Fox Thermal Instruments, Inc.

THERMAL MASS FLOW METER & TEMPERATURE TRANSMITTER

FT2A View™

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105406
Rev. A

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:

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Fox FT2A Manuals:

- **Model FT2A Instruction Manual**
- **Fox FT2A RS485 Modbus & BACnet MS/TP Manual**
- **Fox FT2A Profibus, DeviceNet & Ethernet Manual**

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Introduction

Introduction

Thank you for purchasing the Model FT2A Thermal Gas Mass Flow meter and Temperature Transmitter from Fox Thermal Instruments. The Model FT2A 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 FT2A View™ software allows users to easily display data and configure the FT2A to their specific application parameters. Then software can also log flow/temperature data to an Excel file.

This Manual contains the installation and operation instructions for FT2A View software designed for use with the FT2A meter.

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

Installation

Installation

Installation

Open the front panel of the FT2A enclosure, then connect the meter to the computer with a USB cable (type A male/Mini-B Male cable, 5 Pin). If the PC is connected to the Internet and running Windows 7™, the PC will try to automatically load the VCP driver. If the driver does not load automatically, download the VCP driver at:
http://www.ftdichip.com/Drivers/VCP.htm

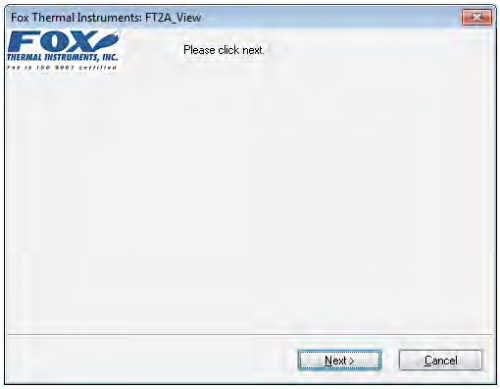
Note: The latest version of the FT2A View™ software is available for download at http://www.foxthermalinstruments.com/products/ft2Aview.php (see Fig. 2.1)

Fig. 2.1: Online Download Location for FT2A View™ Software

Installation

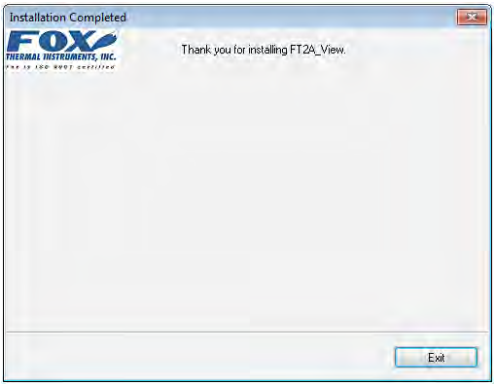
Installation

To install the FT2A View program, run the "FT2AView_V#.##-setup.exe" file that is located in the downloaded file.



After clicking "Next" the screen will show:

Select the folder in which you wish to install FT2A View™, then click "Install".



When the program is done installing, you may exit, then restart your computer.

Installation

COM Port Selection

COM Port Selection

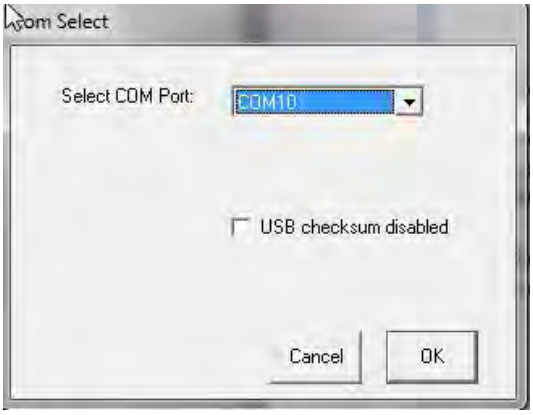
When communicating between FT2A View and the FT2A for the first time, Windows will assign a "virtual COM port" to the FT2A. To determine which COM port number has been assigned, go to the Device Manager on your PC's Windows system Control Panel and click on *Ports* (COM & LPT). The COM port number will be displayed after the USB symbol.

When prompted, enter the assigned COM port by using the drop down menu and press **OK**.

Important Notes:

- The FT2A Meter must be plugged into the computer in order for the system to detect it.
- The program will automatically remember this COM port when calling up the program again.
- The USB Checksum Disabled box should not be checked.

Fig. 2.1: COM Port Selection Window



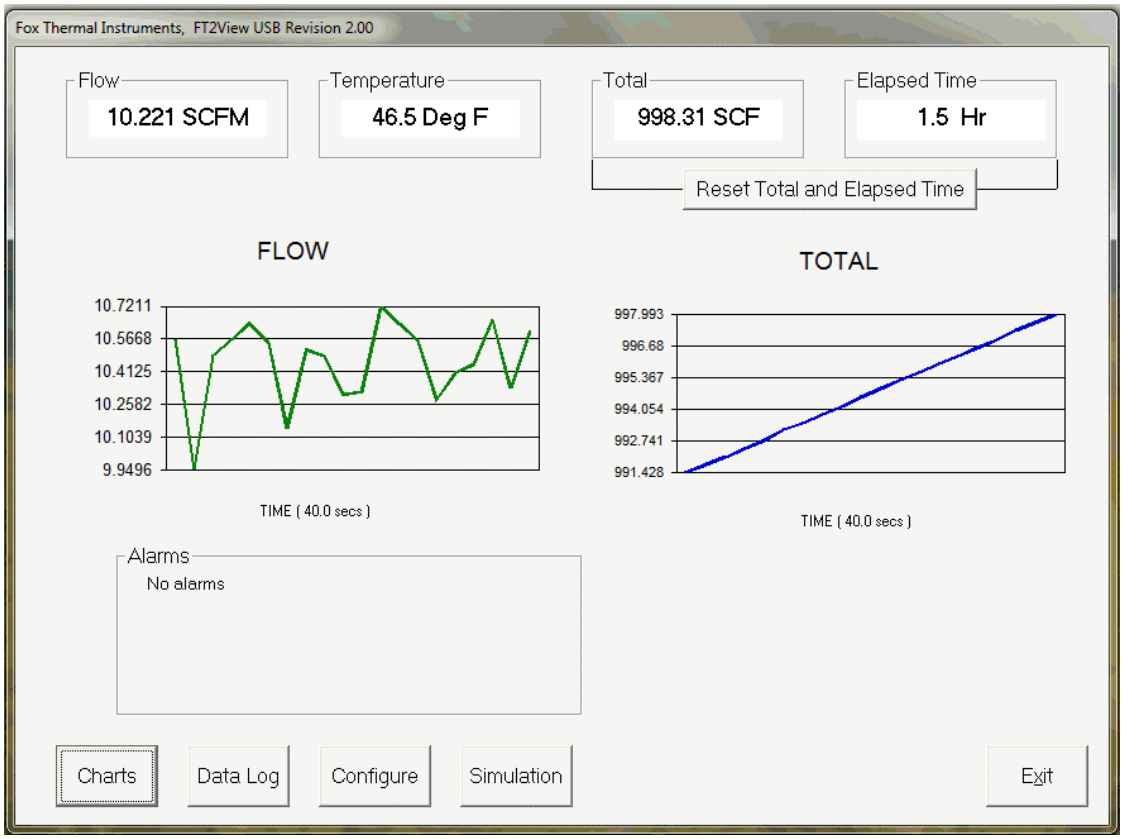
Operation: Main Screen

Main Screen

Main Screen

The image below depicts the main screen that appears when running FT2A View.

Fig. 3.1: FT2A View Main Screen



Note: Data on the screen is refreshed every second.

Charts Button

This opens 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 10.

Note: The charts can be set for either automatic or manual scaling.

Operation: Main Screen

Main Screen

Data Log
This function 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 Logger function, refer to "Operation: Data Logger" on page 19.

Configure
This allows the operator to go in and set the application parameters. This can be done either via the FT2A View™ software or manually via the instrument's display. For more information on configuring application parameters, refer to "Operation: Configure" on page 12.

Simulation
This function can be used to verify that all the flow meter outputs are working properly. Probably 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 frequency output. Refer to Page 20 for more information on how to use the Simulation function.

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

Exit
Exit the application

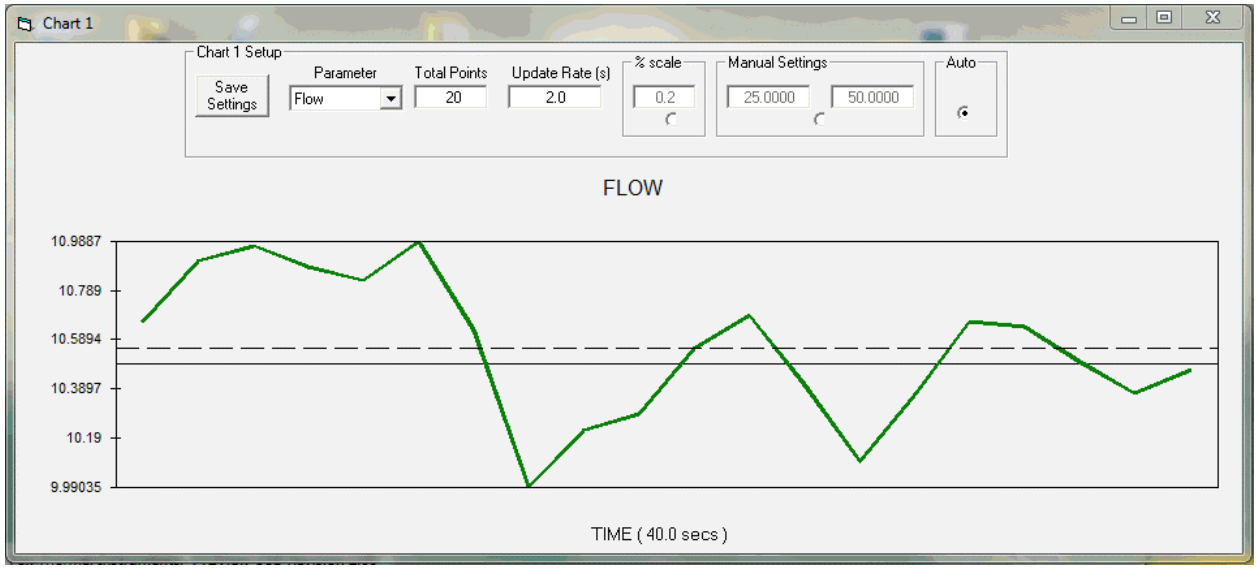
Operation: Chart Settings

Charts Settings

Charts Settings

From the main menu screen, click on "Charts". 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 configured for flow, temperature or total flow and scaled in one of three ways: a plus/minus percent scale, manual scaling, 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 disregarded.

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.

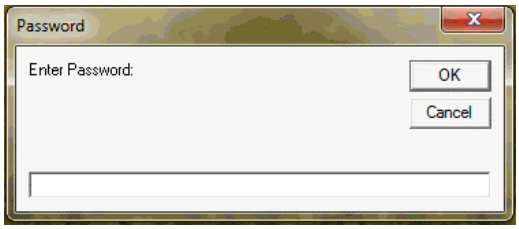
Operation: Configure

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.

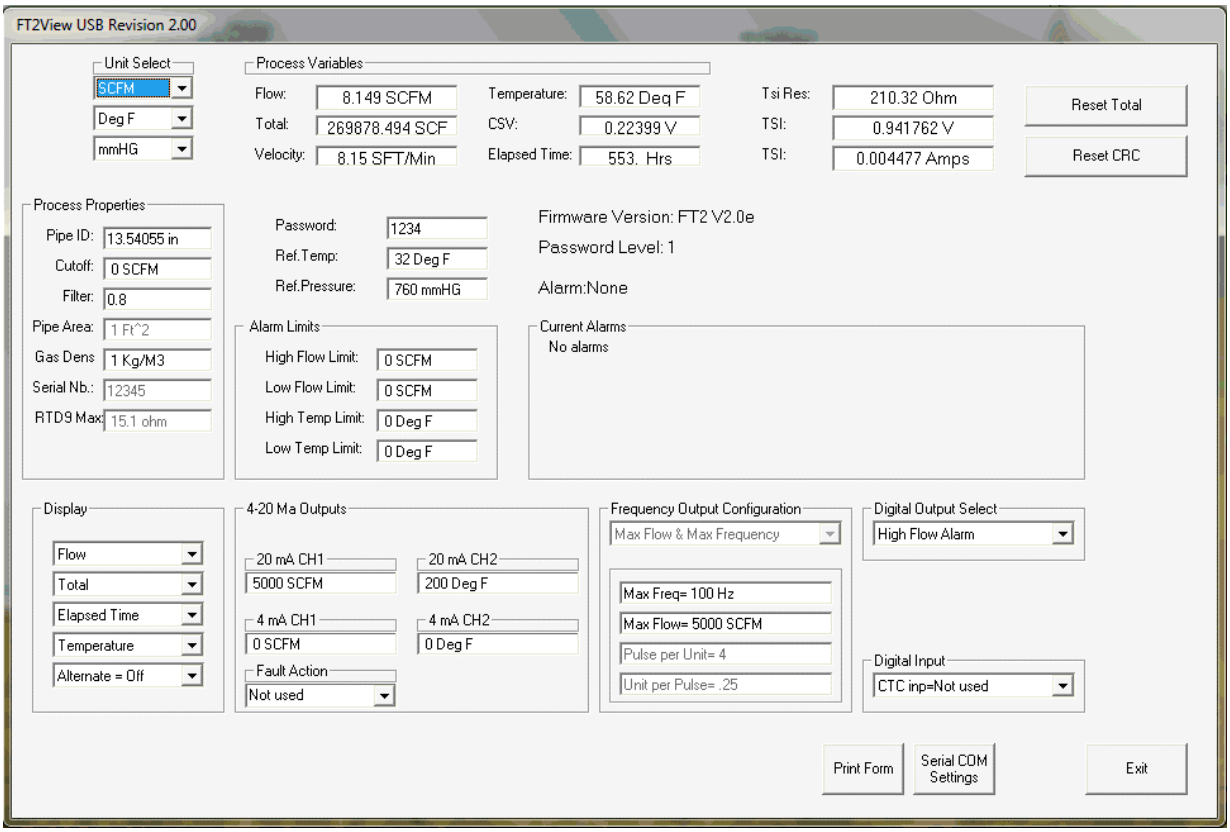
Fig. 3.3: Password Window



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

Level I Configuration

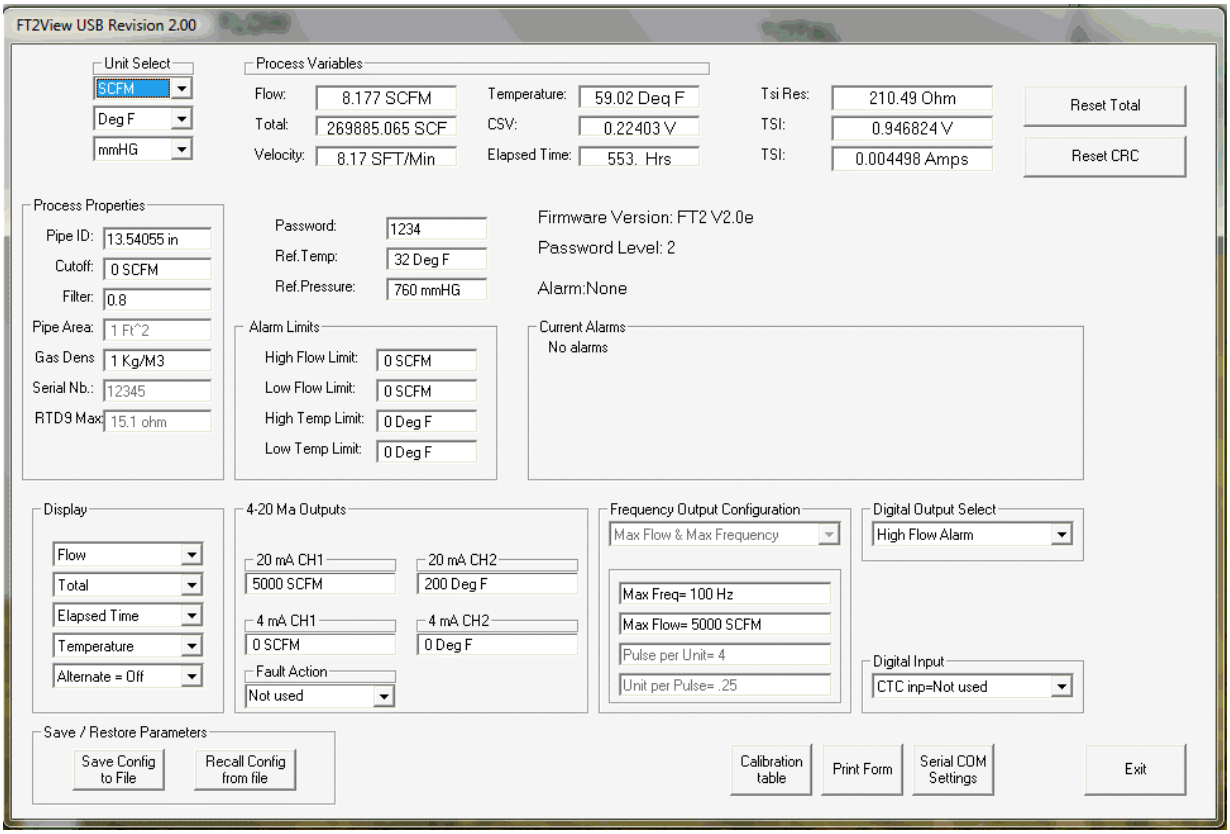
Fig. 3.4: Level I Configuration Screen



Operation: Configure

Level II Configuration

Fig. 3.5: Level II Configuration Screen



Warning: The Level II configuration screen allows access to the instrument calibration table. Users should be careful when making changes to some settings within this screen.

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 Properties

Process Properties

Pipe Inner Diameter (ID): The pipe inner diameter can be entered in either inches or millimeters. 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.

Operation: Configure

Process Properties

Process Properties (cont'd):

Cut-off: A gas flow rate at - or below - the cut-off setting will cause the meter to read zero.

Filter: Changing this value will increase or decrease the damping of the flow rate reading. Decrease the setting to increase damping. The default setting is 0.8 (see FT2A Manual for more details).

Pipe Area: This value can be entered directly - or it is automatically calculated by entering the pipe ID above.

Note: The ID unit is inches/mm, while the pipe area is in square feet/ meters.

Gas Density: The gas density is required only when the selected output is mass units - either pounds or kilograms.

Serial Number: Serial number of the meter (factory set).

RTD9 Max: The FT2A probe contains two sensing elements: a PowerPro™ and a precision RTD. The PowerPro™ sensor has a maximum resistance (measured in ohms) that corresponds to the maximum temperature/current at which it can operate, before it shuts down (factory set).

Display

Display

The user can choose the data to display with the top four drop-down boxes. By selecting "Alternate", the display of the FT2A automatically switches between the data screens.

Alarm Limits

Alarm Limits

Users can set high and low alarms for both flow and temperature. When a limit is reached, an alarm message is displayed and the digital output is activated if programmed for alarm output. The digital output can be used to control an external buzzer, light or other equipment.

Analog 4 to 20 mA

Analog 4 to 20 mA

The FT2A has dual analog 4 to 20 mA outputs. Channel 1 is for flow and Channel 2 is configurable for either flow or temperature. Though the FT2A will already be scaled by the factory for the specific application, FT2A View™ allows the operator to easily re-scale the 4 to 20 mA outputs as needed.

Operation: Configure

Digital Output Select

Digital Output Select
This selection configures the FT2A 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 Input

Digital Input
The digital input selection can be configured to reset the flow totalizer or to switch the meter from calibration curve 1 to curve 2.

Note: The FT2A must be originally configured for two gas calibration curves at the factory to use curve switching.

Process Variables

Process Variables

Flow: Current flow rate in selected units
Total: Cumulative mass or volume flow in selected units
Velocity: Flow velocity
Temperature: Gas temperature (Fahrenheit or Celsius)
CSV: Current sense voltage
Elapsed Time: Time since the Totalizer was reset
TSI resistance: Calculated resistance of the 200 ohm RTD element
TSI voltage: Measured voltage across the 200 ohm RTD element
TSI amperage: Calculated current going through the 200 ohm RTD element

Reference Conditions

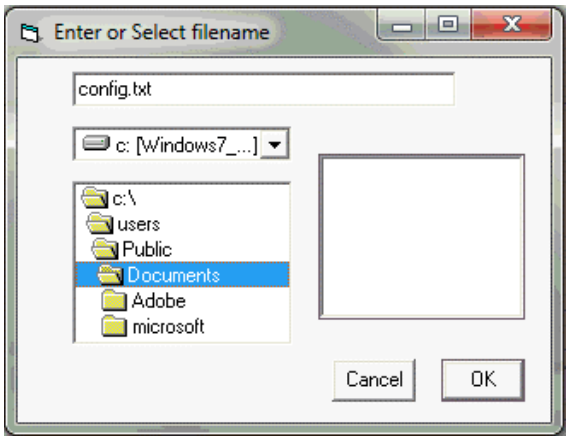
Reference Conditions
Reference temperature and pressure are the standard (or normal) temperature and pressure (STP) for which the flow rate is calculated.

Operation: Configure

Save Current Configuration

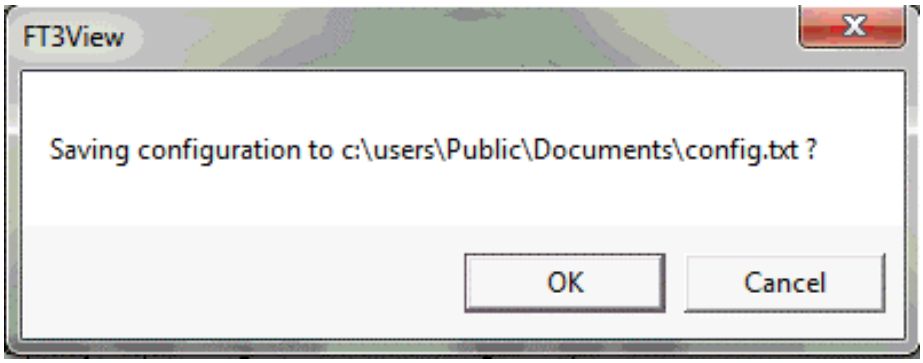
Save Current Configuration to File
The current configuration parameters are saved to a text file.

Fig. 3.6: 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.

Fig. 3.7: Confirmation of Saved Configuration Window



Recall Configuration

Recall Configuration to File
This allows the operator to recall an existing FT2A configuration file.

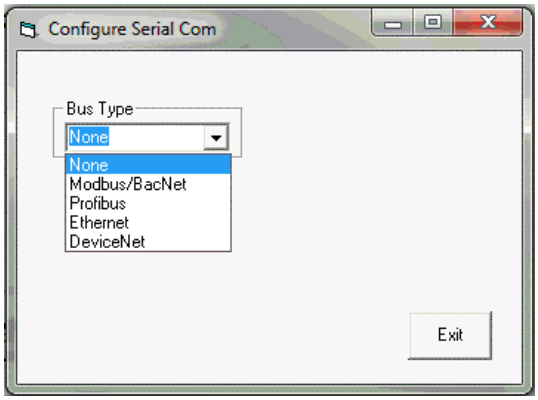
Operation: Configure

Serial COM Settings

Serial COM Settings

Use this function to set the serial communication settings for any of the optional FT2A bus communication boards.

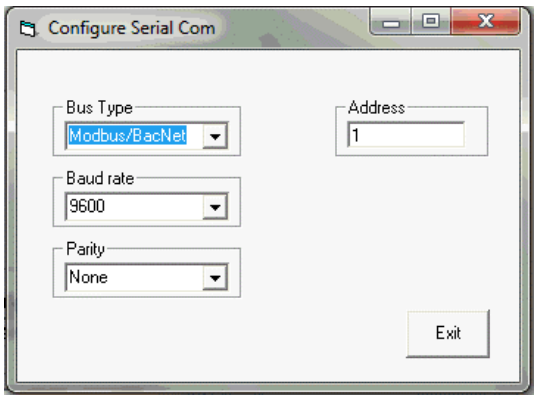
Fig. 3.8: Select Serial Communication Window



The Serial COM selections are:

- NONE
- MODBUS
- BACnet
- ETHERNET
- PROFIBUS
- DEVICENET

Fig. 3.9: Modbus RS485 Settings Screen



Note: The baud rate and parity selector and the network address will be shown for Modbus RS485.

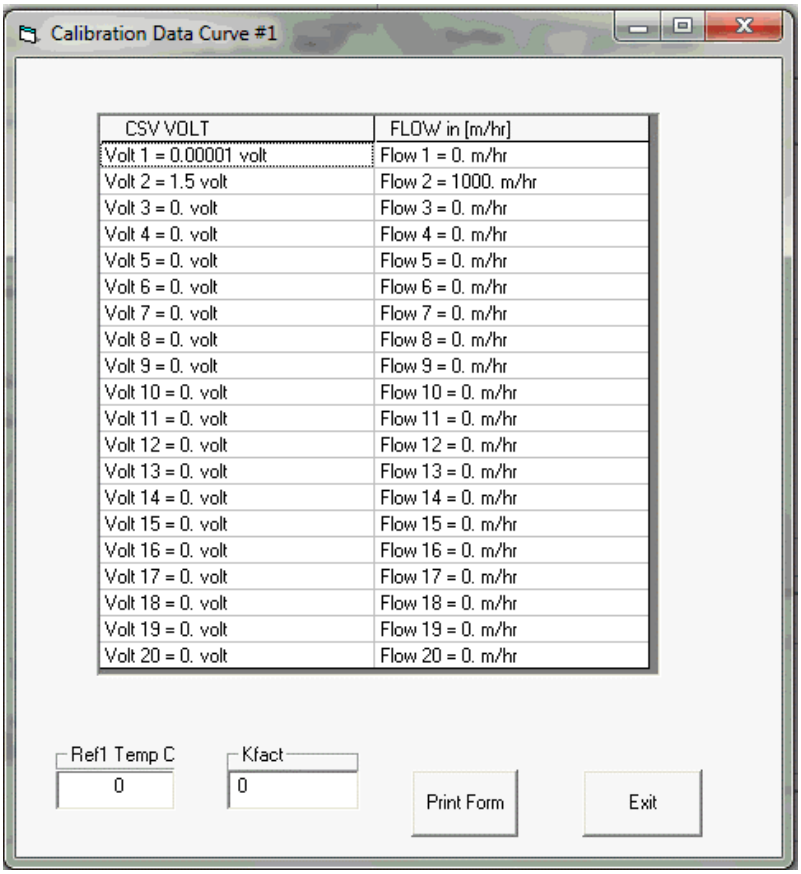
Operation: Configure

Calibration Table

Calibration Table

This allows access to the calibration table(s) stored in the memory of the meter.

Fig. 3.10: Calibration Data Curve Window



The calibration table contains the Current Sense Voltage (CSV) read directly from the meter's bridge circuit, plus the corresponding gas flow velocity (meters per hour). Reference 1 is the temperature at which the table calculations are based. To access a second curve, click the "Curve #2" button.

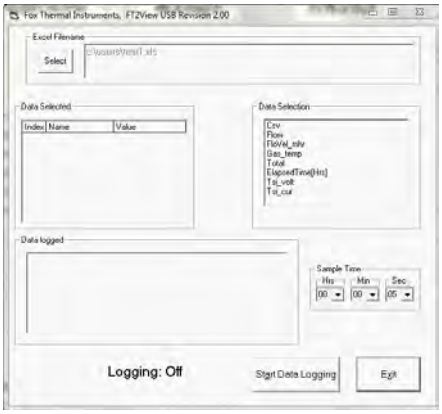
Operation: Data Logger

Data Logger

Data Logger

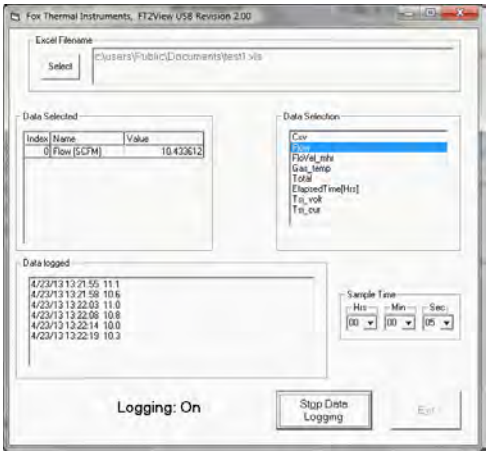
The Data Logger screen can be accessed from the main screen. Clicking the "Data Logger" function will prompt the user for a password. Enter a Level I or Level II password and the Data Logger window will appear.

Fig. 3.11: Data Logger 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. 3.12: Data Logger 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.

Warning: Do not attempt to save your data in the root directory. Windows 7 does not allow this.

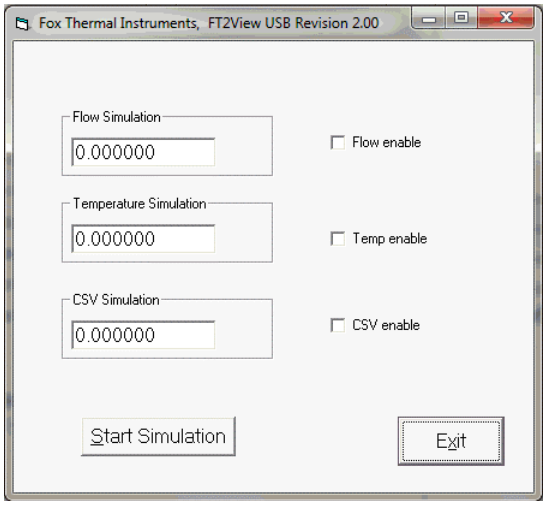
Operation: Simulation Mode

Simulation Mode

Simulation Mode

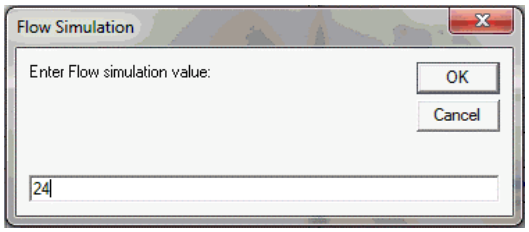
After clicking on "Simulation", a password will be requested. Enter the password and then the Simulation screen will be shown.

Fig. 3.13: 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 outputs, digital outputs and totalizer at simulated flow rates and temperature.

Fig. 3.14: Entering a Simulation Value

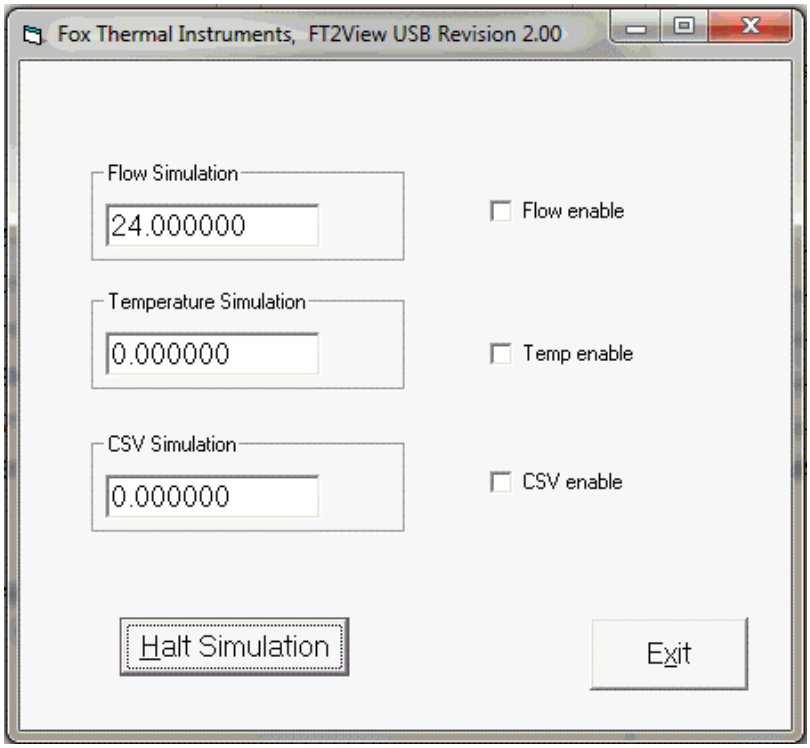


Enter the value, click **OK** and press "Start Simulation".

Operation: Simulation Mode

Simulation Mode

Fig. 3.15: Simulation Running



In Simulation mode, all FT2A outputs and the Totalizer respond as if in normal measurement mode. Click "Halt Simulation" to end.

Definitions

Glossary of Terms and Definitions

COM	Communication
CSV	Current Sense Voltage
ID	Inner Diameter
mA	Milliamps
PC	Personal Computer
RTD	Resistance Temperature Detector
SIM	Simulation
STP	Standard Temperature and Pressure
TSI	Temperature Sense Current

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Definition of Terms

Troubleshooting Tips