Instruction

MI 019-276
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Advanced DTM Library

Operation Using MODBUS Communication Protocol

Foxboro®

by Schneider Electric

Contents

Figures

Preface

This manual explains how to operate, calibrate, and configure CFT51 using the Device Type Manager (DTM). To use CFT51 with Modbus communication protocol, you need to install the Modbus Communication DTM.

The following icons are used in the DTM.

Icon	Explanation
	This icon indicates that all parameters are healthy.
	This icon indicates that one or more parameters in the screen are updated periodically.
	This icon indicates that there is an error in one or more parameters.
	This icon indicates an invalid value in the screen.
	This icon indicates that the parameters have been modified.

1. CFT51 Transmitter

This chapter provides information that is exclusive to using CFT51 Transmitter with Modbus communication protocol. Additional information about this transmitter and Modbus communication protocol is contained in the following document.

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

Figure 1 shows the menu structure of the DTM.

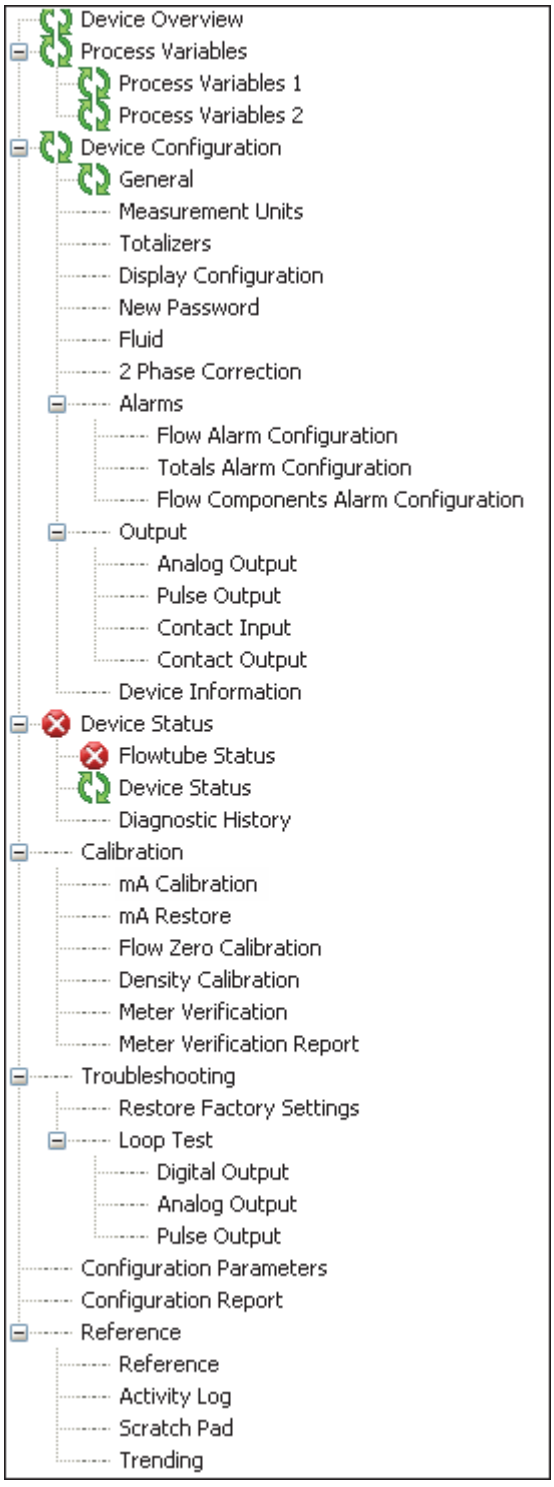


Figure 1. Sample CFT51 Transmitter - Menu Structure

Device Overview

The Device Overview screen displays Modbus information, Device Information, Measurements, Totals and Analog Outputs.

The Measurements block in this screen displays the parameters to which the Analog Outputs 1, 2 and 3, and Pulse Outputs 1 and 2 are mapped. This block also displays the lower and upper range values of the outputs, and the measurement units and display format of the outputs.

The Totals block in this screen displays the current values of totals 1, 2, 3 and 4, and the analog outputs 1, 2, and 3 in the engineering units selected in the Measurements screen.

Clearing a totalizer will reset the corresponding Total 1, 2, 3, and 4 values to default factory settings.

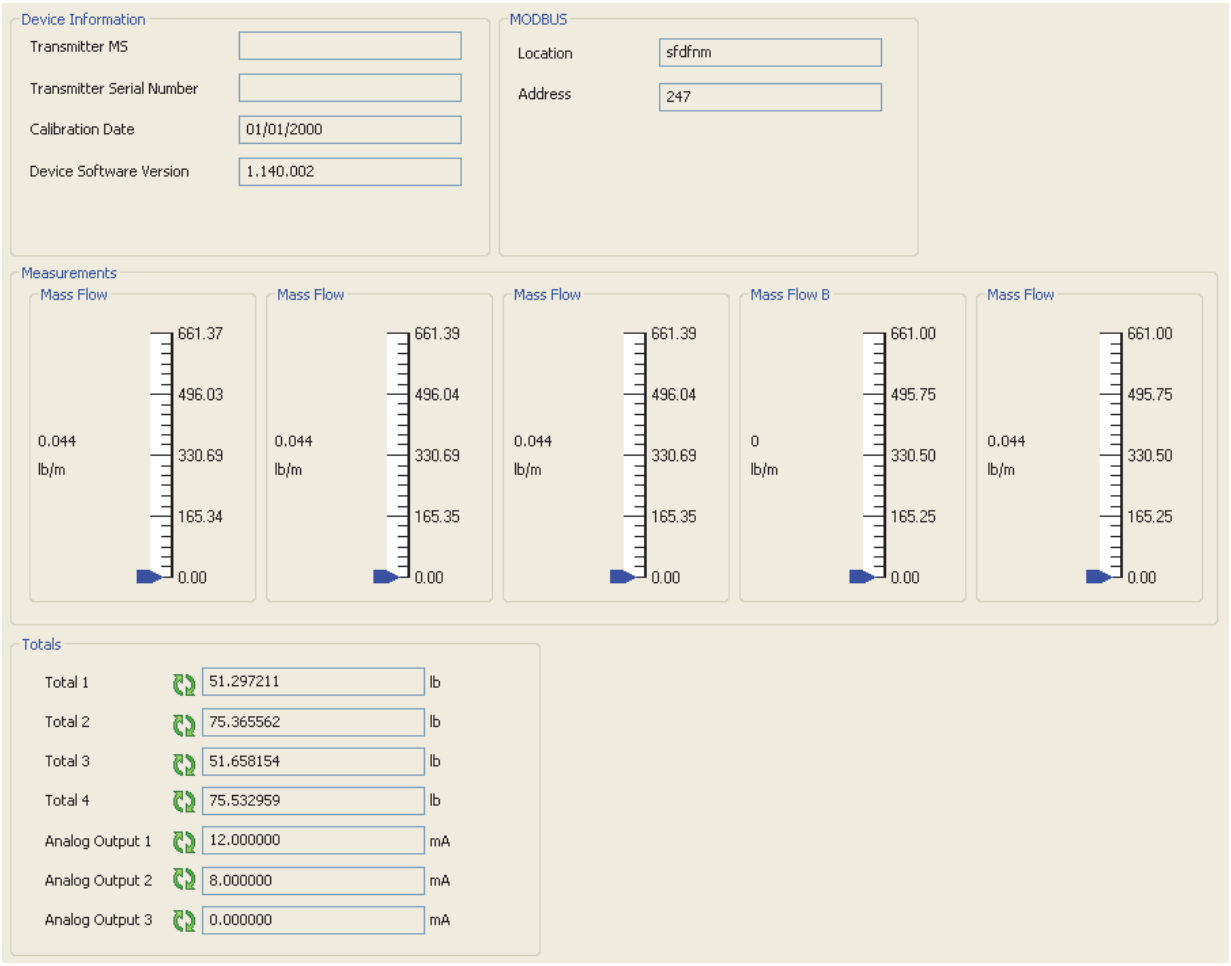


Figure 2. Sample CFT51 Transmitter - Device Overview Screen

Field	Entry
Device Information	
Transmitter MS	This field shows the transmitter MS (model) code.
Transmitter Serial Number	This field shows the transmitter serial number.
Calibration Date	This field shows the date of the last calibration.
Device Software Version	This field shows the software version of the device.
Modbus	
Location	This field shows the location of the transmitter.
Address	This field shows the address of the device. The address which ranges between 1 and 247, is used to uniquely identify the CFT51 on a Modbus network.
Totals	
Total 1	This field shows the current value of Total 1.
Total 2	This field shows the current value of Total 2.
Total 3	This field shows the current value of Total 3.
Total 4	This field shows the current value of Total 4.
Analog Output 1	This field shows the value of Analog Output 1.
Analog Output 2	This field shows the value of Analog Output 2.
Analog Output 3	This field shows the value of Analog Output 3.

Process Variables

Process Variables 1

The Process Variables 1 screen displays the values of measurement parameters in the selected engineering units.

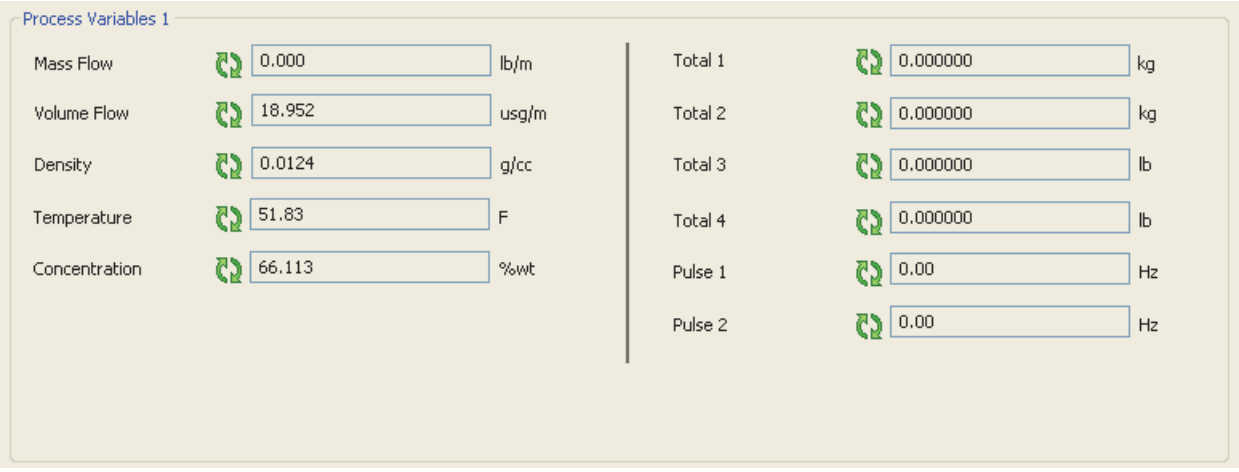


Figure 3. Sample CFT51 Transmitter - Process Variables 1 Screen

Field	Entry
Process Variables 1	
Mass Flow	This field shows the current mass flow rate (forward or reverse) in the selected engineering units.
Volume Flow	This field shows the current volume flow rate (forward or reverse) in the selected engineering units.
Density	This field shows the current density in the selected engineering units.
Temperature	This field shows the current process temperature in the selected engineering units.
Concentration	This field shows the current percent concentration of the selected fluid component.
Total 1	This field shows the current value of Total 1 in the selected engineering units.
Total 2	This field shows the current value of Total 2 in the selected engineering units.
Total 3	This field shows the current value of Total 3 in the selected engineering units.
Total 4	This field shows the current value of Total 4 in the selected engineering units.
Pulse 1	This field shows the current pulse 1 output value in the selected engineering units.
Pulse 2	This field shows the current pulse 2 output value in the selected engineering units.

— NOTE —

Clearing a totalizer will reset the corresponding Total 1, 2, 3, and 4 values and the Pulse Output 1 and 2 values to default factory settings.

Process Variables 2

Process Variables 2 screen displays the mass flow and volume flow values of components A and B in the selected engineering units.

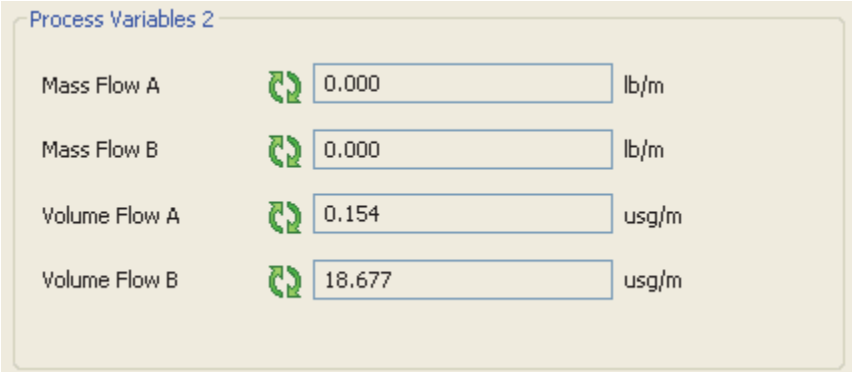


Figure 4. Sample CFT51 Transmitter - Process Variables 2 Screen

Field	Entry
Process Variables 2	
Mass Flow A	This field shows the current mass A flow rate (forward or reverse) in the selected engineering units.
Mass Flow B	This field shows the current mass B flow rate (forward or reverse) in the selected engineering units.
Volume Flow A	This field shows the current volume A flow rate (forward or reverse) in the selected engineering units.
Volume Flow B	This field shows the current volume B flow rate (forward or reverse) in the selected engineering units.

Device Configuration

General

The General screen allows you to configure password access, flow constants, density constants, and other general settings such as flow tube size and material, K Bias, low flow cutoff, and pressure compensation.

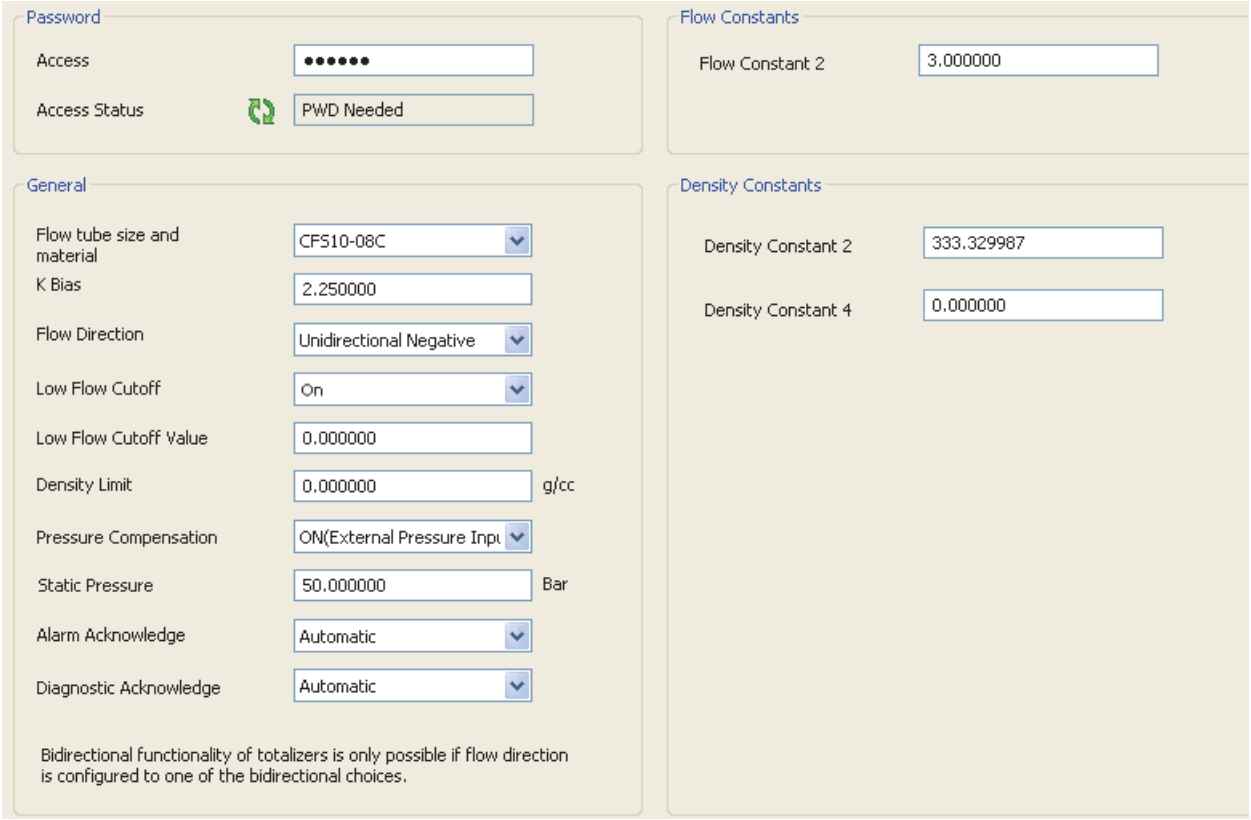


Figure 5. Sample CFT51 Transmitter - General Screen

Field	Entry
Password	
Access	Enter the password (high level or low level). The high level password is required to clear the grand total and to configure all the parameters. Either (high or low level) password can be used to clear the batch total.
Access Status	This field shows the access level. Based on the password (high level or low level) entered, the following access statuses are displayed: ▸ Full Access - A high level password has been entered, which allows you to configure all the parameters. ▸ Limited Access - Only totalizers can be modified; that is, passwords are in use and a low level password has been entered. ▸ PWD Needed - A password is required before configuration changes can be made. ▸ UI Has Lock - The keypad/display is in use. No changes can be made from the communication interface. ▸ Remote Has Lock - Communication interface is in use. No changes can be made from the keypad/display. ▸ DB Busy - CFT51 is temporarily busy. ▸ Write Protect Enabled - Hardware write protect has been enabled.
General	
Flow Tube Size and Material	Select the size and material of the flow tube from the drop-down list. 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, CFS20-30C.
K Bias	K-Bias is used to calibrate or match the measurement of the transmitter to that of another measuring device. For example, if your reading was one percent low, you would set your K-Bias to 1.01.
Flow Direction	Select the direction of flow from the drop-down list. Choose from Bidirectional Positive, Bidirectional Negative, Unidirectional Positive, Unidirectional Negative. Bidirectional functionality of totalizers is only possible if flow direction is configured to one of the bidirectional choices. Conversely if bidirectional functionality is selected for totalizers, unidirectional choices are not available in flow direction.
Low Flow Cutoff	Turn low flow cutoff on or off by selecting On or Off from the drop-down list. Turning low flow cutoff On allows you to set the level above which the transmitter begins to measure flow. If the low flow cutoff is set to Off, then - Low Flow Cutoff Value will not appear.
Low Flow Cutoff Value	Enter low flow cutoff value for the selected mass flow units that provides no output under low flow conditions. The maximum low flow cutoff value is limited to 10% of the nominal capacity of the flowtube. Therefore, you must enter the size and material of the flowtube before setting the low flow cutoff value. If this is not done, the low flow cutoff value is 0.0.
Density Limit	Enter the density limit of the fluid below which the mass flow measurement is zero. When the density increases above the limit, measurement resumes.
Pressure Compensation	Select the Pressure Compensation from the drop-down list. Choose from On (External Pressure Input), On (Internal Static Pressure), or Off. Pressure Compensation is used to offset the effect of pressure variations, which can cause small shifts in mass flow and density measurements. If you select: On: INT P - pressure compensation is enabled using internal static pressure. On: EXT P - pressure compensation is enabled using external updated pressure.
Static Pressure	Enter the pressure value used in static compensation of the measurement.
Alarm Acknowledge	Select the alarm acknowledge mode from the drop-down list. Choose from Automatic or Manual. In automatic mode, all evidence of the alarm clears when the alarm condition no longer exists. In manual mode, the alarm must be acknowledged manually.
Diagnostic Acknowledge	Select the diagnostic acknowledge mode from the drop-down list. Choose from Automatic or Manual. In automatic mode, all evidence of the diagnostic message clears when the diagnostic condition no longer exists. In manual mode, the diagnostic message must be acknowledged manually.

Field	Entry
Flow Constants	
Flow Constant 2	Enter the flowtube flow constant 2 shown on the calibration sheet shipped with your flowtube (or your flowtube data plate).
Density Constants	
Density Constant 2	Enter the density constant 2 shown on the calibration sheet shipped with your flowtube (or your flowtube data plate).
Density Constant 4	Enter the density constant 4 shown on the calibration sheet shipped with your flowtube (or your flowtube data plate).

Measurement Units

The Measurement Units screen allows you to configure units to measure mass, volume, density, temperature, and concentration.

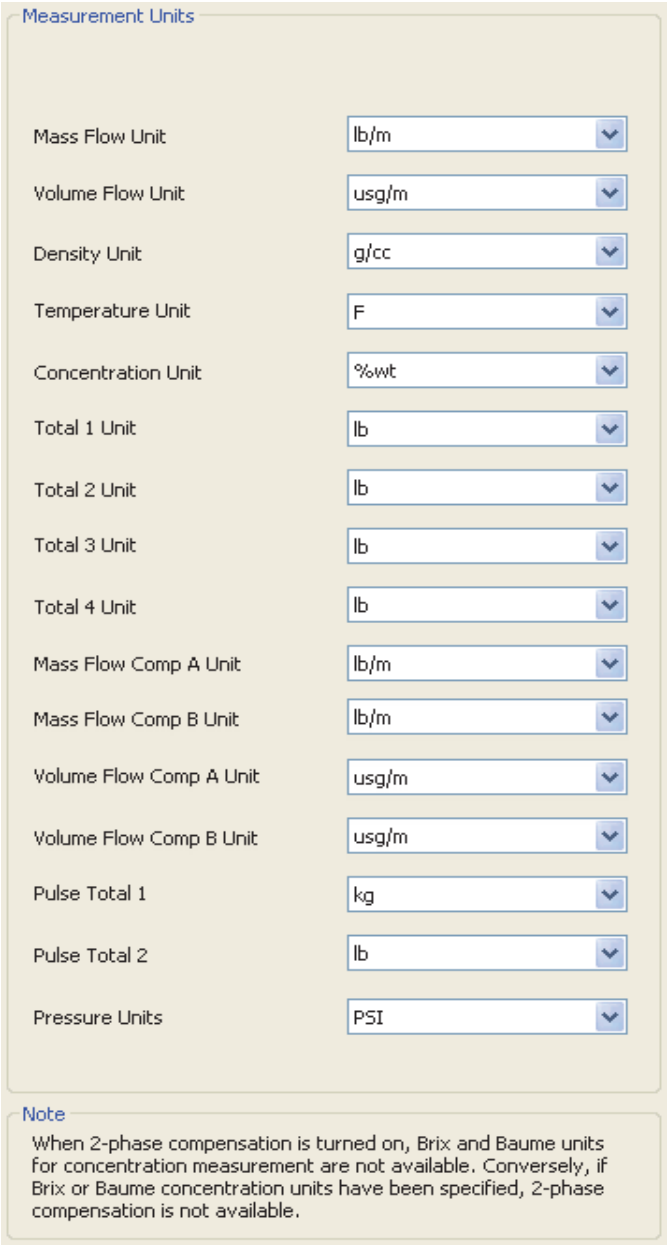


Figure 6. Sample CFT51 Transmitter - Measurement Units Screen

Field	Entry
Measurement Units	
Mass Flow Unit	Select the mass flow units from the drop-down list. Choose from g/sec, g/min, g/hr, g/d, kg/s, kg/m, kg/h, kg/d, lb/s, lb/m, lb/h, lb/d, oz/s, oz/m, oz/h, oz/d, ST/s, ST/m, ST/h, ST/d, MT/m, MT/h, MT/d, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Volume Flow Unit	Select the volume flow units from the drop-down list. Choose from L/s, L/m, L/h, L/d, usg/s, usg/m, usg/h, usg/d, Impg/s, Impg/m, Impg/h, Impg/d, bbl/s, bbl/m, bbl/h, bbl/d, ft3/s, ft3/m, m3/s, m3/m, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Density Unit	Select the density units from the drop-down list. Choose from SG, kg/m3, kg/L, lb/g, lb/ft3, lb/in3, g/mL, g/cc, g/L, ST/yd3, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Temperature Unit	Select the temperature units as degC or degF from the drop-down list. You can select C for degC and F for degF.
Concentration Unit (a)	Select the concentration units from the drop-down list. Choose from %wt, %vol, Brix, Baume.
Total 1 Unit (b)	Select the Total 1 units from the drop-down list. Choose from g, kg, oz, lb, Ton, MTon, usg, Impg, L, bbl, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7
Total 2 Unit[b]	Select the Total 2 units from the drop-down list. Choose from g, kg, oz, lb, Ton, MTon, usg, Impg, L, bbl, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Total 3 Unit[b]	Select the Total 3 units from the drop-down list. Choose from g, kg, oz, lb, Ton, MTon, usg, Impg, L, bbl, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Total 4 Unit[b]	Select the Total 4 units from the drop-down list. Choose from g, kg, oz, lb, Ton, MTon, usg, Impg, L, bbl, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Mass Flow Comp A Unit	Select the Mass Flow A units from the drop-down list. Choose from g/sec, g/min, g/hr, g/d, kg/s, kg/m, kg/h, kg/d, lb/s, lb/m, lb/h, lb/d, oz/s, oz/m, oz/h, oz/d, ST/s, ST/m, ST/h, ST/d, MT/m, MT/h, MT/d, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Mass Flow Comp B Unit	Select the Mass Flow B units from the drop-down list. Choose from g/sec, g/min, g/hr, g/d, kg/s, kg/m, kg/h, kg/d, lb/s, lb/m, lb/h, lb/d, oz/s, oz/m, oz/h, oz/d, ST/s, ST/m, ST/h, ST/d, MT/m, MT/h, MT/d, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Volume Flow Comp A Unit	Select the Volume Flow A units from the drop-down list. Choose from L/s, L/m, L/h, L/d, usg/s, usg/m, usg/h, usg/d, Impg/s, Impg/m, Impg/h, Impg/d, Cuft/min, Cum/h, Cuft/s, Cuft/d, Cum/s, Cum/d, Cuft/h, Cum/min, bbl/s, bbl/m, bbl/h, bbl/d, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.
Volume Flow Comp B Unit	Select the Volume Flow B units from the drop-down list. Choose from L/s, L/m, L/h, L/d, usg/s, usg/m, usg/h, usg/d, Impg/s, Impg/m, Impg/h, Impg/d, Cuft/min, Cum/h, Cuft/s, Cuft/d, Cum/s, Cum/d, Cuft/h, Cum/min, bbl/s, bbl/m, bbl/h, bbl/d, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7.

Field	Entry
Pulse Total 1	Select the Pulse Total 1 units from the drop-down list. Choose from g, kg, lb, oz, Ton, MTon, usg, Impg, L, Cuft, Cum, bbl, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7. This field appears only when "**Pulse Output 1**" is configured for Total mode.
Pulse Total 2	Select the Pulse Total 2 units from the drop-down list. Choose from g, kg, lb, oz, Ton, MTon, usg, Impg, L, Cuft, Cum, bbl, Custom. If you select Custom, then enter values for Label, Offset, and Slope as shown in Figure 7. This field appears only when "**Pulse Output 2**" is configured for Total mode.
Pressure Units	Select the pressure units from the drop-down list. Choose from kPa, PSI, Bar.

a. When 2-Phase Compensation is turned on, Brix and Baume units are not available. Conversely, if Brix and Baume concentration units have been specified, 2-Phase Compensation is not available.

b. The drop-down displays the measurement units of the parameter that is mapped to the totalizer.

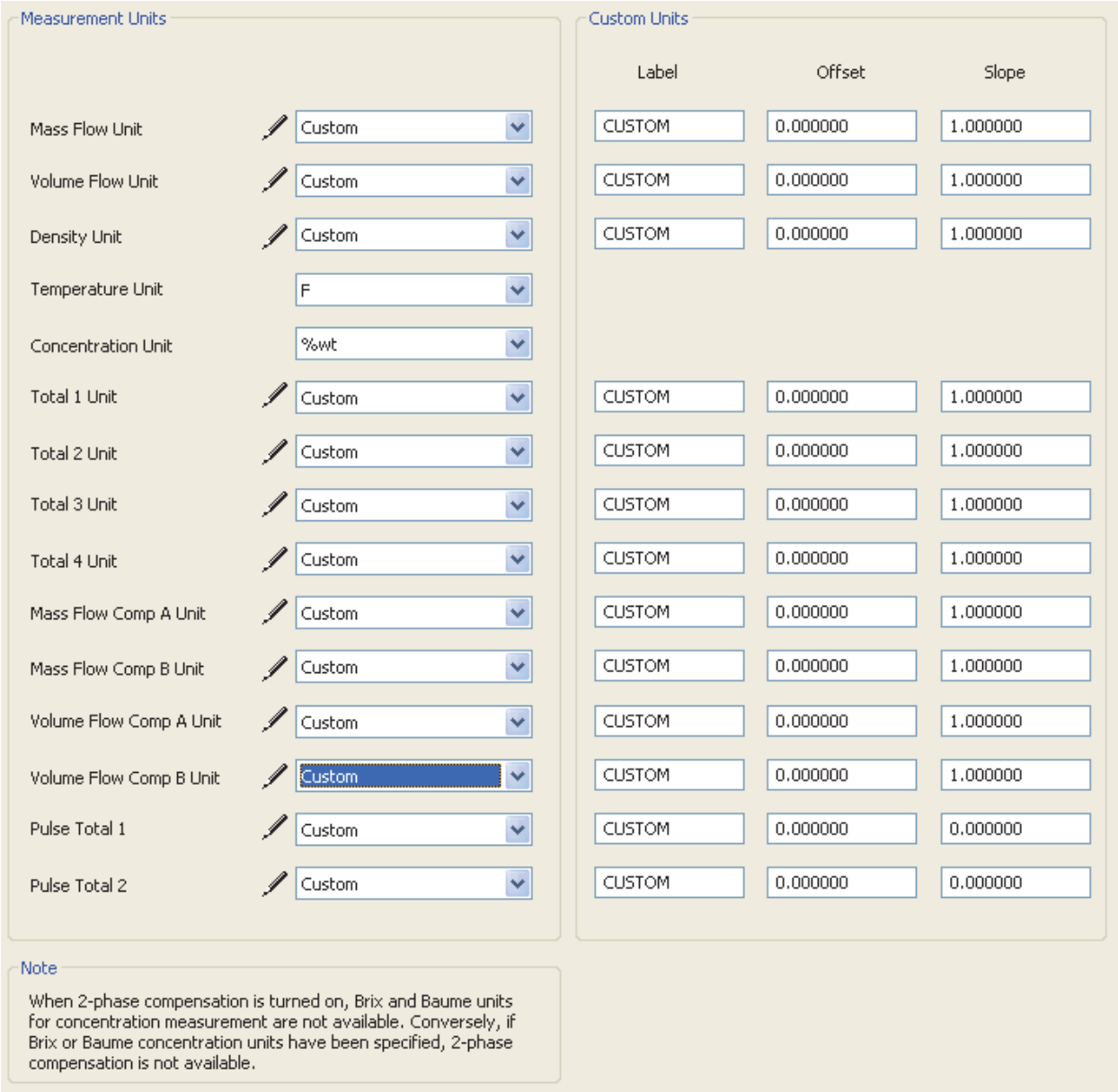


Figure 7. Sample CFT51 Transmitter - Measurements Units Screen (Custom Option)

Field	Entry
Custom Units	
Label	Enter a name for your custom units using up to 8 alphanumeric characters.
Offset	Enter custom offset.
Slope	Enter custom slope conversion factor.

Totalizers

The Totalizers screen allows you to determine what the totalizers have to measure. Totals 1, 2, 3, 4, and Pulse Totals can be turned on, off, or cleared. Clearing a totalizer will reset the corresponding Total 1, 2, 3, and 4 values and the Pulse Total 1 and 2 values to default factory settings.

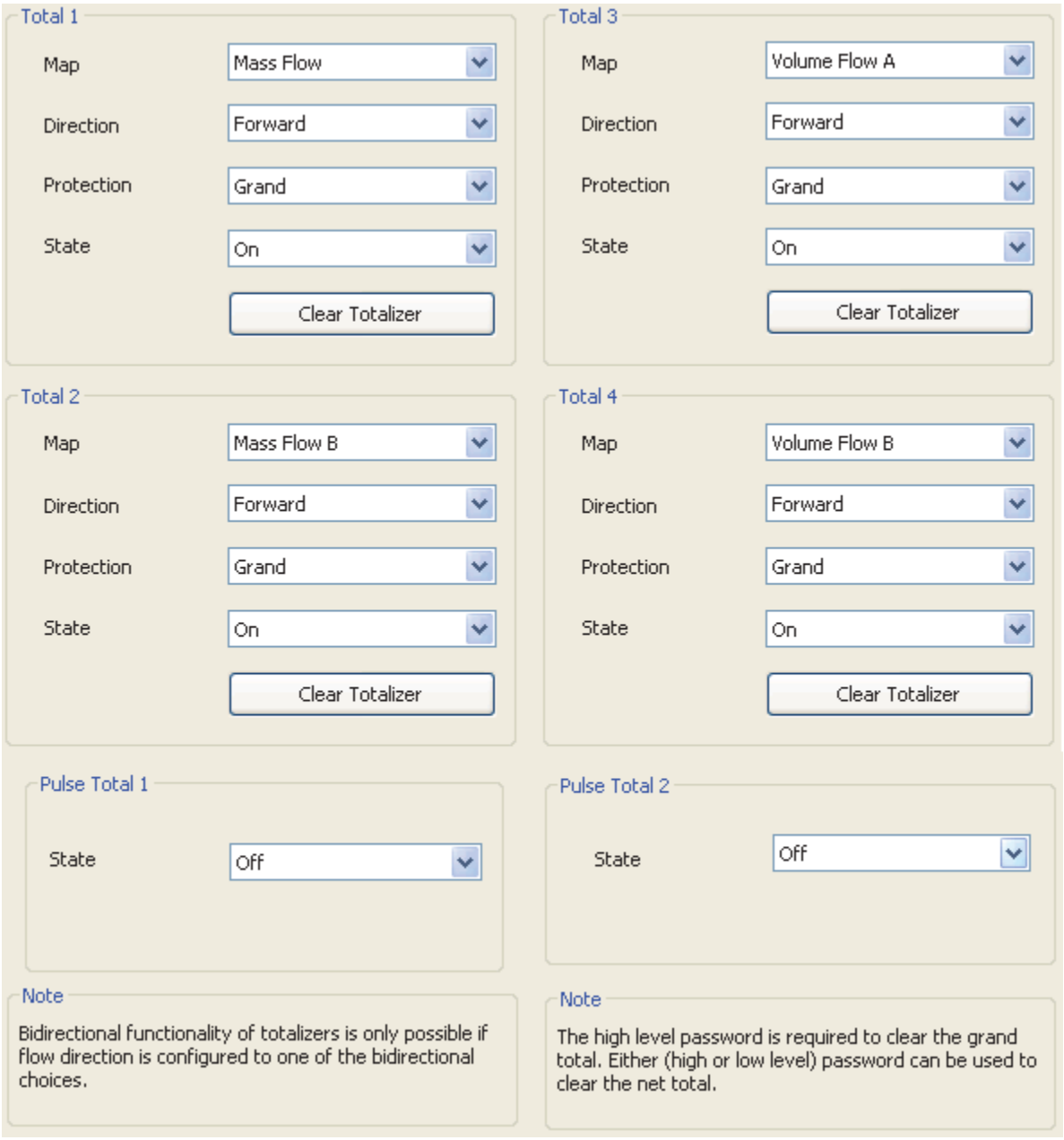


Figure 8. Sample CFT51 Transmitter - Totalizers Screen

Field	Entry
Total 1	
Map	Select the measurement type mapped to this totalizer from the drop-down list. Choose from Mass Flow, Volume Flow, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Direction (a)	Select the direction of flow from the drop-down list. Choose from Forward, Reverse, and Bidirectional.
Protection	Select the type of totalizer from the drop-down list. Choose from Grand and Batch.
State	Select the state of the totalizer from the drop-down list. Choose from On and Off.
Clear Totalizer	Click Clear Totalizer to clear the totalizer 1.
Total 2	
Map	Select the measurement type mapped to this totalizer from the drop-down list. Choose from Mass Flow, Volume Flow, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Direction[a]	Select the direction of flow that will be totalized from the drop-down list. Choose from Forward, Reverse, and Bidirectional.
Protection	Select the type of totalizer from the drop-down list. Choose from Grand and Batch.
State	Select the state of the totalizer from the drop-down list. Choose from On and Off.
Clear Totalizer	Click Clear Totalizer to clear the totalizer 2.
Total 3	
Map	Select the measurement type mapped to this totalizer from the drop-down list. Choose from Mass Flow, Volume Flow, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Direction[a]	Select the direction of flow that will be totalized from the drop-down list. Choose from Forward, Reverse, and Bidirectional.
Protection	Select the type of totalizer from the drop-down list. Choose from Grand and Batch.
State	Select the state of the totalizer from the drop-down list. Choose from On and Off.
Clear Totalizer	Click Clear Totalizer to clear the totalizer 3.
Total 4	
Map	Select the measurement type mapped to this totalizer from the drop-down list. Choose from Mass Flow, Volume Flow, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Direction[a]	Select the direction of flow that will be totalized from the drop-down list. Choose from Forward, Reverse, and Bidirectional.
Protection	Select the type of totalizer from the drop-down list. Choose from Grand and Batch.
State	Select the state of the totalizer from the drop-down list. Choose from On and Off.
Clear Totalizer	Click Clear Totalizer to clear the totalizer 4.
Pulse Total 1	
State	Select the state of the Pulse Total 1 from the drop-down list. Choose from On and Off.
Clear Totalizer	Click Clear Totalizer to clear the pulse totalizer 1.
Pulse Total 2	
State	Select the state of the Pulse Total 2 from the drop-down list. Choose from On and Off.
Clear Totalizer	Click Clear Totalizer to clear the pulse totalizer 2.

a. Bidirectional functionality of totalizers is only possible if flow direction is configured to one of the bidirectional choices. Conversely if bidirectional functionality is selected for totalizers, unidirectional choices are not available in flow direction.

NOTE

1. The high level password is required to clear the grand total. Either (high or low level) password can be used to clear the batch total.
2. Totals 1, 2, 3, and 4 can also be individually cleared by an external contact. An external contact can be used to clear all batch totals or all grand totals as well.
3. The menu selections to turn on, off, or clear the pulse totalizers will appear in "Measurement Units" only when you configure Total mode for pulse output.

Display Configuration

Display configuration screen is used to set the parameters of the display and specify the format of the units on the display.

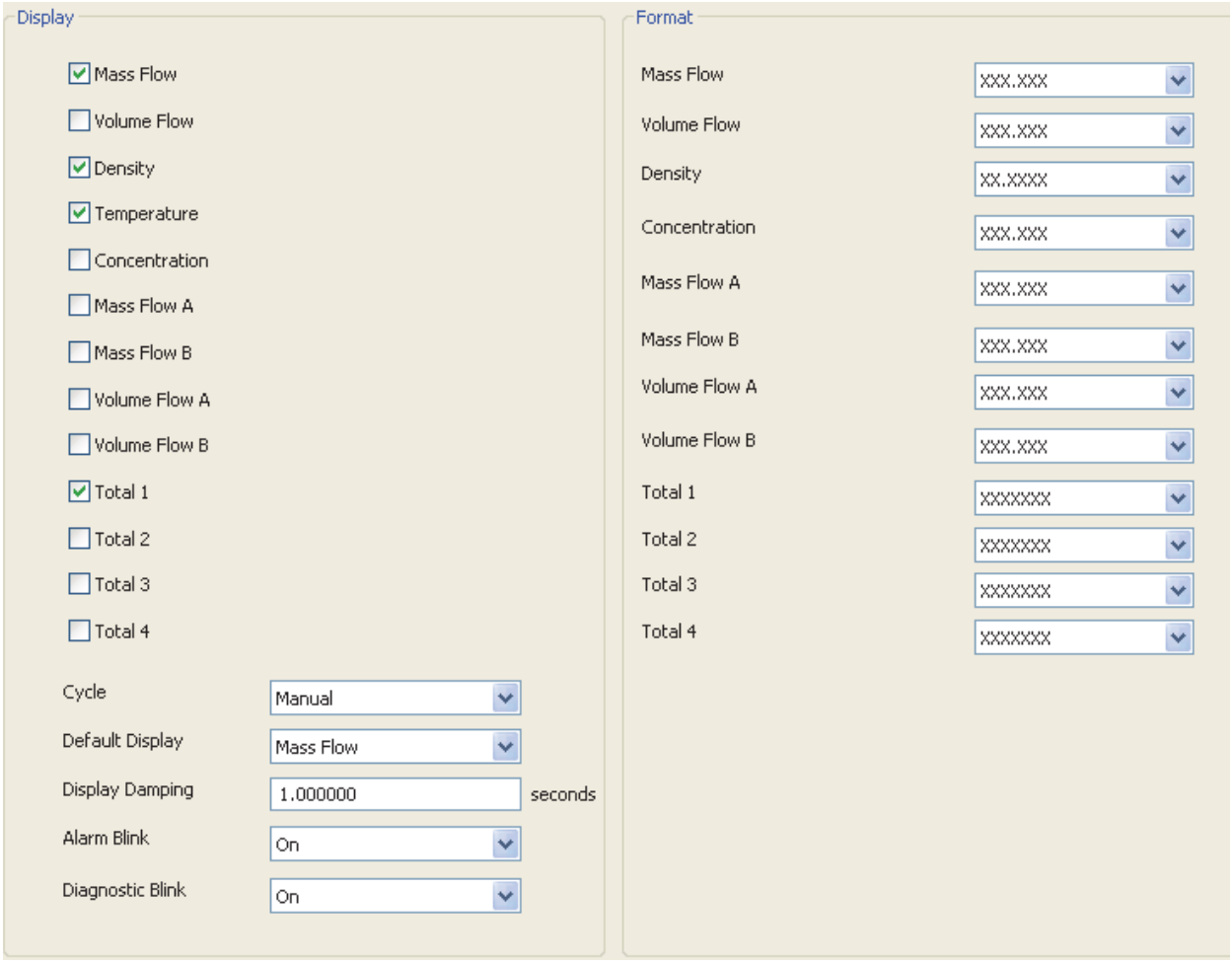


Figure 9. Sample CFT51 Transmitter - Display Configuration Screen

Field	Entry
Display	
Mass Flow	Select to display mass flow on the local display.
Volume Flow	Select to display volume flow on the local display.
Density	Select to display density on the local display.
Temperature	Select to display temperature on the local display.
Concentration	Select to display concentration on the local display.
Mass Flow A	Select to display mass flow A on the local display.
Mass Flow B	Select to display mass flow B on the local display.
Volume Flow A	Select to display volume flow A on the local display.
Volume Flow B	Select to display volume flow B on the local display.
Total 1	Select to display Total 1 on the local display.
Total 2	Select to display Total 2 on the local display.
Total 3	Select to display Total 3 on the local display.
Total 4	Select to display Total 4 on the local display.
Cycle	Select from the drop-down list whether you want the display of the measurements you select to cycle automatically from one to another (On) or be able to be cycled manually (Off). Choose from Manual and Automatic.
Default Display	Select the measurements from the drop-down list you want as the default display. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, Volume Flow B, Total 1, Total 2, Total 3, and Total 4.
Display Damping	Specify the damping response time (from 00.0 to 99.9 seconds) to be displayed on the local display.
Alarm Blink	Configure the local display to blink or not blink when an alarm condition occurs. Choose from On and Off.
Diagnostic Blink	Configure the local display to blink or not blink when diagnostic condition occurs. Choose from On and Off.
Format	
Mass Flow	Select the desired format of the mass flow units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units)
Volume Flow	Select the desired format of the volumetric flow units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units)
Density	Select the desired format of the density units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units)

Field	Entry
Concentration	Select the desired format of the concentration units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units)
Mass Flow A	Select the desired format of the Mass Flow A units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units)
Mass Flow B	Select the desired format of the Mass Flow B units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units)
Volume Flow A	Select the desired format of the Volume Flow A units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units)
Volume Flow B	Select the desired format of the Volume Flow A units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units)
Total 1	Select the desired format of the Totalizer 1 units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units) XXXX.E5 (display in number times hundred thousand units) XXXX.E4 (display in a number times ten thousand units) XXXX.E3 (display in a number times a thousand units) XXXX.E2 (display in a number times a hundred units) XXXX.E1 (display in a number times ten units)
Total 2	Select the desired format of the Totalizer 2 units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units) XXXX.E5 (display in number times hundred thousand units) XXXX.E4 (display in a number times ten thousand units) XXXX.E3 (display in a number times a thousand units) XXXX.E2 (display in a number times a hundred units) XXXX.E1 (display in a number times ten units)

Field	Entry
Total 3	Select the desired format of the Totalizer 3 units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units) XXXX.E5 (display in number times hundred thousand units) XXXX.E4 (display in a number times ten thousand units) XXXX.E3 (display in a number times a thousand units) XXXX.E2 (display in a number times a hundred units) XXXX.E1 (display in a number times ten units)
Total 4	Select the desired format of the Totalizer 4 units on the display. Choose from: XXXXXXX (display in single units) XXXXX.X (display in tenths of units) XXXX.XX (display in hundredths of units) XXX.XXX (display in thousandths of units) XX.XXXX (display in ten thousandths of units) X.XXXXX (display in hundred thousandths of units) XXXX.E5 (display in number times hundred thousand units) XXXX.E4 (display in a number times ten thousand units) XXXX.E3 (display in a number times a thousand units) XXXX.E2 (display in a number times a hundred units) XXXX.E1 (display in a number times ten units)

New Password

The New Password screen is where you can change the access password. The CFT51 Transmitter employs two levels of passwords - High Level and Low Level. Both consist of six alphanumeric characters. The lower level password enables the operator to clear the batch totals in Measure mode. The higher level password enables entering the QuickStart and Setup modes as well as clearing all totals in Measure mode.

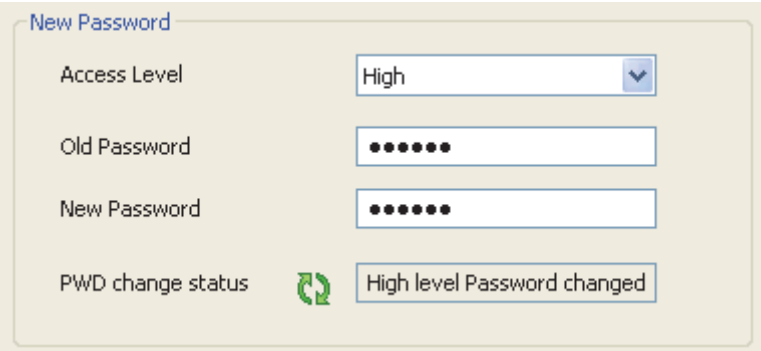


Figure 10. Sample CFT51 Transmitter - New Password Screen

Field	Entry
New Password	
Access Level	Select the Access Level from the drop-down list. Choose from High or Low.
Old Password	Enter the previous password for the access level selected.
New Password	Enter the new password for the access level selected.
PWD Change Status	This field shows whether the change of password was successful.

NOTE

To change a password to 'no password', enter six spaces. Changing a high level password to 'no password' automatically changes the low level password to 'no password'.

Fluid

The Fluid screen allows you to configure components of the fluid like Component Name, Density, Density Change Per Degree, and Reference Temperature.

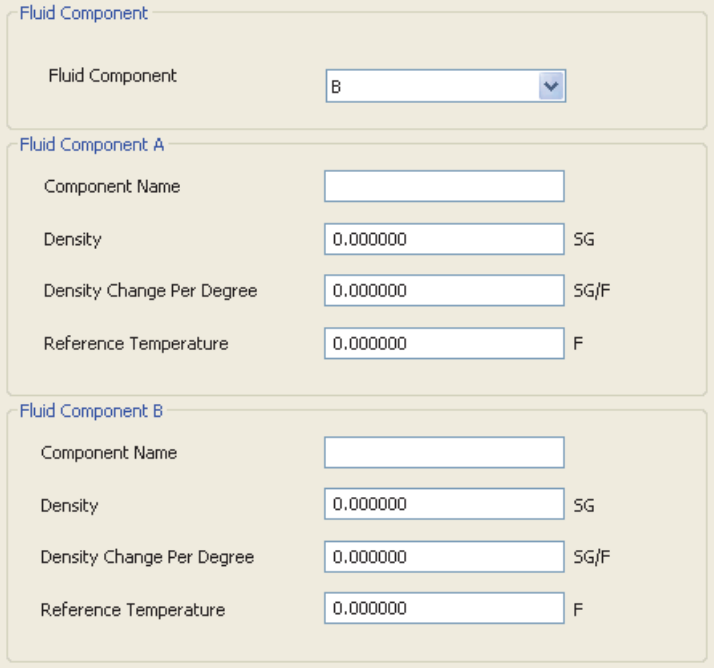


Figure 11. Sample CFT51 Transmitter - Fluid Screen

Field	Entry
Fluid Component	
Fluid Component	Select the fluid component from the drop-down list. Choose from A or B.
Fluid Component A	
Component Name	Specify the name of the component in 8 alphanumeric characters or less.
Density	Specify the density of fluid A.
Density Change Per Degree	Specify the temperature coefficient that is the change in density per unit temperature.
Reference Temperature	Specify the reference temperature of fluid A.
Fluid Component B	
Component Name	Specify the name of the component in 8 alphanumeric characters or less.
Density	Specify the density of fluid B.
Density Change Per Degree	Specify the temperature coefficient that is the change in density per unit temperature.
Reference Temperature	Specify the reference temperature of fluid B.

2 Phase Correction

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

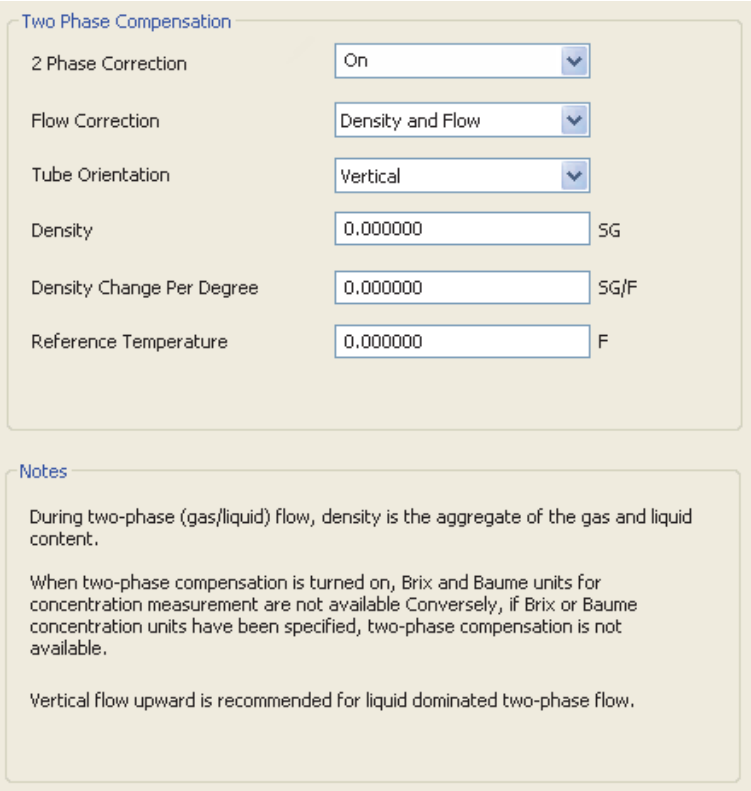


Figure 12. Sample CFT51 Transmitter - 2 Phase Correction Screen

Field	Entry
Two Phase Compensation	
2 Phase Correction	Select the 2 Phase Correction from the drop-down list. Choose from On and Off. When this feature is turned on, it produces compensated measurements in 2-phase applications for greater accuracy.
Flow Correction	Select the Flow Correction from the drop-down list. Choose from Density Only or Density and Flow.
Tube Orientation	Select the flowtube mounting from the drop-down list. Choose from Vertical or Horizontal.
Density	Specify the density of the fluid.
Density Change Per Degree	Specify the temperature coefficient, which is change in density per unit temperature.
Reference Temperature	Specify the reference temperature.

— NOTE

When 2-Phase compensation is turned on, Brix and Baume units for concentration measurement are not available. Conversely, if Brix or Baume concentration units have been specified, 2-Phase Compensation is not available.

Alarms

Flow Alarm Configuration

The Flow Alarm Configuration screen allows you to set parameters for Mass Flow, Volume Flow, Concentration, Density, and Temperature alarms.

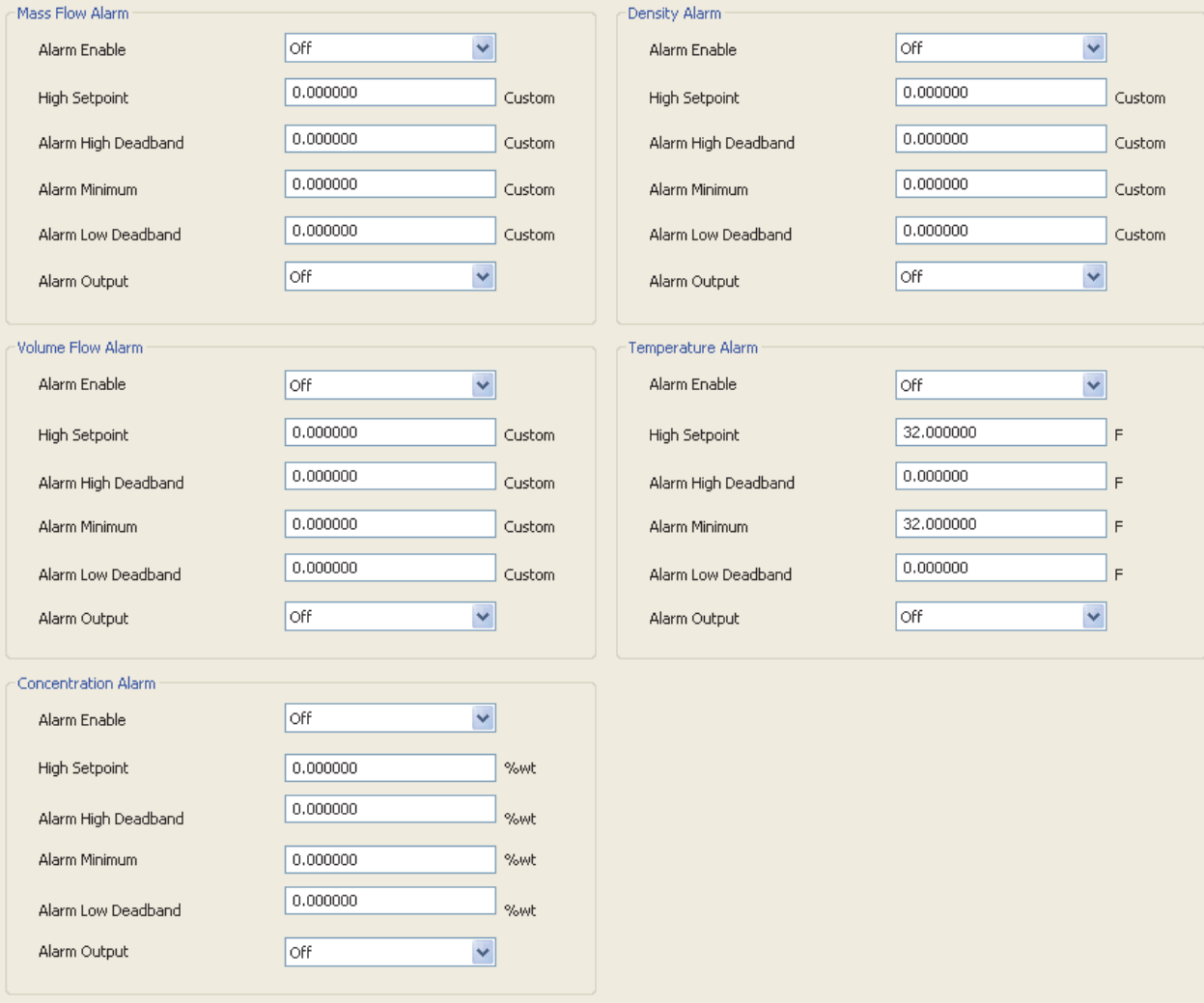


Figure 13. Sample CFT51 Transmitter - Flow Alarm Configuration Screen

Field	Entry
Mass Flow Alarm	
Alarm Enable	Select the flow alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.
Volume Flow Alarm	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.
Concentration Alarm	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.
Density Alarm	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.

Field	Entry
Temperature Alarm	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.

Totals Alarm Configuration

The Totals Alarm Configuration screen is where you can enable or disable totalizer alarms, set high setpoint for alarms, and select alarm output.

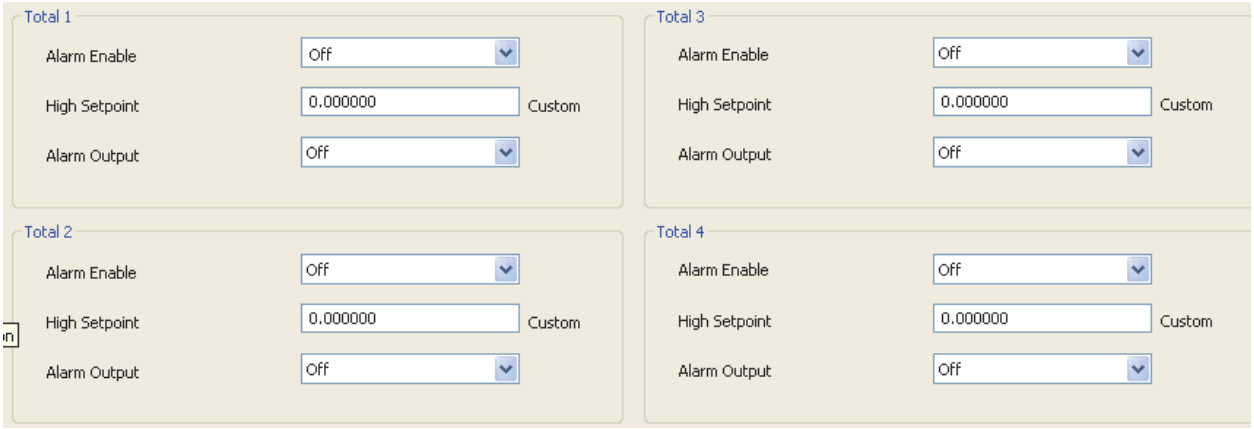


Figure 14. Sample CFT51 Transmitter - Totals Alarm Configuration Screen

Field	Entry
Total 1	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from On or Off.
High Setpoint	Enter the alarm high setpoint value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.
Total 2	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from On or Off.
High Setpoint	Enter the alarm high setpoint value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.
Total 3	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from On or Off.
High Setpoint	Enter the alarm high setpoint value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.

Field	Entry
Total 4	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from On or Off.
High Setpoint	Enter the alarm high setpoint value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.

Flow Components Alarm Configuration

The Flow Components Alarm Configuration screen allows you to set parameters in the alarms configured for mass flow and volume flow components.

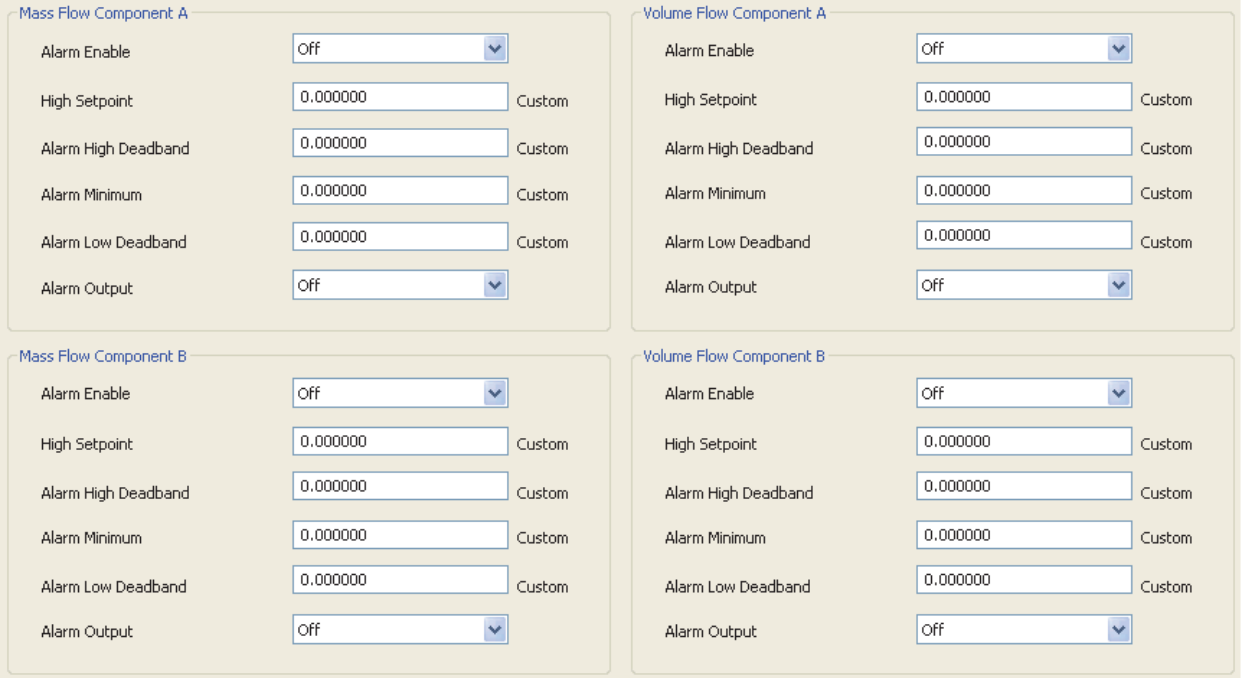


Figure 15. Sample CFT51 Transmitter - Flow Components Alarm Configuration Screen

Field	Entry
Mass Flow Component A	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.
Mass Flow Component B	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.
Volume Flow Component A	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.
Volume Flow Component B	
Alarm Enable	Select the alarm mode from the drop-down list. Choose from Off, Low, High, and Both.
High Setpoint	Enter the high alarm setpoint value.
Alarm High Deadband	Enter the high alarm deadband value.
Alarm Minimum	Enter the alarm minimum value.
Alarm Low Deadband	Enter the low alarm deadband value.
Alarm Output	Select the alarm output from the drop-down list. Choose from Off, Display, Discrete Out, and Both.

Output

Analog Output

The Analog Output screen is where you can map the analog output to the desired map parameter and set URV, LRV, Damping time, Alarm Response, and Diagnostic Response for the outputs.

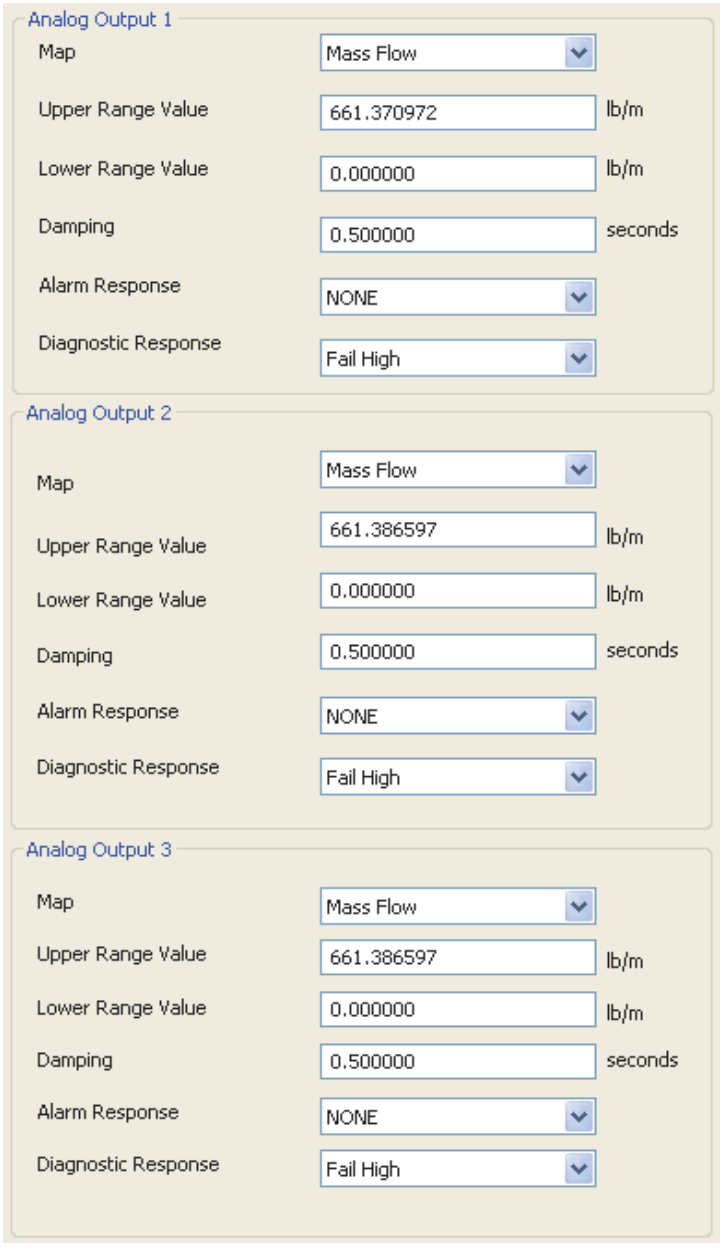


Figure 16. Sample CFT51 Transmitter - Analog Output Screen

Field	Entry
Analog Output 1	
Map	Select the map parameter from the drop-down list to map the output. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Upper Range Value	Set the upper range value for Analog Output 1.
Lower Range Value	Set the lower range value for Analog Output 1.
Damping	Set the damping time that is applied to the analog output. It can be set from 0.0 to 99.9 seconds.
Alarm Response	Select the Alarm Response from the drop-down list. Choose from Fail High, Fail Low, Hold Last Output Value, and NONE. The Alarm Response parameter allows you to drive the analog output fully downscale or upscale if an alarm condition occurs.
Diagnostic Response	Select the Alarm Response from the drop-down list. Choose from Fail High, Fail Low, and Hold Last Value. The Diagnostic Response parameter allows you to drive the analog output fully downscale or upscale if diagnostic condition occurs.
Analog Output 2	
Map	Select the map parameter from the drop-down list to map the output. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Upper Range Value	Set the upper range value for Analog Output 2.
Lower Range Value	Set the lower range value for Analog Output 2.
Damping	Set the damping time that is applied to the analog output. It can be set from 0.0 to 99.9 seconds.
Alarm Response	Select the Alarm Response from the drop-down list. Choose from Fail High, Fail Low, Hold Last Output Value, and NONE. The Alarm Response parameter allows you to drive the analog output fully downscale or upscale if an alarm condition occurs.
Diagnostic Response	Select the Alarm Response from the drop-down list. Choose from Fail High, Fail Low, and Hold Last Value. The Diagnostic Response parameter allows you to drive the analog output fully downscale or upscale if diagnostic condition occurs.
Analog Output 3	
Map	Select the map parameter from the drop-down list to map the output. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Upper Range Value	Set the upper range value for Analog Output 3.
Lower Range Value	Set the lower range value for Analog Output 3.
Damping	Set the damping time that is applied to the analog output. It can be set from 0.0 to 99.9 seconds.
Alarm Response	Select the Alarm Response from the drop-down list. Choose from Fail High, Fail Low, Hold Last Output Value, and NONE. The Alarm Response parameter allows you to drive the analog output fully downscale or upscale if an alarm condition occurs.
Diagnostic Response	Select the Alarm Response from the drop-down list. Choose from Fail High, Fail Low, and Hold Last Value. The Diagnostic Response parameter allows you to drive the analog output fully downscale or upscale if diagnostic condition occurs.

— NOTE —

The parameters mapped to analog outputs, and the lower and upper range values of analog outputs are displayed in a graphical representation in “Device Overview” on page 11.

Pulse Output

The Pulse Output screen allows you to configure pulse output parameters.

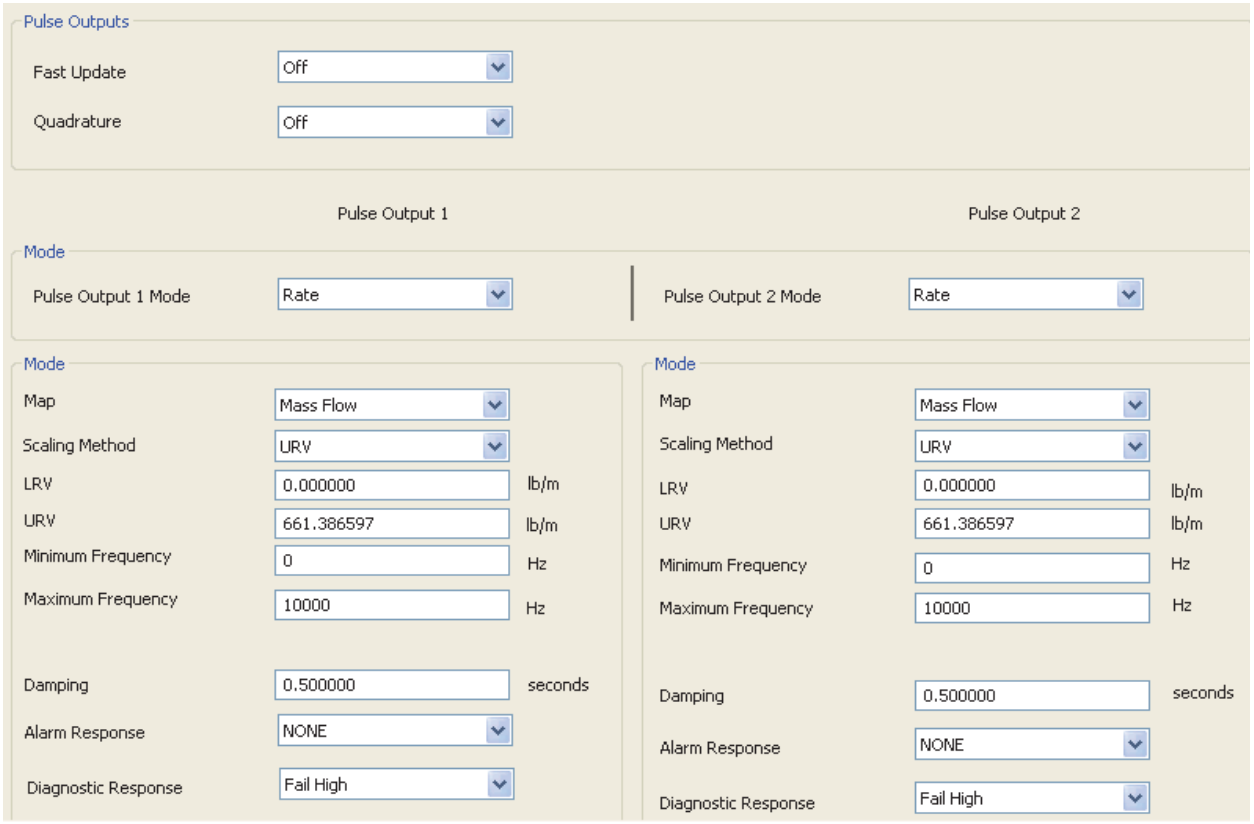


Figure 17. Sample CFT51 Transmitter - Pulse Output Screen

Field	Entry
Pulse Outputs	
Fast Update	This parameter allows you to disable averaging of the raw measurement to achieve the fastest possible dynamic response. Choose from On and Off.
Quadrature	Select the quadrature mode from the drop-down list. Choose from On and Off. When quadrature is enabled, the two pulse outputs switch from normal independent operation to one, where the second pulse output maintains a 90 degree phase offset from the first pulse output.
Pulse Output 1	
Pulse Output 1 Mode	Select the type of pulse output 1 from the drop-down list. Choose from Total (a) and Rate.
Map	Select the mapping parameter for this output from the drop-down list. 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 list. Choose from URV, Units Per Pulse, and Pulses Per Unit.
LRV (b)	Set the lower range value for the mapped measurement.
URV[b]	Set the upper range value for the mapped measurement.
Minimum Frequency	Enter the minimum frequency at which the pulse output can generate pulses.
Maximum Frequency	Enter the maximum frequency at which the pulse output can generate pulses.
Units Per Pulse (c)	Set the units per pulse.
Damping	Set the damping time that is applied to the output. It is the time required to go from zero to 90% of a change. It can be set from 0.0 to 99.9 seconds.
Alarm Response	Select the Alarm Response from the drop-down list. Choose from Fail High, Fail Low, Hold Last Output Value, and NONE. This parameter allows you to drive the pulse output to zero Hz (low) or to 10% over the maximum frequency value (high) if an alarm condition occurs. Select Hold Last Output Value to hold the pulse output at the last frequency.
Diagnostic Response	Select the Diagnostic Response from the drop-down list. Choose from Fail High, Fail Low, and Hold Last Value. This parameter allows you to drive the pulse output to zero Hz (low) or to 10% over the maximum frequency value (high) if a diagnostic condition is detected. Select Hold Last Output Value to hold the pulse output at the last frequency.

Field	Entry
Pulse Output 2	
Pulse Output 2 Mode	Select the type of pulse output 2 from the drop-down list. Choose from Total[a] and Rate.
Map	Select the mapping parameter for this output from the drop-down list. 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 list. Choose from URV, Units Per Pulse, and Pulses Per Unit.
LRV[b]	Set the lower range value for the mapped measurement.
URV[b]	Set the upper range value for the mapped measurement.
Minimum Frequency	Enter the minimum frequency at which the pulse output can generate pulses.
Maximum Frequency	Enter the maximum frequency at which the pulse output can generate pulses.
Units Per Pulse[c]	Set the units per pulse.
Damping	Set the damping time that is applied to the output. It is the time required to go from zero to 90% of a change. It can be set from 0.0 to 99.9 seconds.
Alarm Response	Select the Alarm Response from the drop-down list. Choose from Fail High, Fail Low, Hold Last Output Value, and NONE. This parameter allows you to drive the pulse output to zero Hz (low) or to 10% over the maximum frequency value (high) if an alarm condition occurs. Select Hold Last Output Value to hold the pulse output at the last frequency.
Diagnostic Response	Select the Diagnostic Response from the drop-down list. Choose from Fail High, Fail Low, and Hold Last Value. This parameter allows you to drive the pulse output to zero Hz (low) or to 10% over the maximum frequency value (high) if a diagnostic condition is detected. Select Hold Last Output Value to hold the pulse output at the last frequency.

a. If you select Total, the fields in this section change as shown in Figure 18.
b. This field will not appear if the scaling is Units Per Pulse or Pulses Per Unit.
c. This field appears only if the scaling is Units Per Pulse or Pulses Per Unit.

NOTE

1. Quadrature is available only when Rate mode is selected for the first pulse output. Once quadrature is enabled, configuration options for the second pulse output are no longer available.
2. The parameters mapped to analog outputs, and the lower and upper range values of analog outputs are displayed in a graphical representation in “Device Overview” on page 11.

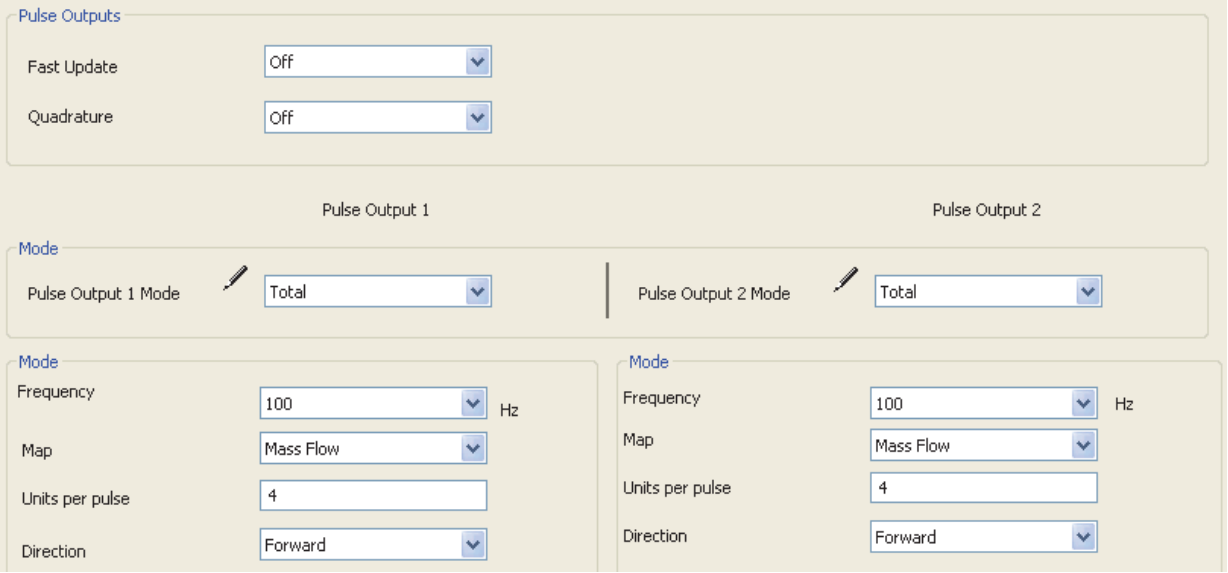


Figure 18. Sample CFT51 Transmitter - Pulse Output Screen (Total Selection)

Field	Entry
Pulse Output 1	
Pulse Output 1 Mode	Select the Total mode for Pulse Output 1 from the drop-down list.
Frequency	Select the Frequency from the drop-down list. Choose from 10 Hz and 100 Hz.
Map	Select the mapping parameter for this output from the drop-down list. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Units Per Pulse	Set the value for units per pulse.
Direction	Select the direction of flow from the drop-down list. Choose from Forward, Reverse, and Bidirectional.
Pulse Output 2	
Pulse Output 2 Mode	Select the Total mode for Pulse Output 2 from the drop-down list.
Frequency	Select the Frequency from the drop-down list. Choose from 10 Hz and 100 Hz.
Map	Select the mapping parameter for this output from the drop-down list. Choose from Mass Flow, Volume Flow, Density, Temperature, Concentration, Mass Flow A, Mass Flow B, Volume Flow A, and Volume Flow B.
Units Per Pulse	Set the value for units per pulse.
Direction	Select the direction of flow from the drop-down list. Choose from Forward, Reverse, and Bidirectional.

NOTE

The menu selections to turn on, off, or clear the pulse totalizers will appear in "Measurement Units" when you configure Total mode for pulse output.

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.

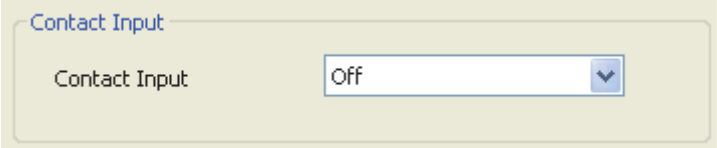


Figure 19. Sample CFT51 Transmitter - Contact Input Screen

Field	Entry
Contact Input	
Contact Input	Select Contact Input from the drop-down list. Choose from: Off - contact input function not enabled Calibrate Zero - initiates a zeroing of the transmitter SelZero - selects zero (primary zero [1] = open contact; secondary zero [2] = closed contact) Signal Lock - drives the outputs to the zero flow condition Alm/Diag Ack - acknowledges an alarm or diagnostic; eliminates the need to do this manually Clear Total1 - resets Total1 Clear Total2 - resets Total2 Clear Total3 - resets Total 3 Clear Total4 - resets Total 4 Clear Batch Totals - resets all batch totals Clear All Totals - resets all totals

Contact Output

The Contact Output screen is where you configure the Function (Off, Alarm, Diagnostic, and Alarm and Diagnostic) and Digital Output (Normally Open, Normally Close).

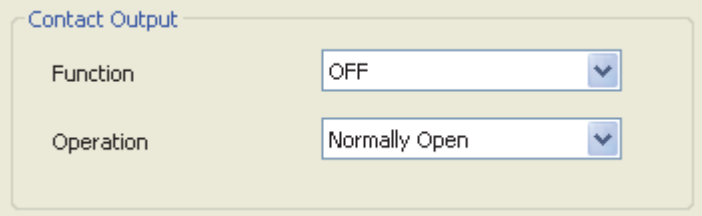


Figure 20. Sample CFT51 Transmitter - Contact Output Screen

Field	Entry
Contact Output	
Function	Select the Function for Contact Output from the drop-down list. Choose from Off, Alarm, Diagnostic, or Alarm and Diagnostic. If you select: Off - The relay output is not used. Alarm - The relay becomes active when any configured alarm occurs. Diagnostic - the relay becomes active when a diagnostic condition occurs. Alarm and Diagnostic - The relay becomes active when a diagnostic condition or any configured alarm occurs.
Operation	Specify the inactive state of the relay output. This is the “normal” condition of the relay (the state when the configured condition does not exist). Choose from Normally Open, Normally Close.

Device Information

The Device Information screen shows complete information of the device. You can enter Location, model code and serial number of the flow tube, and the device tag. You can also set calibration date for the device and enter the name of the calibrator.

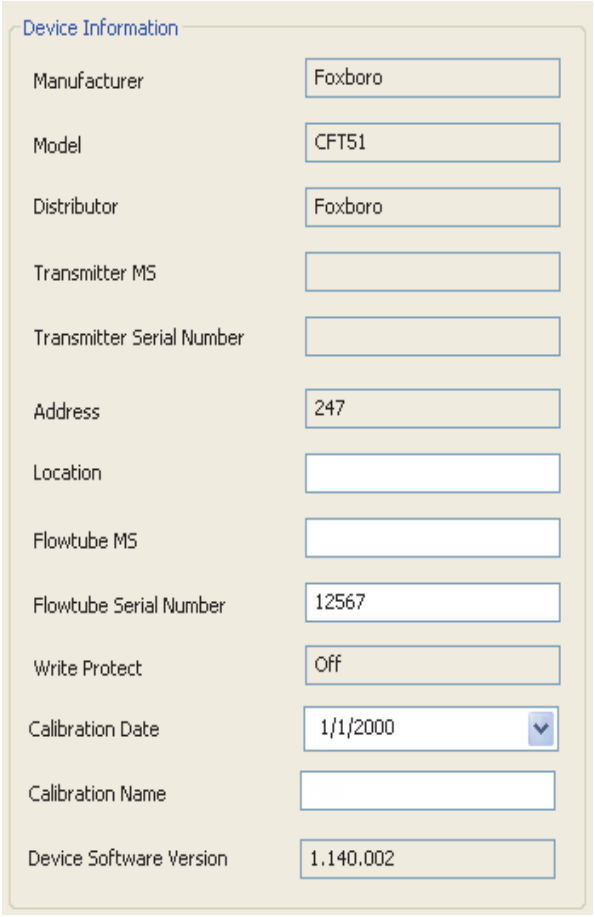


Figure 21. Sample CFT51 Transmitter - Device Information Screen

Field	Entry
Device Information	
Manufacturer	This field shows the name of the manufacturer of the device.
Model	This field shows the model of the device.
Distributor	This field shows the name of the distributor of the device.
Transmitter MS	This field shows the transmitter MS (model) code. Model Code is a reference identifier of the model code of the flowtube being used with your transmitter. The transmitter MS (model) code consists of up to 32 alphanumeric characters.
Transmitter Serial Number	This field shows the transmitter serial number. Serial Number is a reference identifier of the serial number of the flowtube being used with your transmitter. The transmitter serial number consists of up to 16 alphanumeric characters.
Address	This field shows the address of the device.
Location	Enter the location of the transmitter. You can enter up to 14 alphanumeric characters.

Field	Entry
Flowtube MS	Enter the model code of the flowtube being used with your transmitter. You can enter up to 32 alphanumeric characters.
Flowtube Serial Number	Enter the serial number of the flowtube being used with your transmitter. You can enter up to 16 alphanumeric characters.
Write Protect	This field shows the status of the write protection. The write protection jumper, allows or prevents anyone from changing the configuration of the transmitter or resetting the totalizer. the jumper is usually placed in the “disable” position (factory default position).
Calibration Date	Select the date of the last calibration from the drop-down calendar.
Calibration Name	Enter the name of the person who performed the last calibration.
Device Software Version	This field shows the software version of the device.

Device Status

Flowtube Status

The Flowtube Status screen shows the current status of the flowtube. The status is indicated by a green checkmark (healthy), a yellow triangle (warning), or a red X (error).

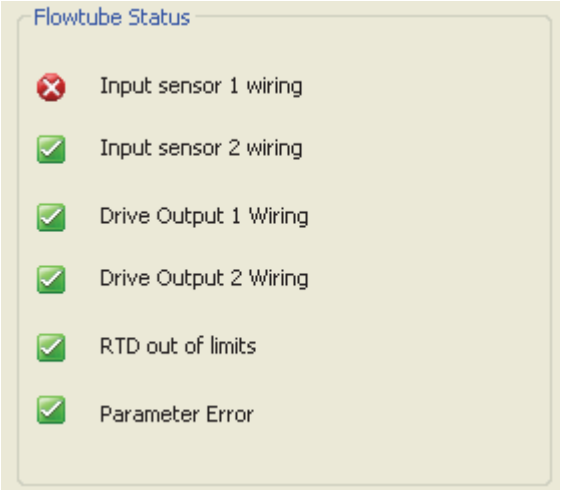


Figure 22. Sample CFT51 Transmitter - Flowtube Status Screen

Field	Entry
Flowtube Status	
Input Sensor 1 Wiring	This field indicates whether or not there is a wiring issue or failure of the first tube input sensor.
Input Sensor 2 Wiring	This field indicates whether or not there is a wiring issue or failure of the second tube input sensor.
Drive Output 1 Wiring	This field indicates whether or not there is a wiring issue or failure of the first drive output.
Drive Output 2 Wiring	This field indicates whether or not there is a wiring issue or failure of the second drive output.
RTD Out of Limits	This field indicates whether or not the RTD resistance is out of range, there is a wiring error, or the electronics have failed.
Parameter Error	This field indicates whether or not a parameter is out of range.

Device Status

The Device Status screen shows the current status of the device.

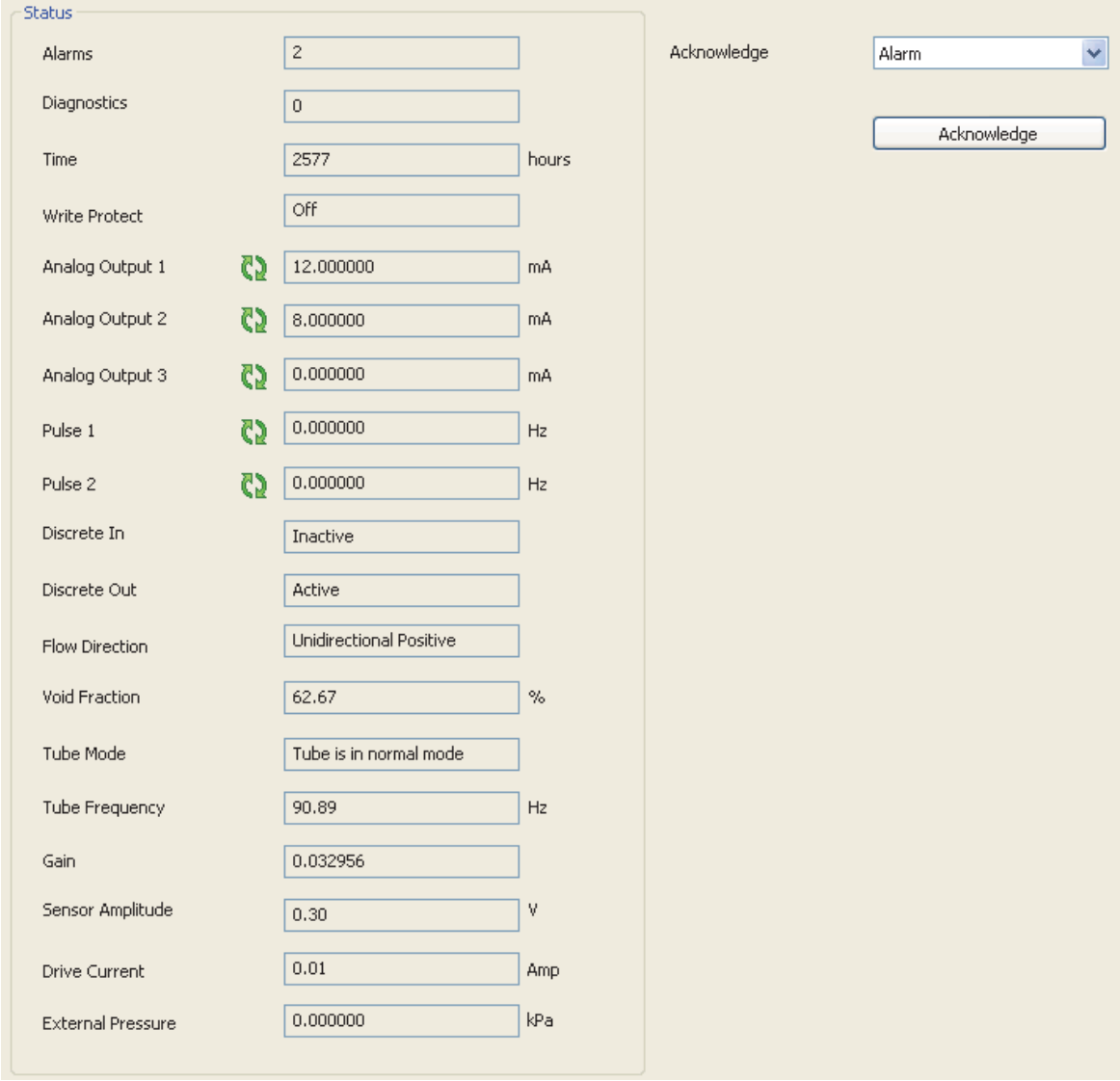


Figure 23. Sample CFT51 Transmitter - Device Status Screen

Field	Entry
Status	
Alarms	This field shows the alarm status of the transmitter.
Diagnostics	This field shows the diagnostic status of the transmitter.
Time	This field shows the number of hours the device has been in service.
Write Protect	This field shows the status of the write protection (On or Off).
Analog Output 1	This field shows the Analog Output 1 value.
Analog Output 2	This field shows the Analog Output 2 value.
Analog Output 3	This field shows the Analog Output 3 value.
Pulse 1	This field shows the Pulse Output 1 value.

Field	Entry
Pulse 2	This field shows the Pulse Output 2 value.
Discrete In	This field shows the contact input state.
Discrete Out	This field shows the contact output state.
Flow Direction	This field shows flow direction (forward or reverse).
Void Fraction	This field shows the void fraction, that is, the percentage of the tube without fluid.
Tube Mode	This field shows the flowtube mode (offline, startup, normal, or normal mode with 2-phase conditions detected).
Tube Frequency	This field shows the flowtube frequency value in Hz.
Gain	This field shows the drive gain.
Sensor Amplitude	This field shows the sensor amplitude in volts.
Drive Current	This field shows the drive current value in amps.
External Pressure	This field shows the external pressure value.
Acknowledge	Select an option from the drop-down to acknowledge alarm and diagnostic conditions. Click Acknowledge to acknowledge the alarm or diagnostic condition.

— NOTE —

The alarm acknowledge function can be configured as Auto or Manual. In Auto, all evidence of the alarm clears when the alarm condition no longer exists. In Manual, the alarm must be acknowledged manually.

Diagnostic History

The Diagnostic History screen displays an error code and the time the diagnostic condition occurred. This time is presented as the total number of hours the transmitter has been powered. A history is given for up to 10 conditions. Once the limit of 10 is reached, the oldest diagnostic condition is dropped from the list and the new one added.

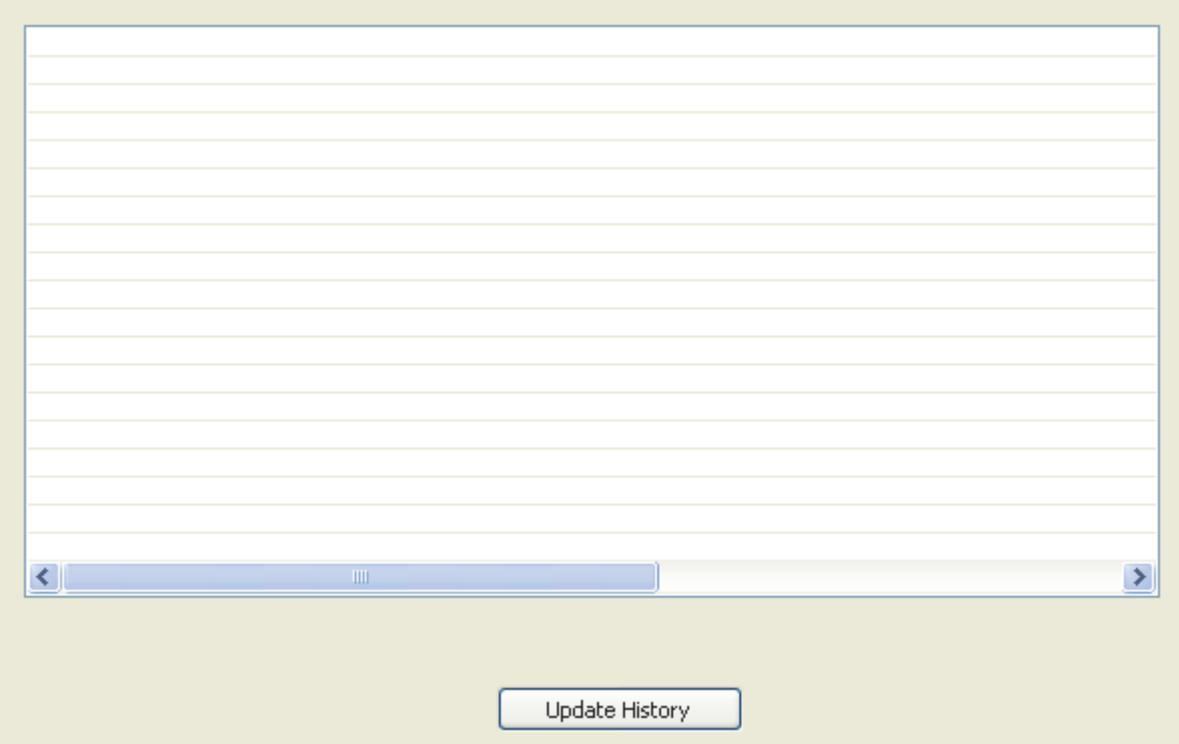


Figure 24. Sample CFT51 Transmitter - Diagnostic History Screen

Calibration

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.

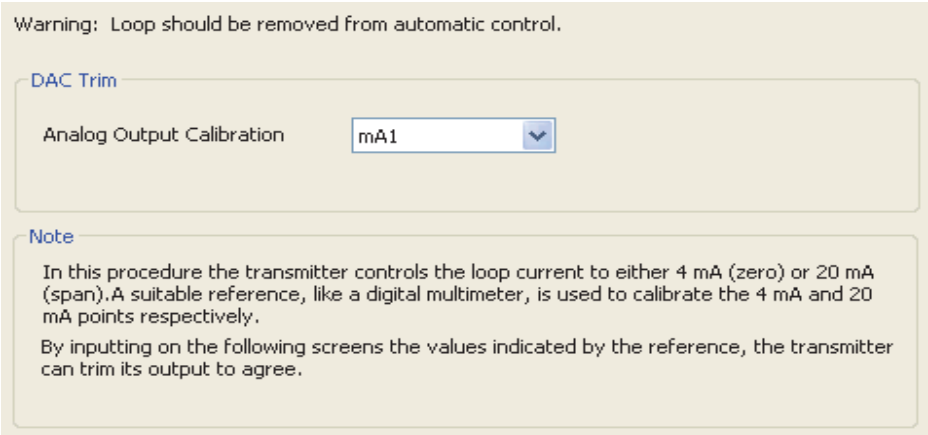


Figure 25. Sample CFT51 Transmitter - mA Calibration Screen 1

Field	Entry
DAC Trim	
Analog Output Calibration	Select the analog output calibration from the drop-down list. Choose from mA1, mA2, mA3.

Click Next, the screen appears as shown in Figure 26.

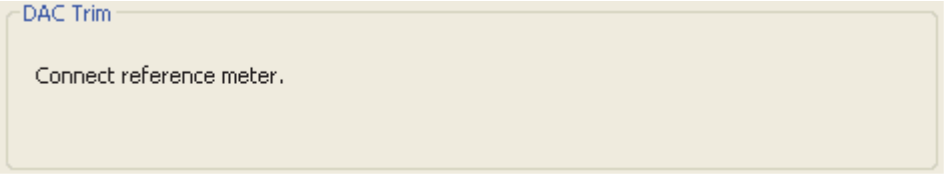


Figure 26. Sample CFT51 Transmitter - mA Calibration Screen 2

Click Next, the screen appears as shown in Figure 27.

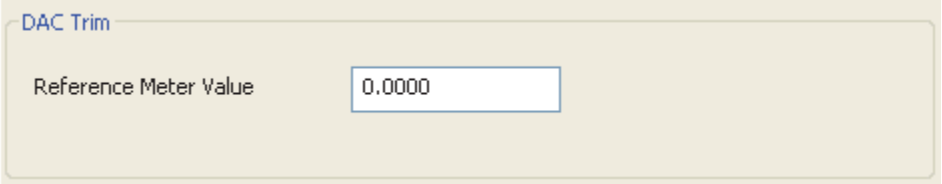


Figure 27. Sample CFT51 Transmitter - mA Calibration Screen 3

Field	Entry
DAC Trim	
Reference Meter Value	Enter the reference meter value.

Click Next, the screen appears as shown in Figure 28.

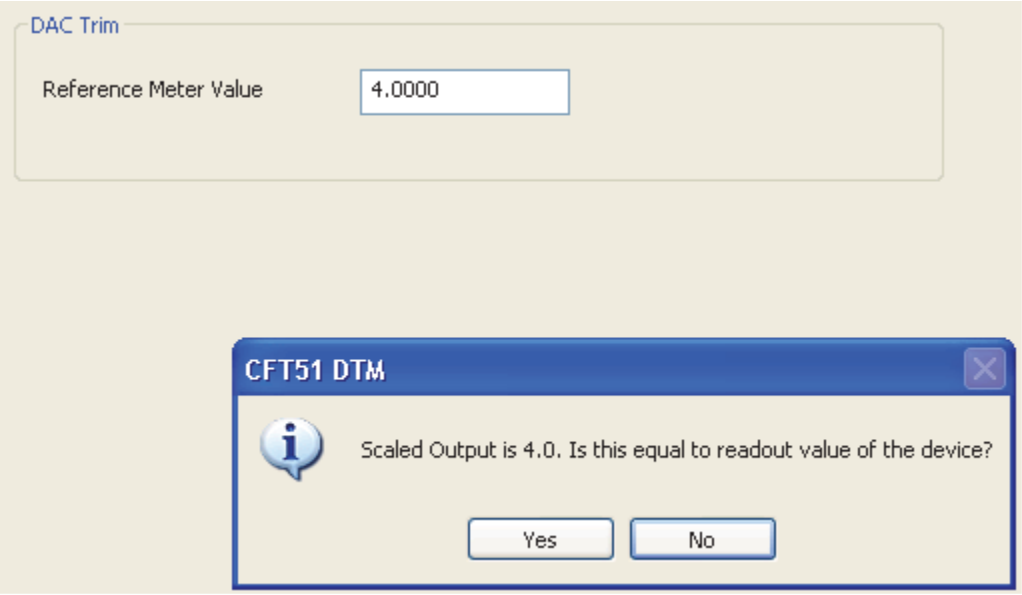


Figure 28. Sample CFT51 Transmitter - mA Calibration Screen 4

Click Yes, the screen appears as shown in Figure 29.

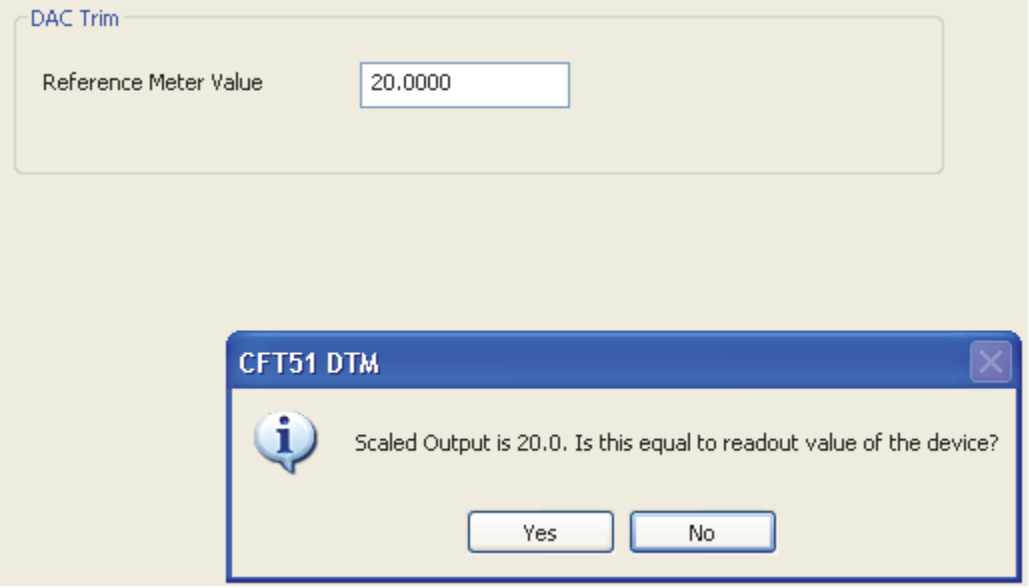


Figure 29. Sample CFT51 Transmitter - mA Calibration Screen 5

Click Yes, the screen appears as shown in Figure 30.

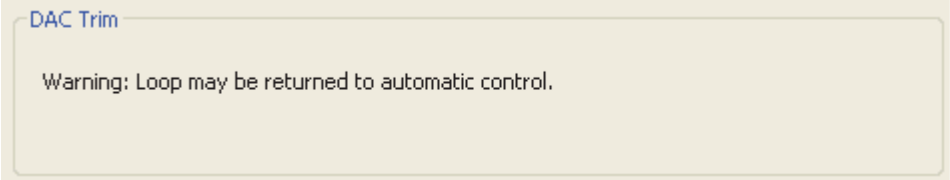


Figure 30. Sample CFT51 Transmitter - mA Calibration Screen 6

Click OK to complete the mA calibration.

mA Restore

mA Restore screen allows you to restore the selected analog output values to default factory settings.

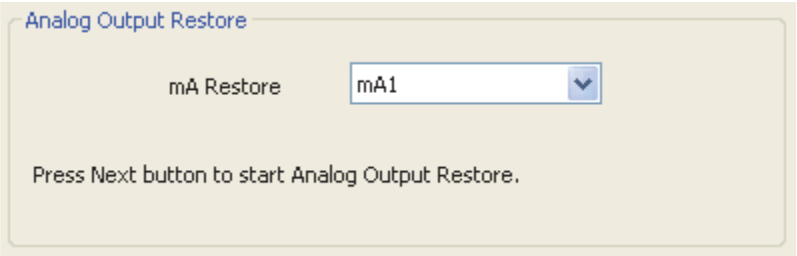


Figure 31. Sample CFT51 Transmitter - mA Restore Screen 1

Click Next, the screen appears as shown in Figure 32.

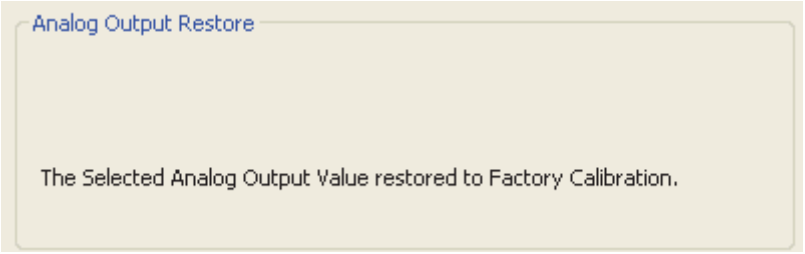


Figure 32. Sample CFT51 Transmitter - mA Restore Screen 2

Click OK to complete the restoration.

Flow Zero Calibration

The Flow Zero Calibration screen allows you to have two independent zeros for two separate fluids. For example, you could use one for liquid and the other for gas.

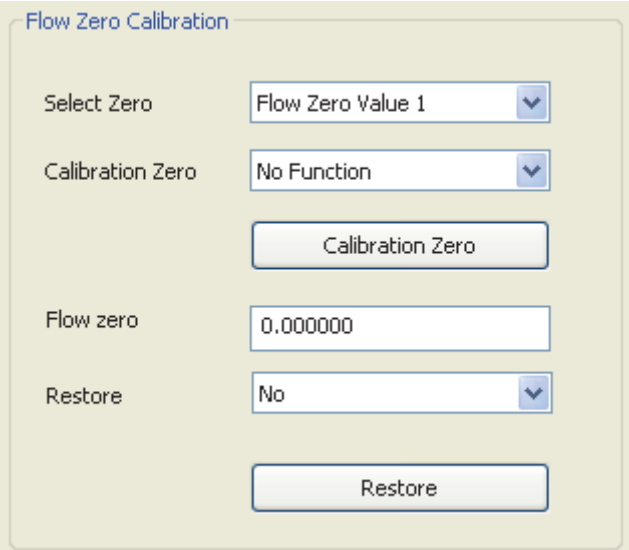


Figure 33. Sample CFT51 Transmitter - Flow Zero Calibration Screen

Field	Entry
Flow Zero Calibration	
Select Zero	Select the zero value from the drop-down list. Choose from Flow Zero Value 1 or Flow Zero Value 2.
Calibration Zero	Select the calibration zero function from the drop-down list. Choose from No Function or Zero Calibration.
Calibration Zero	Click Calibration Zero to initiate a zero calibration. During and after the calibration the transmitter gives you a progress report and shows the status as: Zero Cal Done - When the zero calibration is done Zero Cal In Progress - When the zero calibration is in progress Zero Cal Failed - When the zero calibration is failed
Flow Zero	The Zero Value shows you the value of the calibration. You can change this manually if you desire.
Restore	Select the Restore option from the drop-down list. Choose from Yes or No. Clicking Restore allows you to change the manually entered offset value back to the last zero calibration.

Density Calibration

The Density Calibration screen allows you to calibrate and restore density.

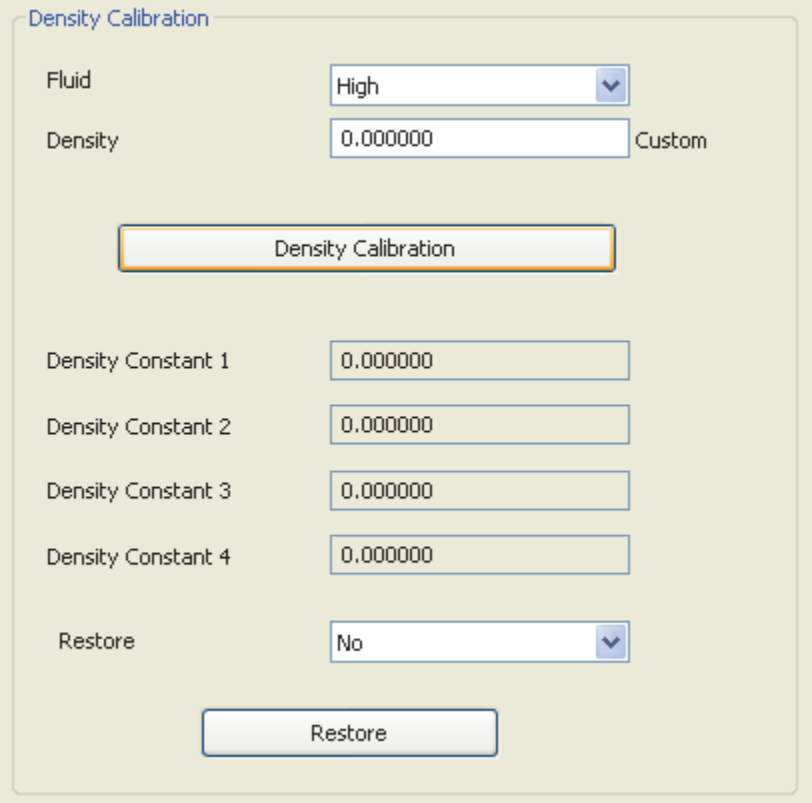


Figure 34. Sample CFT51 Transmitter - Density Calibration Screen

Field	Entry
Density Calibration	
Fluid	Select the density calibration fluid from the drop-down list. Choose from High or Low.
Density	Set fluid density value. This field allows you to enter the liquid's desired density.
Density Calibration	Click Density Calibration to initiate calibration.
Density Constant 1, 2, 3 and 4	These fields show the new density constants, calculated from density calibration fluid and fluid density calibration value. These fields will read zero if you click Restore.
Restore	Select the Restore option from the drop-down list. Choose from Yes or No. Clicking Restore allows you to return to the last inputted values before the calibration procedure was performed.

Meter Verification

Meter verification is used to verify calibration of the flow tube and to check for process related problems such as corrosion and sedimentation deposits. This function will take several minutes to complete and will temporarily disable tube drive and the calculation of measurements.

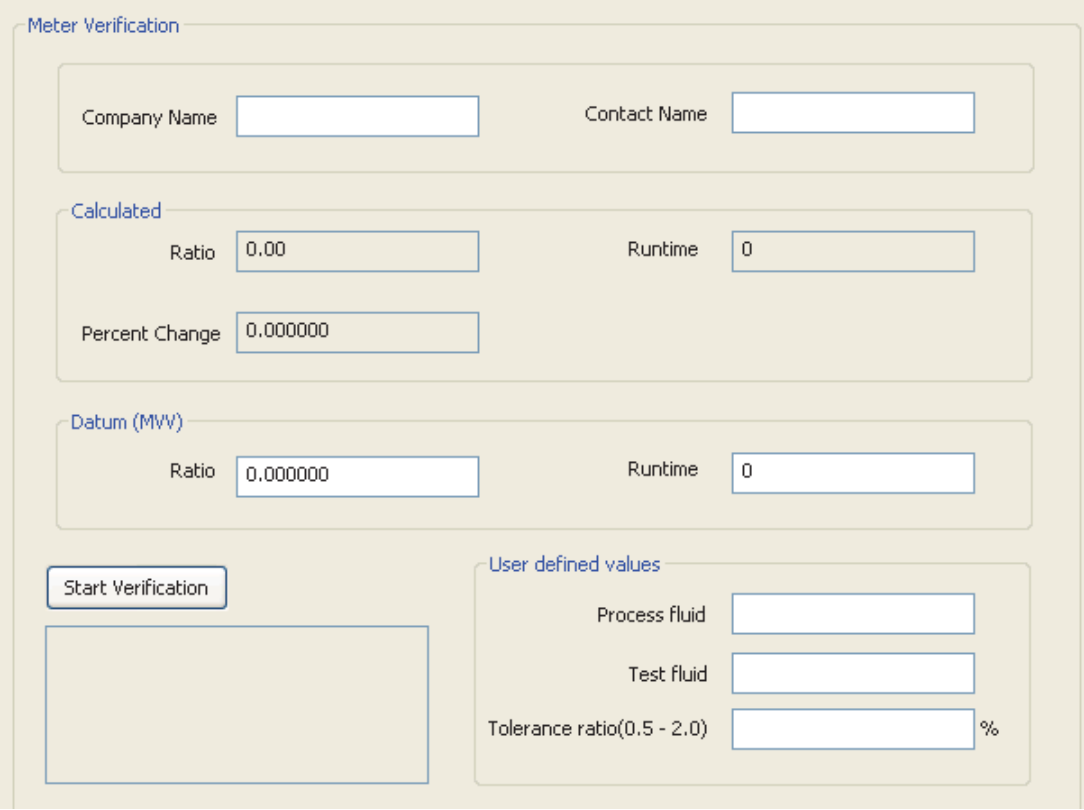


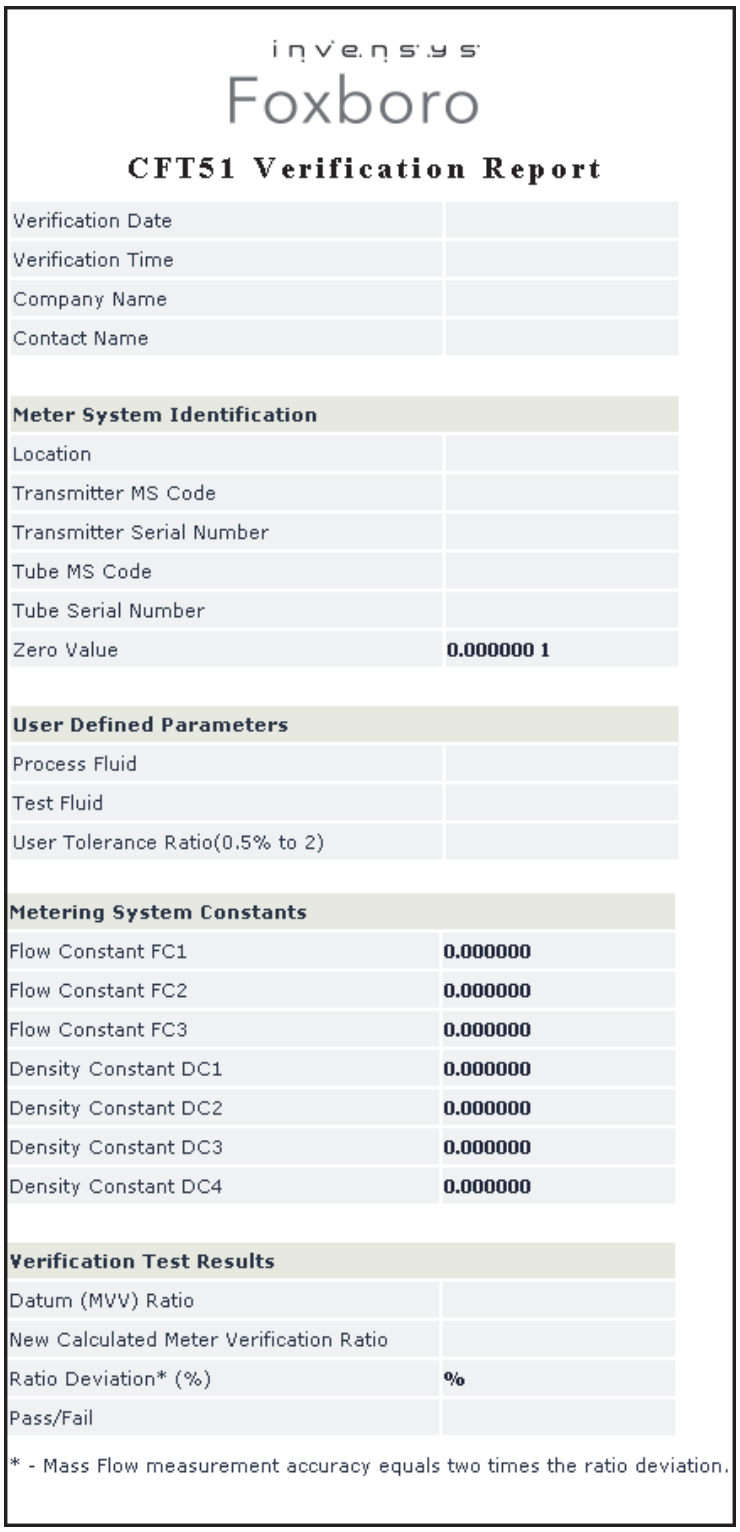
Figure 35. Sample CFT51 Transmitter - Meter Verification Screen

Field	Entry
Meter Verification	
Company Name	Enter the name of the company.
Contact Name	Enter the contact name.
Calculated	
Ratio	This field shows the current ratio.
Runtime	Once the meter verification function is done, the software calculates the latest ratio of the drive and Coriolis frequencies along with the current transmitter run time (in seconds).
Percent Change	This field shows the percent change value, which is the last ratio compared to the datum ratio.
Datum (MVV)	
Ratio	This field shows the initial verification ratio.
Runtime	This field shows the initial verification time.

Field	Entry
User defined values	
Process Fluid	Enter the value for the process fluid.
Test Fluid	Enter the value for the test fluid.
Tolerance Ratio	Enter the tolerance ratio. You can enter a value between 0.5 and 2.0.
Start Verification	Click Start Verification. While verification is in progress, Verification Busy appears. After the verification is complete, Verification Done appears if the verification is successfully completed, or Verification Fail appears if the verification fails.

Meter Verification Report

The Meter Verification Report shows a summary of the verification 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.



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CFT51 Verification Report

Verification Date	
Verification Time	
Company Name	
Contact Name	

Meter System Identification	
Location	
Transmitter MS Code	
Transmitter Serial Number	
Tube MS Code	
Tube Serial Number	
Zero Value	**0.000000 1**

User Defined Parameters	
Process Fluid	
Test Fluid	
User Tolerance Ratio(0.5% to 2)	

Metering System Constants	
Flow Constant FC1	**0.000000**
Flow Constant FC2	**0.000000**
Flow Constant FC3	**0.000000**
Density Constant DC1	**0.000000**
Density Constant DC2	**0.000000**
Density Constant DC3	**0.000000**
Density Constant DC4	**0.000000**

Verification Test Results	
Datum (MVV) Ratio	
New Calculated Meter Verification Ratio	
Ratio Deviation* (%)	**%**
Pass/Fail	

* - Mass Flow measurement accuracy equals two times the ratio deviation.

Figure 36. Sample CFT51 Transmitter - Meter Verification Report Screen

Trouble Shooting

Restore Factory Settings

The Restore Factory Settings options will reset all data to factory default values.

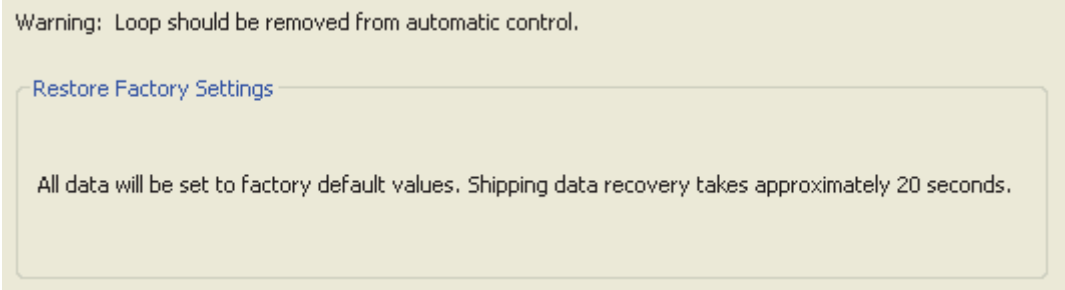


Figure 37. Sample CFT51 Transmitter - Restore Factory Settings Screen

Loop Test

Digital Output

The Digital Output screen allows you to override the digital output.

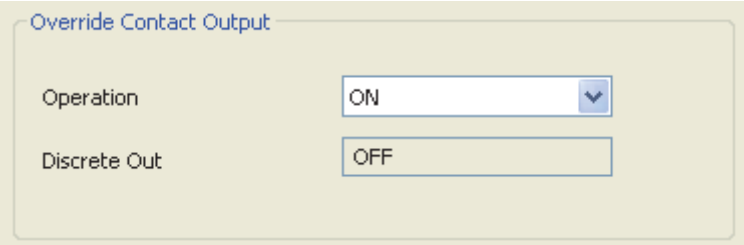


Figure 38. Sample CFT51 Transmitter - Digital Output Screen

Field	Entry
Override Contact Output	
Operation	Select Operation from the drop-down list. Choose from ON and OFF.
Discrete Out	This field shows the status of the discrete output.

Override Analog Output

The Override Analog Output screen allows you to select the analog output loop test and set the override value for it.

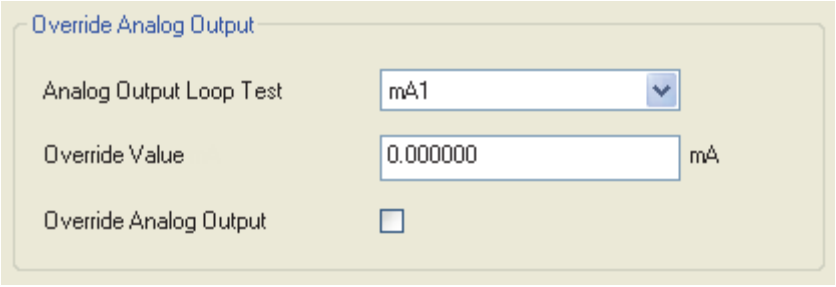


Figure 39. Sample CFT51 Transmitter - Analog Output Screen

Field	Entry
Override Analog Output	
Analog Output Loop Test	Select the Analog Output Loop Test from the drop-down list. Choose from mA1, mA2, and mA3.
Override Value	Set the override value.
Override Analog Output	Select or clear Override Analog Output to activate or deactivate overriding the output value.

Override Pulse Output

The Override Pulse Output screen allows you to select the pulse output loop test and set the override value for it.

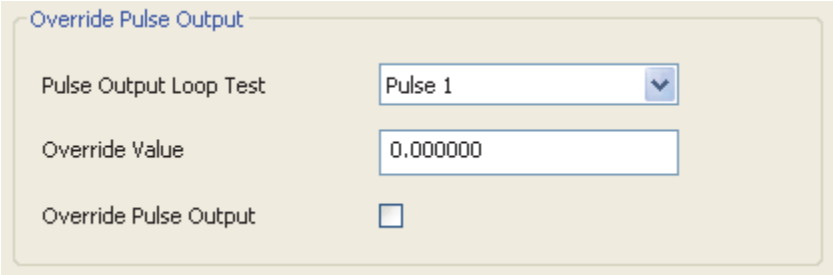
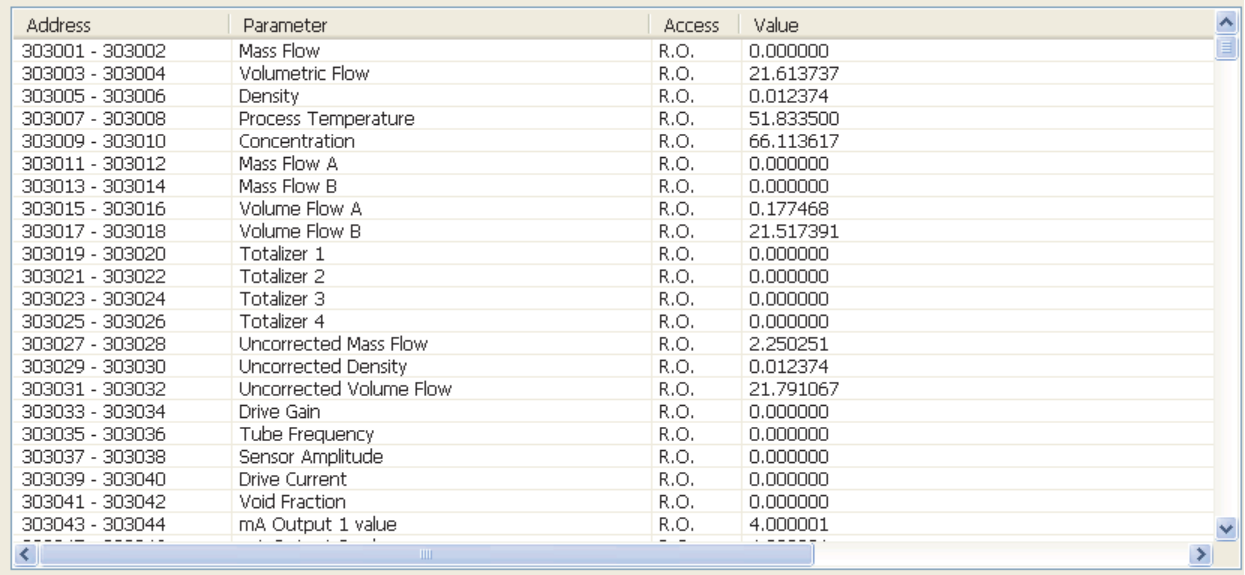


Figure 40. Sample CFT51 Transmitter - Pulse Output Screen

Field	Entry
Override Pulse Output	
Pulse Output Loop Test	Select the Pulse Output Loop Test from the drop-down list. Choose from Pulse 1 and Pulse 2.
Override Value	Set the override value.
Override Pulse Output	Select or clear Override Pulse Output to activate or deactivate overriding the output value.

Configuration Parameters

The Configuration Parameters screen is used to configure the parameters and reading.

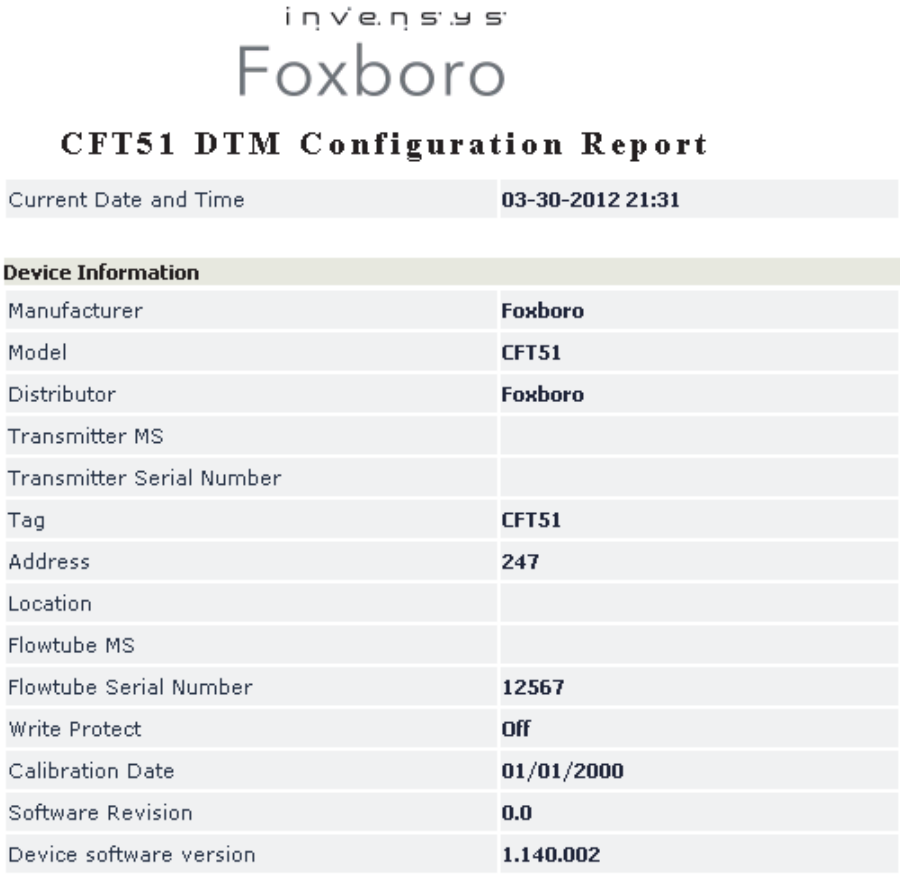


Address	Parameter	Access	Value
303001 - 303002	Mass Flow	R.O.	0.000000
303003 - 303004	Volumetric Flow	R.O.	21.613737
303005 - 303006	Density	R.O.	0.012374
303007 - 303008	Process Temperature	R.O.	51.833500
303009 - 303010	Concentration	R.O.	66.113617
303011 - 303012	Mass Flow A	R.O.	0.000000
303013 - 303014	Mass Flow B	R.O.	0.000000
303015 - 303016	Volume Flow A	R.O.	0.177468
303017 - 303018	Volume Flow B	R.O.	21.517391
303019 - 303020	Totalizer 1	R.O.	0.000000
303021 - 303022	Totalizer 2	R.O.	0.000000
303023 - 303024	Totalizer 3	R.O.	0.000000
303025 - 303026	Totalizer 4	R.O.	0.000000
303027 - 303028	Uncorrected Mass Flow	R.O.	2.250251
303029 - 303030	Uncorrected Density	R.O.	0.012374
303031 - 303032	Uncorrected Volume Flow	R.O.	21.791067
303033 - 303034	Drive Gain	R.O.	0.000000
303035 - 303036	Tube Frequency	R.O.	0.000000
303037 - 303038	Sensor Amplitude	R.O.	0.000000
303039 - 303040	Drive Current	R.O.	0.000000
303041 - 303042	Void Fraction	R.O.	0.000000
303043 - 303044	mA Output 1 value	R.O.	4.000001

Figure 41. Sample CFT51 Transmitter - Configuration Parameters Screen

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.



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CFT51 DTM Configuration Report

Current Date and Time	**03-30-2012 21:31**

Device Information	
Manufacturer	**Foxboro**
Model	**CFT51**
Distributor	**Foxboro**
Transmitter MS	
Transmitter Serial Number	
Tag	**CFT51**
Address	**247**
Location	
Flowtube MS	
Flowtube Serial Number	**12567**
Write Protect	**Off**
Calibration Date	**01/01/2000**
Software Revision	**0.0**
Device software version	**1.140.002**

Figure 42. Sample CFT51 Transmitter - Configuration Report Screen

Reference

Reference

The Reference displays list of **Online Documentation** related to the device, **Useful Links** to related information, and **Customer Service** phone, fax, email, and website information.

Figure 43. Sample CFT51 Transmitter - Reference Screen

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.

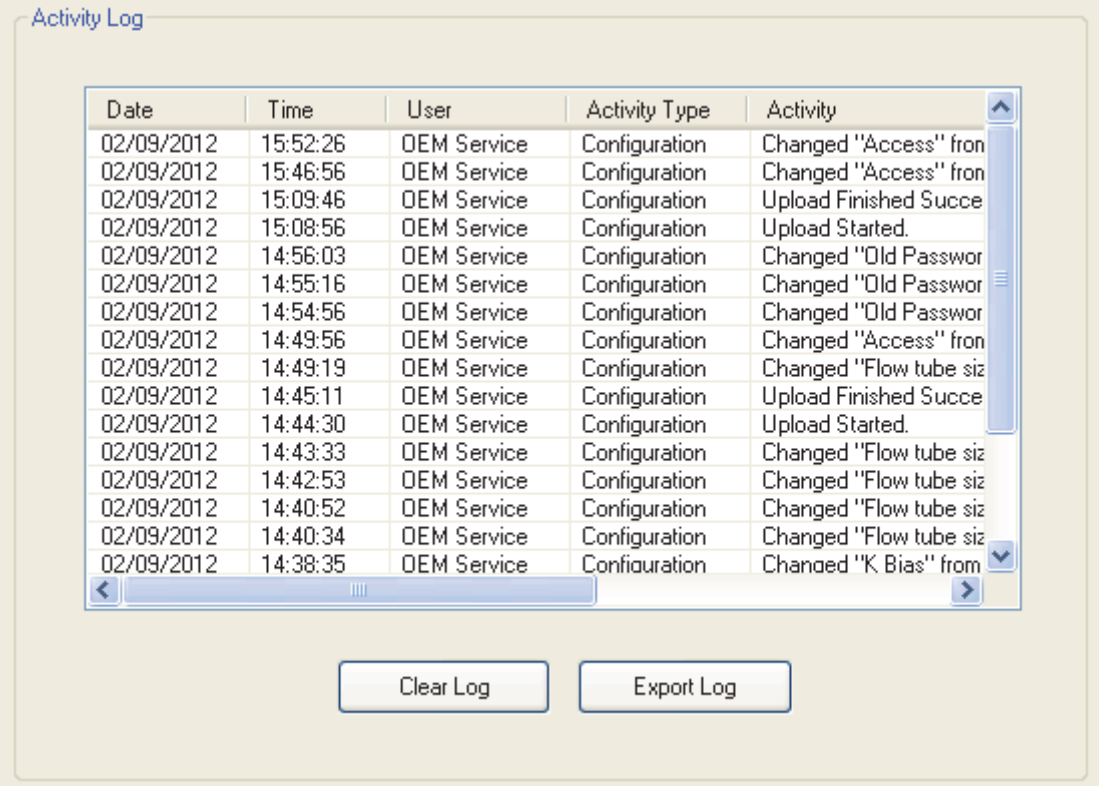

Figure 44. Sample CFT51 Transmitter - Activity Log Screen

Scratch Pad

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

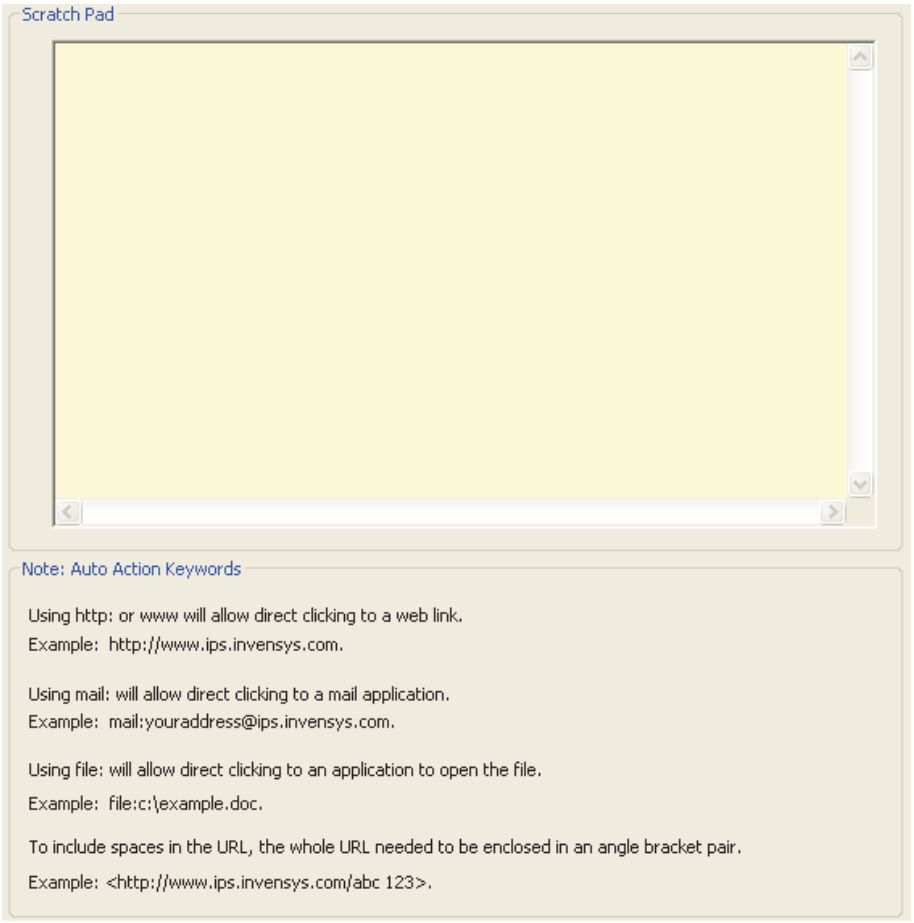

Figure 45. Sample CFT51 Transmitter - Scratch Pad Screen

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 46. 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.

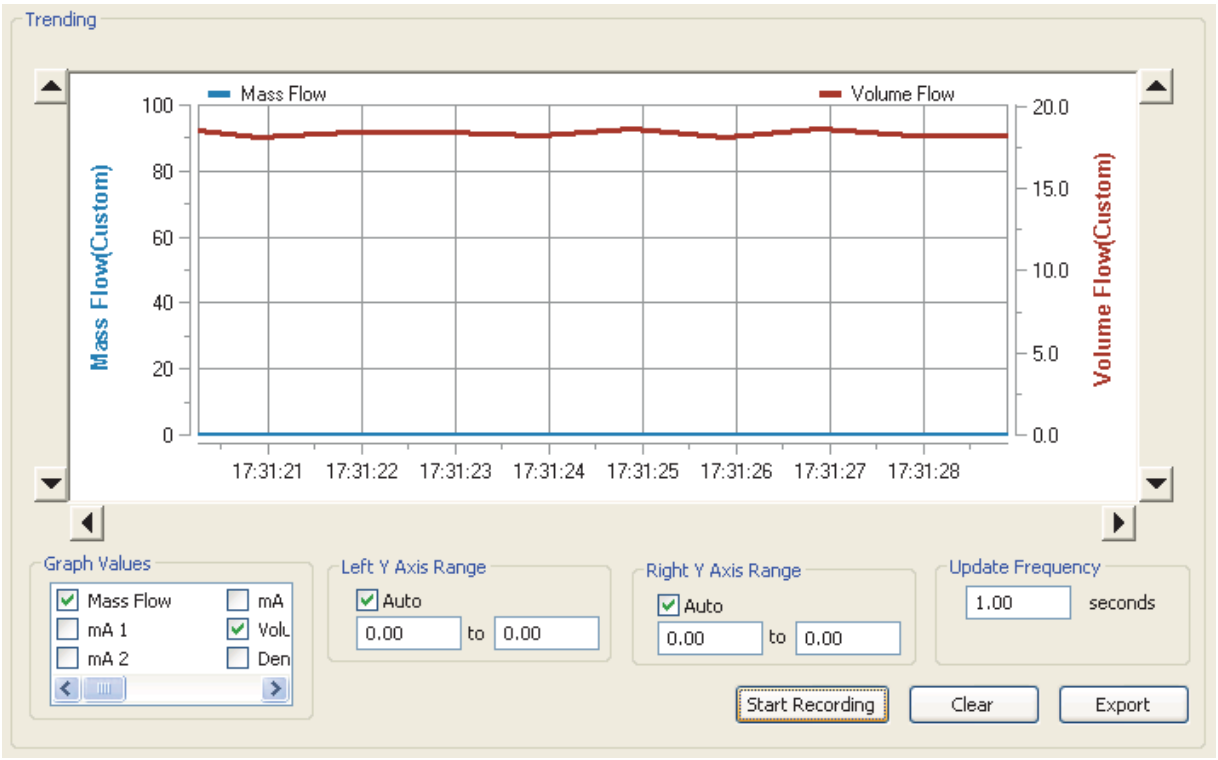

Figure 46. Sample CFT51 Transmitter - Trending Screen

Index

ISSUE DATES

MAY 2012
FEB 2016

Vertical lines to the right of text or illustrations indicate areas changed at last issue date.

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