SOFTWARE

FT1 VIEW™

Free PC-Based Software Tool

for the FT1 Thermal Gas Mass Flow Meter

Software Instruction Manual

Document #106515
Rev G

831.384.4300 | 399 Reservation Rd, Marina, CA 93933 | foxthermal.com

This publication must be read in its entirety before performing any operation. Failure to understand and follow these instructions could result in serious personal injury and/or damage to the equipment. Should this equipment require repair or adjustment beyond the procedures given herein, contact the factory at:

FOX THERMAL INSTRUMENTS, INC.
399 RESERVATION ROAD
MARINA, CA 93933
TELEPHONE: 831-384-4300
EMAIL: SERVICE@FOXTHERMAL.COM

Download Technical Data Sheets from our website:
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Fox Thermal FT1 Manuals:

- **Model FT1 Instruction Manual**

All Fox Thermal Manuals and software available in English only.

Table of Contents

Introduction
Thank you for purchasing the Model FT1 Thermal Gas Mass Flow meter from Fox Thermal. The Model FT1 is one of the most technically advanced flow meters in the world. Extensive engineering effort has been invested to deliver advanced features, accuracy measurement performance, and outstanding reliability.

The FT1 View™ software allows users to easily display data and configure the FT1 to their specific application parameters. The software can also access the Gas-SelectX® menu, run the CAL-V™ calibration validation diagnostic test, and log flow/temperature data.

The Model FT1 is available with two different options: the RS485 Communication option or the Pulse Output option. The FT1 View™ software automatically adapts to the features in the FT1 meter.

This Manual contains the installation and operation instructions for the FT1 View™ Software.

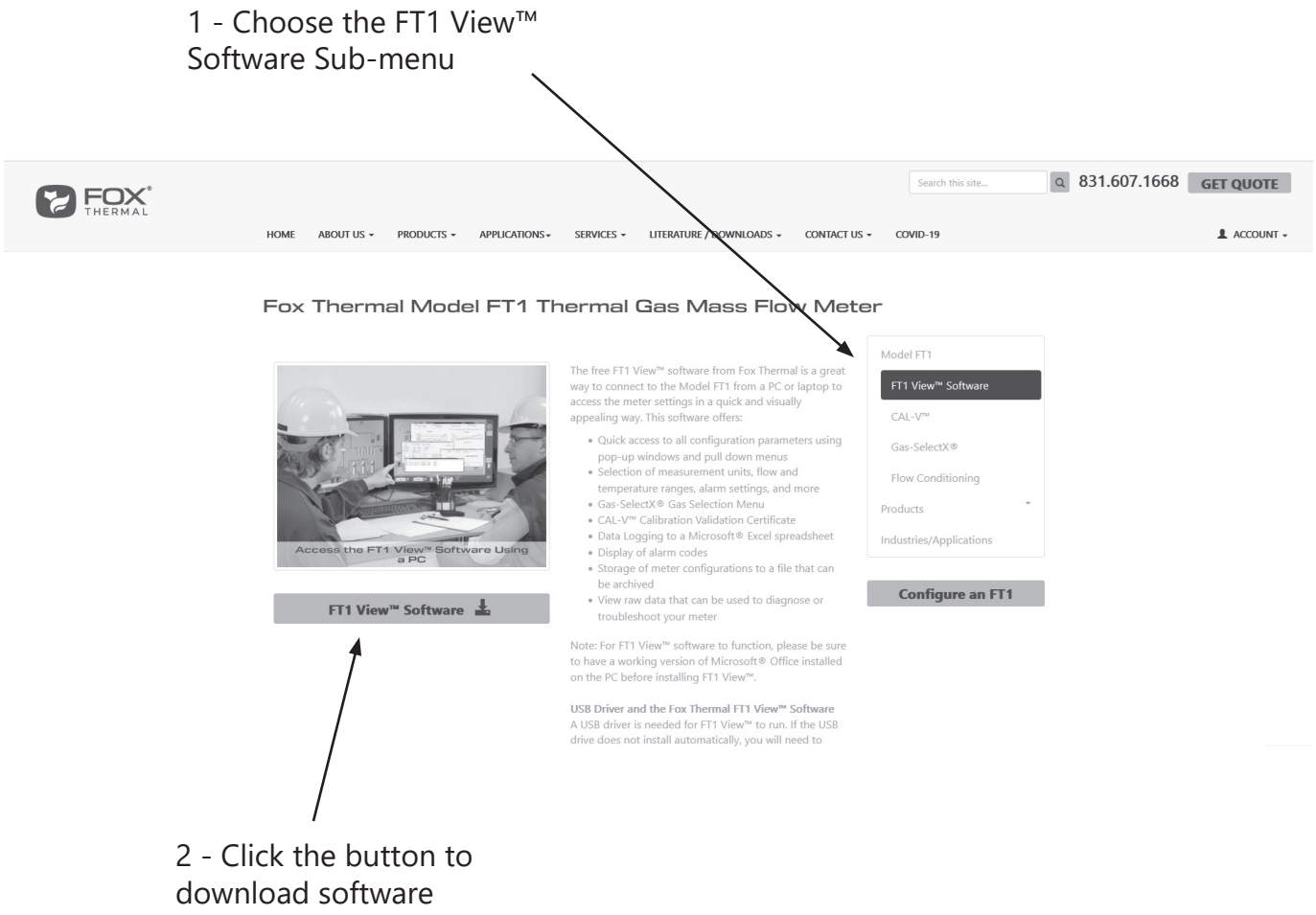
This manual is divided into the following sections: Introduction, Installation, Operation, Definitions, and Index.

Installation

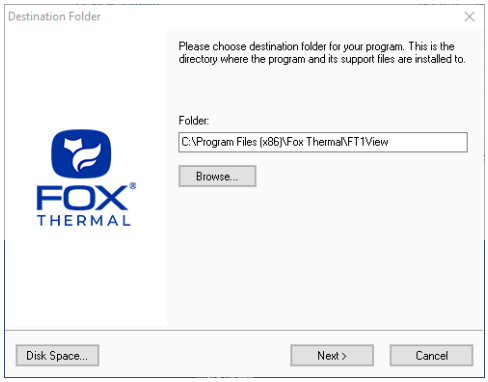
Open the enclosure by unscrewing the enclosure cap, loosen the two captive screws on the display assembly and rotate it open. Connect the FT1 to a PC with a USB (Type-A / Mini-B) cable. If the PC is connected to the internet and running Windows®, the PC will try to automatically load the VCP driver. If the driver does not load automatically, download the VCP driver at: https://ftdichip.com/drivers/vcp-drivers/

NOTE! The latest version of the FT1 View™ software is available for download at www.foxthermal.com/products/ft1.php#ft1view

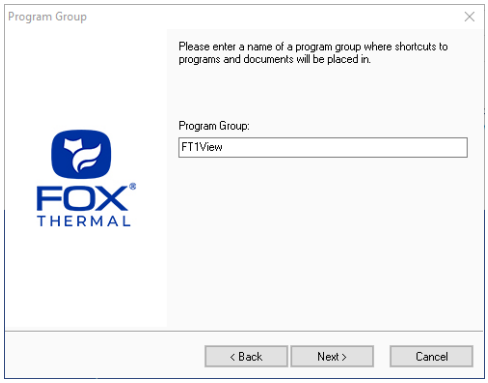
Fig. 2.1: Online Download Location for FT1 View™ Software



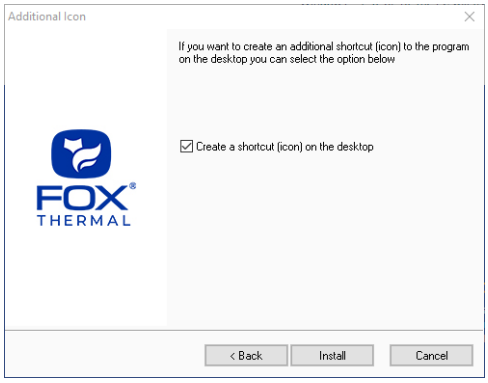
To install the FT1 View™ program, run the downloaded "ft1-view-setup.exe" file. After clicking "Next" the screen will show:



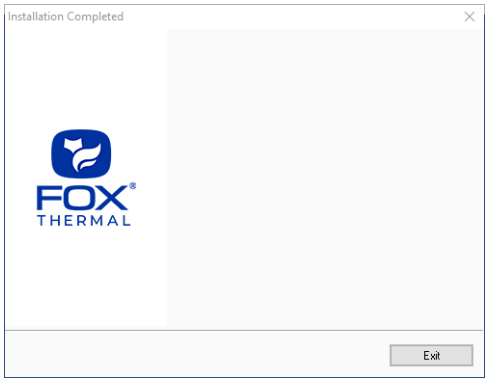
Select the folder in which you wish to install FT1 View™, then click "Next".



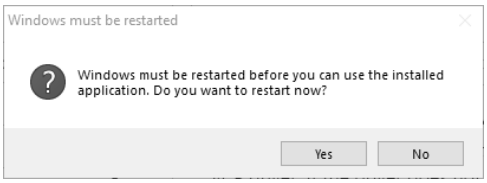
Please enter a name for the Program Group or use the default FT1View name and click "Next".



To find the program easily, you may choose to create a shortcut icon for your PC desktop by placing a check in the checkbox. Click "Install" to continue.



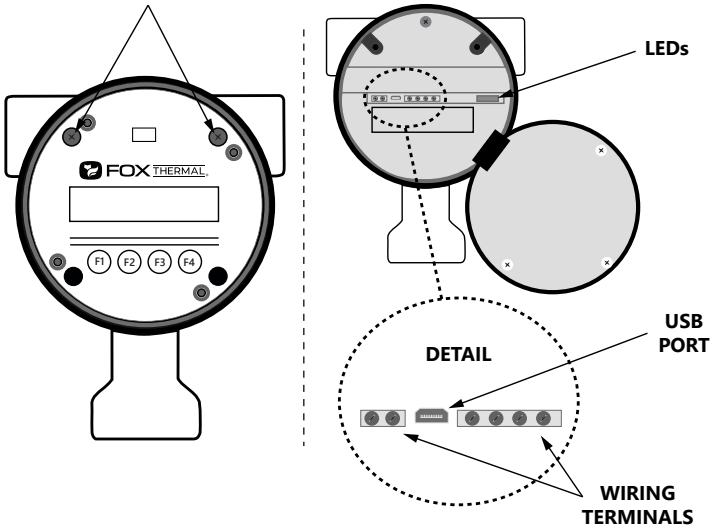
When the program is done installing, click "Exit".



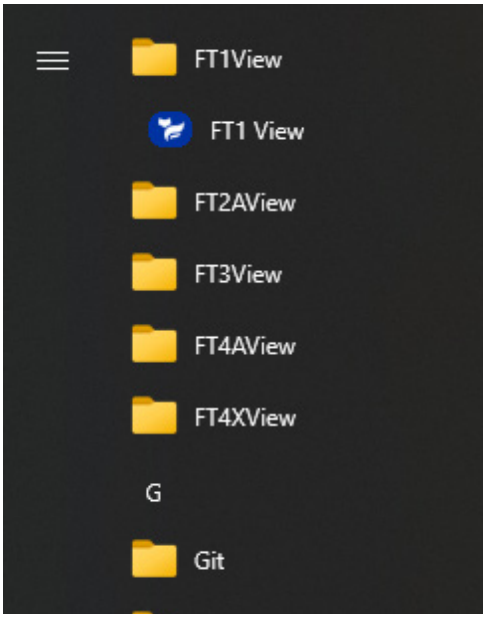
To complete the installation process, close all applications, and restart your computer. The FT1 View Software will be ready to use after the computer has restarted.

Power on the Meter
Refer to the FT1 Instruction Manual for Power input wiring instructions. The FT1 must be powered on to communicate with the FT1 View™ software tool.

Connect the FT1 to a PC or Laptop via USB
Be sure to have your FT1 flow meter connected by USB to a PC or laptop that has FT1 View™ software successfully downloaded to the operating system. Open the enclosure by unscrewing the enclosure cap, loosen the two captive screws on the display assembly and rotate it open. The USB port is accessible on the electonics board beneath the display.



Startup FT1 View™ Software
After re-boot and connecting to a PC via USB, startup the FT1 View™ software accessible in the Windows "Start" button or search bar.



COM Port Assignment
Be sure to have your FT1 connected by USB to a PC or laptop before opening FT1 View™. Upon opening FT1 View™ for the first time, Windows® will assign a "virtual COM port". The COM port number that has been assigned will appear automatically in the drop down box.

If the correct COM Port does not appear, go to Control Panel/Device Manager and click on Ports (COM & LPT). The COM port number should be displayed under the USB symbol.

If prompted, enter the assigned COM port in FT1 View™ by using the drop down menu and press **OK**.

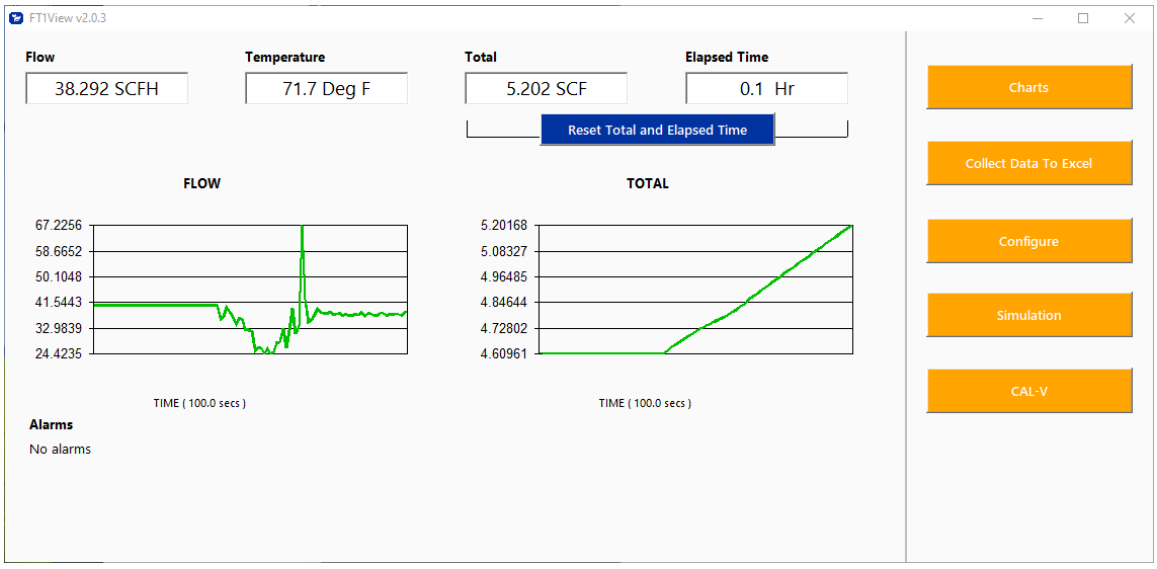
NOTE! The FT1 Meter must be plugged into the computer for the USB port to be detected.

Fig. 3.1: COM Port Selection Window

Main Screen

The image below depicts the main screen that appears upon entering FT1 View™.

Fig. 4.1: FT1 View™ Main Screen



Flow & Temperature

FT1 View™ will show values for flow and temperature in the pipe in real time based on how the flow meter has been configured (in this case, SCFH and ºF). These values are in the upper left of the screen.

Total & Elapsed Time

Flow total and Elapsed Time are shown in the upper right of the screen and can be reset with the button just underneath the displayed values.

Charts Button

This calls up two charts that can be configured for flow, temperature, or total flow. Each chart can be individually enlarged and re-scaled from the original default settings.

NOTE! Data on the screen is refreshed at user selected update rate. See p. 12 for more information on setting up charts.

Collect Data to Excel Button

Selecting the Collect Data to Excel button allows all selected data to be logged to an Excel® file at the specified sample time. All readings are time/date stamped. For more information on using the data collection function, refer to "Collect Data to Excel" on p. 14.

Configure Button
This function is used to adjust the application parameters of the FT1. The application parameters can be set using FT1 View™ software or manually using the FT1 display. For more information on configuring application parameters, refer to p. 16.

Simulation Button
This function can be used to verify that all the flow meter outputs are working properly. The easiest way to perform this check is to enter a specific temperature or flow rate. The corresponding analog outputs can be verified using a DMM and using a timer for the pulse. Refer to p. 22 for more information on how to use the Simulation function.

Calibration Validation Diagnostic Test Section

CAL-V™ Button
Calibration validation allows customers to validate the accuracy and functionality of the meter in the field with a push of a button. By performing a simple test, the operator can verify that the meter is running accurately.
The CAL-V™ calibration validation test is explained in greater detail on p. 24.

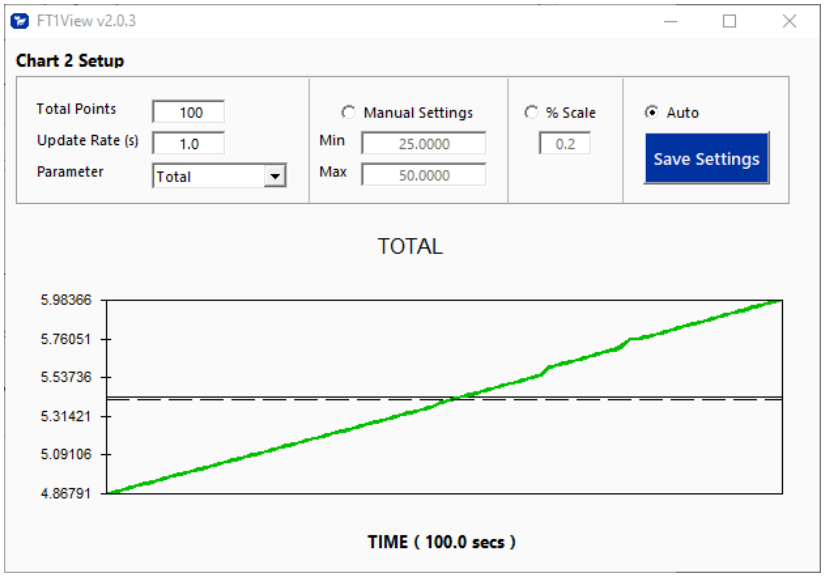
Alarms
The unit can be configured for high/low alarms for either flow or temperature. The "alarms window" displays any alarms or warnings.

Charts Settings

From the main screen, click on "Charts". Two charts will appear side-by-side. Each chart can be selected for flow, temperature or total flow.

Fig. 4.2: Chart Settings Window - Chart 1

Fig. 4.3: *Chart Settings Window - Chart 2*



Total Points
The total points specifies the number of points plotted on the graph. Older data is automatically omitted.

Update Rate
The update rate controls the data refresh rate.

Parameters
Flow, temperature or total flow can easily be selected for charting.

Manual Chart Setting
The Manual mode allows a user to input min/max values for chart scaling. When entering new values, click on Save Settings for them to take effect.

Percent (%) Scale
This sets the scale to a plus/minus specified percentage from the initial measured value. Typically, the minimum/maximum is scaled at plus/minus 10% of that initial value.

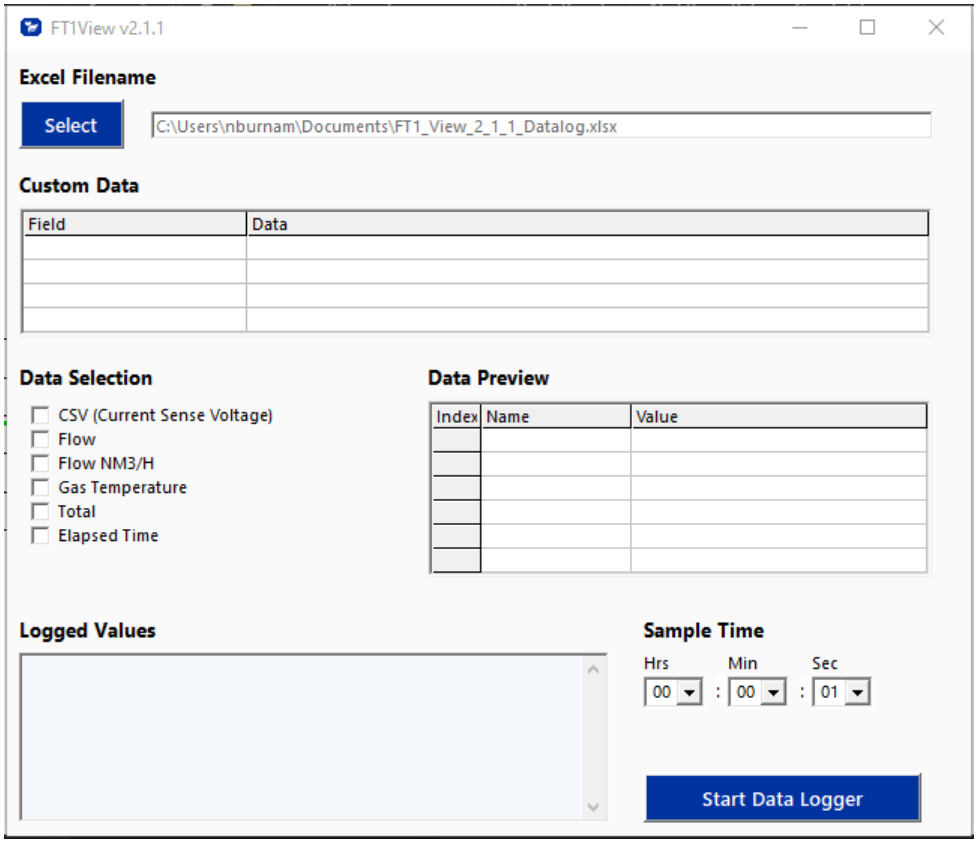
Automatic Chart Setting
Automatic mode lets the program adjust the scaling on a real-time basis based on the entire range of values.

Save Settings
Click the Save Settings button to save the chart settings to the main screen window. These settings can then be closed by clicking on the "X" at the top right corner of the window.

Collect Data to Excel

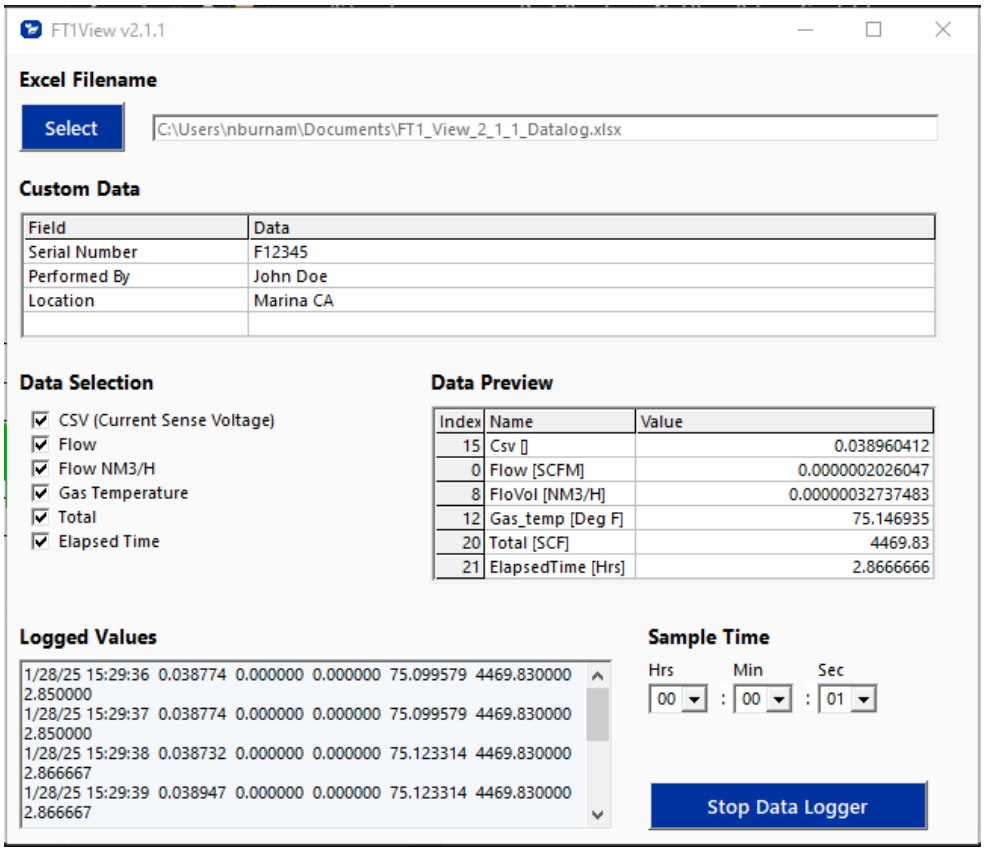
The Data Logger screen can be accessed from the main screen. Clicking the "Collect Data to Excel" button will prompt the user for a password. Enter a Level 1 (1234) or Level 2 (9111) password and the Data Collection window will appear.

Fig. 4.4: Data Collection Window - Logging Turned Off



You may enter custom fields onto the top of the final log file, click on a field to enter the text. Select the sample time from the drop down menu, and then select the required data from the Data Selection list. Select or create a name for the Excel® file and then press the "Start Data Logger" button.

Fig. 4.5: Data Collection Window - Logging Turned On

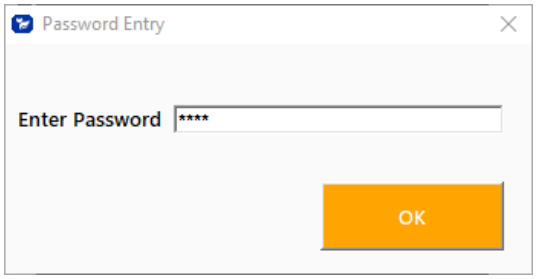


When "Start Data Logger" is pressed, the data is recorded in the specified Excel® file - and also displayed in the Logged Values window. Pressing "Stop Data Logger" ends data acquisition.

Configure

From the main screen, click on the "Configure" button and enter the requested password for either Level 1 (1234) or Level 2 (9111) access.

Fig. 4.6: Password Window



NOTE! Most users will only need access to the Level 1 screen to do basic setting of units, alarms and output scaling.

The FT1 View™ software recognizes the meter configuration automatically. The meter configuration determines whether the screen in Fig 4.7 or 4.8 will appear.

Fig. 4.7: Level 1 Configuration Screen - RS485 Option

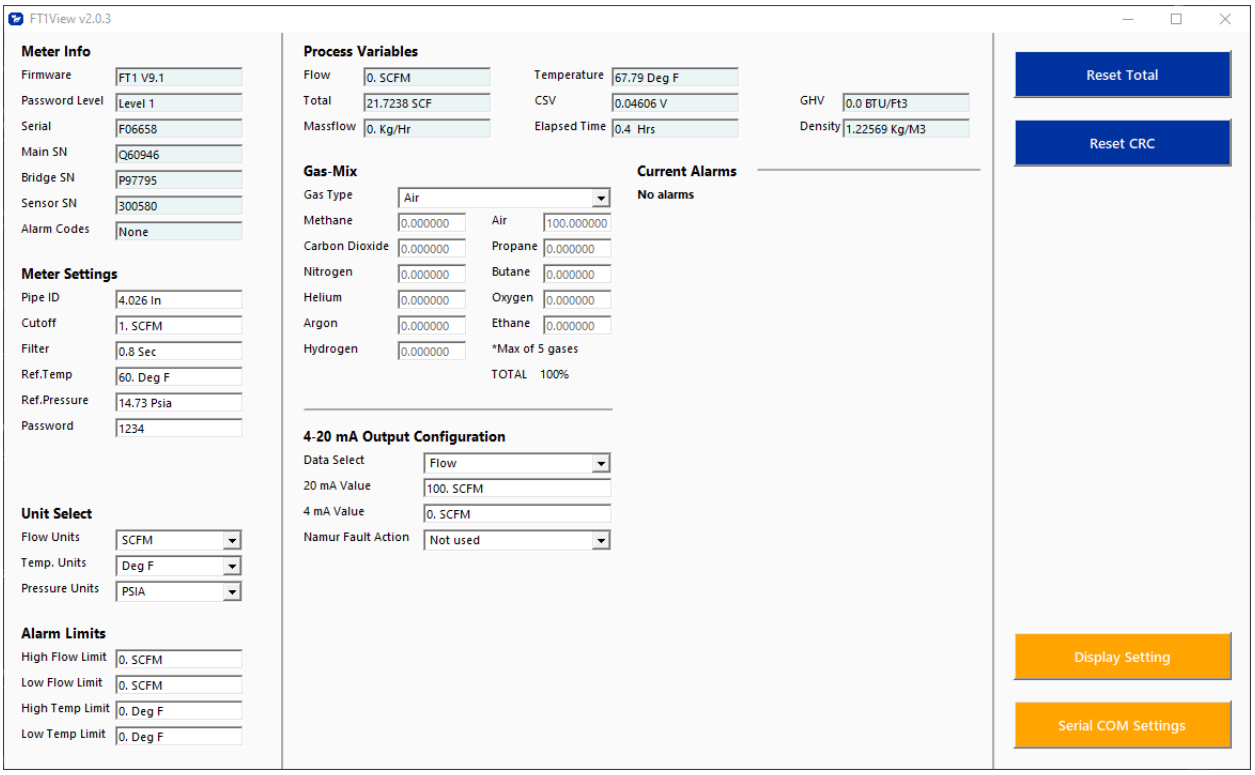
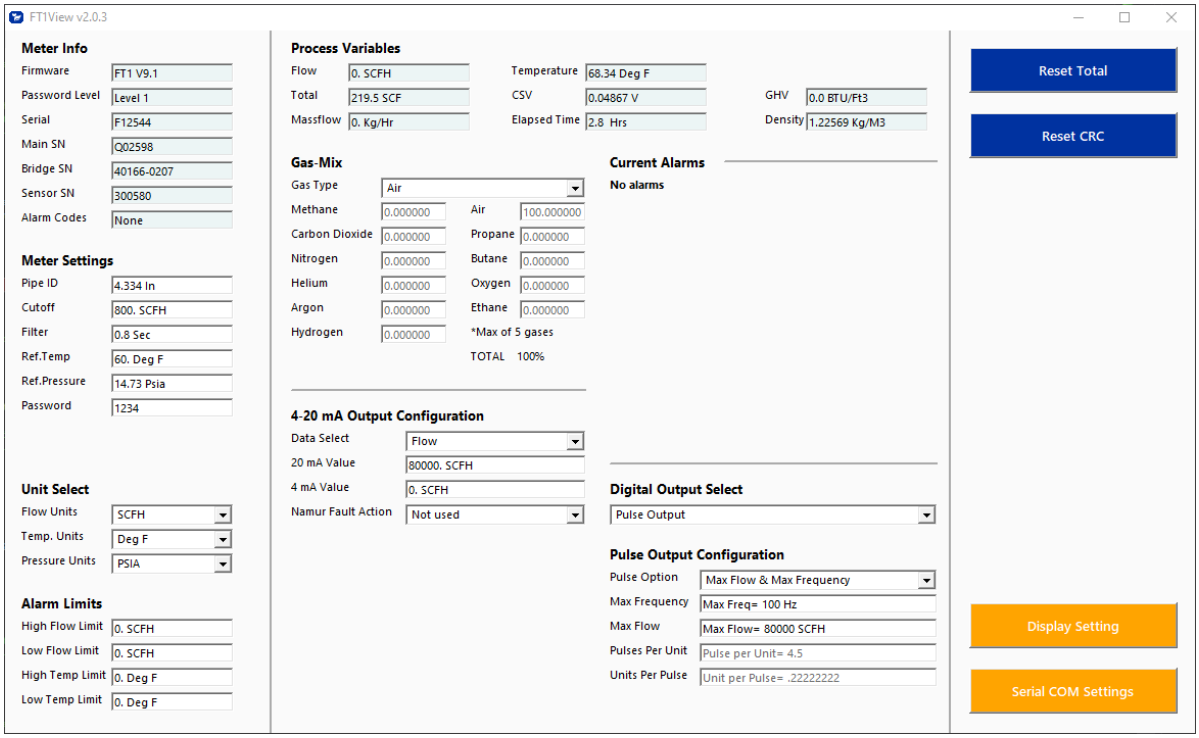


Fig. 4.8: Level 1 Configuration Screen - Pulse Output Option



Meter Info

Firmware: FT1 meter firmware revision level.
Password level: FT1 View Password level entered.
Serial Numbers: Serial numbers of the meter, the main board, bridge and sensor (factory set).
Alarm Codes: Displays the alarm codes as described in the meter manual. These codes are written out in the Current Alarms menu.

Meter Settings

Pipe Inner Diameter (ID): The pipe inner diameter can be entered in either inches or millimeters, depending on whether the flow or mass measurement units selected are metric or US standard. Once entered, the program will automatically recalculate the pipe cross-sectional area for the velocity/flow calculations. A precise ID is required to ensure accurate flow measurement.

Cut-off: A gas flow rate at (or below) the cut-off setting will cause the meter to read zero. Default cut-off is set to 1% of maximum flow value.

Filter: Changing this value will increase or decrease the damping of the flow rate reading. Increase the setting to increase damping. The default setting is 0.8 seconds.

Ref. Temp: Reference Temperature - Reference temperature and pressure are the standard (or normal) temperature and pressure (STP) for which the flow rate is calculated. This is set in the factory according to the customer's original AppID data.

Ref. Pressure: Reference Pressure - Reference temperature and pressure are the standard (or normal) temperature and pressure (STP) for which the flow rate is calculated. This is set in the factory according to the customer's original AppID data.
Password: The Level 1 password can be changed to a new value (number or letter characters up to 4 digits).
K-factor: Enter a percent value [-200 to 200] to scale the flow output. Final Flow = Flow + (Flow * K Factor/100)

NOTE! K-factor settings are only available with Level 2 Password

Unit Select
The "Unit Select" section is used to change the desired units of the flow rate, temperature and reference pressure parameters.

Alarm Limits
Users can set both high/low alarms for both flow and temperature. When a limit is reached, an alarm message is displayed. In addition, if the meter's digital output is activated, breaching the alarm limit automatically activates a discrete output to control an external buzzer, light or some other way to alert the operator.

Process Variables
Flow: Current flow rate in selected units
Total: Cumulative mass or volume flow in selected units
Massflow: Current mass flow rate
Temperature: Gas temperature (Fahrenheit or Celsius)
CSV: Current sense voltage of sensor measurement circuit
Elapsed Time: Time since the Totalizer was reset
GHV: Gross Heating Value of measured gas
Density: Density of measured gas

Gas-Mix
This Gas-SelectX® menu allows the user to choose from a list of gases. More information on Gas-SelectX® can be found on p. 21.

4-20mA Output Configuration
The FT1 has one analog 4-20mA output that is configurable for either flow or temperature. Though the FT1 will be scaled for the specific application coming from the factory, FT1 View™ allows the operator to easily re-scale the 4-20mA output as needed.

Digital Output Select
This selection configures the FT1 digital output for either pulses (counts) or as an alarm discrete output.

If the pulse (counts) output is selected, it can be programmed in three different ways using the pull-down menu "Pulse Output Configuration".

- Maximum flow and maximum frequency
- Pulses per Unit
- Units per Pulse

NOTE! This is only available on a meter configured for Pulse Output. If RS485 option has been ordered, the Pulse option is not available.

Reset Total Button
The Reset Total button will clear the total and elapsed time.

Reset CRC Button
CRC (Cyclical Redundancy Check) is a value that verifies that all critical values in the meter's database are good. This check is performed once every minute. The Reset CRC button clears and generates a new value.

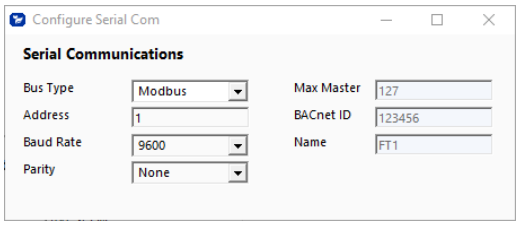
Display Setting
The information displayed on the front panel of the FT1 can be configured by clicking on the "Display Setting" button in the lower right portion of the Configuration Screen in Fig, 4.7 or 4.8. The four drop-down boxes can be used to select the data to present on Screen 1 and Screen 2 of the flow meter display. By selecting "Alternate", the screen automatically switches between the data screens.

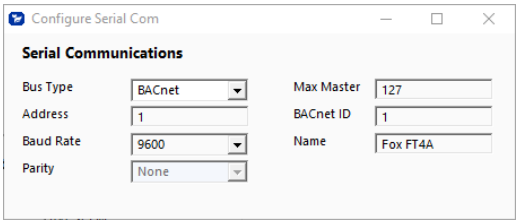
Serial COM Settings

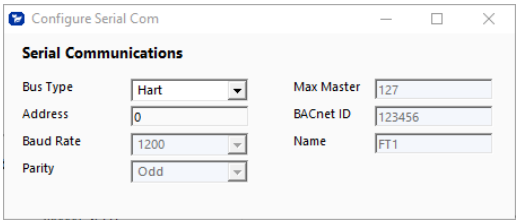
The serial communication settings can be accessed by clicking on the "Serial COM Settings" button in the lower right portion of the configuration screen in Fig. 4.7.

If the FT1 has a serial communication option, this function can be used to set the serial communication parameters.

Fig. 4.9: Select Serial Communication Window







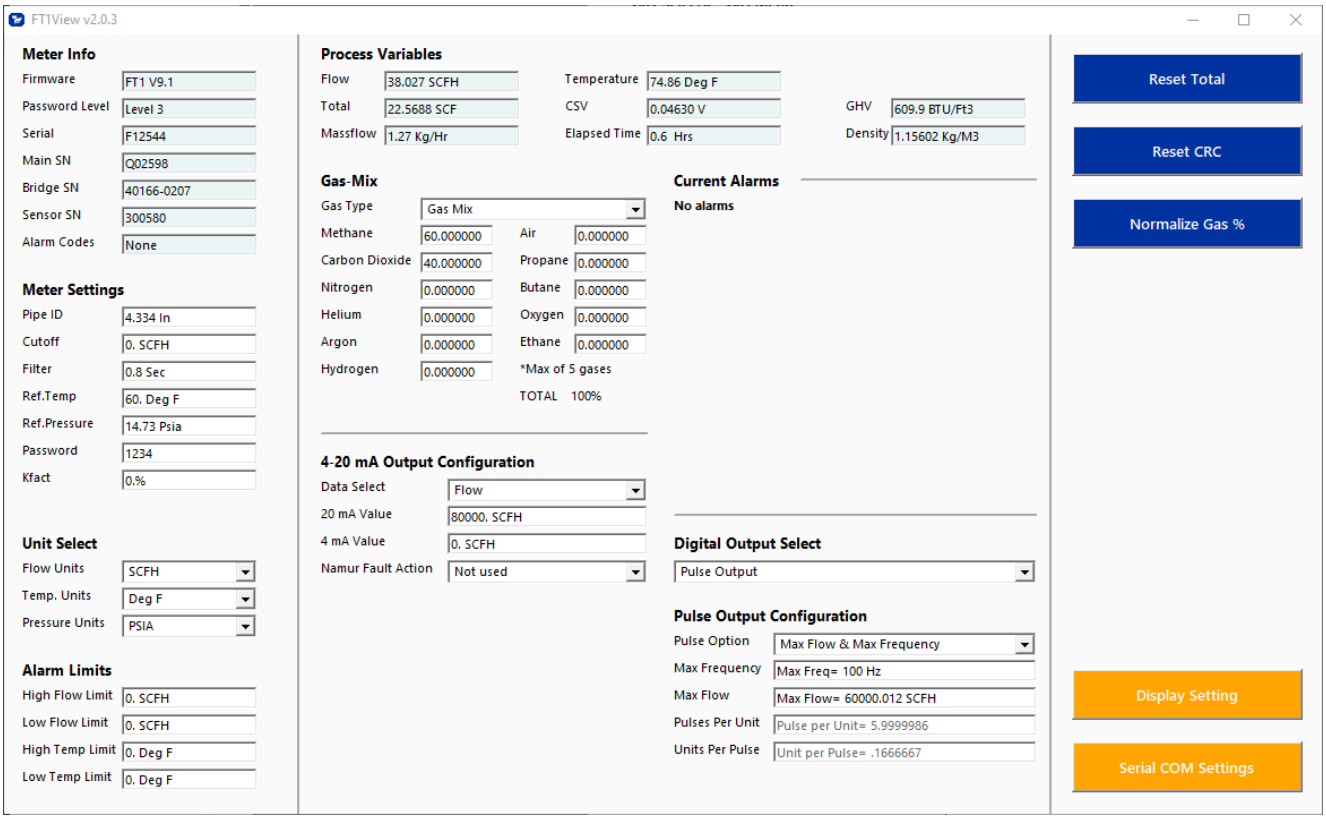
NOTE! This is only available on a meter ordered with the RS485 Modbus RTU, BACnet MS/TP, or HART options. If the Pulse Output option has been ordered, the RS485 Modbus RTU or BACnet MS/TP options are not available. The HART option is only available if the Pulse Output option is ordered.

Gas-Mix: The Gas-SelectX® Gas Menu

Each FT1 flow meter is set to the customer's configuration at the factory. To change the gas or gas mix in the FT1, choose from the following list of gases under "Gas-SelectX":

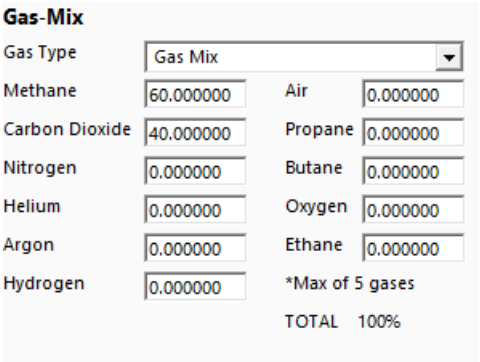
- Air
- Argon
- Butane
- Carbon Dioxide
- Ethane
- Methane
- Natural Gas
- Nitrogen
- Oxygen
- Helium
- Hydrogen
- Propane
- Custom 5-Gas Mix (Any pure gas from list above, excludes Natural Gas)

Fig. 4.10: Gas-SelectX® Menu



NOTE! A list of pure and mixed gases available on the FT1 flow meter are kept on the Fox website at www.foxthermal.com.

Fig. 4.11: Setting the Gas-SelectX® Custom Gas Mixture



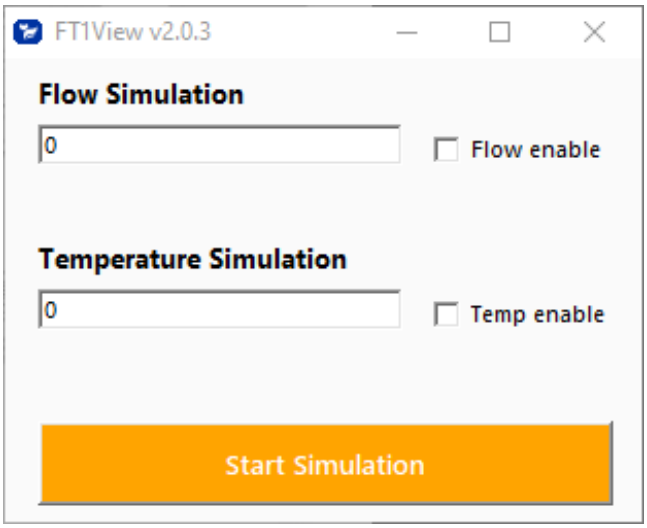
When the "Gas Mix" option is chosen, a series of additional gas concentration fields will become editable. These fields are labeled "Methane", "Carbon Dioxide", "Nitrogen", etc. A default amount will appear in each field, but any of up to five (5) of these can be changed to any percentage between 0.000001 and 100. All remaining gases not used in the 5-Gas Mix must be changed to 0. The total for the five (5) gases chosen for the mix must equal 100% or an error will occur.

NOTE! If the total of the five (5) gases is greater or less than 100%, an alarm will show. Adjust the percentages until 100% is achieved.

Normalize Gas Percentage
In the scenario where the desired gas mix does not total to an even 100%, use the "Normalize Gas %" button to scale the gas mix proportionally so that the total results in 100%.

Simulation Mode
To enter simulation mode, click on the button marked "Simulation" in the Main screen and a password will be requested. Enter the password and then the Simulation screen will be shown.

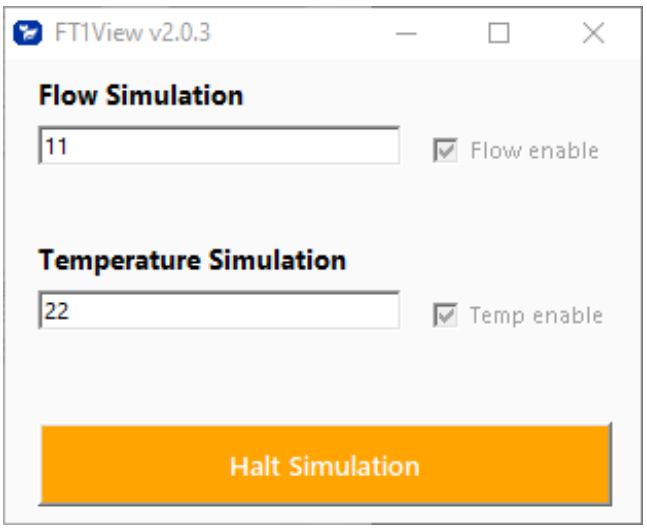
Fig. 4.12: Simulation Mode Window



The simulation mode simulates flow rate and temperature. Click on the required data and enter a value. Simulation mode allows users to verify the operation of the analog output, digital outputs and totalizer at simulated flow rates and temperature.

CAUTION! FT1 outputs (4-20mA, pulse and alarm) - when in simulation mode - may affect the user's system. The user should ensure that this simulation state of operation cannot cause a hazardous or destructive event.

Fig. 4.13: Simulation Running

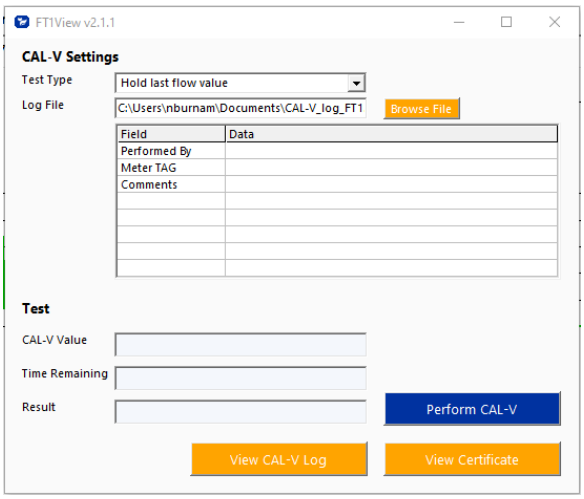


In Simulation mode, all FT1 outputs and the Totalizer respond as if in normal measurement mode. Click "Halt Simulation" to end.

CAL-V™

CAL-V™ is performed to verify the proper operation of the FT1 flow meter. From the Main screen, click on the "CAL-V" button to access the CAL-V™ Menu Window.

Fig. 4.14: CAL-V™ Menu Window



On the CAL-V™ Menu Window, there are fields to enter information about the person performing the test, meter tag information, and any other important information may be entered into the comments area. Below that are blank fields that accept any text input - all of these fields will show up on the final certificate.

A drop-down menu allows the user to choose between these two options:

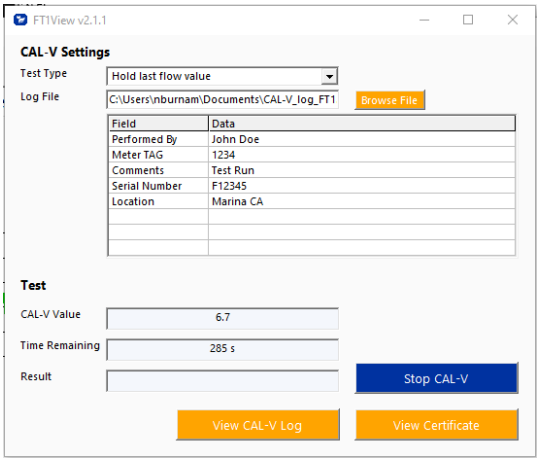
- Flow goes to Zero during CAL-V™
- Flow holds the last value during CAL-V™

Please note that the test will take about five minutes. If the "go to zero" option is chosen, the flow measurement will stop and go to zero for this period. If the "hold value" option has been chosen, the totalizer will continue to increment..

The user can specify a folder name and location to store the test results.

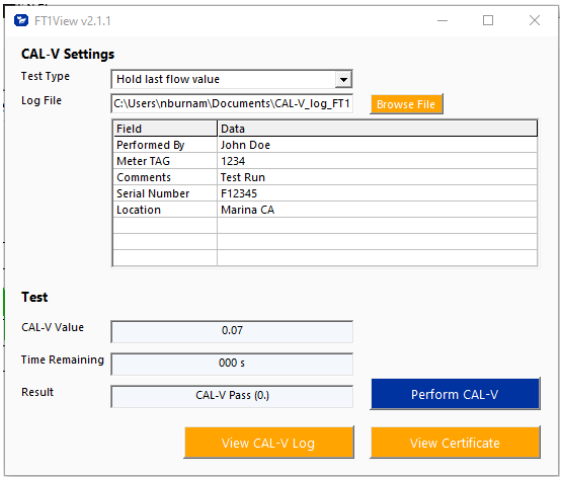
When ready to start, click the "Perform CAL-V" button.

Fig. 4.15: Running a CAL-V™ Test



A Pass/Fail message for the CAL-V™ test will be displayed at the test conclusion.

Fig. 4.16: CAL-V™ Results Window



CAL-V™ Certificate

A CAL-V™ Certificate can be created by pressing the "View Certificate" button. CAL-V™ test data is logged to a file. When a CAL-V™ certificate is requested, the FT1 View™ software will search the log file for the meter serial number and create the certificate from the last test performed.

Fig. 4.17: CAL-V™ Certificate

FOX THERMAL

399 Reservation Road
Marina, CA 93933 USA
Phone: 831-384-4300
sales@foxthermal.com

FT1 CAL-V™ CERTIFICATE

CALIBRATION VALIDATION

CAL-V™ Performed on:	January 28 2025	3:40:20 PM
Firmware version:	FT4A V9.1	
Fox Meter Serial Number:	F12345	
CAL-V™ Results:	CAL-V PASS	
CAL-V™:	0	
Test Temperature:	75.7 F	
Tag #/Meter Location:	1234	
Test performed by:	John Doe	
Additional Comments:	Test Run	
Serial Number:	F12345	
Location:	Marina CA	

CAL-V™ is a calibration routine that validates the flow meter's calibration accuracy by testing the following:
* Repeatability of sensor
* Repeatability of sensor electronics
* Confirms Calibration Algorithms

At the conclusion of the test, the meter will display a pass/fail message and the CAL-V™ data.
A "pass" result confirms the meter is measuring accurately.
CAL-V™ limits: ± 0 - 0.8 Pass, ± 0.8-1.0 Warning, > ± 1.0 Fail

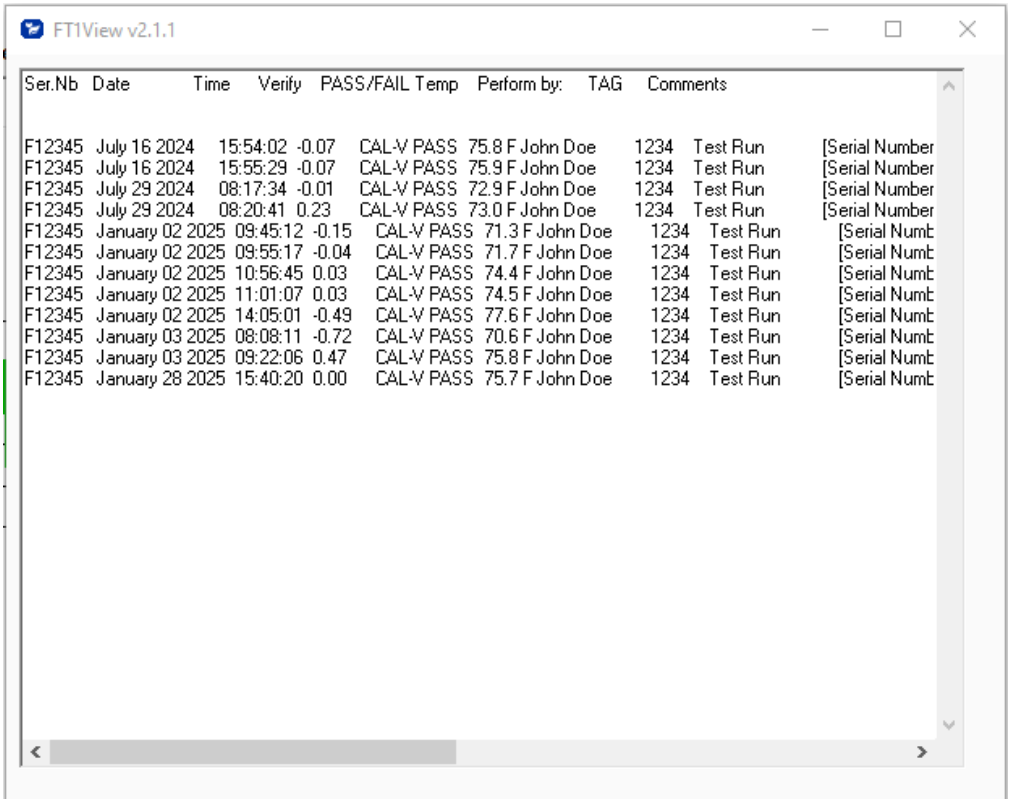
Configuration:

Pipe Diameter:	29.25 In	**Gas Select:**	Single Gas
Customer STP:	60.0 Deg F & 14.73 Psia		Methane 100%
4-20 mA Range:	0 - 11400 SCFM		
Zero Flow Cutoff:	0 SCFM		
Previous CAL-V Value:	0.00		
Previous CAL-V Result:	Pass		
Previous CAL-V Date:	1/3/25 9:27:1		
Gross Heating Value[BTU/FT3]:	1015		
Density[Kg/M3]:	0.6801		

CAL-V™ Log

The "View CAL-V Log" button allows the operator to view a log of previous CAL-V™ tests that have been performed on the meter.

Fig. 4.18: CAL-V™ Log



Glossary of Terms and Definitions

COM	Communication
CSV	Current Sense Voltage
DMM	Digital Multimeter
ID	Inner Diameter
mA	Milliamps
PC	Personal Computer
RTD	Resistance Temperature Detector
STP	Standard Temperature and Pressure

Index

Wiring

Troubleshooting Tips

Definition of Terms

NOTE! is used for Notes and Information

WARNING! is used to indicate a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION! is used to indicate a hazardous situation which, if not avoided, could result in minor or moderate injury.

FOX® THERMAL

SALES@FOXTHERMAL.COM

Address
399 Reservation Road
Marina, CA 93933 USA

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