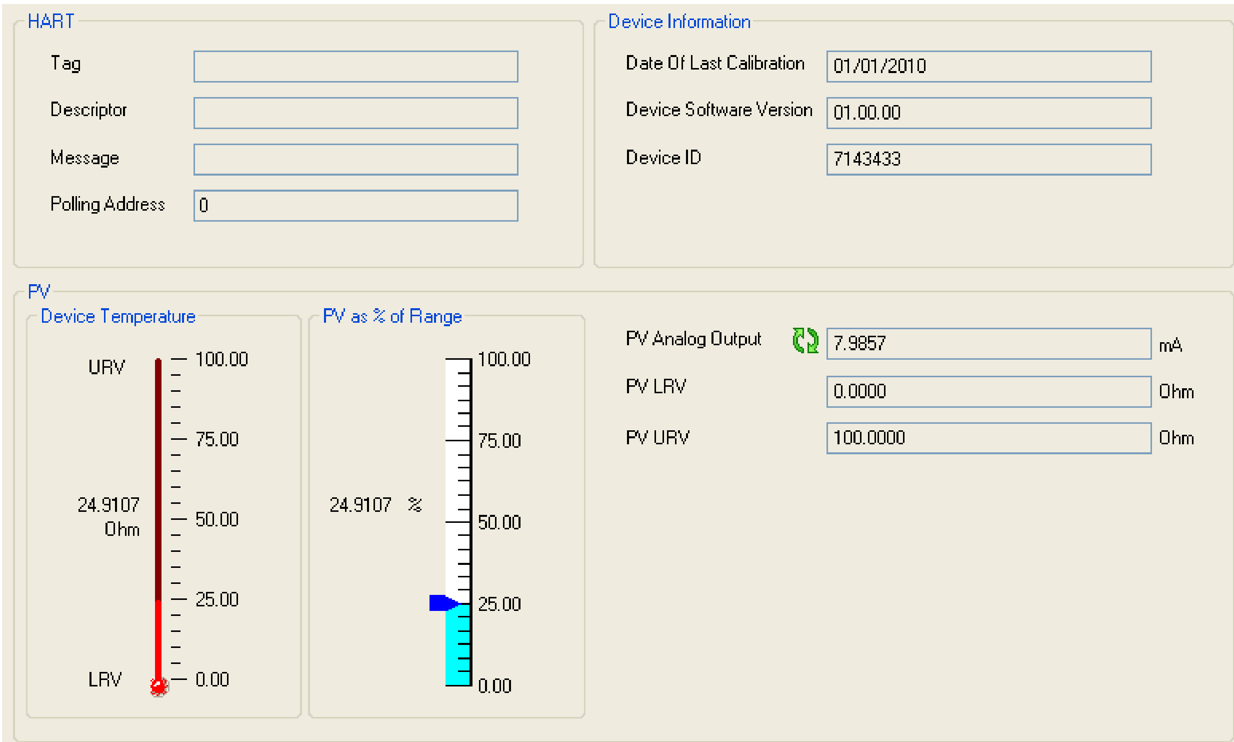


Figure 865. Sample RTT80 Transmitter Device Overview Screen

Field	Entry
HART	
Tag	This field shows the tag of the device, which is the unique identifier of the device. The Tag can consist of up to 32 alphanumeric characters.
Descriptor	This field shows the HART descriptor, which is used to define a description for the device. The Descriptor can consist of up to 32 alphanumeric characters.
Message	This field shows the HART message, which is sent from the device via the HART digital protocol when requested. The Message can consist of up to 32 alphanumeric characters.
Polling Address	This field shows the address of the device.
Device Information	
Date of Last Calibration	This field shows the date on which the transmitter was last calibrated. **— NOTE** You can change the calibration date from the Device Information screen to record the date of last calibration.
Device Software Version	This field shows the software version of the device.
Device ID	This field shows the Device ID, which is the unique identification number of the device.
PV	
PV Analog Output	This field shows the current PV analog output in mA.
PV LRV	This field shows the lower range value of the process variable. Lower range value defines the operational endpoint from which the Analog Value and the 0% point of the Percent Range are derived.
PV URV	This field shows the upper range value of the process variable. Upper range value defines the operational endpoint from which the Analog Value and the 100% point of the Percent Range are derived.

Process Variables

The Process Variables screen displays the values of device variables and the measured values assigned to the device variables in the selected engineering units.

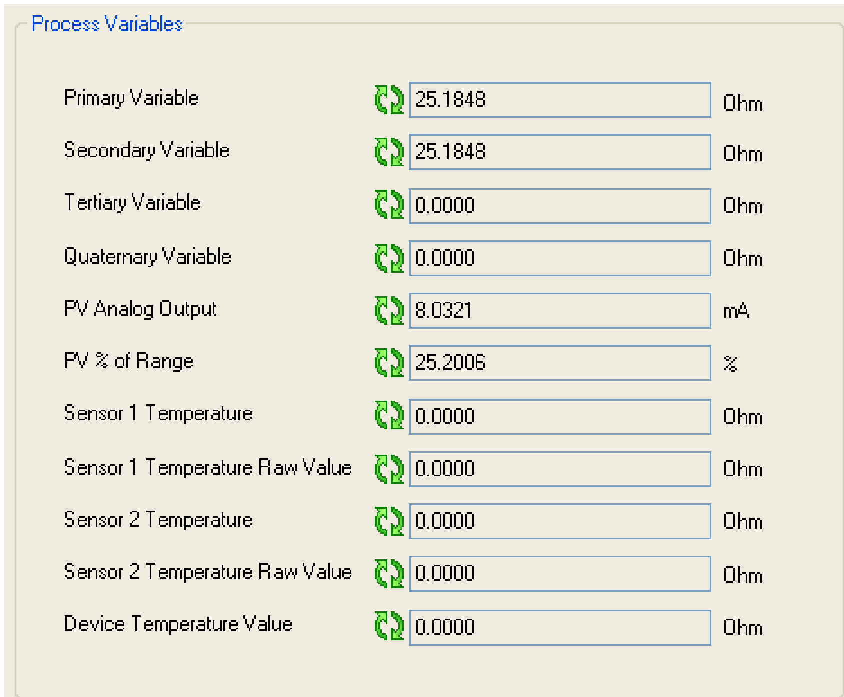


Figure 866. Sample RTT80 Transmitter Process Variables Screen

Field	Entry
Process Variables	
Primary Variable	This field shows the primary HART value in the selected engineering units.
Secondary Variable	This field shows the secondary HART value in the selected engineering units.
Tertiary Variable	This field shows the tertiary HART value in the selected engineering units.
Quaternary Variable	This field shows the quaternary (fourth) HART value in the selected engineering units.
PV Analog Output	This field shows the current value of PV analog output in the selected engineering units.
PV% of Range	This field shows the current PV value in percentage. PV% of Range tracks the Digital Value representation with respect to the range defined by the Lower Range Value and Upper Range Value for normal operating modes. The units of this variable are always in percent.
Sensor 1 Temperature	This field shows the current temperature at the sensor input 1.

Field	Entry
Sensor 1 Temperature Raw Value	This field shows the non-linearized mV or Ohm value of sensor 1 input.
Sensor 2 Temperature	This field shows the current temperature at the sensor input 2.
Sensor 2 Temperature Raw Value	This field shows the non-linearized mV or Ohm value of sensor 2 input.
Device Temperature Value	This field shows the device temperature.

Device Configuration

General

The General screen displays the upper and lower limit values of PV analog outputs. It allows you to set PV map and mains filter. You can also specify upper and lower range values of PV analog outputs, PV damping time, and alarm delay.

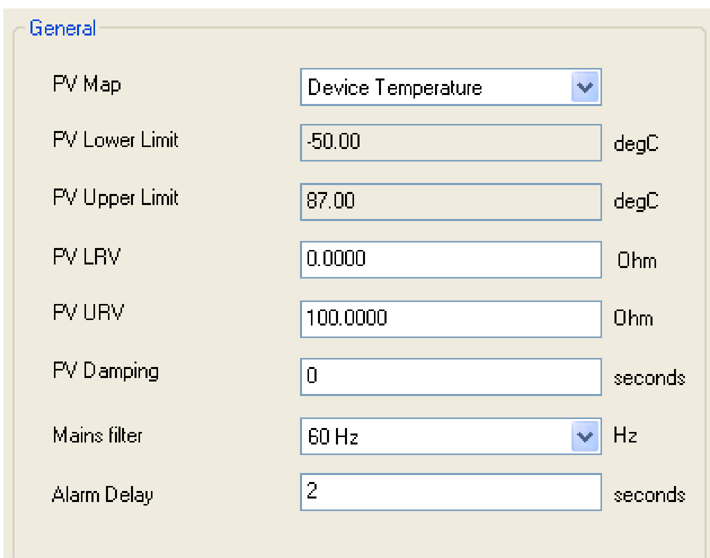


Figure 867. Sample RTT80 Transmitter General Screen

Field	Entry
General	
PV Map	Select a measured variable to assign to the primary HART value from the drop-down list. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.
PV Lower Limit	This field shows the lower limit value of PV analog output.
PV Upper Limit	This field shows the upper limit value of PV analog output.

Field	Entry
PV LRV	Specify Lower Range Value of the measurement. This value relates to the 4 mA analog output value. The set point depends on the measured variable assigned in the PV Map parameter and the sensor type(s) selected. For more details on the sensor types refer to “Sensor1 Type” on page 625 and “Sensor2 Type” on page 631.
PV URV	Specify Lower Range Value of the measurement. This value relates to the 20 mA analog output value. The set point depends on the measured variable assigned in the PV Map parameter and the Sensor Type selected. For more details on the sensor types refer to “Sensor1 Type” on page 625 and “Sensor2 Type” on page 631.
PV Damping	Specify the damping time that is applied to the current output. This parameter specifies the time constant of the exponential delay that occurs in the current output when the measured value fluctuates. If you enter a low time constant the current output reacts quickly, and if you enter a high time constant, current output reaction is delayed.
Mains Filter	Select the mains filter from the drop-down list. Choose from 50 Hz and 60 Hz.
Alarm Delay	Specify time in seconds before an alarm is broadcast.

— NOTE

When one of the sensor types is ‘No Sensor’, then the PV Map drop-down displays two options:

1. Sensor Type n (n = 1 or 2, whichever is selected)
2. Device Temperature

When both the sensor types are ‘No Sensor’, then the PV Map drop-down displays one option - Device Temperature.

Measurement Units

The Measurement Units screen allows you to select the engineering units for all the measured values.

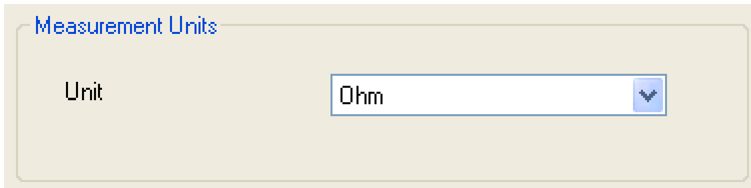


Figure 868. Sample RTT80 Transmitter Measurement Units Screen

Field	Entry
Measurement Units	
Unit	Select the units for all the measured values from the drop-down list. Choose from degC, degF, K, degR, Ohm, and mV.

Sensor

Sensor 1 Settings

The Sensor 1 Settings screen allows you to select the sensor and connection types, and set values for Sensor Offset and Sensor Serial Number for sensor input 1.

If the connection type is 2-wire, then set the value for 2-Wire Compensation.

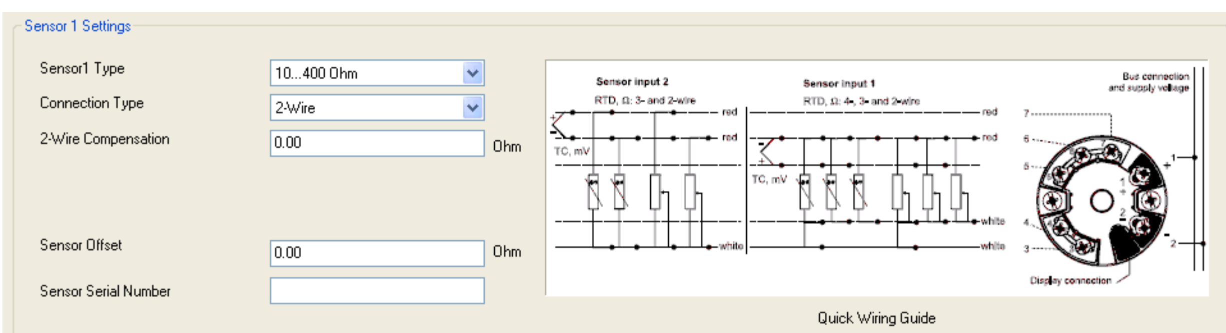


Figure 869. Sample RTT80 Transmitter Sensor 1 Settings Screen

<table>
<tr><th>Field</th><th>Entry</th></tr>
<tr><td colspan="2">Sensor 1 Settings</td></tr>
<tr><td>Sensor1 Type</td><td>Select the sensor type for sensor input 1 from the drop-down list. The options in the drop-down change based on the measurement units selected in the “Measurement Units” on page 624.
Choose from:
• Pt100 IEC 751 (a=0.00385)
• Pt200 IEC 751 (a=0.00385)
• Pt500 IEC 751 (a=0.00385)
• Pt1000 IEC 751 (a=0.00385)
• Pt100 JIS C1604-81 (a=0.003916)
• Ni100 DIN43760 (a=0.006180)
• Ni120 DIN43760 (a=0.006180)
• Ni100 OIML R84:2003 GOST (a=0.006170)
• Ni120 OIML R84:2003 GOST (a=0.006170)
• TC Type B (PtRh30-PtRh6) IEC60584
• TC Type C (W5Re-W26Re) ASTM E988
• TC Type D (W3Re-W25Re) ASTM E988
• TC Type E (NiCr-CuNi) IEC60584
• TC Type J (Fe-CuNi) IEC60584
• TC Type K (NiCr-Ni) IEC60584
• TC Type N (NiCrSi-NiSi) IEC60584
• TC Type R (PtRh13-Pt) IEC60584
• TC Type S (PtRh10-Pt) IEC60584
• TC Type T (Cu-CuNi) IEC60584
• TC Type L (Fe-CuNi) IEC60584
• TC Type U (Cu-CuNi) IEC60584
• Pt50 GOST (a=0.003911)
• Pt100 GOST (a=0.003911)
• Cu50 GOST (a=0.004280)
• Cu50 OIML (a=0.004280)
• Cu50 OIML R84:2003 GOST (a=0.004260)
• RTD Platinum (Callendar/van Dusen)
• RTD Poly Nickel (OIML R84, GOST 6651-94)
• RTD Polynomial Copper (OIML R84:2003)
• 10...400 Ω
• 10...2000 Ω
• -20...100 mV
• No Sensor
NOTE
If you select ‘No Sensor’ then the rest of the fields in this screen do not appear.</td></tr>
</table>

Field	Entry
Connection Type	Select the connection type for sensor input 1 from the drop-down list. Choose from 2-wire, 3-wire, and 4-wire[a]. Prerequisite: You must specify an RTD sensor as the sensor type. If you select 2-wire as the connection type, the 2-Wire Compensation field appears. If you select 3-wire or 4-wire as the connection type, this field does not appear.
2-Wire Compensation	Specify the resistance value for 2-Wire compensation. You can specify from 0 to 30 Ω. This field appears only if you select the connection type as 2-wire.
Sensor Offset	Specify the sensor offset value. The value you specify is added to the measured value. You can specify from -10.0 to +10.0.
Sensor Serial Number	Specify the serial number of the sensor. You can specify up to 12 alphanumeric characters.

a. 4-wire connection is not available for sensor input 2.

If you select thermocouple (TC) sensor as the sensor type, then select the reference junction measurement and specify the fixed preset value for temperature compensation.

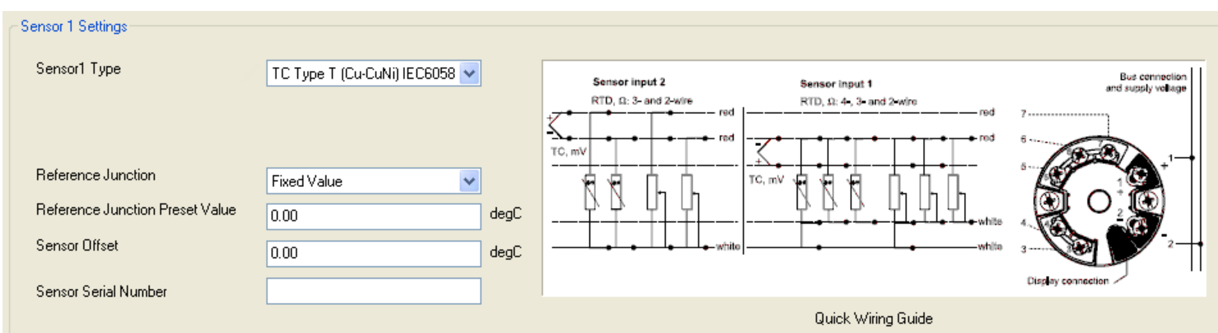


Figure 870. Sample RTT80 Transmitter Sensor 1 Settings Screen (Thermocouple Sensor Type)

Sensor 1 Settings	
Reference Junction	Select the reference junction (cold junction) measurement from the drop-down list. Choose from No Compensation, Internal Measurement, Fixed Value, and Sensor 2 Value. • No Compensation: Select this option if you do not want to use temperature compensation • Internal Measurement: Select this option if you want to use internal reference junction temperature • Fixed Value: Select this option if you want to use a fixed preset value, and you can specify the compensation value via the Reference Junction Preset Value parameter. • Sensor 2 Value: Select this option if you want to use the measured value of sensor 2

Reference Junction Preset Value	Specify the fixed preset value for temperature compensation. You can specify from –50 to +85°C. Prerequisite: You must select the Fixed Value parameter from the Reference Junction drop-down list.

Sensor 1 Trimming

The Sensor 1 Trimming screen allows you to select the linearization method for the connected sensor. When you reset this parameter to the factory settings, the original linearization is restored.

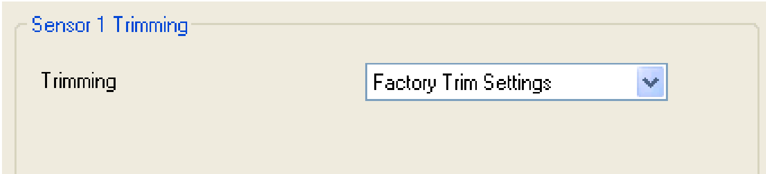


Figure 871. Sample RTT80 Transmitter Sensor 1 Trimming Screen

Field	Entry
Sensor 1 Trimming	
Trimming	Select the linearization method for the connected sensor from the drop-down list. Choose from Factory Trim Settings and User Trim Settings.

If you select User Trim Settings, then specify sensor trimming upper and lower values as shown in Figure 872.

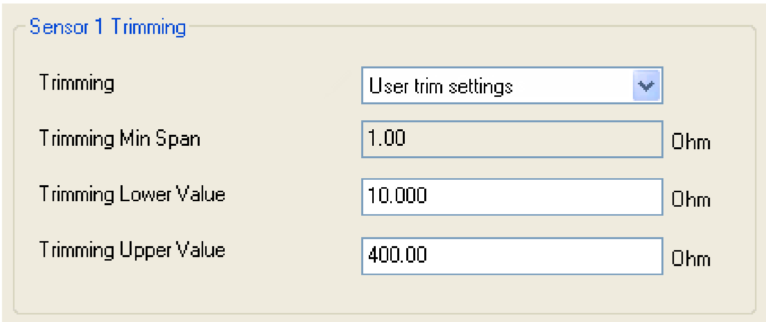


Figure 872. Sample RTT80 Transmitter Sensor 1 Trimming Screen (User Trimmings)

Sensor 1 Trimming	
Trimming Min Span	This field shows the minimum possible span between the upper and lower values of sensor trimming. Prerequisite: The Trimming parameter is set to User Trim Settings.
Trimming Lower Value	Specify the lower point for linear characteristic calibration. This value affects the offset and slope. The input for this parameter depends on the measured variable assigned in the PV Map parameter and the Sensor 1 Type selected. For more details on PV Map refer to “General” on page 622 and for Sensor 1 Type refer to “Sensor 1 Settings” on page 624. Prerequisite: The Trimming parameter is set to User Trim Settings.
Trimming Upper Value	Specify the upper point for linear characteristic calibration. This value affects offset and slope. The input for this parameter depends on the measured variable assigned in the PV Map parameter and the Sensor 1 Type selected. For more details on PV Map refer to “General” on page 622 and for Sensor 1 Type refer to “Sensor 1 Settings” on page 624. Prerequisite: The Trimming parameter is set to User Trim Settings.

Sensor 1 Linearization

The Sensor 1 Linearization screen is enabled when you select RTD Platinum, RTD Poly Nickel, or RTD Polynomial Copper option in the Sensor Type parameter.

If you select either RTD Poly Nickel or RTD Polynomial Copper as the sensor type, then specify values for polynomial coefficients.

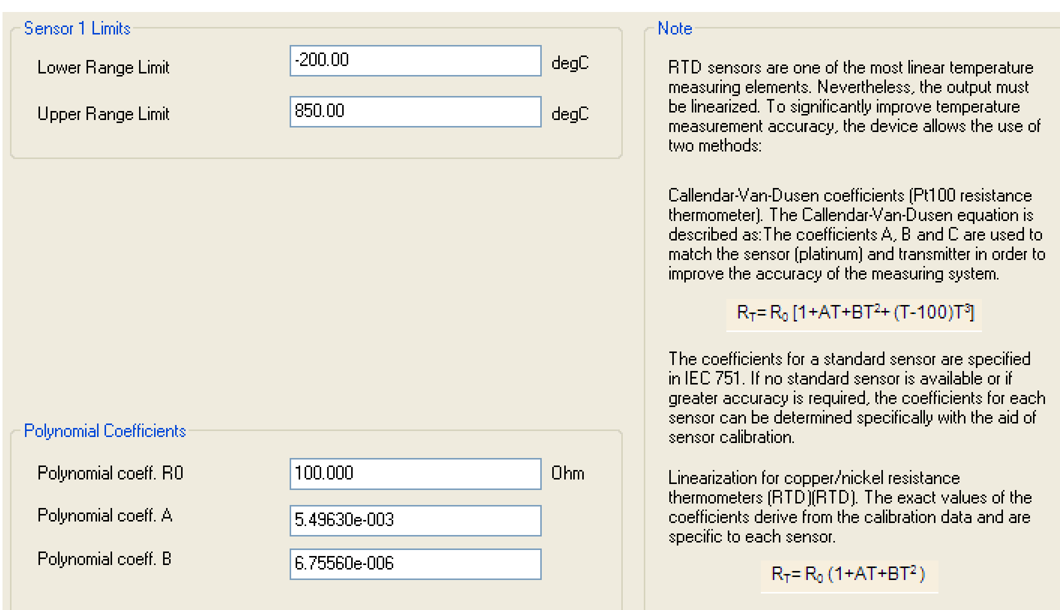


Figure 873. Sample RTT80 Transmitter Sensor 1 Linearization Screen (RTD Poly Nickel or RTD Polynomial Copper Sensor Type)

Field	Entry
Sensor 1 Limits	
Lower Range Limit	Specify the lower calculation limit for sensor linearization. Prerequisite: You must select RTD Platinum, RTD Poly Nickel, or RTD Polynomial Copper as the sensor type.
Upper Range Limit	Specify the upper calculation limit for sensor linearization. Prerequisite: You must select RTD Platinum, RTD Poly Nickel, or RTD Polynomial Copper as the sensor type.
Polynomial Coefficients	
Polynomial Coeff. R0	Specify the R0 value for linearization of nickel or copper sensors. You can specify from 40.000 to 1050.000 Ω.
Polynomial Coeff. A	Specify the coefficient A for sensor linearization of copper or nickel resistance thermometers. The default value set for this parameter is 5.49630e-003.
Polynomial Coeff. B	Specify the coefficient B for sensor linearization of copper or nickel resistance thermometers. The default value set for this parameter is 6.75560e-006.

If you select RTD Platinum as the sensor type, then specify values for Callendar-Van-Dusen Coefficients.

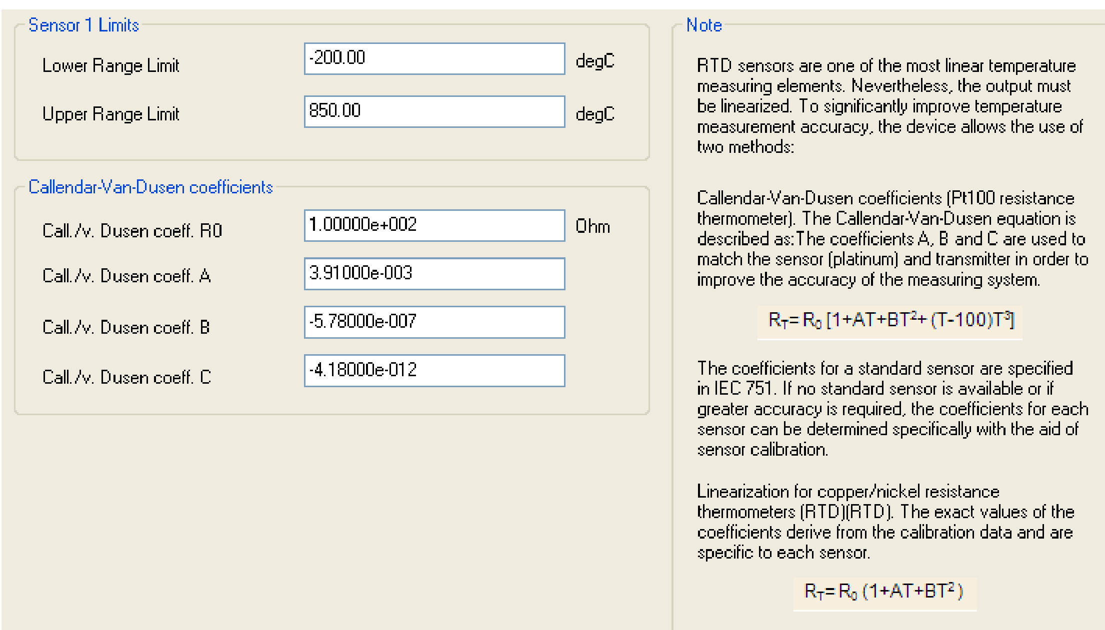


Figure 874. Sample RTT80 Transmitter Sensor 1 Linearization Screen (RTD Platinum Sensor Type)

Field	Entry
Sensor 1 Limits	
Lower Range Limit	Specify the lower calculation limit for sensor linearization. Prerequisite: You must select a sensor type of RTD Platinum, RTD Poly Nickel or RTD Polynomial Copper.
Upper Range Limit	Specify the upper calculation limit for sensor linearization. Prerequisite: You must select a sensor type of RTD Platinum, RTD Poly Nickel or RTD Polynomial Copper.
Callendar-Van-Dusen Coefficients	
Call./v. Dusen Coeff. R0	Specify the R0 value for linearization with the Callendar-Van-Dusen polynomial. You can specify from 40.000 to 1050.000 Ω.
Call./v. Dusen Coeff. A	Specify the coefficient A for sensor linearization. The default value set for this parameter is 3.910000e-003.
Call./v. Dusen Coeff. B	Specify the coefficient B for sensor linearization. The default value set for this parameter is 5.780000e-007.
Call./v. Dusen Coeff. C	Specify the coefficient C for sensor linearization. The default value set for this parameter is 4.180000e-012.

Sensor 2 Settings

The Sensor 2 Settings screen allows you to select the sensor and connection types, and set values for Sensor Offset and Sensor Serial Number for sensor input 2.

If the connection type is 2-wire, then set the value for 2-Wire Compensation.

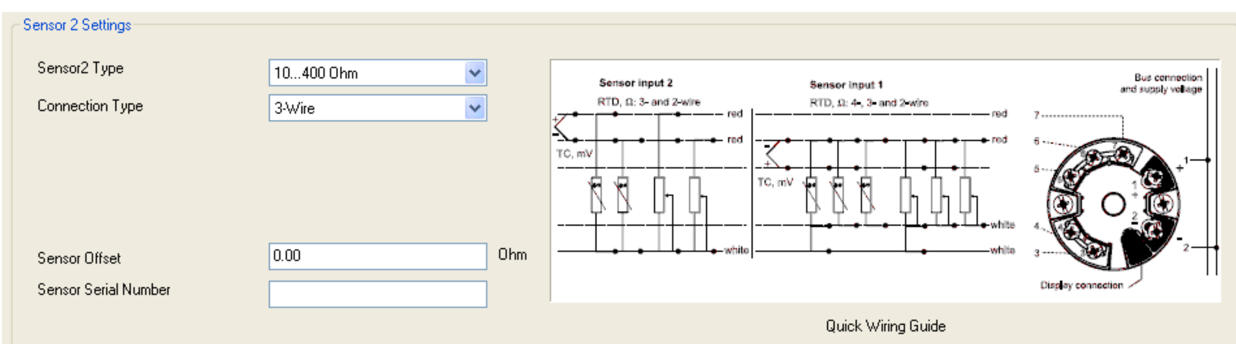


Figure 875. Sample RTT80 Transmitter Sensor 2 Settings Screen

<table>
<tr><th>Field</th><th>Entry</th></tr>
<tr><td colspan="2">Sensor 2 Settings</td></tr>
<tr><td>Sensor2 Type</td><td>Select the sensor type for sensor input 2, from the drop-down list. The options in the drop-down change based on the measurement units selected in the “Measurement Units” on page 624.
Choose from:
• Pt100 IEC 751 (a=0.00385)
• Pt200 IEC 751 (a=0.00385)
• Pt500 IEC 751 (a=0.00385)
• Pt1000 IEC 751 (a=0.00385)
• Pt100 JIS C1604-81 (a=0.003916)
• Ni100 DIN43760 (a=0.006180)
• Ni120 DIN43760 (a=0.006180)
• Ni100 OIML R84:2003 GOST (a=0.006170)
• Ni120 OIML R84:2003 GOST (a=0.006170)
• TC Type B (PtRh30-PtRh6) IEC60584
• TC Type C (W5Re-W26Re) ASTM E988
• TC Type D (W3Re-W25Re) ASTM E988
• TC Type E (NiCr-CuNi) IEC60584
• TC Type J (Fe-CuNi) IEC60584
• TC Type K (NiCr-Ni) IEC60584
• TC Type N (NiCrSi-NiSi) IEC60584
• TC Type R (PtRh13-Pt) IEC60584
• TC Type S (PtRh10-Pt) IEC60584
• TC Type T (Cu-CuNi) IEC60584
• TC Type L (Fe-CuNi) IEC60584
• TC Type U (Cu-CuNi) IEC60584
• Pt50 GOST (a=0.003911)
• Pt100 GOST (a=0.003911)
• Cu50 GOST (a=0.004280)
• Cu50 OIML (a=0.004280)
• Cu50 OIML R84:2003 GOST (a=0.004260)
• RTD Platinium (Callendar/van Dusen)
• RTD Poly Nickel (OIML R84, GOST 6651-94)
• RTD Polynomial Copper (OIML R84:2003)
• 10...400 Ω
• 10...2000 Ω
• -20...100 mV
• No Sensor
NOTE
If you select ‘No Sensor’ then the rest of the fields in this screen do not appear.</td></tr>
</table>

Field	Entry
Connection Type	Select the connection type for sensor input 2 from the drop-down list. Choose from 2-wire and 3-wire. Prerequisite: You must specify an RTD sensor as the sensor type. If you select 2-wire as the connection type, the 2-Wire Compensation field appears. If you select 3-wire as the connection type, this field does not appear.
2-Wire Compensation	Specify the resistance value for 2-Wire compensation. You can specify from 0 to 30 Ω. This field appears only if you select the connection type as 2-wire.
Sensor Offset	Specify the sensor offset value. The value you specify is added to the measured value. You can specify from -10.0 to +10.0.
Sensor Serial Number	Specify the serial number of the sensor. You can specify up to 12 alphanumeric characters.

If you select thermocouple (TC) sensor as the sensor type, then select the reference junction measurement and specify the fixed preset value for temperature compensation.

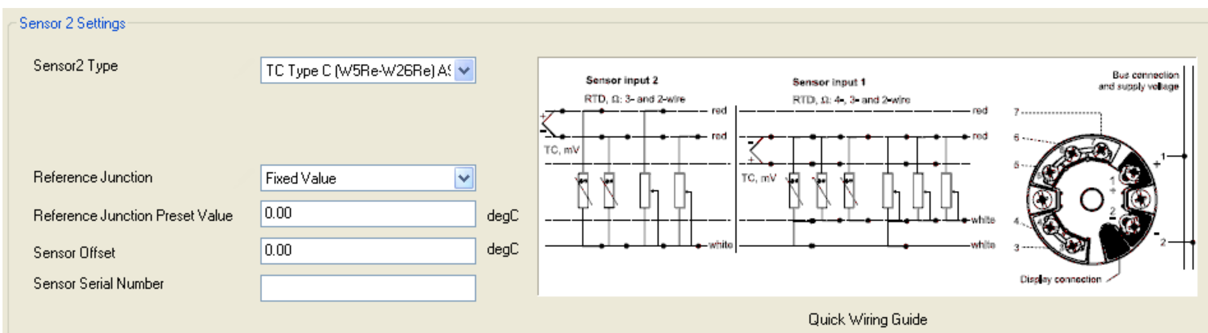


Figure 876. Sample RTT80 Transmitter Sensor 2 Settings Screen (Thermocouple Sensor Type)

Field	Entry
Sensor 2 Settings	
Reference Junction	Select the reference junction (cold junction) measurement for temperature compensation of thermocouples (TC) from the drop-down list. Choose from No Compensation, Internal Measurement, Fixed Value, and Sensor 2 Value. • No Compensation: Select this option if you do not want to use temperature compensation • Internal Measurement: Select this option if you want to use internal reference junction temperature • Fixed Value: Select this option if you want to use a fixed preset value, and you can specify the compensation value via the Reference Junction Preset Value parameter. • Sensor 2 Value: Select this option if you want to use the measured value of sensor 2

Reference Junction Preset Value	Specify the fixed preset value for temperature compensation. You can specify from –50 to +85°C. Prerequisite: You must select the Fixed Value parameter from the Reference Junction drop-down list.

Sensor 2 Trimming

The Sensor 2 Trimming screen allows you to select the linearization method for the connected sensor. When you reset this parameter to the factory settings, the original linearization is restored.

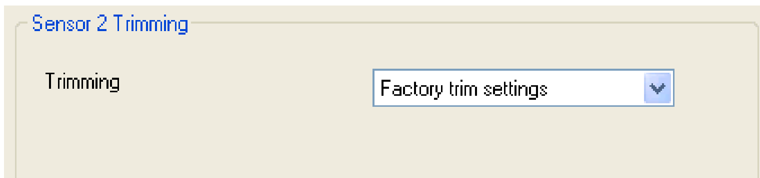


Figure 877. Sample RTT80 Transmitter Sensor 2 Trimming Screen

Field	Entry
Sensor 2 Trimming	
Trimming	Select the linearization method for the connected sensor from the drop-down list. Choose from Factory Trim Settings and User Trim Settings.

If you select User Trim Settings, then specify sensor trimming upper and lower values as shown in Figure 878.

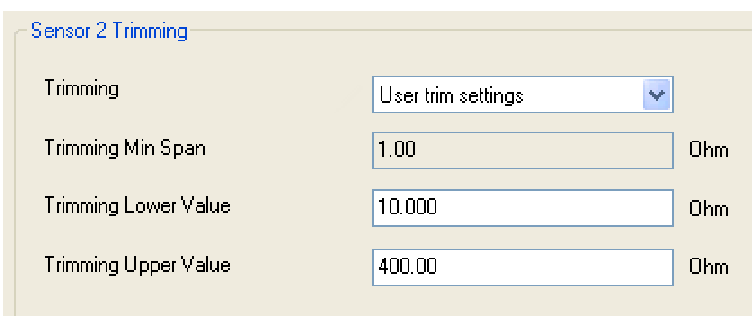


Figure 878. Sample RTT80 Transmitter Sensor 2 Trimming Screen (User Trimmings)

Field	Entry
Sensor 2 Trimming	
Trimming Min Span	This field shows the minimum possible span between the upper and lower values of sensor trimming. Prerequisite: The Trimming parameter is set to User Trim Settings.
Trimming Lower Value	Specify the lower point for linear characteristic calibration. This value affects offset and slope. The input for this parameter depends on the measured variable assigned in the PV Map parameter and the Sensor 2 Type selected. For more details on PV Map refer to "General" on page 622 and for Sensor 2 Type refer to "Sensor 2 Settings" on page 630. Prerequisite: The Trimming parameter is set to User Trim Settings.
Trimming Upper Value	Specify the upper point for linear characteristic calibration. This value affects offset and slope. The input for this parameter depends on the measured variable assigned in the PV Map parameter and the Sensor 2 Type selected. For more details on PV Map refer to "General" on page 622 and for Sensor 2 Type refer to "Sensor 2 Settings" on page 630. Prerequisite: The Trimming parameter is set to User Trim Settings.

Sensor 2 Linearization

The Sensor 1 Linearization screen is enabled when you select RTD platinum, RTD Poly Nickel, or RTD Polynomial Copper option in the Sensor Type parameter.

If you select either RTD Poly Nickel or RTD Polynomial Copper as the sensor type, then specify values for polynomial coefficients.

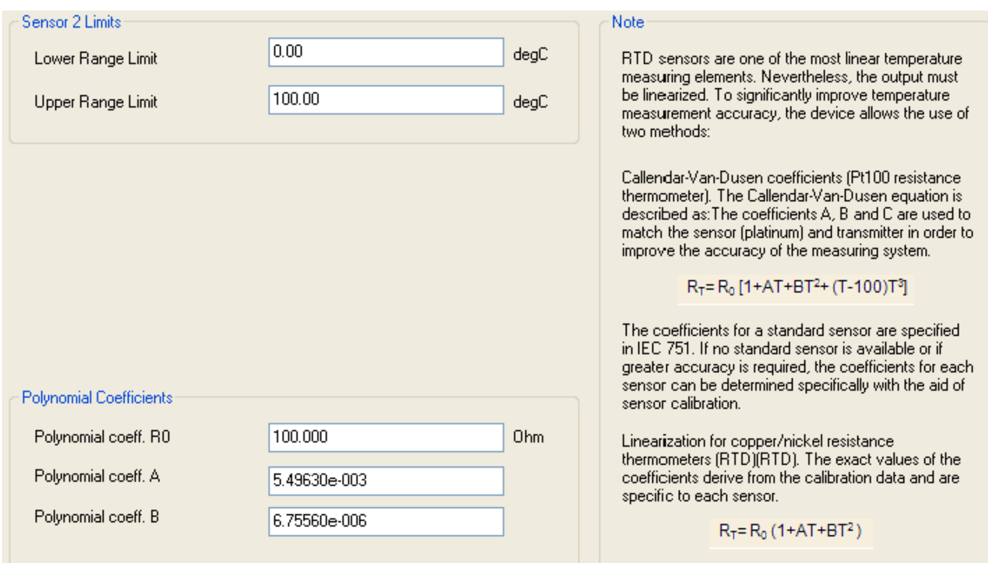


Figure 879. Sample RTT80 Transmitter Sensor 2 Linearization Screen (RTD Poly Nickel or RTD Polynomial Copper Sensor Type)

Field	Entry
Sensor 2 Limits	
Lower Range Limit	Specify the lower calculation limit for sensor linearization. Prerequisite: You must select RTD Platinum, RTD Poly Nickel, or RTD Polynomial Copper as the sensor type.
Upper Range Limit	Specify the upper calculation limit for sensor linearization. Prerequisite: You must select RTD Platinum, RTD Poly Nickel, or RTD Polynomial Copper as the sensor type.
Polynomial Coefficients	
Polynomial Coeff. R0	Specify the R0 value for linearization of nickel or copper sensors. You can specify from 40.000 to 1050.000 Ω.
Polynomial Coeff. A	Specify the coefficient A for sensor linearization of copper or nickel resistance thermometers. The default value set for this parameter is 5.49630e-003.
Polynomial Coeff. B	Specify the coefficient B for sensor linearization of copper or nickel resistance thermometers. The default value set for this parameter is 6.75560e-006.

If you select RTD Platinum as the sensor type, then specify values for Callendar-Van-Dusen Coefficients.

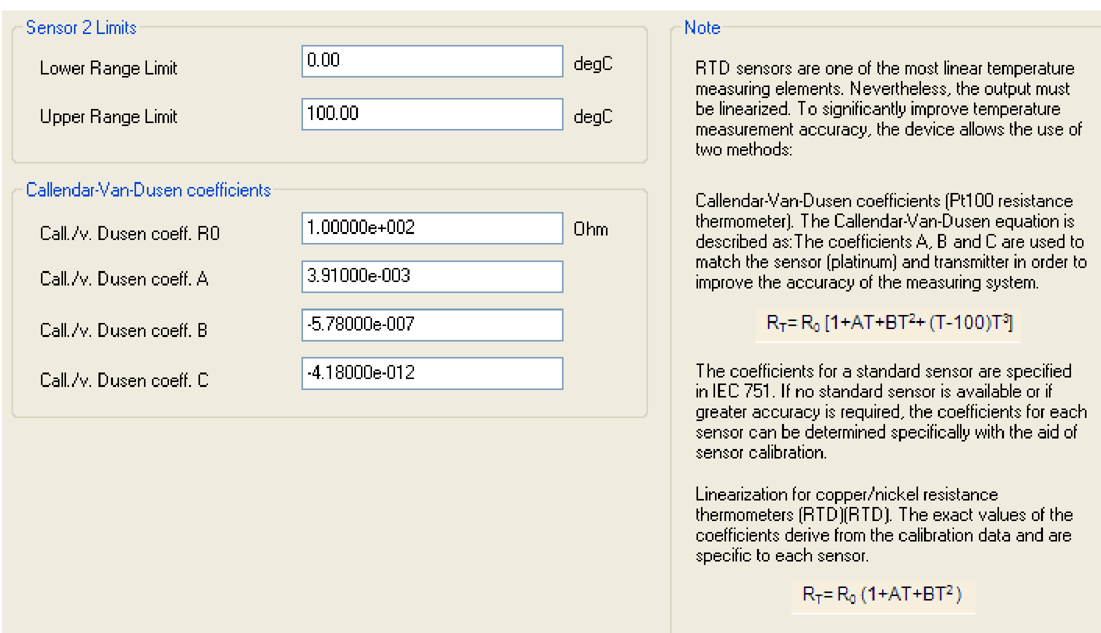


Figure 880. Sample RTT80 Transmitter Sensor 2 Linearization Screen (RTD Platinum Sensor Type)

Field	Entry
Sensor 2 Limits	
Lower Range Limit	Specify the lower calculation limit for sensor linearization. Prerequisite: You must select RTD Platinum, RTD Poly Nickel, or RTD Polynomial Copper as the sensor type.
Upper Range Limit	Specify the upper calculation limit for sensor linearization. Prerequisite: You must select RTD Platinum, RTD Poly Nickel, or RTD Polynomial Copper as the sensor type.
Callendar-Van-Dusen Coefficients	
Call./v. Dusen Coeff. R0	Specify the R0 value for linearization with the Callendar-Van-Dusen polynomial. You can specify from 40.000 to 1050.000 **Ω**.
Call./v. Dusen Coeff. A	Specify the coefficient A for sensor linearization. The default value set for this parameter is 3.910000e-003.
Call./v. Dusen Coeff. B	Specify the coefficient B for sensor linearization. The default value set for this parameter is 5.780000e-007.
Call./v. Dusen Coeff. C	Specify the coefficient A for sensor linearization. The default value set for this parameter is 4.180000e-012.

Min Max Values

The Min Max Values screen displays the minimum and maximum temperatures measured in the past at sensor inputs 1 and 2. If the sensor type is not selected (that is, if sensor type is 'No Sensor'), then the corresponding sensor temperature limits are not displayed.

This screen also displays the minimum and maximum electronics temperature measured in the past.

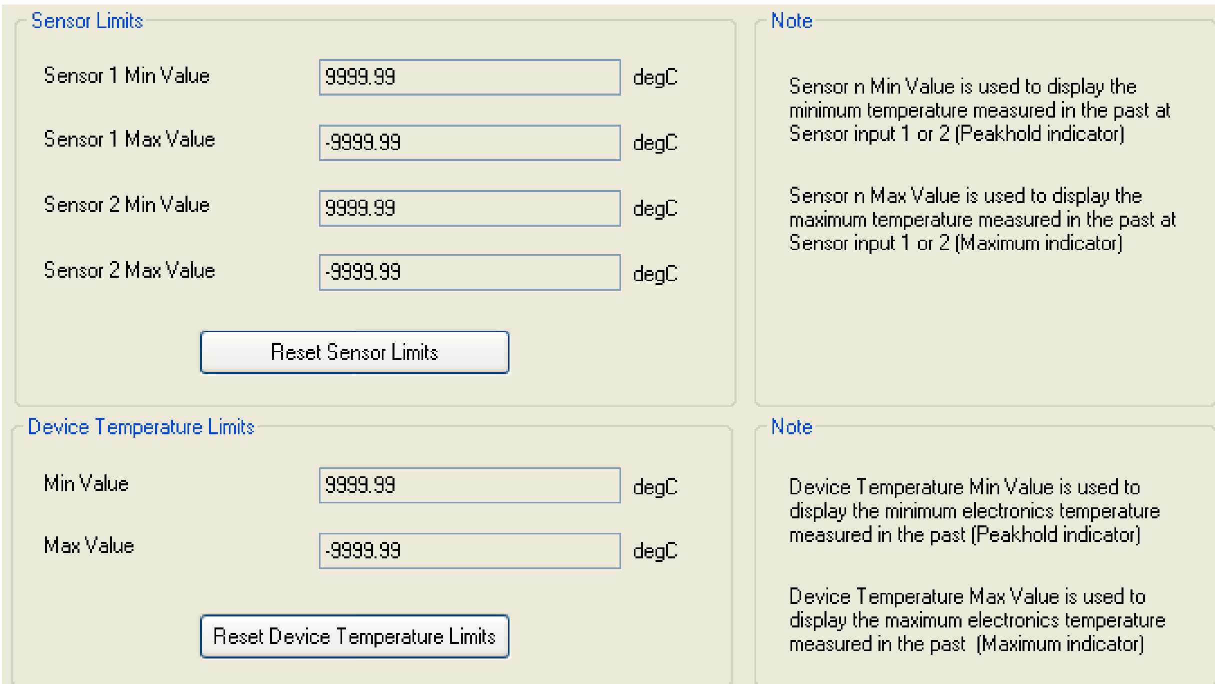


Figure 881. Sample RTT80 Transmitter Min Max Values Screen

Field	Entry
Sensor Limits	
Sensor 1 Min Value[a]	This field shows the minimum temperature measured in the past at sensor input 1.
Sensor 1 Max Value[a]	This field shows the maximum temperature measured in the past at sensor input 1.
Sensor 2 Min Value[b]	This field shows the minimum temperature measured in the past at sensor input 2.
Sensor 2 Max Value[b]	This field shows the maximum temperature measured in the past at sensor input 2.
Reset Sensor Limits[c]	Click Reset Sensor Limits to reset the maximum indicators for the minimum and maximum temperatures measured at the sensor inputs.
Device Temperature Limits	
Min Value	This field shows the minimum electronics temperature measured in the past.
Max Value	This field shows the maximum electronics temperature measured in the past.
Reset Device Temperature Limits	Click Reset Device Temperature Limits to reset the maximum indicator for the minimum and maximum electronic temperatures measured.

a. This field does not appear if sensor type 1 is ‘No Sensor’.

b. This field does not appear if sensor type 2 is ‘No Sensor’.

c. This button is disabled if sensor type 1 and 2 are ‘No Sensor’.

Diagnostic Settings

The Diagnostic Settings screen allows you to select the drift mode, drift alarm category, set the drift point, and sensor switch point. It allows you to select calibration counter start and alarm category, and set the calibration counter start value.

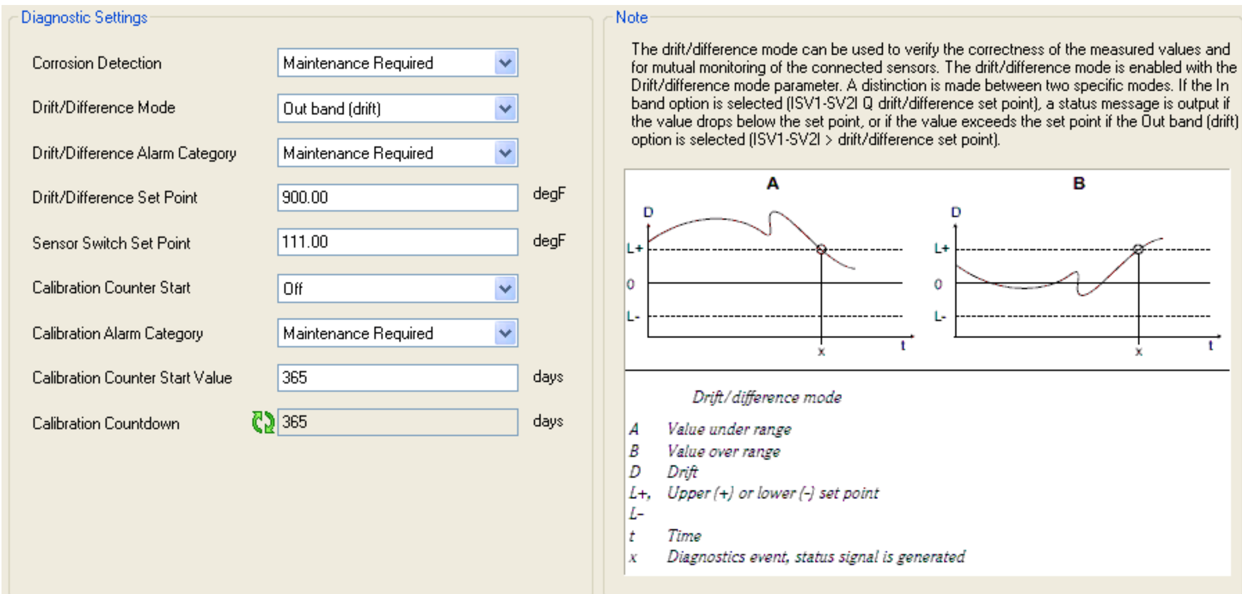


Figure 882. Sample RTT80 Transmitter Diagnostic Settings Screen

Field	Entry
Diagnostic Settings	
Corrosion Detection	Select the device reaction when corrosion of the sensor cables is detected. Choose from Maintenance Required and Failure.
Drift/Difference Mode	This parameter verifies the accuracy of the measured values and monitors the connected sensors. Select an alarm for the measurements exceeding or dropping below the set point, from the drop-down list: ♦ Out Band - A status signal is displayed if the absolute value for the differential value exceeds the drift/difference set point. ♦ In Band - A status signal is displayed if the absolute value for the differential value drops below the drift/difference set point.
Drift/Difference Alarm Category	Select device reaction to a Drift/Difference alarm from the drop-down list. Choose from Out of Specification, Maintenance, and Failure. Prerequisite: The Drift/Difference Mode parameter must be set to Out Band (drift) or In Band.
Drift/Difference Set Point	Specify the maximum permissible measured value deviation between sensor 1 and sensor 2 that results in drift/difference detection. You can choose from 1.0 to 999.0.

Field	Entry
Sensor Switch Set Point	Specify the threshold value for sensor switching. Whether or not this field appears depends on the sensor types selected in the “Sensor 1 Settings” and “Sensor 2 Settings”.
Calibration Counter Start	This parameter can be used to turn the calibration counter on or off or reset the counter. Choose one of the following options from the drop-down list: 1. Off: Stops the calibration counter 2. On: Starts the calibration counter 3. Reset + run: Resets the calibration counter to the set start value and starts the calibration counter
Calibration Alarm Category	Select the calibration alarm category (status signal) from the drop-down list. Choose from Maintenance Required and Failure.
Calibration Counter Start Value	Specify number of days for calibration countdown. You can specify from 0 to 365 days.
Calibration Countdown	This field shows remaining days on the calibration counter. The countdown of the calibration counter runs only if the device is turned on.

Access

The Access screen displays the locking state of the device.

Figure 883. Sample RTT80 Transmitter Access Screen

Field	Entry
Access	
Locking State	This field shows the device locking status. The DIP switch is fitted on the local display. When you activate Write Protection, you can not have write access to the parameters.

Device Temperature

The Device Temperature screen allows you to set alarms for device temperature and displays the device temperature value in the selected engineering units.

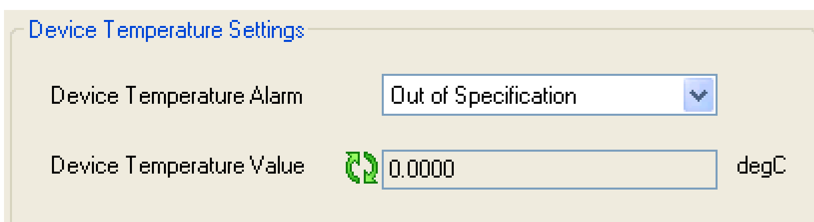


Figure 884. Sample RTT80 Transmitter Device Temperature Screen

Field	Entry
Device Temperature Settings	
Device Temperature Alarm	Select the device reaction to out of operating temperature limits (that is, less than -40°C (-40°F) or greater than +85°C (+185°F)). Choose from Off, Out of Specification, and Failure.
Device Temperature Value	This field shows the device temperature value in the selected engineering units.

Output

Analog

The Analog Output screen allows you to configure the analog output parameters in selected engineering units.

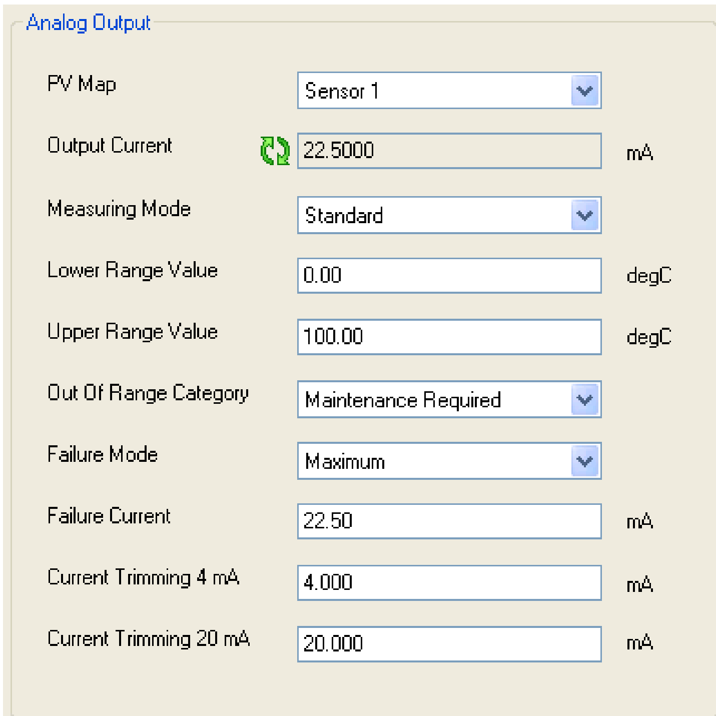


Figure 885. Sample RTT80 Transmitter Analog Output Screen

Field	Entry
Analog Output	
PV Map	Select the PV Map from the drop-down list. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.
Output Current	This field shows the calculated output current in mA.
Measuring Mode	Select one of the following options from the drop-down list to invert the output signal. 1. Standard - The output current increases with increasing temperatures 2. Inverse - The output current decreases with increasing temperatures
Lower Range Value	Specify the Lower Range Value of the measurement. This value relates to the 4 mA analog output value. The set point depends on the measured variable assigned in the PV Map parameter and the sensor type(s) selected. For more details on the sensor types refer to "Sensor1 Type" on page 625 and "Sensor2 Type" on page 631.
Upper Range Value	Specify the Upper Range Value of the measurement. This value relates to the 20 mA analog output value. The set point depends on the measured variable assigned in the PV Map parameter and the sensor type(s) selected. For more details on the sensor types refer to "Sensor1 Type" on page 625 and "Sensor2 Type" on page 631.
Out Of Range Category	Select the device reaction to the measurement value outside the set measuring range from the drop-down list. Choose from Out of Specification, Maintenance Required, and Failure.
Failure Mode	Select the signal on alarm level of the current output in the event of an error. Choose from Minimum and Maximum. If you select Maximum, specify the signal on alarm level using the Failure Current parameter.
Failure Current	Specify the mA level that conveys a failure. You can specify from 21.5 to 23.0 mA. Prerequisite: Failure Mode parameter must be set to Maximum.
Current Trimming 4 mA	Specify the current output at the lower end of the measuring range. You can specify from 3.85 to 4.15 mA.
Current Trimming 20 mA	Specify the current output at the upper end of the measuring range. You can specify from 19.850 to 20.15 mA.

Digital

The Digital Output screen allows you to configure parameters for digital communication interface.

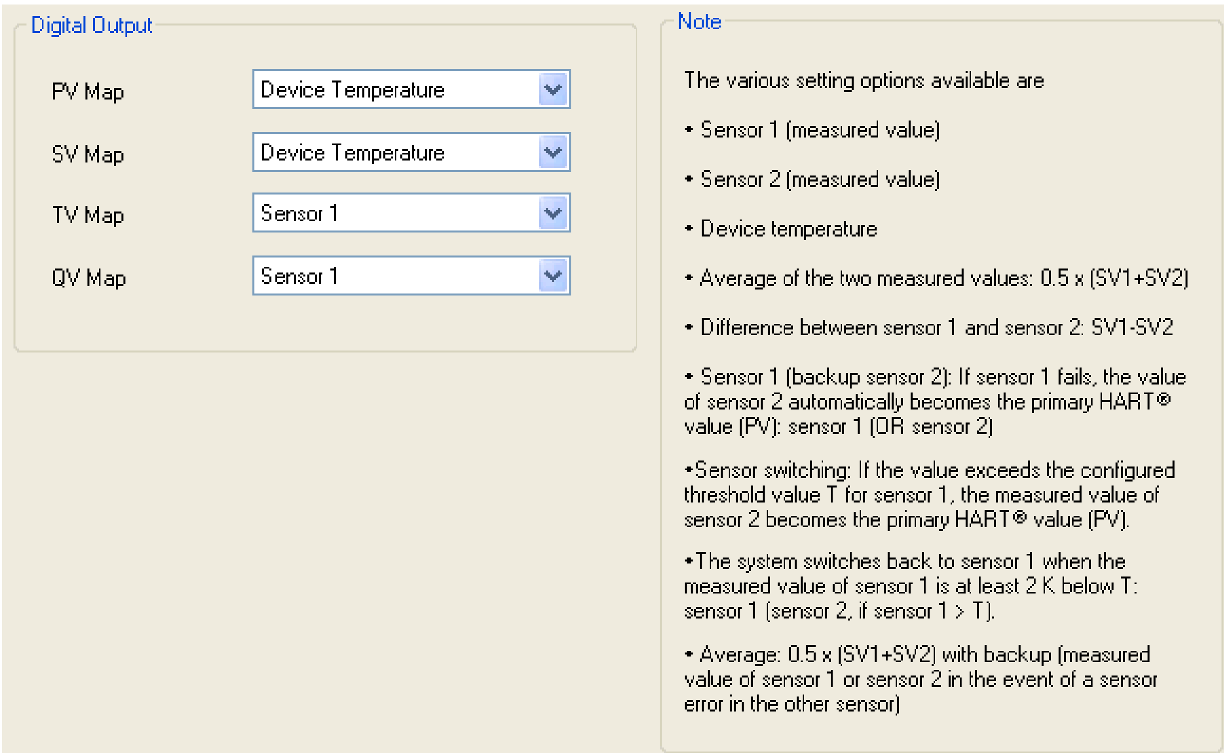


Figure 886. Sample RTT80 Transmitter Digital Output Screen

Field	Entry
Digital Output	
PV Map	Select the PV Map from the drop-down list. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.
SV Map	Select the SV Map from the drop-down list. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.
TV Map	Select the TV Map from the drop-down list. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.
QV Map	Select the QV Map from the drop-down list. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.

For more details about the Map options, refer to the following list:

- Sensor 1 - indicates the sensor 1 measured value
- Sensor 2 - indicates the sensor 2 measured value
- Device Temperature - indicates the electronics temperature
- Average - indicates the average of sensor 1 and sensor 2 (that is, 0.5 x (SV1+SV2))
- Difference - indicates the difference between sensor 1 and sensor 2 (that is, SV1-SV2)
- Sensor 1 (Backup Sensor 2): indicates that if sensor 1 fails, the value of sensor 2 automatically becomes the primary HART value (PV): sensor 1 (OR sensor 2)
- Sensor Switching - indicates that if the value exceeds the configured threshold value T for sensor 1, the measured value of sensor 2 becomes the primary HART value (PV). The system switches back to sensor 1 when the measured value of sensor 1 is at least 2 K below T: sensor 1 (sensor 2, if sensor 1 > T)
- Average with Backup - indicates the average value with the backup value, that is, 0.5 x (SV1+SV2) with backup (measured value of sensor 1 or sensor 2 in the event of a sensor error in the other sensor)

NOTE

When one of the sensor types is 'No Sensor', then the PV Map, SV Map, TV Map, and QV Map drop-down lists display two options:
1. Sensor Type n (n = 1 or 2, whichever is selected)
2. Device Temperature

When both the sensor types are 'No Sensor', then the PV Map, SV Map, TV Map, and QV Map drop-down lists display one option - Device Temperature.

HART

The HART screen allows you to select the polling address and enter the number of response preambles. It displays the number of request preambles. You can set the burst mode and the burst command, and select burst variables for slots 1, 2, 3, and 4.

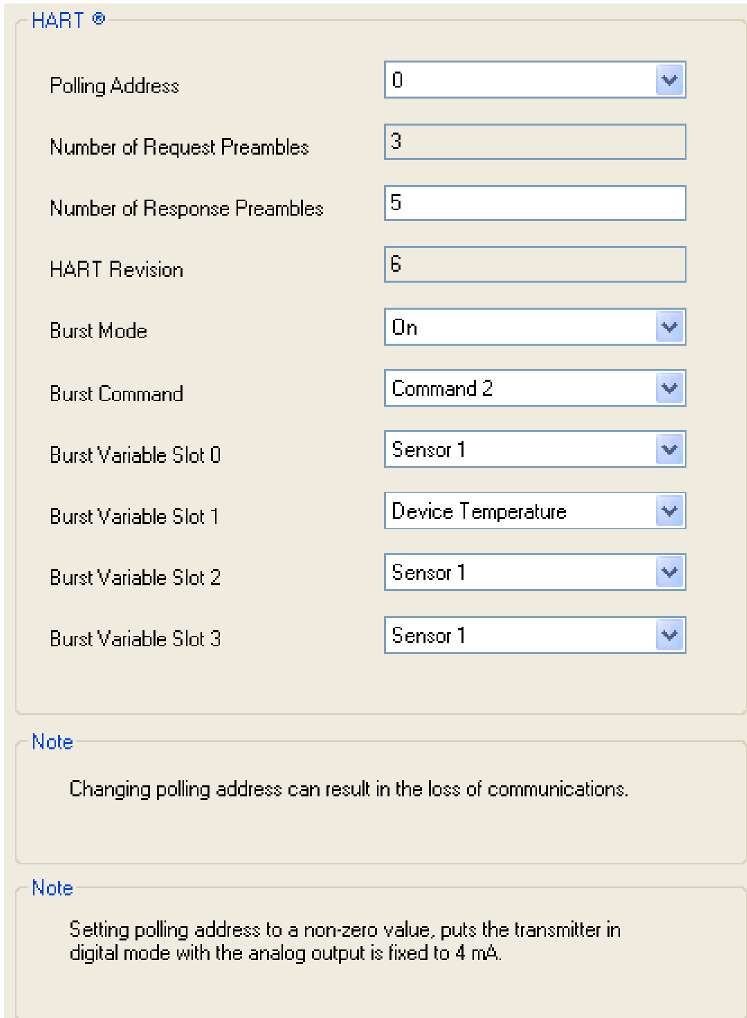


Figure 887. Sample RTT80 Transmitter HART Screen

Field	Entry
HART	
Polling Address	Select the HART address of the device from the drop-down list. For HART 5.0 - Choose from 0 to 15. For HART 6.0 - Choose from 0 to 63.
Number of Request Preambles	This field shows the number of preambles in the HART message.
Number of Response Preambles	Specify the number of preambles in the HART message. You can specify from 2 to 20.

Field	Entry
HART Revision	This field shows the HART revision of the device.
Burst Mode	Select HART burst mode from the drop-down list. Choose from On and Off. If you switch: 1. On - The device regularly sends data to the bus 2. Off - The device sends data to the bus only when requested by the HART master
Burst Command	You can select this parameter only when the Burst Mode option is enabled. Select the command whose response is sent to the HART master in the burst mode. Choose one of the following options from the drop-down list: 1. Command 1 - Primary variable 2. Command 2 - Current and main measured value as % 3. Command 3 - Current and dynamic HART variables 4. Command 9 - Dynamic variables and status 5. Command 33 - Dynamic variables and units
Burst Variable Slot 0	You can select this parameter only when the Burst Mode option is enabled. Select a measured variable from the drop-down list to assign to slot 0. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.
Burst Variable Slot 1	You can select this parameter only when the Burst Mode option is enabled. Select a measured variable from the drop-down list to assign to slot 1. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.
Burst Variable Slot 2	You can select this parameter only when the Burst Mode option is enabled. Select a measured variable from the drop-down list to assign to slot 2. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.
Burst Variable Slot 3	You can select this parameter only when the Burst Mode option is enabled. Select a measured variable from the drop-down list to assign to slot 3. Choose from Sensor 1, Sensor 2, Device Temperature, Average, Difference, Sensor 1 (Backup Sensor 2), Sensor Switching, and Average with Backup.

— NOTE

When one of the sensor types is 'No Sensor', then the Burst Variable Slot 0, 1, 2, and 3 drop-down lists display two options:
1. Sensor Type n (n = 1 or 2, whichever is selected)
2. Device Temperature
When both the sensor types are 'No Sensor', then the Burst Variable Slot 0, 1, 2, and 3 drop-down lists display one option - Device Temperature.

Local Display

The Local Display Configuration screen is used to configure the information display options.

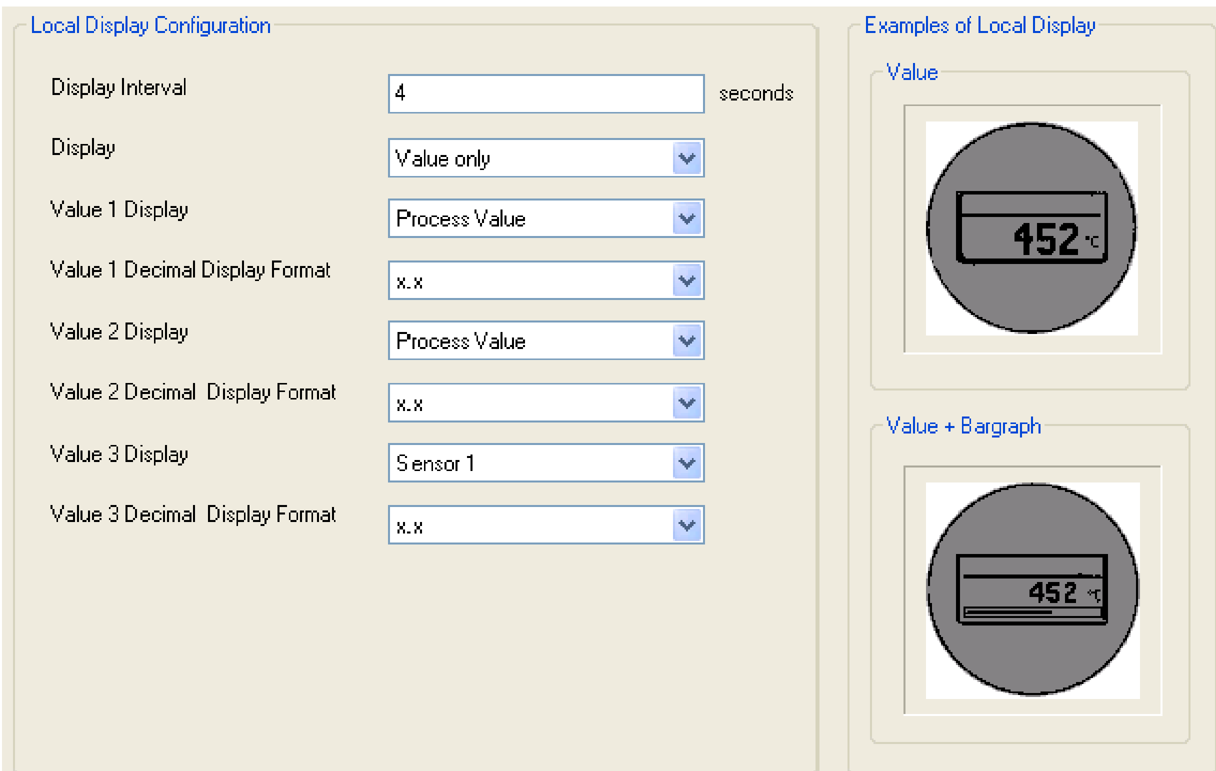


Figure 888. Sample RTT80 Transmitter Local Display Screen

Field	Entry
Local Display Configuration	
Display Interval	Specify in seconds the interval a measured value is displayed if more than one measured value is displayed.
Display	Select the format of display of the measured values on the local display from the drop-down list. Choose from Value Only and Value+Bargraph.
Value 1 Display	Select the value to be displayed as the first value on the local display from the drop-down list. Choose from Process Value, Sensor 1, Sensor 2, Output Current, Percent of Range, and Device Temperature.
Value 1 Decimal Display Format	This field appears only if a measured value is specified in the Value 1 Display parameter. Select the number of characters displayed after the decimal point from the drop-down list. Choose from Automatic, x, x.x, x.xx, x.xxx, and x.xxxx. “Automatic” displays the maximum number of decimal places possible based on the measurement.
Value 2 Display	Select the value to be displayed as the second value on the local display from the drop-down list. Choose from Process Value, Sensor 1, Sensor 2, Output Current, Percent of Range, and Device Temperature.
Value 2 Decimal Display Format	This field appears only if a measured value is specified in the Value 2 Display parameter. Select the number of characters displayed after the decimal point from the drop-down list. Choose from Automatic, x, x.x, x.xx, x.xxx, and x.xxxx. “Automatic” displays the maximum number of decimal places possible based on the measurement.
Value 3 Display	Select the value to be displayed as the third value on the local display from the drop-down list. Choose from Process Value, Sensor 1, Sensor 2, Output Current, Percent of Range, and Device Temperature.
Value 3 Decimal Display Format	This field appears only if a measured value is specified in the Value 3 Display parameter. Select the number of characters displayed after the decimal point from the drop-down list. Choose from Automatic, x, x.x, x.xx, x.xxx, and x.xxxx. “Automatic” displays the maximum number of decimal places possible based on the measurement.

Device Information

The Device Information screen shows the complete information of the device. It allows you to set final assembly number, tag, HART short tag, descriptor, date of last calibration, and message.

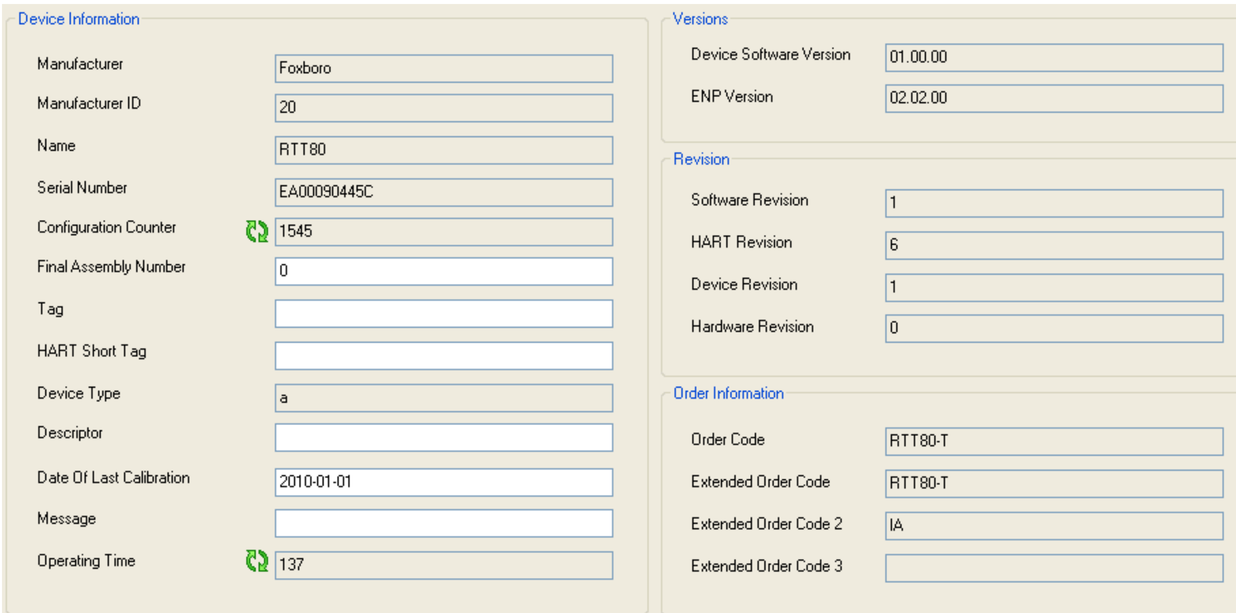


Figure 889. Sample RTT80 Transmitter Device Information Screen

Field	Entry
Device Information	
Manufacturer	This field shows the name of the manufacturer.
Manufacturer ID	This field shows the manufacturer ID. This is a 2-digit hexadecimal number. The manufacturer ID for this device is 20.
Name	This field shows the name of the device.
Serial Number	This field shows the serial number of the device.
Configuration Counter	This field shows the counter reading for changes to device parameters. **— NOTE** This parameter increments by 1 when the values of static parameters change during optimization or configuration. This counter shows an higher value when several parameters change in the device. You can not reset this counter. If the counter overflows, (16 bit), it starts again at 1.
Final Assembly Number	Enter the final assembly number for the device.
Tag	Specify a unique name for the device tag. You can use up to 32 alphanumeric characters.

Field	Entry
HART Short Tag	Specify HART short tag. You can use up to 8 alphanumeric characters.
Device Type	This field shows the device type that is registered with the HART Communication Foundation. This is a 2-digit hexadecimal number.
Descriptor	Specify a description for the device. You can use up to 32 alphanumeric characters.
Date of Last Calibration	Specify the date of the last calibration.
Message	Specify the HART message that is sent from the device via the HART digital protocol when requested. You can use up to 32 alphanumeric characters.
Operating Time	This field shows the time in hours that the device has been in operation until now.
Versions	
Device Software Version	This field shows the software version of the device.
ENP Version	This field shows the version of the electronic nameplate (ENP). This is a 6-digit number in the format xx.yy.zz
Revision	
Software Revision	This field shows the software revision of the device.
HART Revision	This field shows the HART revision of the device.
Device Revision	This field shows the revision of the device that is registered with the HART Communication Foundation. This is a 2-digit hexadecimal number.
Hardware Revision	This field shows the hardware revision number of the device.
Order Information	
Order Code	This field shows the order code of the device which is generated from the extended order code.
Extended Order Code	This field shows the extended order code: RTT80-T.
Extended Order Code 2	Not used.
Extended Order Code 3	Not used.

Device Status

Device Status 1

The Device Status 1 screen shows the current status of the device. The status of each parameter is recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

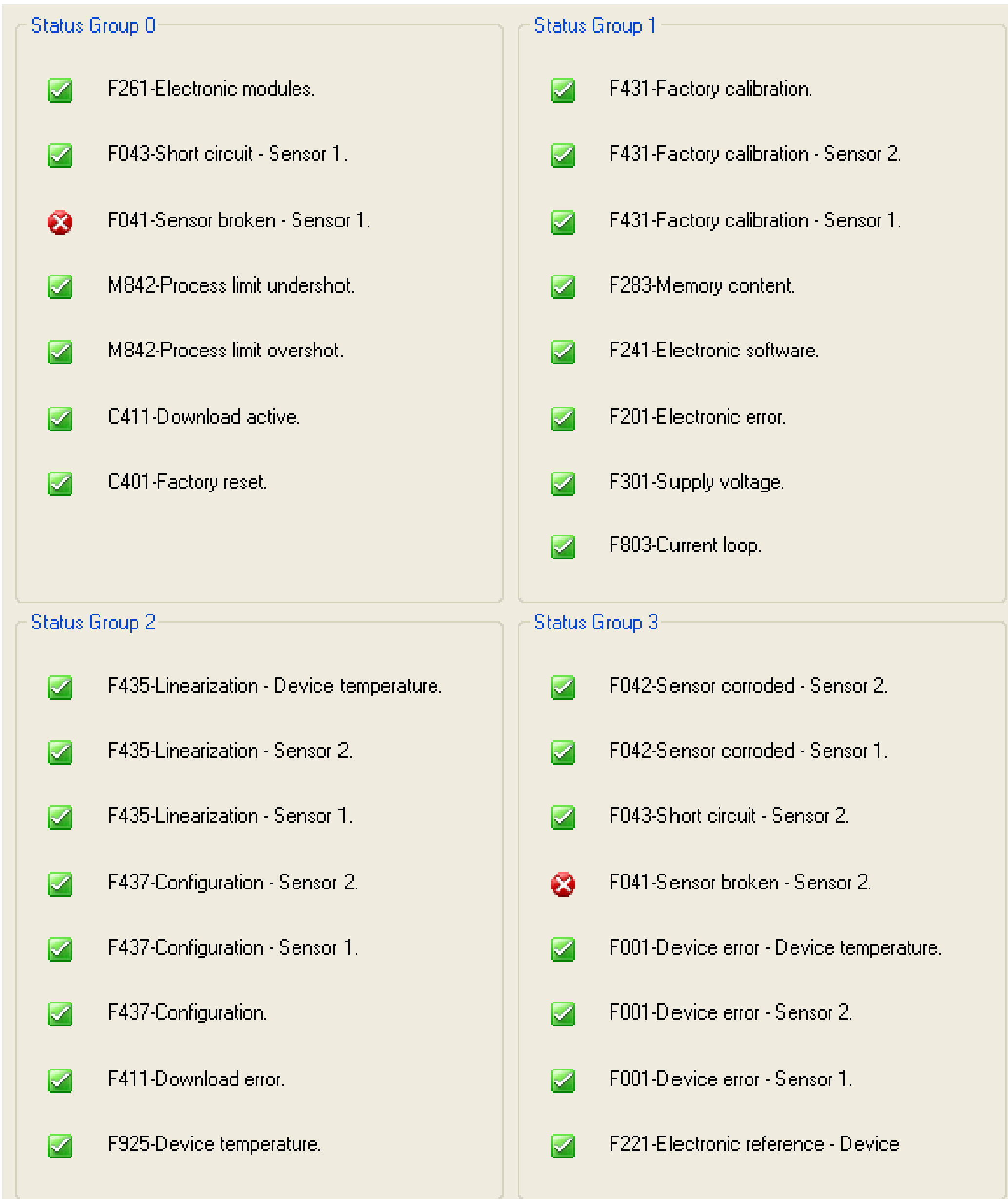


Figure 890. Sample RTT80 Transmitter Device Status 1 Screen

Device Status 2

The Device Status 2 screen shows the current status of the device. The status of each parameter is recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

Figure 891. Sample RTT80 Transmitter Device Status 2 Screen

Device Status 3

The Device Status 3 screen shows the current status of the device. The status of each parameter is recognized by the use of a green check mark (good), a yellow triangle (warning), or a red X (error).

Figure 892. Sample RTT80 Transmitter Device Status 3 Screen

HART Status

The HART Status screen shows the HART status as well as the field device status.

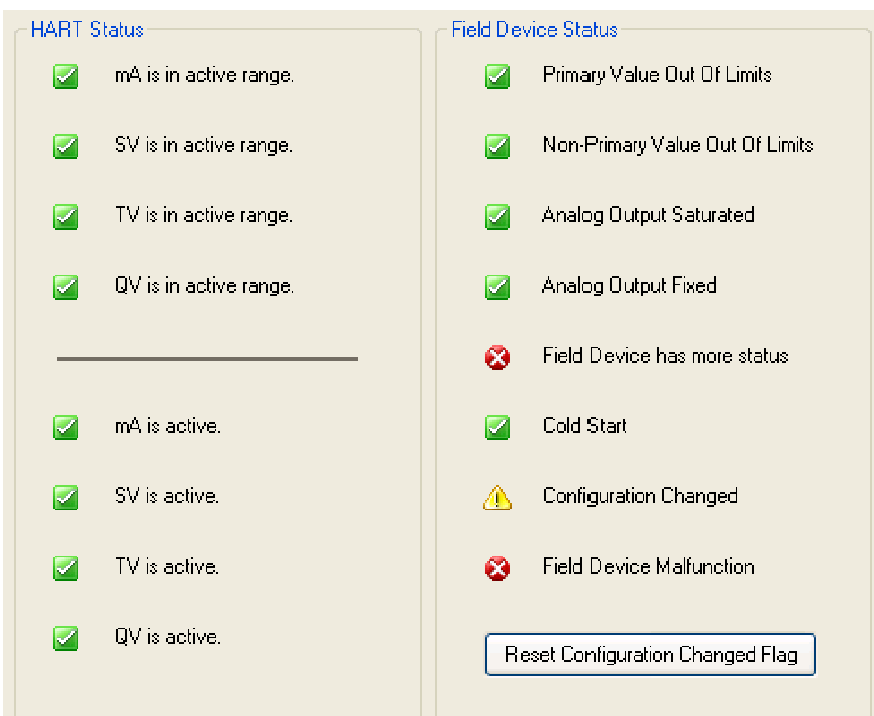


Figure 893. Sample RTT80 Transmitter HART Status Screen

Troubleshooting

Diagnostics History

The Diagnostics History displays all the information, status, and process conditions of the device.

Actual

The Actual screen displays current diagnostics messages with the highest priority.

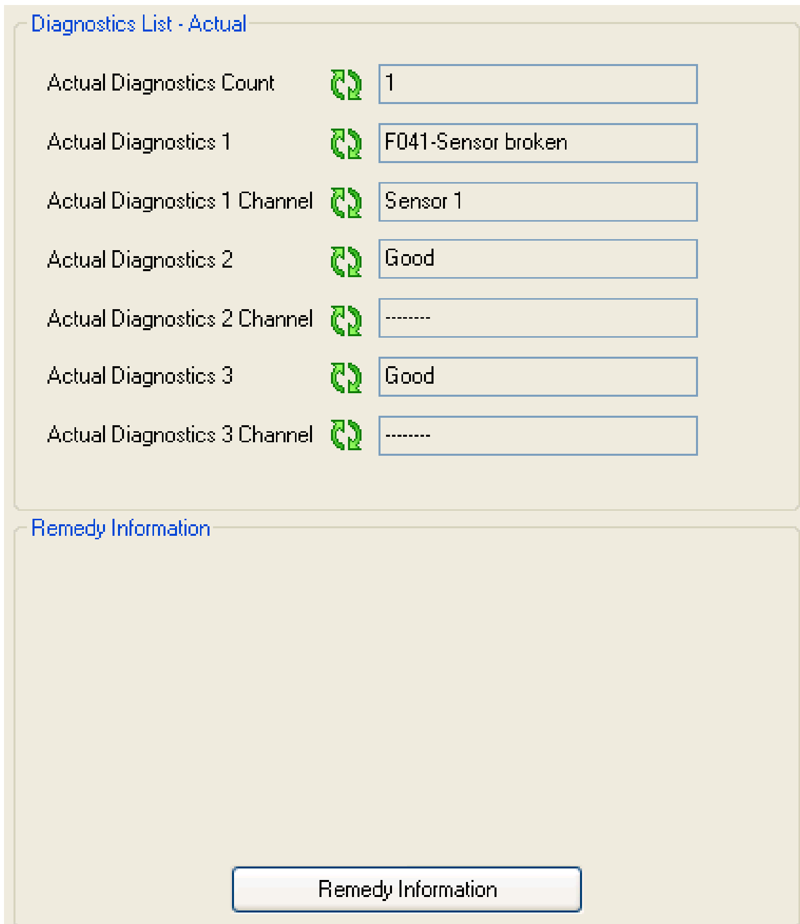


Figure 894. Sample RTT80 Transmitter Diagnostics - Actual Screen

Field	Entry
Diagnostics List - Actual	
Actual Diagnostics Count	This field shows the number of diagnostics messages currently pending in the device.
Actual Diagnostics 1	This field shows the current diagnostics message with the highest priority.
Actual Diagnostics 1 Channel	This field shows the sensor input related to current diagnostics 1 message.
Actual Diagnostics 2	This field shows the current diagnostics message with the second highest priority.
Actual Diagnostics 2 Channel	This field shows the sensor input related to current diagnostics 2 message.
Actual Diagnostics 3	This field shows the current diagnostics message with the third highest priority.
Actual Diagnostics 3 Channel	This field shows the sensor input related to current diagnostics 3 message.
Remedy Information	If you click on Remedy Information the device displays the suggested remedial action for the current diagnostics message as shown in the Figure 895.

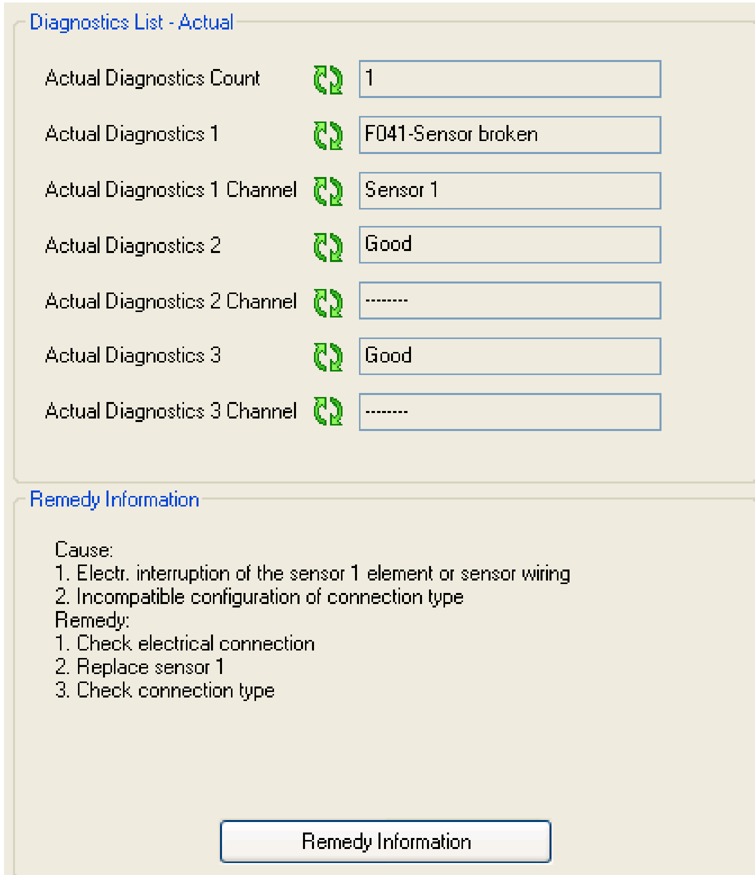


Figure 895. Sample RTT80 Transmitter Diagnostics - Actual Screen (Remedy Information)

Previous

The Previous screen displays five diagnostics messages that occurred in the past. These messages are displayed in chronological order.

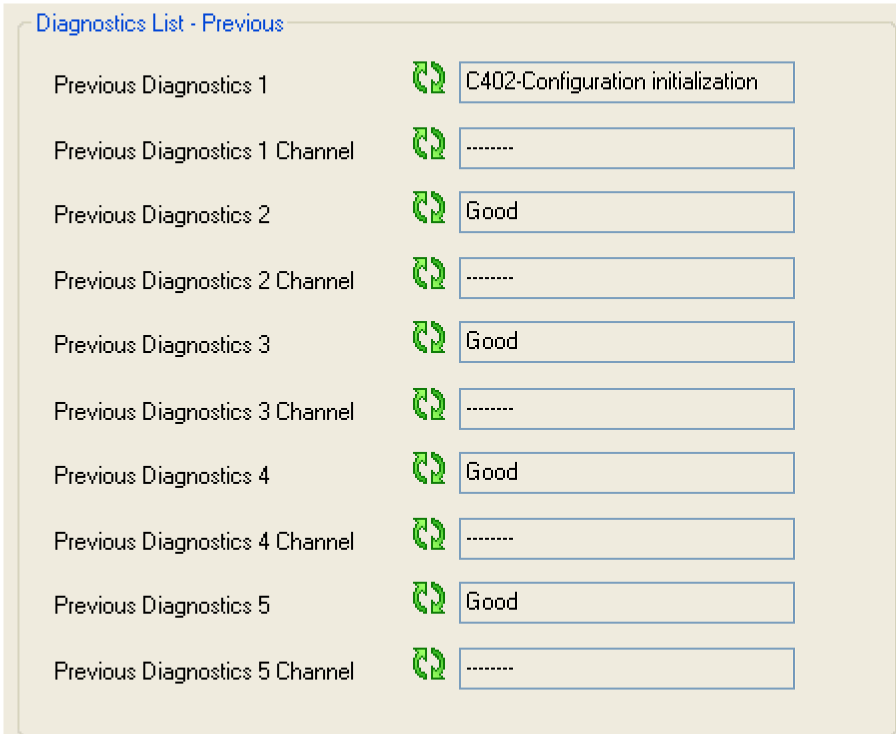


Figure 896. Sample RTT80 Transmitter Diagnostics - Previous Screen

Field	Entry
Diagnostics List - Previous	
Previous Diagnostics 1	This field shows the last diagnostics message with the highest priority.
Previous Diagnostics 1 Channel	This field shows the possible sensor input related to the previous diagnostics 1 message.
Previous Diagnostics 2	This field shows the last diagnostics message with the second highest priority.
Previous Diagnostics 2 Channel	This field shows the possible sensor input related to the previous diagnostics 2 message.
Previous Diagnostics 3	This field shows the last diagnostics message with the third highest priority.
Previous Diagnostics 3 Channel	This field shows the possible sensor input related to the previous diagnostics 3 message.
Previous Diagnostics 4	This field shows the last diagnostics message with the fourth highest priority.
Previous Diagnostics 4 Channel	This field shows the possible sensor input related to the previous diagnostics 4 message.

Field	Entry
Previous Diagnostics 5	This field shows the last diagnostics message with the fifth highest priority.
Previous Diagnostics 5 Channel	This field shows the possible sensor input related to the previous diagnostics 5 message.

Restore Factory Defaults

The Restore Factory Defaults screen allows you to reset all data to factory default values.

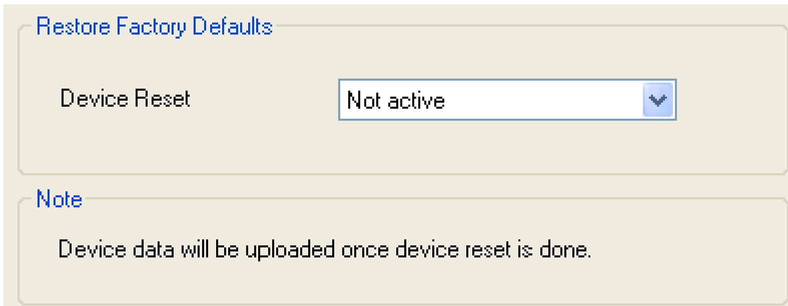


Figure 897. Sample RTT80 Transmitter Restore Factory Defaults Screen

Field	Entry
Restore Factory Defaults	
Device Reset	Select one of the following options to reset the device configuration from the drop-down list: 1. Not Active - No action is executed 2. To Factory Defaults - All the parameters are reset to the original factory setting 3. To Delivery Settings - All the parameters are reset to the original factory setting. 4. Restart Device - The device is restarted but the configuration is not unchanged

Loop Test

The Loop Test is a procedure to use the transmitter as a calibration source to check other instruments in the loop.

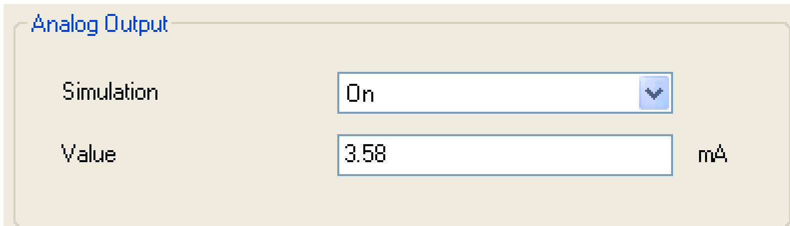


Figure 898. Sample RTT80 Transmitter - Loop Test Screen

Field	Entry
Analog Output	
Simulation	Select one of the options - On or Off from the drop-down list to switch simulation of the current output on or off.
Value	Specify a current value for the simulation. You can choose a value from 3.58 to 23.0 mA

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