SOFTWARE

FT4A VIEW™

Free PC-Based Software Tool

for the FT4A Thermal Gas Mass Flow Meter

Software Instruction Manual

Document #107559
Rev D

FOX® THERMAL

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Disclaimer

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:

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Fox Thermal FT4A Manuals:
- **Model FT4A Instruction Manual**

All Fox Thermal Manuals and software available in English only.

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Introduction
Thank you for purchasing the Model FT4A Thermal Gas Mass Flow meter from Fox Thermal. The Model FT4A 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 FT4A View™ software allows users to easily display data and configure the FT4A to their specific application parameters. It also allows users to collect flow/temperature data and export to an Excel® file. Users can access the Gas-SelectX® menu and the CAL-V™ calibration validation diagnostic test.

The Model FT4A is available with two different communication options: RS485 Modbus or HART. The FT4A View™ Software has been developed to react intuitively to the type of FT4A meter with which it is interfacing.

This Manual contains the installation and operation instructions for the FT4A View™ Software.

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

Prepare the Flow Meter for Connecting to a PC

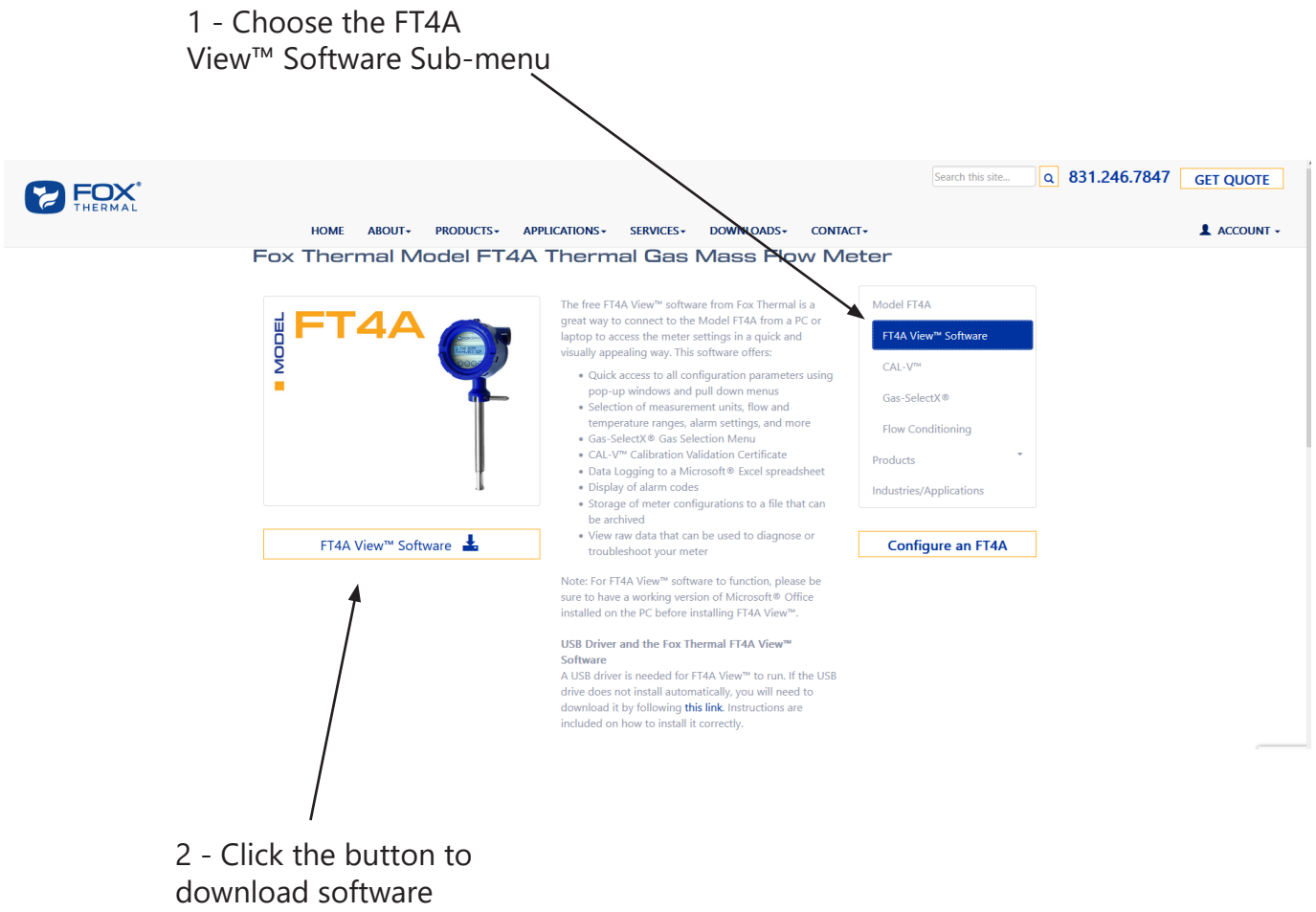
Open the enclosure by unscrewing the enclosure cap. Connect the FT4A to a PC with a USB (Type-A to Mini-B cable). If the PC is connected to the internet and running Windows®, the PC will try to automatically load the VCP driver. If the driver does not load automatically, download the VCP driver at: www.ftdichip.com/Drivers/VCP.htm

Download the FT4A View™ Software from Fox Website

The latest version of the FT4A View™ software is available for download at www.foxthermal.com/products/FT4A.php#FT4Aview

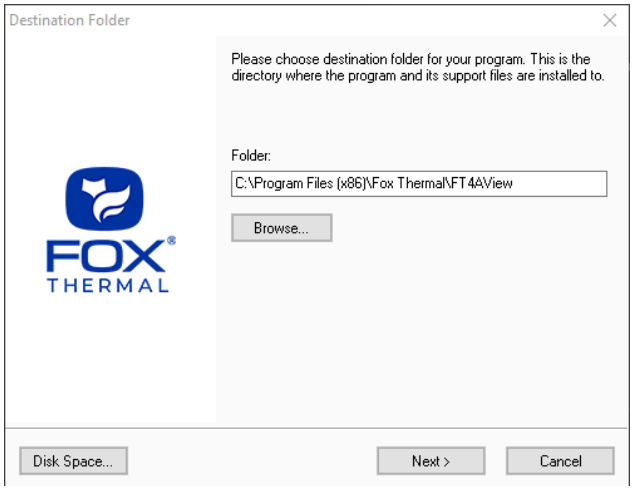
The location of the FT4A View Software download link on the FT4A product webpage is shown below.

Fig. 2.1: Online Download Location for FT4A View™ Software

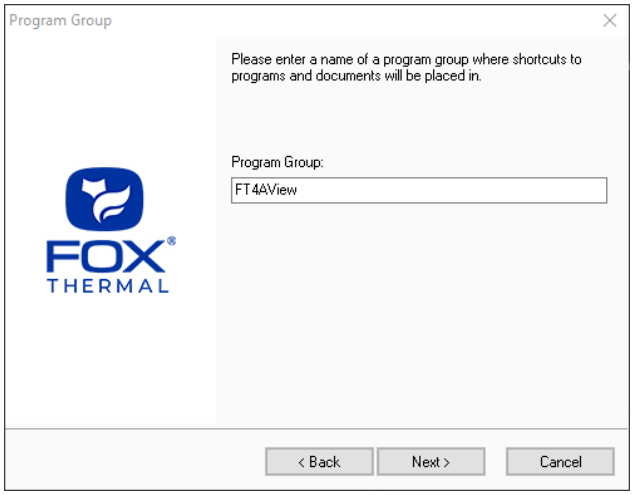


Install the FT4A View™ Software on a PC

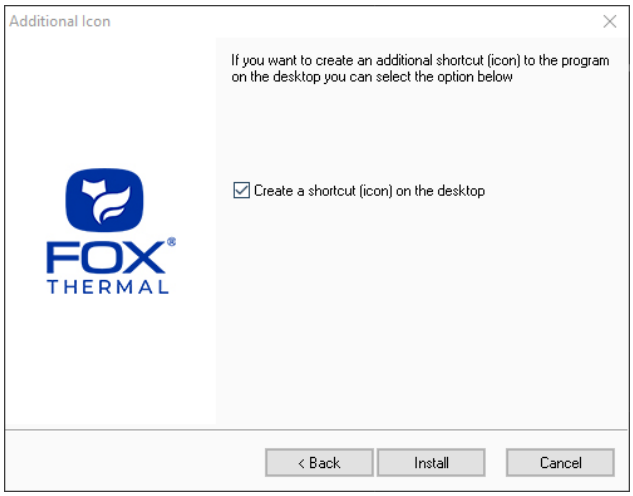
To install the FT4A View™ program, run the downloaded "ft4a-view-setup.exe" file. After clicking "Next" the screen will show:



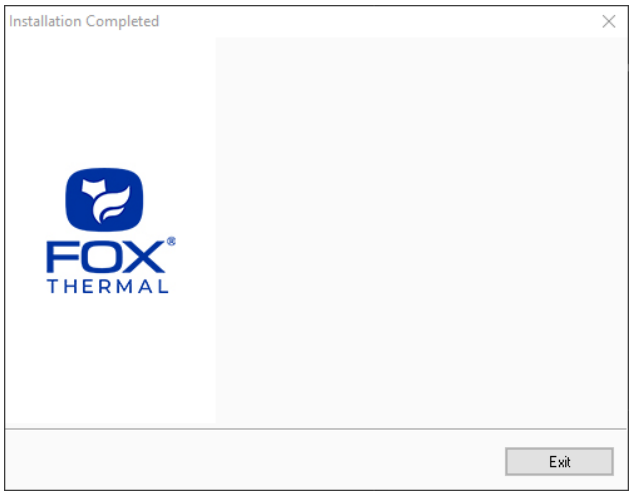
Select the folder in which you wish to install FT4A View™, then click "Next".



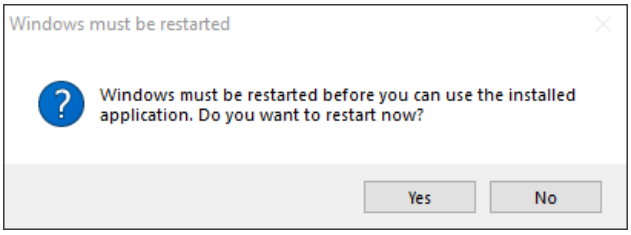
Please enter a name for the Program Group or use the default FT4AView name and click "Next".



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.



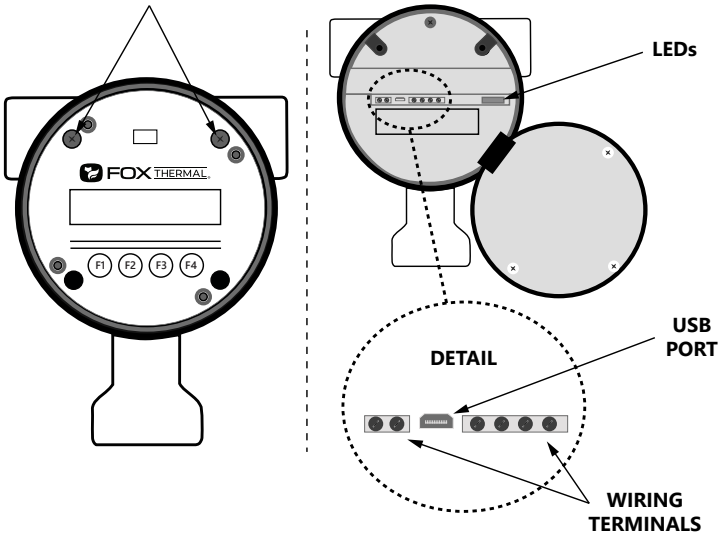
When the program is done installing, click "Exit".



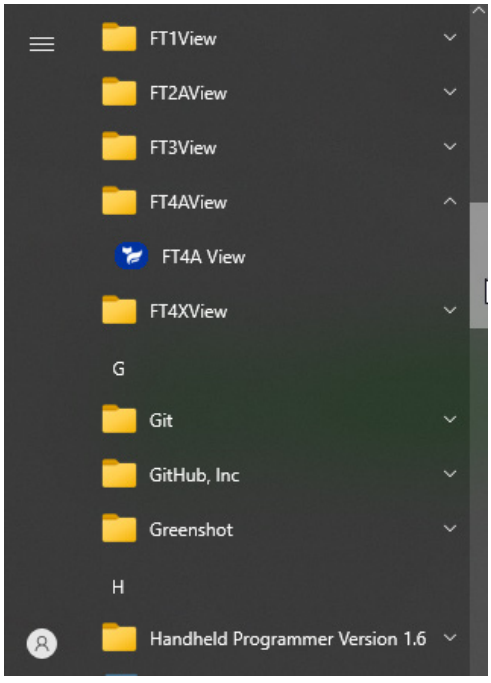
To complete the installation process, close all applications, and restart your computer. The FT4A View™ Software will be ready to use after the computer has rebooted.

Power on the Meter
Refer to the FT4A Instruction Manual for Power input wiring instructions. The FT4A must be powered on to communicate with the FT4A View™ software tool.

Connect the FT4A to a PC or Laptop via USB
Be sure to have your FT4A flow meter connected by USB to a PC or laptop that has FT4A 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 FT4A View™ Software
After re-boot and connecting to a PC via USB, startup the FT4A View™ software accessible in the Windows "Start" button or search bar.



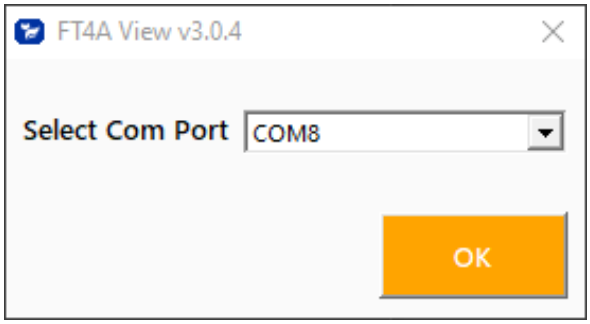
COM Port Assignment
Upon opening FT4A View™ for the first time, Windows® will assign a "virtual COM port". The COM port number that has been assigned will appear automatically in the drop down box.

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 FT4A View™ by using the drop down menu and press **OK**.

NOTE! The FT4A Meter must be plugged into the computer in order for the system to register it.

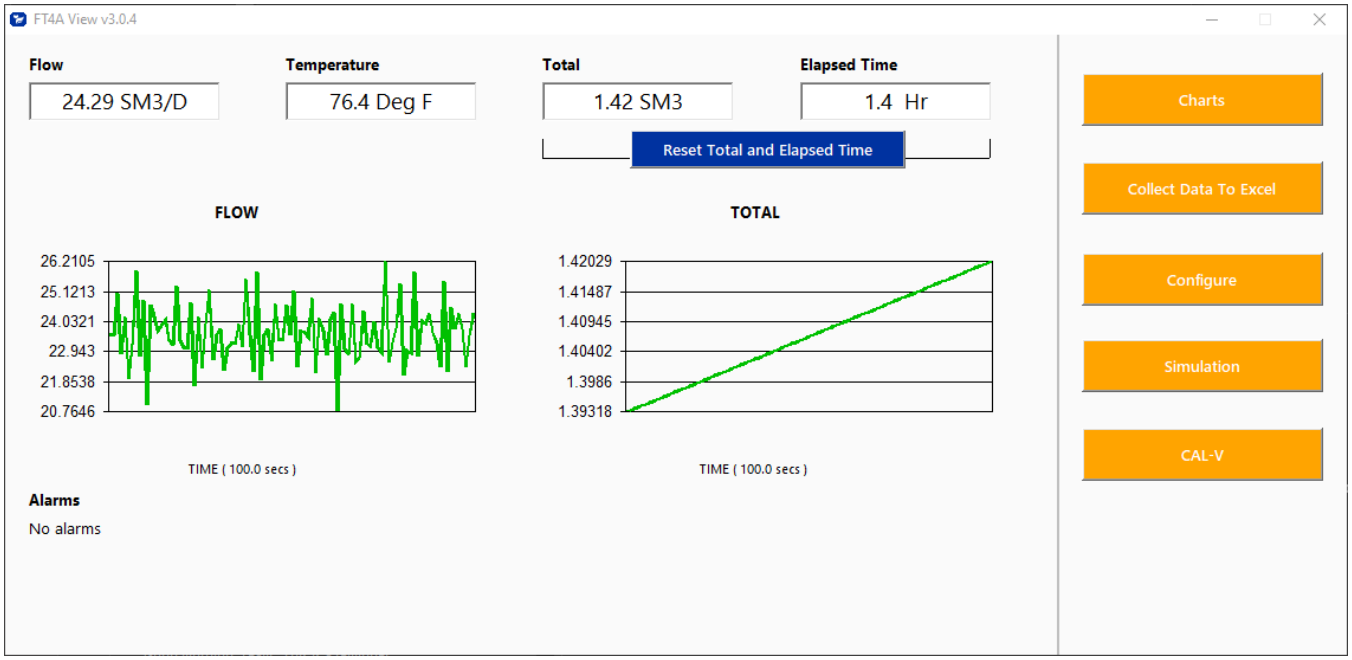
Fig. 3.1: COM Port Selection Window



Main Screen

The image below depicts the main screen that appears upon entering FT4A View™.

Fig. 4.1: FT4A View™ Main Screen



Flow & Temperature

FT4A 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, SM3/D 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 rescaled from the original default settings. For more information on how to change the charts settings, refer to p. 12.

NOTE! Data on the screen is refreshed at user selected update rate.

Collect Data to Excel® Button

Selecting the Collect Data to Excel button allows all selected data to be assembled into 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 allows the operator to set the application parameters. This can be done using the FT4A View™ software or manually using the instrument's display. For more information on configuring application parameters, refer to "Configure" on 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/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. 23.

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

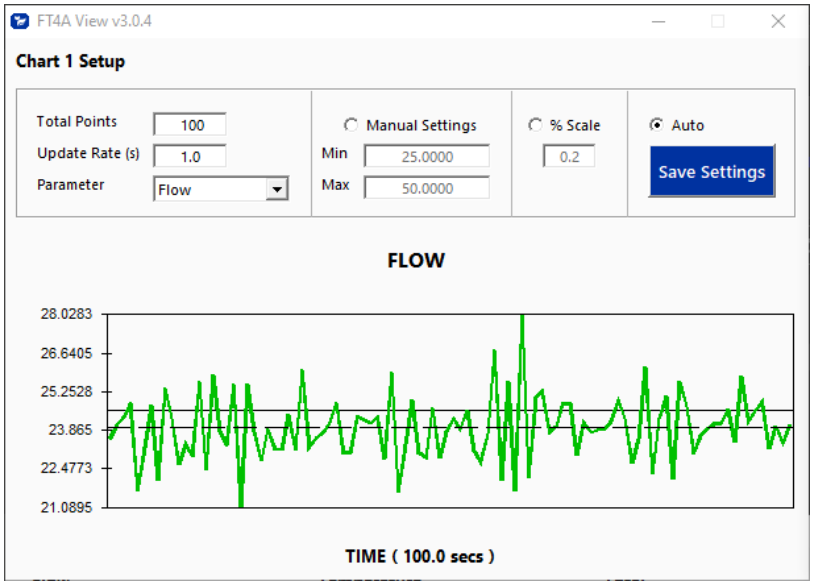
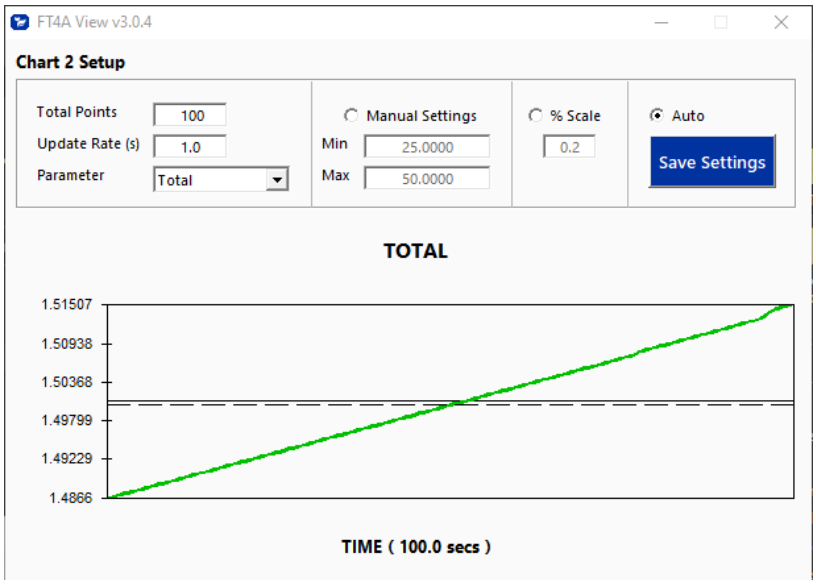


Fig. 4.3: Chart Settings Window - Chart 2



Each chart can be selected for flow, temperature or total and scaled in one of three ways: inputting min/max values manually, a plus/minus percent scale, or real-time automatic scaling.

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.

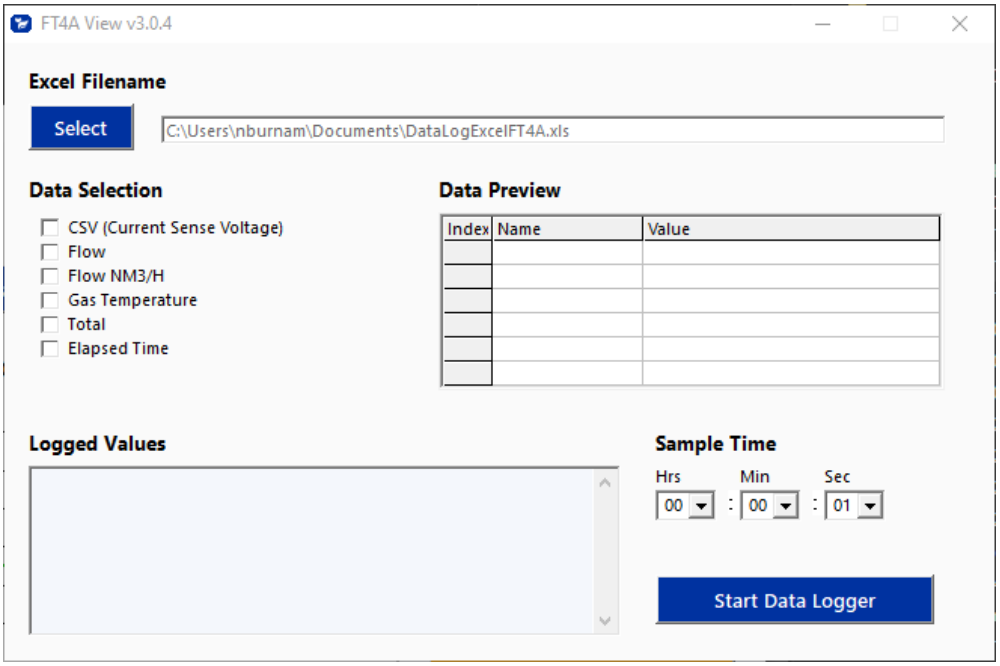
Automatic Chart Setting
Automatic mode lets the program adjust the scaling on a real-time basis based on the entire range of values.

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

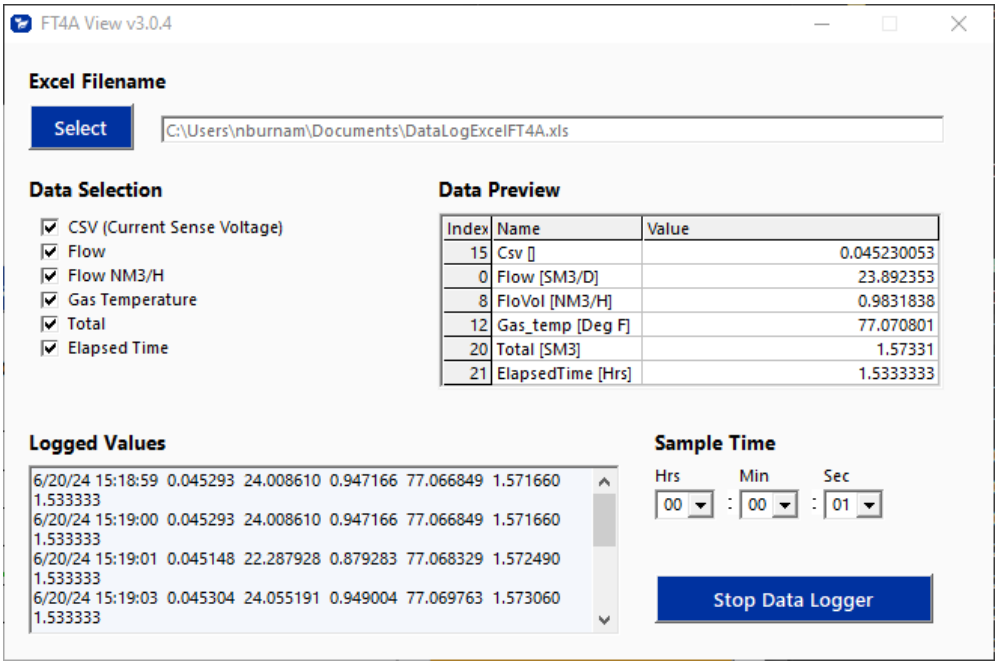
The Data Collection screen can be accessed from the main screen. Clicking the "Collect Data to Excel" function will prompt the user for a password. Enter a Level I (1234) or Level II (9111) password and the Data Collection window will appear.

Fig. 4.4: Data Collection Window - Logging Turned Off



Select the sample time from the drop menu, and then select the required data from the Data Selection list. Press the "Select" button to create a name for the Excel file and then press the "Start Data Logger" button.

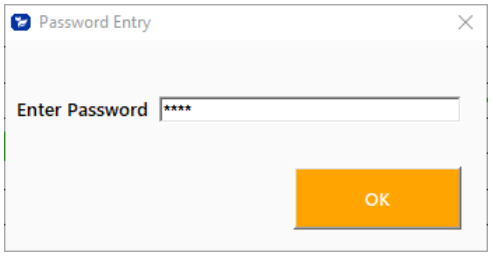
Fig. 4.5: Data Collection Window - Logging Turned On



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 menu, click on the "Configure" button and enter the requested password for either Level I (1234) or Level II (9111) access.

Fig. 4.6: Password Window



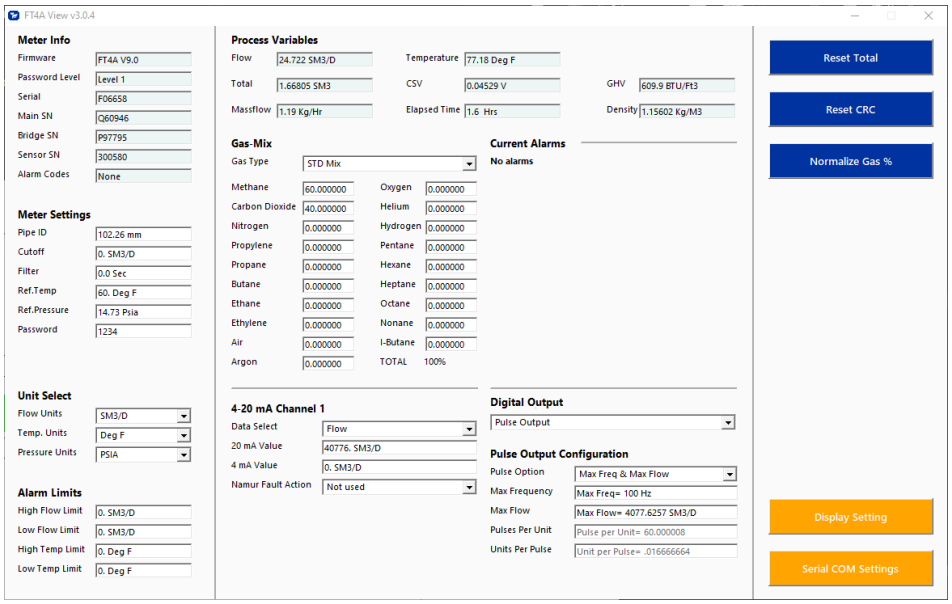
NOTE! Most users will only need access to the Level I screen to do basic setting of units, alarms and output scaling.

The FT4A 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 I Configuration Screen - RS485 Option

Meter Info
- **Firmware:** FT4A meter firmware revision level.
- **Password level:** FT4A 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.

Fig. 4.8: Level I Configuration Screen - Pulse Option



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.
- **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 user defined 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.

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: Mass flow of gas in Kg/Hr
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

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 CRC value.

Gas-SelectX®
This menu allows the user to select a gas or gas mix from a list of gases. When entering the FT4A gas menu the user will have three choices:

1. Pure Gas Menu (PUR) - a list of pure gases
2. Gas Mix (MIX) - any combination of the gases in the Gas Mix menu (total must equal 100%)
3. Oil & Gas Mix (O&G Mix) Menu - any combination of the gases in the Oil & Gas menu (total must equal 100%)

NOTE! A list of pure and mixed gases available on the FT4A flow meter are kept on the Fox website at www.foxthermal.com.

NOTE! Gases are in mole percentages.

Fig. 4.9: Gas-SelectX Menu in Configuration Screen

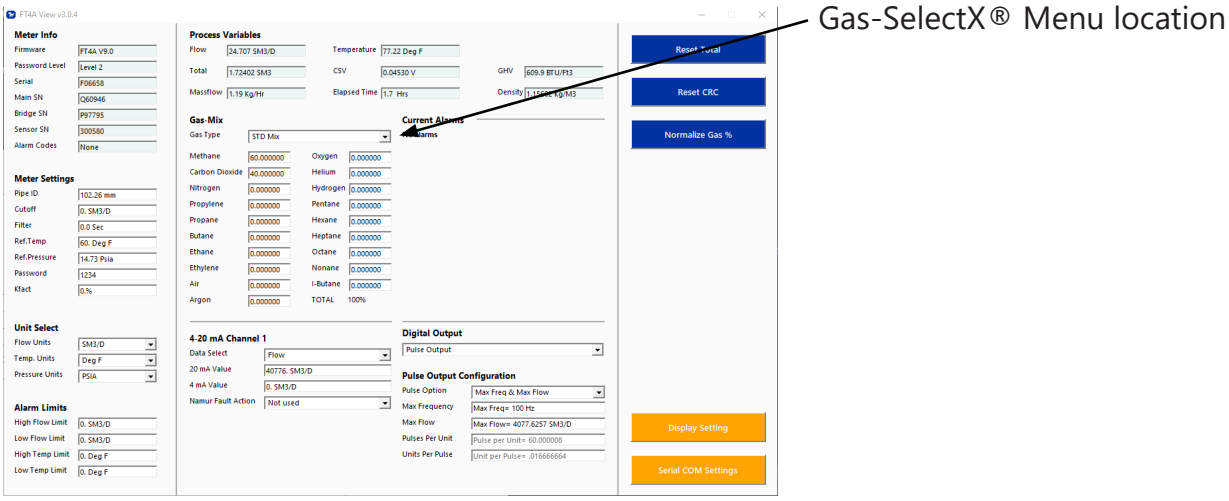
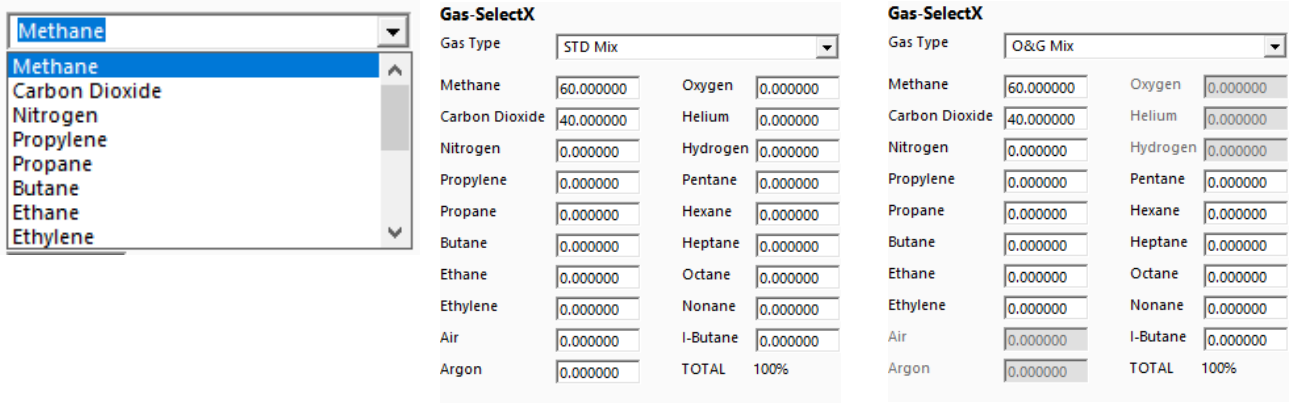


Fig. 4.10: Setting the Gas-SelectX Gas or Gas Mix



In the first example, Methane has been chosen from the list of gas options. The last two options are "STD Mix" and "O&G Mix". When the "STD Mix" or "O&G Mix" options are chosen, a series of additional gas concentration fields will appear. Each field is labeled according to the gases available in that menu. A default amount will appear in each field, but these can be changed to any percentage between 0.000000 and 100.000000. All remaining gases **not** used in the Gas Mix must be changed to 0.000000. The total for the gases chosen for the mix must equal 100.000000%.

NOTE! If the total of the three gases is greater or less than 100.000000%, an alarm will show. Adjust the percentages until 100.000000% 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%.

4-20mA Output: Channel 1

The FT4A has one analog 4 to 20 mA output that is configurable for either flow or temperature. Though the FT4A will be scaled for the specific application coming from the factory, FT4A View™ allows the operator to easily re-scale the 4-20mA output as needed.

Digital Output Select

This menu allows the user to choose between dedicating the Output to Pulse, Alarms, or None.

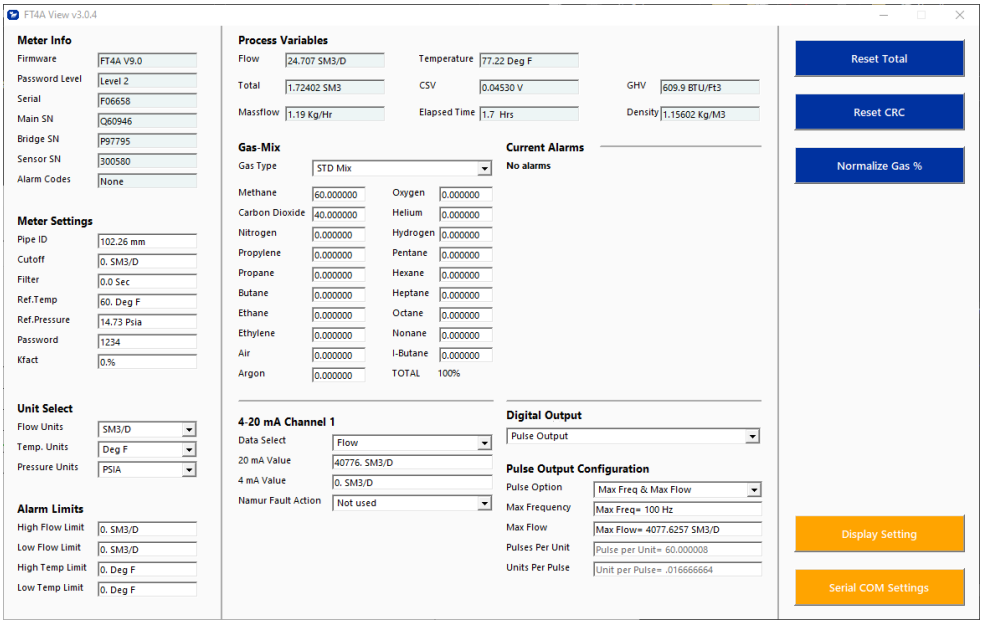
Pulse Output Configuration

This selection configures the FT4A digital output for either pulses (counts) or as an alarm discrete output.

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

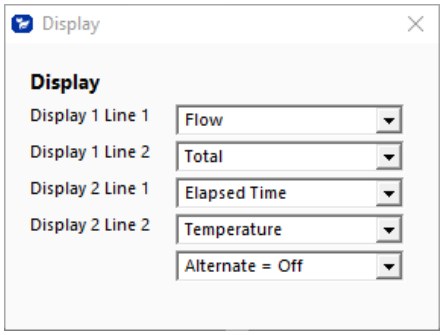
- Maximum flow and maximum frequency
- Pulses per Unit
- Units per Pulse

Fig. 4.11: Level 2 Configuration Screen



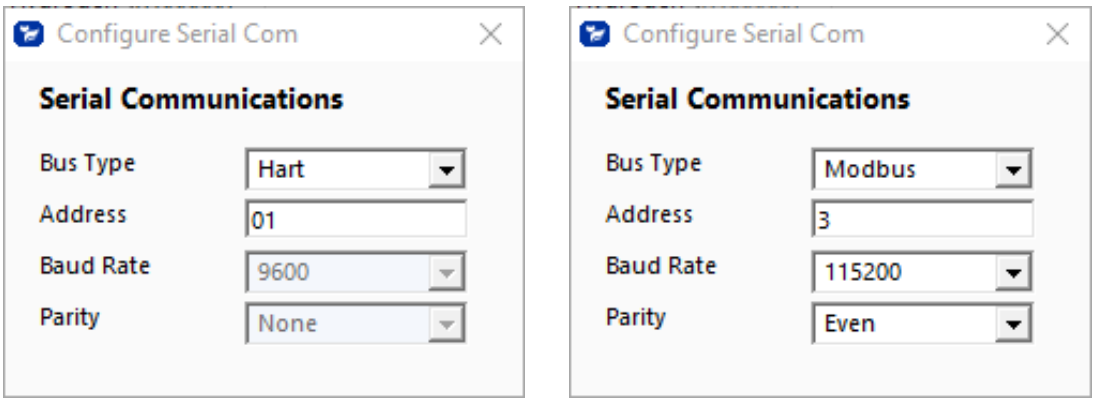
Display Setting
The information displayed on the front panel of the FT4A can be configured by clicking on the "Display Setting" button in the lower right portion of the Configuration Screen in Fig. 4.11. With the top four drop-down boxes, the user can choose the data to display on the meter's LCD display screen. By selecting "Alternate = On", the screen automatically switches between the data screens.

Fig. 4.12: Display Setting



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. Use this function to adjust the settings of the FT4A serial communication options.

Fig. 4.13: Select Serial Communication Window

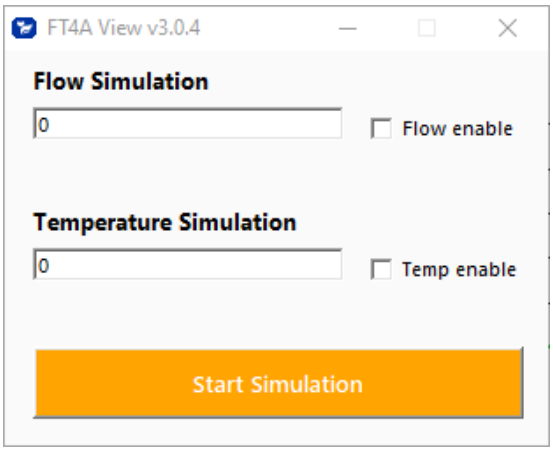


NOTE! This is only available on a meter configured for RS485 Modbus RTU or HART.

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.

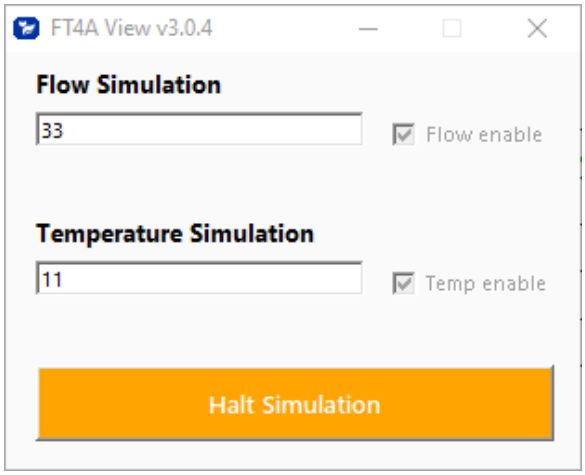
Fig. 4.14: Simulation Mode Window



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

Enter the value, click **OK**, select the corresponding checkbox, and press "Start Simulation".

Fig. 4.15: Simulation Running

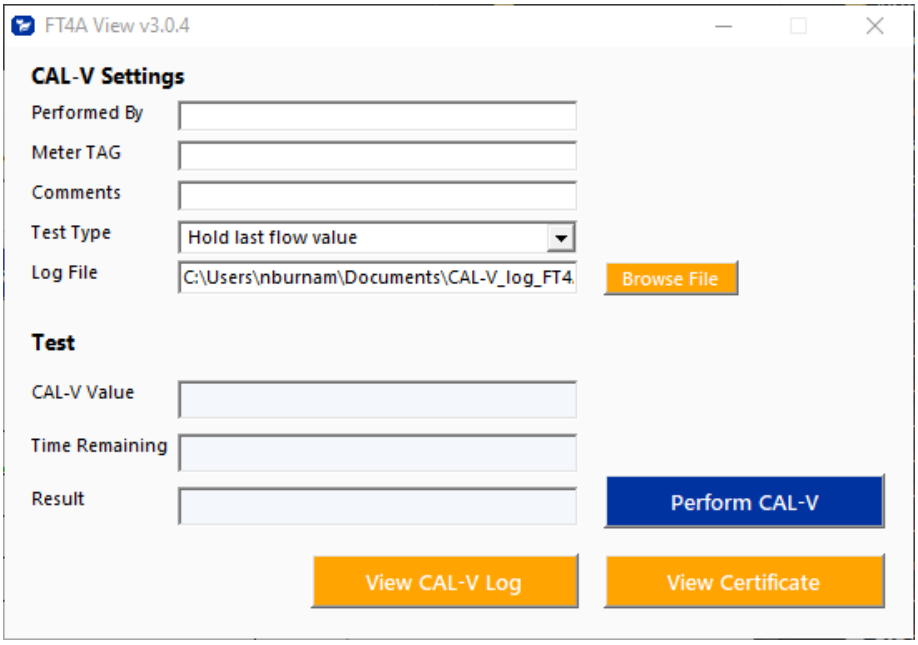


In Simulation mode, all FT4A outputs and the Totalizer respond as if in normal measurement mode. Click "Halt Simulation" to end.

CAL-V™

CAL-V™ is performed to verify the proper operation of the FT4A flow meter. From the Main screen, click on the "CAL-V" button to access the CAL-V™ Test Menu Window.

Fig. 4.16: CAL-V™ Test Menu Window



On the CAL-V™ Test 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.

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™

The user can also specify a particular folder name and location for the data to be stored in a log to access test results at later times.

Please note that the test will take about five minutes. The flow measurement will stop and go to zero for this period unless the "hold last value" option has been chosen.

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

Fig. 4.17: Running a CAL-V™ Test

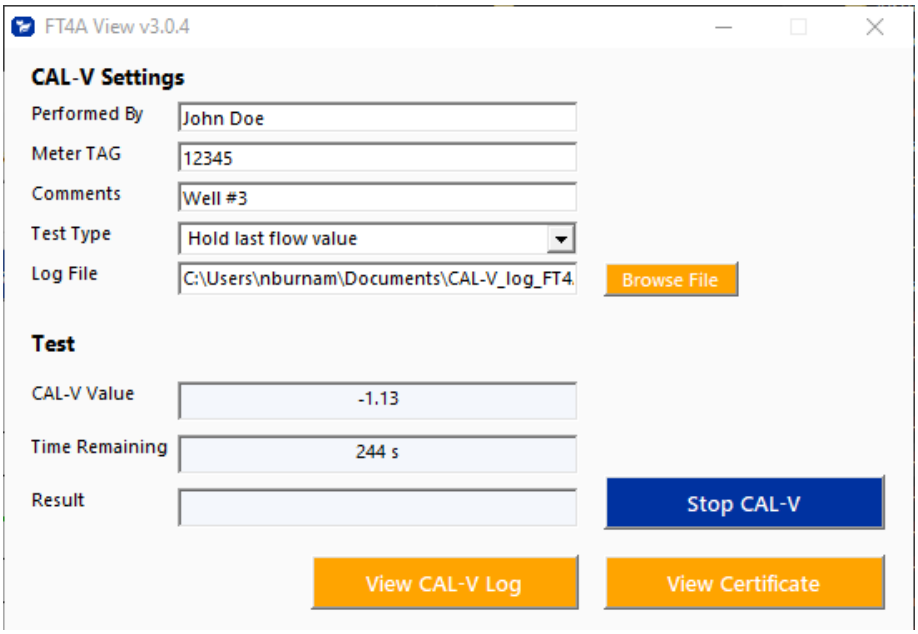
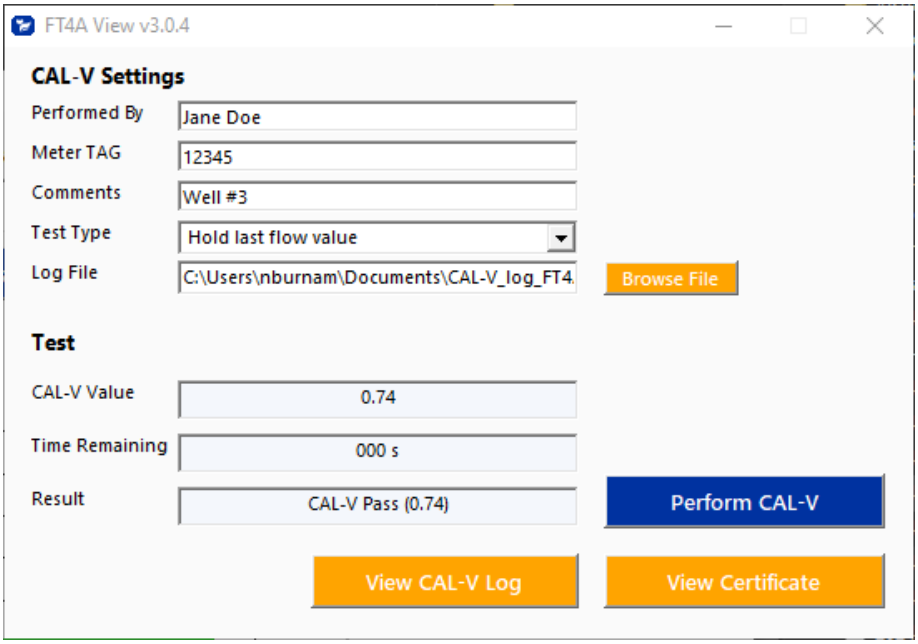


Fig. 4.18: CAL-V™ Results Window



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

CAL-V™ Certificate

The "View Certificate" button will display the latest certificate. When performing a CAL-V™ test, all the data is logged into a CAL-V™ log file with all pertinent data, including the serial number. You can choose to create multiple logs by changing the file name and location on the CAL-V™ Test Menu Window. When a CAL-V™ certificate is requested, the program will search the log file for the specific serial number and will display only the last check performed.

Fig. 4.19: CAL-V™ Certificate

FOX THERMAL

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

FT4A CAL-V™ CERTIFICATE
CALIBRATION VALIDATION

CAL-V™ Performed on:	June 20 2024 15:40:43
Firmware version:	FT4A V9.0
Fox Meter Serial Number:	F06658
CAL-V™ Results:	Pass
CAL-V™:	0.72
Test Temperature	72.5 F
Tag #/Meter Location:	12345
Test performed by:	Jane Doe
Additional Comments:	Well #3

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:

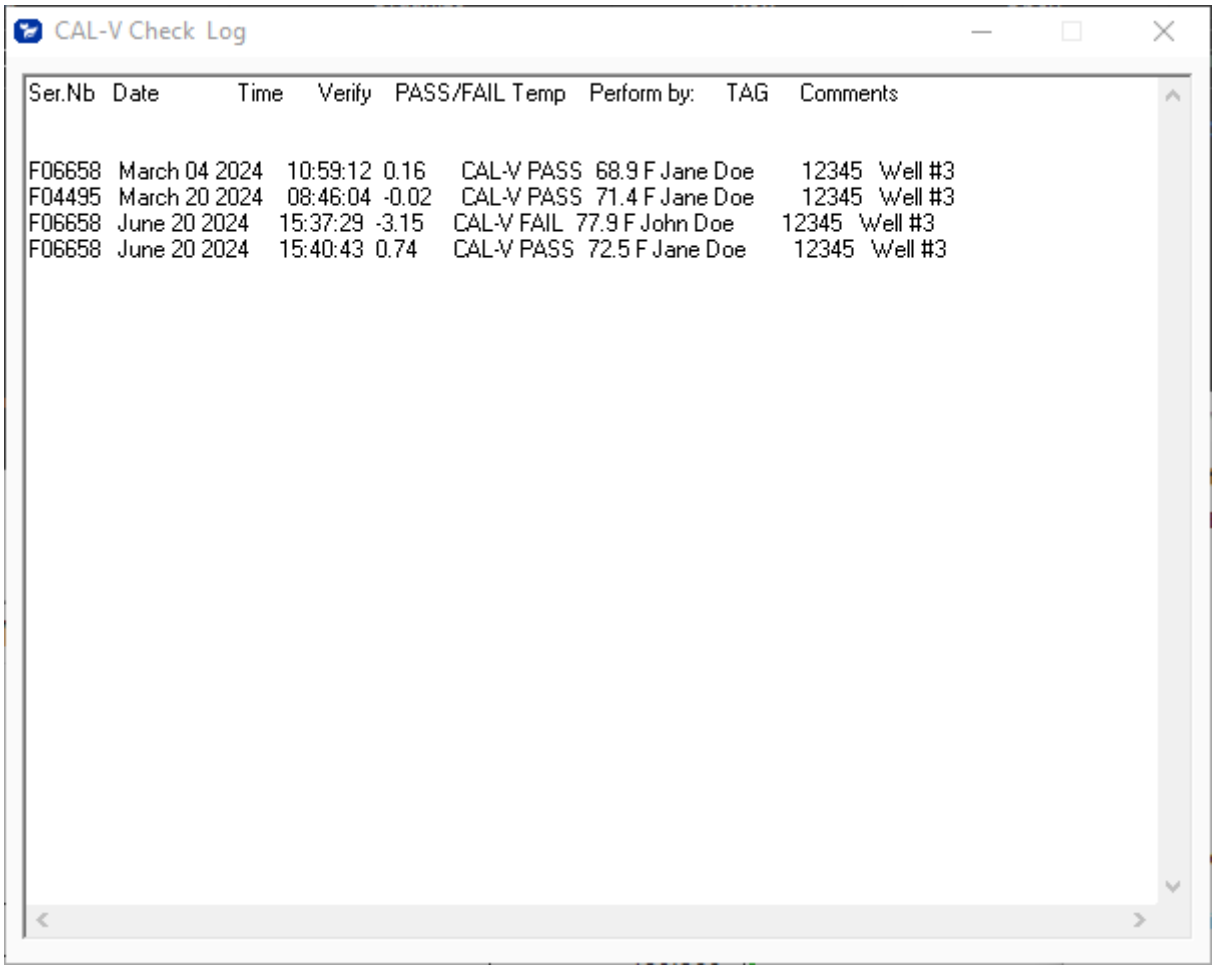
Pipe Diameter:	5.026 In
Customer STP:	60.0 Deg F & 14.73 Psia
4-20 mA Range:	0 - 1000 SCFM
Zero Flow Cutoff:	0.016666664 SCFM
Previous CAL-V Value:	0.00
Previous CAL-V Result:	Pass
Previous CAL-V Date:	00/00/00 00:00:00
Gross Heating Value[BTU/FT3]:	1015.5
Density[Kg/M3]:	0.7151

Gas Select: Natural Gas(Mix)
Methane 94.900002%
Ethane 2.500000%
Propane 0.300000%
CO2 0.700000%
Nitrogen 1.600000%

CAL-V™ Log

The "View CAL-V Log" button allows the operator to view a log of previous CAL-V™ checks that have been run on the meter. Be sure to access the correct log by choosing the correct file name in the CAL-V™ Log Filename box.

Fig. 4.20: CAL-V™ Log



Glossary of Terms and Definitions

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

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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.

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