Software User Manual Rev. Y

Disclaimer
The instructions in this document have been carefully checked for accuracy and are presumed to be reliable. The authors of this document assume no responsibility for inaccuracies and reserve the right to modify and revise this document without notice. It is the author's goal to supply accurate and reliable documentation. If you discover a discrepancy in this document, please email your comments to support@f4tsoftware.com.

ProcessView

This User Manual applies to ProcessView software versions 7.01 and greater.

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Welcome

Welcome to the "ProcessView" software and it's rich feature set. This software is used to monitor, control and display status for up to 50 Watlow® F4T, Watlow® F4 Legacy controllers or Watlow® PM series controllers on an Ethernet network or RS-485 network. The software supports F4T's that can have up to 4 PID Control Loops, 2 Cascade Control Loops and 4 additional monitor sensors and up to 2 Limit Control Loops for 10 analog inputs total. The software supports Legacy F4 controllers that can have up to 3 Analog inputs for either regular PID control or cascade used for part or substrate control applications. Each Legacy F4 can have up to two control loops. The software supports data logging parameters from both F4T and F4 controls in either a comma delimited format (for use in Excel) or a secure Encrypted format for quality control applications. The PM series controllers and Limits are also supported in ProcessView.

It can be used to graph F4T generated non-encrypted data log files for easy interpretation and for archiving in either hardcopy or electronic PDF files. The software is best used if it is run on Windows 7 or 10/11 and with a monitor that has a resolution of 1024 x 768 or greater.

Here are some additional features:

Email Notifications Capability – This software can be used to send End of Profile and or Alarm conditions via an email or text message.

Real Time Trending – This software has a real time trend chart for each F4T or F4 connected on the network that can be used to validate the F4T or F4 performance or for archiving purposes.

Profile Event Control – This software can be used to monitor and control Profile Event Outputs when a profile is idle or running.

Cloud Database Support – This software can be used to upload logged data to Cloud Support Services. Microsoft Azure and Amazon AWS RDS are supported which allows users to access data securely from remote locations. Data is logged in a SQL database format for easy data sorting and organization. Data can be sent to a Microsoft Access database or a Microsoft SQL Server database as well.

Remote PC Access Supports Multiple Users – Using the "Internet of Things" technology, remote PC's can access all the controllers on the network connected to ProcessView.

Additional Hardware Monitoring Sensors – Additional Sensors can be added to the network for Part or Process monitoring using Watlow's D4T Data Logger. Up to 24 additional sensors can be added.

Quality Assurance Reports – Customizable QA reports can be configured which record if a profile has been completed successfully or not and the report can then be archived in a PDF file or sent to an external printer.

Variable Control – This software can be used to monitor and control up to 8 internal digital or analog variables inside a F4T for external machine control. Digital inputs to the F4 controller can be viewed as well.

Alarm Management – This software displays real-time alarm status and control for alarm monitoring and management.

Custom Naming Capability – This software allows the user to provide custom names that are more pertinent to their application for various analog inputs or digital I/O.

Batch Recording – When a Profile is running the real-time data is displayed and can be archived with a printed copy or electronic PDF file as well as custom user notes appended to the trend chart.

Trend Chart Customization – This software allows users to select which data is displayed real-time as well as trend pen graph colors.

Data Logging – This software can selectively log data from the F4T or F4 either continuously or only when a Profile is running. The file saved can be either a CSV file or Encrypted file for Quality standards. All events, variables, starting, stopping, pausing and termination of an active Profile is logged to the data file. When the data log file session has ended, all minimum and maximum process values for all sensors are recorded.

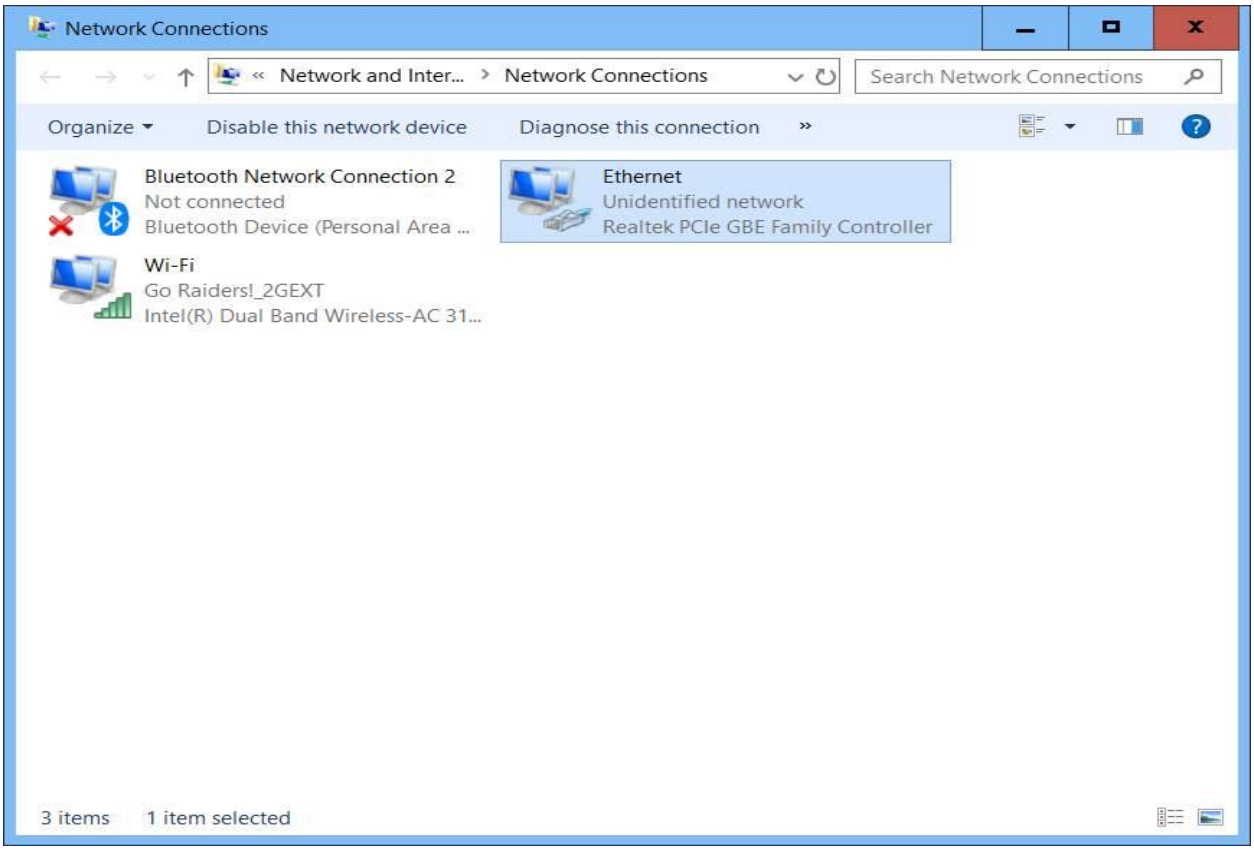
Password/Security Protection – This software has the ability to password protect all menus for either a Technician or Operator type user.

Real-Time Data Logging Viewer – All data can be viewed as it is being logged in real time. You can add notes to the data log file while it is logging and after it is completed.

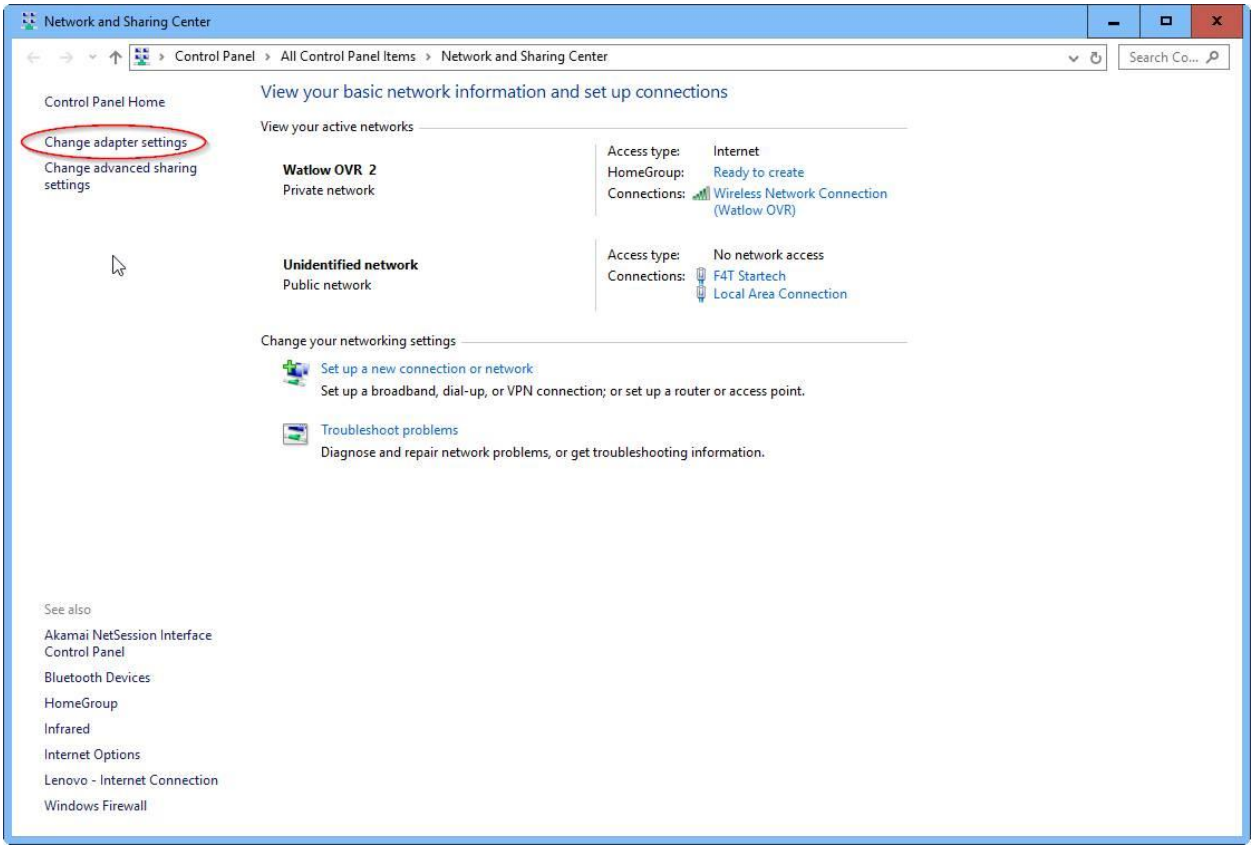
21 CFR Part 11 Compliance – ProcessView combined with a locked out F4T Controller can be used to satisfy 21 CFR Part 11 Quality guidelines. ProcessView supports electronic signatures, advanced password management, encrypted data log files and an Audit Trail which all are used for data integrity and security for Life Science, Pharmaceutical, Food or any other industry requiring 21 CFR Part 11 Compliance.

Network Connection

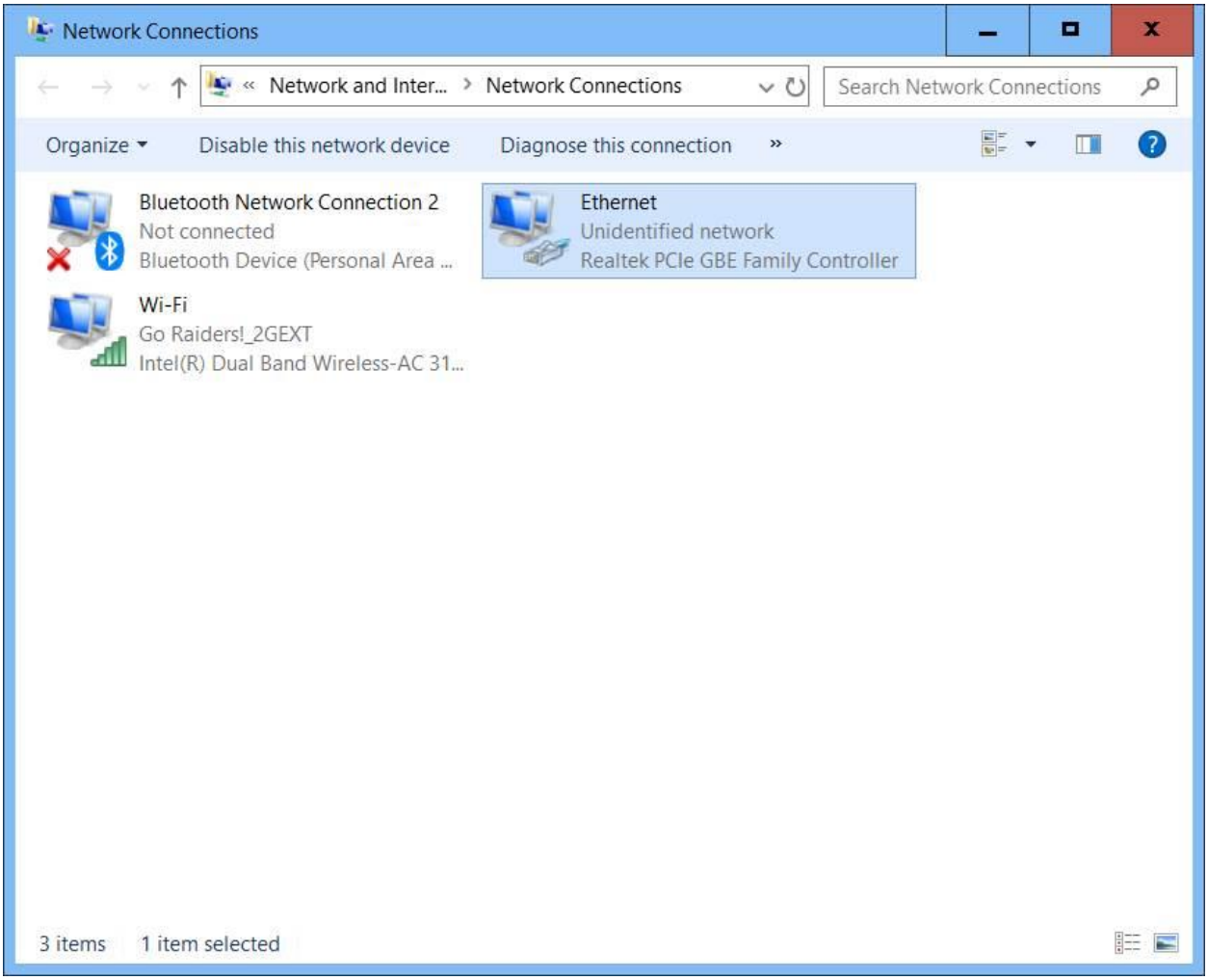
In order for the software to communicate correctly you must ensure that the F4T's and the PC running this software are connected via Ethernet and are on the same Local Area Network Address. To change or ensure that this is the case, please navigate to the Windows Control Panel and select "Network and Sharing Center":



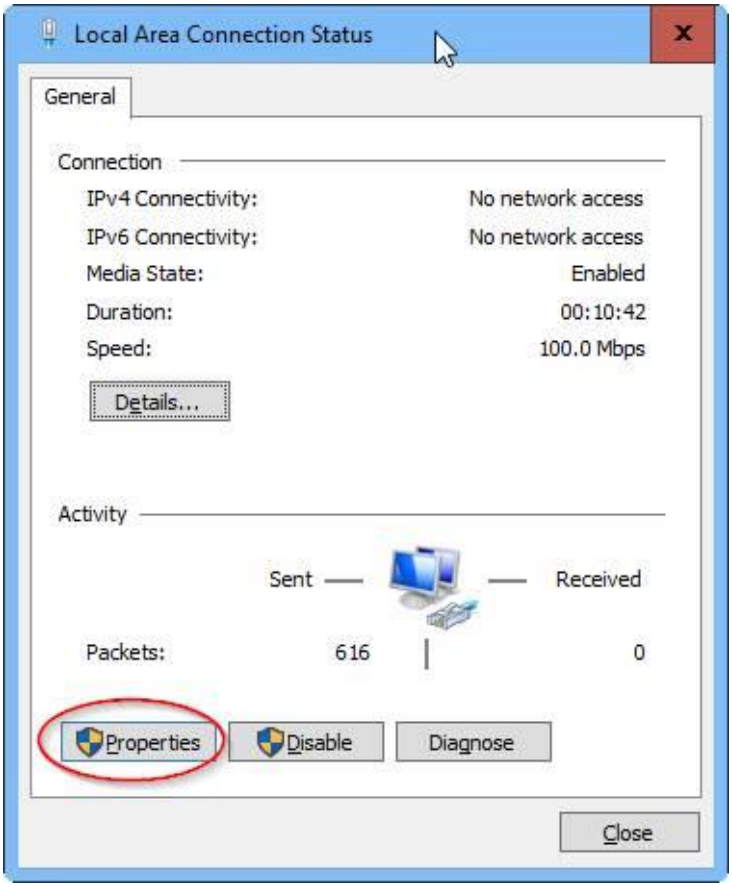
Next Select "Change adapter settings:



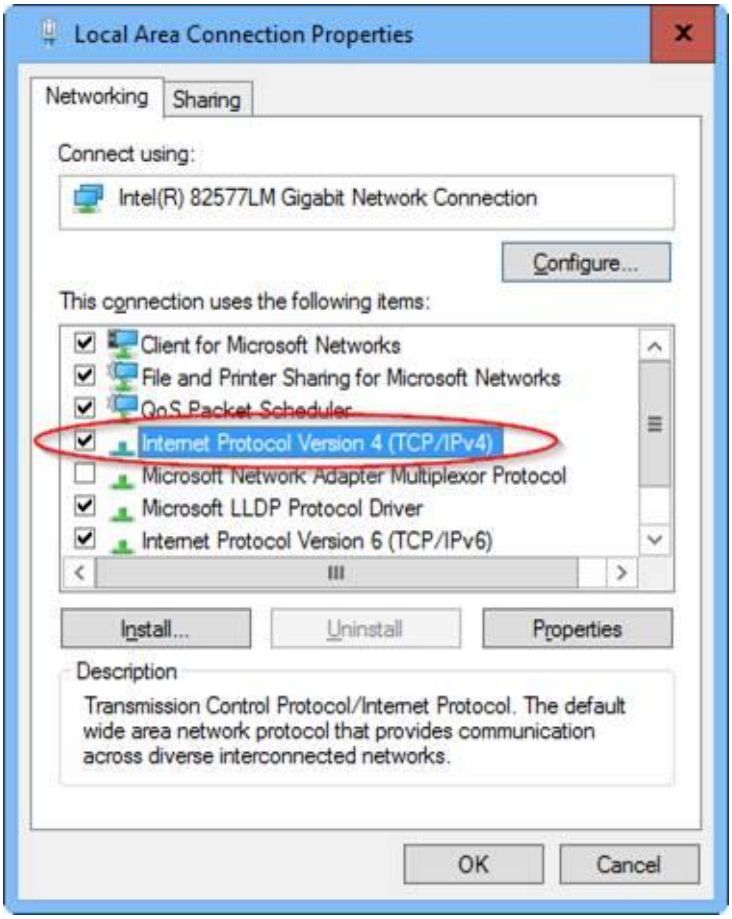
Then select the appropriate network adapter that is used to connect the Ethernet cable. If hardwired it will usually be the “Local Area Connection”. If wireless than select the “Wireless Network Connection”. Then “double click” on the selected network connection with your mouse.



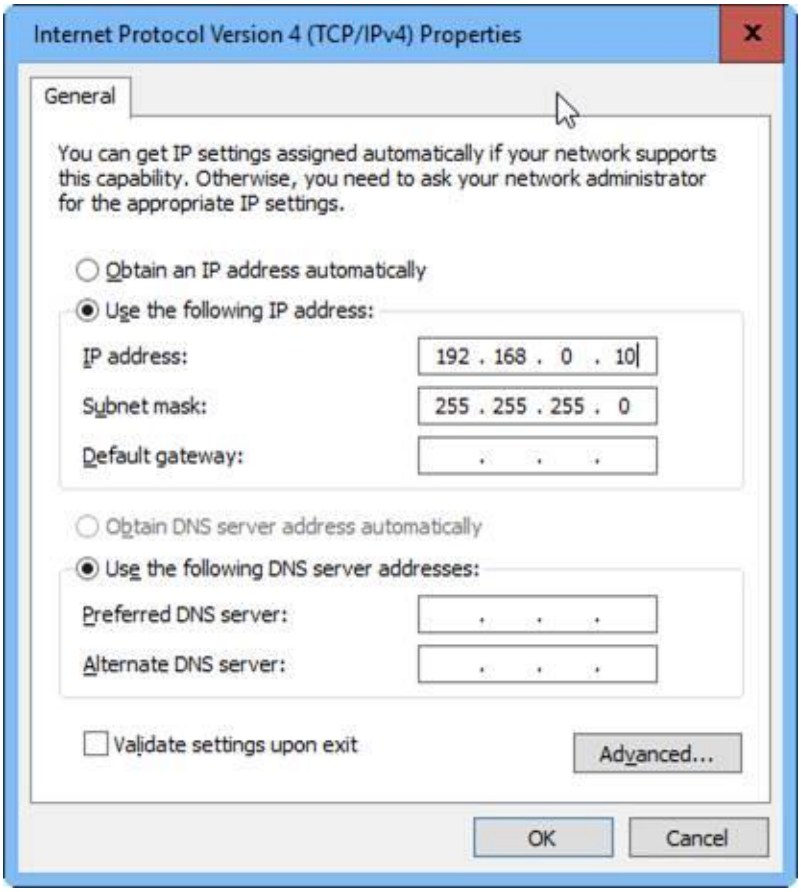
The following pop up window will be displayed:



Then select by double clicking on “Internet Protocol Versions 4 (TCP/IPv4)”



Then in the IP address field put in a network address that is on the same network as the F4T (Do not put in the same address as the F4T). The F4T default address is 192.168.0.222. If you put in an address that is something like 192.168.0.10 it will then be on the same local network. Make sure you select “Use the following address” as well. Enter 255.255.255.0 for the Subnet mask. Leave the Default gateway blank as show below:



Select OK and exit out of all the dialog boxes by selecting “OK”. Your adapter card will now be on the same local network as the F4T and it should communicate. If you change the internal IP Address on the F4T using the F4T touch screen you will need to power the F4T off and then on for it to take effect.

Legacy F4 Serial Communications

The Watlow F4 Controller typically interfaces with ProcessView via a USB to RS-485 converter. The F4 Controller uses RS-485 “2-wire” half duplex serial communications. The signals for this are +Tx/Rx, -Tx/Rx and GND. The positive transmit and receive signals share the same positive wire and the negative transmit and receive signals share the minus wire of the USB converter.

RS-485 Communications:

Important!!!

It is very important that you use a USB to RS-485 converter that uses a good chip set that is supported by Windows 7/10 or 11. If you use an older USB to RS-485 converter you might experience intermittent communication errors which are very hard to diagnose and debug. Several customers have had issues with communicating to an F4T network because they did not have up to date USB to RS-485 converters and when they switched to newer designs the communication errors went away. So please if you don't have good USB to RS-485 converter, spend the $25.00 and buy one! If you can get one with the FTDI Chipset, they are the most reliable.

Here are a couple (Waveshare, and DTech) that have been tested and have been proven to work very well and are available on Amazon for under $25.00:

Waveshare:

Industrial USB to RS485 Converter Adapter Original FT232RL Fast Communication Embedded Protection Circuits Resettable Fuse ESD Protection TVS Diode etc Automatic Transceiving

Visit the waveshare Store

229 ratings | 13 answered questions

Amazon's Choice for "modbus"

BEST PRICE!

$15.79

Get **Fast, Free Shipping** with Amazon Prime

FREE Returns

Best price

DTech:

DTECH RS485 Cable to USB C RS422 Serial Adapter with FTDI Chip Breakout Board LED Indicators RS-485 RS-422 Converter Supports Windows 11 10 8 7 XP Mac (1.5 Feet)

Brand: DTech

5 ratings

BEST PRICE!

$17.88

Get **Fast, Free Shipping** with Amazon Prime

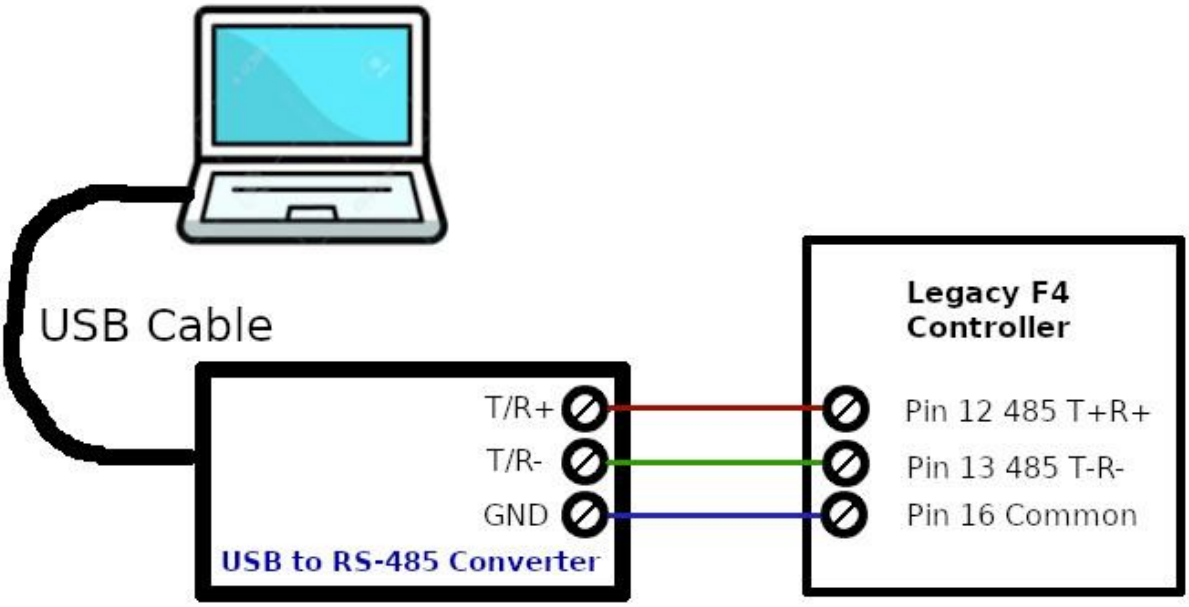
FREE Returns

Best price

Get $100 off instantly: Pay $0.00 upon approval for the Amazon Store Card.

The Watlow F4 Controller typically interfaces with ProcessView via a USB to RS-485 converter. The F4 Controller uses RS-485 "2-wire" half duplex serial communications. The signals for this are +Tx/Rx, -Tx/Rx and GND. The positive transmit and receive signals share the same positive wire and the negative transmit and receive signals share the minus wire of the USB converter.

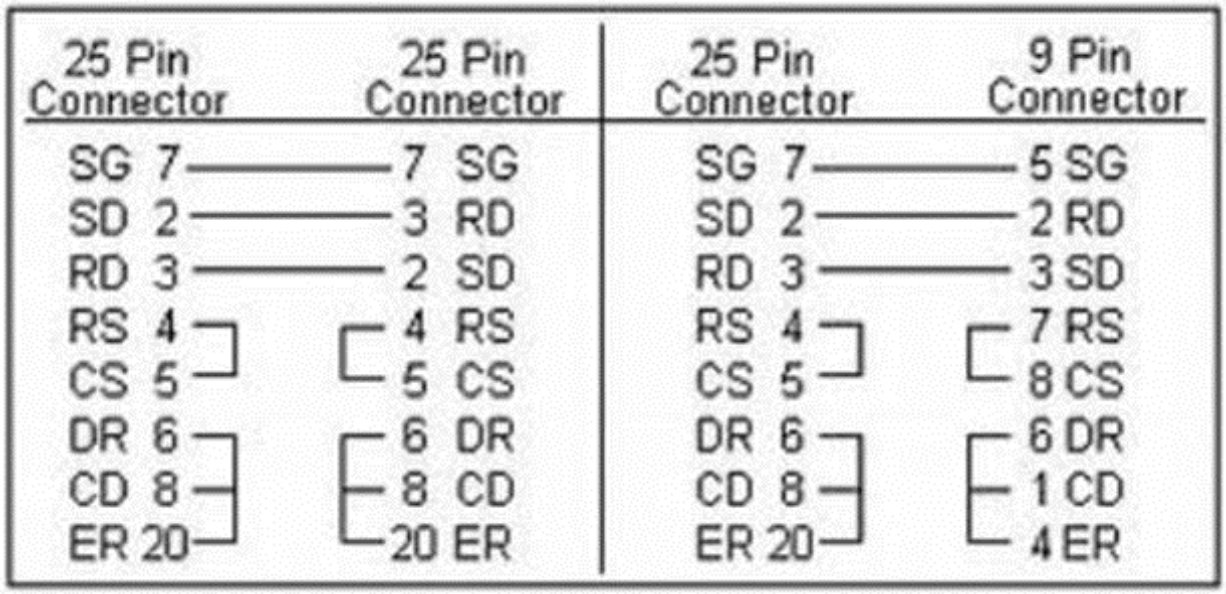
Below is an example of RS-485 wiring required:



RS-232 Communications:

If you are using a USB to RS-232 converter from your PC a little more work will be necessary compared to the easier USB to RS-485 converter setup. A lot of chamber manufacturers will provide a RS-232 port with a DB-9 or DB -25 connector for the RS-232 signals, but they will not jumper out the RTS, CTS signals or the DTR, DSR signals which will pose a problem in getting the communication to work. The F4 controller uses pins 14 (TX), 15 (RX) and 16 (Common) for RS-232 communications. Most USB converters will also need to have some of the signals "Looped Back" in order to enable communications. Some customers have found that it is easy to take the mounted DB-9 or DB-25 connector off of the panel on the chamber and jumper the signals on the connector where the wires are soldered to the terminals.

Below is a diagram which shows how to jumper the signals with both a DB-25 and DB- 9 connector (DB-9: jumper 7 and 8, jumper 1,4 and 6, DB-25: jumper 4 and 5, jumper 6, 8 and 20)

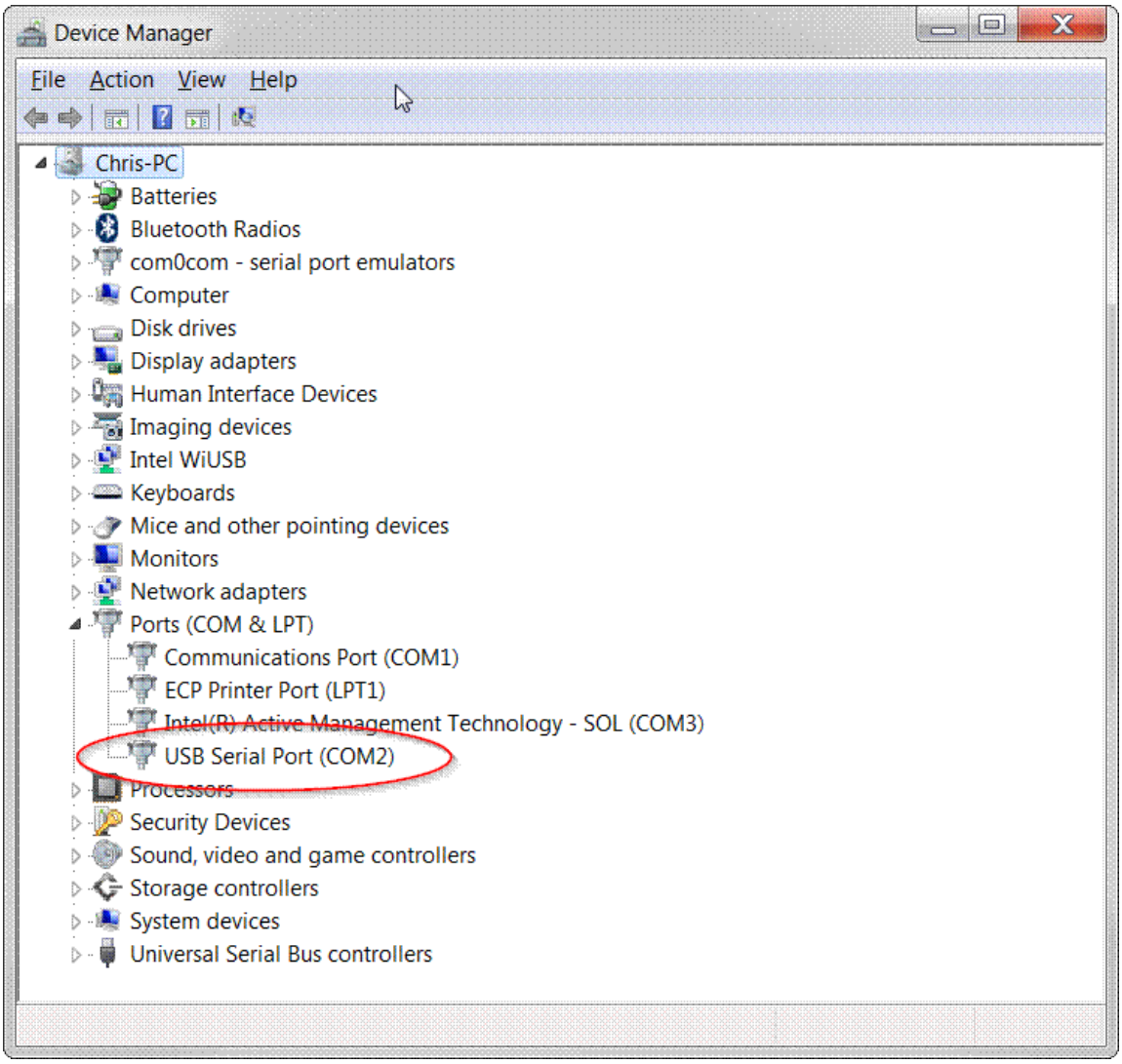


You must make sure that the TX or SD signal goes to pin 15 of the F4 controller and the RX or RD signal goes to pin 15 of the F4 controller (sometimes you might need to swap the wires connected to pins 14 and 15 on some chambers to get the correct interface).

The ProcessView communication settings for the F4 controller must match the current settings stored inside the F4 controller. The network address and baud rate must be the same. To access the communication parameters in the F4 Controller go to the "Setup Menu", then select "Communications" and you will then see the Baud Rate setting (9600 or 19200). Then if you select the forward arrow on the F4 you will see the Network Address setting (1-256). These settings will be used when you configure the F4 Setup in ProcessView.

The other piece of information you will need for the setup is the COM port number assigned by Windows to your USB to RS-485 converter.

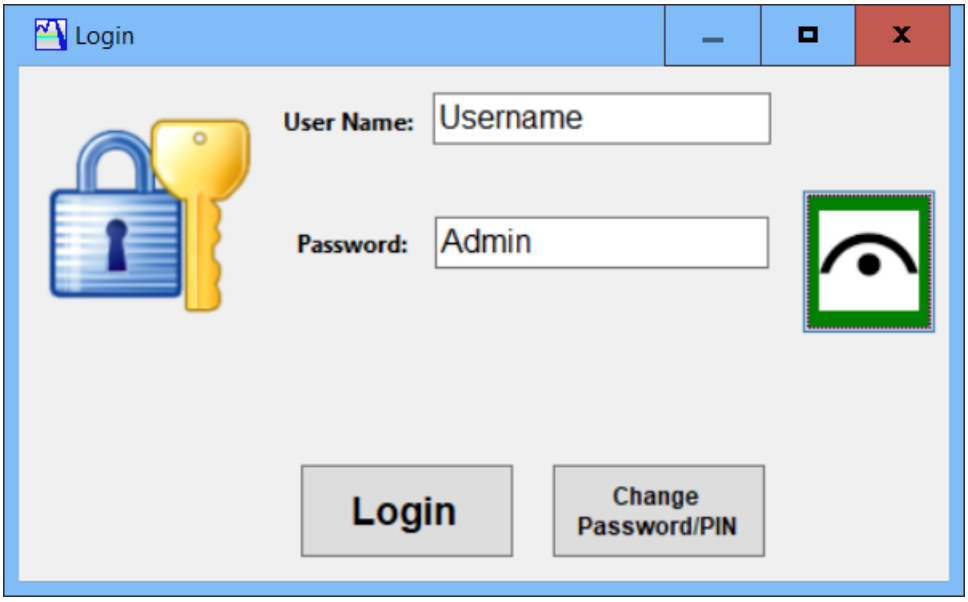
After installing the driver for your USB converter you can check which COM port was assigned to the converter by looking at the Device Manager under the Control Panel in Windows as shown below (in this example COM2 was assigned):



Getting Started F4T/D4T

After you have ensured and setup your PC to be on the same Local Network as the F4T (see setting up Network section) then the next thing you need to do is configure the F4T control loop names and

if they are used in the F4T internal program. After installing the ProcessView Software, the main screen below will be shown. You will need to select the "Settings" menu and then select "Add an F4T On-line", menu item. If you log out of that screen you will then need a password to get back in from the "Login" menu. The default user name is "Username", and the default password to use is "Admin" and below is the login screen.

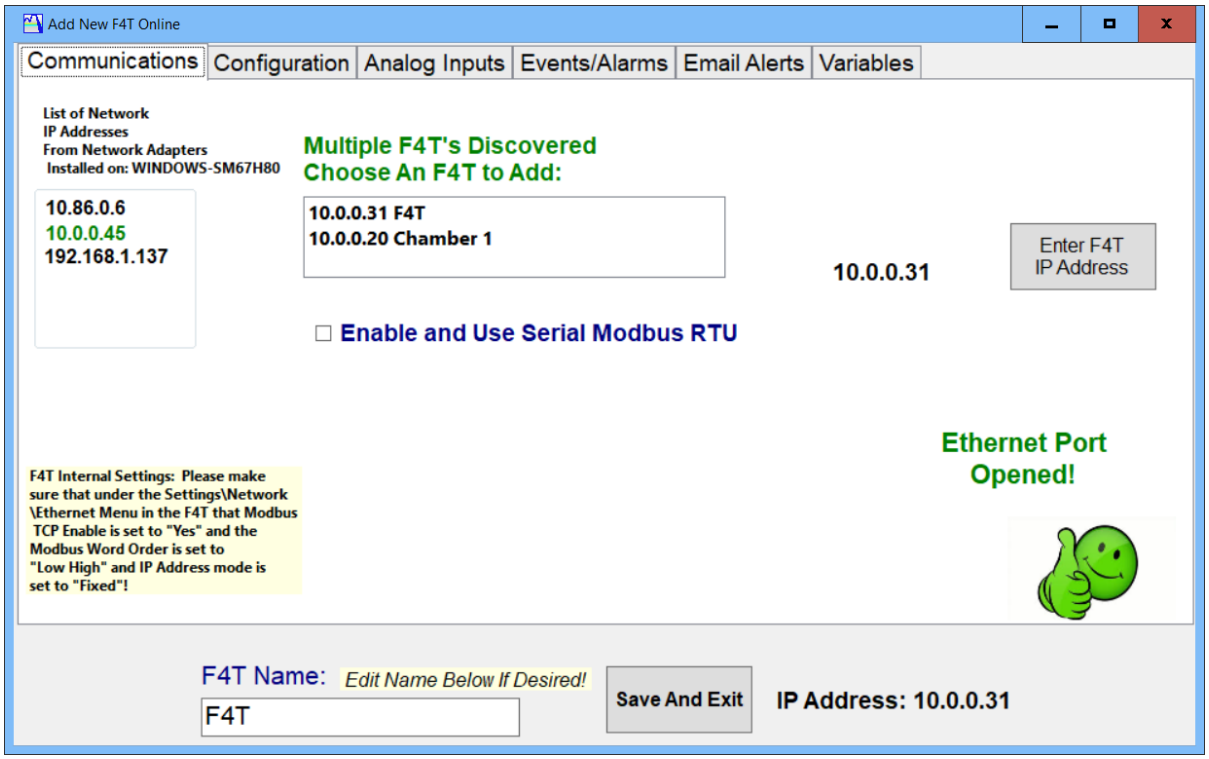


After selecting the "Settings" menu you will see the "Add New F4T Online" Screen for adding an F4T controller. You will then need to configure the communications to the F4T controller. Enter the appropriate communication parameters for either Ethernet (IP Address of the F4). The default IP address is 192.168.0.222 which is what configured from Watlow. If you are not sure what the F4T IP address is you will need to get that information from the F4T controller. You can do this by touching the settings icon on the bottom of the front F4T screen, then select the "Settings" button, then select the "Network" button, then select "Ethernet". You can then scroll down and you will see the Ethernet Address for your F4T controller. When the screen first comes up, the ProcessView software will scan the local networks for F4T Controllers and populate the list box for any controllers it discovers. You can then select the appropriate controller in the list box and that will be the IP Address used for the rest of the setup process. The screen will also show you the list of IP Addresses associated with your PC's Network Adapters that are on the PC. Make sure that they are colored green which means they are on the same subnet as the F4T IP Address. If for some reason you don't see any discovered F4T's in the list box you can try and manually add an F4T IP Address using the

"Enter F4T IP Address" button. Sometimes if you are using a shared network or a virtual PC this might be the case.

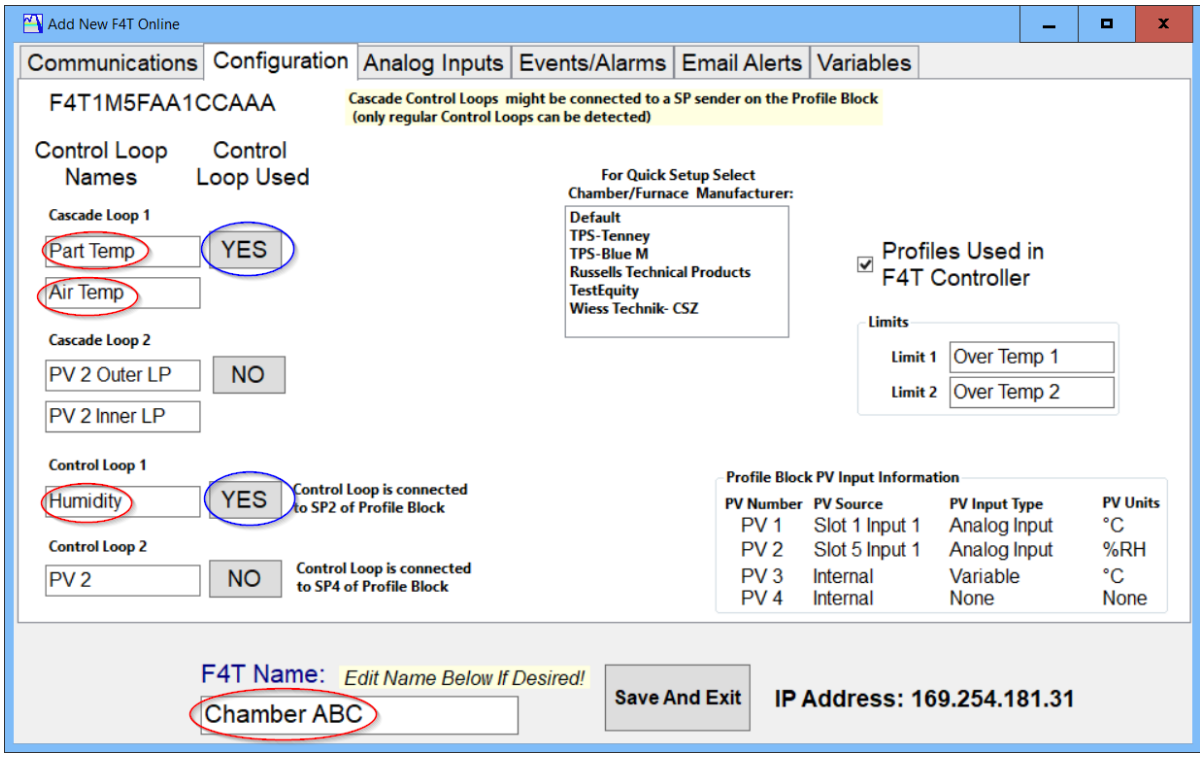
F4T Setup:

Communications Tab:



If your F4T has been detected and there is only one F4T on the network the software will automatically select the "Configuration Tab" to complete the setup. Otherwise with multiple F4T's or D4T's on the network you will need to select the F4T in the list that you are setting up and then you will be taken to the Configuration screen as shown below:

Configuration Tab:



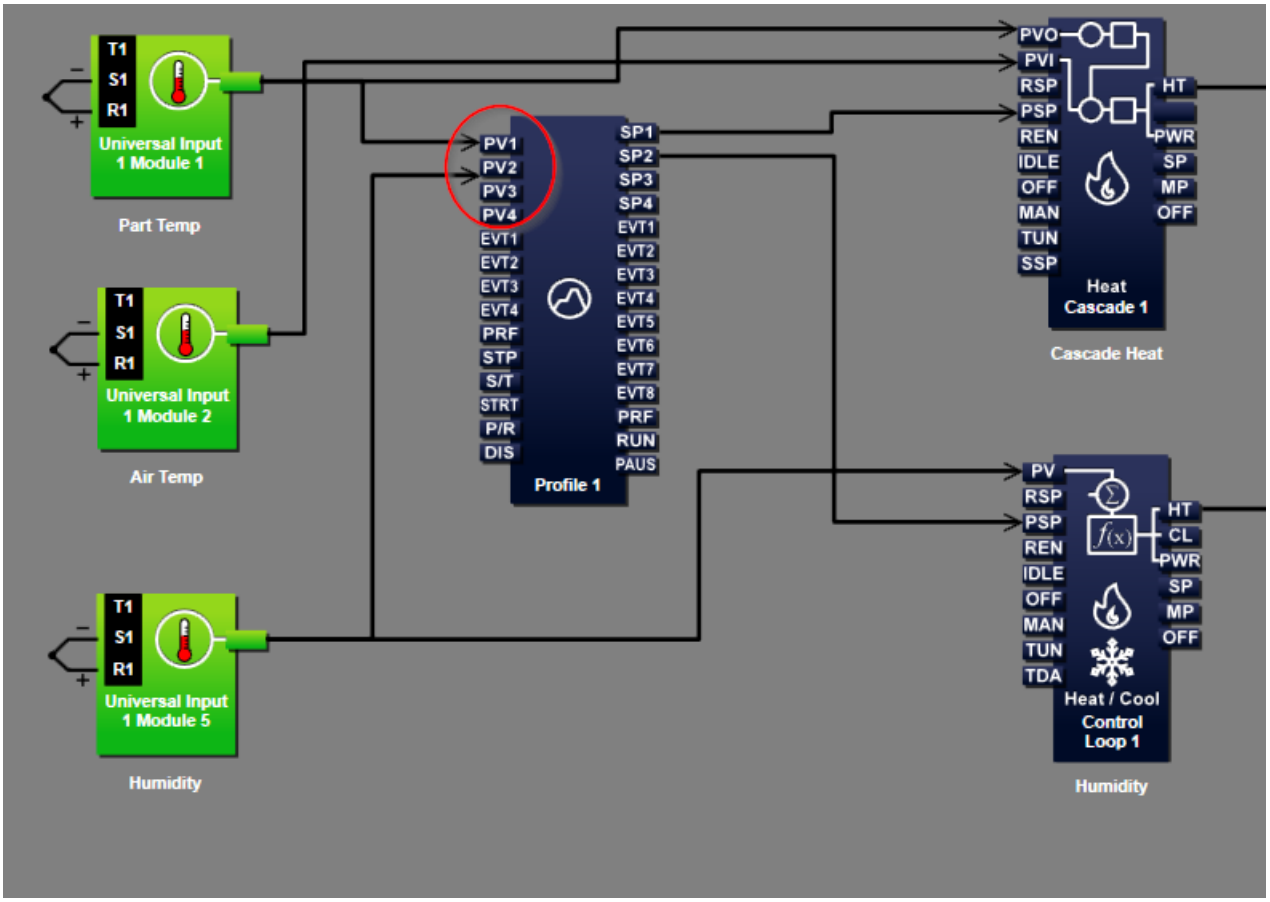
The software will detect all the control loops present in the F4T based on it's model number. It does not know which control loops are being used and which ones are active. You will need to tell the software thru the configuration tab which control loops are used and which ones that are being used are connected to the profile engine of the F4T.

All the circled fields are fields that you can edit to give unique names to the analog signals that are being read by the F4T. All the red circled fields are names for the control loops or inputs to the control loop. In the above screen shot, it is configured for 1 cascade loop (Part Temp and Air Temp) and 1 control loop (Humidity). The blue circled YES/NO buttons are used to tell the software if control loops are being used in the F4T program. The "YES" buttons are telling the software that Cascade 1 and Control Loop 1 are being used in the F4T program. In the example above, Cascade Loop 2 and Control Loop 2 are not being used in the F4T program. You must make sure this matches the configuration in the F4T controller. The Green circled unit's text box is where the units were changed from the default of temperature (F or C) to "%RH" for humidity.

If you know the manufacturer of your chamber or oven then you can just select the manufacturer in the Chamber/Furnace List and all the names and correct number of loops used will be present and you don't have to do anything else except give your chamber or furnace an appropriate name.

The Profile Block PV Information container is used for diagnostics and will show you what is wired up in Composer to the Profile Block PV inputs. The software uses PV1 and PV2 so you have to make sure those inputs are correct.

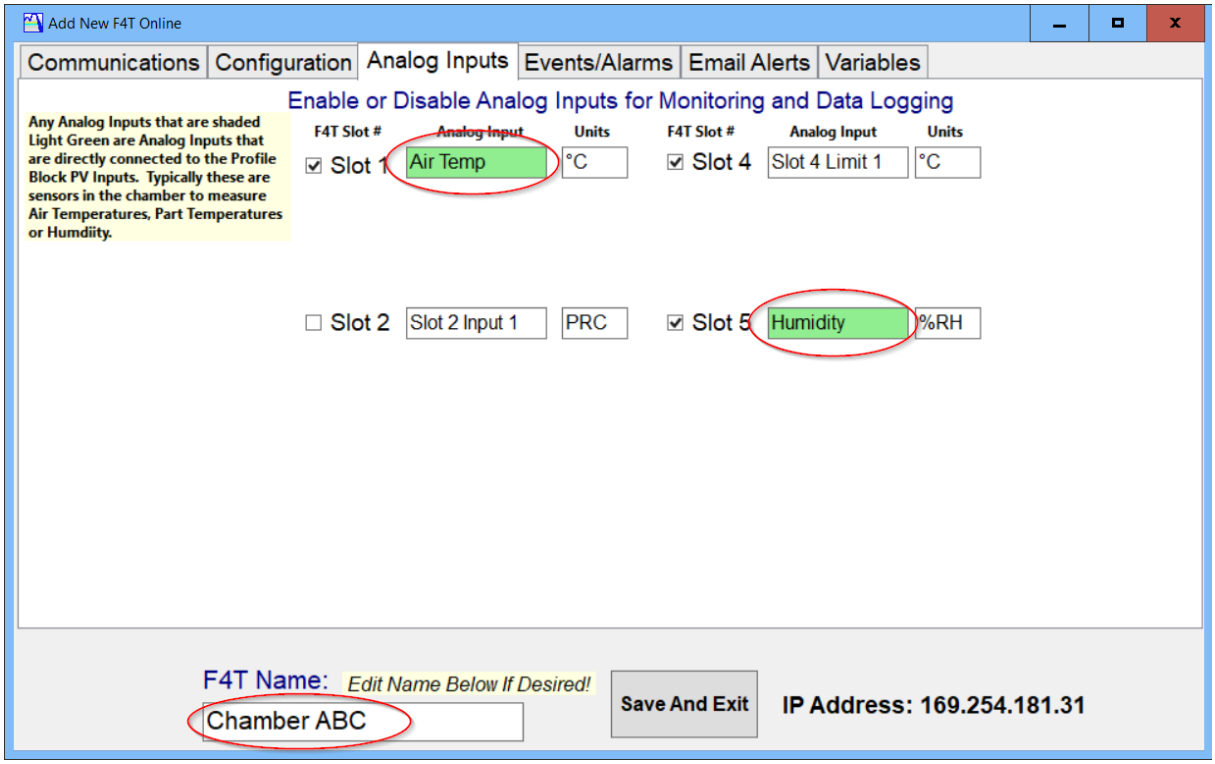
Each regular control loop will also have a note by it if it is connected to the Profile Functions Block's SP output. This is the setpoint signal that is used by the Profile Block to tell the corresponding control loop what the remote setpoint is during a profile program. If a cascade control loop is being used then you will not see a note as this information is not available from the F4T. You might have to use the Composer software to verify this. In the screen shot above, cascade loop 1 is connected to SP1 of the profile block and control loop 1 is connected to SP2 of the profile block. Below is a screenshot from Watlow's Composer software showing an example of a cascade control loop and a regular control loop configured in the software which is programmed in a F4T controller. The circled PV1, PV2 inputs and SP1, SP2 outputs are what must be connected for the software to work with the profile engine. The software does not work with the PV3, P4 or SP3, SP4 input/outputs of the Profile Block. In most of the cases users that setup the program in the F4T will do it similar to the screenshot below.



Analog Inputs Tab:

If you would like to also see the Analog Input filtered values on the trend graph or data log their values independently of the process value being fed to the control loop (most cases this is the same value, but in others a process block may be doing some math or scaling before the signal get's to the control loop block). You can give custom names to the Analog Inputs instead of the default names that indicate the slot number and input number being used.

You can select the "Analog Input" tab to configure the analog inputs as shown below:

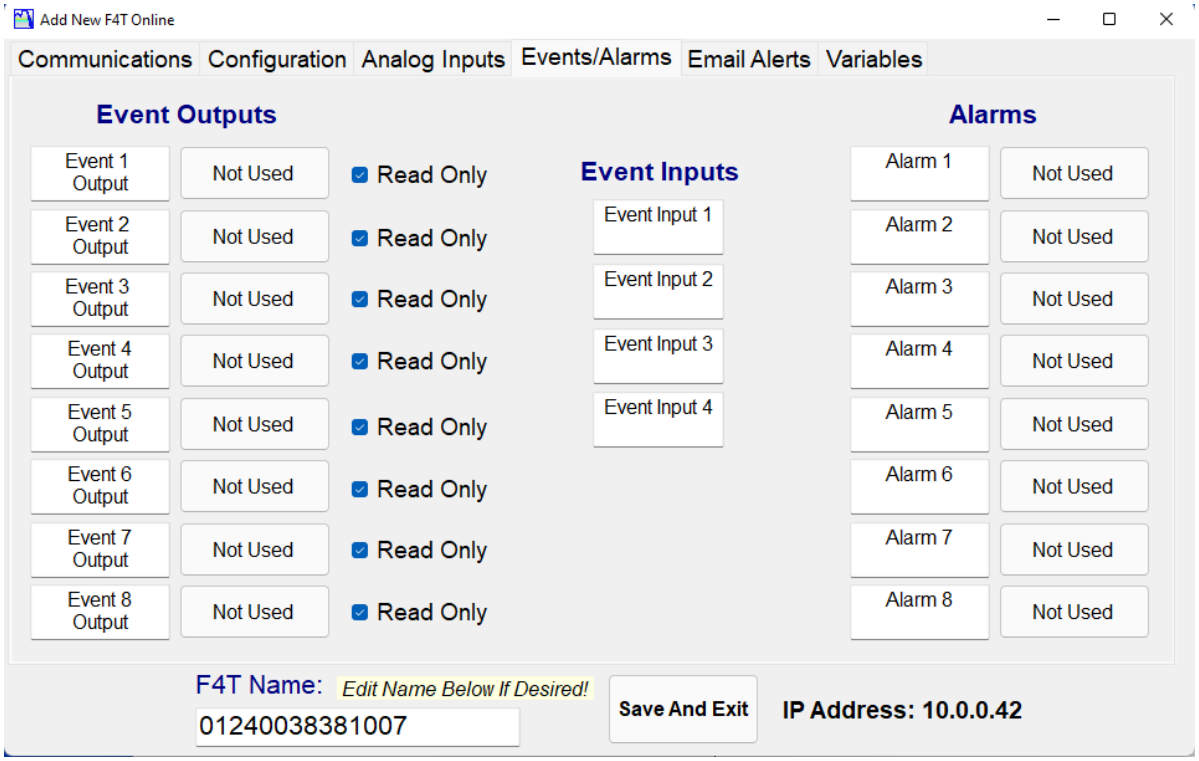


This will show you all the analog inputs that are connected to the F4T and which slot and input numbers are being used. If an Analog input is shaded light green, then those are inputs that are directly wired to the PV inputs of the Profile Block. In most cases, you will not need to enable any of the Analog inputs as the software reads the values that are present at the control loop input. Only in some cases you may want to see the "raw" analog value coming in before it is scaled or processed by a process block or linearization block.

Events/Alarms Tab:

The Events/Alarms tab is used to tell the software which events are being used and internal alarms in the F4T. The Events are the signals that are outputs from the Profile Block and can be set as read only or provide the user the ability to change the state of the event output from the software. You can give a custom name to each event output which corresponds to the event function.

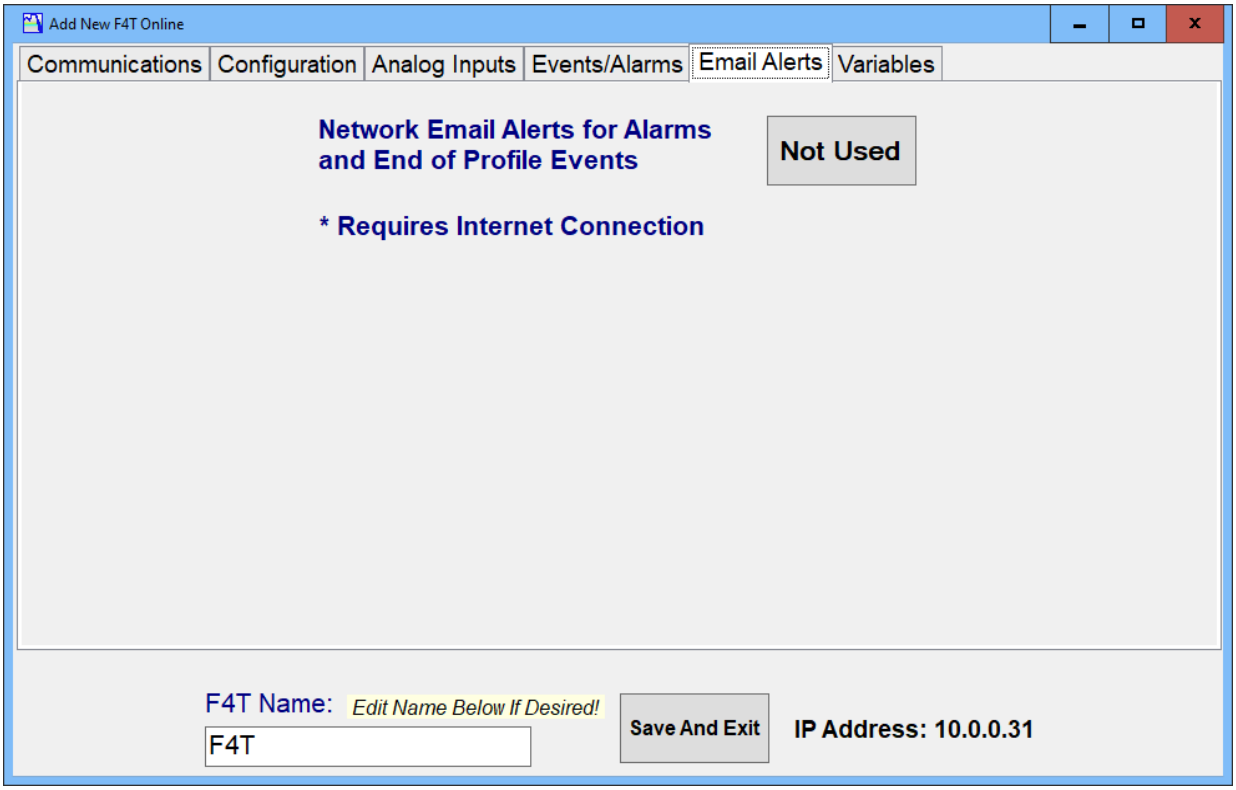
Here is an example below:



The Alarms are the internal alarms (8 total) for the F4T controller. In most cases you will not need to access them as they usually are prewired internally in the F4T program and will trip other logic conditions inside the chamber or furnace. The event outputs can be read only or can provide access to the users to make changes independently from the controller program. Custom names can be given to the event outputs, event inputs or alarms which correspond to the function of the event output or alarm condition.

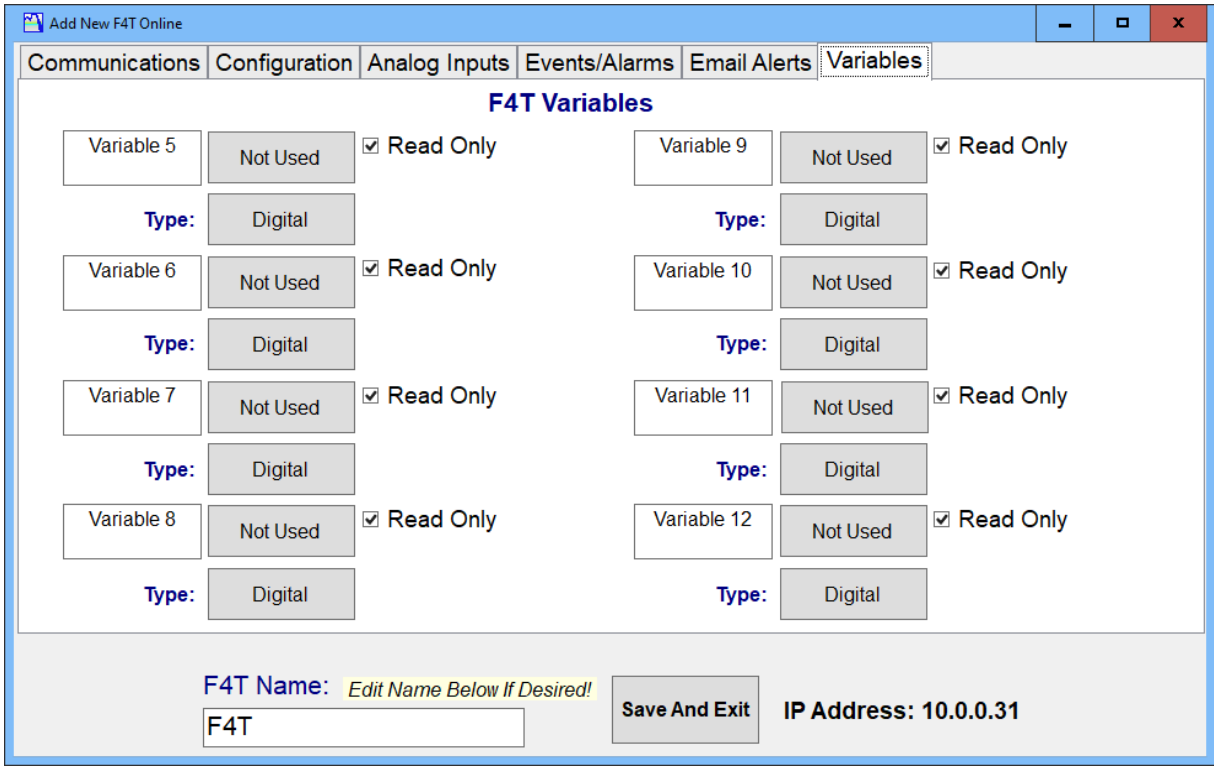
Email Alerts Tab:

The email alerts tab is used to enable sending emails or text messages when a profile is completed or an alarm condition occurs. The PC must have internet access in order for this function to work properly and you will need to check with your IT department for the settings required to allow this to work.



Variables Tab:

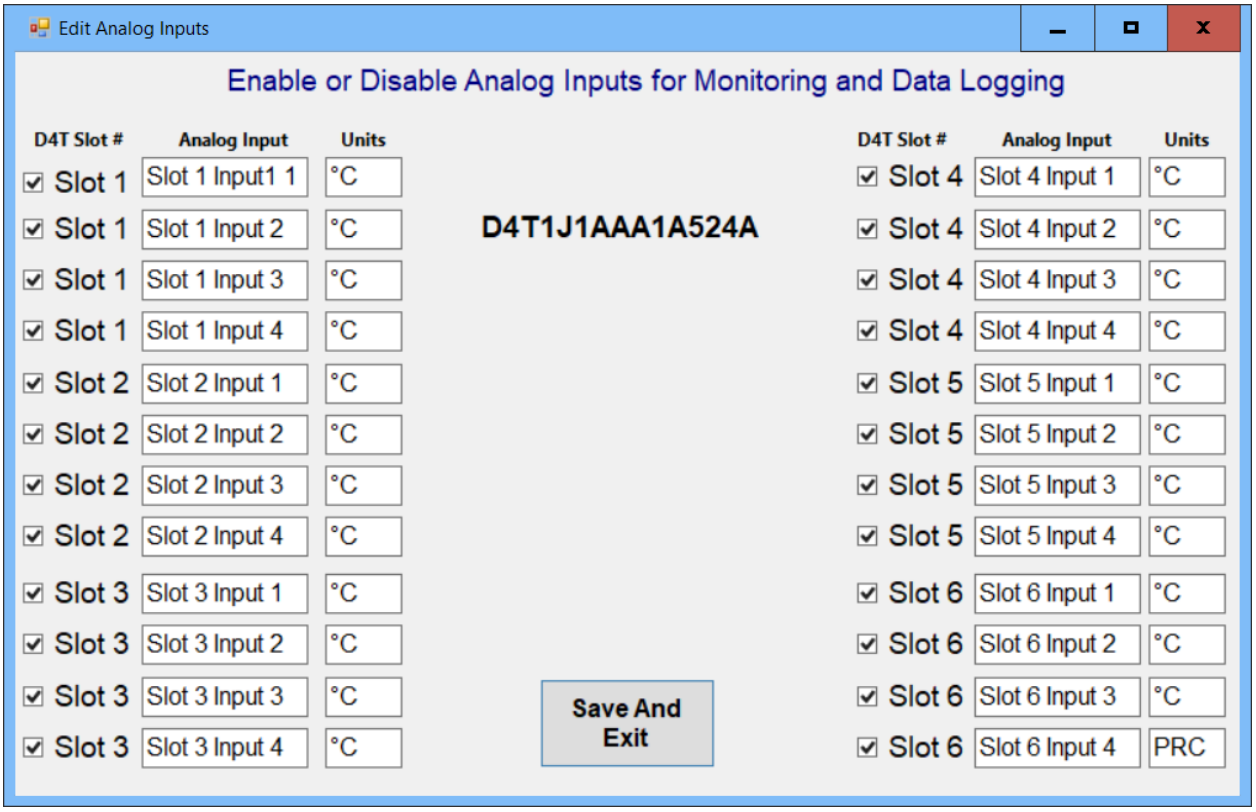
The variables tab is used to provide the software access to the F4T internal variables. In most cases you will not need to access or enable the variables on this tab. This is for advanced users that want to have the software be able to set an analog value or digital state to an internal variable that can then be tied to internal logic in the F4T. An example might be to set a belt speed which would use an internal F4T variable tied to an internal Analog voltage output which would be sent to an external speed controller. The variables that can be access are variables 5-12. Custom names can be given to the variable for the function it is providing, such as in the example above it could be “Belt Speed Setpoint”.



D4T Setup:

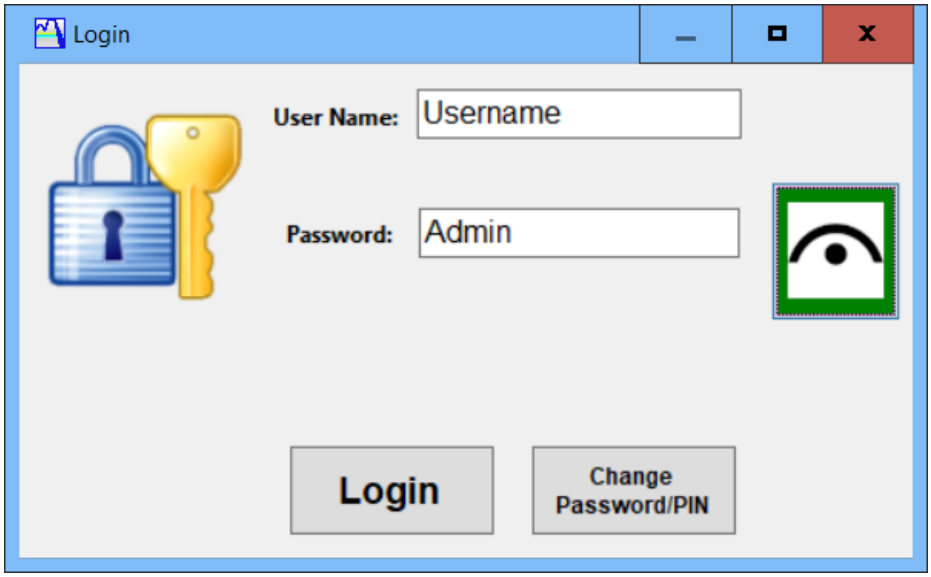
Setting up a D4T is much easier than an F4T as there are only 2 tabs to configure (Configuration and Analog Inputs). After selecting or setting the IP address with the communications tab as show for the F4T you can then enable the Analog Inputs that you would like available for data logging and trending. The screen will show the slot number the input flex module cards are in as well as the input number for that card. If units have been assigned in the D4T they will also be shown. You can also change the units to custom units as well by renaming the units.

You can also give custom names to the analog inputs that you will be monitoring as shown below:

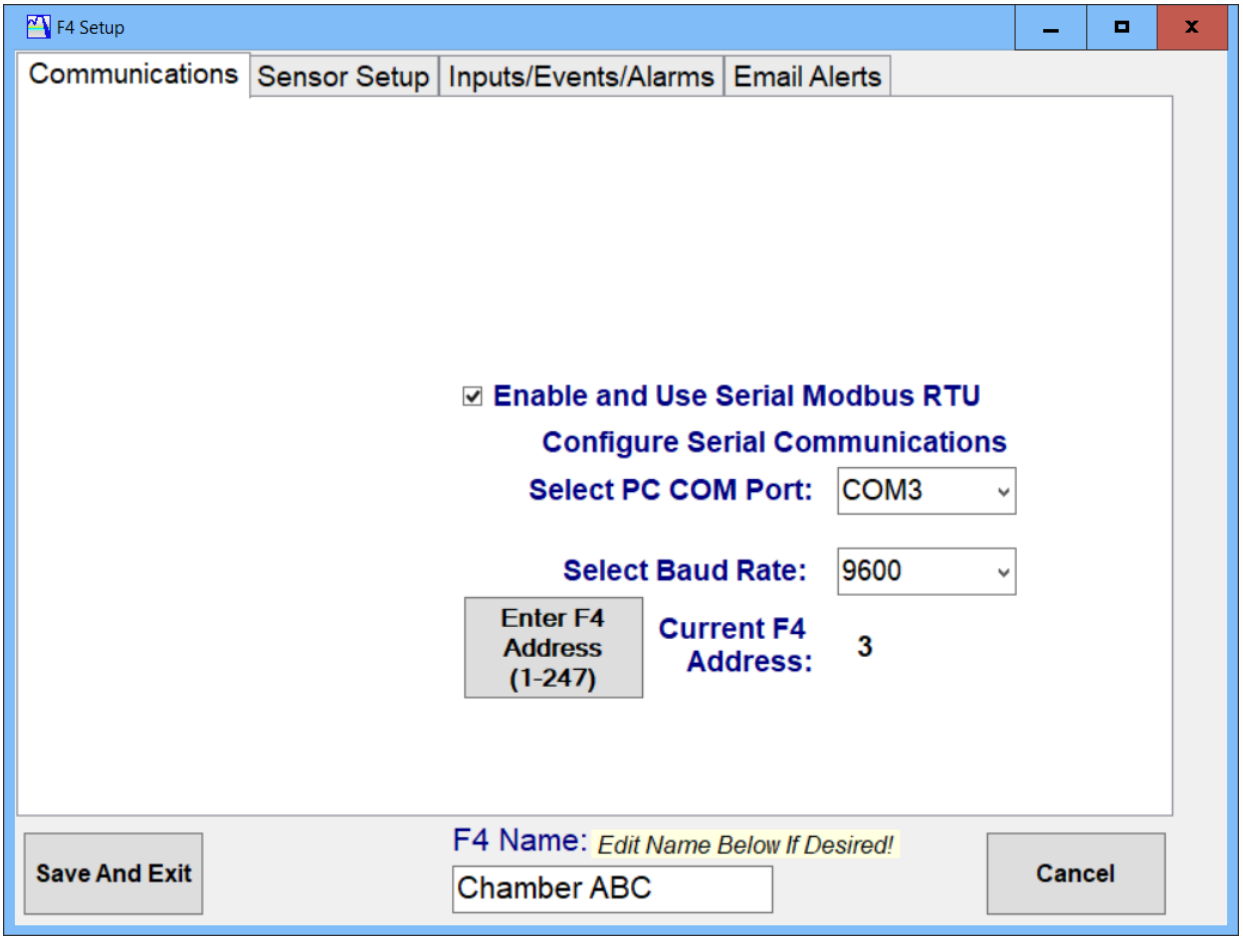


Getting Started Legacy F4, PM Controllers

After you have ensured and setup your PC to be on the same Local Network as the F4 or PM (see setting up Network section) then the next thing you need to do is configure the F4 or PM sensor input locations and functions. After installing the ProcessView Software, the main screen below will be shown. You will need to select the "Settings" menu and then select, "Add New Legacy F4 Online" or "Add New PM Controller Online" menu item. If you log out of that screen you will then need a password to get back in from the "Login" menu. The default user name is "Username", and the default password to use is "Admin".

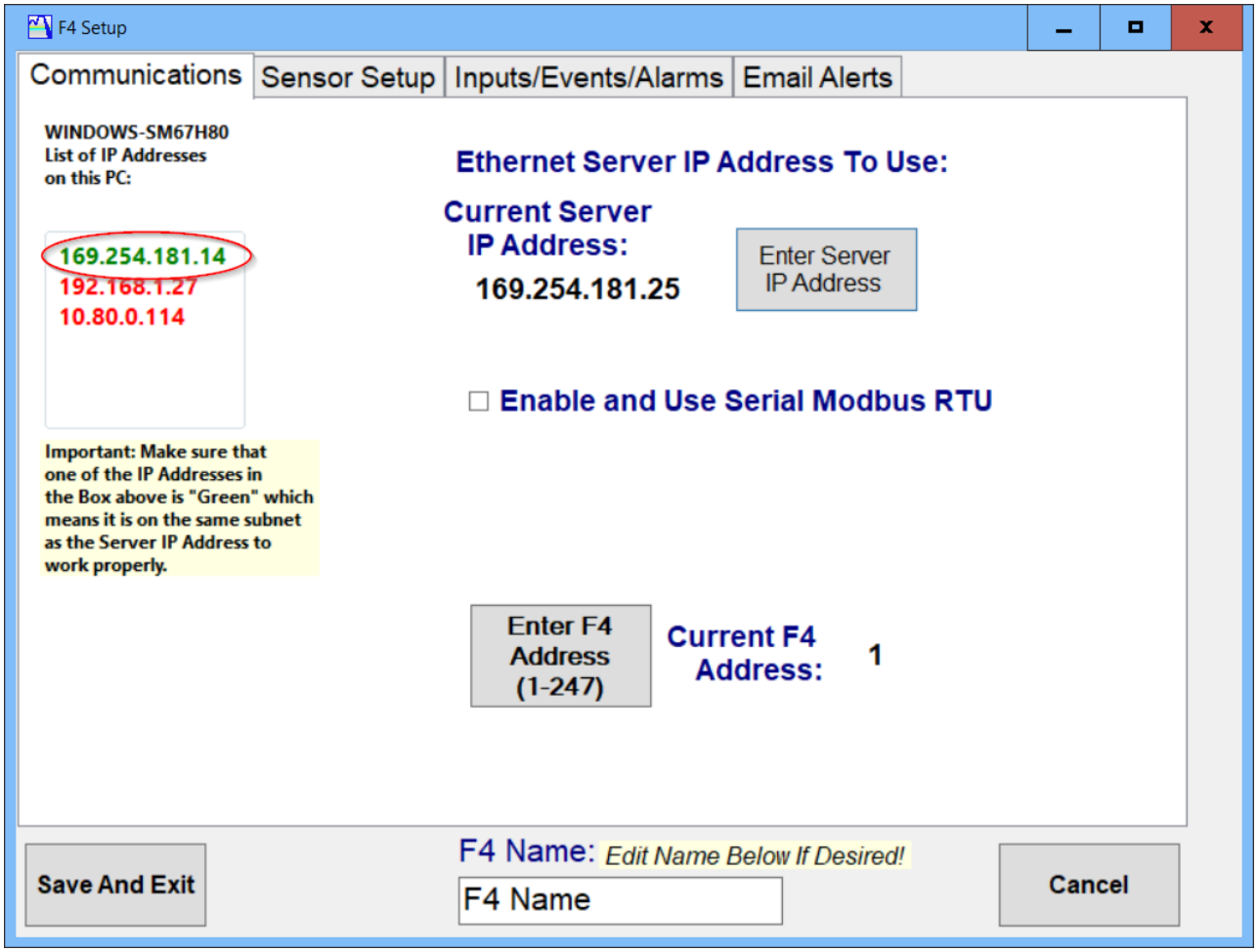


After selecting the “Add Controller” menu you will see the “Add New Legacy F4 Online” menu for adding an F4 controller. You will then need to configure the communications to the F4 or PM controller. Enter the appropriate communication parameters for either Ethernet or the serial port. If you are not sure what the PM IP address is you will need to get that information from the PM controller. If you are using an Ethernet to serial gateway, you will need the IP address for the gateway. With the “Enable and Use Serial Modbus RTU” check box checked you will see the serial port setup below. Make sure the PC Com Port, Baud Rate and F4 Controller Address is set to match the F4 controller you are interfacing with.

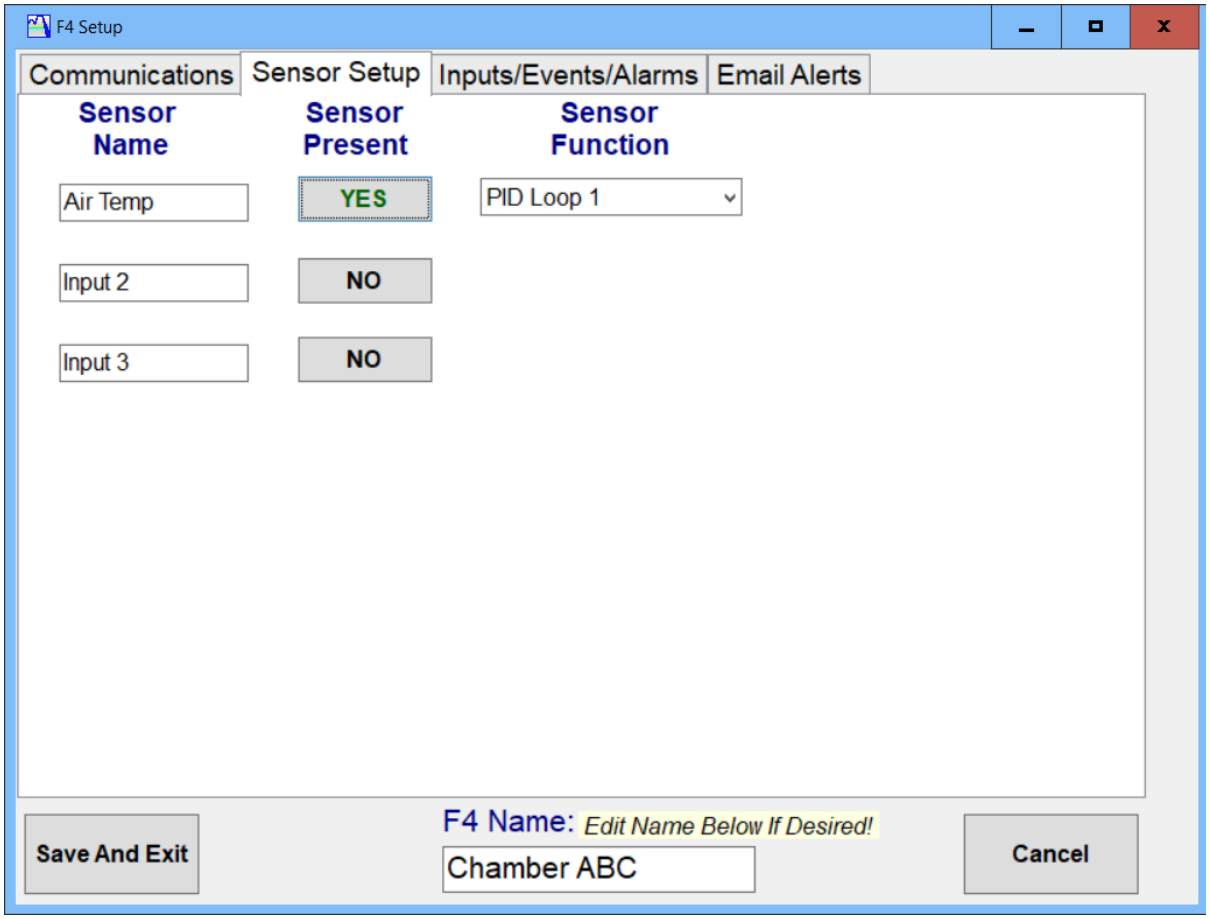


With the "Enable and Use Serial Modbus RTU" check box unchecked you will see the Ethernet port setup below.

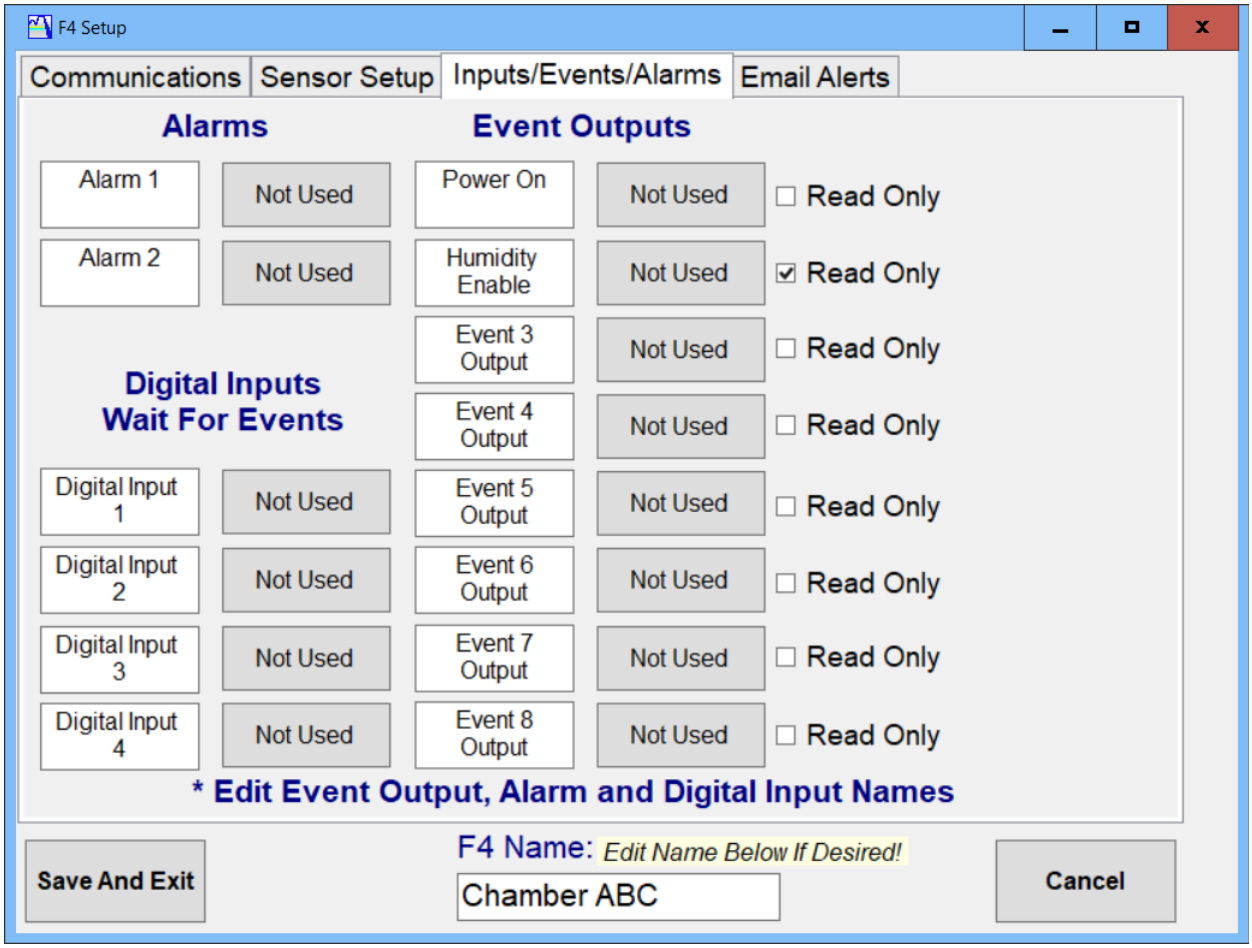
The screen will also show you the list of IP Addresses associated with your PC's Network Adapters that are on the PC. Make sure that one network adapter IP address is colored green which means it is on the same subnet as the Ethernet Gateway or PM IP Address. Sometimes if you are using a shared network or a virtual PC this might be the case. In the screen below the Ethernet Gateway Address is 169.254.181.25 which is on the same subnet as the circled adapter IP address listed in the box. You will also need to set the Current F4 Address to the network or Modbus address that is set in the F4 controller.



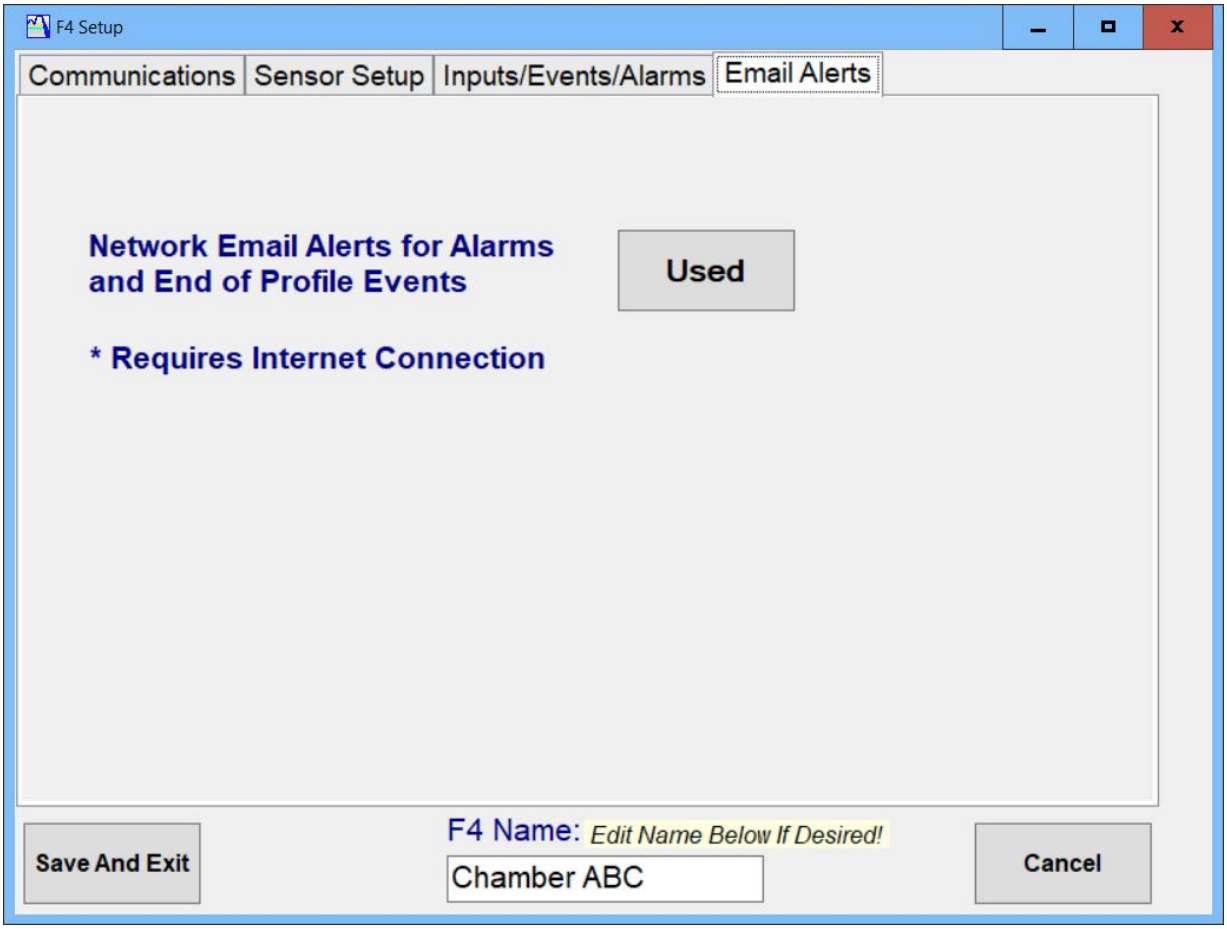
After you have done this you will need to select the “Sensor Setup” Tab to set up how the sensors are mapped to the F4T, PM or F4 controller. You can edit the Sensor Name to a name which makes more sense for the application. In the screen below Input 1 is named “Air Temp” for PID Loop 1. If you are using a dual channel F4 controller then you will most likely need to enable the second sensor for the humidity sensor and PID Loop 2. It is important to make sure that the number of control loops and sensors enabled match the F4 controller you are interfacing with or you will cause unknow software errors as the software will try and access parameters that will be rejected by the F4.



The next tab you will need to configure is the Inputs/Events/Alarm tab show below. You can give custom names in the name fields for the Alarms, Digital Inputs and Event Outputs. Below names were given for Event 1 Output and Event 2 Output and Event Output 2 was set to a read only condition so a user cannot change the state of the Event Output 2.



If you are planning on use email alerts you will need to have the PC running the software to have Internet access and you will need to have your IT department provide you the correct settings for your email server. The actual email setup is done from another menu under the “Settings” menu.



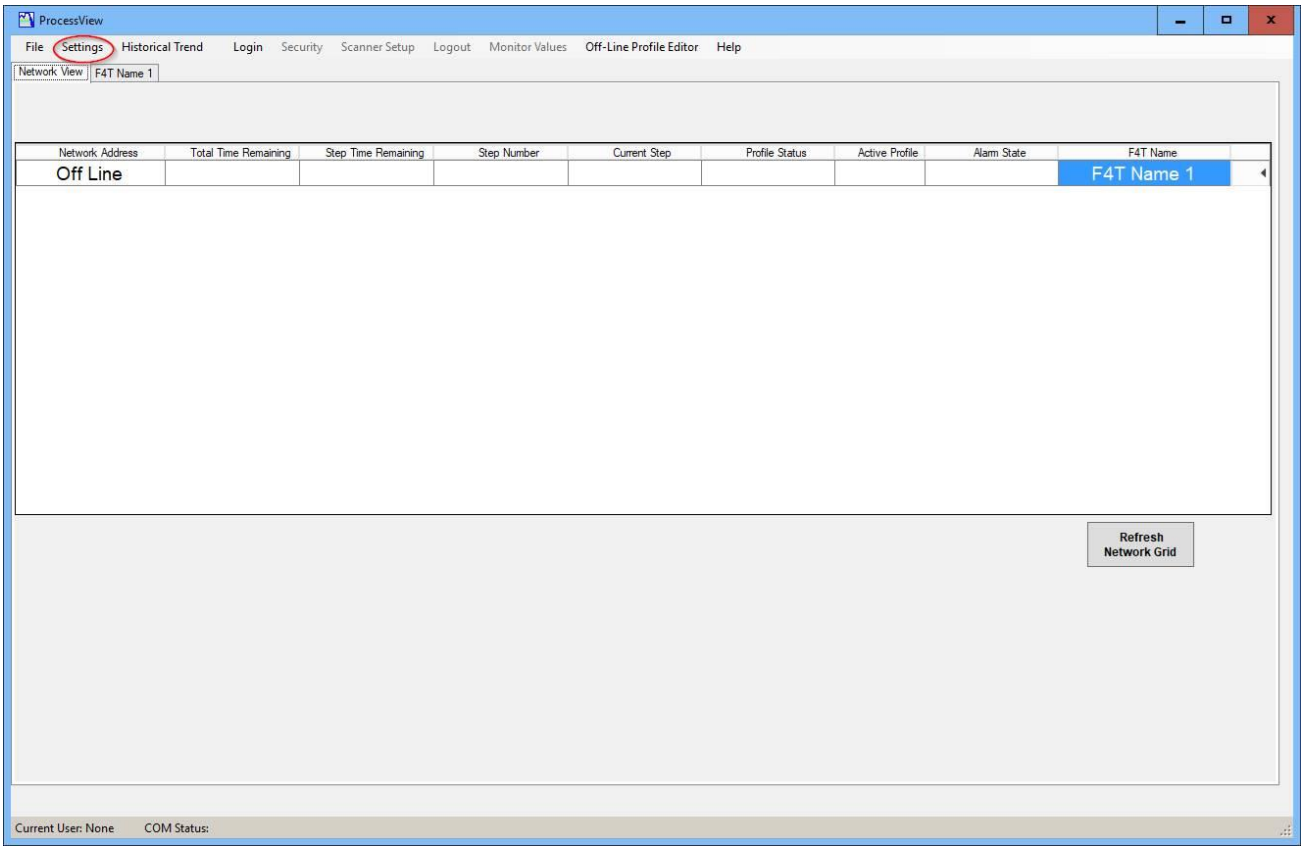
Add PM Controller

Make sure the following settings in the "Setup" configuration of the PM controller are set before trying to setup ProcessView for a PM controller:

1. Make sure that the communication protocol is set for Modbus instead of Standard Bus.
2. Make sure that the Data Map is set to 2 (Default is set to 1).
3. If using Ethernet, make sure Modbus TCP Enabled (set to "YES") and Ethernet/IP is set to "NO".
4. Make sure IP Address Mode is set to Fixed and enter the corresponding IP address that is going to be on the same subnet as your PC card if using Ethernet communications.
5. Modbus Word Order should be set to "Low-High" which is the default.

Edit an Off Line F4T

You can use the Edit an Off Line F4T display to edit stored configuration settings for F4T's that are not communicating on the Network. You can also use this screen to replace an existing F4T that is off line with a newly commissioned F4T by replacing the stored settings of the "Off Line" F4T with the new F4T that will be added to the network. Select the "Settings" menu and then select "Edit Selected F4T or F4 Configuration". Make sure the F4T or F4 you want to edit is selected or highlighted in the "Network View" tab.

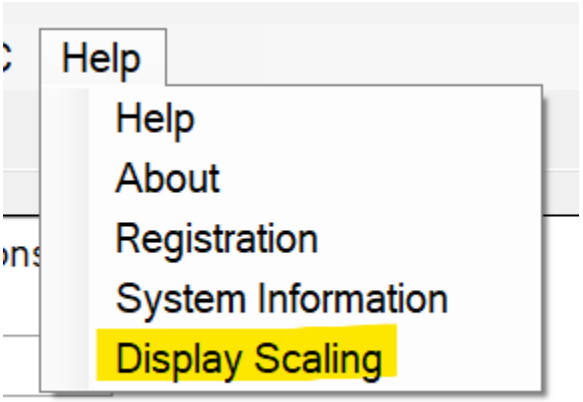


Display Scaling

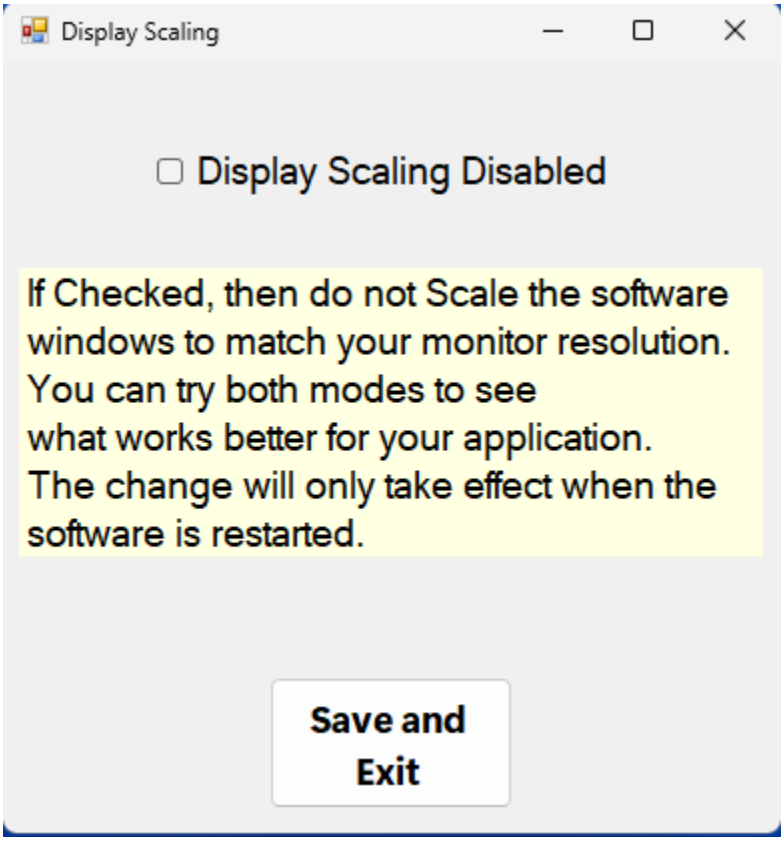
If the "Display Scaling Disabled" Check box is checked then Display Scaling will be disabled and all windows and fonts will be the original proportion from the original design. If it is not checked then the software will scale all windows and fonts to match the resolution of the monitor and will be activated when the software restarts. The main window will fill the entire monitor space. You should try both modes to see what display works best for your application because sometimes when

the scaling is applied, some text boxes and labels may not show up correctly due to Window's font availability or other operating system constraints.

Select the Display Scaling men item under the Help Menu:



That will bring up the following window that you can use to disable or enable Display Scaling:



Email Alerts

You can use the Network Alert screen to setup automatic email alerts to be sent when a profile is done running it's program or if the F4T is in an alarm condition. The host PC running the Profile Utility software must have an internet connection and have access to a remote SMTP server. You will need to know your service provider's email address, password and SMTP address. In addition make sure that Email Alerts are enabled which you can find in the menus "Add Controller/Edit Selected F4T/F4 or PM Configuration/Edit Units/Labels" then go to the "Email Alerts" Tab and enable Network Email Alerts.

An example below is for a Google SMTP server:

Email Address: Joe12@gmail.com

Password: Password12

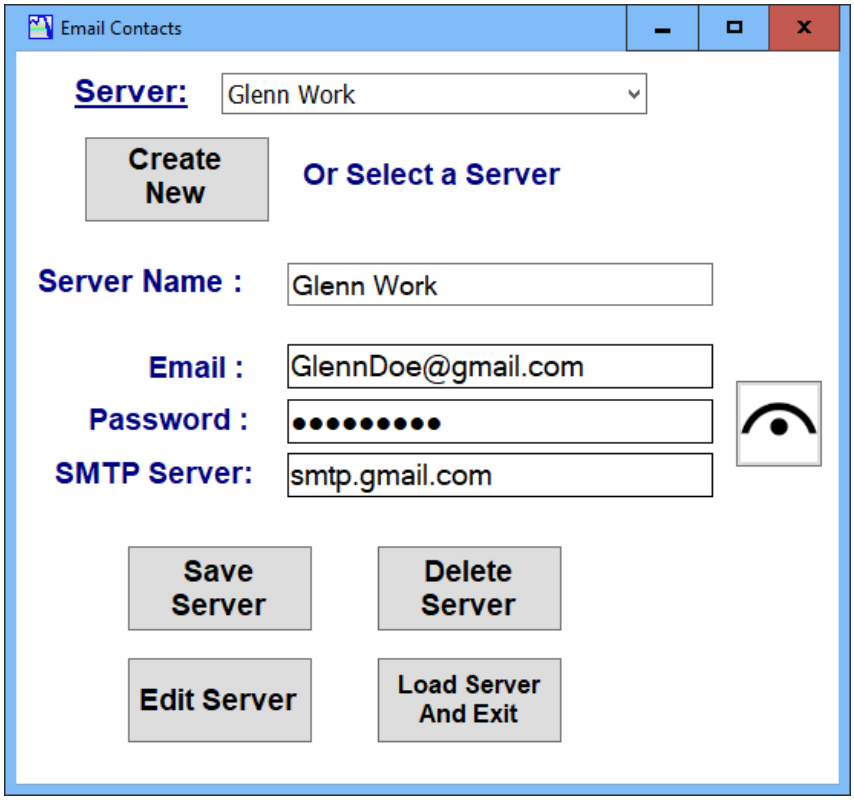
SMTP: smtp.gmail.com

You can fill out the email address for the message to be sent to in the Email Address field and also enter in a custom subject for the email that will be sent from the PC. You can enable either or both of the conditions that trigger an email being sent by the PC using the "Email Alarm" or "Email Profile End" buttons on the screen. You can use the "Email Test Message" to test your email smtp server. ProcessView will attempt to send a test message to your email account which you can use to make sure your settings are correct.

Typical Ports used are 25, 465 and 587 and the default port is 587.

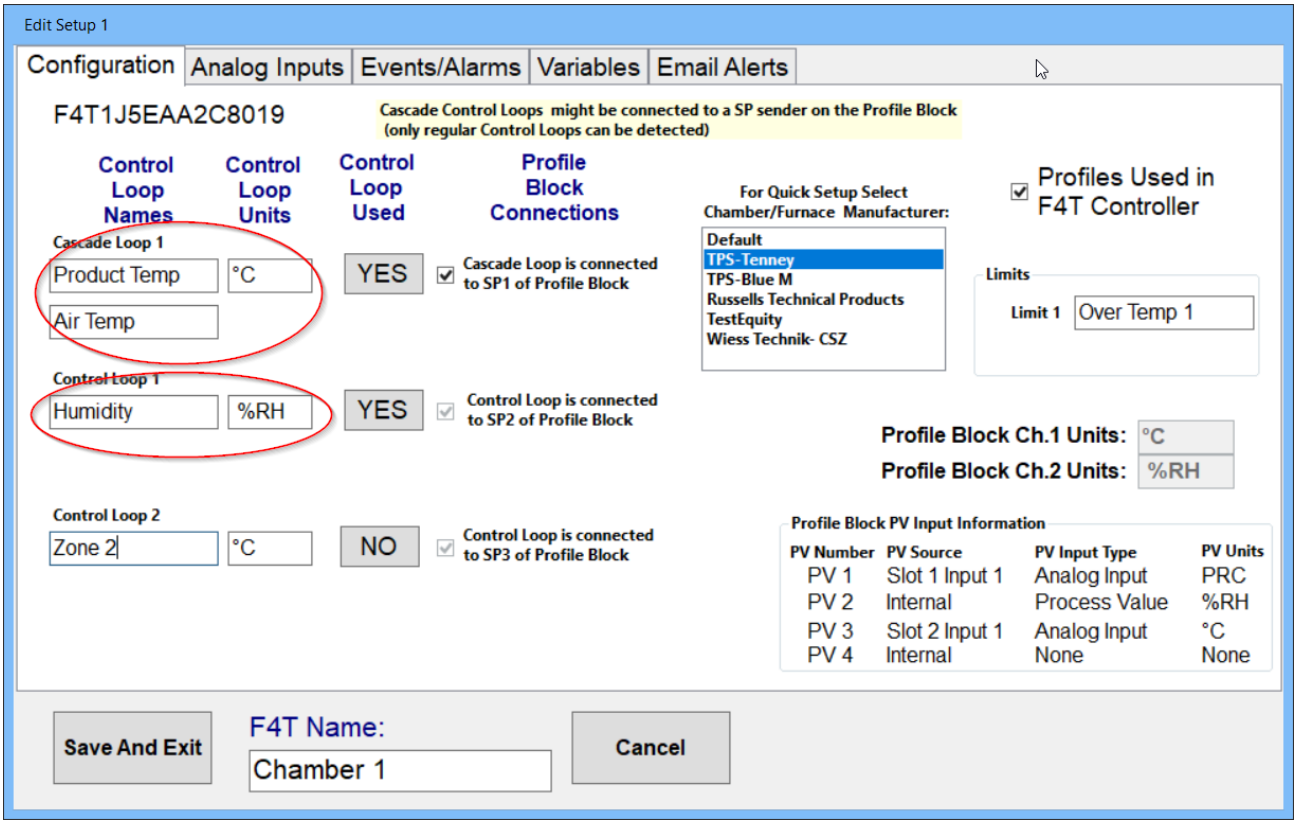
Gmail Note: Google email requires the 2-step Verification to be enabled and that an App Password be used for ProcessView to be able to send emails to the Google SMTP server. This can be setup in "My account\security" account settings for your gmail account. You will then need to create an App Password and use that as the password to access your google email smtp login.

Use the “Save/Load Server” button to save your configuration or retrieve a saved configuration. The following window will pop up which allows you to select saved configuration settings:



Edit Units/Labels

Once you have installed an F4T/F4/PM or D4T controller you can edit units or labels to provide a better representation of your application to the user or operator. If you select the top menu “Add Controller”, then “Edit Selected F4T/F4 or PM Configuration” then select “Edit Units/Labels” you will see the screen below. The units and label fields can be edited and saved and those text values will be changed through out the software in all other screens.



Using Watlow RUI Gateways

ProcessView supports both Ethernet Modbus TCP and Modbus RUI Gateways. The RUI Gateway is used to connect to multiple EZ-Zone PM or F4T's on a RS-485 network using Watlow's proprietary STD Bus. This makes retrofit's for existing furnace or chambers easy to interface to existing EZ-Zone PM controllers that come standard with the RS-485 STD bus interface.

For more information on how to setup the Gateway please refer to Watlow's RUI User Guide manual.

In order to set all the offsets for multiple F4T's or PM controllers on a network you must configure the RUI Gateway using Watlow's EZ-Zone Configurator software which you can download from the Watlow Website for free.

When adding the RUI for the first time you will need to have a PM or F4T controller connected to the gateway. The RUI must first be configured for Modbus Enabled, Modbus Word Order set to Low High, and a Modbus Offset value of 8500. These settings will be found under the Communications 2 menu of the RUI. Communications 2 settings are for the interface between the RUI and the Controllers on the network.

Communications 1 menu settings are for the interface from ProcessView and the RUI and must match accordingly for either Ethernet or Serial settings.

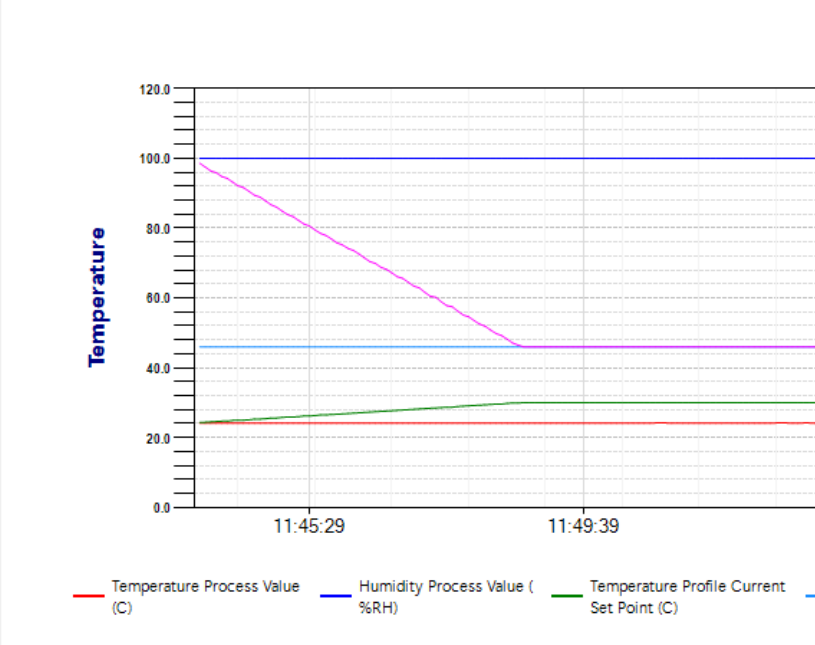
Each PM or F4T controller will then need to have an individual STD Bus Address and be enabled and given the corresponding offset value in the Local Gateway section in the Configurator software. For controller 1 on the network it should have an offset value of 0, the 2nd controller will have an offset value of 8500, the 3rd controller will have an offset value of 17000 and so on.

Historical Trend

The Historical Trend is used to graph data from Data Log CSV files stored on the PC. It can also be used for archiving purposes and the graph along with batch input data can be printed or saved to a PDF file. Fonts, Titles and Axis can be customized as well as the data to be graphed. All the formatting items like font size and type will be saved and will be used if data log files are automatically saved after a profile has been run.

ProcessView

Historical Data Graph



Left Y-Axis MIN

Left Y-Axis MAX

Left Auto Scale

Change Y-Axis Font

Change X-Axis Font

Left Y-Axis Title

Temperature

Right Y-Axis Title

Process

Graph Title

Profile: 1:TestA Data Log Graph

Change Y-Axis Title Font

Change Graph Title Font

Grid Line Color

Graph Back Color

Annotate

Annotate Font

File Name: C:\ProgramData\ProcessView\Da

Hide File Name on PDF and Print

Select Y-Axis

Left — Temperature Process Value (C)

Left — Humidity Process Value (%RH)

Left — Temperature Profile Current Set Point (C)

Left — Humidity Profile Target Set Point (%RH)

Left — Humidity Profile Current Set Point (%RH)

Do not show power trend lines on graph, PDF or Print

Import Data Log File

Return

Login Screen

The Login menu is where a user enters their credentials. The User Name and Password are entered to enable menus per the user level. When the software is first installed the default password to use is "Admin" and the default User Name is set to "Username".

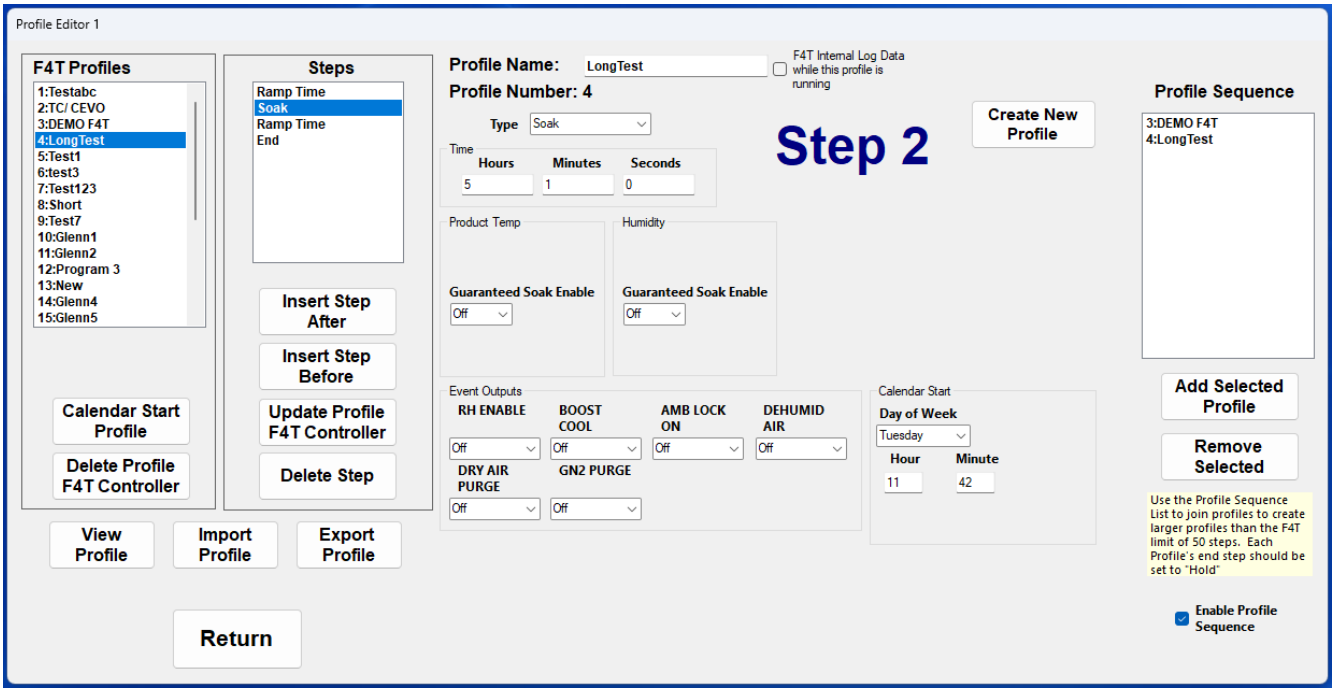
That will provide access to all menus in the software and is for a Supervisor level. You can then go into the "Security" menu and enable/disable menus and setup passwords and level capabilities for the software. You can also change the password for this username.

Profile Editor

The Profile Editor Screen allows you to create, edit and manage profiles for the F4 or F4T controllers. You can use the Off-Line Profile Editor from the Main Menu screen to create and save profiles for later use on your PC. The On-Line Profile Editor can be used to upload profiles from the controller and edit them. You can save them to a file for archiving or send the newly created Profile down to the controller as a new Profile Program. When the files are saved, they are saved as an XML format. For F4T controllers, you can join or sequence existing profiles stored in the F4T controller.

This capability allows the user to have more than 50 steps in a profile run. The F4T is limited to only 50 steps per profile so this feature allows user to join or sequence profiles to provide up to a maximum of 2000 steps for one single profile. This feature is only for the F4T as the F4 allows the user to jump to additional profiles in the controller and is not limited to 50 steps. If this feature is used then the user should check the enable check box and for each profile in the sequence that is not the last profile, the end step should be set to hold so the temperatures or process values remain the same as the last step when the next profile is started.

You can view newly create files by using the Profile Viewer screen in the software to make sure the profile is correct.

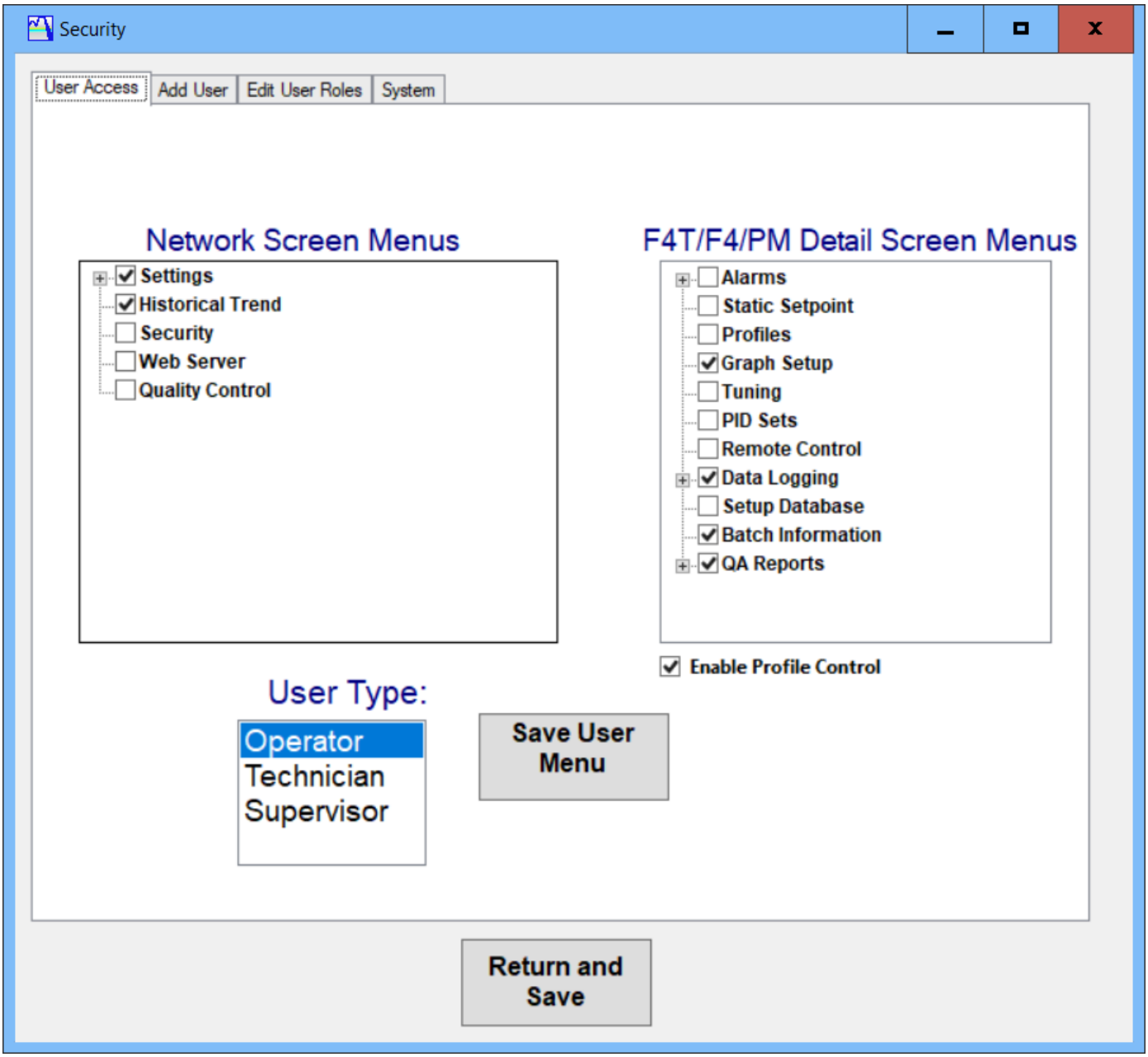


User Access Screen

The User Access Screen tab on the Security screen is used to set the active menus for three available User Levels (Operator, Technician or a Supervisor). When the software boots up it defaults to the “System” User level which basically disables almost all functions to keep any user from doing anything that could compromise the process.

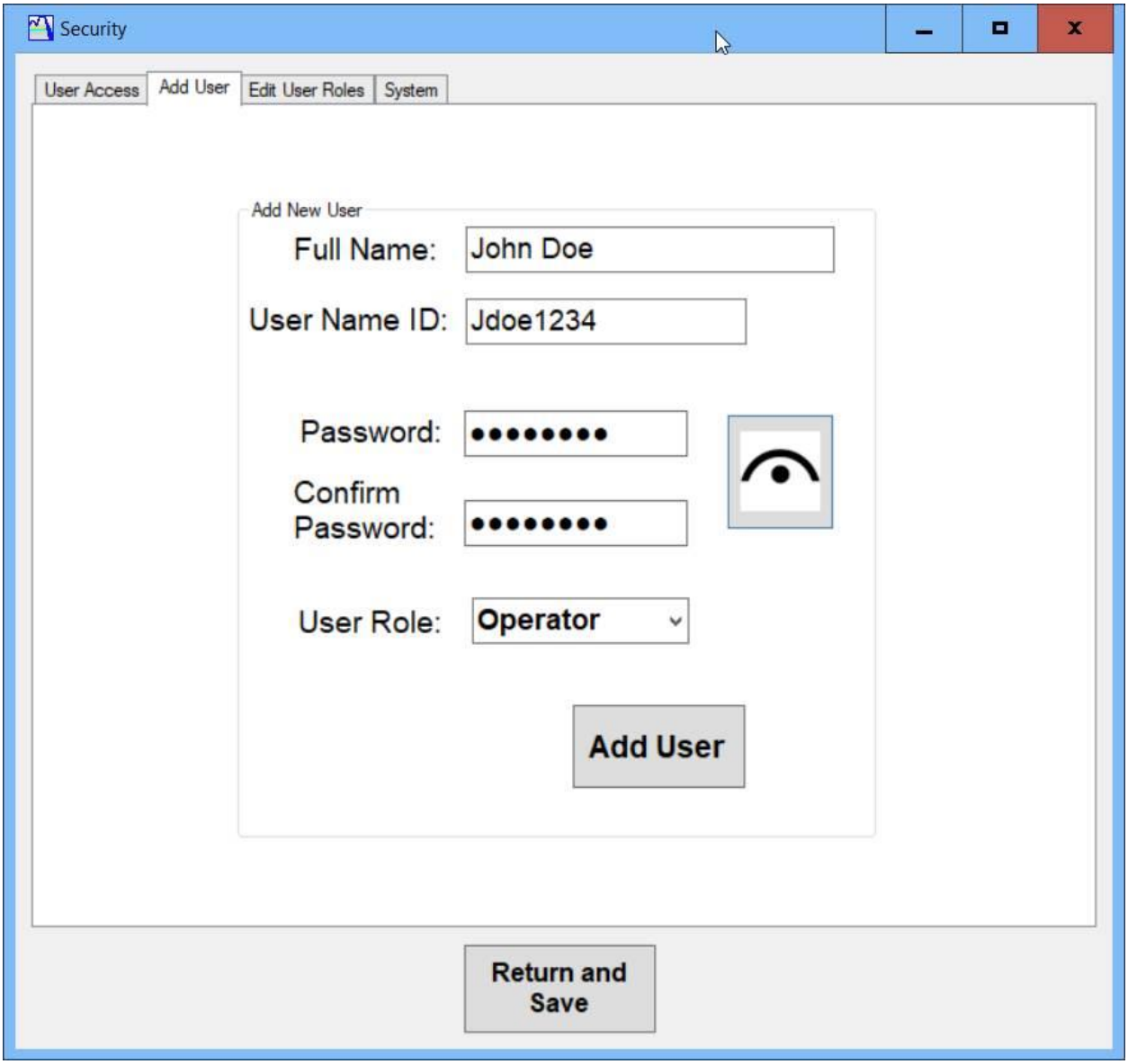
Each menu item can be visible or inactive for the user. Set the appropriate viewing rights for a Technician, Operator or Supervisor User. Once you have set the view rights then select the “Save” button in order to save the viewing rights for the User type (Operator, Technician or Supervisor). The viewing

rights will be saved in memory temporarily until you exit the Edit Setup screen and save all settings using the “Return and Save” button.



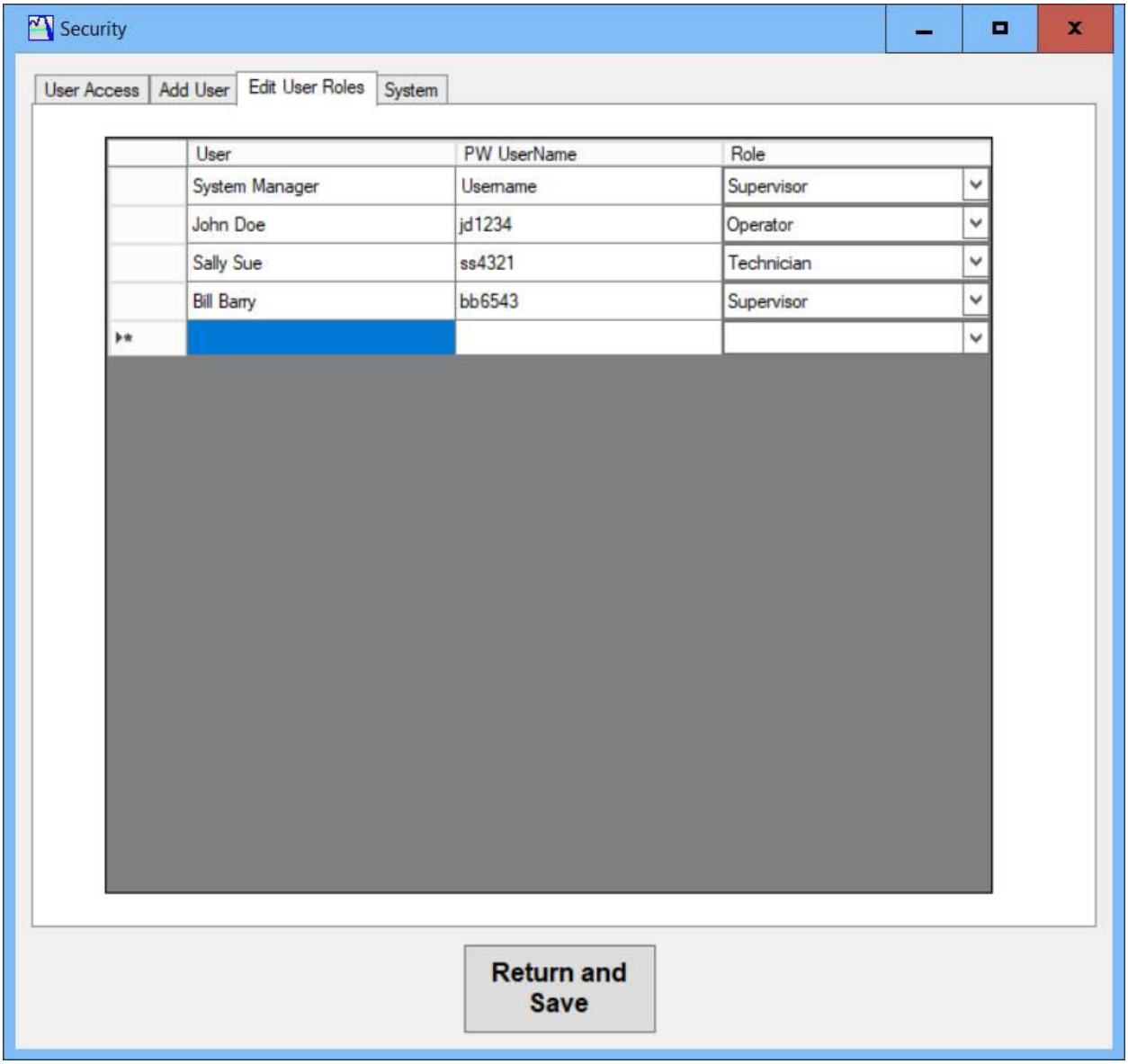
Add User Screen

The Add User Screen tab on the Security screen is used to add users into the software security system. If a duplicate User Name ID is found, the system will not allow you to enter the same User Name ID and you must have a unique name. The system always saves the User Name ID forever so that it requires that there not be any duplicate User Name ID's in the system. The "Full Name" field should be used to store the user's full real name which can be used in the Audit trail for verification and signed documents. The "Password" field must contain 1 uppercase character, 1 lowercase character, 1 number, 1 special character (!@#$%^&*()+-=_~`), no white space, no commas, no periods and must be 8- 12 characters in length.



Edit User Roles Screen

The Edit User Roles Screen tab on the Security screen is used change or edit user's roles in the software security system. This is where you can see all the user's in the system along with their full name, user name and current role. You can change the user's role by clicking on the arrow under the "Role" column.



Security System Screen

The Security System Screen tab on the Security screen is used configure various functions in the software security system. The Enable PIN Authentication check box is used if you want to add an additional authentication factor besides username and password for identification. If this is checked the user will have to enter a 4-digit code for their PIN during logging into the system. The Enable Password Expiration check box is used for Password Aging. If this is checked then a user must change his password if his password has expired for a set amount of days entered in the "Days" field. The Enable Auto Logout will automatically log out a user if there has not been any activity for a certain amount of time. The time for this feature is entered in the field below the check box in minutes.

The Require Digital Signatures is used to digitally sign a data log file. If this box is checked then users can electronically sign a data log file to prevent any tampering of the data. More than one user can sign a file and after the last signing a new checksum for the file is calculated for the file. If a file has been tampered with then the file will not be able to be saved or viewed as the signature is always verified before allowing the data to be displayed.

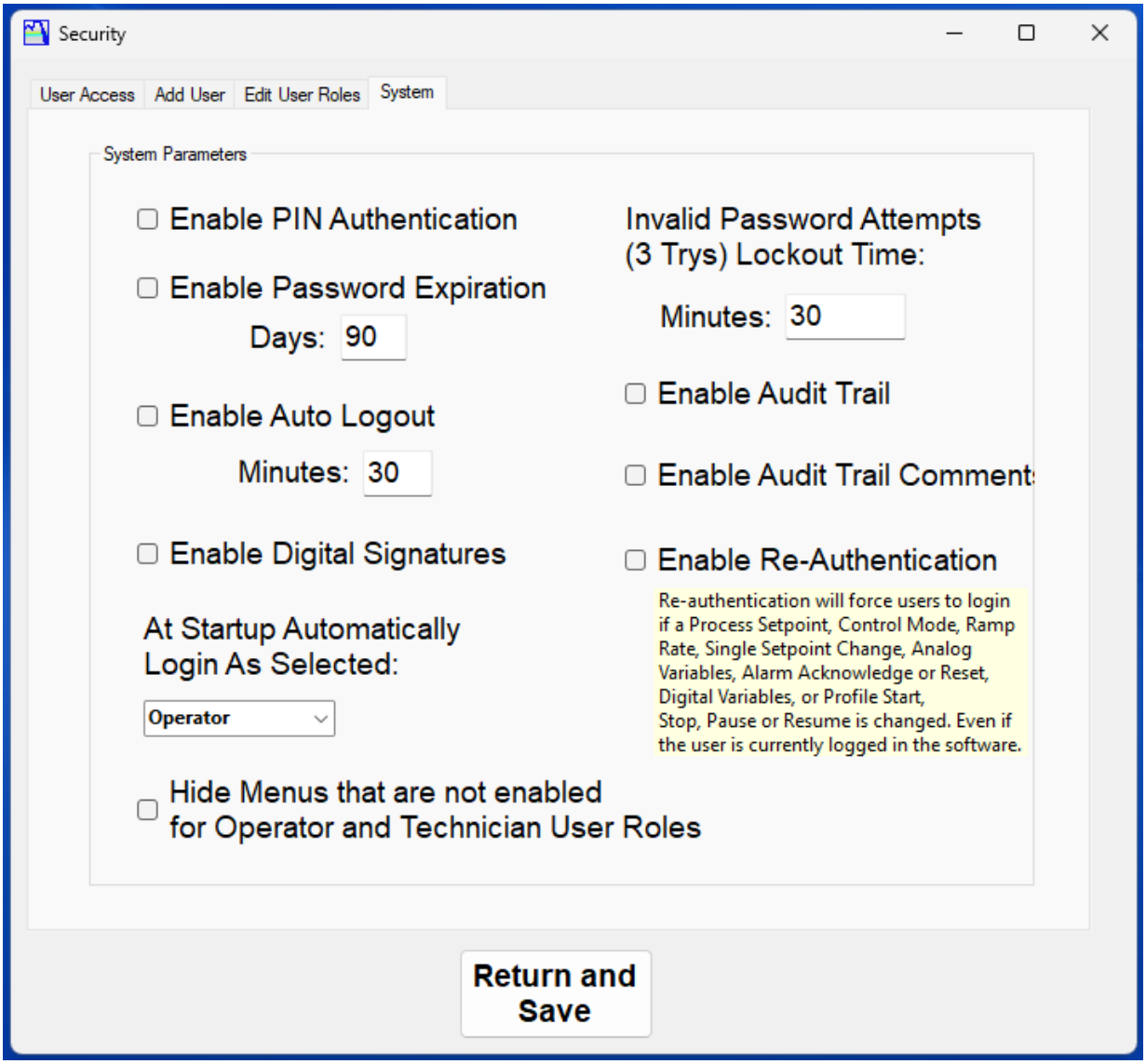
If you would like to bypass the original login requirement at startup and have the default permissions set to a certain role level then you can check select the appropriate level in the "At Startup Automatically Login As" drop down box. When the system automatically logs in at the selected level, the current user is assigned the name "System Manager" for the user name and that is what will show up in the audit trail files. When a user logs out of the system, the user role will go to the "None" level and nothing can be activated or selected that would effect the process control.

The system will lockout a user if it detects more than 3 failed attempts at logging into the system and will lockout the user for the time entered in the field below the check box in minutes.

If the Enable Audit Trail check box is checked, then all user interactions with the software that are time stamped and logged into the audit trail encrypted file. The "who", "what", "why", "when" and reason parameters are all stored when an audit trial entry is entered by the system. If the enable audit trail comments check box is checked than the user must enter text into a text field every time an audit event is recorded.

The Enable Re-Authentication check box is used to force a user to log in to the system when changing parameters that could affect the process. Parameters such as setpoints, stopping profiles, variables, etc. will need to have a user re-enter their password even if they are previously logged into the system for extra security. This prevents users from tampering with the process if the system is left unattended by a currently logged in user.

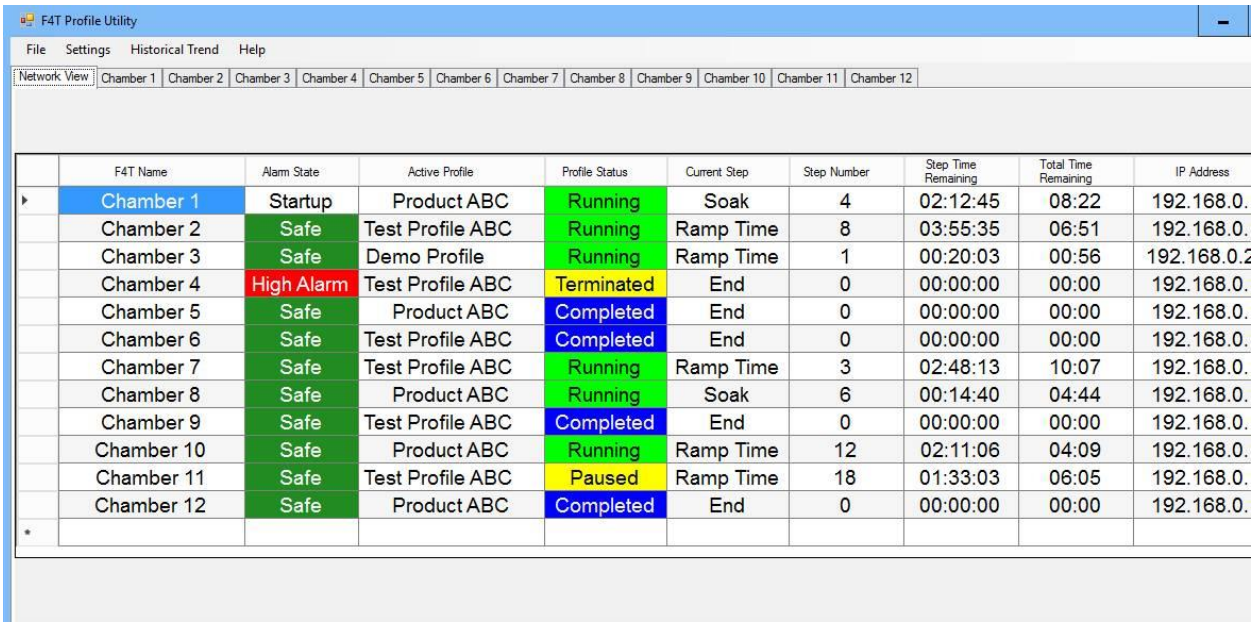
The "Hide Menus that are not enabled for Operator and Technician roles" check box is used to hide all menus instead of "graying' the menus out. By hiding the menus, the software interface can be made much simpler and easier to use for operators or technicians that never use the "grayed" out menus. Or you might want to keep the grayed out menus so in the future if you need a feature such as Remote PC you will be reminded that the feature exists in ProcessView.



Network View Screen

The “Network View Screen” is the screen that provides the individual Profile Status of each F4T connected on the network. The “File” menu is used to close the program. The “Settings” menu is used to add or edit an existing F4T on the network. The “Historical Trend” menu is used to import F4T Data Log files that have been created by the F4T and display them in a real time chart. The only files supported are non-encrypted files that were generated by the F4T. All the information is updated real time on the Network View Screen. Fields are color coded to provide a quick indication if a profile is running or an

alarm is present. The “Help” menu is used to pull up the help file, register this product or check the software version number.



F4T Name	Alarm State	Active Profile	Profile Status	Current Step	Step Number	Step Time Remaining	Total Time Remaining	IP Address
Chamber 1	Startup	Product ABC	Running	Soak	4	02:12:45	08:22	192.168.0.
Chamber 2	Safe	Test Profile ABC	Running	Ramp Time	8	03:55:35	06:51	192.168.0.
Chamber 3	Safe	Demo Profile	Running	Ramp Time	1	00:20:03	00:56	192.168.0.2
Chamber 4	High Alarm	Test Profile ABC	Terminated	End	0	00:00:00	00:00	192.168.0.
Chamber 5	Safe	Product ABC	Completed	End	0	00:00:00	00:00	192.168.0.
Chamber 6	Safe	Test Profile ABC	Completed	End	0	00:00:00	00:00	192.168.0.
Chamber 7	Safe	Test Profile ABC	Running	Ramp Time	3	02:48:13	10:07	192.168.0.
Chamber 8	Safe	Product ABC	Running	Soak	6	00:14:40	04:44	192.168.0.
Chamber 9	Safe	Test Profile ABC	Completed	End	0	00:00:00	00:00	192.168.0.
Chamber 10	Safe	Product ABC	Running	Ramp Time	12	02:11:06	04:09	192.168.0.
Chamber 11	Safe	Test Profile ABC	Paused	Ramp Time	18	01:33:03	06:05	192.168.0.
Chamber 12	Safe	Product ABC	Completed	End	0	00:00:00	00:00	192.168.0.

Main Screen

The main screen is used for managing profiles in the controller. You can start, stop, pause and resume profile programs stored in the F4T. Event Outputs can be manually changed from this screen as well as Chamber Control Variables. If you want to add an annotation to the graph you can use the “Annotate” button to add a comment to the graph. If you then Archive the graph by using the “Archive” menu it will save the annotated graph in a PDF file or it can be sent to the default printer. If data logging is enabled you will see the green data log icon and you can view the data being logged real time by selecting the Data Logging menu and then the View Data

menu.

ProcessView

ProcessView

File | Add Controller | Historical Trend | Login | Security | Logout | Off-Line Profile Editor | Web Server | Quality

Network View | **Chamber 1**

Alarms | Static Setpoint | Profiles | Graph Setup | Tuning | PID Sets | Data Logging | Analog Inputs | Databas

Profile Status And Control

Active Profile: **2:ShortTest2**

Profile Status: **Completed**

START

Step Type: **End**

Step Number: **0** OF **4**

Start Step: **1**

Step Time Remaining: **00:00:00**

Total Time Remaining: **00:00:--**

Temperature Profile Target SP	----	Humidity Profile Target SP	----
Temperature Profile Current SP	----	Humidity Profile Current SP	----
Temperature Rate Rate:	----	Humidity Rate Rate:	----

Profile Events

RH ENABLE	BOOST COOL	AMB LOCK ON	DEHUMID AIR
OFF	OFF	OFF	OFF

DRY AIR PURGE	GN2 PURGE
OFF	OFF

Left Auto Scale Off

LOG

OFF

T

C

Controller Internal Limit Status

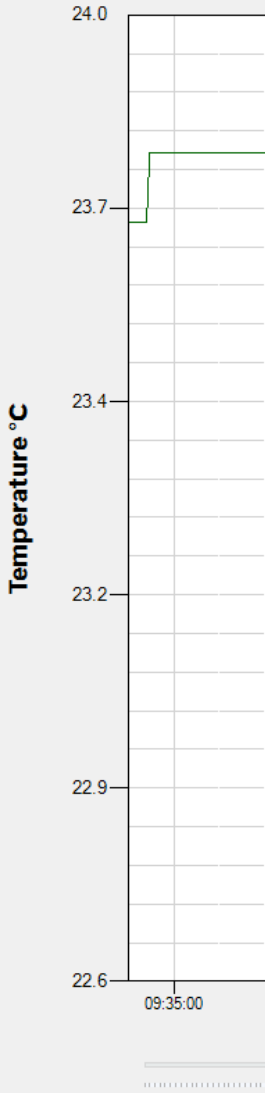
Over Temp 1

Safe

Controller Internal Alarm Status

Alarm 3

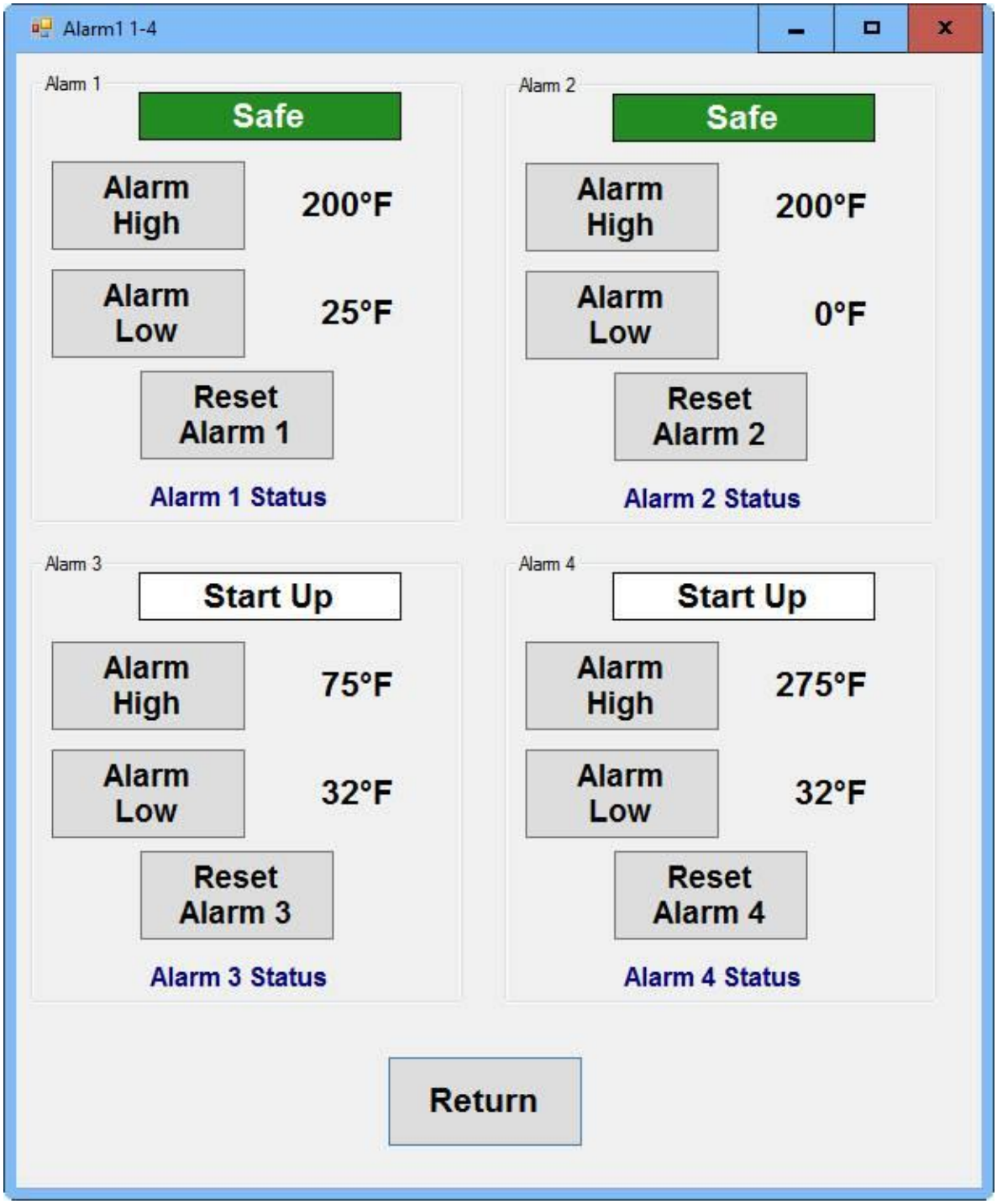
Alarm



Start: 02/20/2024 09

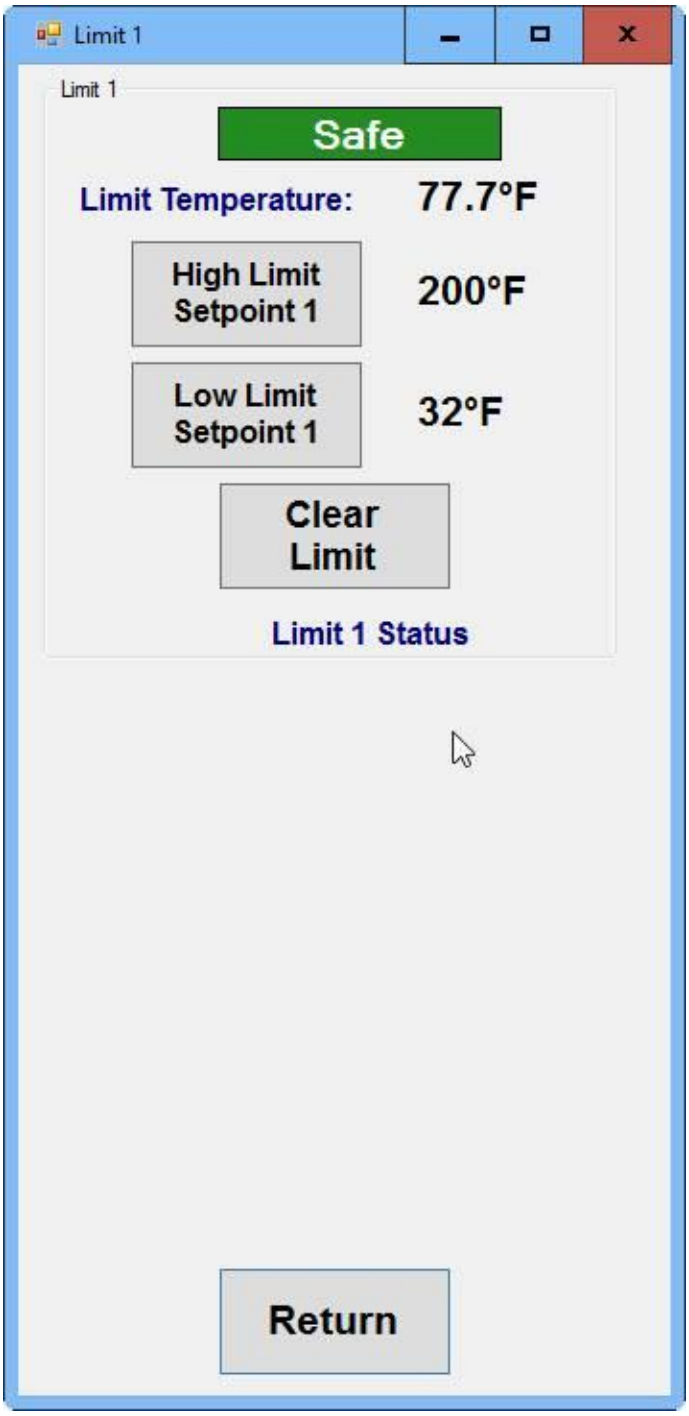
Alarms

You can use the Alarms Screen to change Alarm Setpoints and resetting alarms. There are 4 alarms per screen (eight alarms total within the F4T). Each Alarm has an alarm status box which tells you the status of the alarm. The alarm status messages can be “No Alarm”, “Start Up”, “Error”, “High Process” or “Low Process”. If an Alarm is a non-latching alarm the alarm will reset and clear itself when the alarm condition goes away.


Alarm1 1-4
Alarm 1
Safe
Alarm High
200°F
Alarm Low
25°F
Reset Alarm 1
Alarm 1 Status
Alarm 2
Safe
Alarm High
200°F
Alarm Low
0°F
Reset Alarm 2
Alarm 2 Status
Alarm 3
Start Up
Alarm High
75°F
Alarm Low
32°F
Reset Alarm 3
Alarm 3 Status
Alarm 4
Start Up
Alarm High
275°F
Alarm Low
32°F
Reset Alarm 4
Alarm 4 Status
Return

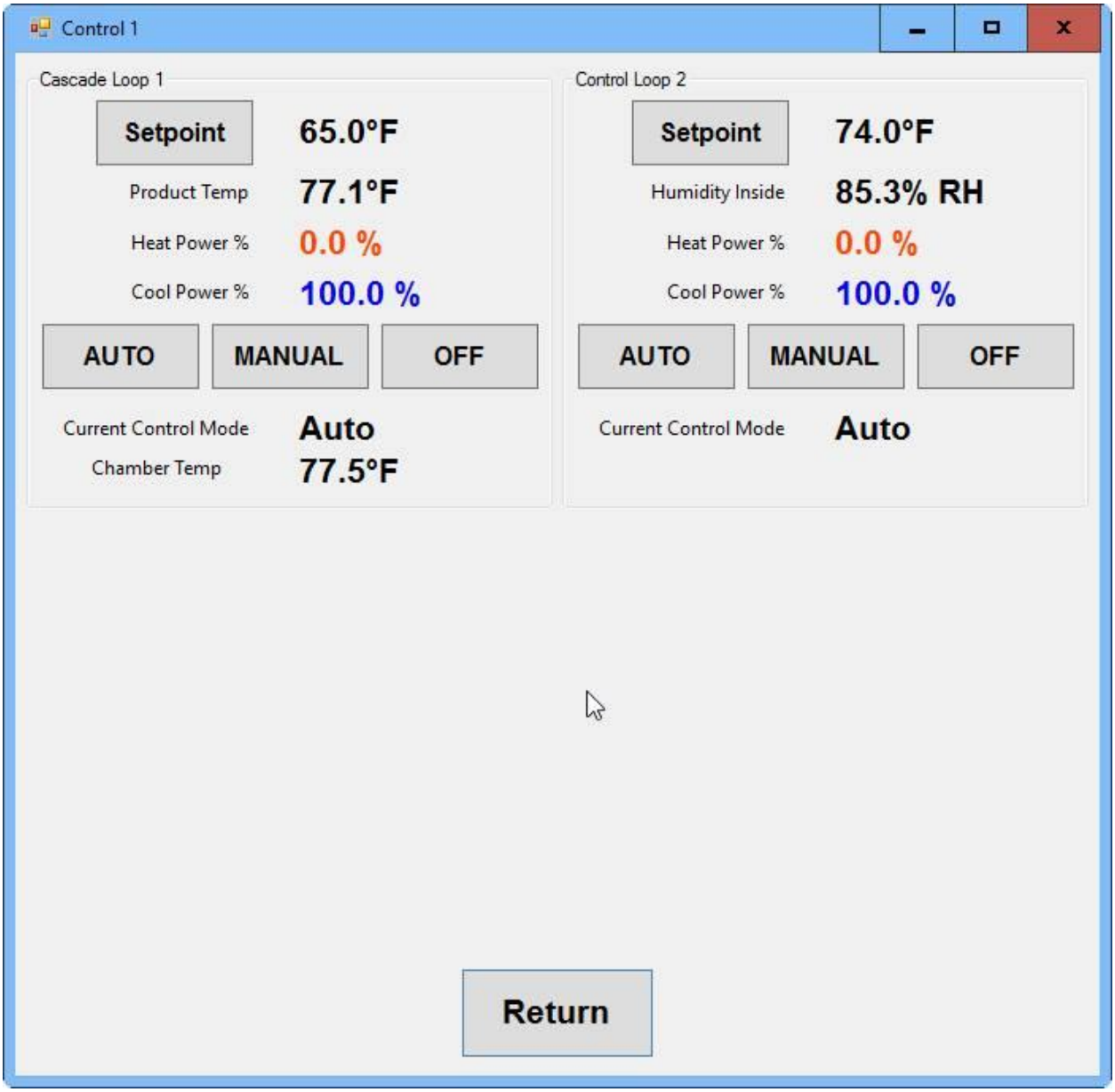
Limit

You can use the Limit screen to setup the FM approved limit control high and low setpoints. You can also view the current input temperature that the limit control loop is monitoring. The limit status will show if an alarm condition is present or in a safe mode. The “Clear Limit” button can be used to clear a limit alarm condition if it is no longer present and in a safe condition. The Limit display screen supports up to 2 independent limit control loops if configured in the F4T.



Static Setpoint

You can use the Control screen to change control setpoints for each control loop independently from the F4T profile program when it is not in use. You can change the control mode for each control loop by changing the control mode to “AUTO”, “MANUAL”, or “OFF”. The current output power percentage is also displayed on the screen. The auto control mode puts the control loop in automatic PID control mode. The manual control mode puts the loop in a manual control loop and uses a fixed preset percentage output value that is output to the heating, humidifier or cooling system. If a cascade loop is used (part temperature control) then the chamber temp is also displayed with the part temperature being controlled. You can monitor up to 4 Control Loops and or 2 Cascade Loops if supported by the F4T.

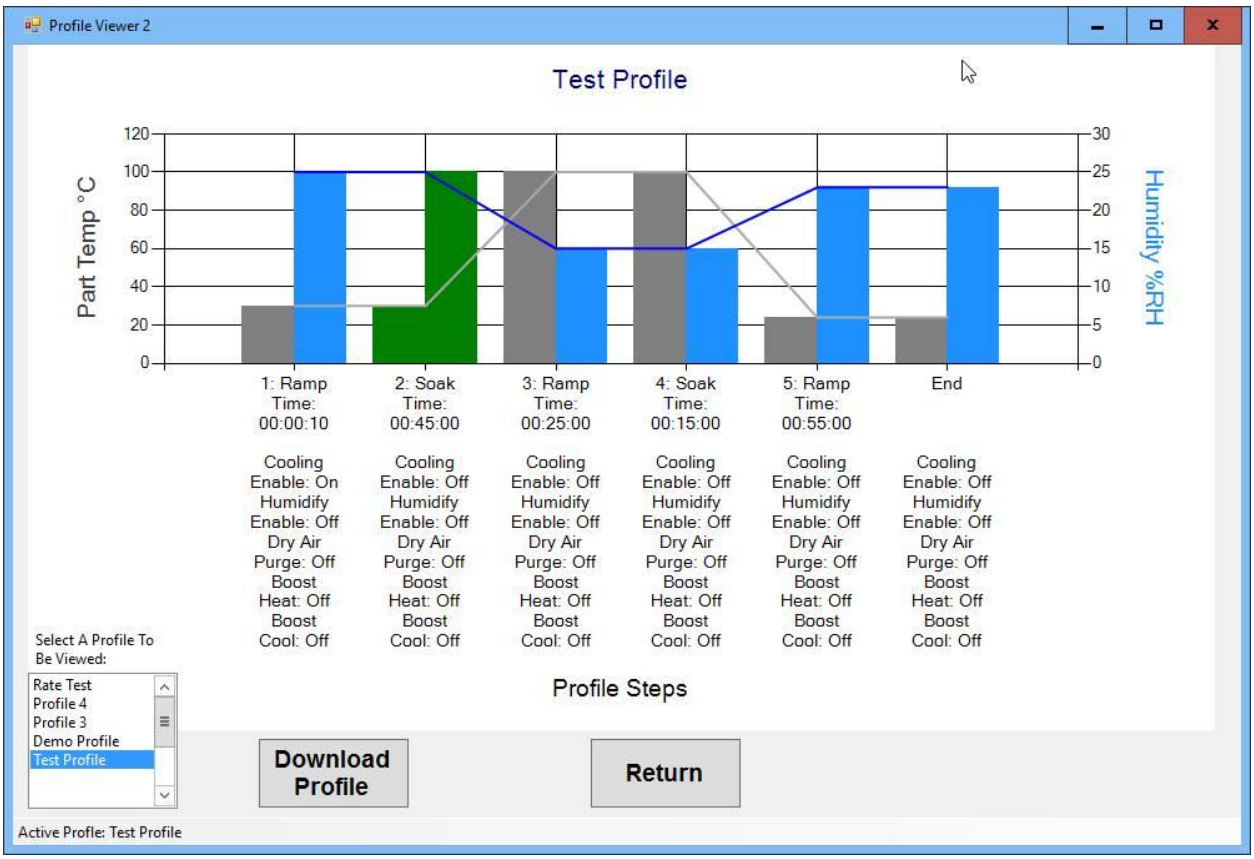


Profile Viewer

Use the Profile Viewer Screen to load profiles that are stored inside the F4T or F4 and look at them graphically. There are 40 stored profiles that can be loaded from the F4T or F4 which provides a quick and easy way to see what the profiles are that are stored inside the F4T or F4 controller. After you select a profile, the graph will be populated with the profile. You can use the “DownLoad Profile” button to download the current viewed profile to the F4T or F4 controller as the Active Profile to be run. If you hover your mouse over the data bars, you will see more detailed information about each profile step. Under each step are how the Event Outputs are to be turned on or off for that step. In the chart

below, the Event Outputs were given custom names from the “Edit Selected F4T or F4 Configuration” sub menu, under the “Settings” menu.

If a profile is running and you open the active profile in the viewer the current step will be highlighted by the green color as shown below and will be updated as the profile program progresses.



Graph Setup

The Graph Setup page is used to select Pen colors for the trend chart and to enable them. You can also select either the right Y-Axis or left Y-Axis to be used for trending. Each individual trend can also be given custom units to be displayed on the trend chart. Both the right and left Y-Axis titles can also be modified or given a unique name for the trend chart. In the Axis Control group box, you can either set the high and low values for the axis scale of have ProcessView scale the axis automatically. If you check the High or Low Tolerance check boxes, then you will see a tolerance band graph the current setpoint. This can be useful to see if the process values follow the current setpoint in a profile. If the process value goes above or below the tolerance band you can have ProcessView display an alarm and the alarm is enable by checking the “Display High Tolerance Alarm”

check box. If you click on the Pen color, a dialog will window will pop up allowing you to change the trend color.

Note: Make sure you select the correct Sample Rate that will allow the Trend Graph to graph all the data points for your maximum profile time. ProcessView will graph a maximum of 3600 data points in the graph, so you will need to make sure that when you run your profile all data points will be graphed for the Profile that you run. You can see what the maximum time is when you change either the units or sample rate.

Once the Graph Setup is completed all the values and settings are saved for future sessions.

Setup Graph 1

Pen Name	Pen Color	Pen Enable	Select Y-Axis
Process Inputs			
Temperature		On	Left
Humidity		Off	Right

Axis Control

Left Y-Axis | Left Y-Axis
Right Y-Axis | Right Y-Axis
X-Axis Font | Y-Axis Font

Grid Line Color

Graph Back

Stop Trending When Profile Has Ended or Stopped

Temperature Control Loop		
Temperature Target SP		Off
Temperature Current SP		Off
Temperature Heat PWR		Off
Temperature Cool PWR		Off

Humidity Control Loop		
Humidity Target SP		Off
Humidity Current SP		Off
Humidity Heat PWR		Off
Humidity Cool PWR		Off

Left Y-Axis Title
Temperature °C

Right Y-Axis Title
Humidity % RH\Power %

Limit
Limit 1 Off

Sample Rate 5.0 Units Sec

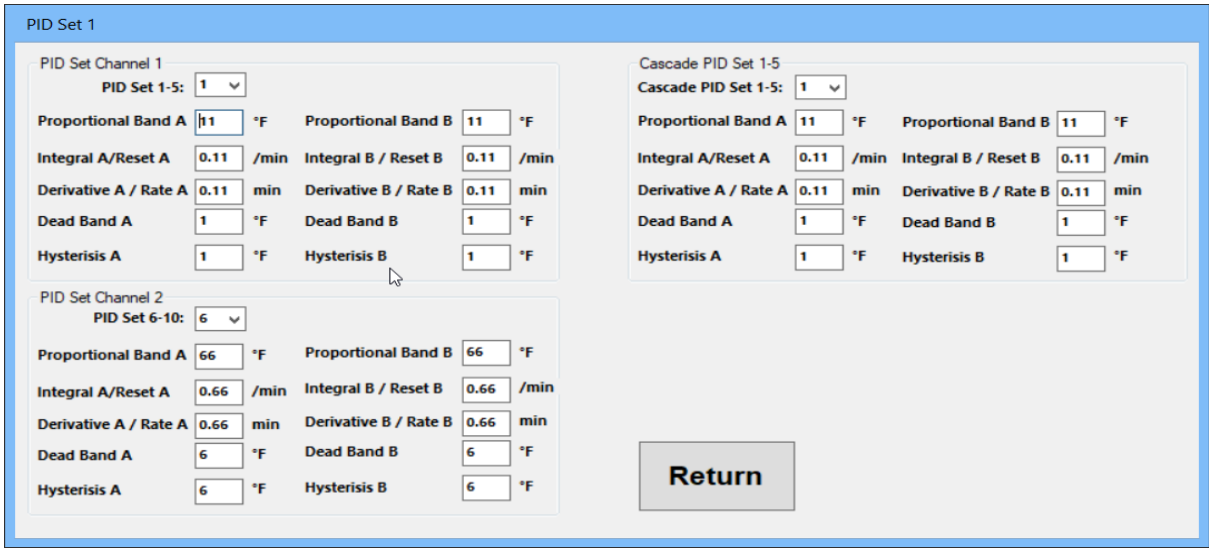
Maximum time the Data will be Graphed with Sample Rate:

Maximum Trend Time: 20 Hours 50 Minutes

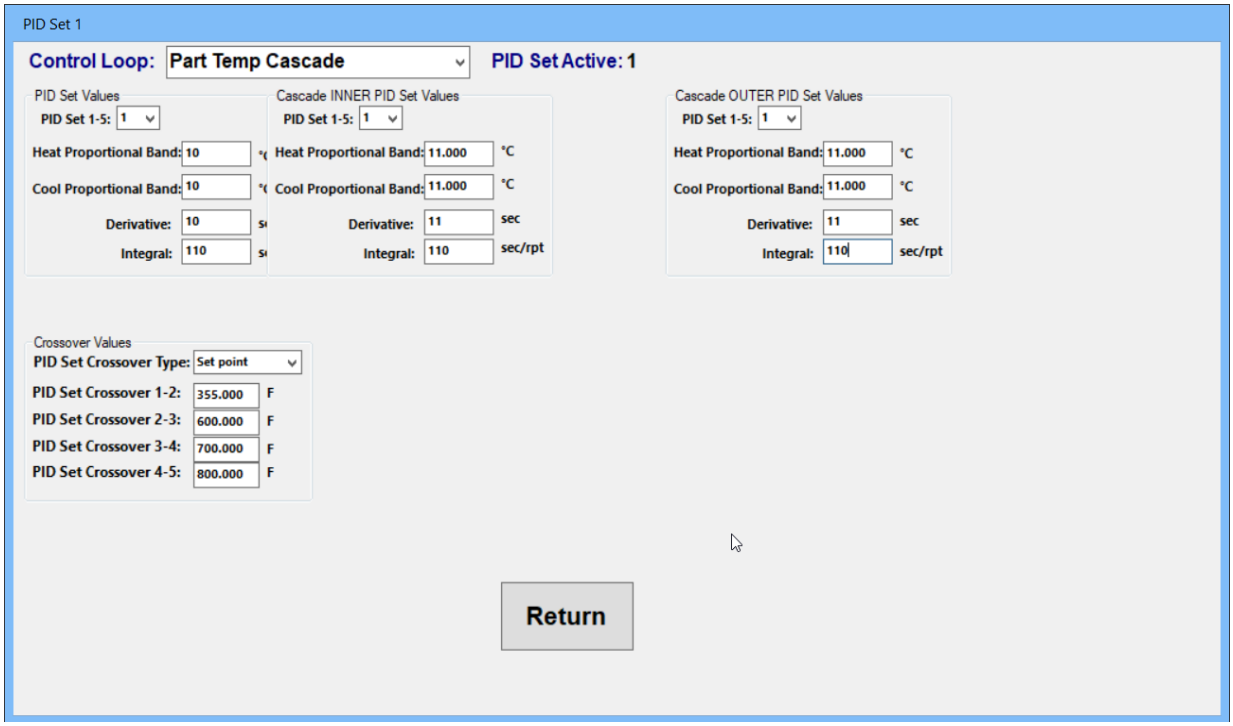
Save an

PID Sets

You can use the PID Sets Window to view and edit the internal PID sets inside the F4 Controller or F4T Controller. This feature is only available for the F4 Controller. Below is the window used for editing and viewing all the PID sets in the F4 Controller.



Below is the window for the F4T Controller. When you select the Control Loop combination box, the values will be updated for that particular control loop.

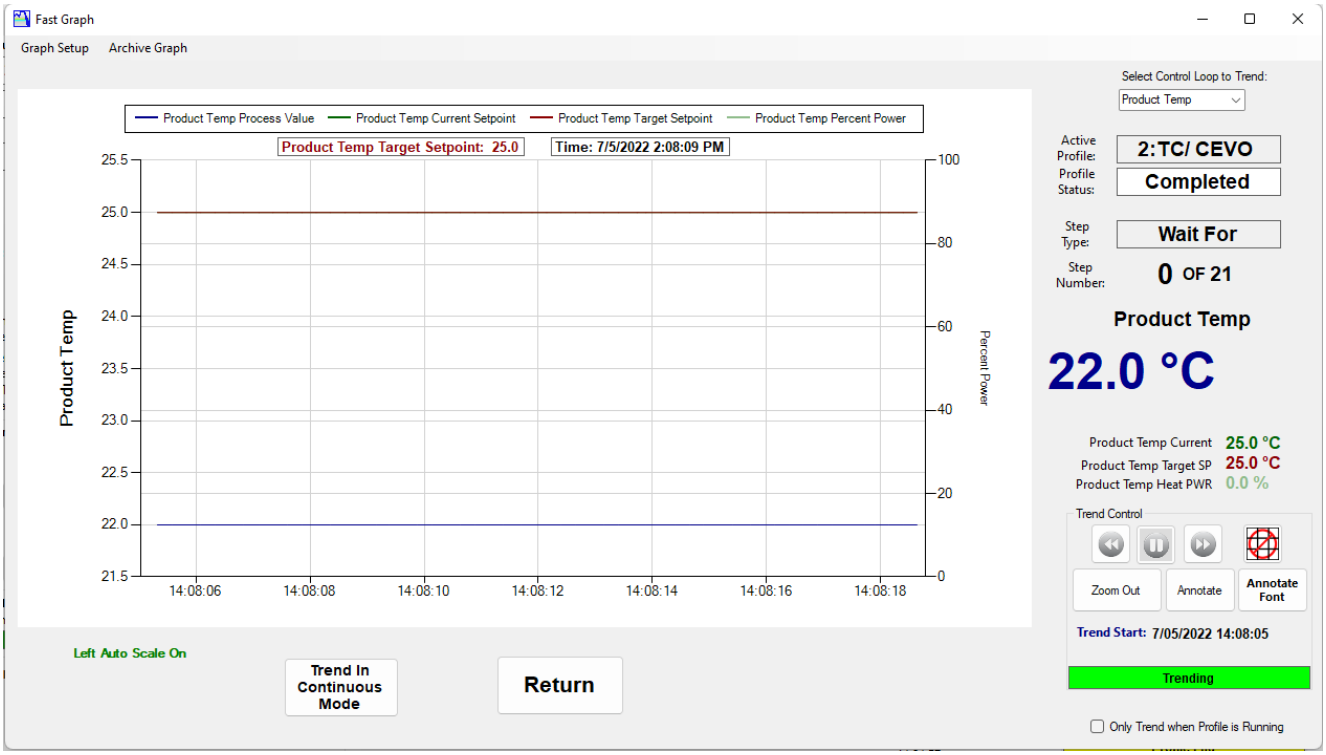


Fast Graph

The Fast Graph is used to graph one of the control loops process value and current setpoint much faster than the regular trend plot. For a Legacy F4 controller, the update rate can be as fast as 500 milliseconds, and for the F4T controller, it can be as fast as 250 milliseconds. This is useful for control loops that have fast changing signals such as pressure. This Fast Graph menu is only displayed when there is only one controller on the network as the dedicated communication speed takes up most of the communication bandwidth. You can use the dropdown list box to select which of the control loops to select (only one can be graphed at a time).

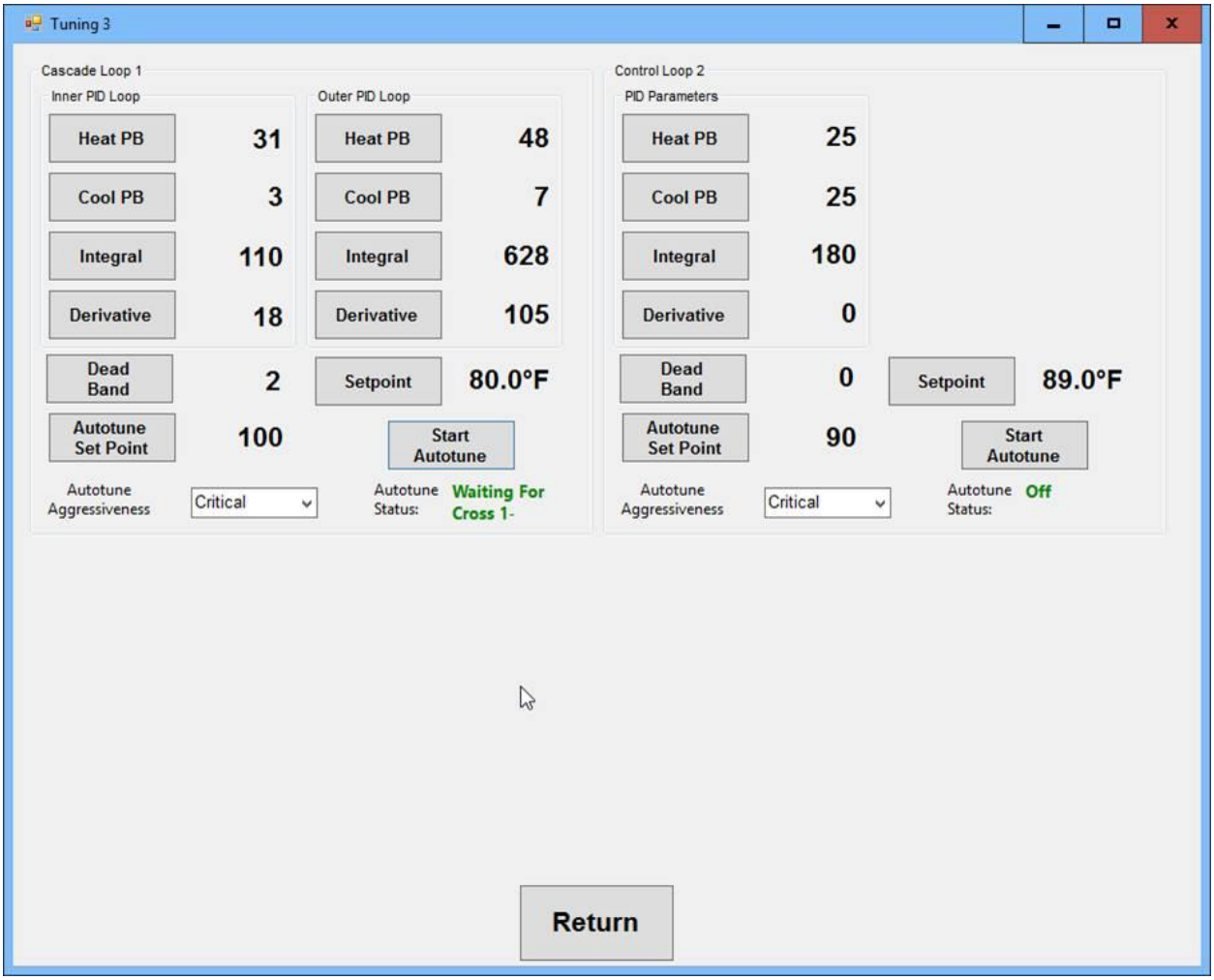
The fixed parameters that can be graphed, are the Process Value, the Target Setpoint, the working Setpoint and Percent Power. You can go into the Graph Setup menu to access the setup parameters and change the pen colors, enable the pens or change the update rate.

The percent power and target setpoint are updated at the slower normal graph rate of 5 seconds for an F4T and 8 seconds for an F4 controller.



Tuning

You can use the Tuning screen to tune upto 4 Control Loops and or 2 Cascade Loops if supported by the F4T. Using this in conjunction with the Trend Graph allows you to quick see the Control Loop response after Auto Tuning or with Manual Tuning. The tuning screen below shows two Control Loops, a Cascade Loop and a regular PID Control Loop. With the Cascade loop you can modify the PID parameters for both the “Inner” and “Outer” Cascade Control Loop. Refer to the F4T Operation Manual for more information regarding the Cascade Control Loop. When Auto Tuning the control loop, first enter a setpoint that is where your end process temperature will be operating at and then select the “Start Autotune” button. The F4T will then begin the Autotune and will wait for the process value to cross over the setpoint value 3 times before it calculates the new PID settings. This can be done for both Cascade and regular PID Control Loops. The “Autotune Setpoint” button is used to set a percentage of the regular Setpoint that the Autotune function tunes at. This is primarly used when any overshooting temperatures during the Autotune could harm the equipment. If this is not the case, then it is recommended to set the “Autotune Setpoint” value to 100 or 100% of the setpoint. Then the autotune will tune at the desired process temperature. You can also select the type of response you want by selecting Critical, Under Damped or Over Damped in the “Autotune Aggressiveness” drop down box. Refer to the F4T Operation Manual for more information on the Tuning parameters and what they are used.



Setup Data Logging Screen

Data To Log

The “Data to Log” tab screen is used to select which parameters are to be logged during file data logging. The Data Log Interval button is used to set the frequency of data logging and has a minimum value of 5.0 seconds. The “Event Output Data Enable” is used to check if certain events are set to “ON” during a profile to check tolerance bands or provide data for only one particular or a group of steps in the profile. Select “All Steps” to see the step data information that will be logged in the summary at the end of the data log. Select “None” if you do not want step data to be included in the data log summary at the end of the data log or select a particular event output that can be used as a trigger to record data just during the steps that have event output turned on in the profile run.

ProcessView

Setup Data Logging 1

Data To Log | Log File Name/Location | Start/Stop Automation

Data Log Interval

5.0

Units

Sec

- [ ] Login User Name
- [ ] Active Profile

Profile Data

- [ ] Temperature Target SP
- [ ] Temperature Current SP
- [ ] Humidity Target SP
- [ ] Humidity Current SP
- [ ] Step Number
- [ ] Step Type
- [ ] Profile Status

Event Outputs

- [ ] RH ENABLE
- [ ] BOOST COOL
- [ ] AMB LOCK ON
- [ ] DEHUMID AIR
- [ ] DRY AIR PURGE
- [ ] GN2 PURGE

Temperature

- [ ] Target SP
- [ ] Current SP
- [ ] Temperature
- [ ] Heat PWR
- [ ] Cool PWR

Humidity

- [ ] Target SP
- [ ] Current SP
- [ ] Humidity
- [ ] Heat PWR
- [ ] Cool PWR

Over Temp 1 Data

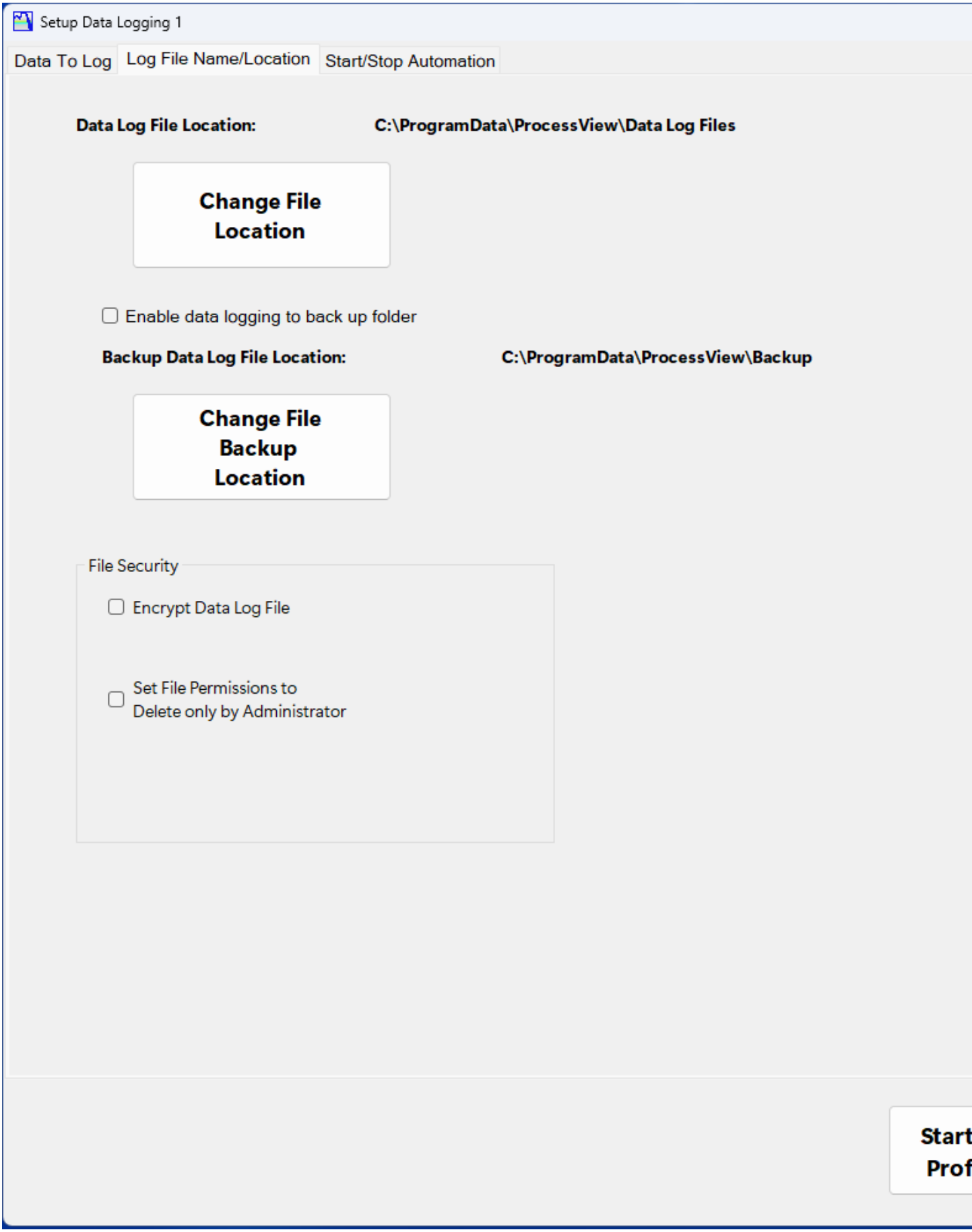
- [ ] Over Temp 1 Status
- [ ] Over Temp 1
- [ ] Over Temp 1 High SP
- [ ] Over Temp 1 Low SP

Start
Prof

Log File Name/Location

The “Log file Name\Location” tab is used to change the folder path where the Data Log files are stored on your PC. Select the “Change File Location” button to change the folder path. If you want ProcessView to make a backup copy of the data log file after logging has ended then you can check the “Backup File after data logging has ended” checkbox and specify a backup location.

If you would like to append information on all the files you can enter text and check the “Append user supplied text to file name” check box. If you would like for a user to be prompted when starting a profile to add text to the file name then check the check box that does this. If you need the data log to be secure and encrypted then check the “Encrypt Data Log File” check box and ProcessView will encrypt the data log file. You can use the View Data Viewer to look at the data from the encrypted file. You can make the order of the file name to your requirements by checking the the File Name Items and setting the order that is needed in your application. Just remember to make “Seconds” the last item in the list so that every file that is stored will have a unique file name.


Setup Data Logging 1
Data To Log
Log File Name/Location
Start/Stop Automation
Data Log File Location:
C:\ProgramData\ProcessView\Data Log Files
Change File Location
Enable data logging to back up folder
Backup Data Log File Location:
C:\ProgramData\ProcessView\Backup
Change File Backup Location
File Security
Encrypt Data Log File
Set File Permissions to Delete only by Administrator

Start/Stop Automation

If you want ProcessView to automatically start data logging when a profile is started and then stop the data logging when the profile has ended then check the “Data Log Only When Profile is Running” check box. If want ProcessView to automatically print a graph of the data just logged then check the “Print Data Graph at End of Profile” box. After a profile has ended ProcessView will try and print the graph to the default printer in Windows. If you want to have ProcessView save the a graph of the data just logged to a PDF file then check the “Save PDF Data Graph at End of Profile” check box.

If you want to have ProcessView send the data file after it is done logging to an external FTP site you can check the FTP check box and you will then be prompted for the address of the FTP site where the data is to be sent. If you want ProcessView to automatically log data on power up if a profile is running then check the appropriate check box. You can also have ProcessView send a chart from the logged data to the default printer connected to your PC. Check that check box if you want that to happen.

If you want to have ProcessView send the data file after it is done logging to an external FTP site you can check the FTP check box and you will then be prompted for the address of the FTP site where the data is to be sent. If you want ProcessView to automatically log data on power up if a profile is running then check the appropriate check box. You can also have ProcessView send a chart from the logged data to the default printer connected to your PC. Check that check box if you want that to happen.

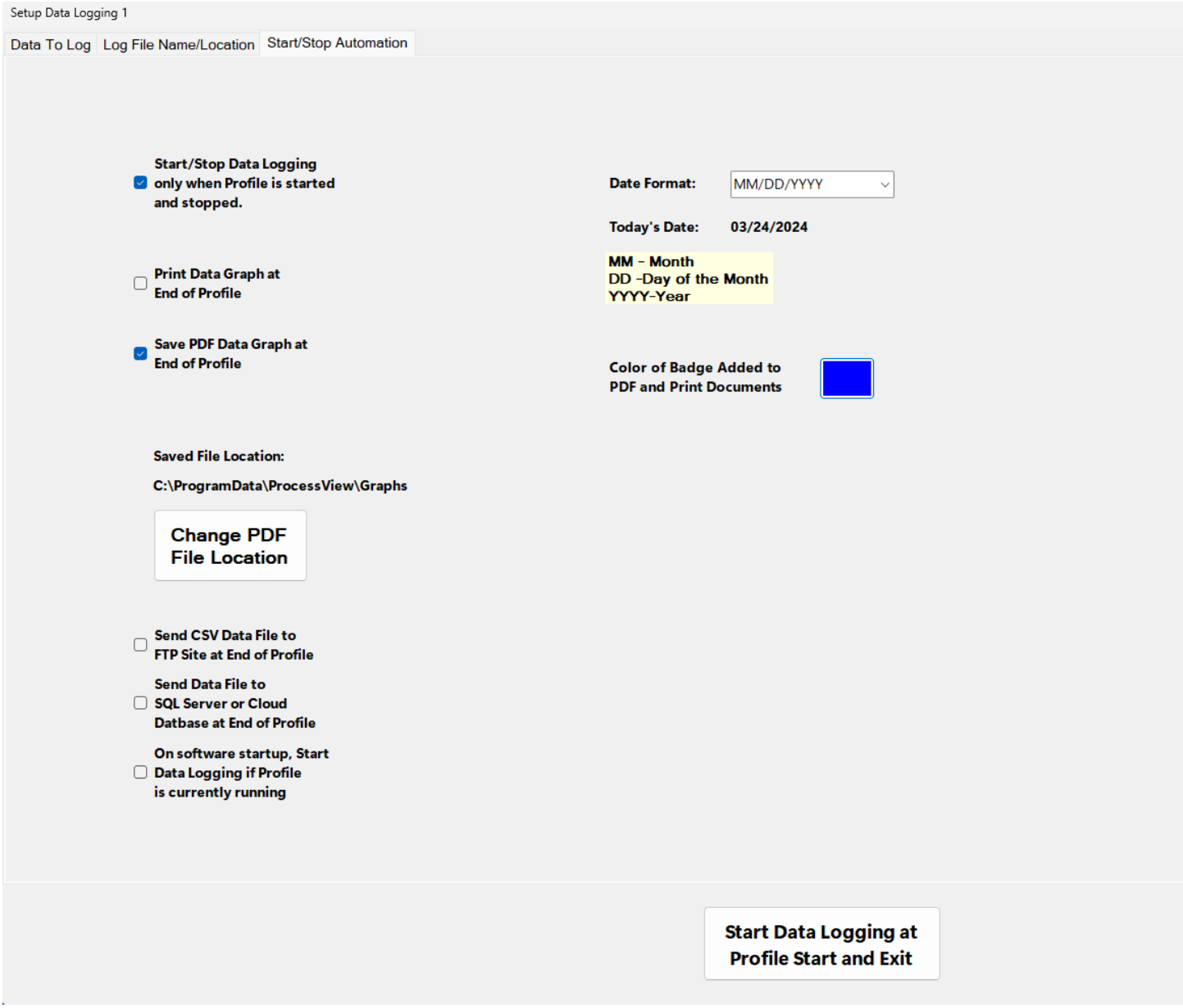
If you want ProcessView to automatically start data logging at startup when a Profile is currently running then check the “On software startup, Enable Data Logging and DataLog if Profile is running” check box.

For Database applications, you can have ProcessView automatically create a database table and send the data to the new table created at the end of the Profile Run. Check the checkbox shown below “Send Data File to SQL Server or Cloud Database at End of Profile”. The table that is created will have the same name as the file name created for CSV files with a prefix of “dbo” for SQL Server databases.

You can also change the date format used thru out the software to match your preferences.

You can also change the date format used thru out the software to match your preferences. If you want to have color coded reports for each controller (ex. Blue badge for a freezer, Red badge for a furnace) you can select the color for each controller by selecting the color badge button. The badge

is a small filled rectangle that is added to the upper left corner of any printed or saved PDF files that are automatically printed after a profile run.



Real-Time Data Viewer Screen

The Real-Time Data Viewer screen is used to view data as it is being logged in real time. You can add notes to the data log file while data is being logged. Anytime a user changes an event, variable, starts, stops, resumes or pauses a Profile that event will be logged. After the logging session has ended, all sensor input minimum and maximum values will be logged as well. This is valuable information for quality control purposes and validation of test runs. Notes can be appended to the data file after a Profile is done or the data logging session has been stopped by the user.

From this screen is where you are able to start and stop manual data logging when data logging is not done automatically when profiles are run. If data logging at the start of a profile option is enabled, then the “Start Data Logging” button will not be visible.

You can load a view prior data logs that are encrypted or not encrypted from the Load Data Log File button. You can see a historical graph of prior data log files with the Graph Data button. If you need to add an electronic signature to the data log you can do this with the electronic signature button. After adding the signature, the file will be converted to an XML file type which as the encrypted electronic signature added to it. This will create a file that is now tamper proof and cannot be altered in anyway. If anything is changed in the file the signature will be invalid. If you need to check if a signed file has not been altered you can use the “Verify Signed File” to check a signed XML file for Authentication. Then if the signed file passes you can load the XML file into Excel to do what you want with the file.

View Data 1

Load Data Log File

Data Log File Viewer

Data Log File: 2024-02-20_11-43-39_Chamber 1_1_TestA__.csv

Date	Time	Temperature Process Value (C)	Humidity Process Value (%RH)	Temperature Profile Current Set Point (C)	Humidity Set Point
02202024	11:45:34	24.1	100.0	26.3	46.0
02202024	11:45:29	24.1	100.0	26.2	46.0
02202024	11:45:24	24.1	100.0	26.2	46.0
02202024	11:45:19	24.1	100.0	26.0	46.0
02202024	11:45:14	24.1	100.0	25.9	46.0
02202024	11:45:09	24.1	100.0	25.9	46.0
02202024	11:45:04	24.1	100.0	25.8	46.0
02202024	11:44:59	24.1	100.0	25.6	46.0
02202024	11:44:54	24.1	100.0	25.6	46.0
02202024	11:44:49	24.1	100.0	25.4	46.0
02202024	11:44:44	24.1	100.0	25.3	46.0
02202024	11:44:39	24.1	100.0	25.3	46.0
02202024	11:44:34	24.1	100.0	25.1	46.0
02202024	11:44:29	24.1	100.0	25.0	46.0
02202024	11:44:24	24.1	100.0	25.0	46.0
02202024	11:44:19	24.1	100.0	24.9	46.0
02202024	11:44:14	24.1	100.0	24.7	46.0
02202024	11:44:09	24.1	100.0	24.7	46.0
02202024	11:44:04	24.1	100.0	24.6	46.0
02202024	11:43:59	24.1	100.0	24.5	46.0
02202024	11:43:54	24.1	100.0	24.4	46.0
02202024	11:43:49	24.1	100.0	24.3	46.0
02202024	11:43:44	24.1	100.0	24.2	46.0

Enter Text To Be Added To Data Log File Here

Enter Note to Data Log File

Graph Data

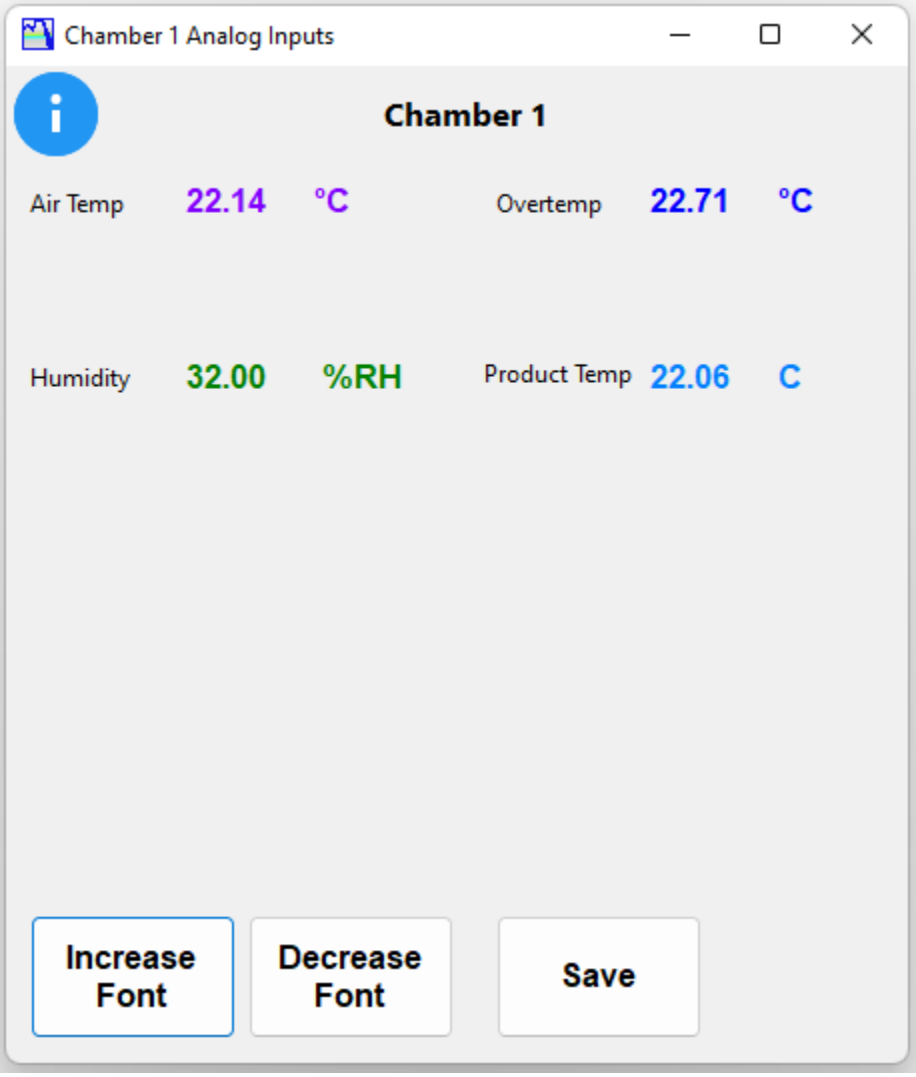
Data Sort (Newest First)

Return

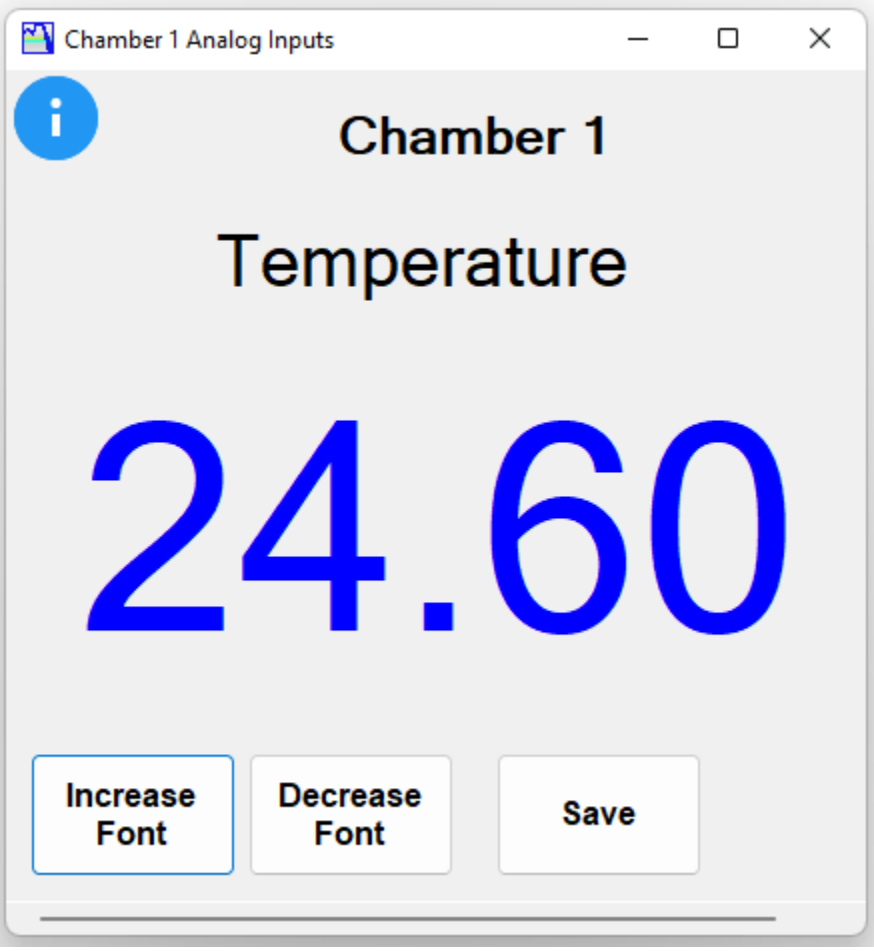
Analog Inputs

The Analog Inputs Window, is used to display all of the Analog inputs for the F4T controller (F4's are not supported). The values displayed are the raw analog inputs from either TCs, voltages, current or other internal values such as a variable or process block. The color of the displayed process values can be changed using the "Setup Graph" window. The names of each analog input can be customized in the "Edit Units/Labels", Analog Inputs tab screen which comes from the "Edit Selected F4T/F4 or PM Configuration" menu. You can also enable or disable displaying the Analog Inputs from that screen as well.

If you want to increase the size of the values, labels or units you can do this by first selecting the parameter then left clicking your mouse one time. This will select the parameter, and then you can re-position it on the window by dragging your mouse to the location you desire. Then you can the left click your mouse one time to deselect it and lock it into place. After the move has been done or after selecting and deselecting a parameter you can increase or decrease the font size to make it larger or smaller. Then when finished you will need to select the Save button to save the settings. This feature allows a user to have very large fonts for process values so you can see them on a PC display from a far distance away. You can then move the Analog Input window for several controllers onto the PC display to show multiple chamber process values. You can also select the information icon and a help window will pop up which describes how to use the screen.



Below is an example of how you can increase the font to make a large process value window:



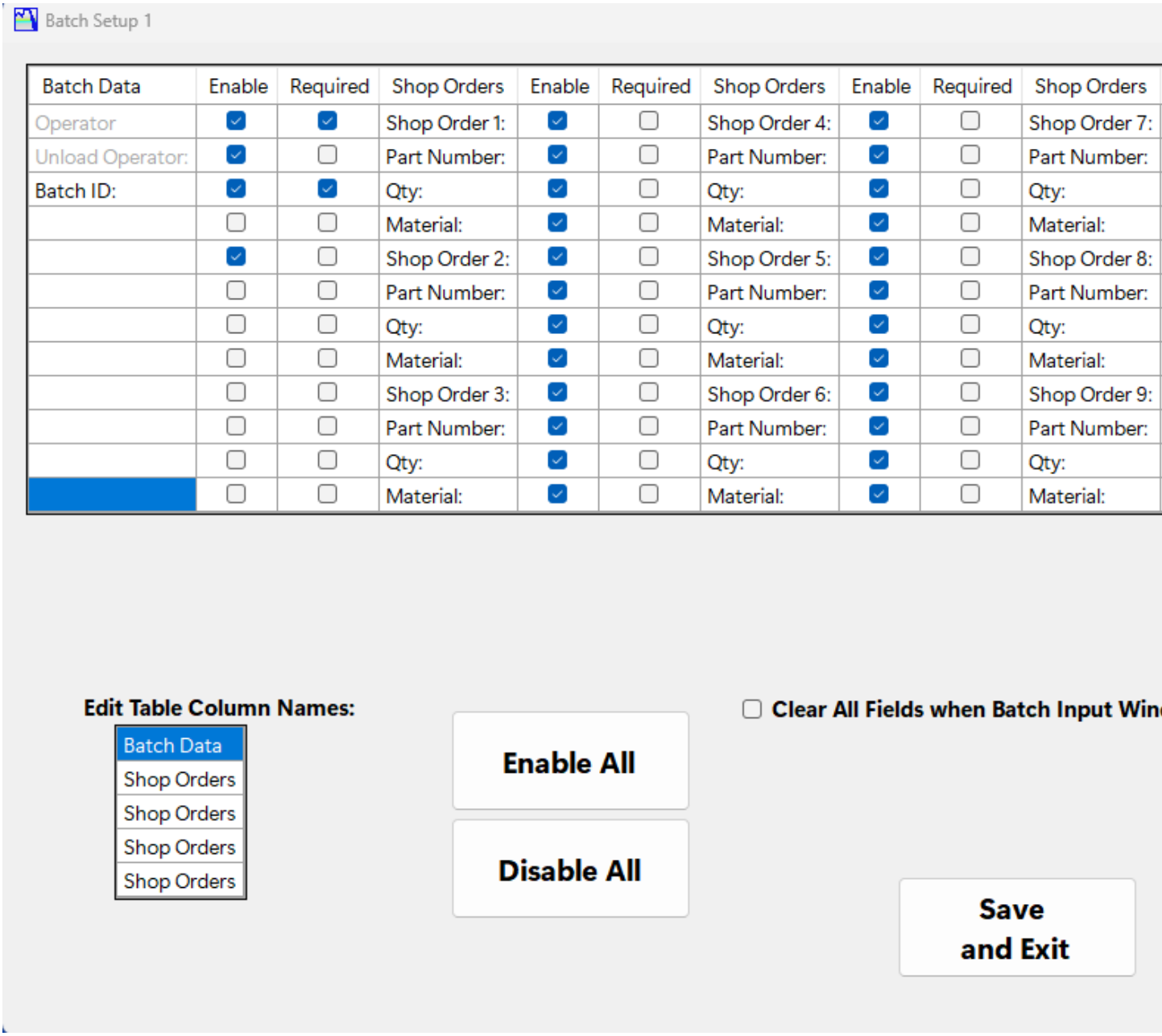
Batch Setup

The “Batch/Scanner Setup” screen is used configure the fields for batch entry before a profile is run. The only two fields that cannot be changed are the “Load Operator and Unload Operator” fields. All the fields can be customized to your application. The “Enable” check boxes are used to enable the fields during the batch entry. The “Required” check boxes can be used to force an input to the associated field. If the field has not been entered by the user when starting a profile an error message will pop up alerting the operator to fill in the information before a profile will be allowed to run. You can use the enable and disable buttons to select all the fields to be enabled or disabled to save some time.

The “Clear All Fields when Batch Input Window Loads” will clear all inputs when the batch input window opens forcing the user to input all new information for a batch run. If this is left unchecked then the software will retain the last batch entry fields when the batch input window opens.

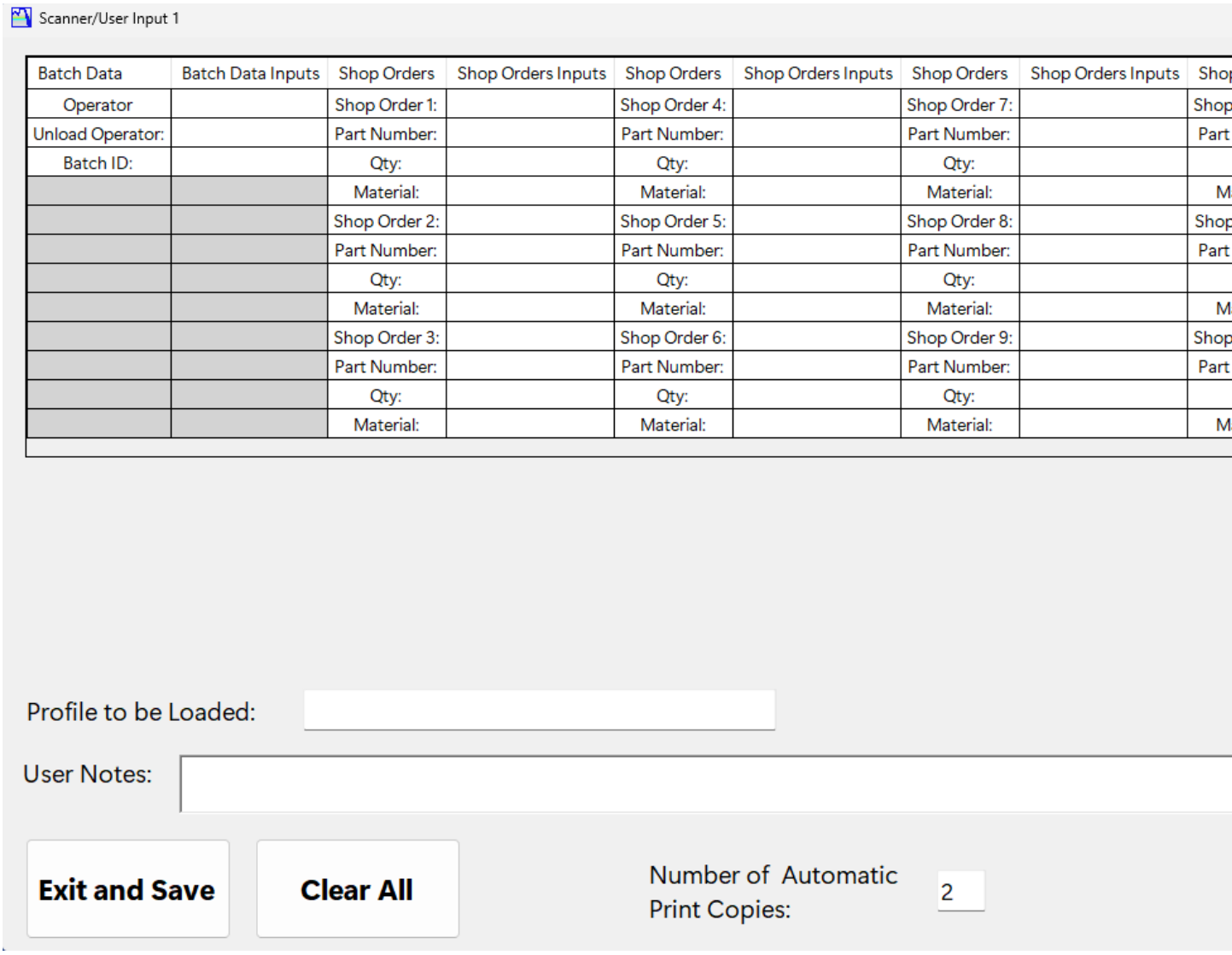
When using a scanner, the order that is scanned is the first column will be first and each row in that column will be scanned, then the second column and so forth.

Bar Code/QR Code Scanner Configuration: In order for the software to recognize that a Bar Code/QR Code has been scanned, the Scanner must be configured to have a CR (Enter Key/Carriage Return Pressed) as an ending character or suffix character that is appended to the Bar Code Data. Most Scanners can be configured this way by scanning a configuration bar code from the Scanner's User Manual. Please refer to your Scanner's User Manual in order to configure this.



The “Batch Data” column fields are shown in the Quality Assurance Report in the General section at the top of the report. All the other columns are shown in the “Batch Information” section of the Quality Assurance report. You can determine for you application how to organize these fields for that are applicable to your application. If you choose to have a graph and the batch information automatically printed or saved to a PDF file after running a batch or profile you can select how many printed copies are printed by entering the number that you wish to have printed in the text box at the bottom of the window.

Below is an example of using different parameters and associated shop orders when loading a chamber with lots of different shop orders and part numbers:



Database Setup

The Database Setup Screen is used to connect to a database such as Amazon AWS RDS, Microsoft Azure, Microsoft Access or Microsoft SQL server. After datalogging has finished, then you must first connect to the database server unless it is for Microsoft Access database.

Before you can connect to the data base you must put in the correct path to the database server and the name of the database you are trying to connect to. If you are unsure what this is consult your local IT person at your company that is familiar with how your company's database settings are configured. You also need to select the database format that you are trying to connect to.

You also must have your username and password typed in that is used to connect to your database. After you have the username and password entered you can connect to the database by selecting the "Login Button". If it is successful you will see the green "Connected" label and you will get a popup message that says you are connected. After you datalogging is finished either automatically after a Profile is done or if you stop it manually you can upload and save the data. When you select the "Upload Data To Database" button or a data log file is automatically uploaded after a Profile is done, a table will be created in your database that has the same name as the data log file and it will be populated with the data. The file will have a prefix of .dbo added to the file name which represents the default schema for SQL Server which stands for "Database Owner".

You will then see the data that was uploaded in a data grid view table on the database window and a message will appear which tells you how many data rows or records were uploaded. If you are using a Microsoft Access database, the software will create a new database before it creates a table to populate the data in. For cloud and Microsoft SQL Server the software will only create a new database if the current database name is not found in the database server that is connected to.

Saving Tables Automatically after a Profile Run:

To have ProcessView automatically save a database table after a profile has been run then you will need to set the checkbox in the Data Log Setup window as show below:

Setup Data Logging 1

Data To Log | Log File Name/Location | Start/Stop Automation

- [x] **Start/Stop Data Logging only when Profile is started and stopped.**
- [ ] **Print Data Graph at End of Profile**
- [ ] **Save PDF Data Graph at End of Profile**

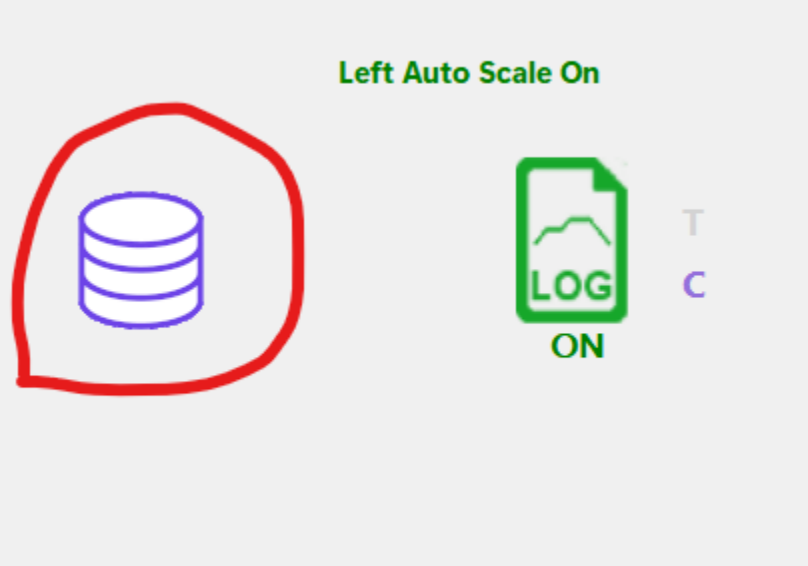
Saved File Location:

C:\ProgramData\ProcessView\Graphs

Change PDF File Location

- [ ] **Send CSV Data File to FTP Site at End of Profile**
- [x] **Send Data File to SQL Server or Cloud Datbase at End of Profile**
- [ ] **On software startup, Start Data Logging if Profile is currently running**

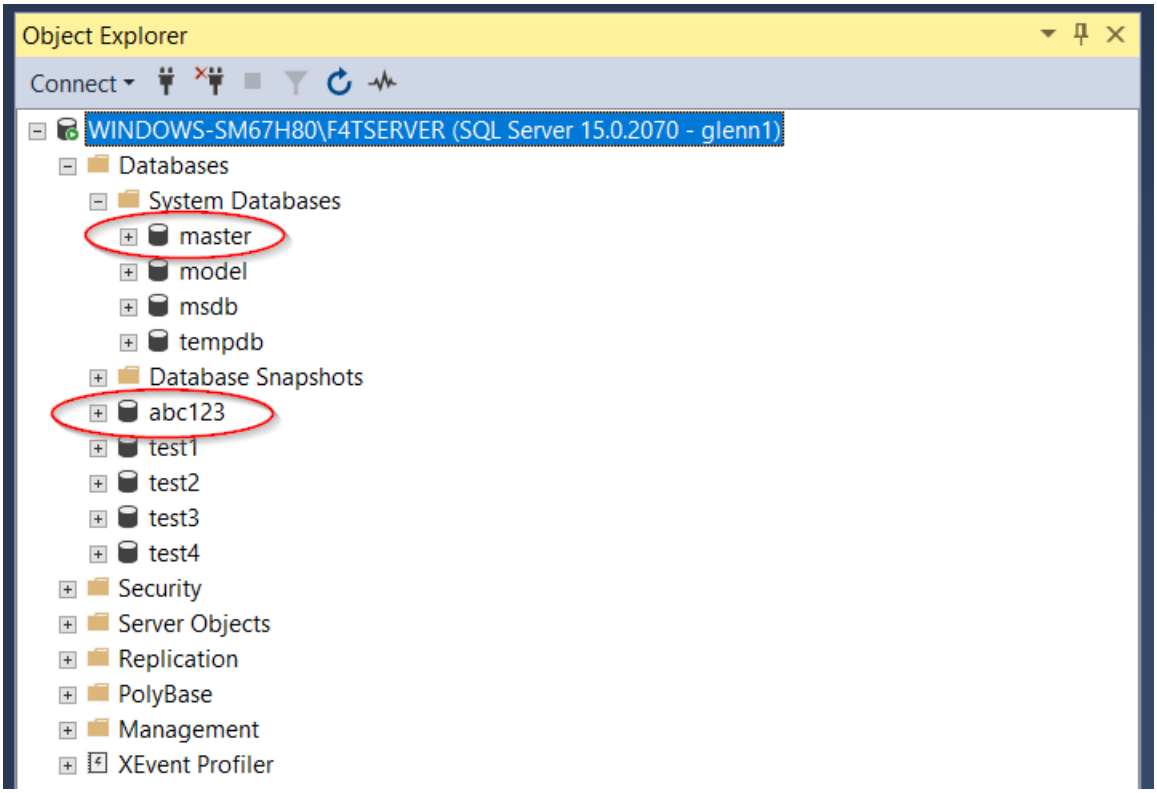
While the profile is running and the software is connected to the remote database, the indicator shown below will appear on the Main graphing window as show below next to the data logging enable indicator:



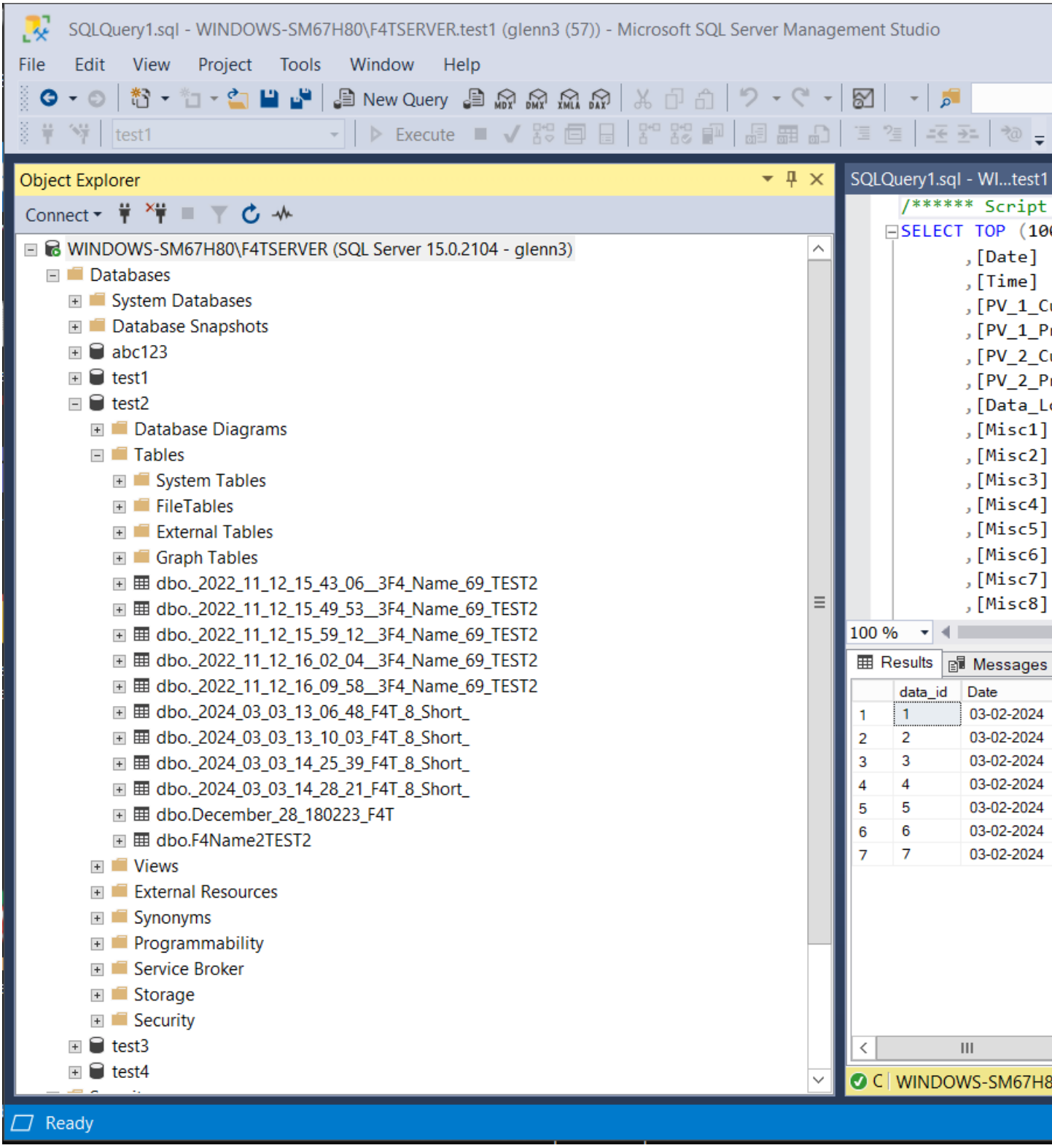
Microsoft SQL Server:

When using Microsoft SQL Server, when you login ProcessView will try and connect to the “master” System Database using the username and password credentials first. There must be a “master” System database present on the instance of the SQL server which is always included upon first installing the SQL Server. Then when the “Upload Data To Database” button is selected, ProcessView will check to see if the Database Name field is already present in the remote SQL server and switch from the “master” to the named database. If the named database is not in the SQL Server, ProcessView will create a new database and use it instead of the “master” database.

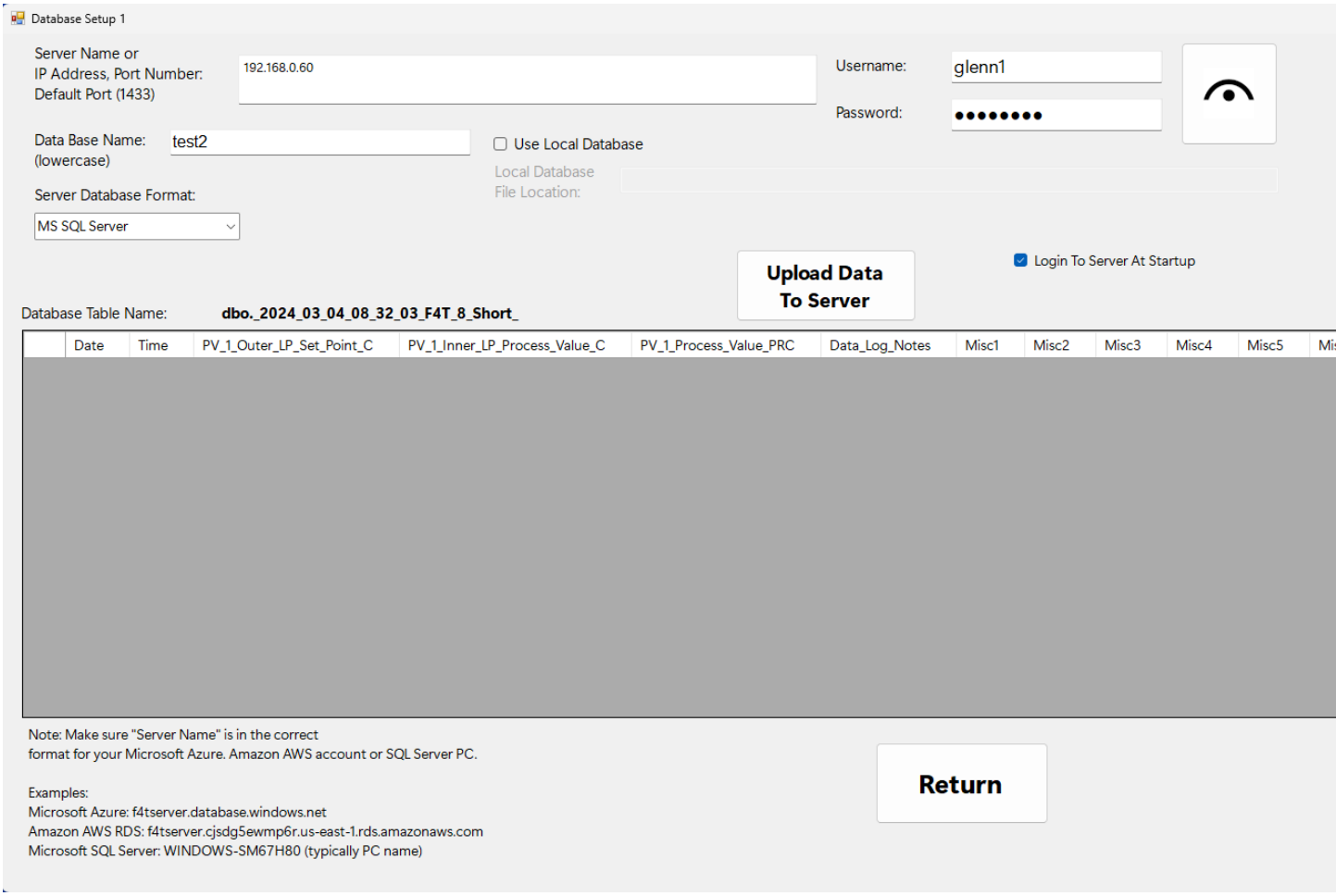
You can check this by using Microsoft SQL Management Server Studio software at the SQL Server PC and checking to see if it exists as shown below:



Below is a screen shot which shows the tables created after a profile has been run. The table names are the same name as the csv file name with a “dbo” prefix. In the Datalog Setup window you can specify the file name and its components. The table files were stored in the database named “test2”.

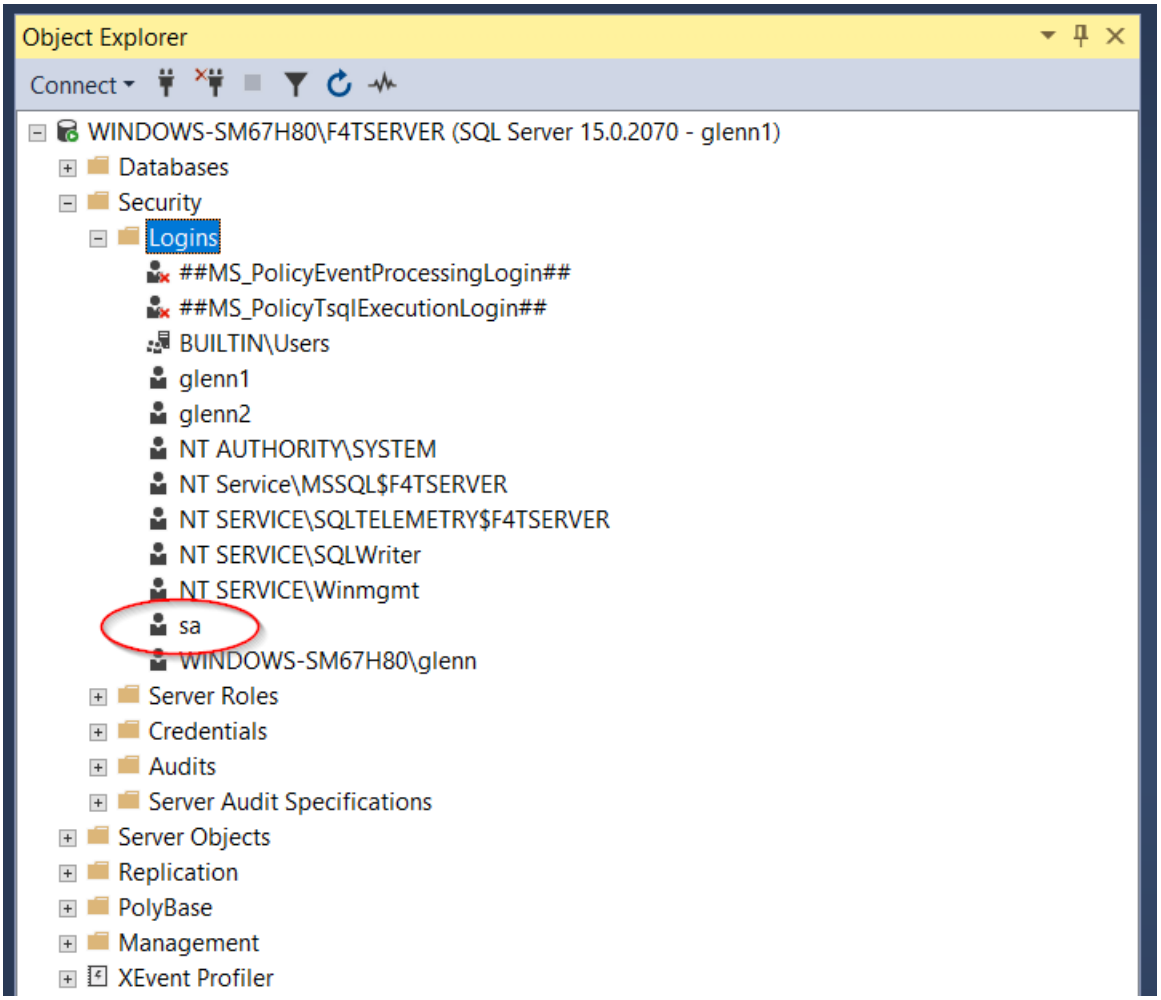


Below is a screenshot of the Database setup window from ProcessView which shows the database name and file name that was created during a Profile Run:



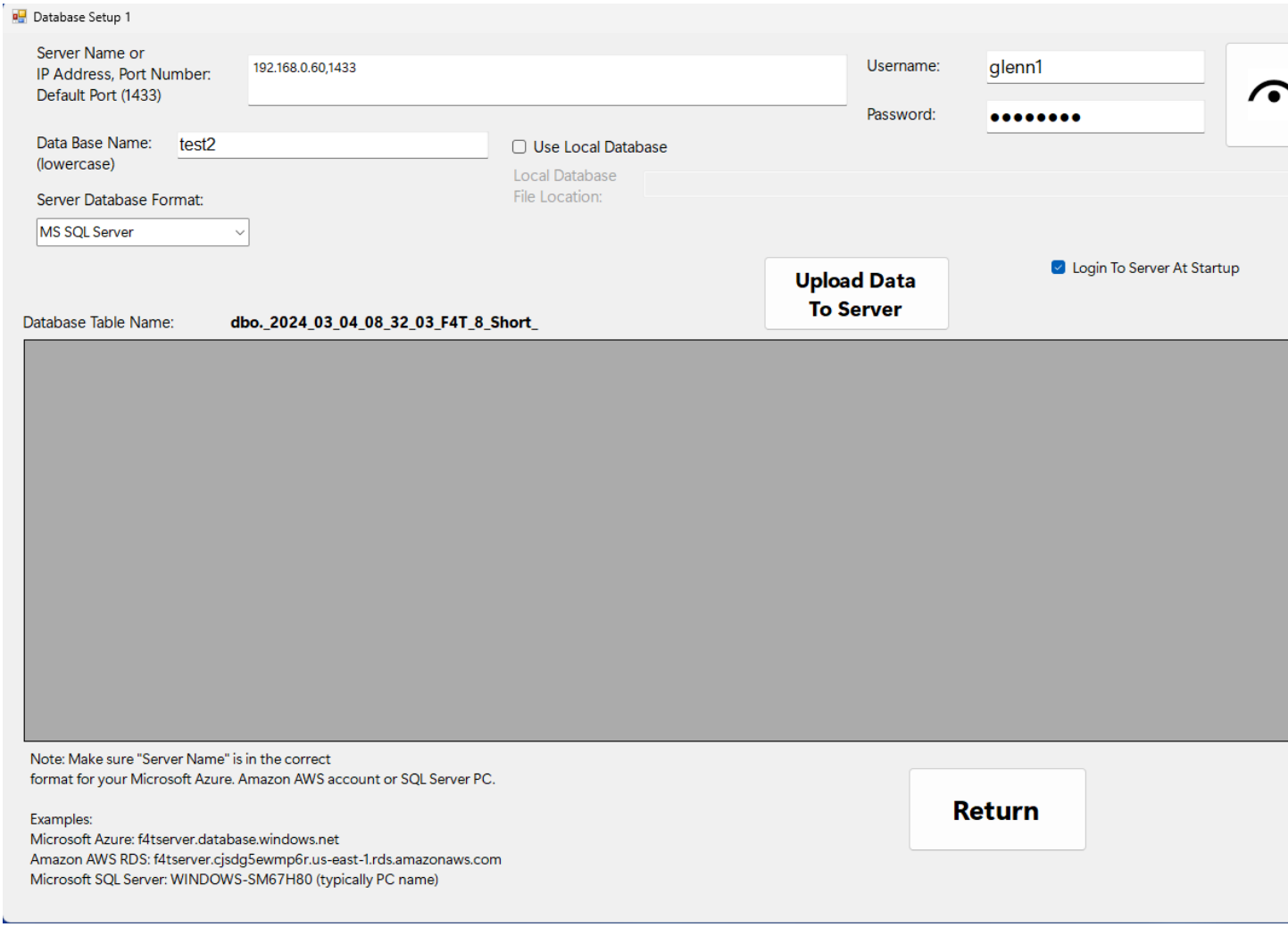
Below is an example of a database setup using Microsoft SQL Server as the Database format. The database that is used is “abc123” which is stored on the SQL Server. The Server Name is “WINDOWS-SM67H80” which also is the name given to the PC running Microsoft SQL Server. In the majority of cases you will not need to check the “Use Local Database” check box. This is only used if you are using a Local DB or local database for testing purposes.

The Username and Password are for the user that is given remote access in the SQL Server software. Below is an example of a list of users setup on a SQL Server. This window is show in the Microsoft SQL Management Server Software:



You can also connect to a SQL Server using an IP address and Port number. 1433 is the default port used by SQL Server. If your SQL Server is setup to use a different port then this is how you can access that SQL server using a different port number.

An example is show below:



Setting Up a MS SQL Server to allow Remote PC Access

After installing Microsoft SQL Server on your PC which will be the server for the database, you will have to note the server name (usually the name given the PC), the instance (then name given the server) and the name of the database that you want ProcessView to store data in.

There are two types of adjustments which must be set before connecting to the remote SQL Server. These settings are important because without them the connection to the remote SQL Server will not be able to be successfully created

Configuration settings:

1. The SQL Server instance to allow the protocol being requested

2. Allow access through the Window Firewall

In order to allow access to SQL Server instance, we have to enable TCP/IP protocol which is not enabled by default.

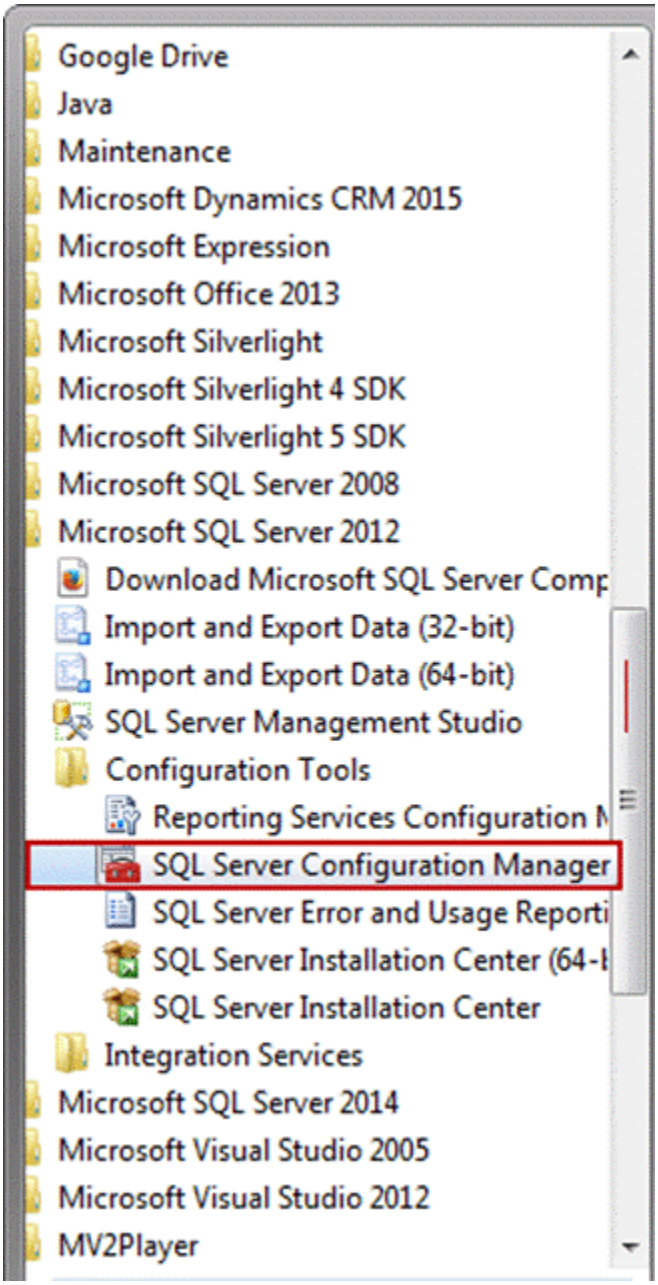
In order to establish a successful remote connection is to set up appropriate ports through the Window Firewall. In SQL Server there are two types of instances. First is a default instance and the second is a named instance. To connect to the default instance of Database Engine, or named instance that is the only instance installed on the machine, the TCP port 1433 is the only port that you need to specify.

But if you have multiple name instances installed on your machine, to connect with one of them, we must provide a port number which corresponding to appropriate instance name. By default named instance used dynamic port, which means that every time when the Database Engine starts new port number is assigned. Because of that it is difficult to configure Windows Firewall to enable access.

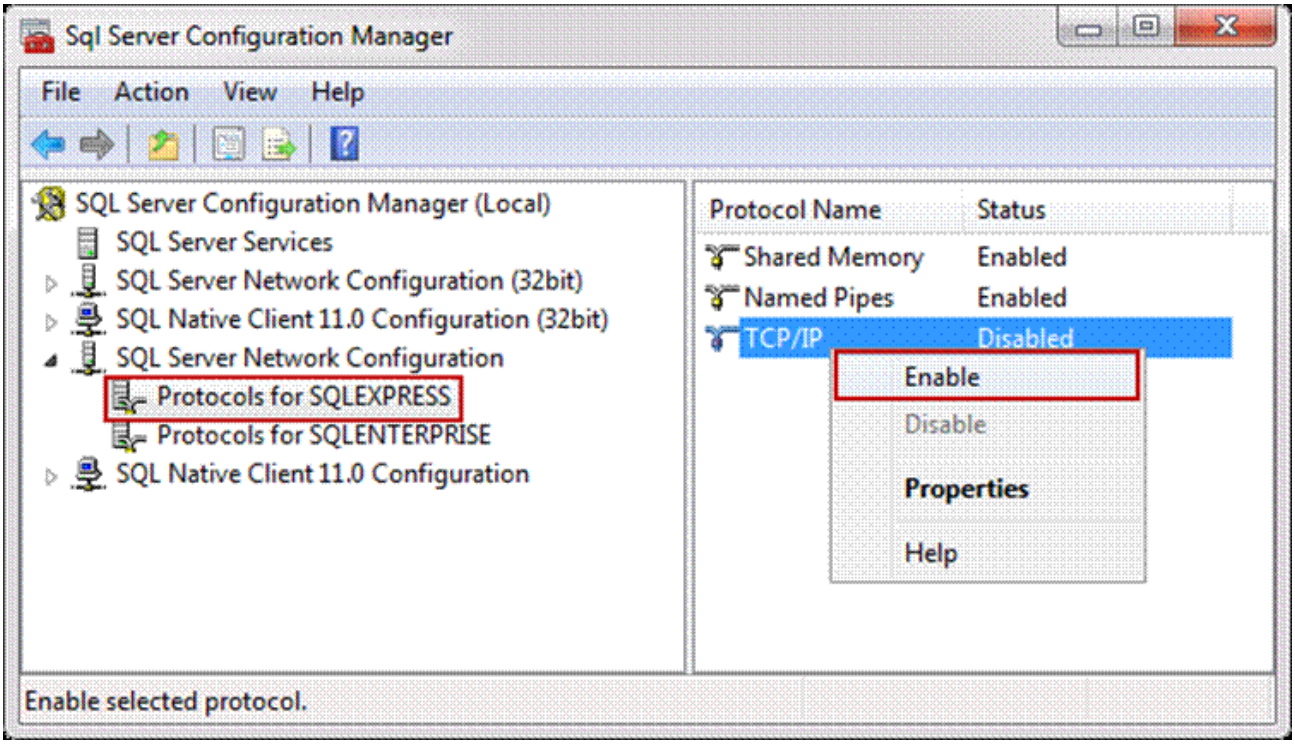
In order to resolve this problem, there is a SQL Browser service, which provide the TCP port number that corresponds to the named instances. The SQL Browser services use UDP port 1434. Now we met with the basic matters relating to remote connection, let's continue with the setup procedure.

Enabling TCP/IP protocol

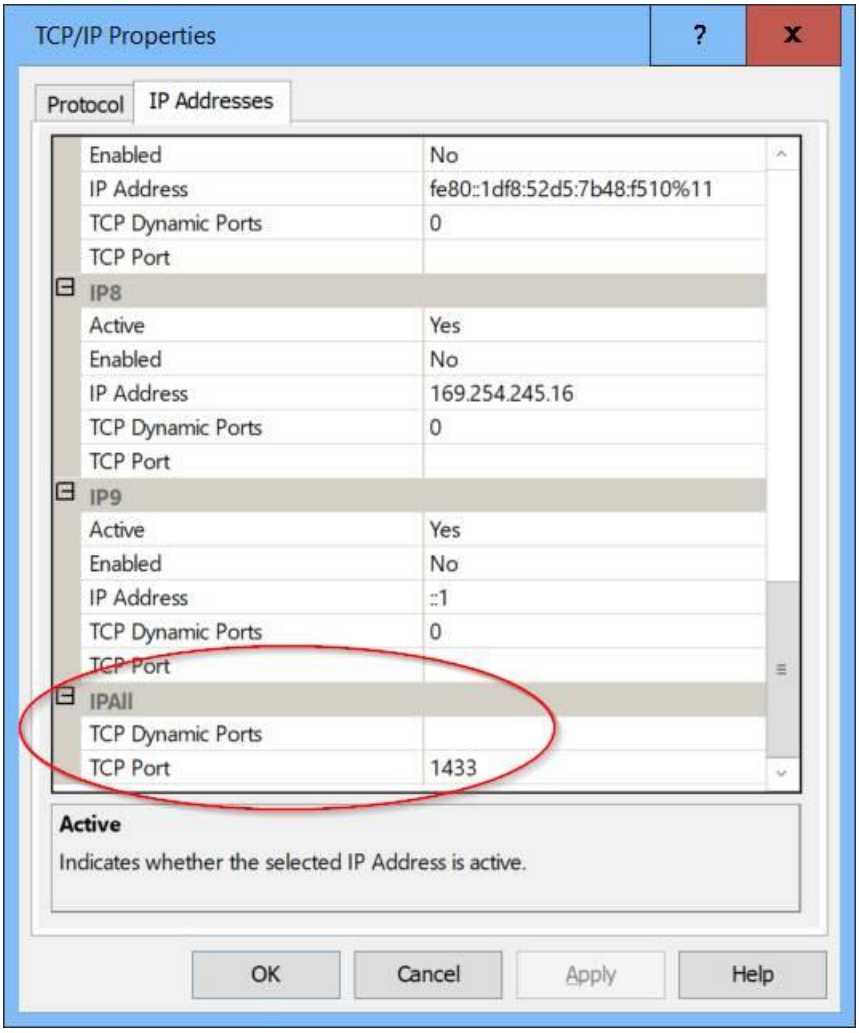
The first step is to enable TCP/IP protocol on the SQL Server service. Open the **SQL Server Configuration Manager** in the **Configuration Tools** folder under the **Microsoft SQL Server** folder:

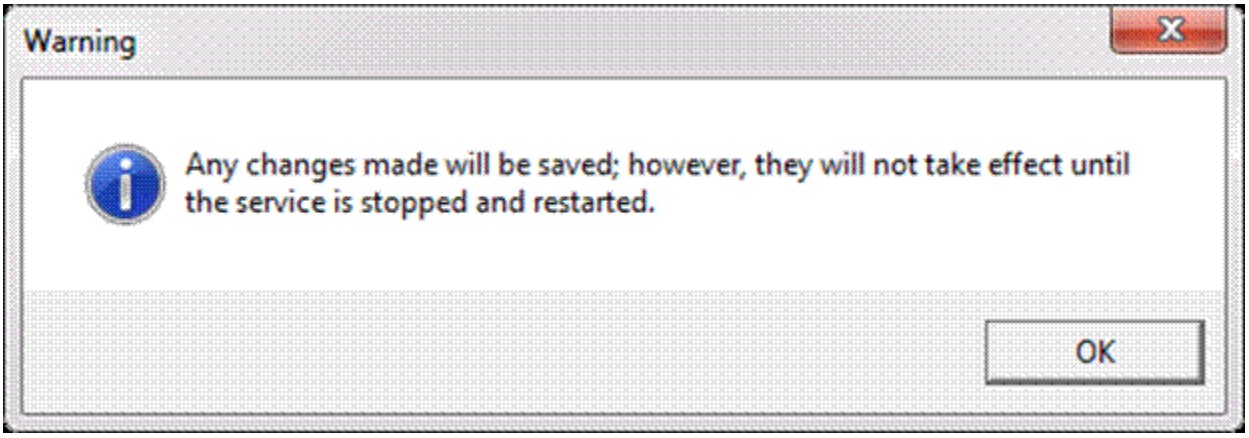


From the **SQL Server Network Configuration** node, select the **Protocols** item for the appropriate SQL Server. In the details pane, right click the **TCP/IP** item and select the **Enable** option:



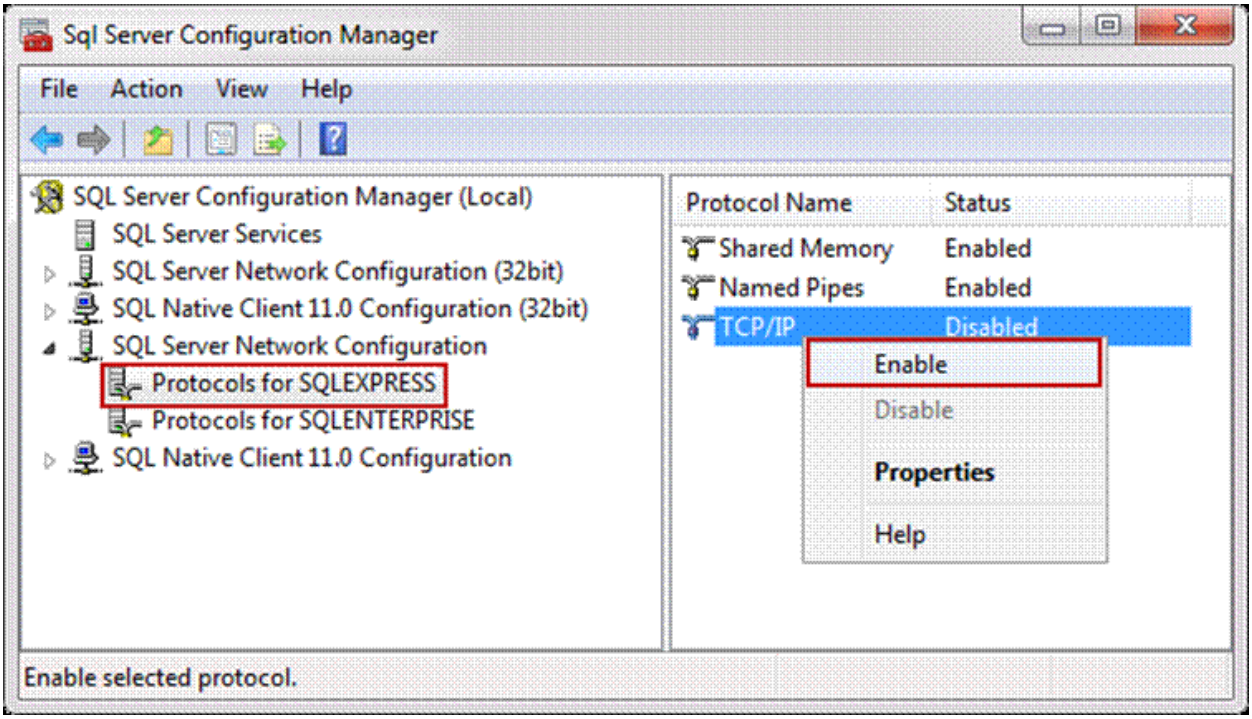
After that, again right click and select Properties of TCP/IP protocol. Select the **IP Addresses** tab in the window and scroll down all the way down to **IPALL** section and make sure the TCP Dynamic Ports is set to nothing and the TCP Port is set to a value of 1433 as shown below, then hit OK:





After this step the **Warning** box pop up in which informs us that changes that are made won't take effect until the next time service is started.

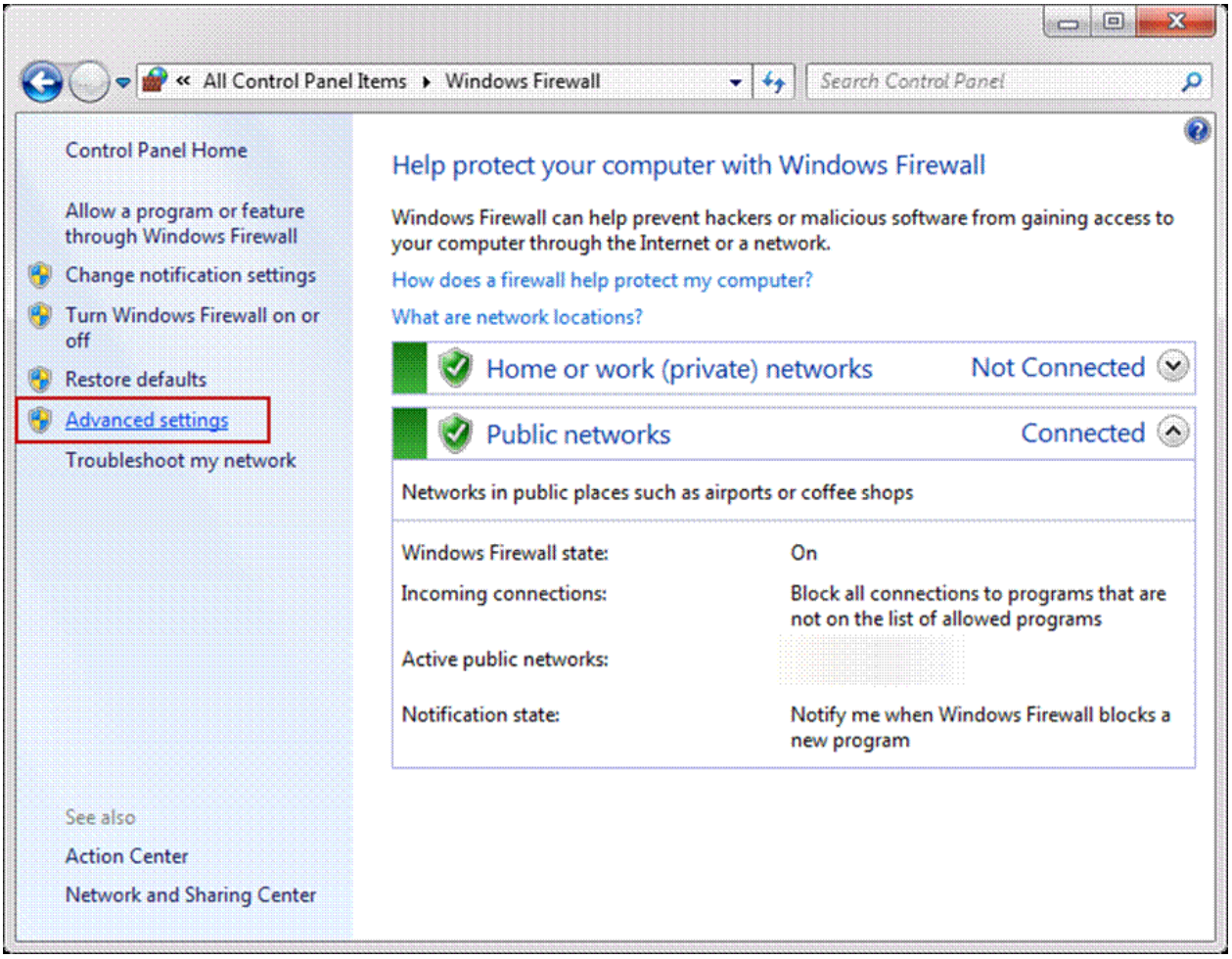
In order for the changes take effect, from console pane, select the **SQL Server Services** and from the details pane, right click the **SQL Server (SQLEXPRESS)** database engine instance and click the **Restart** option:



Now the service started with TCP/IP enabled, but still can't connect remotely until we configure the Windows Firewall.

Configuring Windows Firewall

From the **Control Panel** choose **Windows Firewall** and click the **Advanced settings** or just type **wf.msc** in **Search program and files** from the **Start** menu:



- **Inbound Rules:** You can allow or block traffic attempts to access the computer that matches certain criteria in the rule. By default inbound traffic is blocked, to allow traffic to access computer, you need to create inbound rule.
- **Outbound Rules:** You can allow or block traffic originating from specifying computer creating rules. By default outbound traffic is allowed, so you need to create the rule that block outbound traffic.

In the **Windows Firewall with Advanced Security**, click the **Inbound Rules** from the left pane, right click **Inbound Rules** and select the **New Rule** or from the **Actions** pane click the **New Rule:**

You will create a new Inbound Rule with the following properties:

Rule Type: **Port**

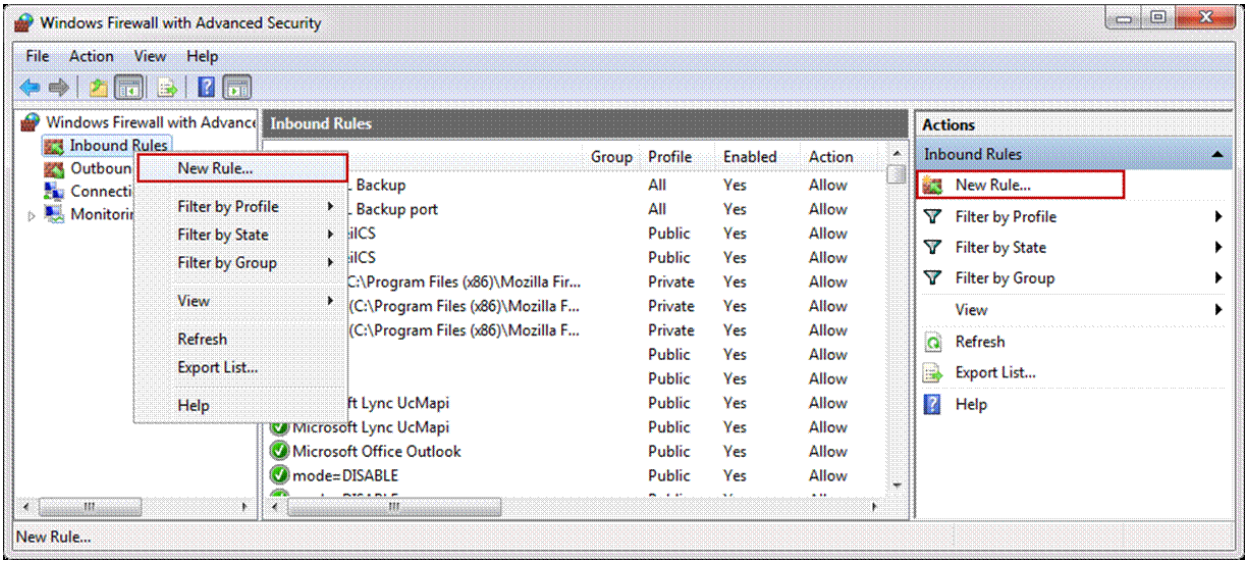
Protocol and Ports**: UDP, 1434**

Action: **Allow the connection**

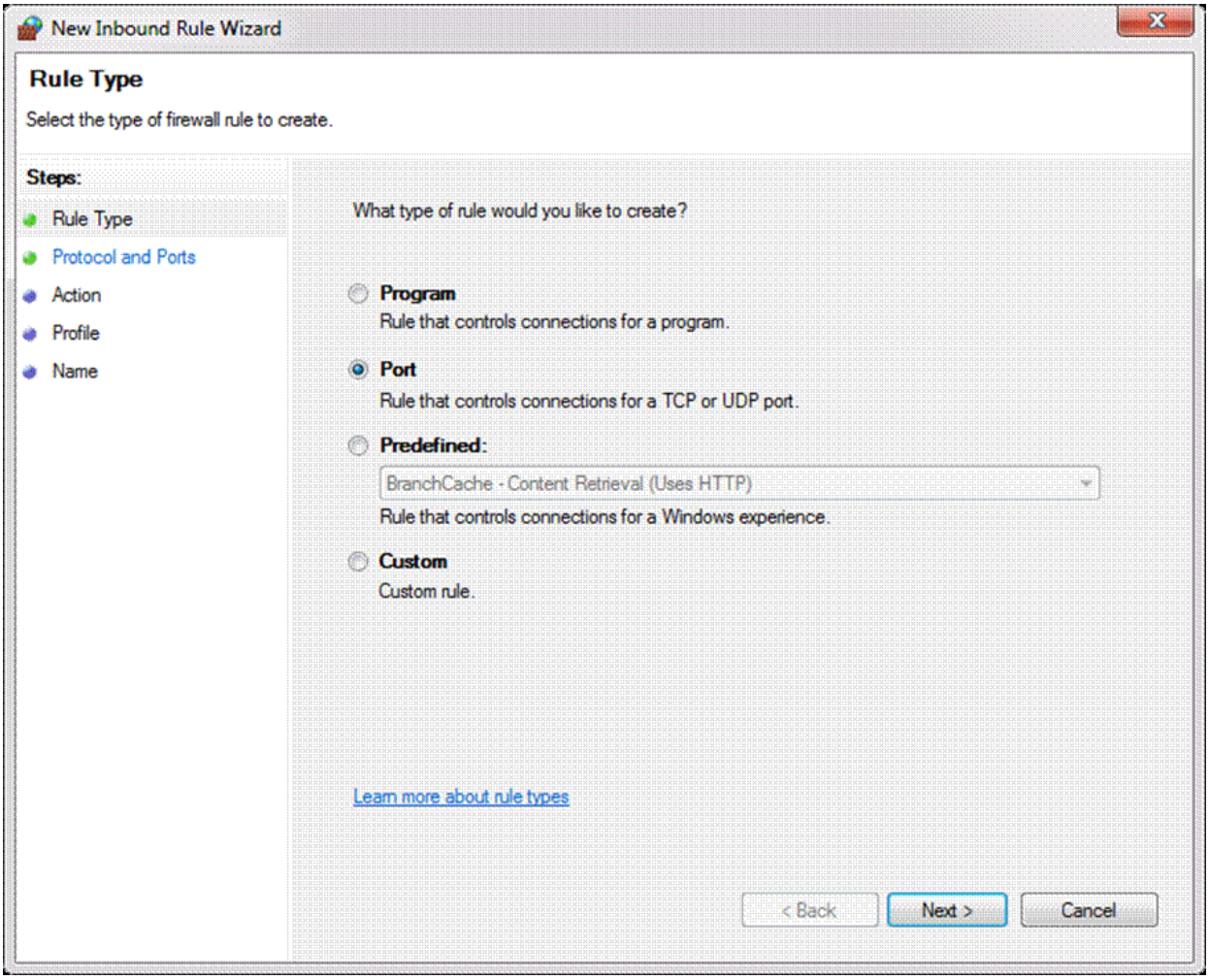
Profile: **Domain, Private, Public**

Name: **SQL UDP 1434**

Go to Inbound Rules and select New Rule.



On which you will click, it's up to you. In both case the **New Inbound Rule Wizard** will appear. Under the **Rule Type** choose **Port** and click the **Next** button:



From this link you can more informed of all rule types which are shown in the image above.

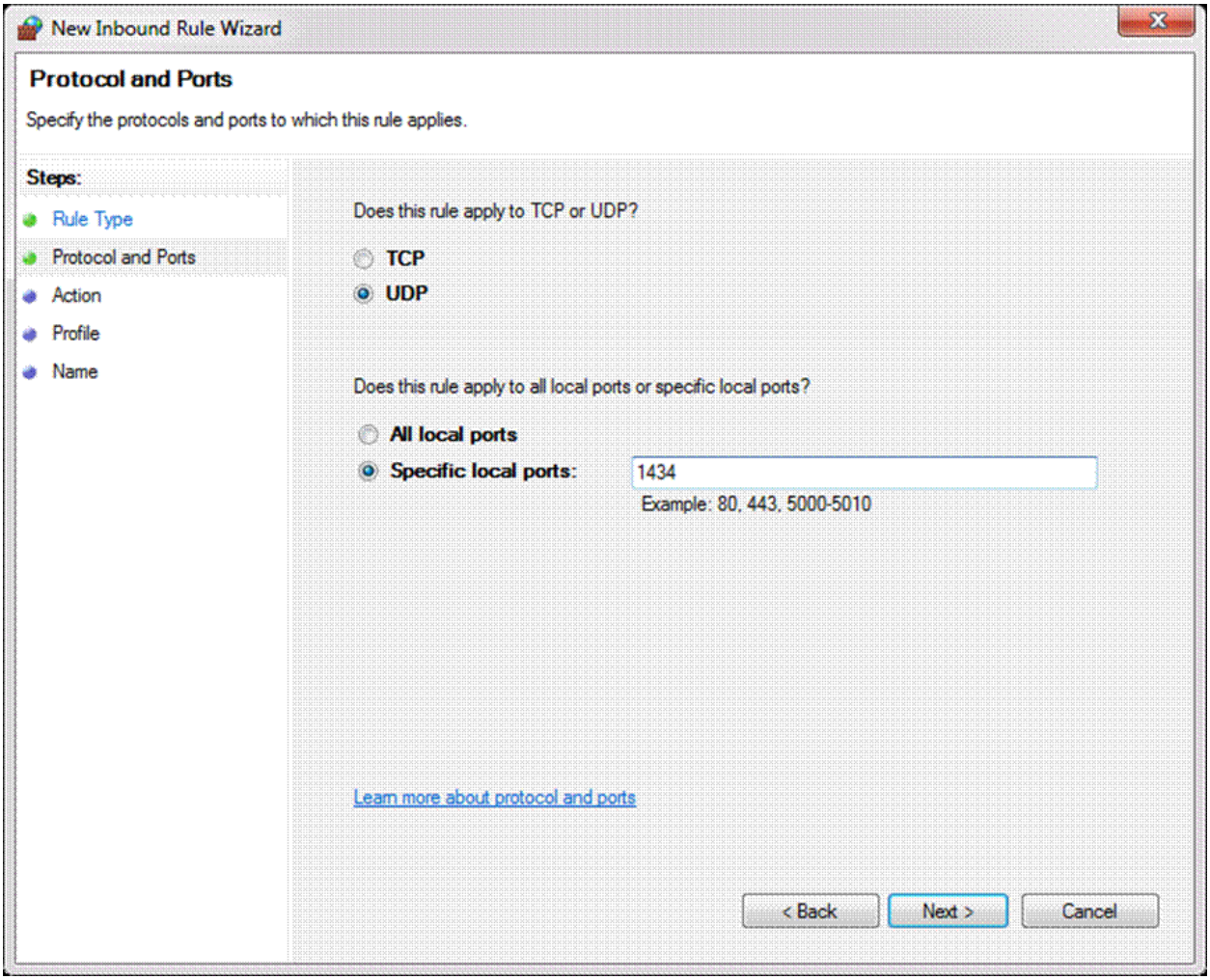
In the **Protocols and Ports** there are a several options that you can choose, depending on which type of protocols you select.

If you are wondering what is the difference between the TCP and UDP protocols you can find from this link.

TCP is used for the default instance and named instance if is the only instance installed on the machine and default port is 1433.

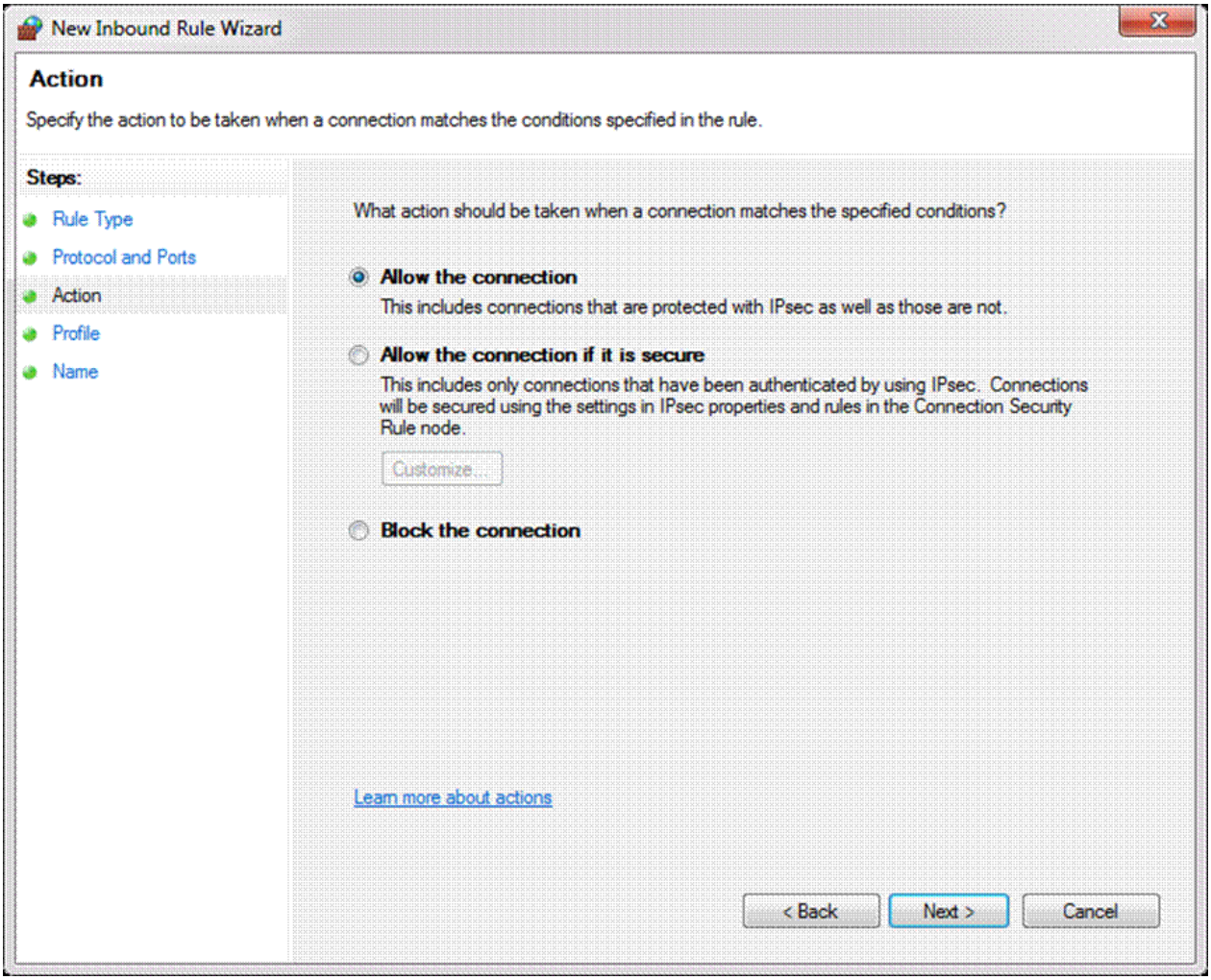
- **All local ports**: Rule applies on all ports from the selected protocol.
- **Specific local ports**: In the text box you specify a port or set of ports to which the rule applies.

For this example, select the UDP protocol and in the **Specific local ports** enter port number 1434. To proceed with the settings SQL Browser services, click the **Next** button:



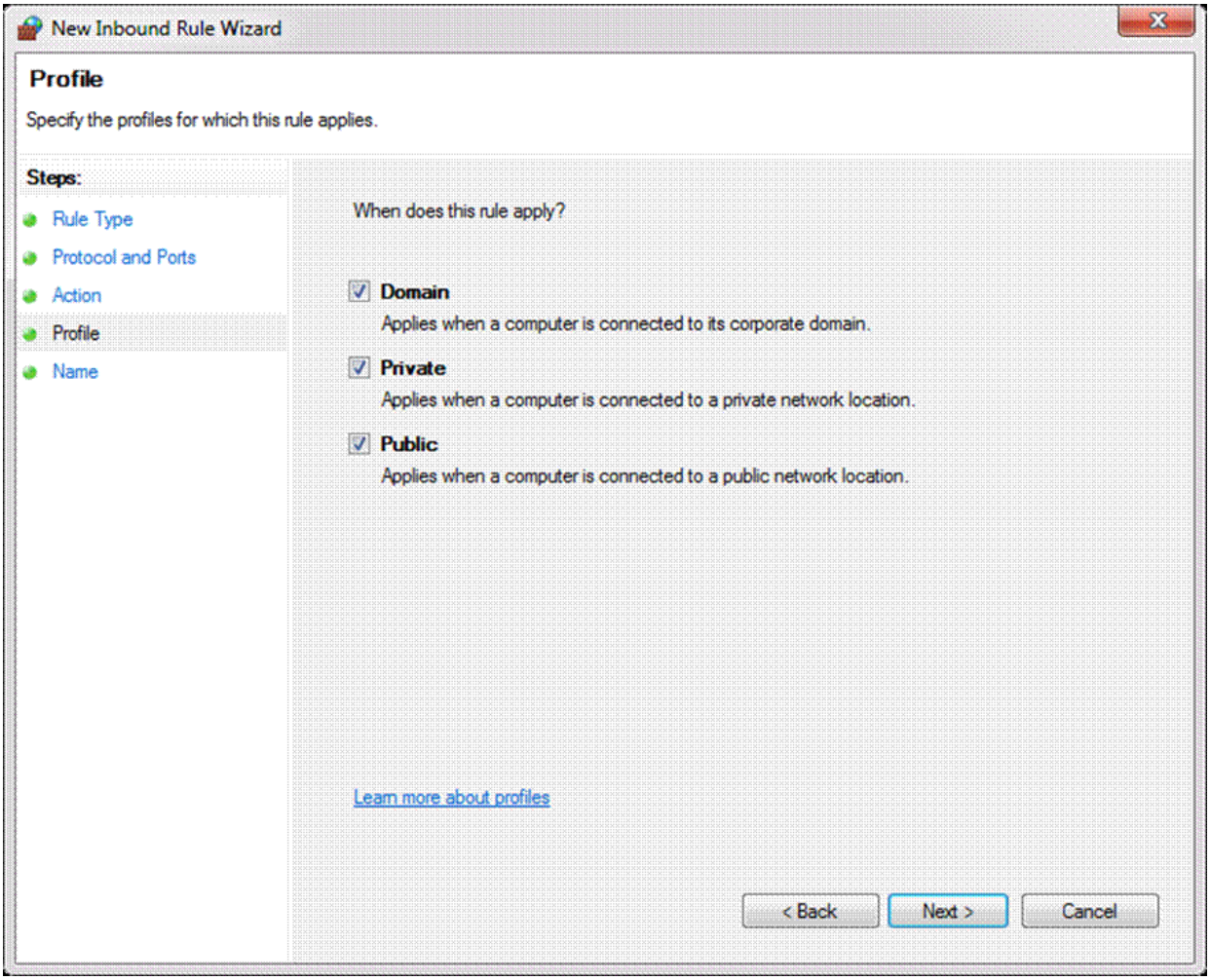
- **Allow the connection:** Includes all connections secure and insecure**.**
- **Allow the connection if it is secure**: Includes only connection if it is made through a secure channel.
- **Block the connection:** Blocks all connections secure and insecure.

In the **Action** dialog choose **Allow the connection** and click the **Next** button:



- **Domain**: The setting is applied only when a computer is connected to a domain.
- **Private**: The setting is applied when a computer is connected to a network that is identified as a private network.
- **Public**: The setting is applied when a computer is connected to untrusted public network.

In the **Profile** dialog choose all three profiles and click the **Next**:



On this step give the rule a name and click the **Finish**.

Note: When we give the name of the rule, please write some descriptive name that you can understand later, when you need to find them or edit in the Inbound Rules list.

In the Name Dialog give the rule a name that you understand and will remember, you can also add a description in the description text box that the rule is for allowing incoming requests on the UDP port 1434.

Name: **SQL UDP 1434**

You will now need create an incoming rule for the TCP Port 1433 just like you did the UDP port 1434. Repeat the steps above:

Go to Inbound Rules and select New Rule. Add the following rule, refer to images above if unclear.

Rule Type: **Port**

Protocol and Ports**: TCP, 1433**

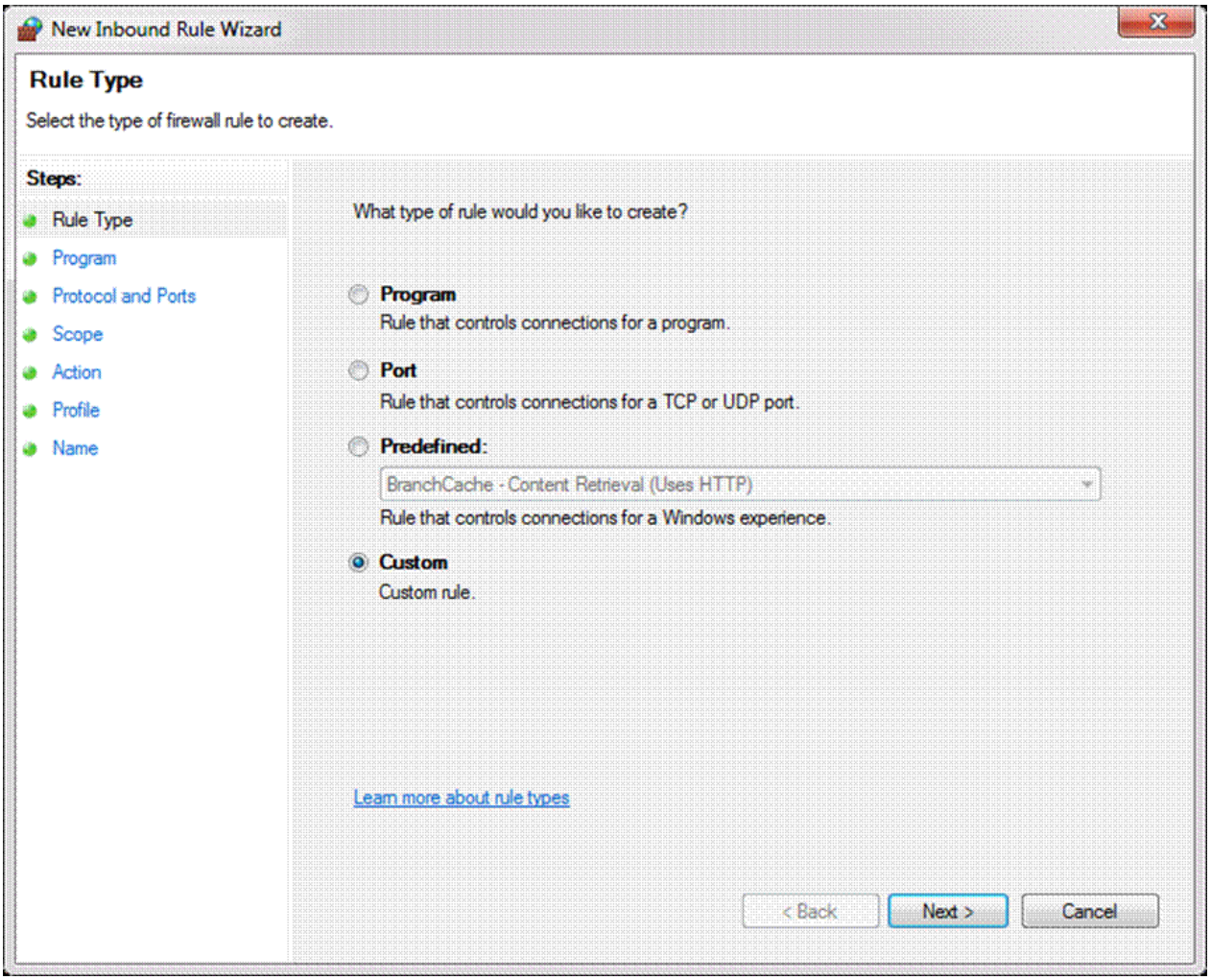
Action: **Allow the connection**

Profile: **Domain, Private, Public**

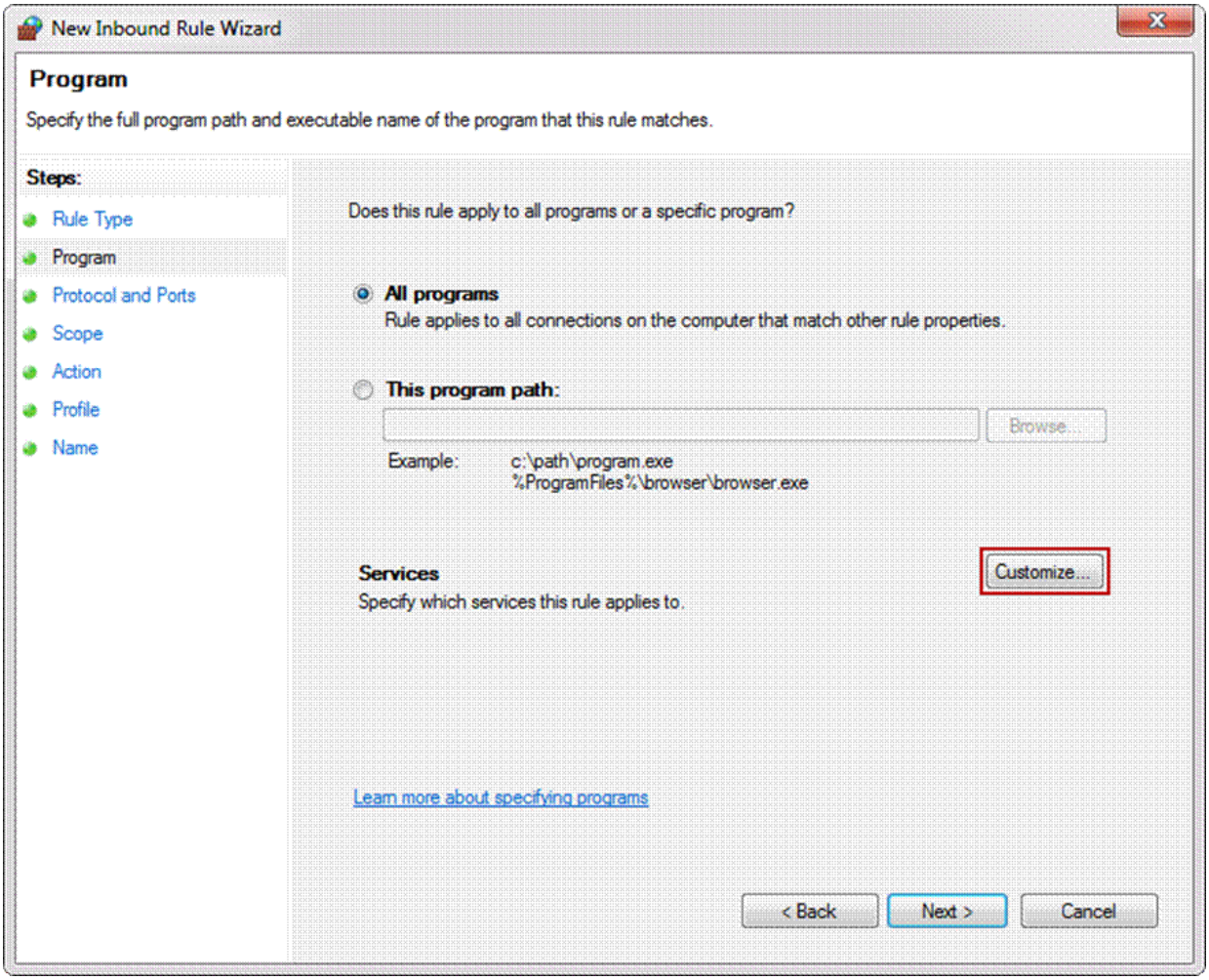
Name: **SQL TCP 1433**

Now create an allow rule for the database engine instance.

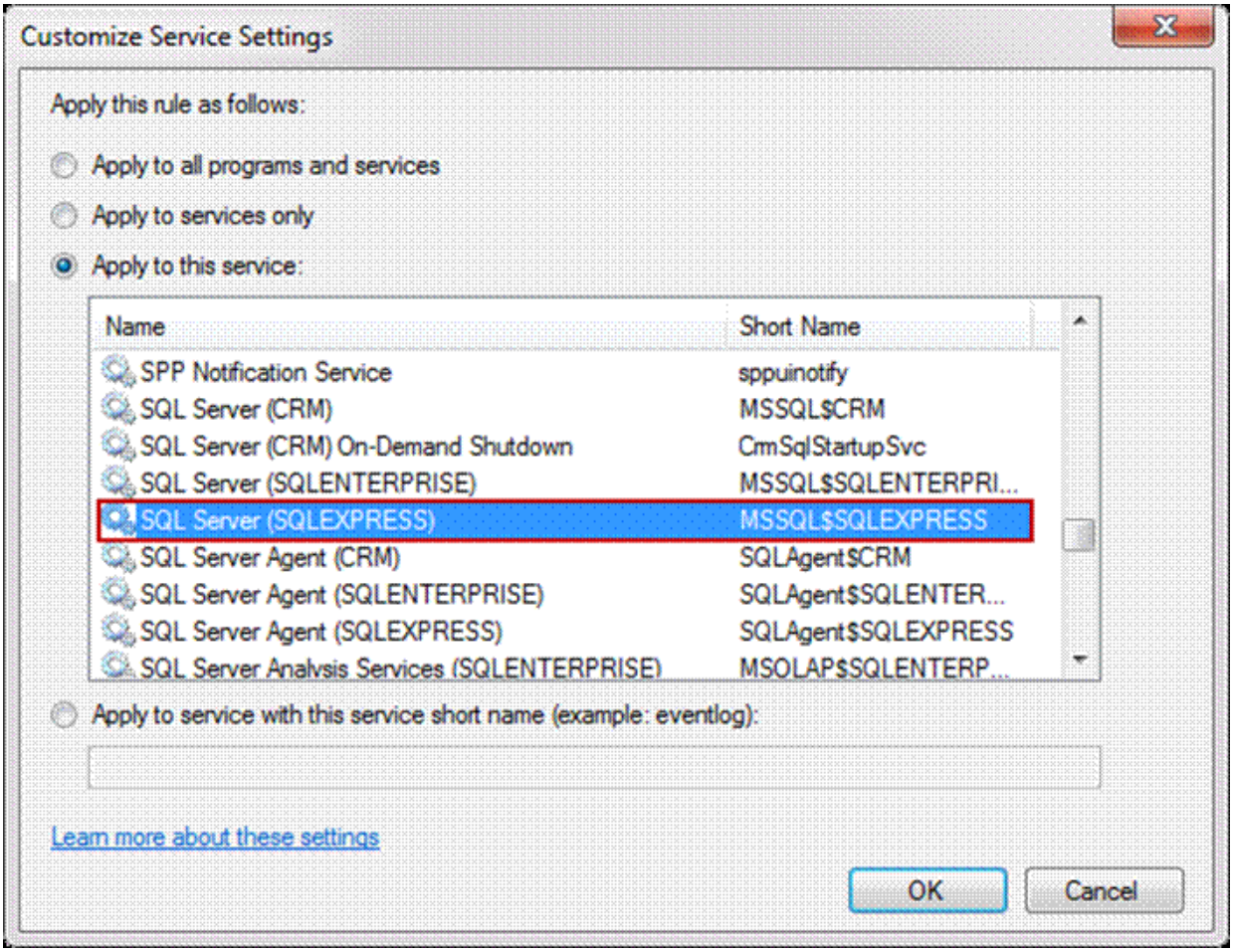
Go to the **New Rule** and from the **Rule Type** select the **Custom** rule:



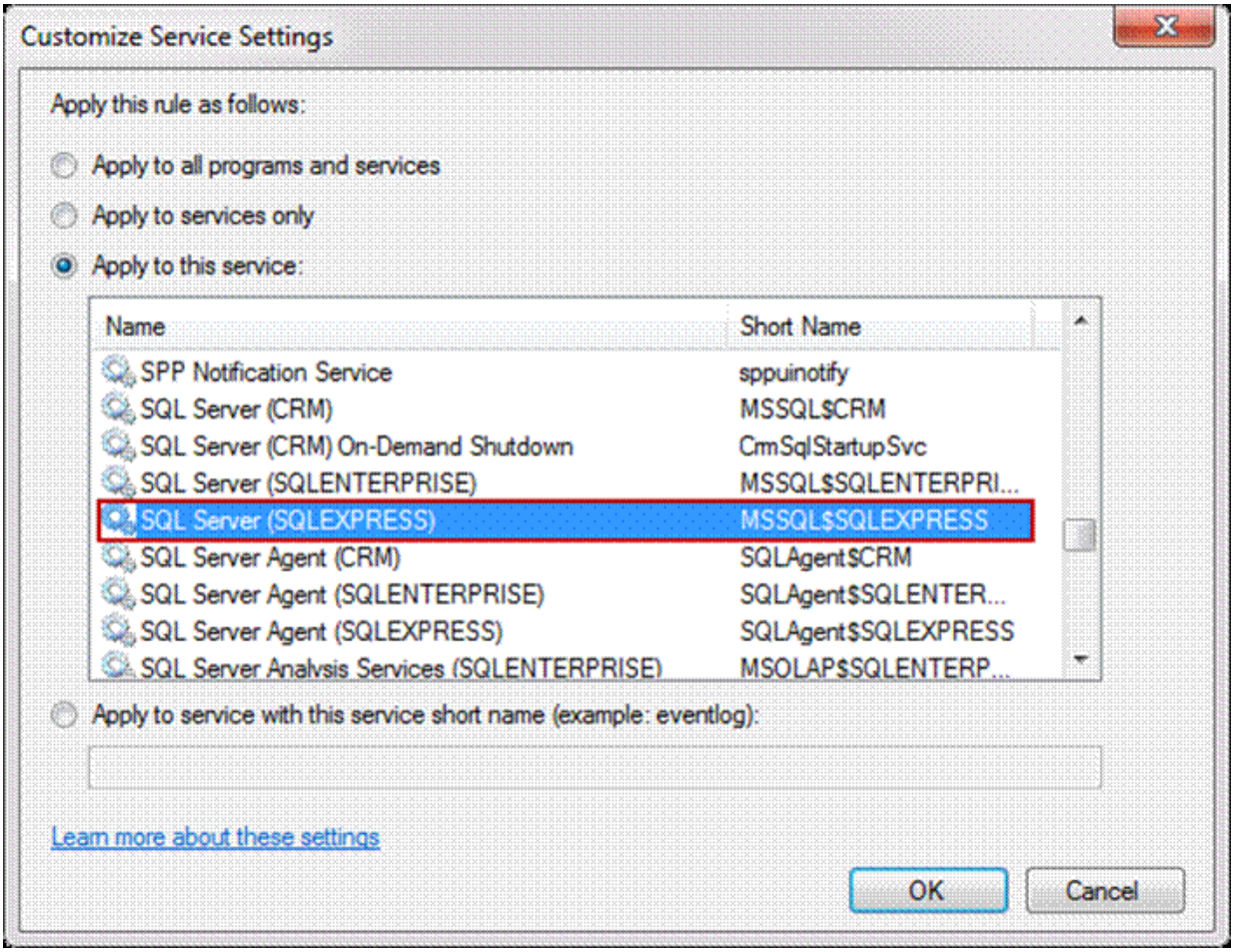
In the **Program** under the **Services** click the **Customize** button:



From the **Customize Service Settings** under **Apply to this service** select database engine instance service and click the **OK** button:



Then click the **Next** all the way to the **Name** dialog, give rule a name and click the **Finish**:



Repeat the steps above except in the **Customize Services Settings** Dialog, select SQL Browser under the **Apply to this service** radio button.

The rule should have the following settings:

Rule Type: **Custom**

Program: **All Programs**

Action: **Allow the connection**

Profile: **Domain, Private, Public**

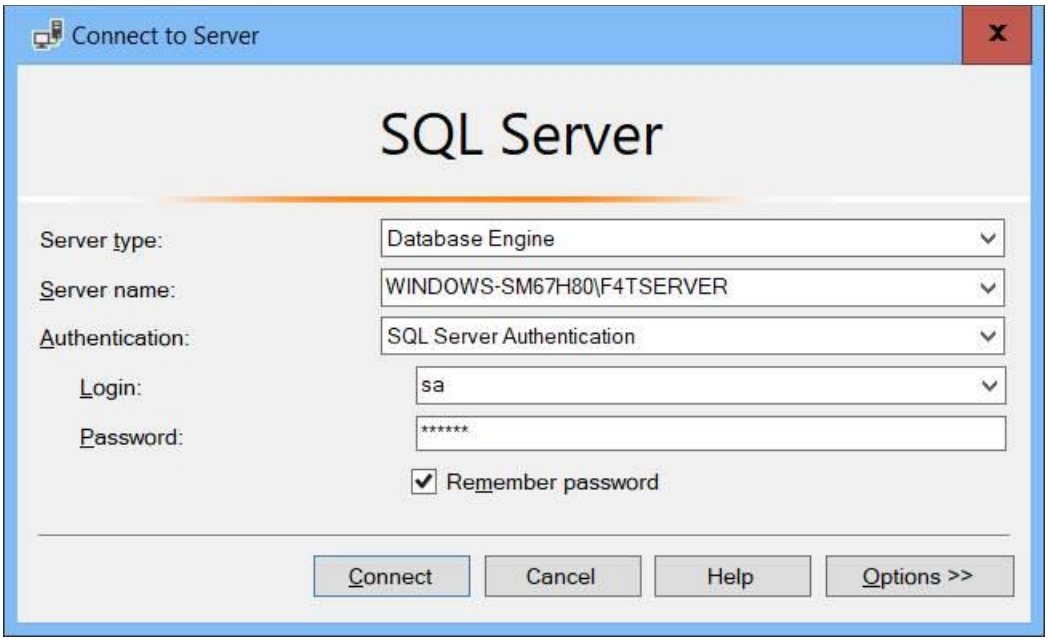
Name: **SQL Browser**

You should now have 4 inbound rules**: SQL Browser, SQL Express, SQL TCP 1433, SQL UDP 1434.**

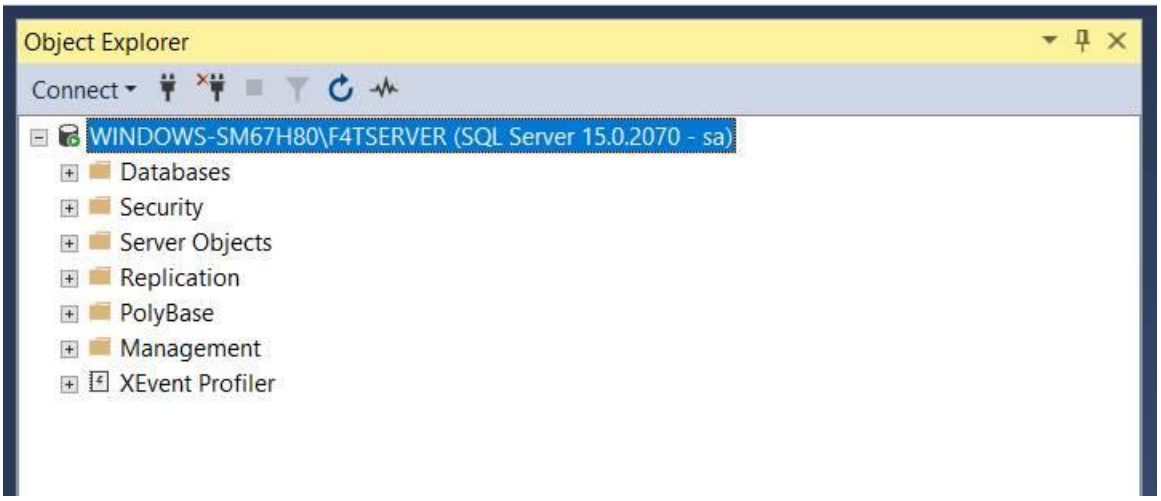
Now when all rules are set up, you are ready to connect to remote SQL Server.

Start the SQL Server, in the dialog window for the **Server name** enters the name of the instance that you want to connect with. From the **Authentication** drop down box, select the **SQL Server**

Authentication and for the field **Login** and the **Password** enter your credentials then click the **Connect** button and see if you can connect to the SQL server.



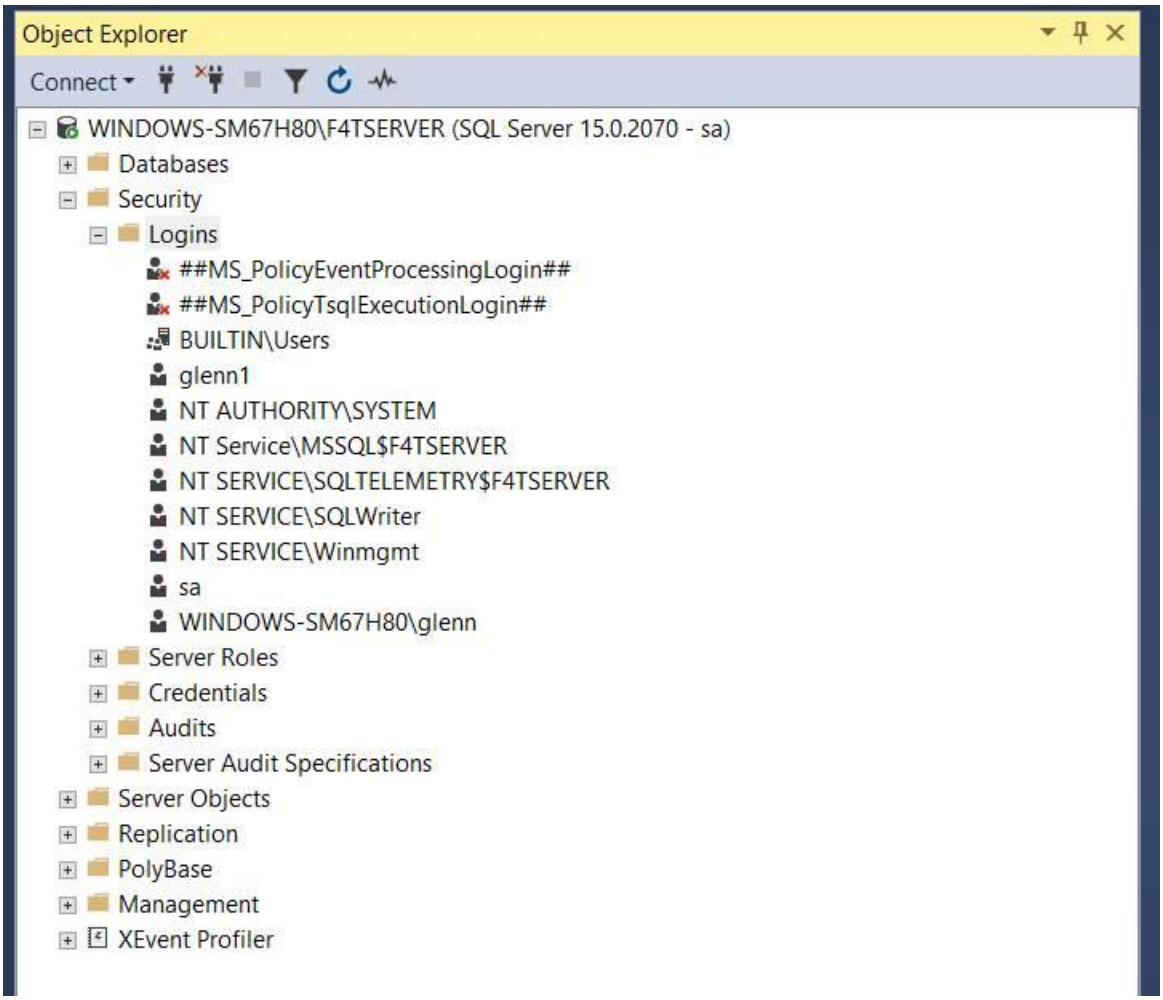
If you are successful you will see a similar window in the Object Explorer in the Microsoft SQL Management Studio program below that shows you are are connected:



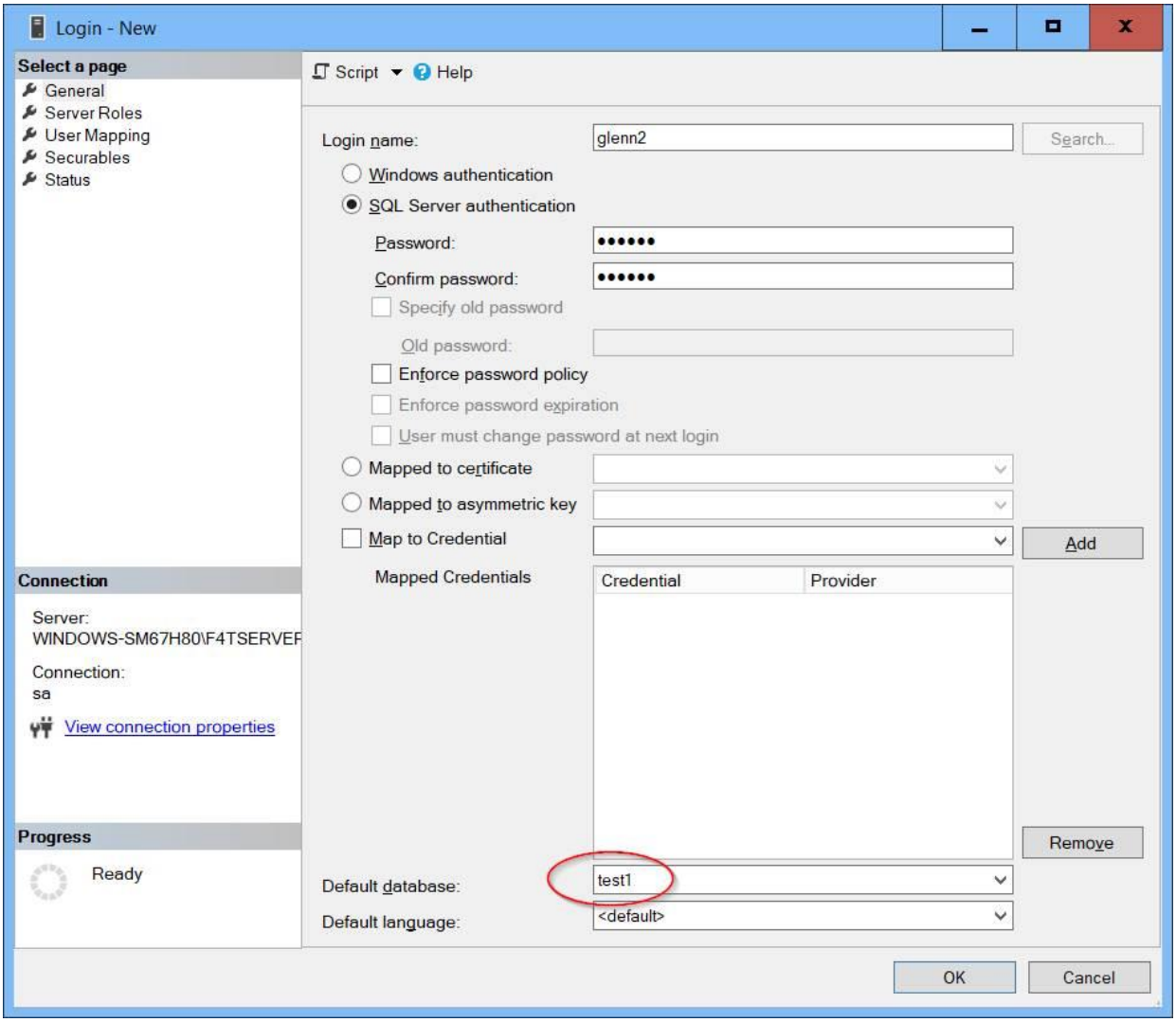
Add a Remote User to the Database

If you need to add a new remote user to access the database from ProcessView you will need to open the Microsoft SQL Management Studio program and select **Security,** then **Logins**. There you will see all the current users that are allowed to access the database. In the window below, the user "sa" is a user that was

created when first installing the SQL Server Program and provides System Administration rights. We will now create a new user that can access the database.

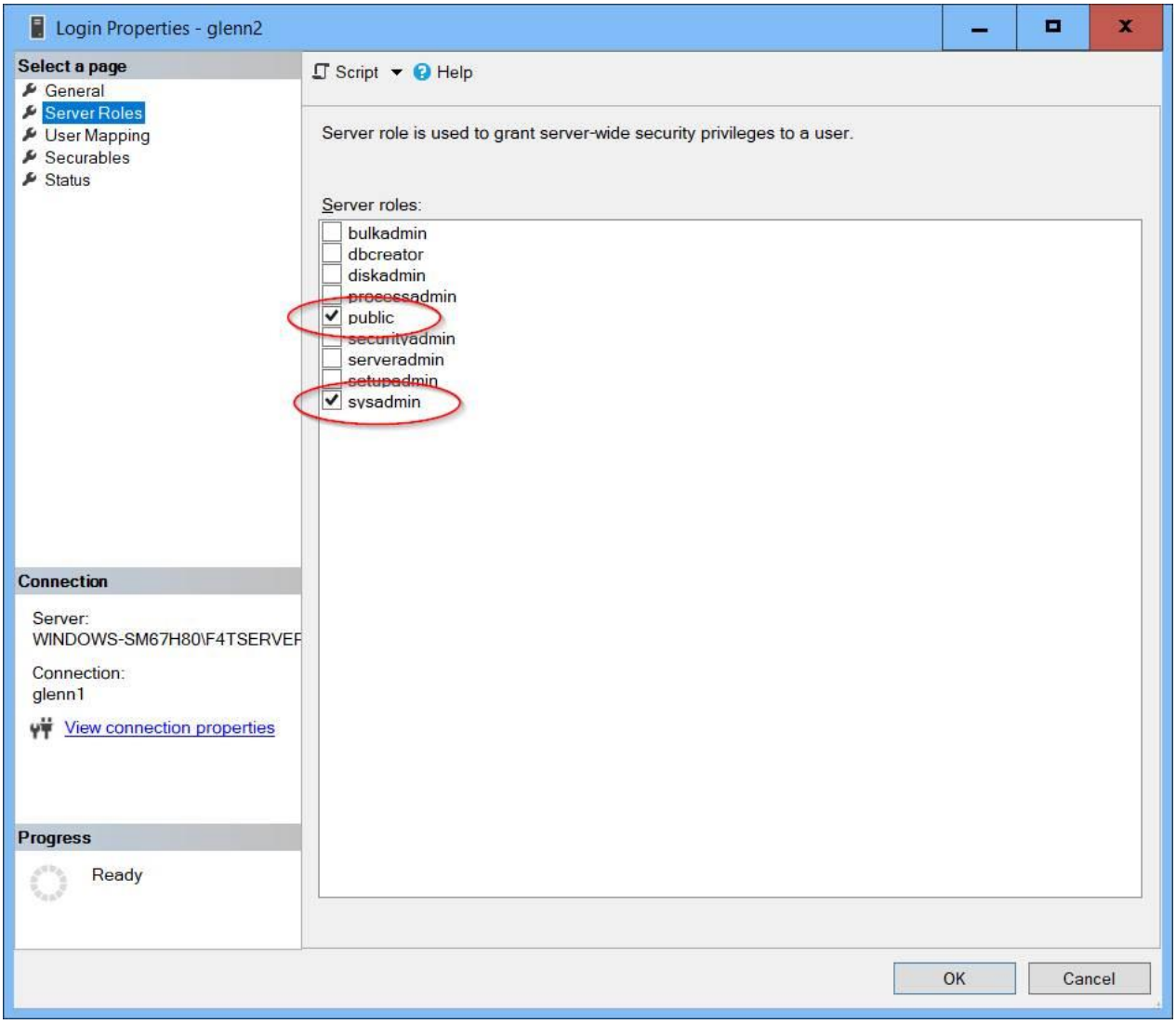


Right Click on Logins and select **New Login...** Your will see the following pop up window below.

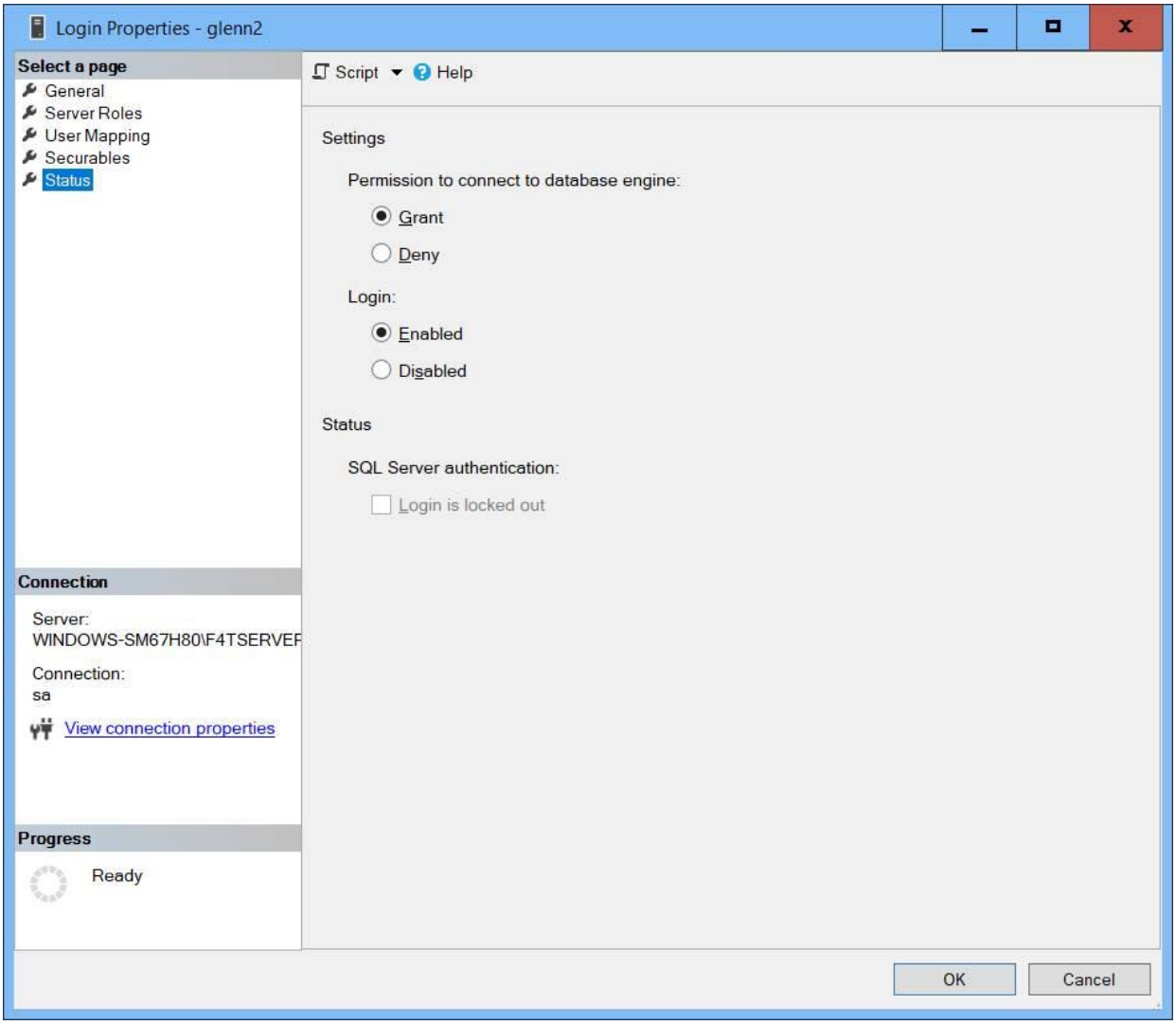


Enter the login name, in this case it is “glenn2” and select **SQL Server authentication** and enter a user password for the new user. In the Default database field, select your database that you want to have the new user have access too. In the example above the default database selected was “test1”.

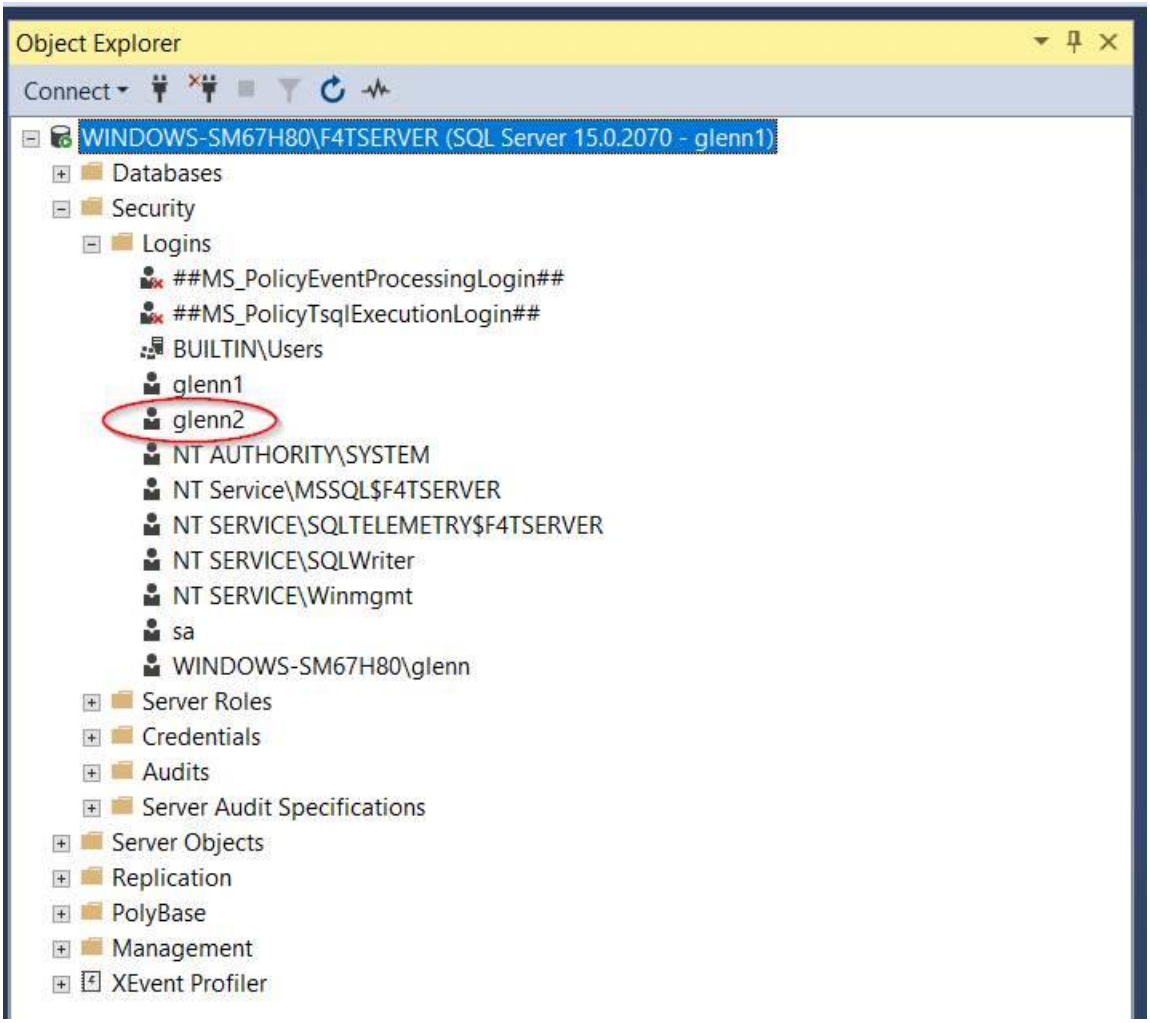
Then select the **Server Roles** Page, and make sure that the checkboxes **public** and **sysadmin** below are checked:



Then go to the **Status** page and make sure that the permission to connect to database engine is set to **Grant** and Login is **Enabled**.



Hit OK, and you should have a new user added to the database for remote access.



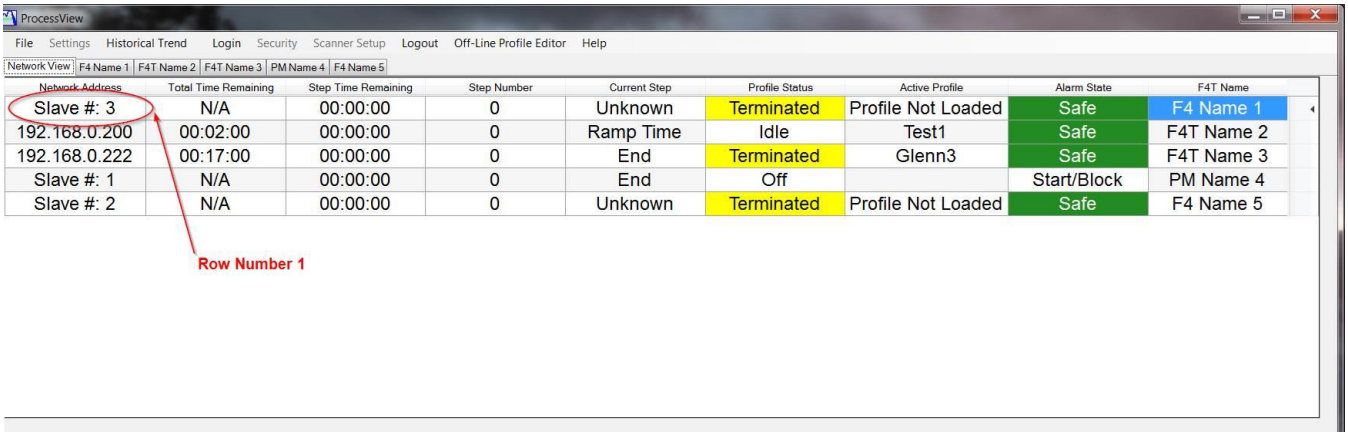
Command Line Arguments

ProcessView supports a few command line arguments when starting up the software. By using command line arguments with ProcessView an external software application can invoke ProcessView and make changes to Static Setpoints, change control modes (F4T and PM only), and start or stop a profile. If a command line argument is included when starting ProcessView, ProcessView will start then execute the command and then close. If there is an error when trying to execute the command, ProcessView will notify the user with a pop-up message to let the user know there was an error condition while trying to execute the command. If no pop-up messages are present then it can be assumed the command was executed correctly.

The following Command Line Argument commands are supported:

Change Static Setpoint:

F4 Controls: f4ssX Y Z, where X is the row number of the controller shown on the Network Overview Screen (see below). Y is the control loop number that is changed, and Z is the new setpoint value. Spaces are delimiters between arguments.



F4T Controls: ftssX Y Z

PM Controls: pmssX Y Z

Example Command Line usage:

Change the static setpoint for control loop 1 for the F4T on row 4 to 125.7.

Processview.exe ftss4 1 125.7

Start Profile:

F4 Controls: f4spX Y , where X is the row number of the controller shown on the Network Overview Screen. Y is the profile number that is to be started. Spaces are delimiters between arguments.

F4T Controls: ftspX Y

PM Controls: pmspX Y

Example Command Line usage:

Start Profile number 5 for the PM that is on row 2.

Processview.exe pmsp2 5

Stop/End Profile:

F4 Controls: f4epX, where X is the row number of the controller shown on the Network Overview Screen.

F4T Controls: ftepX

PM Controls: pmepX

Example Command Line usage:

Stop the currently running profile for an F4 on row 1.

Processview.exe f4ep1

Change Control Mode (F4T and PM controls only):

F4T Controls: ftcmX Y Z where X is the row number of the controller shown on the Network Overview Screen. Y is the control loop number that is changed, and Z is the new Control Mode.

Control Mode Codes: Z = 0, control loop Off. Z = 1, control loop set to Auto. Z=2, control loop set to Manual

Spaces are delimiters between arguments.

PM Controls: pmcmX Y Z

Example Command Line usage:

Set the Control Mode for control loop 2 to Automatic for the F4T on row 3 Processview.exe ftcm3 2 1

ProcessView Remote PC Overview

The ProcessView Remote PC feature enables a user to remotely control and read data from a remote PC. The remote PC can be connected to the PC running ProcessView thru a local area network or thru the internet via an MQTT Cloud Service.

ProcessView Server or an MQTT Cloud Service is an MQTT server/broker and a client-based messaging platform designed for the fast, efficient and reliable movement of data to and from connected IoT devices. It uses the MQTT protocol for instant, bi-directional push of data between your Watlow F4T/F4/PM controllers and a ProcessView Client.

Efficient Network Utilization:

Unlike HTTP (web servers or VNC servers), MQTT is based on a publish-subscribe architecture so the total network traffic is reduced since there is no client polling. MQTT message size is also significantly smaller than HTTP so the amount of data passing through the network is reduced. Real-time updates are very fast when compared with older technologies such as web servers or VNC servers.

Reliable Data Delivery:

Data delivery over unreliable networks can be a challenge. ProcessView Server and MQTT Cloud Services implements all MQTT Quality of Service levels, including at most once, at least once and exactly once delivery.

Enterprise-Grade Security:

ProcessView Server is designed to secure the IoT data from Watlow F4T/F4/PM controllers to enterprise systems or remote PC's. Support for authentication using username/password required for both the Server side and Client side to insure a secure connection.

Below shows 3 chambers communicating with the ProcessView software. The ProcessView software is communicating with the ProcessView Server software which can run on the same PC as ProcessView or on a remote Server. Each remote PC is running the ProcessView Client software and is communicating to the ProcessView Server.

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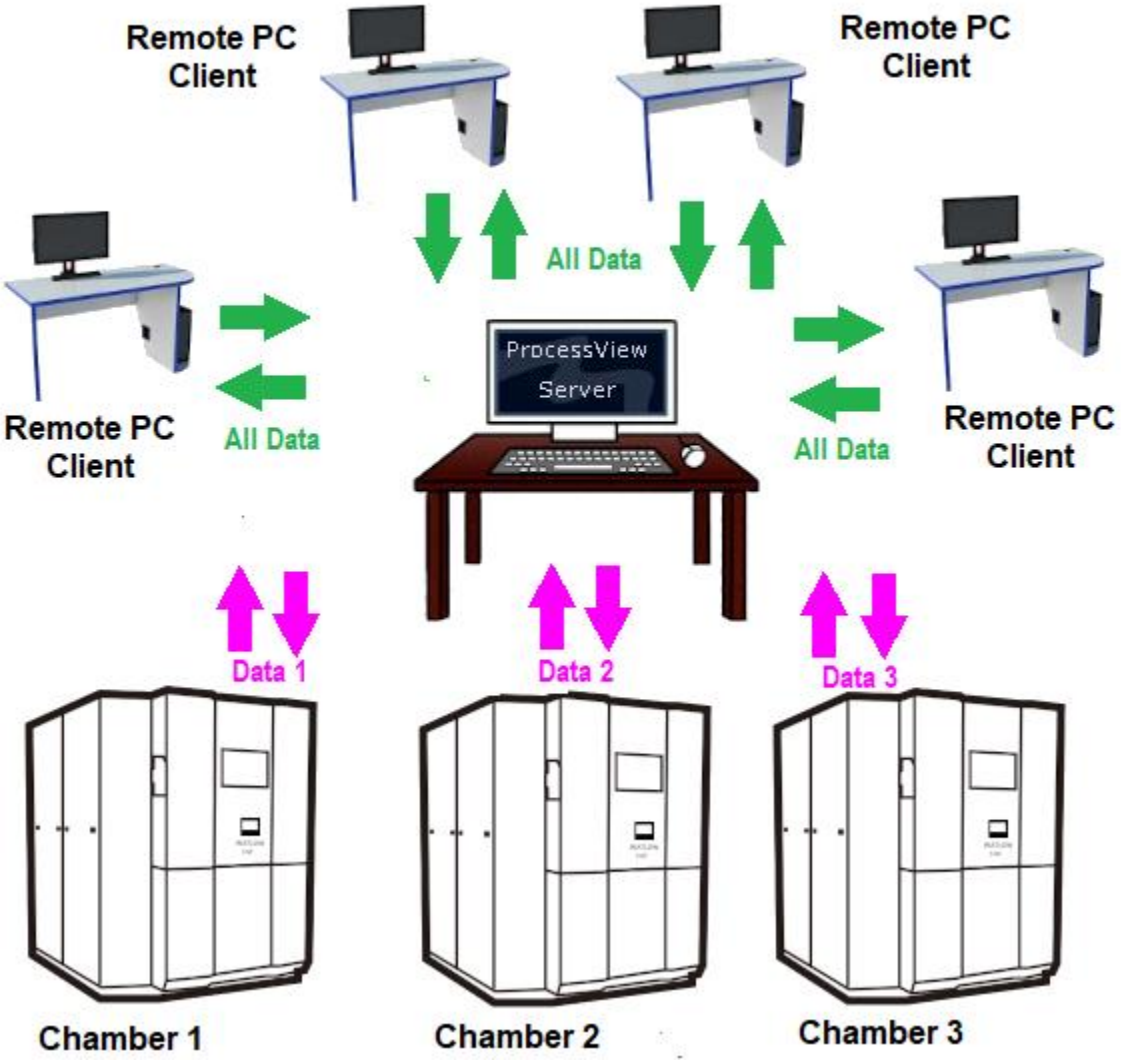
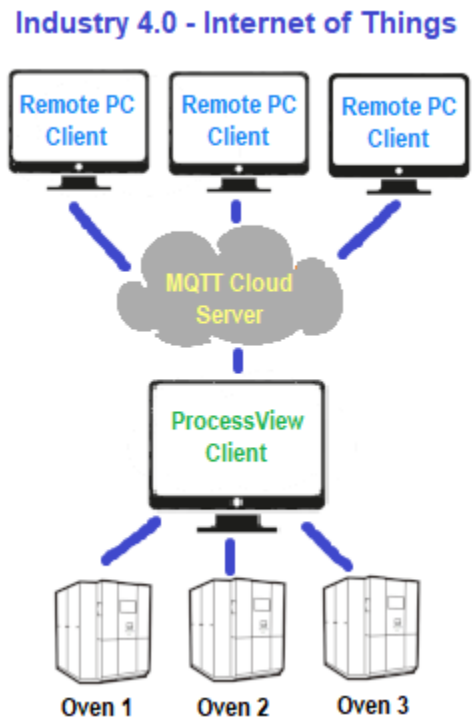
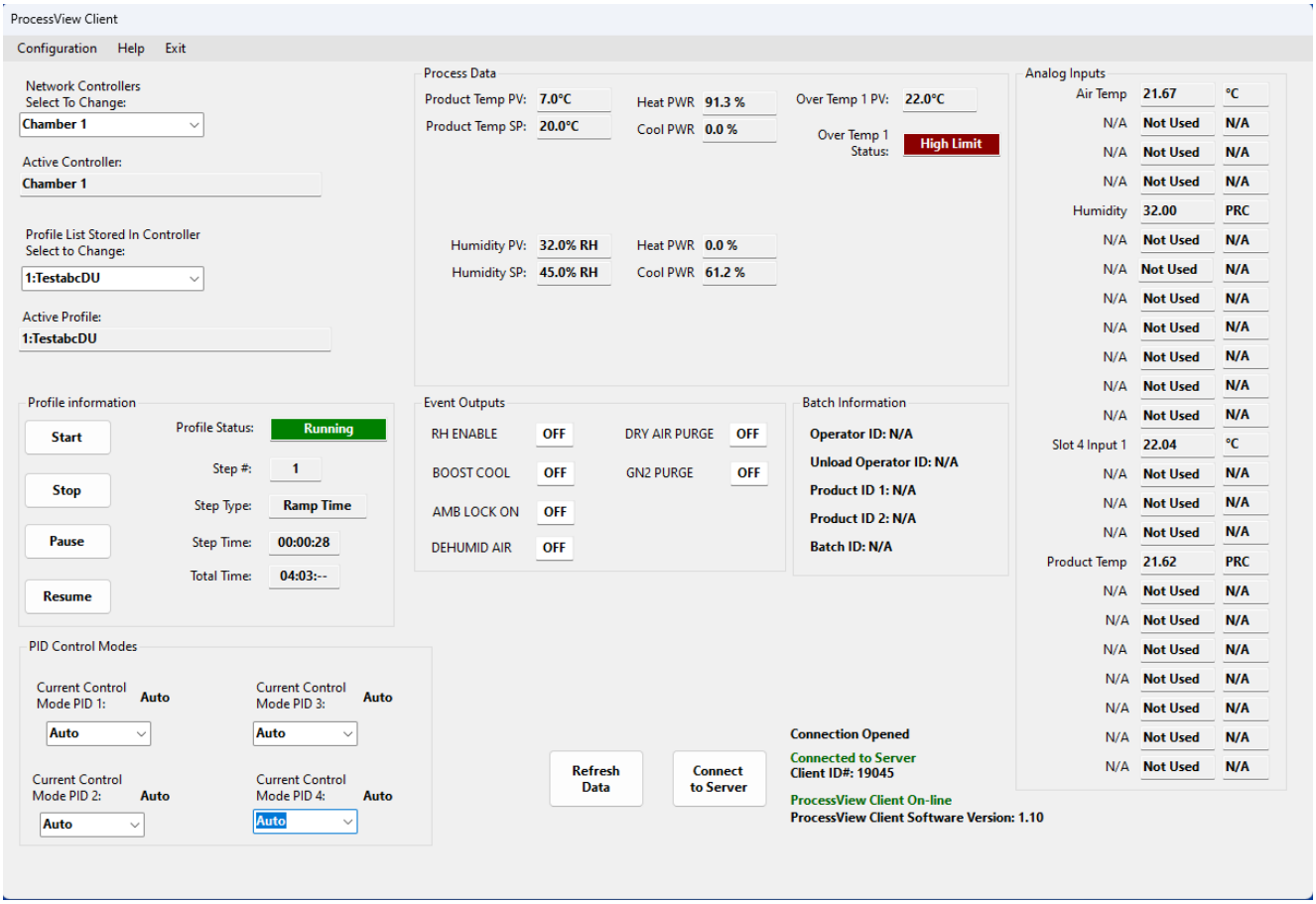
Multiple Network Users Supported!





ProcessView Remote PC Client



The ProcessView Remote PC Client software is used as a client which subscribes and publishes messages to a MQTT Server/Broker to get data from the client running on ProcessView main software. The type of communication used by the Client adheres to the MQTT protocol which is an OASIS standard messaging protocol for the Internet of Things (IoT). When the client is connected to a Server, it is possible to do the following functions remotely from a PC:

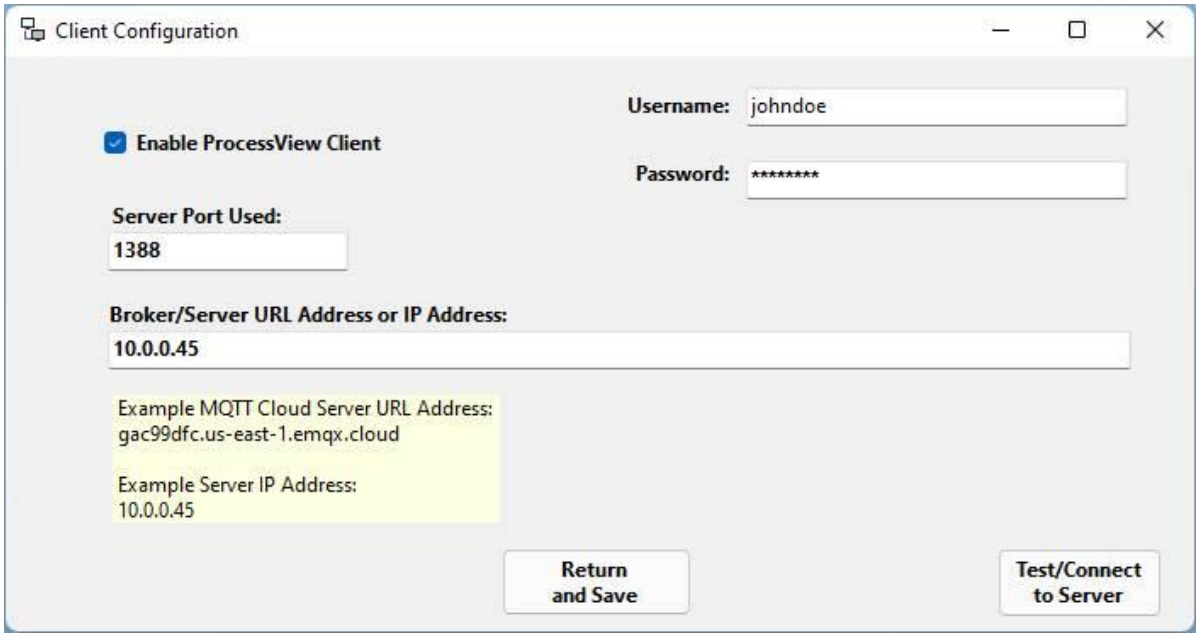
- Start a stored Profile in a controller
- Stop a Profile currently running in a controller
- Pause a Profile currently running in a controller
- Resume a Profile that is currently paused in a controller
- Change the active profile in a controller to a stored profile in the controller
- Change the Control Mode for each PID control loop in a controller

- View the current Profile Status, Profile Step, Profile Step Type, Profile Step Time and Profile Total Time remaining
- View the Alarm Status for Alarms 1 and 2 internal to the controller if used
- View the current process values for the first 2 PID loops
- View the current setpoint values for the first 2 PID loop
- View the current heat and cool power percentages for all PID loops
- View the status of the integrated Limit Controller and process value
- View the status of the Event Outputs
- View the above parameters for each controller on the network interfaced with ProcessView

In order for the client to read data from the ProcessView client it must be connected to both the Server and the ProcessView Client. In the above screenshot in the lower right hand corner is the connection status, which shows a connection has been opened and it is connected to a Server and the ProcessView Client is also connected to the Server. This feature is only present with the ProcessView Server software running. If you are using a cloud based server on the Internet, you will not be able to get status if the ProcessView Client is connected to the server.

Client Configuration:

The window form below shows the window that is opened after selecting the “Configuration” menu from the main Client window:



Configuring for Server Software running on a local network:

The "Port" text box is the port to be used on the PC running the Server software. If there are connected clients on a network that will be accessing the server, you will need to enable those TCP/IP ports in the Windows Security setup advanced settings on the PC that is running the Server Software before any connected Client can access the server. For secure communications, a username and password are required and will be also required when setting up connected clients. The password and username must be the same for both the server and clients. In the screenshot above the IP Address for the local server is 10.0.0.45 in the Server URL text box. The TCP/IP port being used by the Server is 707.

URL for running a Server on a Local Network:

When running the Server on a local network the URL text field should have contain the PC's IP address that the Server software is running on. In the screenshot above the PC running the Server software is 10.0.0.45. Any clients used must also use the IP address of the PC that is running the Server software.

URL for running a Server on a MQTT Cloud Service:

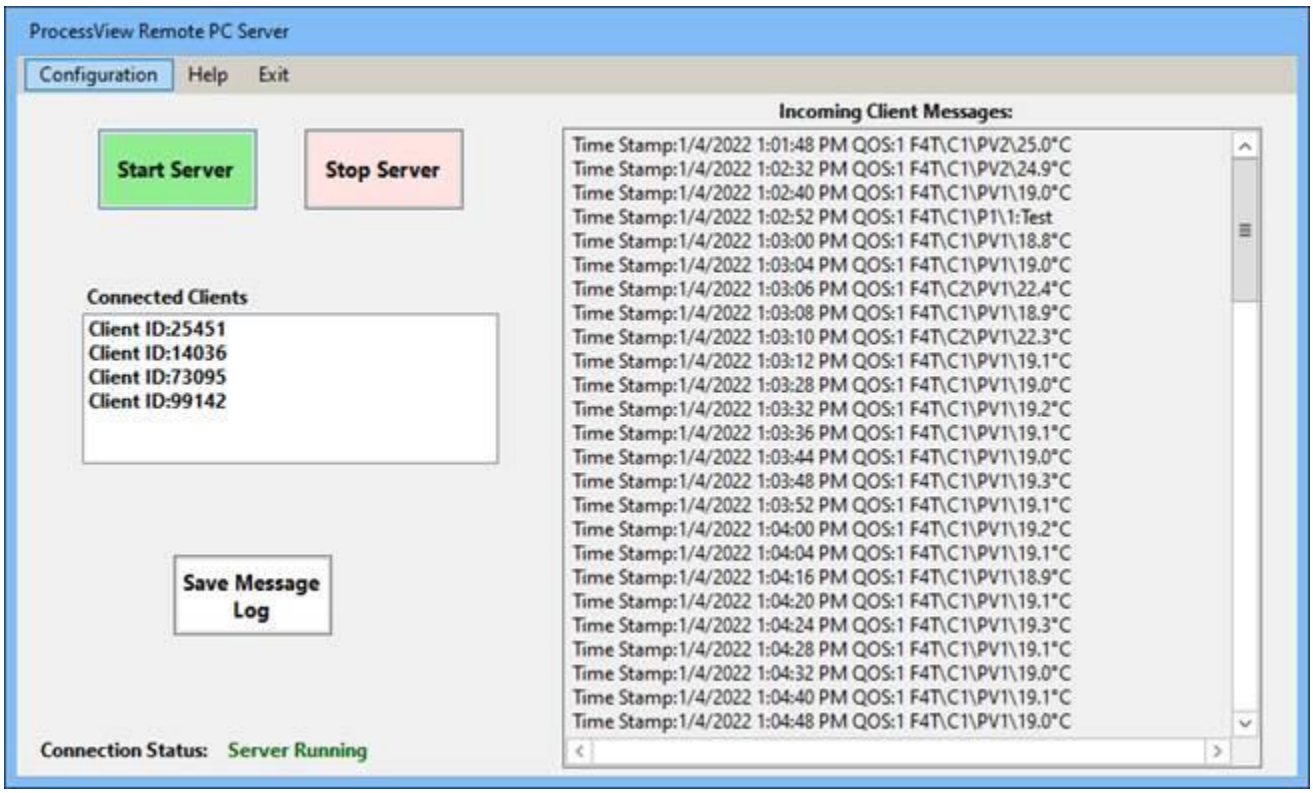
When interfacing with a Cloud Service over the Internet, the Server URL will be provided by the MQTT Cloud Server being used. You will need to refer to the documentation for the service you have chosen. The port number will also be dependent on the Cloud Service being used and you will need that information from the service. The benefits of using a

MQTT Cloud Server is that you can access all the data from the client over the internet and can be remotely located offsite from where the ProcessView PC is located.

Software Registration

To register the software and be able to access all the features you will need to enter a registration key that you can get from your vendor that sold you the Client Software. The registration key is tied to the PC that the client software is running on, so make sure when you activate the registration you do it on the PC that will be used in your application. The registration form can be found under the “Help” menu and “Registration” menu.

ProcessView Remote PC Server

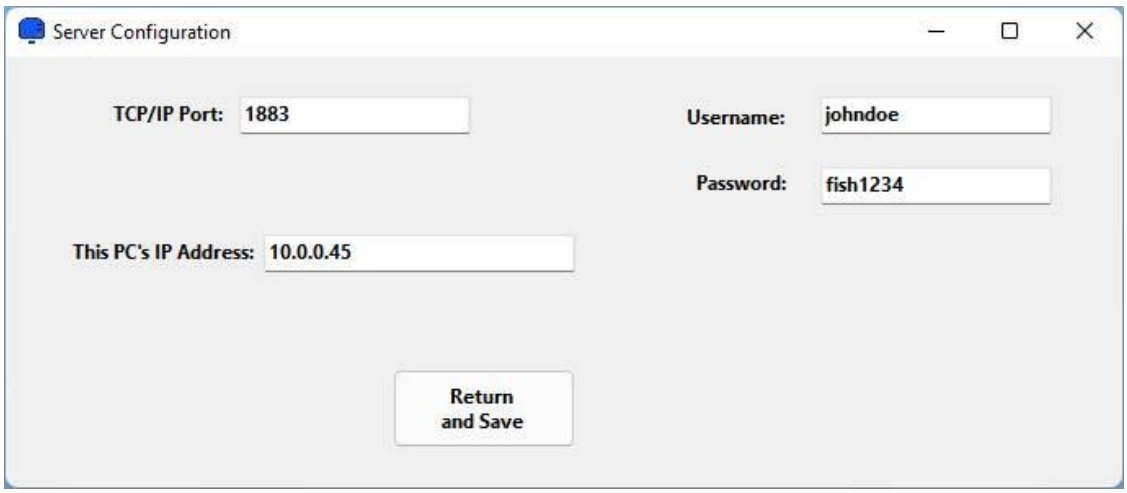


The ProcessView Remote PC Server software is used as a server running to facilitate messages sent and received from connected ProcessView Clients. The type of communication used by the Server adheres to the MQTT protocol which is an OASIS standard messaging protocol for the Internet of Things (IoT). The server can be loaded on the same PC that is running ProcessView or it can be run on a PC that is used as a Server separate from the PC that ProcessView is running on. The main screen above has two

buttons that are used to start and stop the server running. All connected clients with Client ID numbers are shown in the “Connected Clients” list box. All incoming Client messages are displayed with a time stamp in the text box labeled “Incoming Client Messages”. This can be used for debugging and also shows the type of message that was received from a client. The message log can also be saved to a text file using the “Save Message Log” button for future reference or debugging. After the Server is started, you should see the Connection status as “Server Running” as show above.

Server Configuration:

The window form below shows the window that is opened after selecting the “Configuration” menu from the main server window:



When initially starting the Server software a prompt pops up to setup the Server configuration before the Server can be used. The “Port” text box is the port to be used on the PC running the Server software. If there are connected clients on a network that will be accessing the server, you will need to enable those TCP/IP ports in the Windows Security setup advanced settings on the PC that is running the Server Software before any connected Client can access the server. For secure communications, a username and password are required and will be also required when setting up connected clients. The password and username must be the same for both the server and clients.

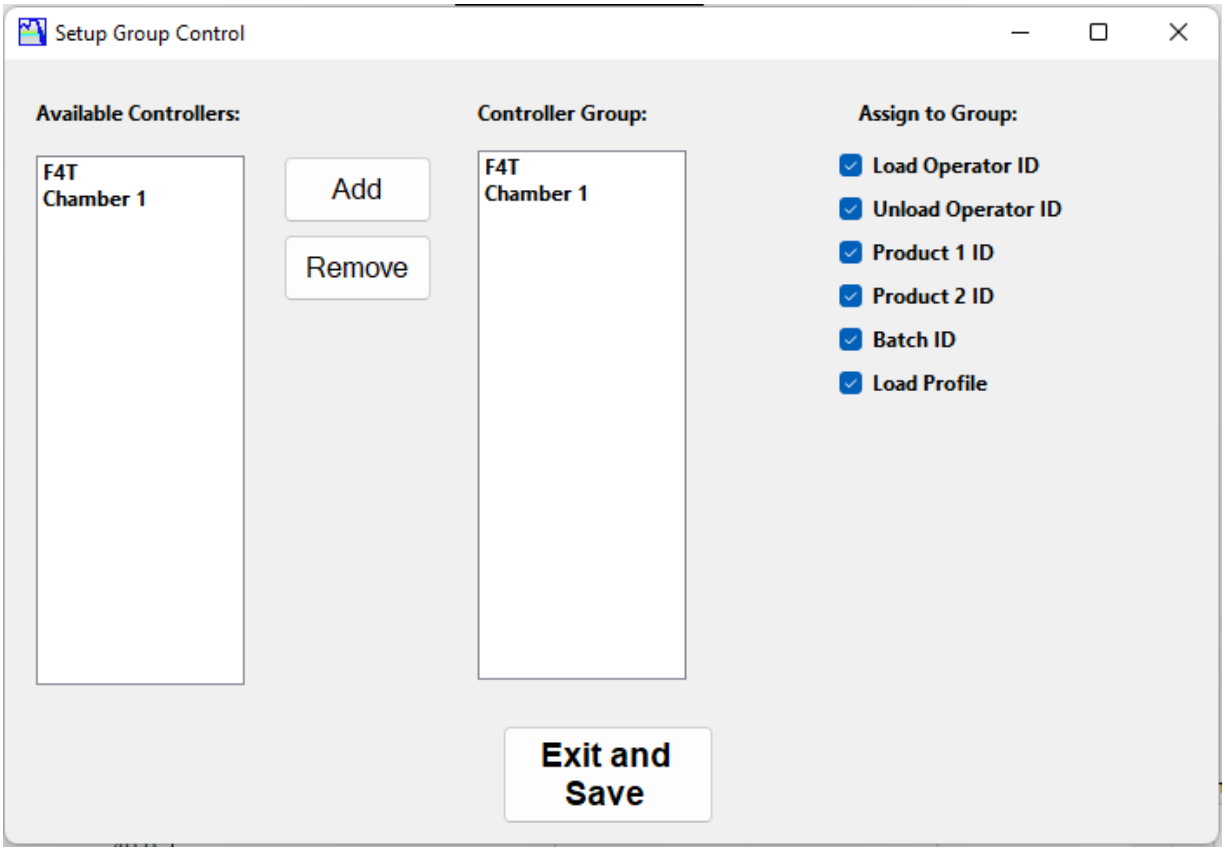
URL for running a Server on a Local Network:

When running the Server on a local network the URL text field should have contain the PC's IP address that the Server software is running on. In the screenshot above the PC running the Server software is 10.0.0.45. Any clients used must also use the IP address of the PC that is running the Server software.

Group Control

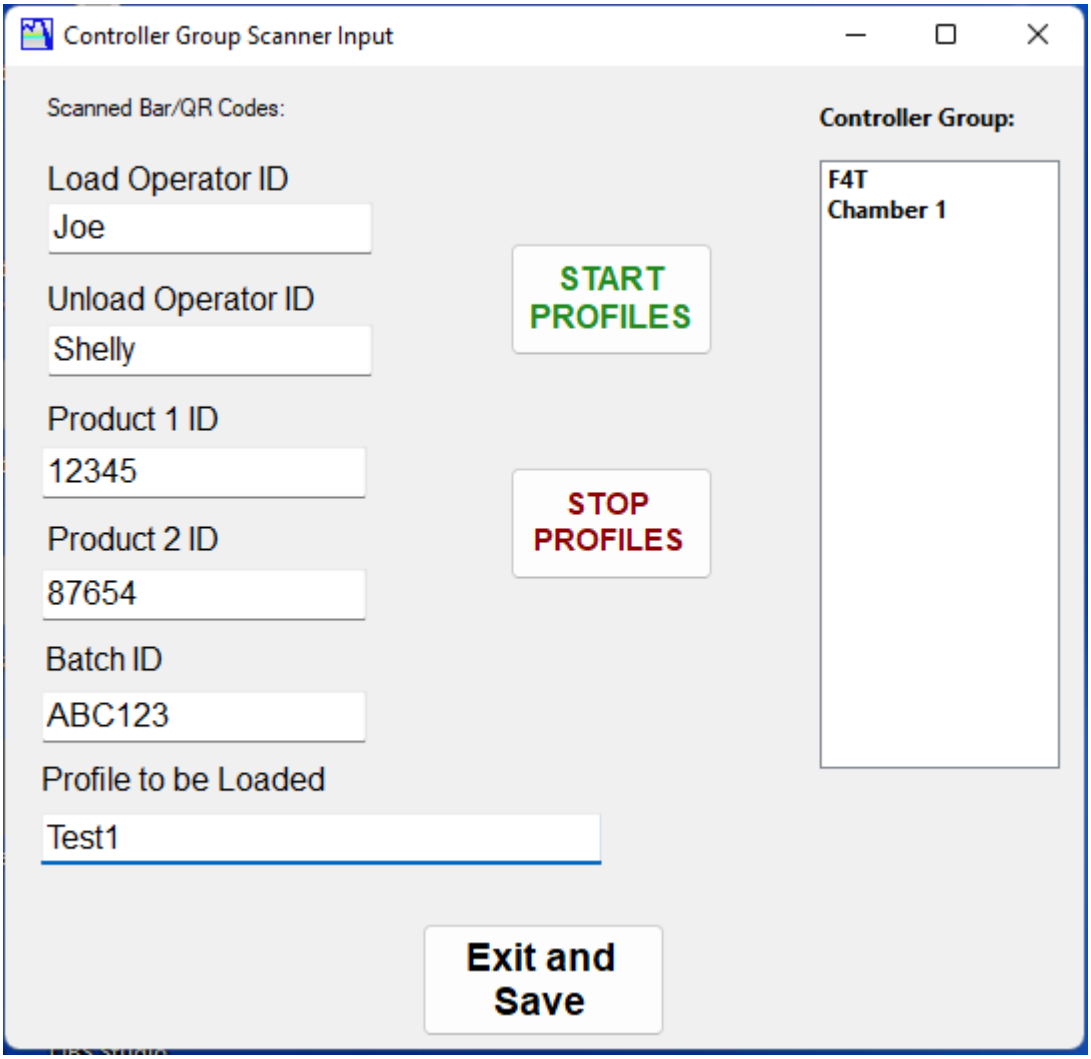
The "Group Control" feature is useful when you have a group of controllers that are all running the same product or batch in a profile run. You can scan batch parameters or enter them manually one time for all the controllers specified in the group. You can also start and stop the profiles for the entire group at the same time in the Group Scanner/User Input window.

You can use Setup Group Control window to choose which controllers on the network are in a group when a batch is run. You can add or remove controllers to make a "Group" that can then have the same batch parameters loaded in all the controllers in the group on the network. You can assign which batch labels will be used for scanning or entering manually that will all be the same for each controller in the group.



Group Scanner\User Input:

When scanning or entering manually batch parameters for the controller group you need to select the “Group Scanner\User Input menu and you will see the window below. Before using this window you need to initially select one of the controllers that is in the group and go to the “Scanner Setup” window and make sure the “Copy to Group Control Batch Parameters” check box is checked then save and exit. This will copy the batch parameters which will be saved and used for all Group batch scans. From this window you can also start and stop profiles simultaneously for all the controllers in the group and you can load the same profile that is to be loaded and started for all the controllers in the group.



ProcessView Web Server

ProcessView has a built in Web Server that can be used to view Profile status and Process data for each controller on the ProcessView network. The Web Pages are read only and are intended to allow users to get an update on what the status is for each controller on the network that is running a profile. The web pages are read only so that no users or hackers have the ability to make changes to the controllers that are connected to the PC that is running ProcessView for security reasons.

As long as the PC that is running ProcessView is connected to a network, all computers on that network can access the Web Server page. If ports are opened to the internet thru a router and firewall then the Web Server can be accessed on the Internet. This allows a user to access the Profile Status of all the controllers from anywhere in the world if the user has Internet access. Mobile devices such as smart phones can also access the Web Page as long as they are connected on the same network.

To access the Web Server Page, the remote user must put in the IP address that is assigned the PC that is running the ProcessView software. The remote PC must be on the same LAN as the computer that is running ProcessView. For example, if the PC that is running ProcessView IP's address is 192.168.0.1, then any computer that is connected to the LAN that has an IP address of 192.168.0.XXX can access the served Web Page. When accessing the Web Server, the IP Address and the Port number must be entered into the Web Browsers address field. For example, if the IP Address of the PC running ProcessView is 192.168.0.200, then to see the Web Server page, the connecting PC or smart phone would need to have the IP Address 192.168.0.200:50001 entered in the browsers address bar as shown below:

If the user would like access to the served Web Page on the Internet then any routers must have port 50001 (which is the ProcessView default Web Server Port) forwarded to the ProcessView PC's IP address. The IPS provider must also have that port open and not blocked. Consult your IT department if you are unsure how to do this. In order to start the Web Server, you must first enable the Web Server from the main menu item "Web Server". If a user would like to enable the Web Server or use a different port for the Web Server then that can be changed in the Web Server window form shown below:

To see the web page that is served after enabling the Web Server, you can enter "localhost:50001" in the browser IP address bar on the PC that is running ProcessView to see what will be sent out on the network.

Home: Profile Status | Process Data

ProcessView Web Server

Network Profile Status

Controller Name	Active Profile	Profile Status	Current Step	Step Number	Step Time Remaining	Total Time Remaining
F4 Chamber 1	DEMO 1	Running	Ramp Time	1	18:51:16	N/A
F4T Chamber 2	Demo 2	Running	Ramp Time	1	22:07:19	70:09:--
F4T Chamber 3	Demo 3	Running	Soak	2	01:25:10	33:29:--
PM Oven 4	Profile 1	Running	Ramp Time	1	58:24:36	N/A
F4 Chamber 4	DEMO 4	Running	Ramp Time	5	18:15:51	N/A

After entering the IP Address above, you should see the home page for the Web Server as shown below:

Home: Profile Status | Process Data

ProcessView Web Server

Process Data

Controller Name	Control Loop 1 Current Setpoint	Control Loop 1 Target Setpoint	Control Loop 1 Process Value	Control Loop 2 Current Setpoint	Control Loop 2 Target Setpoint	Control Loop 2 Process Value	Monitor Process Value
F4 Chamber 1	Temperature Current SP=42.5°C	Temperature Profile Target SP=35.0°C	Temperature=42.4°C	Humidity Current SP=32.0% RH	Humidity Profile Target SP=54.0% RH	Humidity=32.0% RH	
F4T Chamber 2	Air Temp Current SP=81.3°C	Air Temp Profile Target SP=89.0°C	Air Temp=0.0°C	Humidity Current SP=73.0% RH	Humidity Profile Target SP=50.0% RH	Humidity=100.0% RH	
F4T Chamber 3	Temperature Current SP=80.0°C	Temperature Profile Target SP=80.0°C	Temperature=63.4°C				
PM Oven 4	Temperature Current SP=92.7°F	Temperature Profile Target SP=100.0°F	Temperature=92.8°F				
F4 Chamber 4	Chamber Temp Current SP=100.0°F	Chamber Temp Profile Target SP=75.0°F	Chamber Temp=100.0°F	Humidity Current SP=75.0% RH	Humidity Profile Target SP=75.0% RH	Humidity=0.0% RH	

Using a Digi Port Server with an F4 Controller

ProcessView supports using a Digi Port Server device to interface to F4 controllers on an Ethernet network. The PC running ProcessView communicates to the Digi Port Server via Ethernet and the port server converts Modbus TCP/IP to Modbus RTU via RS-232 (single controller) or RS-485 half duplex (multiple controllers on a serial network). Below are screenshots from the Digi Webserver which shows how the Digi Port Server must be set up to work with ProcessView and an F4 controller.

The first thing you need to do is configure the DIP switches for RS-485 half duplex and wire up the RJ-45 Ethernet port from the Digi Port Server to the F4 Controller RS-485 terminals. The wiring is as follows:

(Data +) is pin 5 on the RJ-45 (usually a Blue/White wire), it should be connected to the Rx+/Tx+ terminal of the F4 controller (terminal 12)

(Data -) is pin 1 on the RJ-45 (usually a Orange/White wire), it should be connected to the Rx-/Tx- terminal of the F4 controller (terminal 13)

(SGND) is pin 7 on the RJ-45 (usually a Brown/White wire), it should be connected to the GND terminal of the F4 controller (terminal 7)

If you have several F4 controllers connected on a RS-485 network you might need to connect a 120-ohm termination resistor across the (Data +) and (Data -) terminal of the last controller physically connected on the network if noise issues seem to be present.

Configure the IP address using ARP-ing

An IP address can be configured by manually updating a server's ARP table and then pinging the Digi device.

The ARP-Ping command assigns the IP address you designate but also assigns default subnet mask and gateway addresses. It is necessary to change the subnet mask and gateway addresses.

This procedure assumes that your Digi device is connected to the Ethernet network.

1. Record the MAC address of the Digi device. The MAC address is on the label side (bottom) of the unit.
2. Access a server on the same subnet as the Digi device.

3. Manually update the server's ARP table using the Digi device's MAC address and the IP address you want assigned to the Digi device. The following is an example of how this is done on a Windows NT 4.0 system:

   ```
   arp -s 191.168.2.2 00-00-9d-22-23-60
   ```

4. Ping the Digi device using the IP address just assigned. For example:

   ```
   ping 191.168.2.2
   ```

   The ping will probably time out before there is a response from the Digi device.
5. Wait 30 seconds and then ping the Digi device again.

   The Digi device replies to the ping, indicating that the IP address has been configured.

The next thing you have to do is setup the IP address for the Digi PortServer (refer to Digi Port documentation on how to do this, it usually involves using an arp command in Windows. Below is a process to do this from the Digi Port Server manual:

Configure the IP address using ARP-ing

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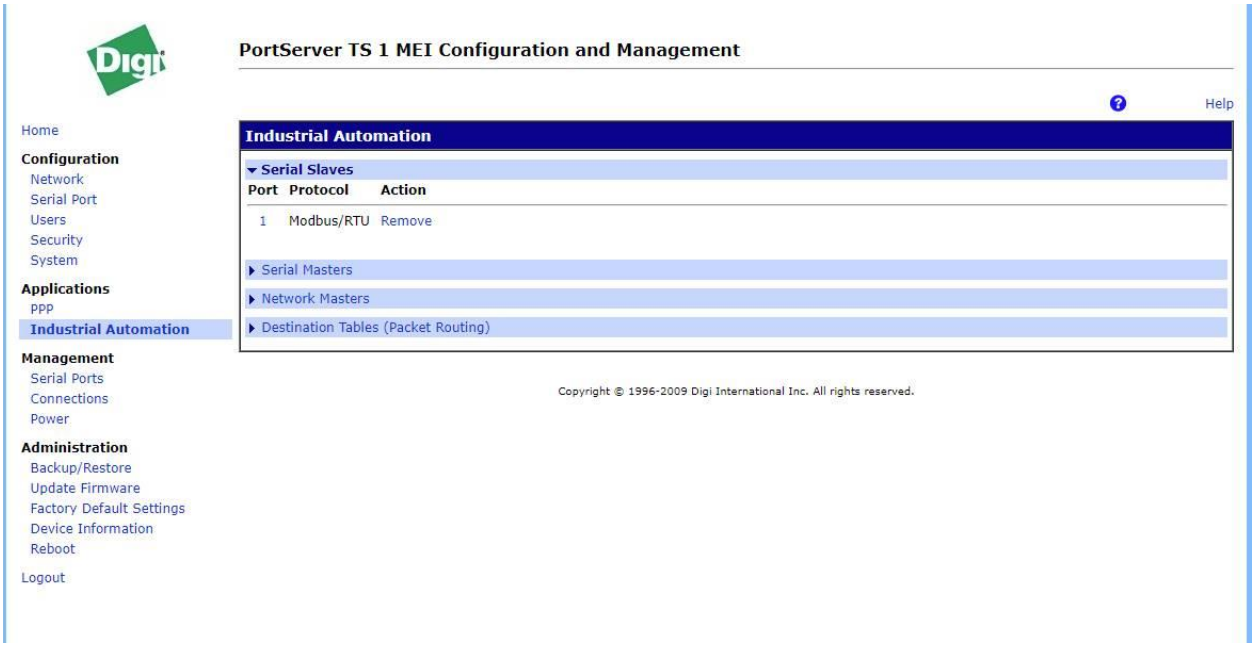
   ```

   The ping will probably time out before there is a response from the Digi device.
5. Wait 30 seconds and then ping the Digi device again.

   The Digi device replies to the ping, indicating that the IP address has been configured.

Then you need to create an "Industrial Automation" profile for the serial port in the Port Server. Below are screen shots from the Web Server of the Port Server which allows you to configure the Port Server for Modbus RS-485 RTU communications.


PortServer TS 1 MEI Configuration and Management
Help
Home
Configuration
Network
Serial Port
Users
Security
System
Applications
PPP
Industrial Automation
Management
Serial Ports
Connections
Power
Administration
Backup/Restore
Update Firmware
Factory Default Settings
Device Information
Reboot
Logout
Industrial Automation
Serial Slaves
Port Protocol Action
1 Modbus/RTU Remove
Serial Masters
Network Masters
Destination Tables (Packet Routing)
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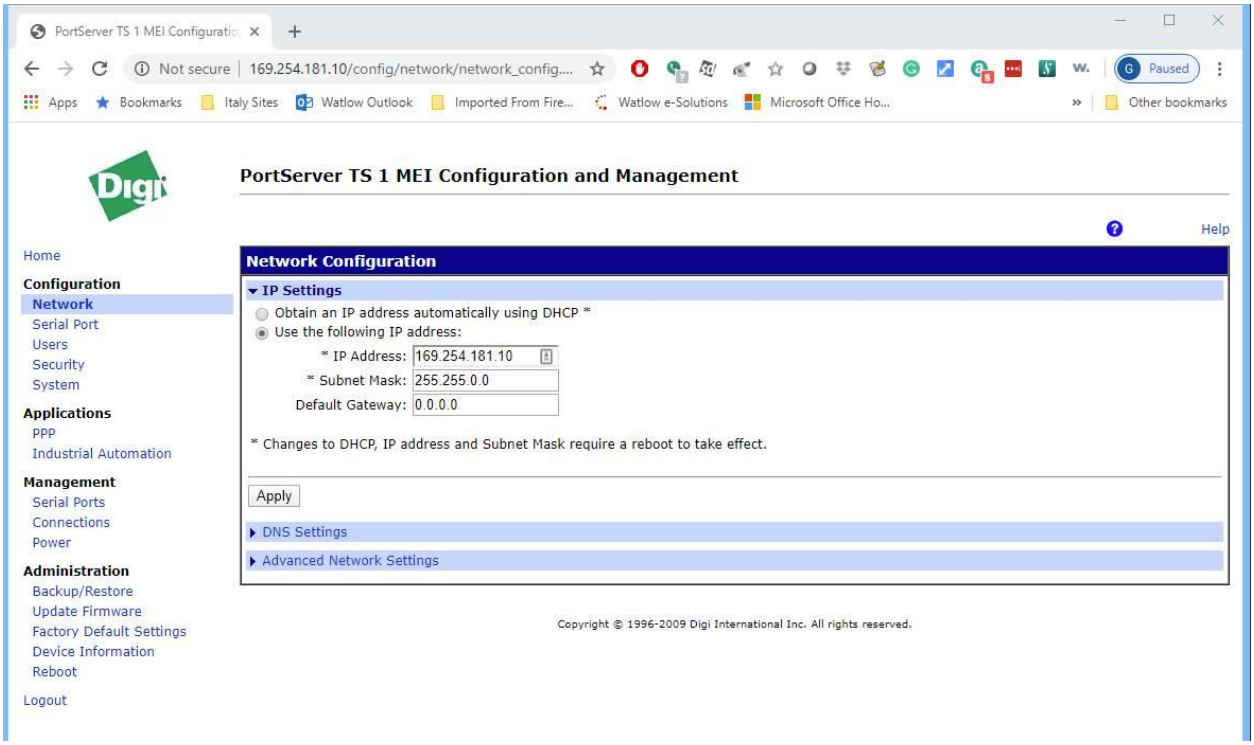
PortServer TS 1 MEI Configuratio
Not secure | 169.254.181.10/config/network/network_config....
Paused
Apps
Bookmarks
Italy Sites
Watlow Outlook
Imported From Fire...
Watlow e-Solutions
Microsoft Office Ho...
Other bookmarks
PortServer TS 1 MEI Configuration and Management
Help
Home
Configuration
Network
Serial Port
Users
Security
System
Applications
PPP
Industrial Automation
Management
Serial Ports
Connections
Power
Administration
Backup/Restore
Update Firmware
Factory Default Settings
Device Information
Reboot
Logout
Network Configuration
IP Settings
Obtain an IP address automatically using DHCP *
Use the following IP address:
* IP Address: 169.254.181.10
* Subnet Mask: 255.255.0.0
Default Gateway: 0.0.0.0
* Changes to DHCP, IP address and Subnet Mask require a reboot to take effect.
Apply
DNS Settings
Advanced Network Settings
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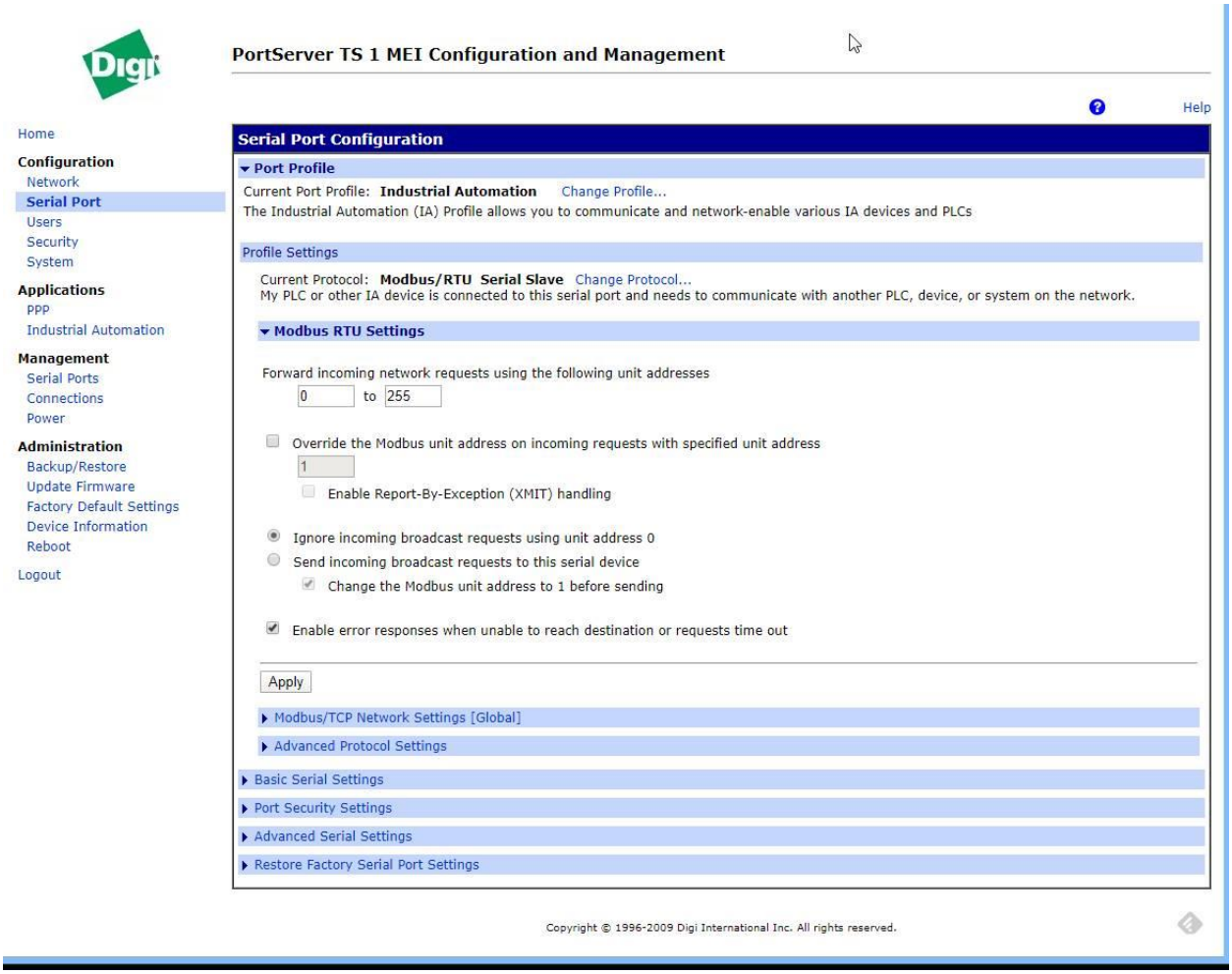
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Applications
PPP
Industrial Automation
Management
Serial Ports
Connections
Power
Administration
Backup/Restore
Update Firmware
Factory Default Settings
Device Information
Reboot
Logout
Serial Port Configuration
Port Profile
Current Port Profile: Industrial Automation Change Profile...
The Industrial Automation (IA) Profile allows you to communicate and network-enable various IA devices and PLCs
Profile Settings
Current Protocol: Modbus/RTU Serial Slave Change Protocol...
My PLC or other IA device is connected to this serial port and needs to communicate with another PLC, device, or system on the network.
Modbus RTU Settings
Forward incoming network requests using the following unit addresses
0 to 255
Override the Modbus unit address on incoming requests with specified unit address
1
Enable Report-By-Exception (XMIT) handling
Ignore incoming broadcast requests using unit address 0
Send incoming broadcast requests to this serial device
Change the Modbus unit address to 1 before sending
Enable error responses when unable to reach destination or requests time out
Apply
Modbus/TCP Network Settings [Global]
Advanced Protocol Settings
Basic Serial Settings
Port Security Settings
Advanced Serial Settings
Restore Factory Serial Port Settings
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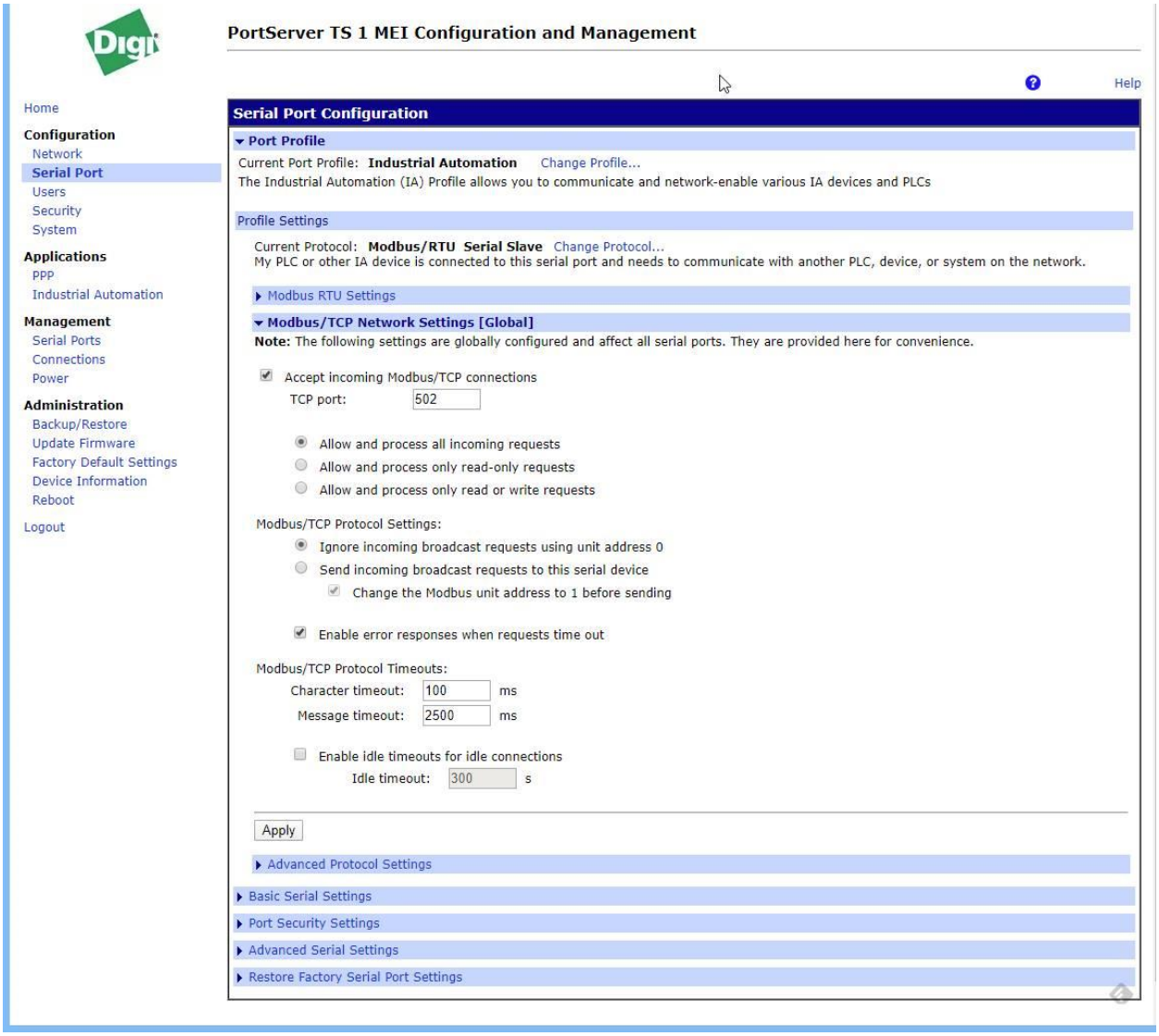
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Serial Ports
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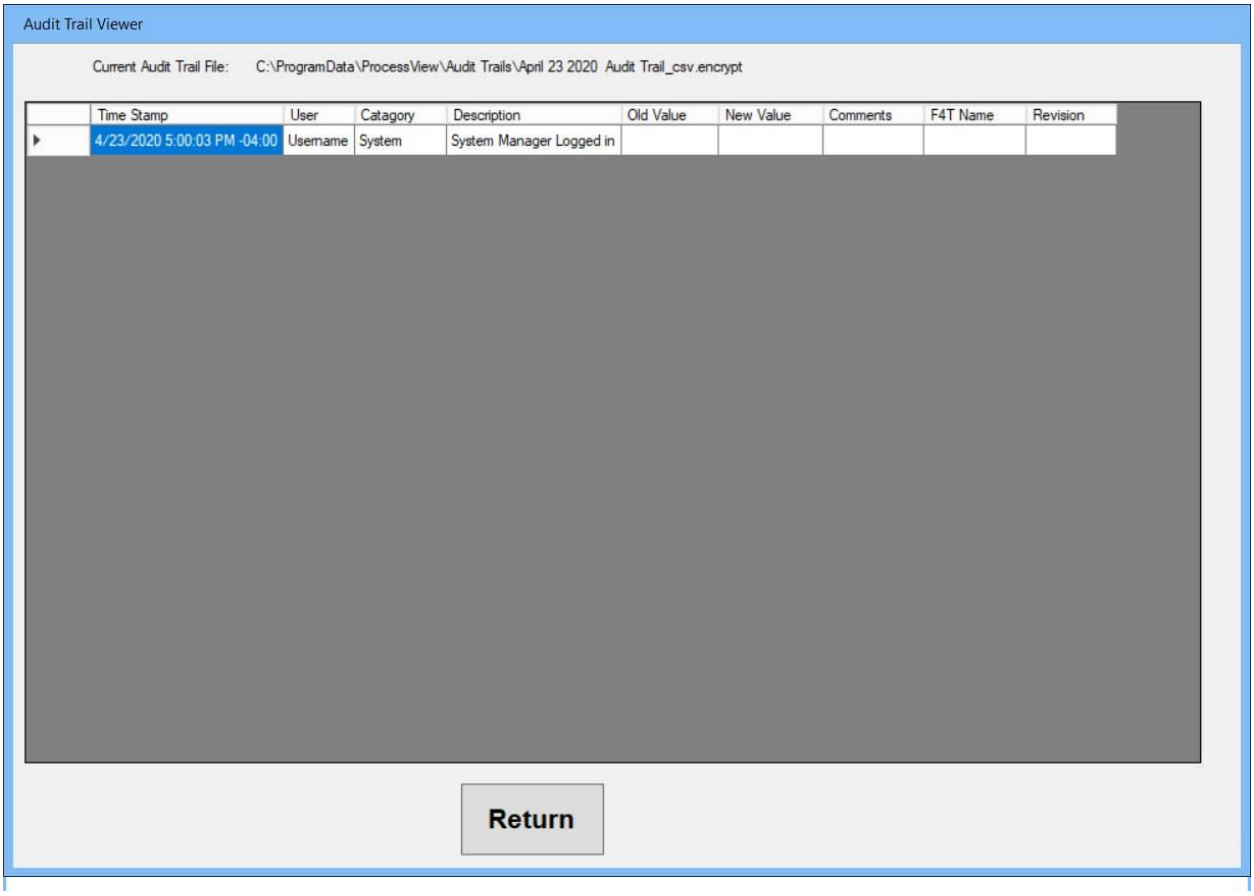
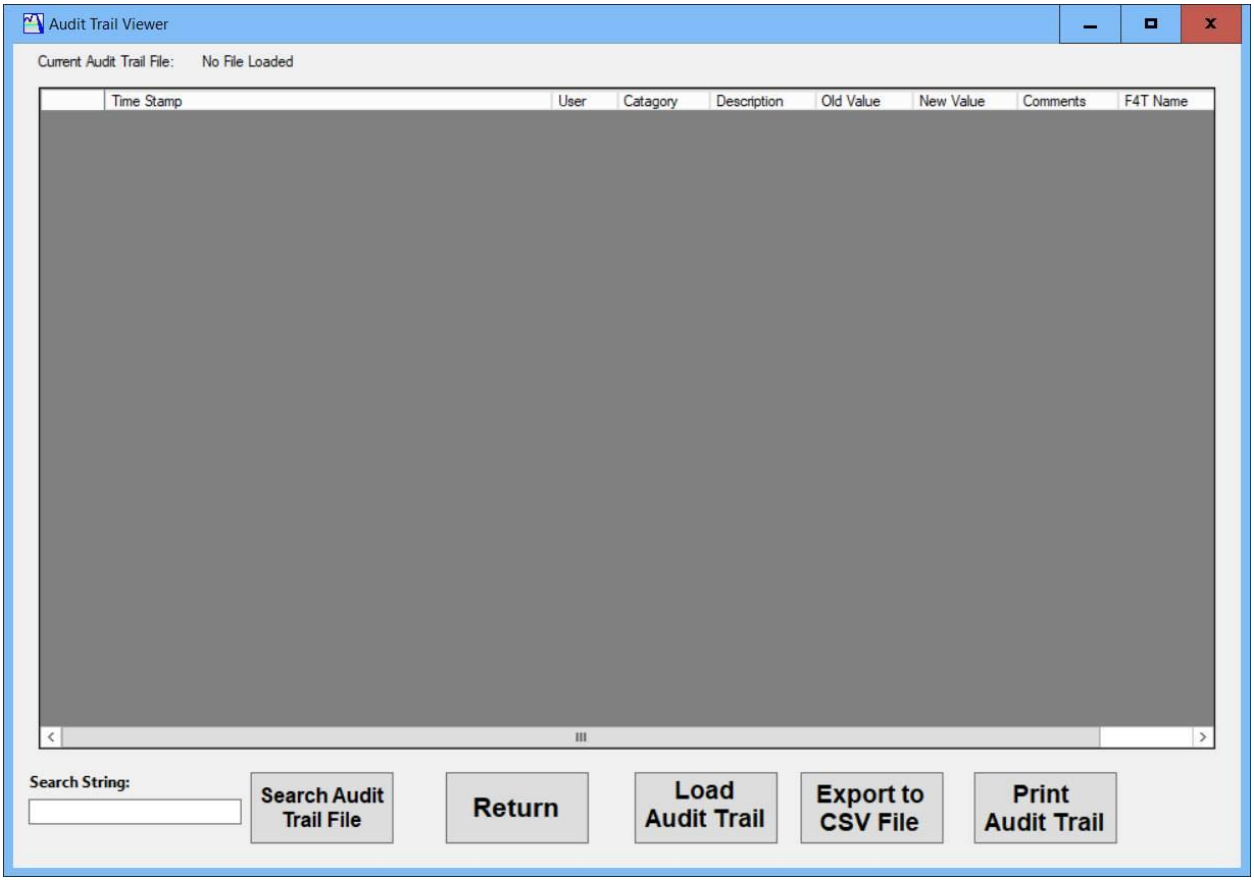
Administration
Backup/Restore
Update Firmware
Factory Default Settings
Device Information
Reboot
Logout
Serial Port Configuration
Port Profile
Current Port Profile: Industrial Automation Change Profile...
The Industrial Automation (IA) Profile allows you to communicate and network-enable various IA devices and PLCs
Profile Settings
Current Protocol: Modbus/RTU Serial Slave Change Protocol...
My PLC or other IA device is connected to this serial port and needs to communicate with another PLC, device, or system on the network.
Modbus RTU Settings
Modbus/TCP Network Settings [Global]
Note: The following settings are globally configured and affect all serial ports. They are provided here for convenience.
Accept incoming Modbus/TCP connections
TCP port: 502
Allow and process all incoming requests
Allow and process only read-only requests
Allow and process only read or write requests
Modbus/TCP Protocol Settings:
Ignore incoming broadcast requests using unit address 0
Send incoming broadcast requests to this serial device
Change the Modbus unit address to 1 before sending
Enable error responses when requests time out
Modbus/TCP Protocol Timeouts:
Character timeout: 100 ms
Message timeout: 2500 ms
Enable idle timeouts for idle connections
Idle timeout: 300 s
Apply
Advanced Protocol Settings
Basic Serial Settings
Port Security Settings
Advanced Serial Settings
Restore Factory Serial Port Settings



Audit Trail

When the audit trail is enabled, the audit trail file is written to in a secure encrypted format which can be viewed using the audit trail viewer. The audit trail is created each day and is assigned a file name with the date in the file name. The Audit Trail Viewer is used to see the current active audit trail events for the current software session. If you want to see all the events for a given day then you need to use the “Export Audit Trail” window from that menu item.

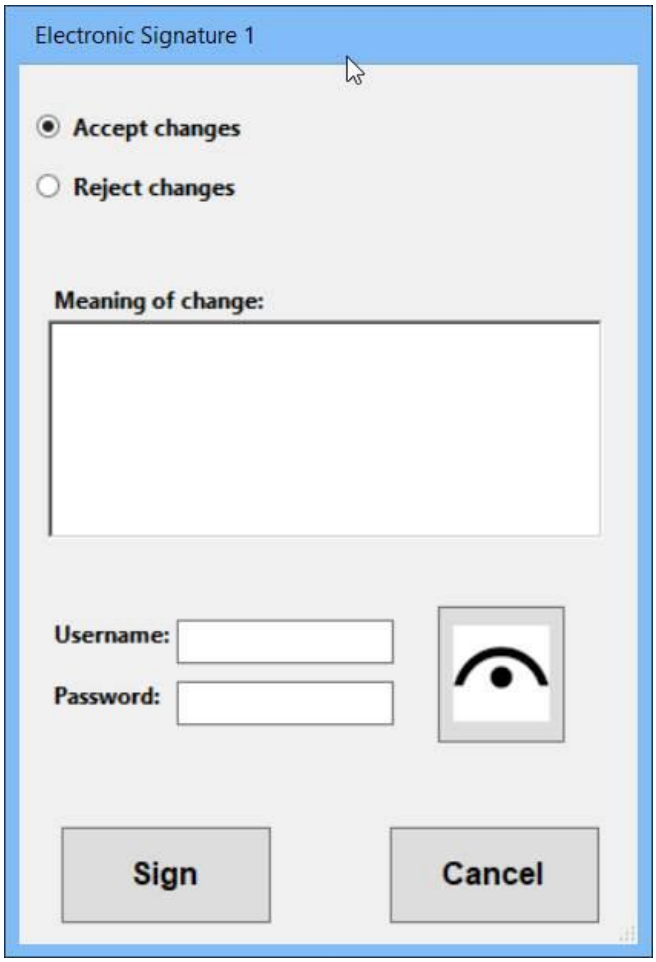


Below is the window shown from selecting the "Export Audit Trail" sub menu under Quality Control. From this window you can load a whole days' worth of Audit Trail events. You can also export them to an unprotected CSV file for Auditors to inspect or print them for a hard copy. You can also search the audit trail for specific search strings, like a date, username or event type.

Digital Signature

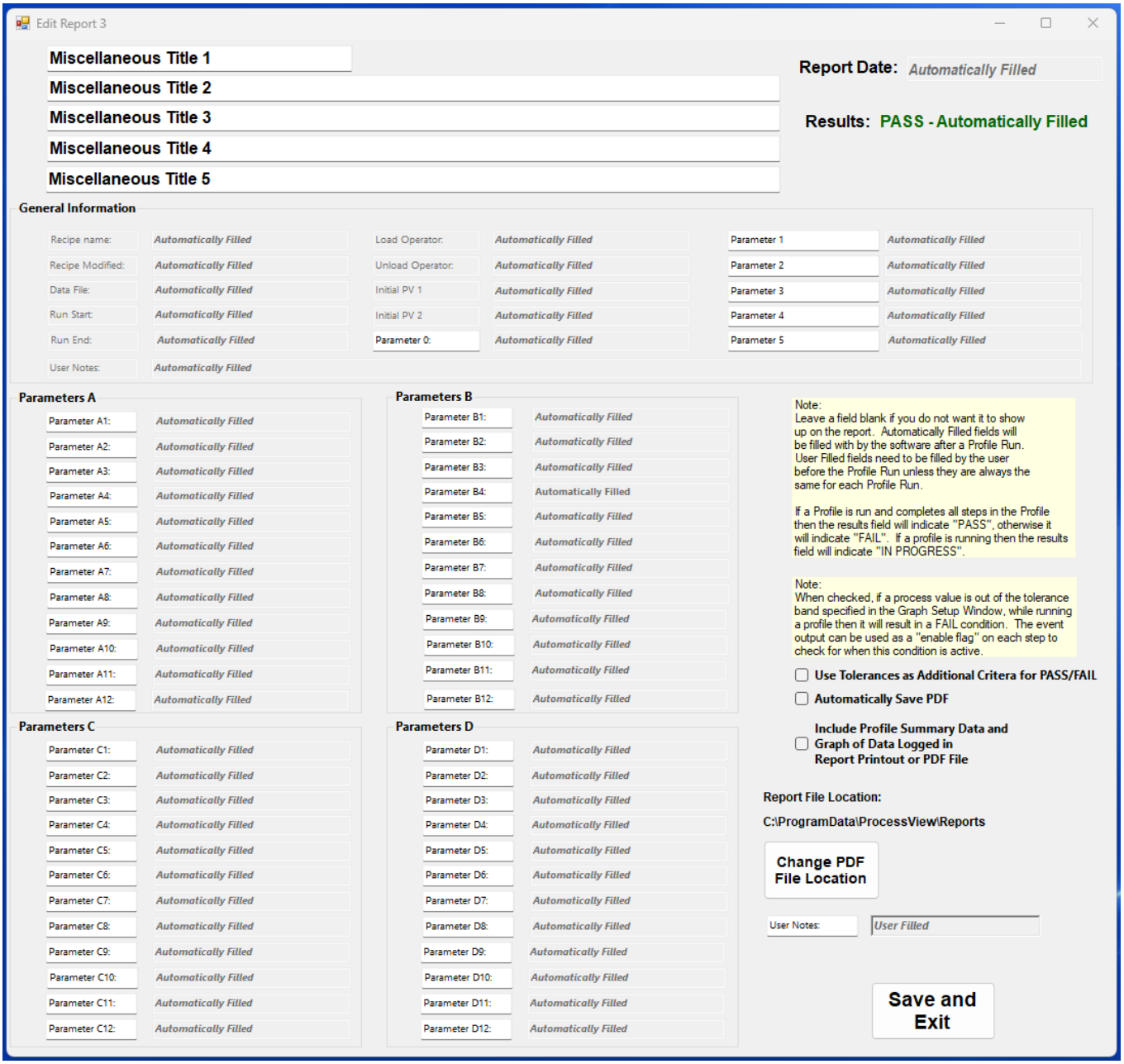
The "Digital Signature" pop up window appears when you select the digital sensor button on the Data Viewer Window. This allows a user to digitally sign a data log file and after the data log file is signed it is converted to a signed XML file. The XML Signature used (also called *XMLDSig*, *XML-DSig*, *XML-Sig*) defines an XML syntax for digital signatures and is defined in the W3C recommendation XML Signature Syntax and Processing. The user can accept or reject the changes and can add a comment for the meaning of change after the user has logged in with their credentials for

authentication. Multiple users can sign as well and each time a user signs the logged file it will be appended to the file. This method insures the data log file is tamper proof.



QA Reports

You can use the QA Reports feature to create reports that are generated after a profile has run successfully or aborts for some reason. In order to configure a report, you must first select the "Configure Report" menu from the "QA Report" menu. After selecting you will see a window like to the one below:

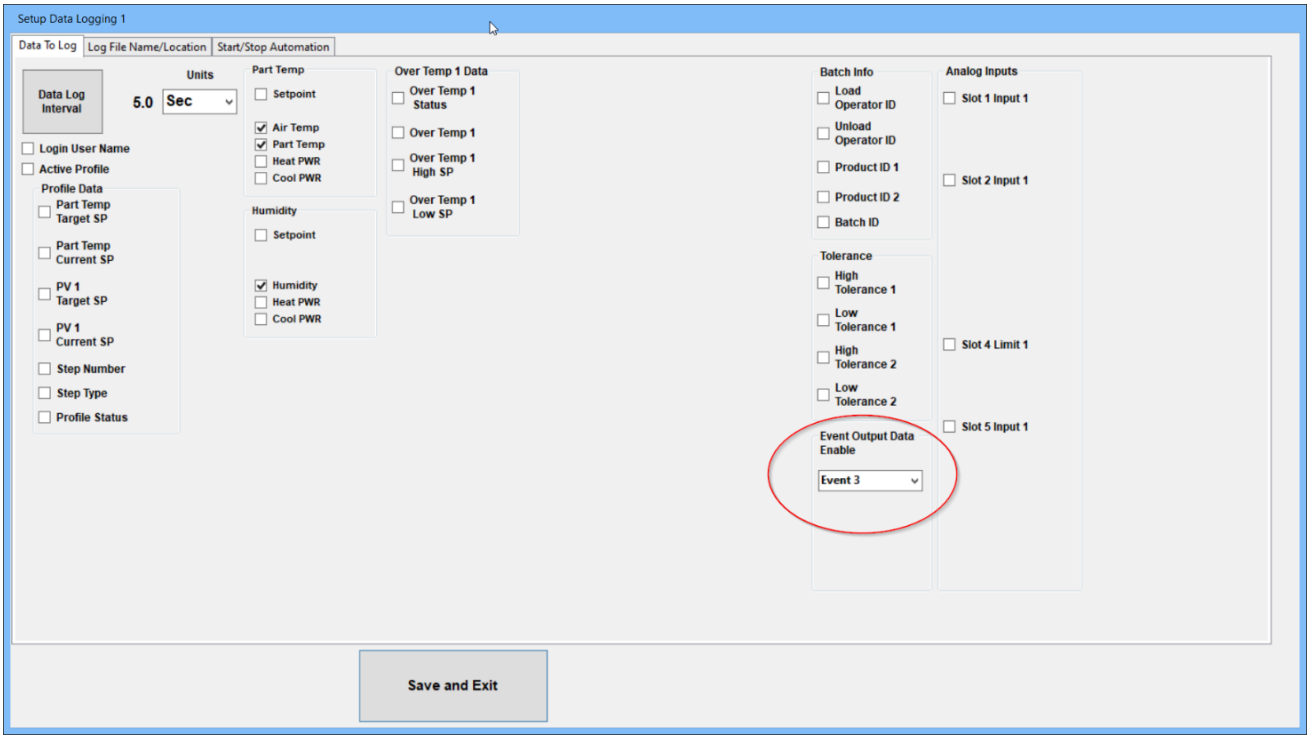


To customize the fields shown in the actual report window, you can change the text in the fields that are designed to be filled in by the operator or user before or after a batch or profile is run. If you do not want certain text field to show up on the report then you can delete all the text in the fields and it will not be shown on the actual report. For example if you don't want any of the information for the "Parameter A1" to show up on the report then you simply just need to delete all the text fields in the Parameter A1 section and it will not be shown when the report is displayed after a profile run. All the input fields that will be automatically field by the software at the end of a profile run except the "User Notes" field. The User Notes field can be filed out by the user after the profile as

been run for adding additional information about the profile or batch run.There are several checkboxes on the configuration window that are used for the following functions:

Use Tolerances as Additional Criteria for PASS/FAIL

This feature is used to determine if a process value is within a user specified tolerance band which is specified or setup in the Graph Setup Window. The tolerance values that are set in the Graph Setup Window +/- values not percentages. If the process value while running in a profile exceeds the higher tolerance band or is below the lower tolerance band then the QA report will indicate a "FAIL" condition, otherwise it will be a pass condition. If you want to only measure the tolerances on a specific step in the profile then you can use an event output to trigger when the tolerance conditions are checked. When an event specified is set to "ON" during a profile program then the software will check the process values against the tolerance bands. This event used can be setup in the Data Log Setup window as shown below which is setup for when Event 3 output is set to "ON":



Include Profile Summary Data and Graph of Data Logged in Report Printout or PDF File Check Box

When checked the summary data which is logged at the end of the data log will be included in the QA report. Maximum PV, Step Std. Error, etc. which are recorded during the profile run can be saved in the QA

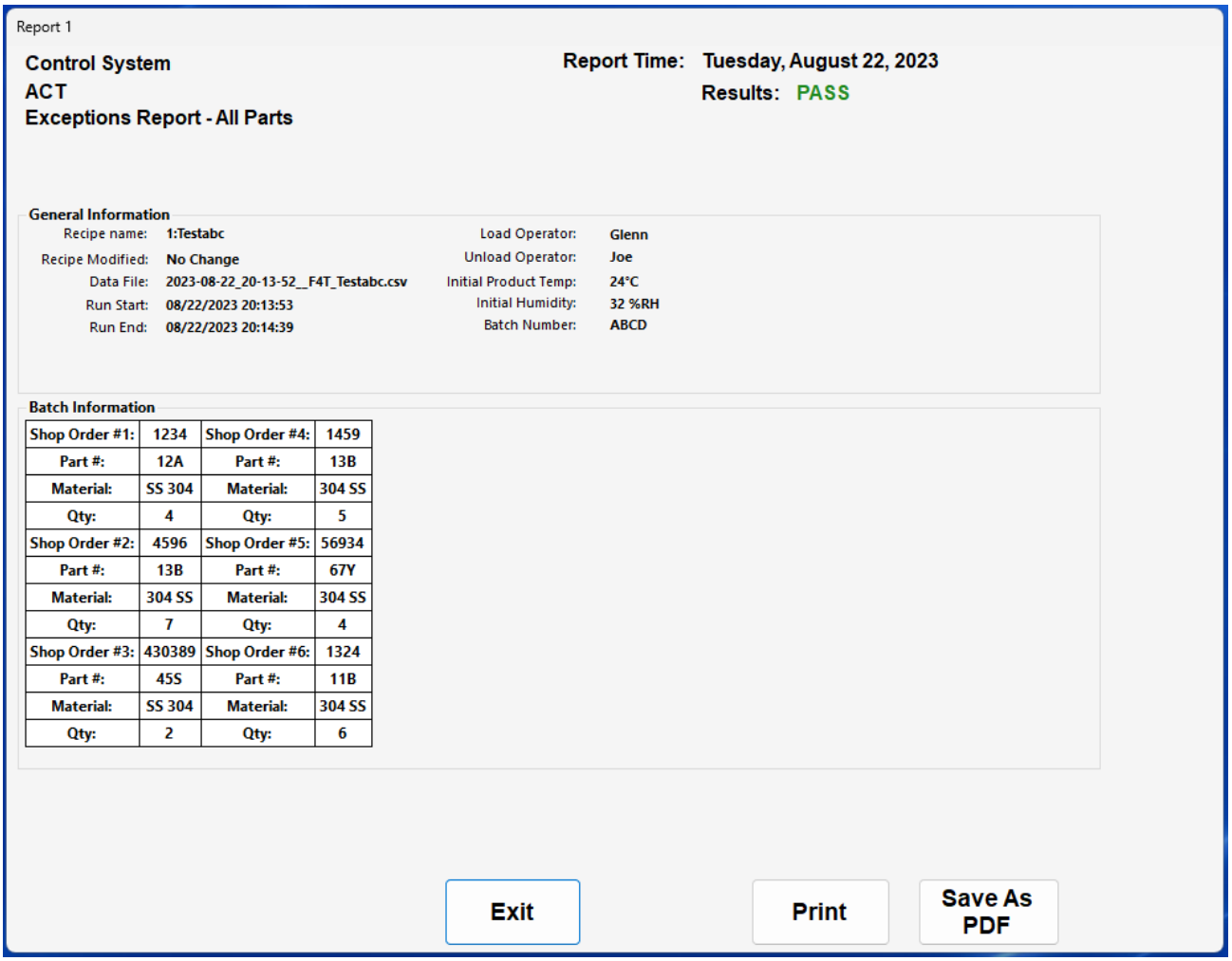
report if this checkbox is checked. A graph of the data that was logged will be included at the end of the report as well.

Automatically Save PDF file Check Box

If checked then after a profile is run, a PDF file will be generated and saved at the location specified by the user automatically.

All the fields that not greyed out can be edited to whatever you would like your report to look like. The Report Titles, General Information and Parameter fields can be changed and that will be saved when the report is generated after a profile has run or has aborted for some reason. If you erase an editable field then on the actual report it will not show up or will be blank. After a profile is run all the fields that are marked "Automatically Filled" will be filled by ProcessView and all the fields that are marked "User Filled" (User Notes) can be filled out after a profile is run for special circumstances.

Below is an example report that was run:



Report 1

Control System
ACT
Exceptions Report - All Parts

Report Time: Tuesday, August 22, 2023
Results: PASS

General Information

Recipe name:	1:Testabc	Load Operator:	Glenn
Recipe Modified:	No Change	Unload Operator:	Joe
Data File:	2023-08-22_20-13-52__F4T_Testabc.csv	Initial Product Temp:	24°C
Run Start:	08/22/2023 20:13:53	Initial Humidity:	32 %RH
Run End:	08/22/2023 20:14:39	Batch Number:	ABCD

Batch Information

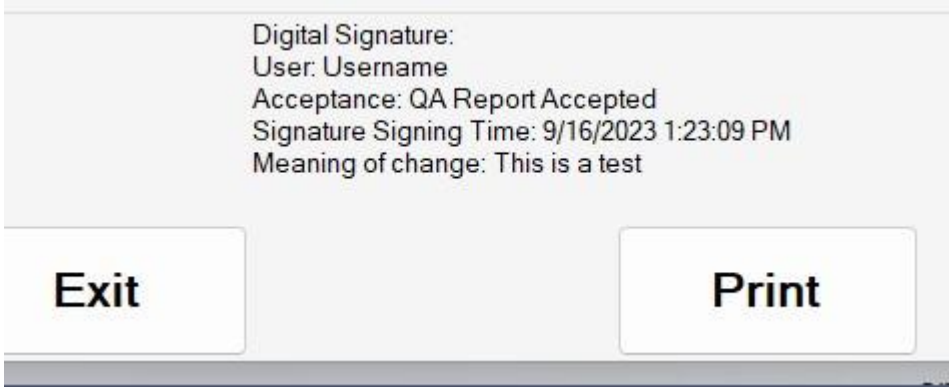
Shop Order #1:	1234	Shop Order #4:	1459
Part #:	12A	Part #:	13B
Material:	SS 304	Material:	304 SS
Qty:	4	Qty:	5
Shop Order #2:	4596	Shop Order #5:	56934
Part #:	13B	Part #:	67Y
Material:	304 SS	Material:	304 SS
Qty:	7	Qty:	4
Shop Order #3:	430389	Shop Order #6:	1324
Part #:	45S	Part #:	11B
Material:	SS 304	Material:	304 SS
Qty:	2	Qty:	6

Exit | Print | Save As PDF

Digital Signatures

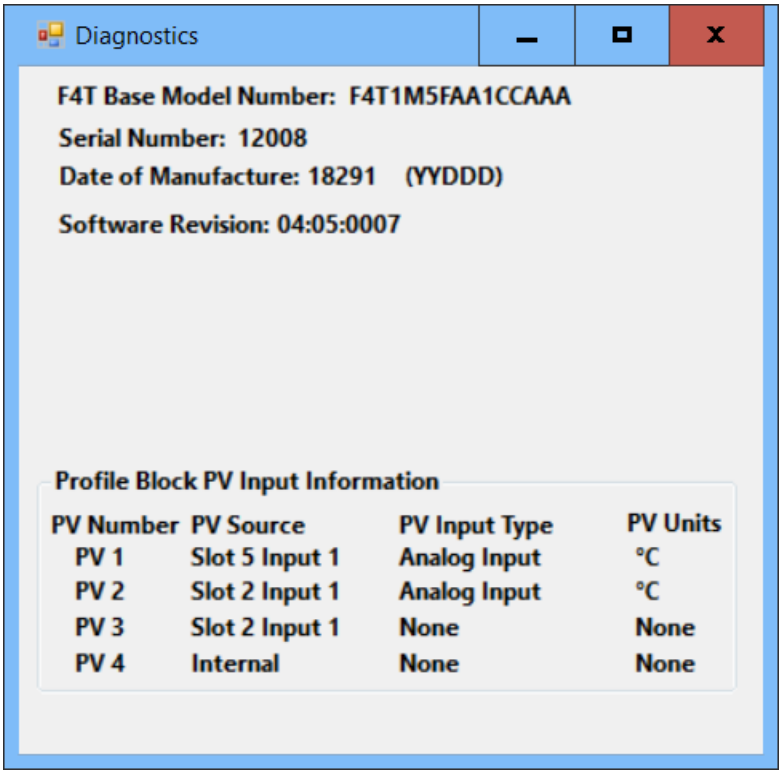
You can add a digital signature after a report has been completed by selecting the Add Digital Signature button. That will bring up a popup window that the user will need to login to the system using their username and password and can accept or decline the report. In order to use this feature, you must enable Digital Signatures in the Security window under the System tab.

The information is then printed at the bottom of the report as shown below:

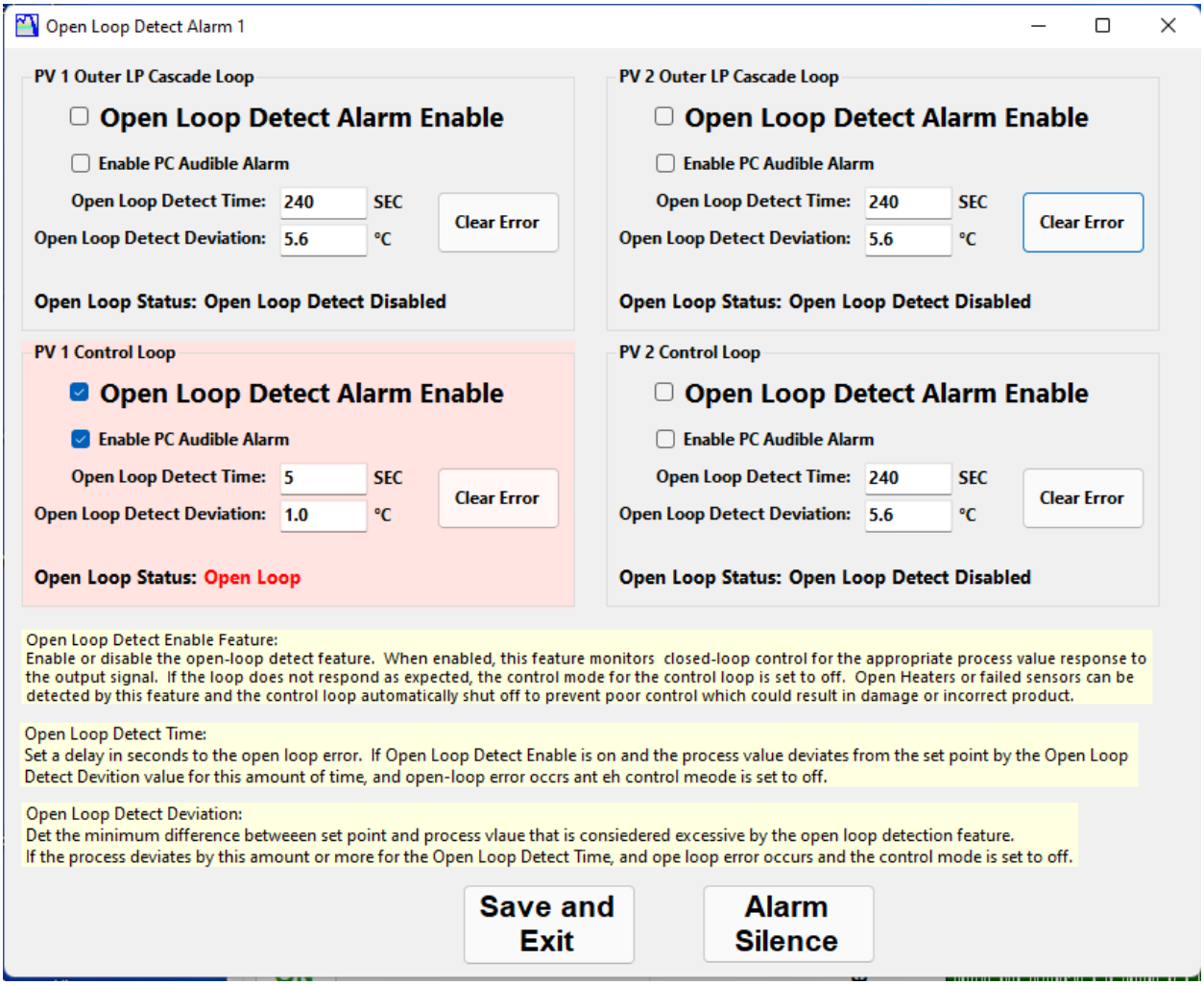


Diagnostics

The diagnostics window will provide information about the controller's model number, serial number, date of manufacture and current software revisions. For F4T's additional information about the Profile Block PV inputs is also provided so you can verify that PV1 and PV2 are connected internally correctly in the F4T controller.



Open Loop Detect Alarm



Open Loop Detect Enable

Enable or disable the open-loop detect feature When enabled, this feature monitors closed loop control for the appropriate process value response to the output signal If the loop does not respond as expected, the control mode is set to off. Open heaters or failed/reversed sensors can be detected by this feature and the control loop automatically shut off to prevent poor control which could result in equipment damage or quality issues with the product being controlled by the process.

Open Loop Detect Time

Set a delay in seconds for the open loop error. If Open Loop Detect Enable is on and the process

value deviates from the set point by the Open Loop Detect Deviation value for this amount of time, an open-loop error occurs and the control mode is set to off.

Range: 0 to 9,999 seconds

Open Loop Detect Deviation
Set the minimum difference between the set point and the process value that is considered excessive by the open loop detection feature. If the process deviates by this amount or more for the Open Loop Detect Time, an open loop error occurs and the control mode is set to off

Range: -99,999 to 99,999 ºF or units
-55,555 to 55,555 ºC

Use the Enable PC Audible Alarm checkbox to cause an audible PC alarm if an alarm condition occurs. Use the Alarm Silence button to silence the audible PC alarm or if the alarm is no longer present and has been cleared using the Clear Button.