
Fox Thermal Instruments, Inc.

THERMAL MASS FLOW METER & TEMPERATURE TRANSMITTER



Notice

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

FAX: 831-337-5787

EMAIL: SERVICE@FOXTHERMALINSTRUMENTS.COM

Download Technical Data Sheets from our website:

www.foxthermalinstruments.com

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Fox FT4X Manuals:

- Model FT4X Instruction Manual
- FT4X Data Logger Manual

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Introduction

Introduction

Introduction

Thank you for purchasing the Model FT4X Thermal Gas Mass Flow meter from Fox Thermal Instruments. The Model FT4X 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 new FT4X View™ software allows users to easily display data and configure the FT4X to their specific application parameters. Collect flow/temperature data and export to an Excel file. The software can access the new Gas-SelectX® gas menu and the Calibration Validation diagnostic function using the CAL-V® test. Unique to the FT4X is the addition of 3 Logs: 24-Hour Log, Configuration Log, and the Event Log. These logs provide useful information about the daily totals by Contract Time, meter Configuration, and event/alarm records.

The Model FT4X is available with two different communication options: the RS485 Modbus or HART. The FT4X View Software has been developed to react intuitively to the type of FT4X meter with which it is interfacing.

This Manual contains the installation and operation instructions for the FT4X View™ Software.

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

Installation

Pairing

Prepare the Flow Meter for Connecting to a PC

Open the enclosure by unscrewing the back enclosure cap. Connect the FT4X to a PC with a USB (type A, micro) 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

Download the FT4X View Software from Fox Website

The latest version of the FT4X View™ software is available for download at www.foxthermalinstruments.com/products/FT4X.php#FT4Xview

The location of the FT4X View Software download link on the FT4X product webpage is shown below.

Fig. 2.1: Online Download Location for FT4X View™ Software

1 - Choose the FT4X View Software Sub-menu

2 - Links to download software

Fox Model FT4X Thermal Gas Mass Flow Meter

The free FT4X View™ software from Fox is a great way to connect to the Model FT4X from a PC or laptop to access the meter settings in a quick and visually appealing way. This software offers:

- Quick access to all configuration parameters using pop-up windows and pull-down menus
- Selection of measurement units, flow and temperature ranges, alarm settings, and more
- Gas-SelectX® Gas Selection Menu
- CAL-V™ Calibration Validation Certificate
- View Logs for 40 24-hour daily signals and events/alarms
- Data collection to a Microsoft® Excel spreadsheet
- Display of alarm codes
- Storage of meter configurations to a file that can be archived
- View raw data that can be used to diagnose or troubleshoot your meter

Note: For FT4X View™ software to function, please be sure to have a working version of Microsoft® Office installed on the PC before installing FT4X View™.

USB Driver and the Fox FT4X View™ Software
A USB driver is needed for FT4X View™ to run. If the USB drive does not install automatically, you will need to download it by following [this link](#). Instructions are included on how to install it correctly.

Model FT4X

- FT4X View™ Software
- CAL-V™
- Gas-SelectX®
- Data Logger
- FC10 Flow Conditioners
- Products
- Industries/Applications

Help Me Choose A Meter

Configure an FT4X

FT4X Downloads

More Info

Features/Benefits | Specs | Approvals | Options | **Downloads** | Dimensions

FT4X Downloads

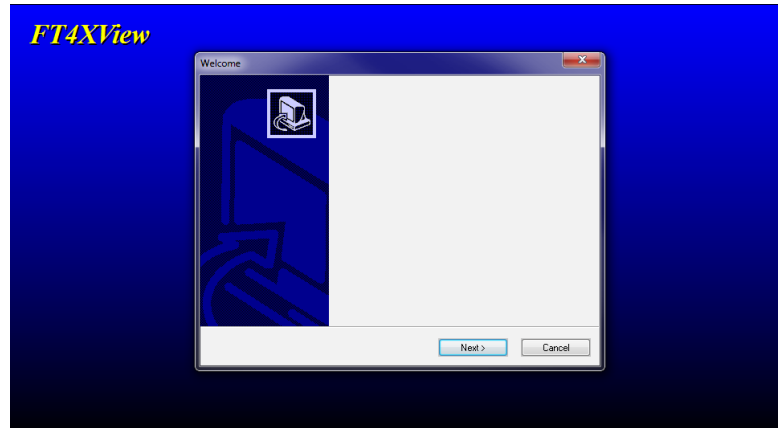
| Model FT4X Information to View and/or Download | Model FT4X View™ Information to View and/or Download |
|--|--|
| Model FT4X Datasheet ↓ | FT4X View™ Software v. 1.1.98 ↓ |
| FT4X Model Codes ↓ | FT4X View™ Datasheet ↓ |

Installation

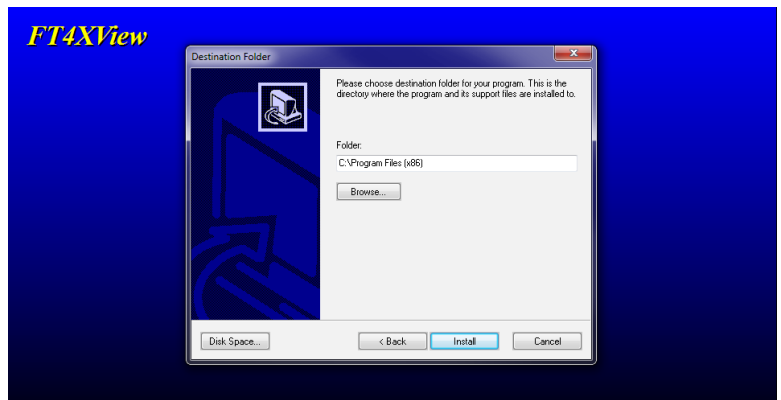
Installation

To install the FT4X View™ program on your PC or laptop, run the "FT4XView_V#.##-setup.exe" file that is located in the downloaded file.

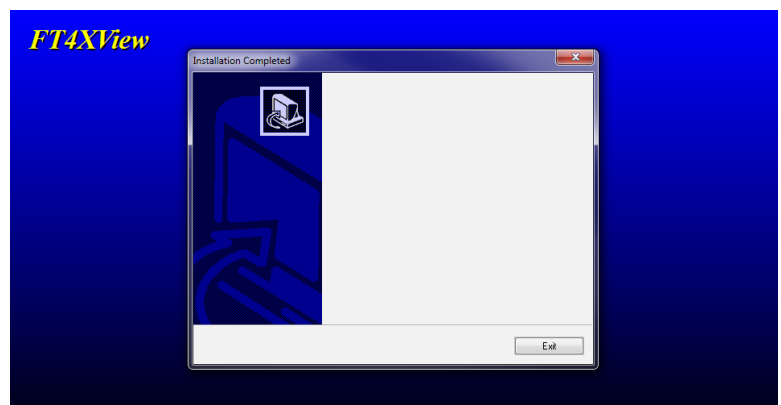
Click "Next" to begin installation.



Select the folder in which you wish to install FT4X View™, then click "Install".



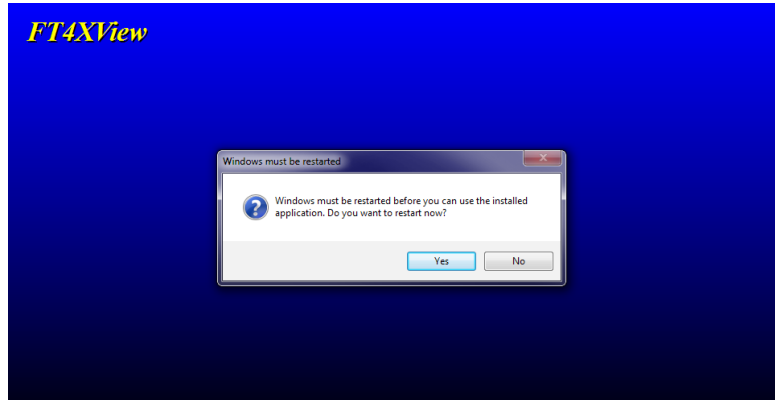
When the program is done installing, you may exit.



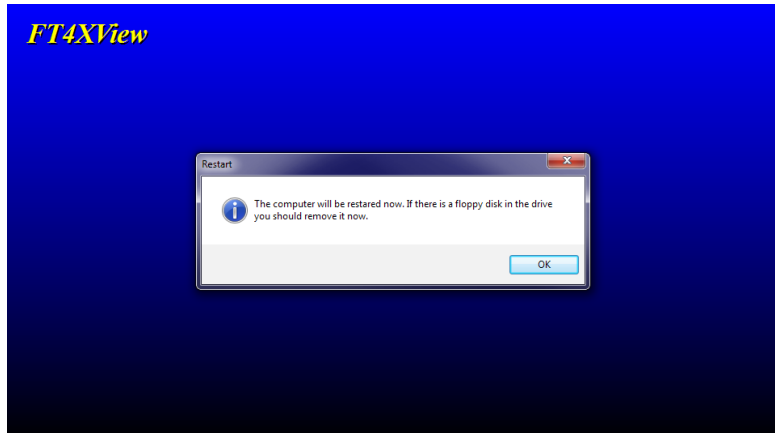
Installation

Installation

It is recommended to restart the computer before accessing the software. Click "Yes".



Before restarting, be sure to empty any disks from your PC drives, then click "OK".



INSTALLATION

Startup

Power On

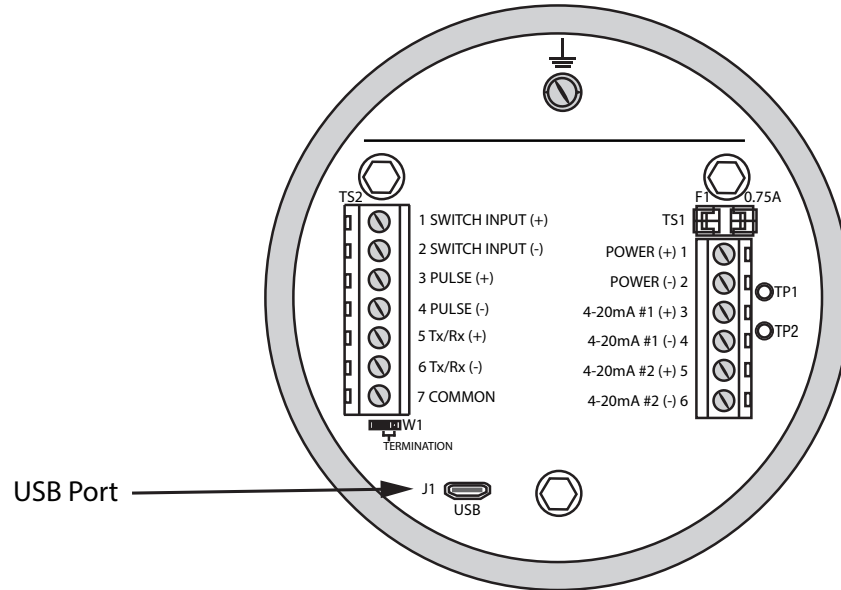
Power On The Meter

Refer to the FT4X Instruction Manual for Power input wiring instructions. The FT4X must be powered on to communicate with the FT4X View Software tool.

Connect USB

Connect the FT4X to a PC or Laptop via USB

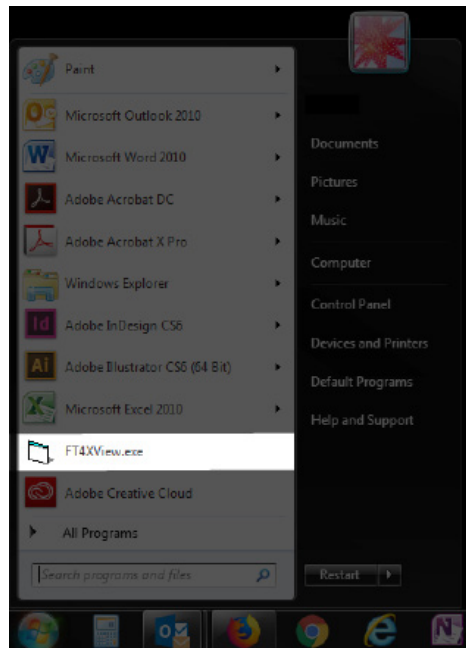
Be sure to have the FT4X connected by USB to a PC or laptop with the FT4X View software installed before opening FT4X View. The USB port can be found by removing the rear enclosure cap.



Startup

Startup the Software

After re-boot and connecting to a PC via USB, startup the FT4X View software accessible in the Windows "Start" button or search bar.



Startup

COM Port Assignment

COM Port Assignment

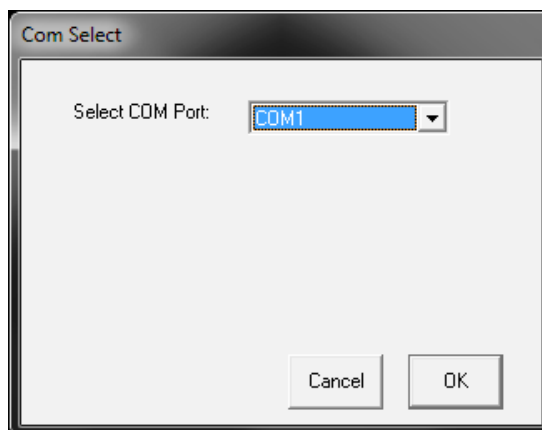
Upon opening FT4X View™ for the first time, Windows will assign a "virtual COM port". The COM port number that has been assigned will appear automatically in the drop down box.

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 FT4X View by using the drop down menu and press **OK**.



NOTE: The FT4X Meter must be plugged into the computer in order for the system to register it.

Fig. 2.2: COM Port Selection Window



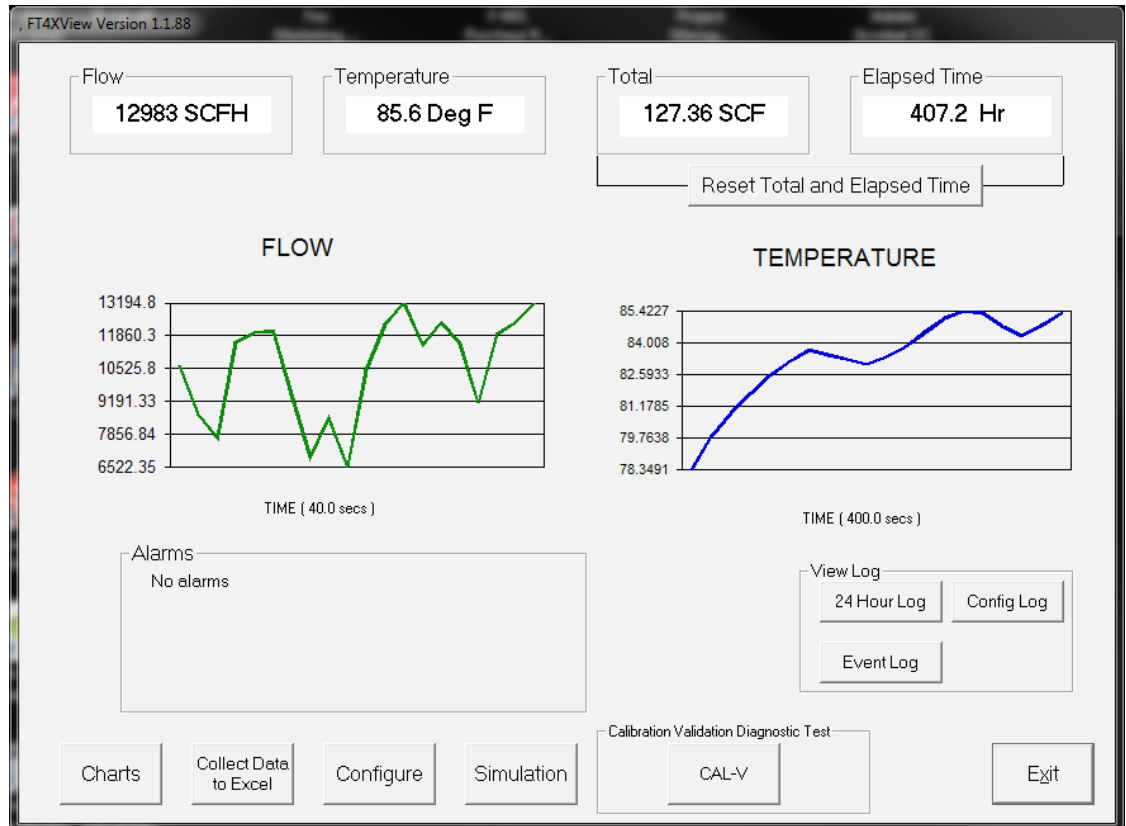
Operation: Main Screen

Main Screen

Main Screen

The image below depicts the main screen that appears upon entering FT4X View™.

Fig. 3.1: FT4X View™ Main Screen



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

Flow & Temperature

FT4X 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 °F). These values are in the upper left of the screen. Use "Configure" to change from SCFH and °F to other options. Two graphs also show real time changes in flow and temperature.

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 either temperature or 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 "Operation: Chart Settings" on page 12.

NOTE: It can be set for either automatic or manual scaling.



Operation: Main Screen

Main Screen

Collect Data to Excel Button

This function allows all selected data to be assembled into an Excel file at the specified sample time. All readings are time/date stamped.

Configure Button

This allows the operator to go in and set the application parameters. This can be done either via the FT4X View™ software or manually via the instrument's display. For more information on configuring application parameters, refer to "Operation: Configure" on page 15.

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 watch for the pulse. Refer to Page 25 for more information on how to use the Simulation function.

Calibration Validation Diagnostic Test Section

CAL-V® Button

The CAL-V® calibration validation test can be performed while the unit is still in the pipe (even if a no flow condition cannot be established) or out of the pipe. CAL-V® does the following:

- Validates the zero stability of the meter
- Checks thermal conductivity (heat transfer) repeatability of the sensor

The CAL-V® calibration validation test is explained in greater detail on p. 26.

View Log (Data Logger) Section

Tot24 Log Button

Pressing this button produces a pdf listing of totals: yesterday's total followed by 40 24-hour totals. The start time begins and is reset when the totalizer is reset

Config Log Button

The Configuration Log button produces a pdf listing of the meter's current configuration settings.

Event Log Button

The Event Log button will open a series of windows requesting the number of records to be accessed and which record must start the list. This data will be produced in an excel spreadsheet.

Exit Button

Exit the application.

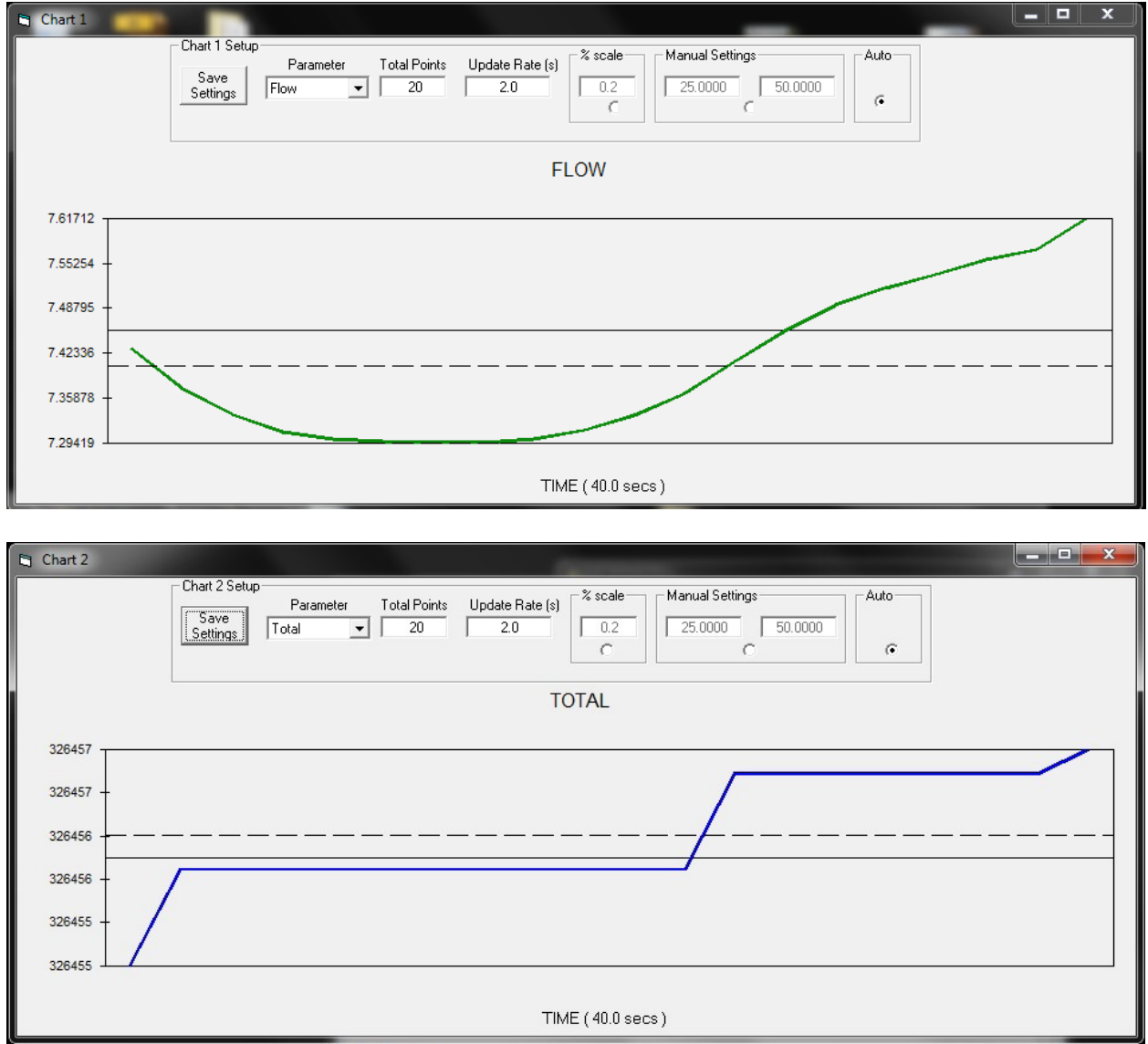
Operation: Chart Settings

Charts Settings

Charts Settings

From the main menu screen, click on the "Charts" button. Two charts, one for flow and the other for temperature, will appear side-by-side.

Fig. 3.2: Chart Settings Window - Charts 1 and 2



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

Operation: Chart Settings

Charts Settings

Save Setting

The user can save any new chart settings on the main page window. These settings can then be closed by clicking on the "X" at the top right corner of the window.

Parameters

All meter operating parameters can easily be selected for charting: flow, temperature or total flow.

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.

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.

Manual Chart Setting

The Manual mode allows a user to input min/max values for chart scaling. When entering new values, press enter for them to take effect.

Automatic Chart Setting

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

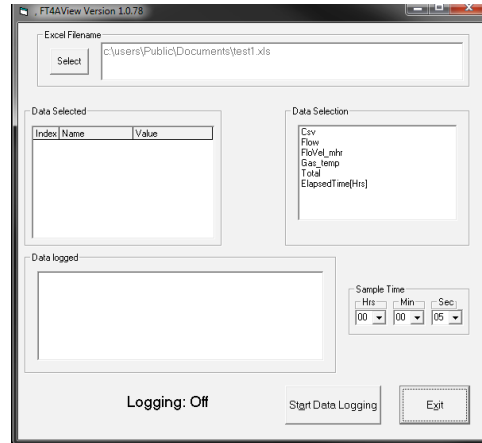
Operation: Collect Data to Excel

Collect Data to Excel

Collect Data to Excel

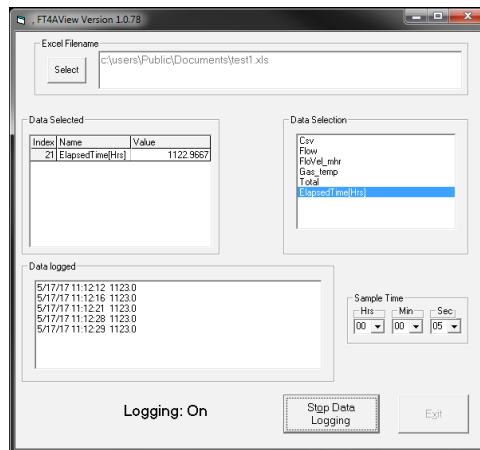
The Collecting Data screen can be accessed from the main screen. Clicking the "Collect Data to Excel" function will prompt the user for a password. Enter a Level I or Level II password and the Collect Data window will appear.

Fig. 3.1: Data Collection Window - Logging Turned Off



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 Logging" button.

Fig. 3.2: Data Collection Window - Logging Turned On



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

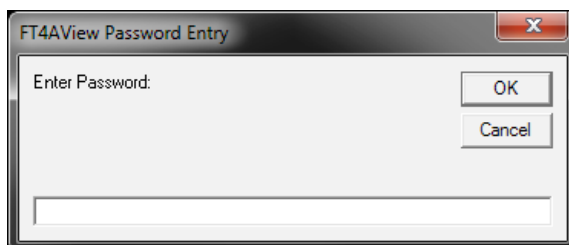
Operation: Configure

Configure

Configure

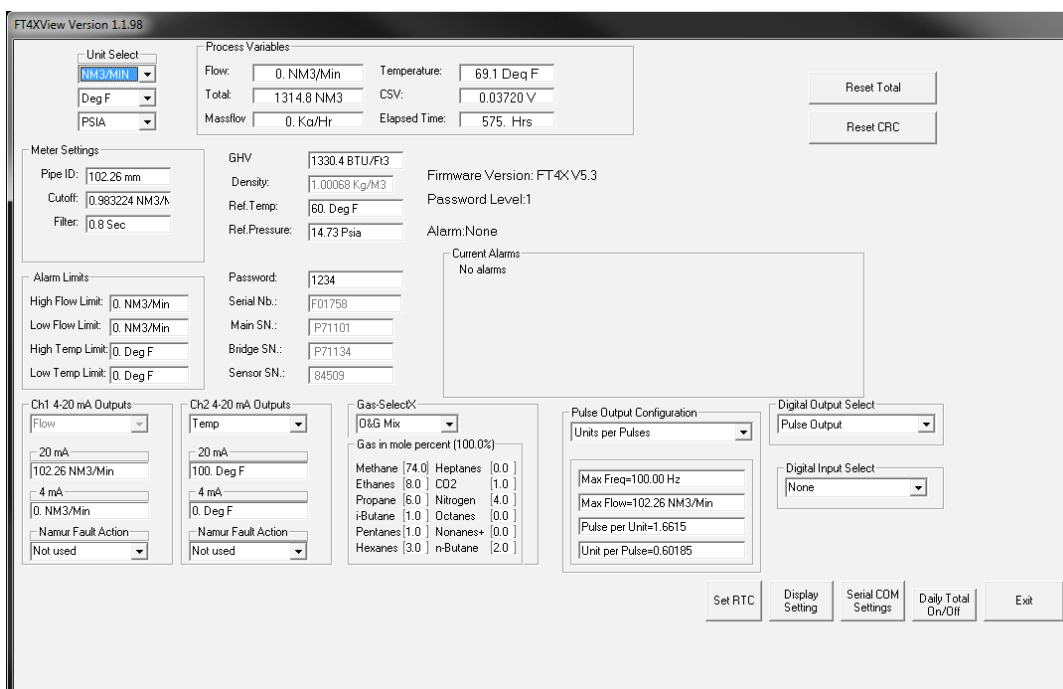
From the main menu, click on the "Configure" button and enter the requested password for either Level I (1234) or Level II (9111) access.

Fig. 3.3: Password Window



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

Fig. 3.4: Level 1 Configuration Screen



Configure (Level 1 Password)

Unit Select

Unit Select

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

Process Variables

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
- **Elapsed Time:** Time since the Totalizer was reset

Operation: Configure

Resets

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 the value.

Meter Settings

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 (see FT4X Manual for more details).
- **Kfact:** A K-Factor can be applied to the meter's settings to offset the meter's calibration. The K-Factor is a direct scaling of the meter's output across the entire full scale.

GHV

GHV

Gross Heating Value of the programmed gas in the Gas-SelectX® gas menu is calculated by the meter and viewed here.

Density

Density

View the density of the programmed gas in the Gas-SelectX® gas menu is displayed here.

Reference Conditions

Reference Conditions: Ref. Temp. and Ref. 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.

Alarm Limits

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.

Password

Password

If the Level 1 password must be changed, enter the new password in this field.

Operation: Configure

Serial Numbers **Serial Numbers:** Serial numbers of the meter, the main board, bridge and sensor (factory set).

Analog 4-20mA Outputs **4-20mA Output: Channels 1 & 2**
 Channel 1: This analog 4-20mA output is programmed for flow.
 Channel 2: This analog 4-20mA output is configurable for either flow or temperature. Though the FT4X will already be scaled for the specific application coming from the factory, FT4X View™ allows the operator to easily re-scale the 4-20mA output as needed.

Gas-SelectX® **Gas-SelectX® Gas Menu**
 This menu allows the user to select a gas or gas mix from a list of gases. When entering the FT4X gas menu the user will have three choices:

1. Pure Gas Menu (PUR) - a list of 11 gases
2. Gas Mix (MIX) - a mixture of any gases available in the Pure Gas menu except Natural Gas (total must equal 100%)
3. Oil & Gas Mix (O&G Mix) Menu - any combination of the 12 gases in the Oil & Gas menu (total must equal 100%)

| Pure Gas Menu | Mixed Gas Menu** | O & G Gas Menu** |
|----------------------|----------------------|----------------------|
| Air | Air | Methane (C1) |
| Argon | Argon | Ethane (C2) |
| Butane | Butane | Propane (C3) |
| Carbon Dioxide (CO2) | Carbon Dioxide (CO2) | i-Butane (C4) |
| Methane | Ethane | n-Butane (C4) |
| Natural Gas * | Methane | Pentanes (C5) |
| Nitrogen | Nitrogen | Hexanes (C6)*** |
| Oxygen | Oxygen | Carbon Dioxide (CO2) |
| Helium | Helium | Nitrogen |
| Hydrogen | Hydrogen | Heptanes (C7)** |
| Propane | Propane | Octanes (C8)** |
| | | Nonanes+ (C9+)**** |

* Natural gas refers to pipeline quality dry natural gas, whereas naturally occurring gas from oil fields constitutes a special gas mix of which the composition is to be entered in the O&G gas menu.

** The molar mass of the gases are programmable in 0.1% increments. Gases may be mixed in any proportion equaling 100%. Round compositions to the nearest percentage; rounding errors to be added/subtracted to Hexanes (C6).

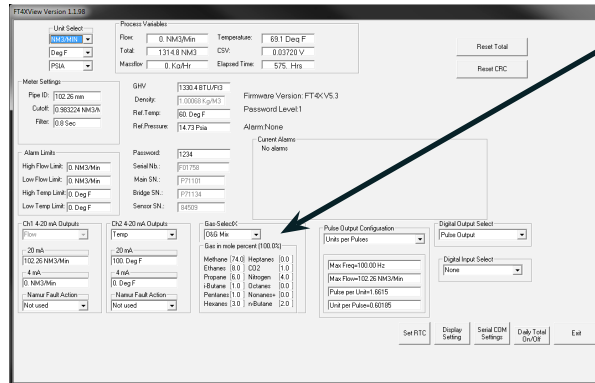
***Per BLM 43 CFR subparts 3175.119 and 3175.126: when the concentration of C6+ (C6 and higher) is less than 0.5 percent, Heptanes, Octanes and Nonanes + can be combined with Hexanes and will be considered Hexanes+. Users electing to use this method must enter the 60% n-hexane, 30% n-heptane and 10% n-octane concentration as the Hexanes concentration and enter 0% in heptanes, octanes, and nonanes fields.

****Total of all gases C9 & greater (C9+).

Operation: Configure

Gas-SelectX®

Fig. 3.5: Gas-SelectX® Menu in Configuration Screen

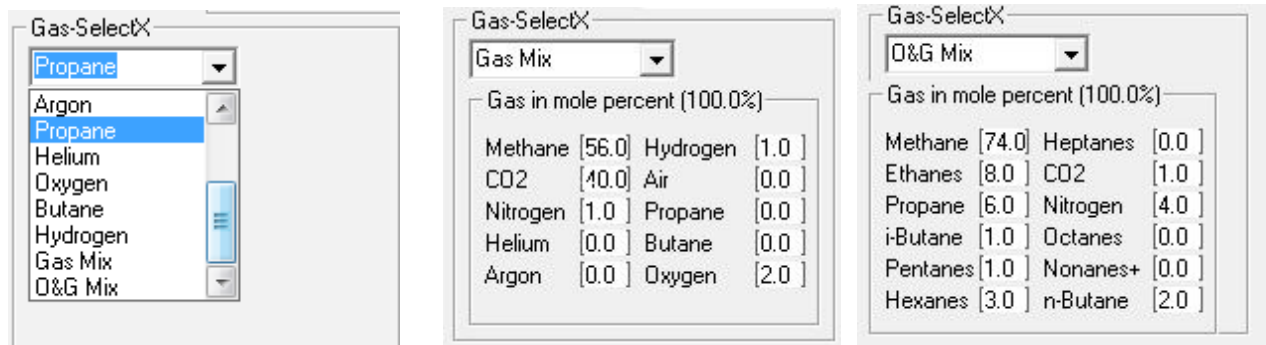


Gas-SelectX Menu location

NOTE: A list of pure and mixed gases available on the FT4X flowmeter are kept on the Fox website at www.foxthermalinstruments.com.

NOTE: Gases are in mole percentages

Fig. 3.6: Setting the Gas-SelectX® Gas or Gas Mix



In the first example, Propane has been chosen from the list of gas options. The last two options are "Gas Mix" and "O&G Mix". When the "Gas 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 0.0 and 100.0. All remaining gases **not** used in the Gas Mix must be changed to 0.0. The total for the gases chosen for the mix must equal 100.0%.

NOTE: If the total of the three gases is greater or less than 100.0%, an alarm will show. Adjust the percentages until 100.0% is achieved.



Operation: Configure

Pulse Output Configuration

Pulse Output Configuration

This selection configures the FT4X 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

Digital Output Select

Digital Output Select

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

Digital Input Select

Digital Input Select

This menu allows the user to choose between Reset Total or None.

Save/Restore Parameters

Save/Restore Parameters (Level 2 Password only)

There are two functions available with a level 2 password only.

Configure (Level 2 Password)

Fig. 3.7: Level 2 Configuration Screen

The screenshot displays the 'Level 2 Configuration Screen' for FT4X View Version 1.1.98. It is divided into several sections:

- Process Variables:** Flow (0.00 NM3/Min), Total (1314.8 NM3), Massflow (0.00 Kg/Hr), Temperature (69.6 Deg F), CSV (0.04012 V), Elapsed Time (575.1 Hrs).
- Meter Settings:** Pipe ID (102.26 mm), Cutoff (0.983224 NM3/A), Filter (0.8 Sec), Klact (0.0%).
- Alarm Limits:** High Flow Limit (0.00 NM3/Min), Low Flow Limit (0.00 NM3/Min), High Temp Limit (0.00 Deg F), Low Temp Limit (0.00 Deg F).
- GHV:** 1330.4 BTU/FI3, Density: 1.00068 Kg/M3, Ref. Temp: 60.00 Deg F, Ref. Pressure: 14.73 Psia.
- Serial Numbers:** Serial Nb.: F01758, Main SN.: P71101, Bridge SN.: P71134, Sensor SN.: 84509.
- Gas-SelectK:** Gas in mole percent (100.0%): Methane (74.0), Ethanes (8.0), Propane (6.0), i-Butane (1.0), Pentanes (1.0), Hexanes (3.0), Heptanes (0.0), CO2 (1.0), Nitrogen (4.0), Octanes (0.0), Nonanes+ (0.0), n-Butane (2.0).
- Output Configuration:** Pulse Output Configuration (Units per Pulses), Digital Output Select (Pulse Output), Digital Input Select (None).
- Save / Restore Parameters:** Save Config to File, Recall Config from File (highlighted with a dashed box and an arrow pointing to the text 'Available only with Level 2 password').
- Buttons:** Reset Total, Reset CRC, Set RTC, Display Setting, Serial COM Settings, Daily Total On/Off, Exit.

NOTE: The "Save/Restore Parameter" options in both Figures 3.4 and 3.5 are not available using a Level 1 password.



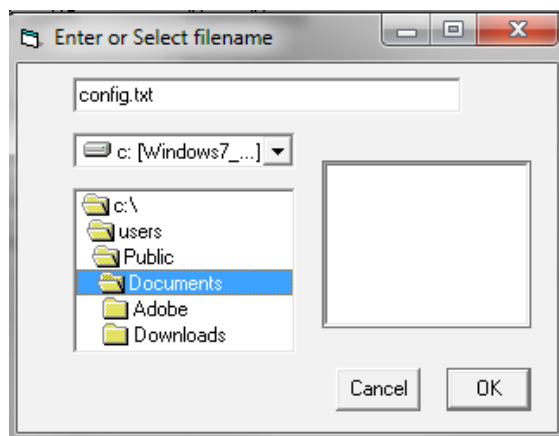
Operation: Configure

Save Current Configuration

Save Current Configuration to File (Level 2 Password)

The current configuration parameters are saved to a text file.

Fig. 3.8: Save Current Configuration to File Window

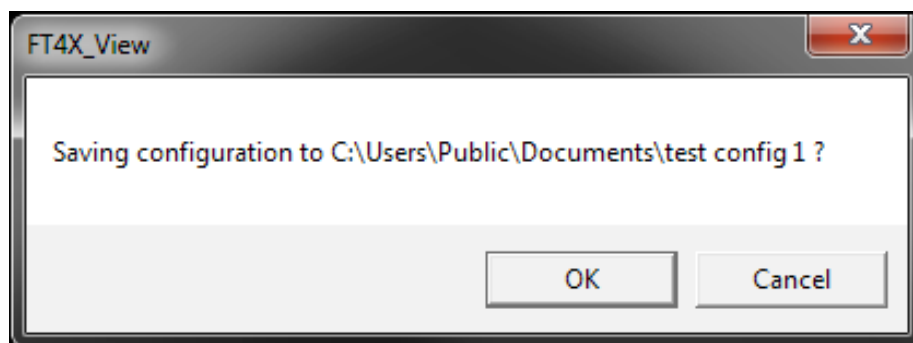


Select an existing file to overwrite or a new file name and then press **OK**. A confirmation window will be shown.



NOTE: This feature is only accessed with a Level II password.

Fig. 3.9: Confirmation of Saved Configuration Window



Recall Configuration

Recall Configuration to File (Level 2 Password)

This allows the operator to recall an existing FT4X configuration file.



NOTE: This feature is only accessed with a Level II password.

Operation: Configure

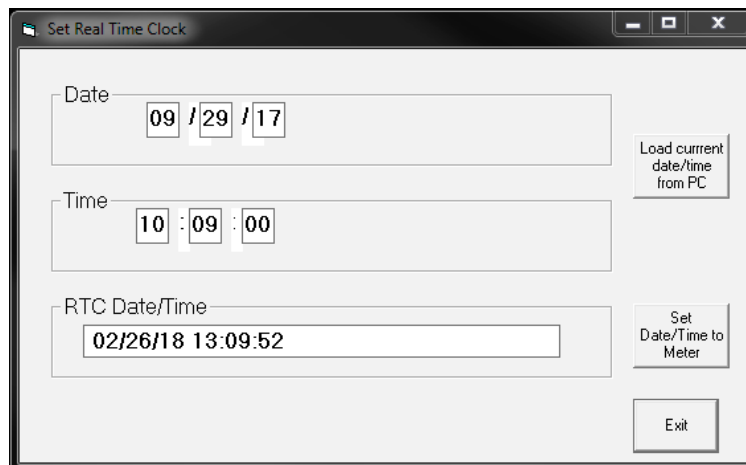
Set Real Time Clock

Set RTC (Real Time Clock)

The user has the option of setting the date/time manually in the provided fields or to use the "Load current date/time from PC" button which pulls the current date and time automatically from your PC's data.

To set the date and time, click the "Set Date/Time to Meter" button.

Fig. 3.10: Setting the Real Time Clock (RTC)

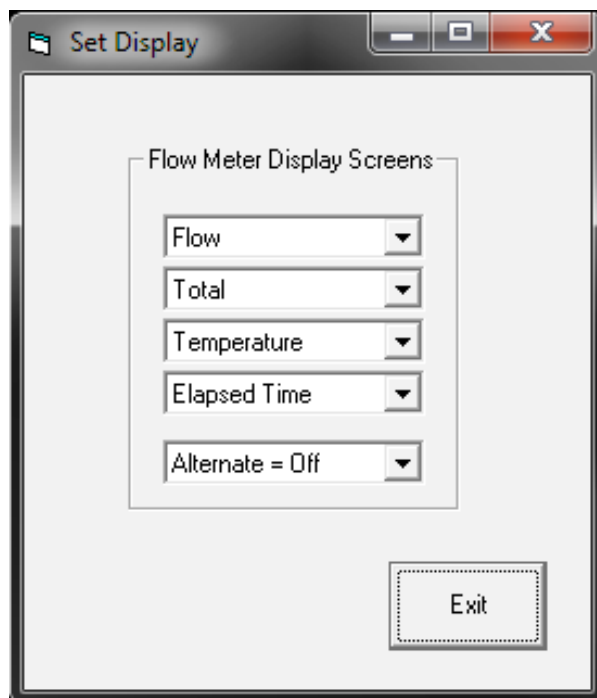


Display Settings

Display Setting

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. 3.11: Display Setting



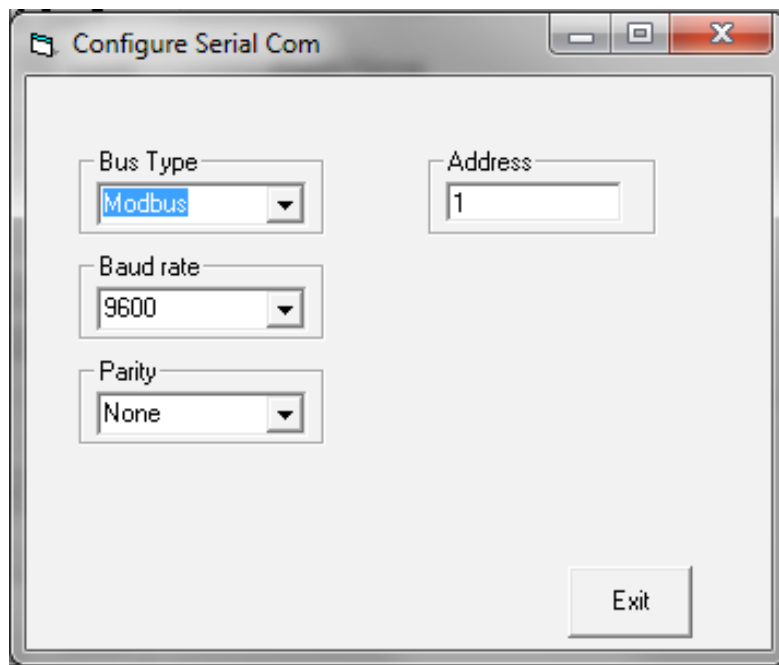
Operation: Configure

Serial COM Settings

Serial COM Settings

Use this function to set the serial communication settings for any of the optional FT4X bus communication boards.

Fig. 3.12: Select Serial Communication Window



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

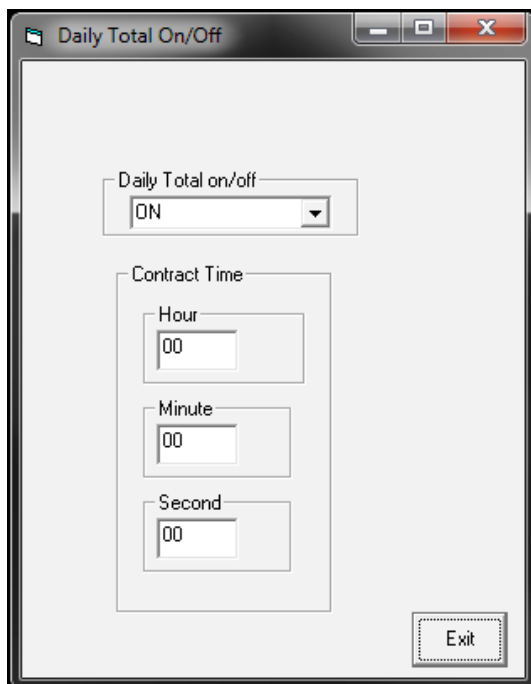
Operation: Configure

Daily Total
On/Off

Daily Total On/Off

After installation and during the setup of your meter, the user must turn on the Daily Total function.

Fig. 3.13: Turning on Daily Total Function and setting Contract Time



Contract Time

Setting the Contract Time

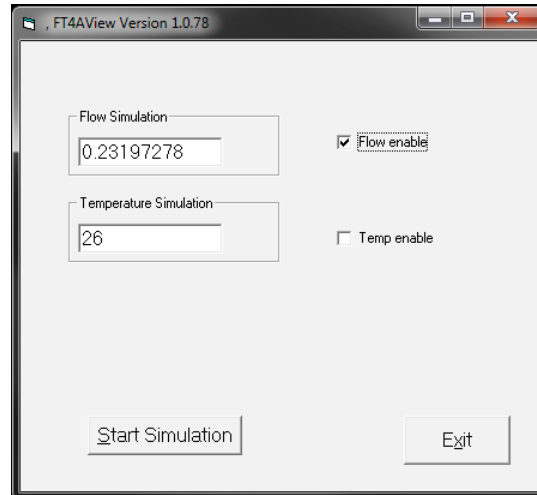
Resetting the Contract Time is done using the Daily Total On/Off window as seen in the figure above. The default Contract Time is midnight, but the user can change the Contract Time in this window, if needed.

Operation: Simulation Mode

Simulation Mode **Simulation Mode**

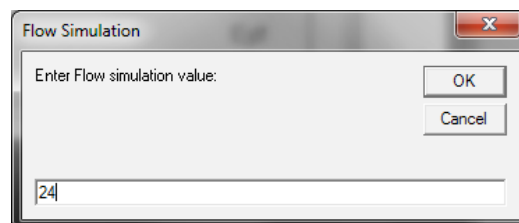
After clicking on the button marked "Simulation" from the main menu, a password will be requested. Enter the password and then the Simulation screen will be shown.

Fig. 3.14: Simulation Mode Window



The simulation mode simulates flow rate, temperature and/or CSV. 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.

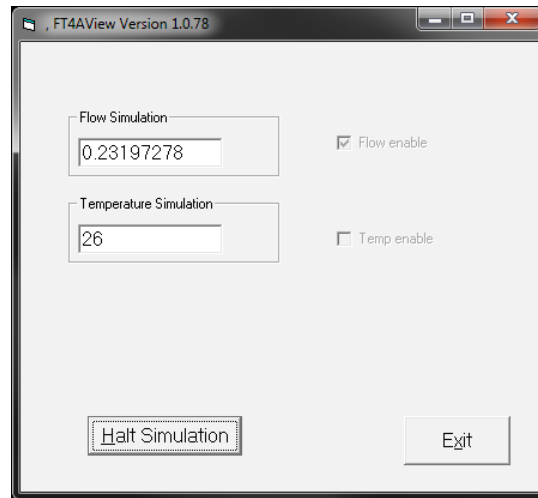
Fig. 3.15: Entering a Simulation Value



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

Operation: Simulation Mode

Simulation Mode *Fig. 3.16: Simulation Running*



In Simulation mode, all FT4X outputs and the Totalizer respond as if in normal measurement mode. Click "Halt Simulation" to end.

Operation: CAL-V®

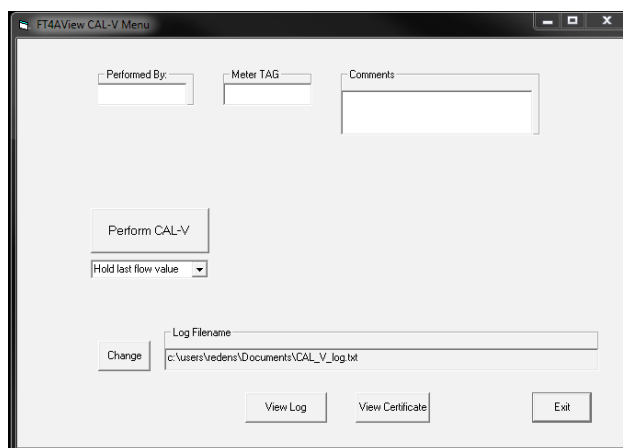
CAL-V®

CAL-V®

After clicking on the button marked "CAL-V" located in the box marked "Calibration Validation Diagnostic Test" from the main menu, the CAL-V screen will be shown.

CAL-V™ is performed to verify the proper operation of the FT4X Fox meter. From the Main Menu, click on the "CAL-V" button to access the CAL-V Menu Window.

Fig. 3.17: CAL-V™ Menu Window



On the CAL-V™ Menu, 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.

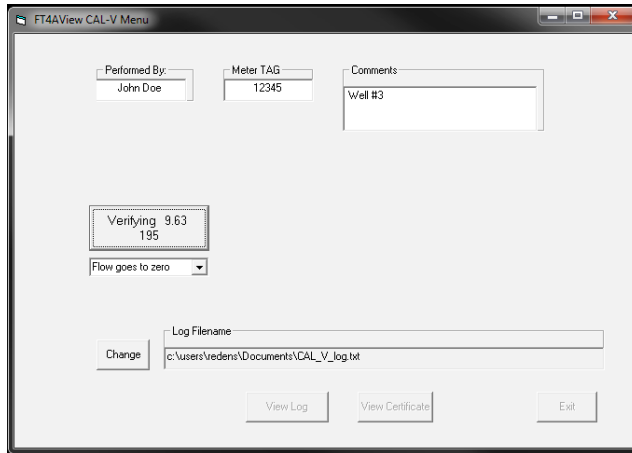
Please note that the test will take about four minutes. The flow measurement will stop and go to zero for this period unless the "hold last value" option has been chosen.

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

Operation: CAL-V®

CAL-V®

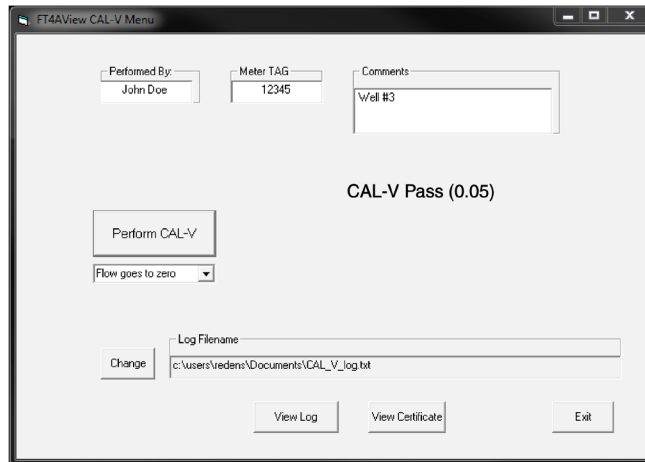
Fig. 3.18: Running a CAL-V™ Test



CAL-V® Results

The CAL-V™ test window will display the current calculated value as the microprocessor adjusts current to the sensor. At the end of the test, a Pass/Fail message will be displayed.

Fig. 3.19: CAL-V™ Check Results Window




Operation: CAL-V® Certificate

CAL-V®
Certificate

CAL-V Certificate

The "CAL-V™ Certificate" button will display the latest certification. When performing CAL-V™, 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 window. A laptop can be used to perform the CAL-V™ on a different FT4X meter. 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. 3.20: CAL-V™ Certificate



399 RESERVATION ROAD
MARINA, CA 93933 USA
PHONE: 831-384-4300
FAX: 831-384-4312
sales@foxthermalinstruments.com
www.foxthermalinstruments.com

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FT4X CAL-V™ CERTIFICATE
 CALIBRATION VALIDATION

| | | |
|---------------------------------|------------------|-------------|
| CAL-V™ Performed on: | February 09 2018 | 12:11:44 PM |
| Firmware version: | FT4X V5.3 | |
| Fox Meter Serial Number: | F01758 | |
| CAL-V™ Results: | Pass | |
| CAL-V™: | -0.07 | |
| Test Temperature | 68.8 F | |
| Tag #/Meter Location: | _____ | |
| Test performed by: | _____ | |
| Additional Comments: | _____ | |

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
- * Zero Stability of the meter
- * 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: 0.0-0.8 Pass, 0.8-1.0 Warning, >1.0 Fail

Configuration:

| | | | |
|--------------------------------------|-------------------------|--------------------|---------|
| Pipe Diameter: | 4.026 In | Gas Select: | O&G Mix |
| Customer STP: | 60.0 Deg F & 14.73 Psia | Methane | 74% |
| 4-20 mA Range: | 0 - 3611 SCFM | Ethane | 8% |
| Zero Flow Cutoff: | 34.722225 SCFM | Propane | 6% |
| Previous CAL-V: | -0.08 | I-Butane | 1% |
| Previous CAL-V: | Pass | N-Butane | 2% |
| Gross Heating Value[BTU/FT3]: | 1330.2 | Pentane | 1% |
| Density[Kg/M3]: | 1.0007 | Hexane | 3% |
| | | CO2 | 1% |
| | | Nitrogen | 4% |
| | | Heptane | 0% |
| | | Octanes | 0% |
| | | Nonane+ | 0% |

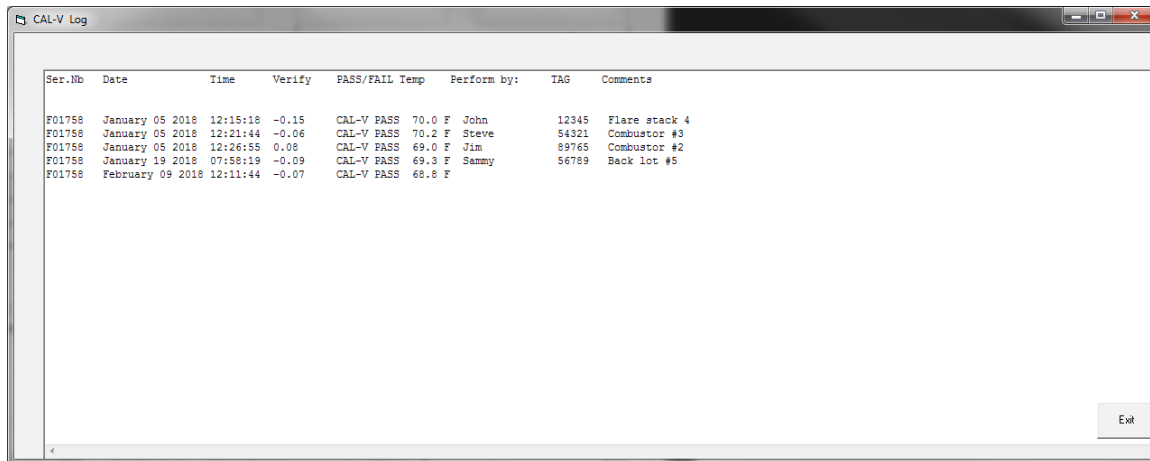
Operation: CAL-V® Log

CAL-V® Log

Diagnostic Tests Log

The Diagnostic Tests 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. 3.21: CAL-V™ Log



The screenshot shows a window titled "CAL-V Log" with a table of test results. The table has columns for Ser.No, Date, Time, Verify, PASS/FAIL Temp, Perform by:, TAG, and Comments. There are six rows of data, all showing "CAL-V PASS" results.

| Ser.No | Date | Time | Verify | PASS/FAIL Temp | Perform by: | TAG | Comments |
|--------|------------------|----------|--------|-------------------|-------------|-------|---------------|
| F01758 | January 05 2018 | 12:15:18 | -0.15 | CAL-V PASS 70.0 F | John | 12345 | Flare stack 4 |
| F01758 | January 05 2018 | 12:21:44 | -0.06 | CAL-V PASS 70.2 F | Steve | 54321 | Combustor #3 |
| F01758 | January 05 2018 | 12:26:55 | 0.08 | CAL-V PASS 69.0 F | Jim | 89765 | Combustor #2 |
| F01758 | January 19 2018 | 07:58:19 | -0.09 | CAL-V PASS 69.3 F | Sammy | 56789 | Back lot #5 |
| F01758 | February 09 2018 | 12:11:44 | -0.07 | CAL-V PASS 68.8 F | | | |

An "Exit" button is located in the bottom right corner of the window.


Logs: 24 Hour Log

24 Hour Log

24 Hour Log

After clicking on the button marked "24 Hour Log" located in the box marked "View Log" from the main menu, the operator can view a log of totals from the meter. Pressing this button produces a pdf listing of totals starting with yesterday's total and followed by 40 24-hour totals. The start time begins and is reset when the totalizer is reset.

Fig. 3.22: 24 Hour Log Example



399 RESERVATION ROAD
MARINA, CA 93933 USA
PHONE: 831-384-4300
FAX: 831-384-4312
sales@foxthermalinstruments.com
www.foxthermalinstruments.com

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FT4X Flowmeter

24-Hour Totals Log

Date / Time Printed: 02/26/18 10:17:33

Firmware version: FT4X V5.3

Fox Meter Serial Number: F01758

Daily Totals Log: (SCF)

| | | | | | |
|---------|-------------------|----|---------|-------------------|-------|
| Day 1: | 02/26/18 00:00:00 | 0. | Day 21: | 00/00/00 00:00:00 | 0. |
| Day 2: | 02/25/18 00:00:00 | 0 | Day 22: | 00/00/00 00:00:00 | 0 |
| Day 3: | 02/24/18 00:00:00 | 0 | Day 23: | 00/00/00 00:00:00 | 0 |
| Day 4: | 02/23/18 00:00:00 | 0 | Day 24: | 00/00/00 00:00:00 | 0 |
| Day 5: | 02/22/18 00:00:00 | 0 | Day 25: | 02/02/18 06:00:00 | 0 |
| Day 6: | 02/21/18 00:00:00 | 0 | Day 26: | 02/01/18 06:00:00 | 0 |
| Day 7: | 02/20/18 00:00:00 | 0 | Day 27: | 01/31/18 06:00:00 | 0 |
| Day 8: | 02/19/18 00:00:00 | 0 | Day 28: | 01/30/18 06:00:00 | 0 |
| Day 9: | 02/18/18 00:00:00 | 0 | Day 29: | 01/29/18 06:00:00 | 0 |
| Day 10: | 02/17/18 00:00:00 | 0 | Day 30: | 01/28/18 06:00:00 | 0 |
| Day 11: | 02/16/18 00:00:00 | 0 | Day 31: | 01/27/18 06:00:00 | 0 |
| Day 12: | 02/15/18 00:00:00 | 0 | Day 32: | 01/26/18 06:00:00 | 0 |
| Day 13: | 02/14/18 00:00:00 | 0 | Day 33: | 01/25/18 06:00:00 | 0 |
| Day 14: | 02/13/18 00:00:00 | 0 | Day 34: | 01/24/18 06:00:00 | 11395 |
| Day 15: | 02/12/18 00:00:00 | 0 | Day 35: | 01/23/18 06:00:00 | 81024 |
| Day 16: | 02/11/18 00:00:00 | 0 | Day 36: | 01/22/18 06:00:00 | 81596 |
| Day 17: | 02/10/18 00:00:00 | 0 | Day 37: | 01/21/18 06:00:00 | 80994 |
| Day 18: | 00/00/00 00:00:00 | 0 | Day 38: | 01/20/18 06:00:00 | 75046 |
| Day 19: | 00/00/00 00:00:00 | 0 | Day 39: | 01/19/18 06:00:00 | 0 |
| Day 20: | 00/00/00 00:00:00 | 0 | Day 40: | 01/18/18 06:00:00 | 0 |

FT4X_24hrs_log

Logs: Configuration Log


Configuration Log

Configuration Log

After clicking on the button marked "Config Log" located in the box marked "View Log" from the main menu, the operator can view a log of the meter's current configuration. The log is in pdf form and includes the following information:

- Current date/time
- Meter's firmware version and serial number
- Meter settings for temperature, pressure, etc
- Application or process factory-set values
- Alarm settings
- Gas mix information

Fig. 3.23: Configuration Log Example



399 RESERVATION ROAD
MARINA, CA 93933 USA
PHONE: 831-384-4300
FAX: 831-384-4312
sales@foxthermalinstruments.com
www.foxthermalinstruments.com

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FT4X Flowmeter

Configuration Log

Date / Time Printed: 2/26/18 10:19:05

Firmware version: FT4X V5.3

Fox Meter Serial Number: F01758

FT4X Configuration:

| | |
|--|--|
| <p>Flow unit : SCFM</p> <p>Temperature unit Deg F</p> <p>Pressure unit: Psia</p> <p>Cutoff: 34.722 SCFM</p> <p>Filter: 0.8 Sec</p> <p>Pipe ID: 4.026 In</p> <p>Density: 1.001 Kg/M3</p> <p>Gross Heating Value: 1330.20 BTU/Ft3</p> <p>Ref Temp: 60.0 Deg F</p> <p>Ref pressure: 14.73 Psia</p> <p>Hi Flow Alarm: ---</p> <p>Lo Flow Alarm: ---</p> <p>Hi Temp Alarm: ---</p> <p>Lo Temp Alarm: ---</p> <p>4-20 mA selected: Flow</p> <p style="padding-left: 20px;">20 mA: 3611.1 SCFM</p> <p style="padding-left: 20px;">4 mA: 0.0 SCFM</p> <p>Kfactor: 0%</p> | <p>Gas SelectX: O&G Mix</p> <p>Methane 74.0%</p> <p>Ethane 8.0%</p> <p>Propane 6.0%</p> <p>I-Butane 1.0%</p> <p>N-Butane 2.0%</p> <p>Pentane 1.0%</p> <p>Hexane 3.0%</p> <p>CO2 1.0%</p> <p>Nitrogen 4.0%</p> <p>Heptane 0.0%</p> <p>Octanes 0.0%</p> <p>Nonane+ 0.0%</p> |
|--|--|

FT4X_cfg_log

Logs: Event Log

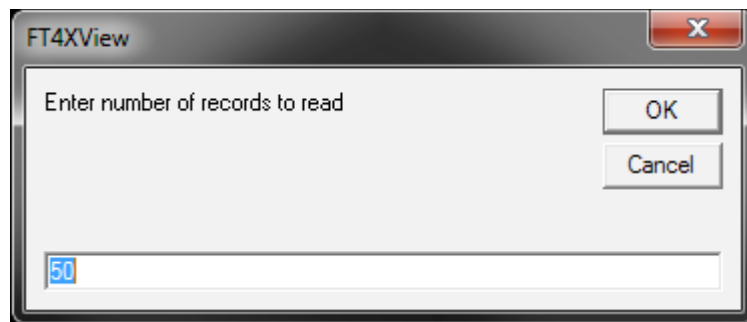
Event Log

Event Log

After clicking on the button marked "Event Log" located in the box marked "View Log" from the main menu, the operator can view a log of the meter's current configuration.

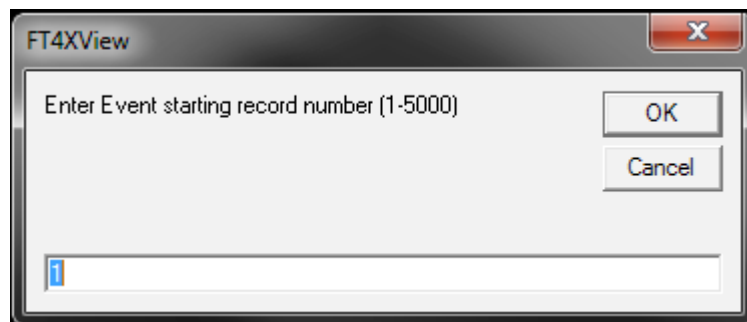
The Event Log button will open a series of windows requesting the number of records to be accessed and which record must start the list. This data will be produced in an excel spreadsheet.

Fig. 3.23: Enter Number of Records to be Viewed in Log



Enter the number of records that you would like to view in the log.

Fig. 3.24: Enter Record Number to Begin the Log



Enter the number of the record that you would like to have at the beginning of the log. This event will start the log and all subsequent events will follow. Any previous events will be excluded from this viewing of the log.

Logs: Event Log

The Event/Alarm Log will open in Excel. The Log includes the following information:

- Current date/time
- Meter's firmware version
- Meter's serial number
- Instances of power on/off of meter
- Instances that an Alarm has occurred
- Setting of the Real Time Clock
- Changes to meter's configuration or settings
- Changes to the gas mix information
- Resets (total or CRC)

Fig. 3.25: Configuration Log Example

| | A | B | C | D | E | F | G |
|----|---|----|----------------------|----------------------------|---|---|---|
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | Date/Time: | 2/26/18 10:24:31 | | | |
| 11 | | | | | | | |
| 12 | | | Firmware Version: | FT4X V5.3 | | | |
| 13 | | | | | | | |
| 14 | | | Meter Serial Number: | F01758 | | | |
| 15 | | | | | | | |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |
| 20 | | 1 | 2/26/2018 10:11 | RTC clock set | | | |
| 21 | | 2 | 2/26/2018 13:06 | Flow Unit set to SCFM | | | |
| 22 | | 3 | 2/26/2018 13:06 | Pct Butane set to 2.% | | | |
| 23 | | 4 | 2/26/2018 13:05 | Pct N2 set to 4.% | | | |
| 24 | | 5 | 2/26/2018 13:05 | Pct CO2 set to 1.% | | | |
| 25 | | 6 | 2/26/2018 13:05 | Pct Hexane=3.% | | | |
| 26 | | 7 | 2/26/2018 13:05 | Pct Pentane=1.% | | | |
| 27 | | 8 | 2/26/2018 13:05 | Pct I-Butane=1.% | | | |
| 28 | | 9 | 2/26/2018 13:05 | Pct Propane set to 6.% | | | |
| 29 | | 10 | 2/26/2018 13:05 | Pct Ethane=8.% | | | |
| 30 | | 11 | 2/26/2018 13:05 | Freq. In range | | | |
| 31 | | 12 | 2/26/2018 13:05 | CH1 4-20 In range | | | |
| 32 | | 13 | 2/26/2018 13:05 | Pct CH4 set to 74.% | | | |
| 33 | | 14 | 2/26/2018 13:05 | Freq. Out of range | | | |
| 34 | | 15 | 2/26/2018 13:05 | CH1 4-20 Out of range | | | |
| 35 | | 16 | 2/9/2018 15:11 | CAL-V Pass (-0.068) | | | |
| 36 | | 17 | 2/9/2018 15:07 | CAL-V Started | | | |
| 37 | | 18 | 2/9/2018 13:48 | Total Reset | | | |
| 38 | | 19 | 2/9/2018 13:46 | Lo flow Alarm Off | | | |
| 39 | | 20 | 2/9/2018 13:46 | Lo Flow Limit set to 0. | | | |
| 40 | | 21 | 2/9/2018 13:46 | Hi Flow Limit set to 0. | | | |
| 41 | | 22 | 2/9/2018 13:46 | Feq. Maxflo set to 216667. | | | |
| 42 | | 23 | 2/9/2018 13:46 | CH1 20 mA set to 216667. | | | |
| 43 | | 24 | 2/9/2018 13:46 | Flow Unit set to SCFH | | | |

Definitions

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 |
| TSI | Temperature Sense Current |

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Definition of Terms



Troubleshooting Tips



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.