

# **OPERATORS MANUAL AIR PLUS 5**



## **Met One Instruments, Inc**

Corporate Sales & Service: 1600 NW Washington Blvd. Grants Pass, OR 97526

Tel (541) 471-7111 Fax (541) 471-7116

[www.metone.com](http://www.metone.com) - [www.service@metone.com](mailto:www.service@metone.com)



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Operators Manual Air Plus 5

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## Technical Support

Should you require support, please consult your printed documentation or our website [www.metone.com](http://www.metone.com) to resolve your problem. If you are still experiencing difficulty, you may contact a Technical Service representative during normal business hours;

Monday – Friday 7:00 a.m. to 4:00 p.m. Pacific Time.

Voice: (541) 471-7111

Fax: (541) 471-7116

E-Mail: [service@metone.com](mailto:service@metone.com)

Mail: Technical Services Department  
Met One Instruments, Inc.  
1600 NW Washington Blvd  
Grants Pass, OR 97526

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## Overview

Air Plus software includes all of the functions required for the collection, viewing of data, and production of both tabular and graphic reports needed by most users of an air quality or other environmental monitoring system. It is designed for use with the Met One Instruments, Inc. line of data collection products.

The software provides a complete data collection package for each of the various products and easy archiving of data. It also includes printed reports, real-time operation and automatic daily calculations.

Data collection can be performed automatically based on the requirements of the system. It can be done at a specified averaging interval or on a daily basis. Data can be collected via direct connection, direct radio link, standard telephone modem connection, cellular telephone modem, or by an easy to carry data transfer module.

Archived data can be reviewed in standard tabular format, or as typical line charts displaying either a single parameter or multiple parameters. The graphics package also includes the capability to produce wind rose charts. There is an export function that allows the user to export data in standard comma separated (\*.csv) format and an import feature that will allow users to import existing data in to a new station.

Follow the onscreen installation instructions and you will be ready to collect data in just a few minutes. Systems manufactured and assembled by Met One Instruments, Inc. will include a station disk or data file that is used to automatically configure the Air Plus software. Other configurations may require the operator to enter the necessary setup values for their specific application.

### Recommended System Requirements:

Processor Speed:	1GHz or faster
Memory:	512MB minimum
Disk Space:	60MB
Operating System:	Windows XP, Windows Vista, Windows 7, Windows 8

# 1 Installation

The necessary installation files are supplied on a standard CD-ROM.

## 1.1 Getting Started

Insert the CD-ROM into your computer and the Auto-run program will automatically begin the software installation process. If the installation program does not automatically launch when inserting the CD-ROM, you may manually begin the installation process. Press the Windows START button and select “Run...” Press the “Browse...” button and select your CD-ROM drive. Open the “Software” folder, select the file labeled “setup.exe” and press the “Open” button. Press the “OK” button to begin the installation process.

## 1.2 Installation Options



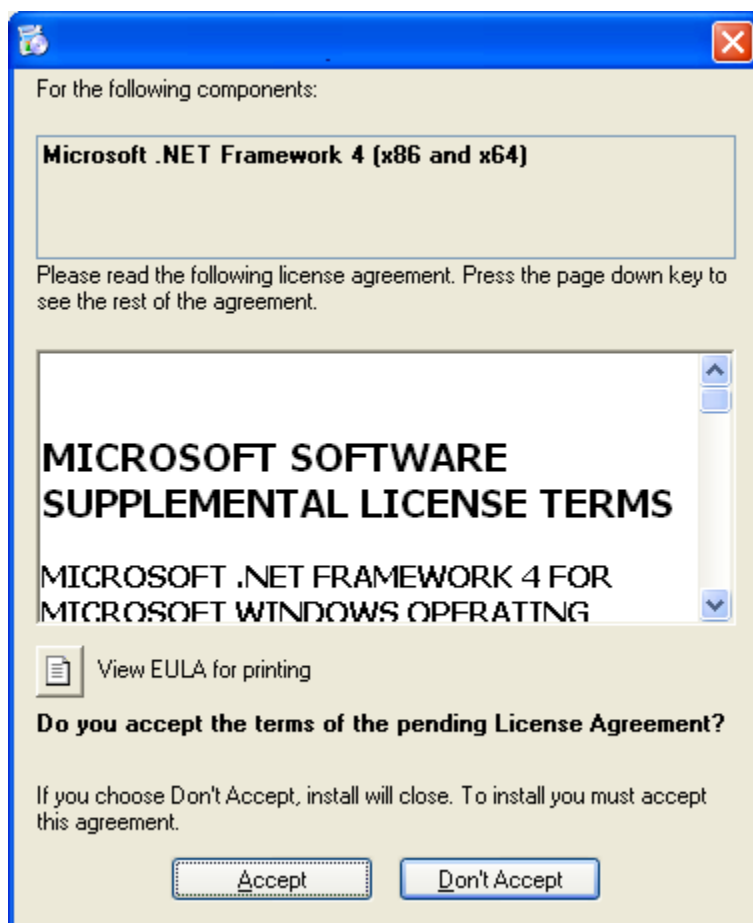
### **ATTENTION:**

The Air Plus installation CD includes the USB drivers necessary to communicate with all Met One Instruments, Inc. particle counters via the USB port of your computer. These drivers must be installed *before* connecting one of them to the USB port on your computer. If the supplied drivers are not installed first, Windows may install generic drivers that are not compatible with the counters. These drivers are also included with all Met One Instruments, Inc. particle counters able to communicate via USB. If you already have them installed on your computer, you do not need to install them again now.

To install the USB drivers, click on the “USB Drivers” menu selection on the splash screen. These drivers may be installed either before or after the installation of Particle View.

### 1.3 .NET 4 Framework Installation

Air Plus uses the .NET 4 framework. The installation process will detect if you meet the requirements. If your computer does not meet these requirements, you will be prompted to install the necessary files for Air Plus to run properly.

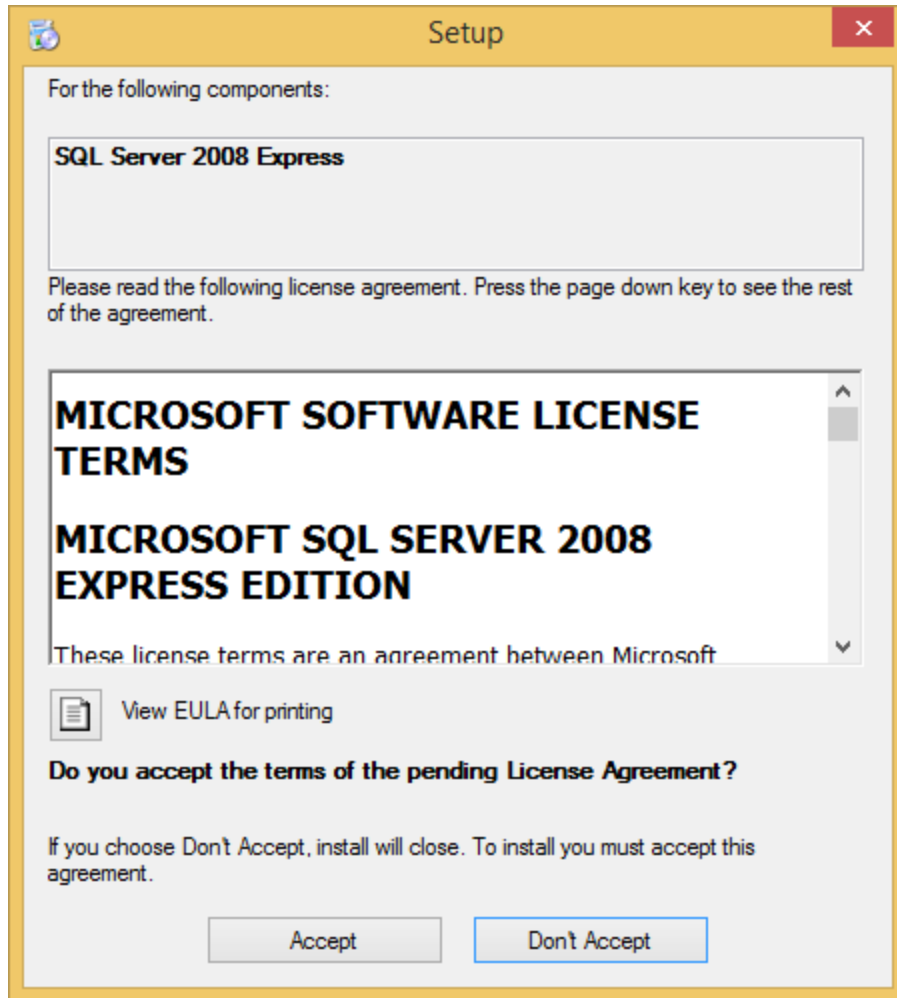


It will take a few minutes for .NET Framework 4 to install. Once completed, the setup may ask you to reboot your computer. Once rebooted, the installation of Air Plus will continue.

### 1.4 SQL Server 2008 Express Installation

Air Plus uses SQL Server 2008 Express to store all data from the particle counters. The installation process will search your computer to verify you have it loaded. If not, the installer will install it before installing Air Plus.

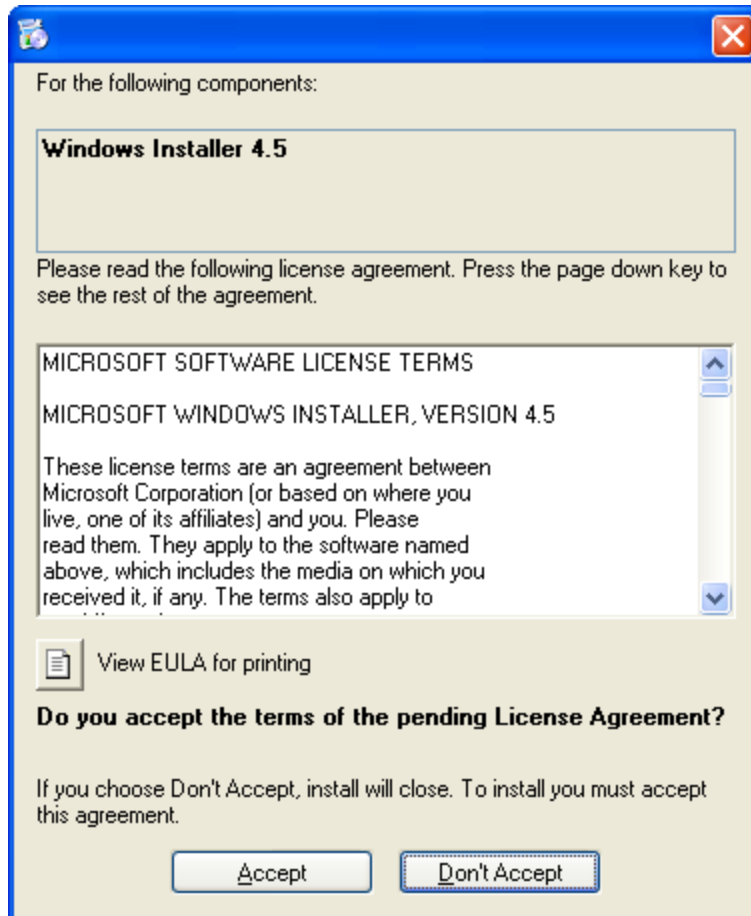




It will take a few minutes for SQL Server 2008 Express to install. Once completed, the setup may ask you to reboot your computer. Once rebooted, the installation of Air Plus will continue.

### 1.5 Windows Installer 4.5

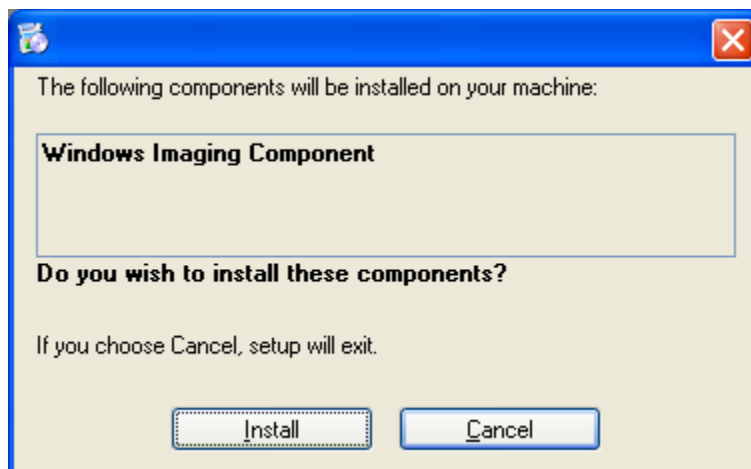
Air Plus uses the newest version of windows installer, 4.5, for setting up Air Plus properly. The installation process will detect if you meet the requirements. If your computer does not meet these requirements, you will be prompted to install Windows Installer 4.5.



It will take a few minutes for .NET Framework 4 to install. Once completed, the setup may ask you to reboot your computer. Once rebooted, the installation of Air Plus will continue.

#### 1.6 Windows Imaging Component (Windows XP Only)

On Windows XP machines, in order to properly install the .NET 4 Framework, Windows Imaging Component may be needed. The installation process will detect if you meet the requirements. If your computer does not meet these requirements, you will be prompted to install Windows Imaging Component.



It will take a few minutes for Windows Imaging Component to install. Once completed, the setup may ask you to reboot your computer. Once rebooted, the installation of Air Plus will continue.

## 1.7 Air Plus installation

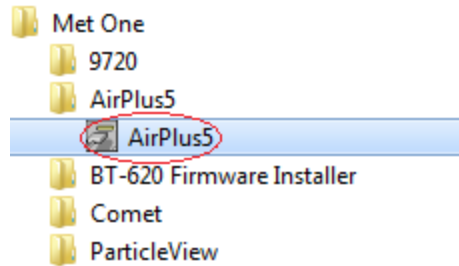


Follow the on screen prompts to finish installing Air Plus. After the installation has finished, the installation wizard will confirm the process was successful.

***IMPORTANT:*** Once installation is complete, it is important to run Windows Update and download all critical updates.

## 2 Air Plus

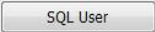
To open Air Plus, open the start menu and navigate to the Met One directory. Under the Met One directory there will be an Air Plus folder, click on the AirPlus5 icon to start Air Plus for the first time.



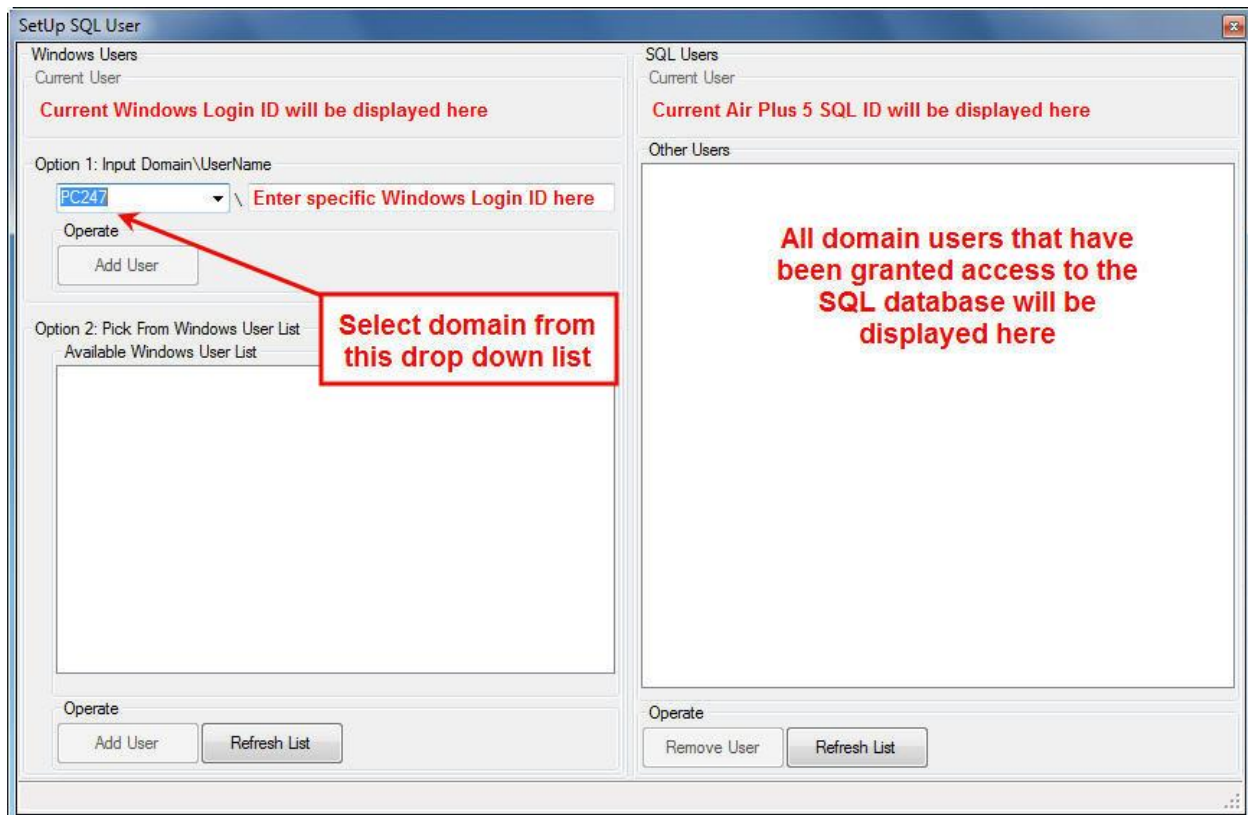
## 2.1 Configuring Air Plus 5 for Multiple Windows Users

If you are installing and using Air Plus 5 only on a single Windows User Login, the installation is now complete. Please proceed to Section 2.


However, if one or more Windows users in addition to the user that has installed Air Plus 5 will be using the software, each Windows Login ID will need to be granted access to the SQL Server database individually. SQL database access privileges are initially granted and removed using the Windows Login ID that installed Air Plus 5. Once additional ID's are added, they are also able to manage SQL database access privileges.

To configure Windows user SQL database access, open Air Plus 5 and click on the  button located in the lower right of the main screen. This will open the Set up SQL User window. On the left hand side you will be able to see and add Windows domains and users. On the right hand side, you will be able to see and remove Windows users that have been given access to the SQL database.

### 2.1.1 Granting SQL Access Using a Known Domain Login

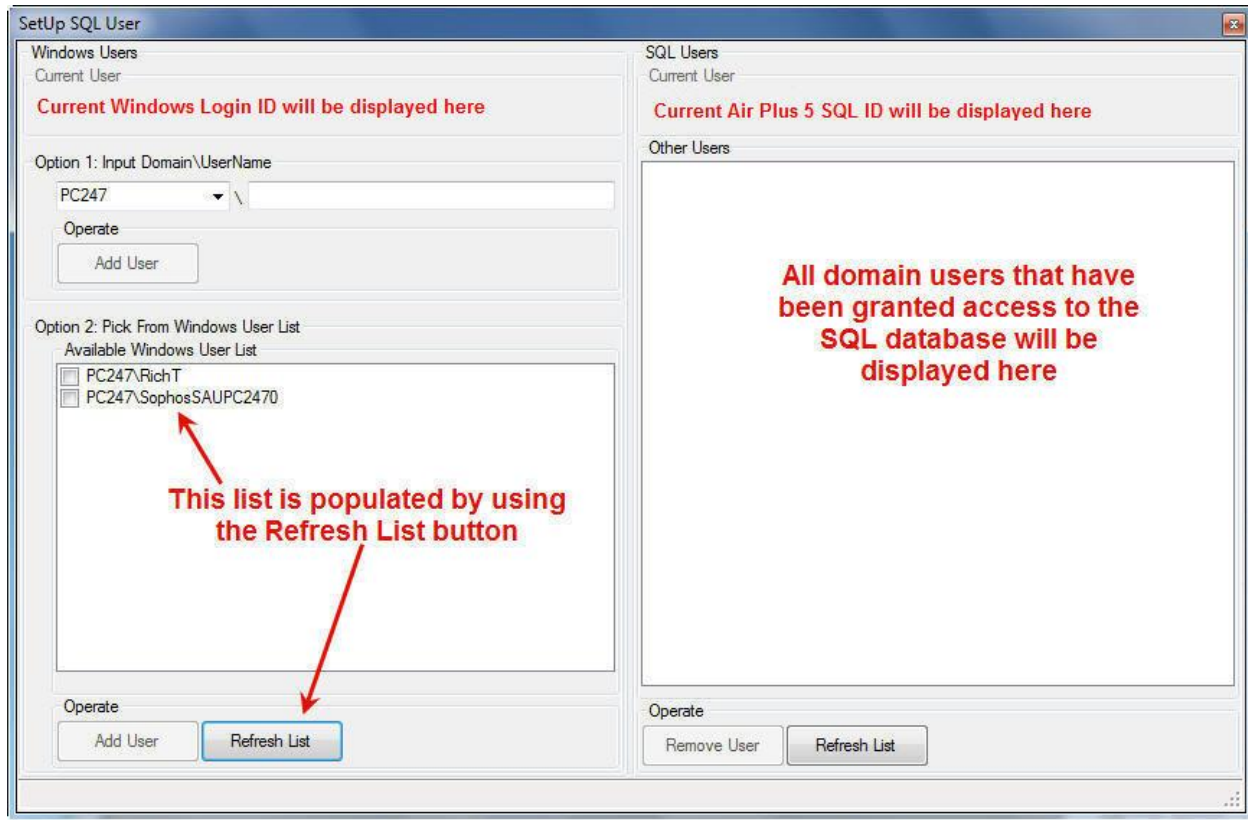



To add specific users, in the Option 1 section select the domain that the Windows login will use and then enter the login name in the space to the right. The login name must be entered **exactly** as it appears in the domain list.

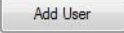
Press the  button and Air Plus 5 will locate that user ID and add it to the access list on the far right. If the name does not match exactly what is in the domain list, Air Plus 5 will not find it and it will not be added.

The user name must exist in order to add it to the list. You cannot add a Windows user in Air Plus 5 if it has not already been added to the domain.

## 2.1.2 Granting SQL Access Using a List of Domain Users

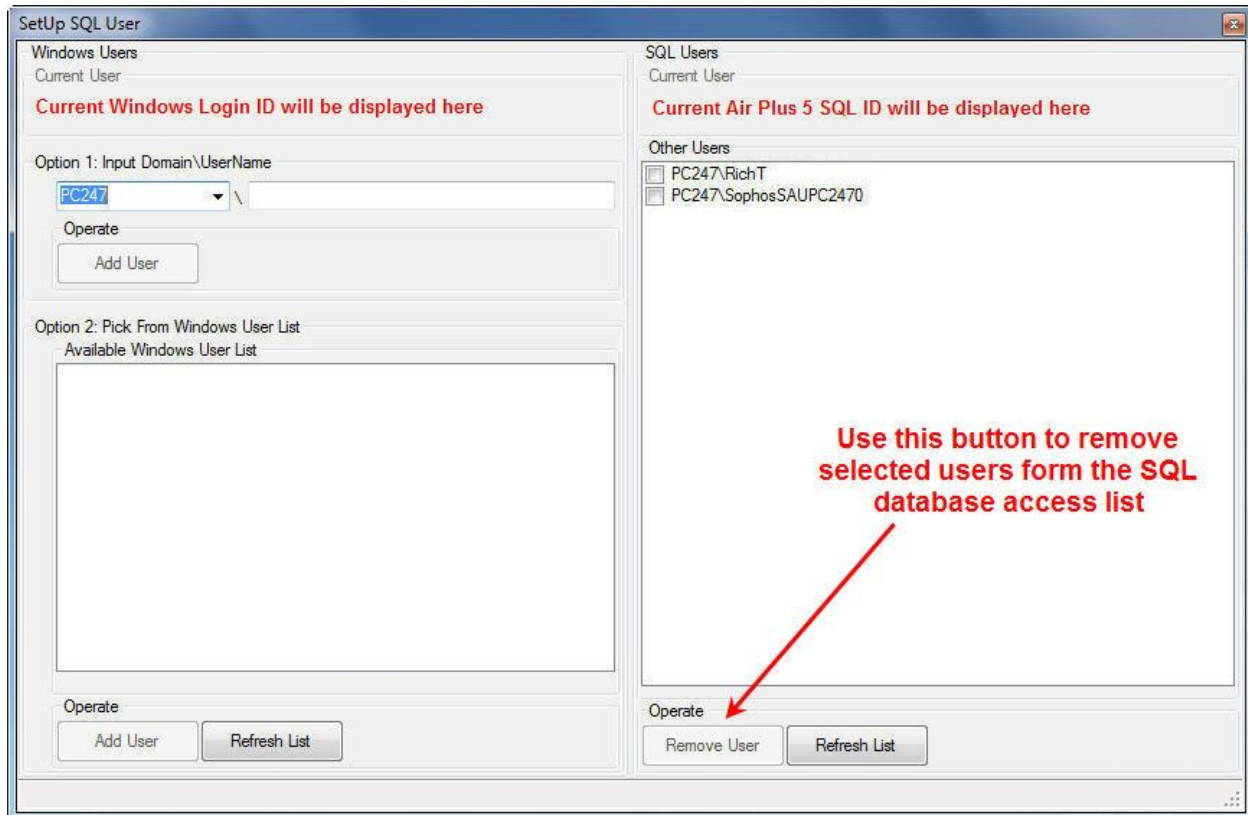




To see all domain users, press the  button. You will see all domains to which the computer belongs and all domain users. If you have a large network, this list may take a few minutes to populate.

Using the checkboxes, select all users that will be using Air Plus 5 and press the  button. Air Plus 5 will add all of them to the access list on the far right.

### 2.1.3 Revoking SQL Database Access

Sometimes a Windows user will need to be removed from the SQL database access list.



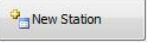
If the “Other Users” list on the far right is not populated, just press the  button located beneath it. Using the checkboxes, select all users that need to be removed and then press the  button. Air Plus 5 will delete them from the access list.

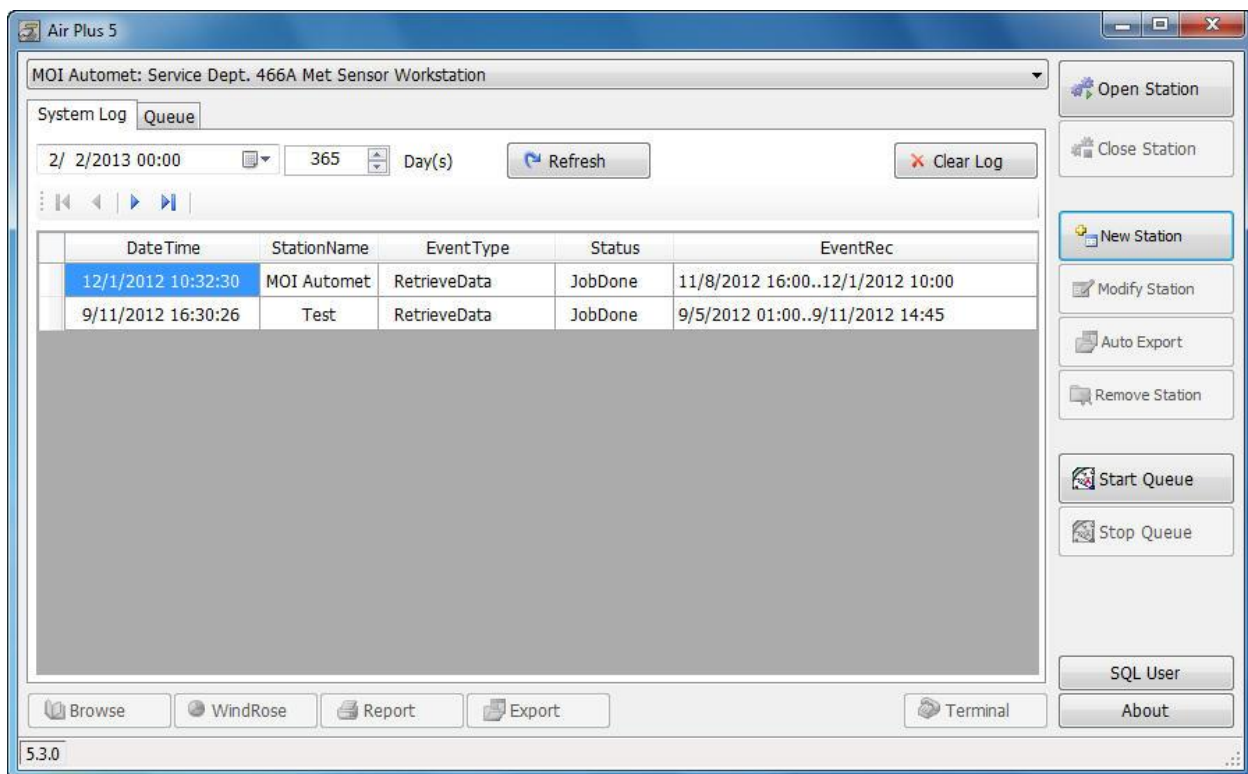
### 3 Configuration

If the Air Plus software has been supplied as part of a system, a setup disk or data file will be supplied on a separate CD-ROM disc. The setup disk contains all of the information and files necessary to automatically configure the program to communicate with the system as it is shipped from the factory.

If the software has been purchased without a system, and a setup disk was not provided, then the configuration details will need to be manually input. See section 3.1 to define a new station and then skip to section 3.3 for manual configuration directions.

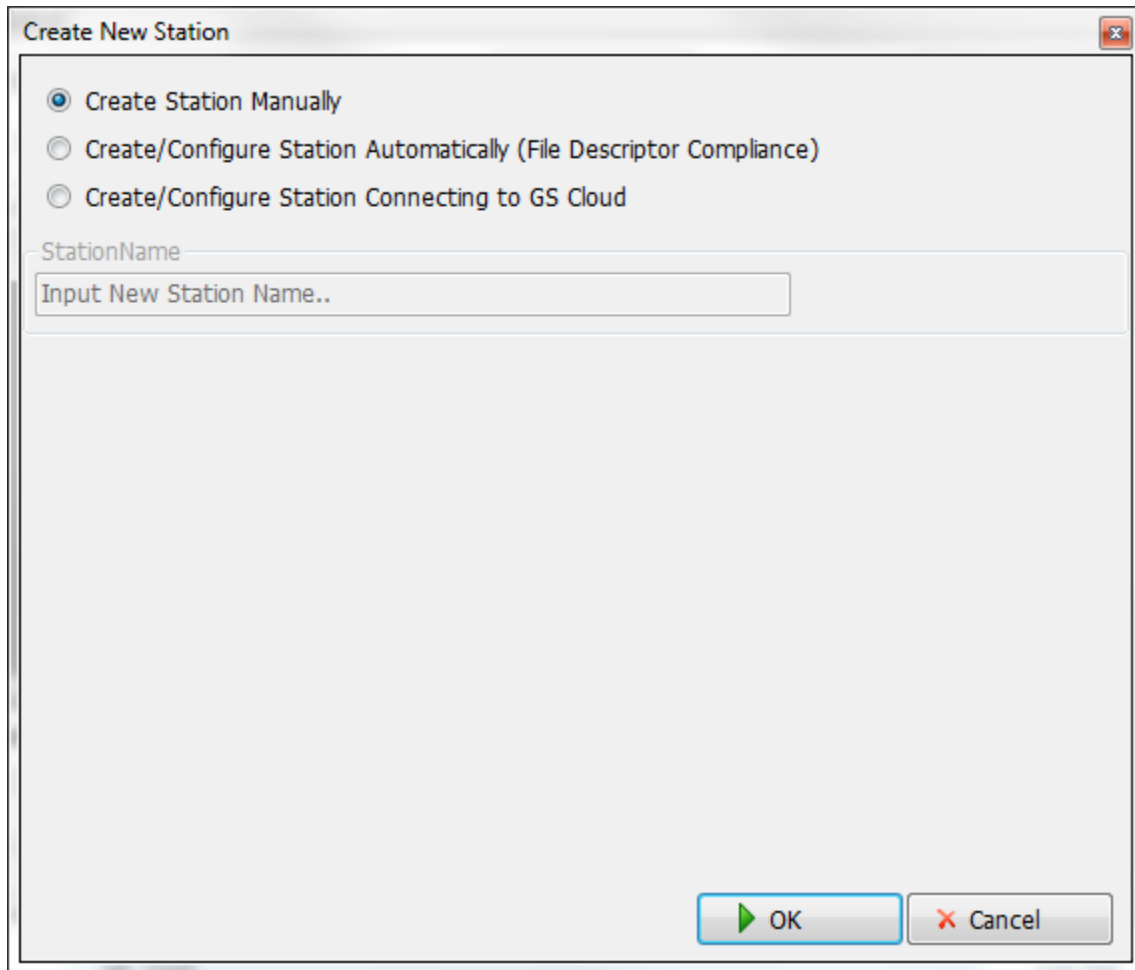
#### 3.1 Defining a New Station

Whether using a setup disk or manually configuring your station, you must first define the station to be used. From the main screen (shown below), press the  button to enter the Station Definition screen.





Air Plus gives users the option to manually configure a station or have Air Plus find the product and automatically create the station. If your product is being stored on the cloud, choose the GS Cloud option to download the data from the cloud.



The image shows a software dialog box titled "Create New Station". It contains three radio button options: "Create Station Manually" (which is selected), "Create/Configure Station Automatically (File Descriptor Compliance)", and "Create/Configure Station Connecting to GS Cloud". Below these options is a text input field labeled "StationName" with the placeholder text "Input New Station Name..". At the bottom right of the dialog are two buttons: "OK" with a green play icon and "Cancel" with a red X icon.

By choosing the automatic method, you must supply a station name and connection information. Air Plus will then attempt to connect to the device and automatically configure the station based on the device discovered.

The Station Definition screen has several tabs for configuring different parameters of your station. Users can manually fill out all the station information or if automatic configuration was selected, all the required information will be filled out for the user.

The screenshot shows the 'Station Definition' window with the 'Connect' tab selected. The window contains the following elements:

- Tabs:** Connect, Logger, Channel, Queue.
- Station Name:** A text input field.
- Station Location (Description):** A text input field.
- Logger:** A dropdown menu currently showing '466A'.
- Connection Options:**
  - RS232/Modem Connection:** Selected with a radio button. Includes a 'Com Port' dropdown set to 'COM1' and a 'Baud Rate' dropdown set to '9600'.
  - TCP/IP Connection:** Unselected with a radio button. Includes an 'IP Address' text field and a 'Port' text field.
  - Dial Up:** Unchecked with a checkbox. Includes a 'Phone Number' text field.
- Status Bar:** Displays the number '20130202165809530'.
- Buttons:** Save, Import, and Export buttons are located at the top right.

### 3.1.1 Connect Tab




This tab allows the entry of a station name and description, setting the logger type, and defining the method of connection to the logger.

If you are using a USB to serial adapter, you will need to verify which COM Port your computer has assigned to it. You can find this by going to Start Menu / Control Panel / System / Hardware / Device Manager / Ports. You should see your adapter listed here with a COM4 or similar in parenthesis after it. This is the port number to select in the drop down box on the Station Definition screen. If you do not see your adapter listed, your computer does not recognize it and has not installed it for use. Most likely, you will need to load the drivers that should have come with it.

If you are dialing out to a modem connected to the device out in the field, you need to select the COM Port that your computer modem uses and check the Dial Up box. Add the phone number exactly as it will be dialed (include a 1 if it is long distance). Do not use any dashes or spaces.

If you have your device connected to a network using an IP Address or a modem that is using an IP Address instead of a traditional dial in phone number, you will need to enter that information in the TCP/IP fields. You will need both the actual address and the Port number. If either of these items is missing or incorrect, you will not be able to connect to your device.

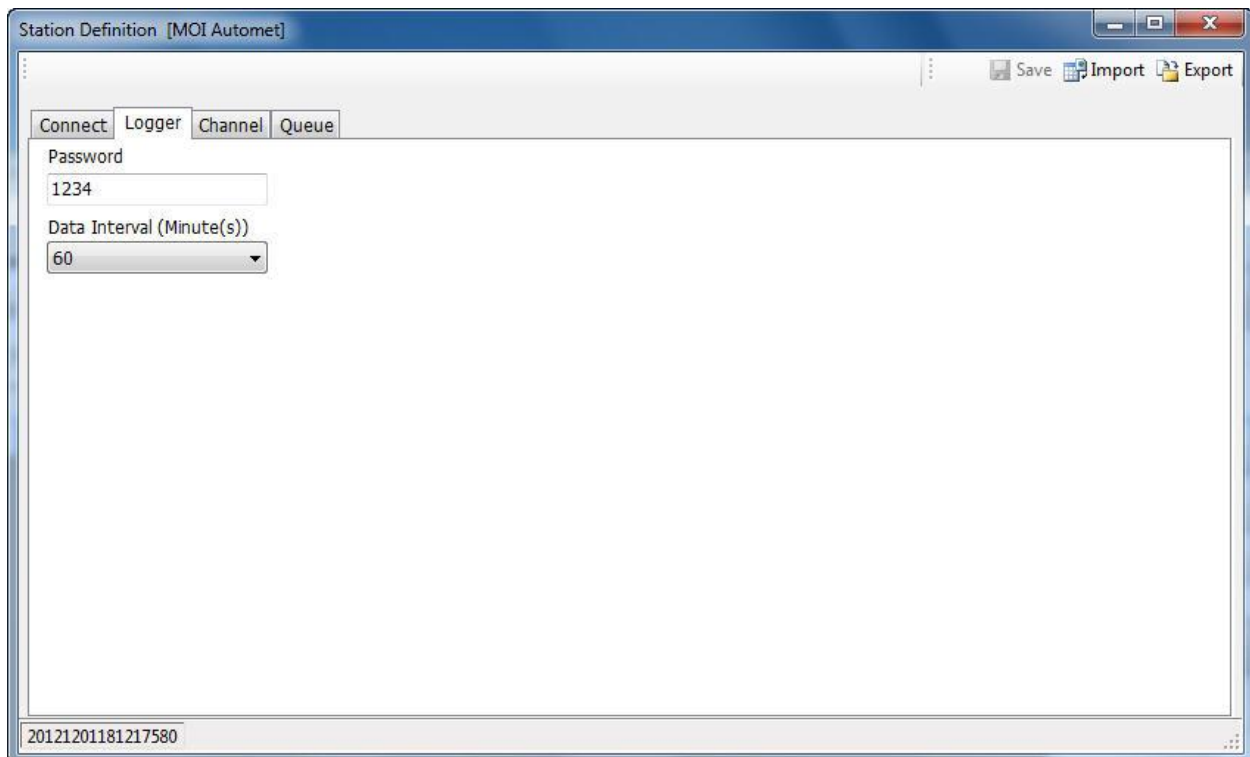
Once the station is defined and saved, the station name and description will appear in the station selection drop down list on the main page. If you later decide you wish to change the name of your station, you may return to this screen and modify it. If you have a \*.ini setup file or

would like to copy an existing station as a starting point, select the  Import button on this tab to import the channel configurations at this time. Once your station is fully defined, press the  Save button to save your setup. You may now select the  Export button on this tab to archive it for future use.

Air Plus will not import Micro Met Plus 2.x.x \*.ini setup files.

### 3.1.2 Logger Tab


Air Plus provides the ability to remotely perform certain functions on your data logger that require a password to access. The default password for Automet data loggers is F1, F2, F3, F4 on the data logger keypad and can be changed to any four key combination of the F1-F6 keys on the data logger. In order for Air Plus to be able to perform password protected features, the password must be entered in the password field on this tab. The password is represented here by using the single digit 1 for F1, 2 for F2, and so on. For example, the default password would be shown in this field as 1234.

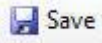


The Data Interval should be set to match the data interval of the data logger. It is only used to label the x-Minute text on the Browse Data screen. It has no effect on any calculation but if it doesn't match your logger, Air Plus will display your data oddly. For example, let's say your data logger is collecting ten minute data. If you select 10 here, you will see your data listed every ten minutes exactly as it was collected. If you select 60, you'll only see the last 10 minute averaging period collected each hour and you'll be missing the other 5 data sets. If you select 1, you will see nine rows of data saying "None" and then every tenth entry will be the 10 minute average.

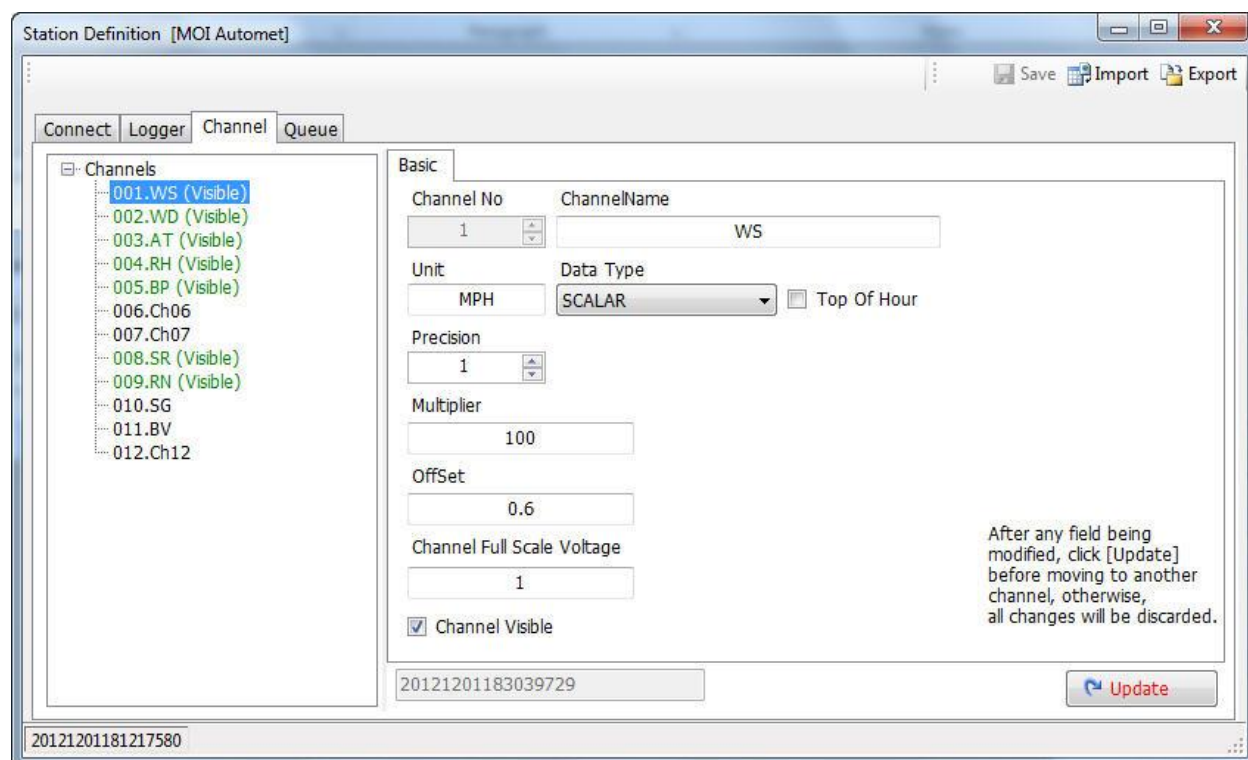
### 3.1.3 Channel Tab

This screen is used to configure your monitoring channels. If you have imported a station configuration file, this screen should already be filled in for you. If not, you will manually need to configure each channel for your system.

To manually configure these channels refer to Appendices A through D. Place a check in the “Visible” column for each channel you would like to have displayed throughout the program. Be sure to press the  button to save any changes made to each channel before creating or modifying the next one.

Repeat these steps for each channel to be defined or modified and then press the  button when complete.

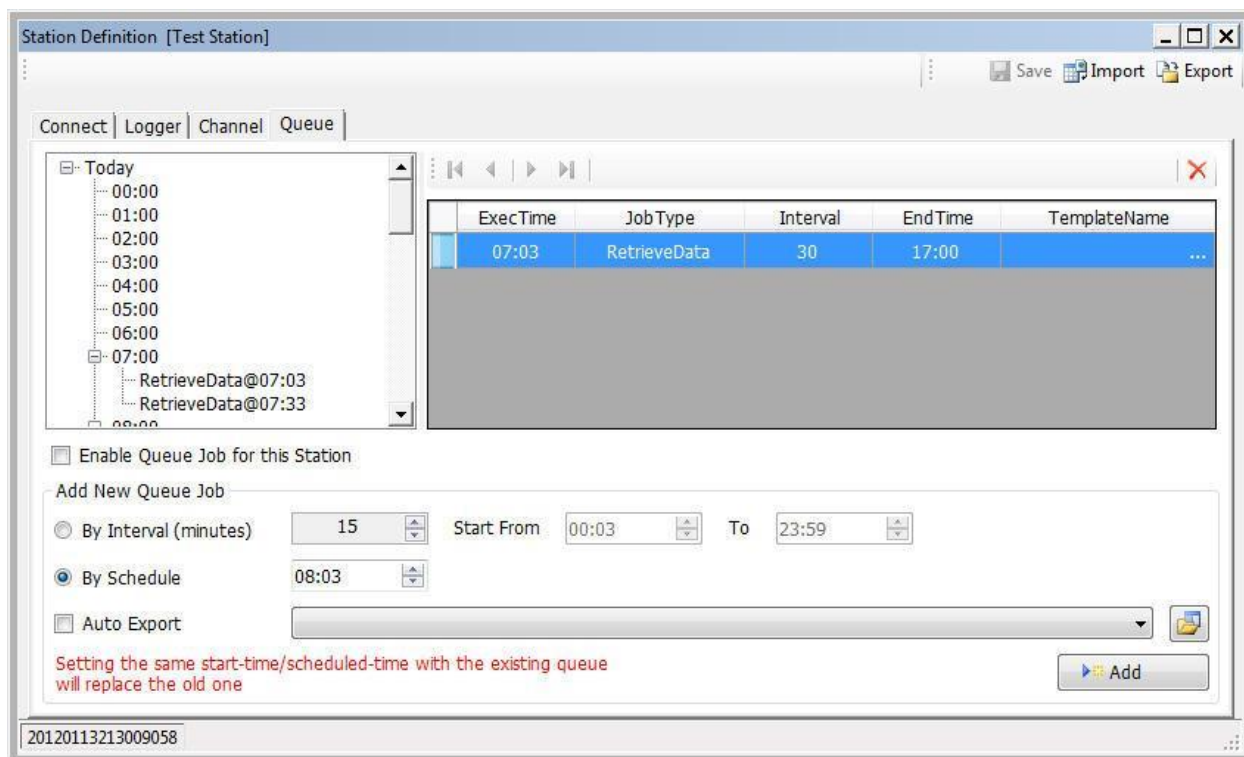
The channel parameters are specific to the type of product you are connecting to. Some products have fixed channels that cannot be changed. See the Appendices at the end of this manual for specific product details.



**Warning:** Always make sure that critical Air Plus channel parameters (Data Type, Multiplier, Offset, and Full Scale Voltage) match the channel parameters of the data logger. This must be done before data is retrieved from the data logger. Failure to do so will cause incorrect data values to be stored in Air Plus.

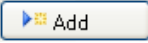
### 3.1.4 Queue Tab and the Auto Export Feature

This is the screen used to create a daily automatic polling queue for your logger. You may set the data retrieval to occur either at specific times or as a repeating event occurring at a set interval. Choose which option you would like to use at the bottom of the screen. For a single daily event, choose “By Schedule” and set the time of day you would like the event to occur. For a recurring event, choose “By Interval” and set the time interval (in minutes) you would like the event to occur. You may also define a window of time in which this event will occur. By default the window is set for an all-day event.



You may also check the Auto Export box if you would like to automate exporting your data to a csv file on your local PC, network location, or ftp server. If you choose this option, you will need to also select the Auto Export profile you wish to use by picking it from the drop down box list to the right of the check box. If there are no profiles yet created, you may create one by using the browse button to the right of the drop down selector. See “Exporting and Importing Data” for more details on creating an Auto Export profile. As part of an Auto Export event, a data download will be performed first; a separate download event does not need to be created.

***Due to variations in clock settings on computers and electronic devices, it is generally not advisable to download hourly data exactly on the hour. It is best to set your download times for a few minutes after the hour to allow for deviations and drift over time.***

Once your event is fully defined, press  and you will see it appear in the box in the top right section of the screen. This box will list all defined events for this station. To the left side of this box, is an expandable tree listing of the events scheduled for today. Please note

that importing another station configuration does not import the Queue setup. The Queue for each station must be individually configured.

Be certain to check the “Enable Queue Job for this Station” check box to activate the queue and

press the  button on the top of the screen to save your events.

To see the complete listing of all automatic daily queue events for all stations on your computer, select the Queue tab on the main screen. This is an excellent place to review your events and check for conflicts in your automated schedule.

### **3.1.5 Notification Tab**

The notifications tab allow users to setup event based notifications for current station. Currently, users may set up three event type notifications along with 3 different send type notifications. Users may setup a new data download notification, a data retrieval failed notification, or a data conditional notification. More detailed information about each type can be found below. Along with these events, there are e-mail, text message, and twitter send types.

## **4 Notifications**

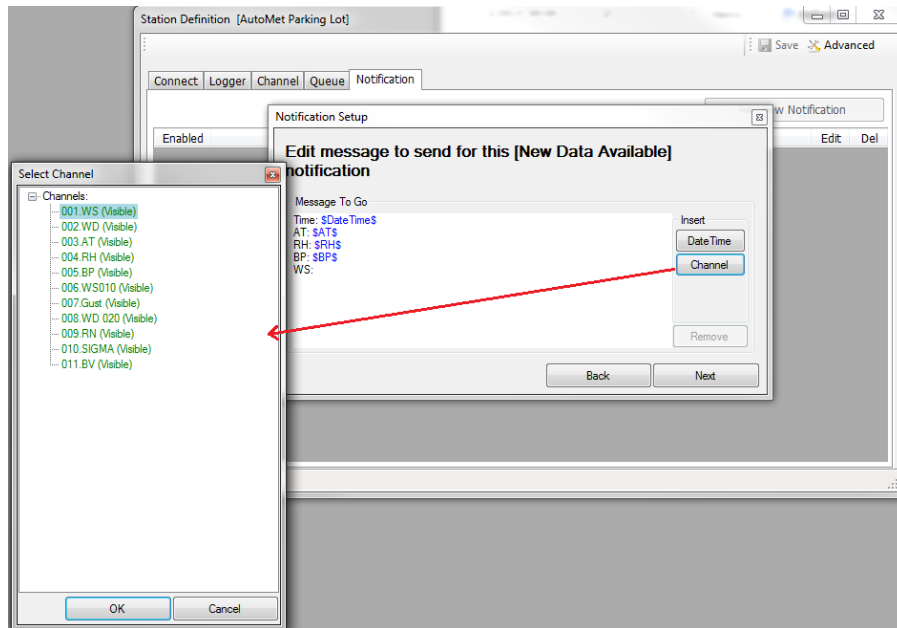
Air Plus allows for user notifications via email, text message, or twitter. Depending on the type of notification, users can setup custom messages to be sent to allow them to know when a notification event has occurred. This section will cover all notification event and send types.

### **4.1 Notification Event Types**

#### **4.1.1 New Data Download**

The new data download notification event occurs when Air Plus successfully downloads new data from the station. This event type is very useful for users who care about the new data as it is downloaded. For example, some users may want to post their current reading to Twitter after a new data download.

Choosing a new data download notification allows the user to setup a custom message to be sent when the notification occurs. As seen in the image below, users can report specific channels, time, and custom text to be sent with their message. In our example below, the time, temperature, humidity, pressure, and wind speed will be posted to twitter.



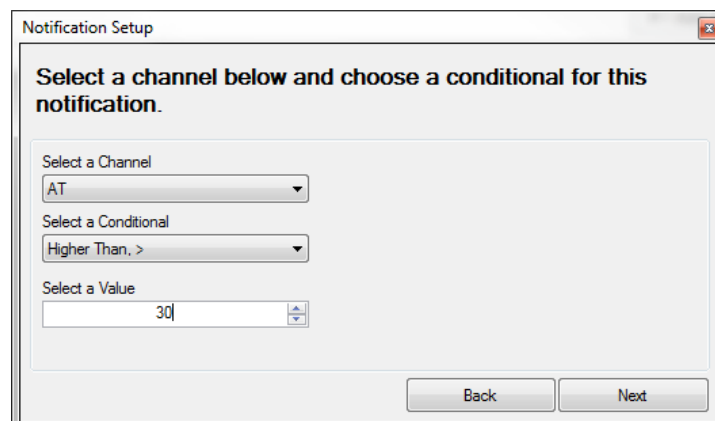
The custom message box allows for special parameters to be displays from the device's current readings at the time of the message. Press the channel button to display the channel list and choose a channel value to be displayed when the notification occurs. Press the date time button to enter the devices time when the data was collected, or press the remove button to delete a special message parameter.

#### 4.1.2 Data Retrieval Failed

The data retrieval failed notification occurs when Air Plus is not able to download data from the station. This is a helpful tool to become aware of any connection problems with the station and can lead to finding a problem with a station early. Most users only download data once a day so having a notification for failure will let the user know they need to try again.

#### 4.1.3 Data Conditional

The data conditional notification occurs when a specific condition is met on a channel for that station. Users may select a channel, choose between greater than, less than, or equal to and enter a conditional value. Once this condition is met, the notification will be sent. In the example below, a notification will be sent when the temperature channel is above 30 degrees Celsius.



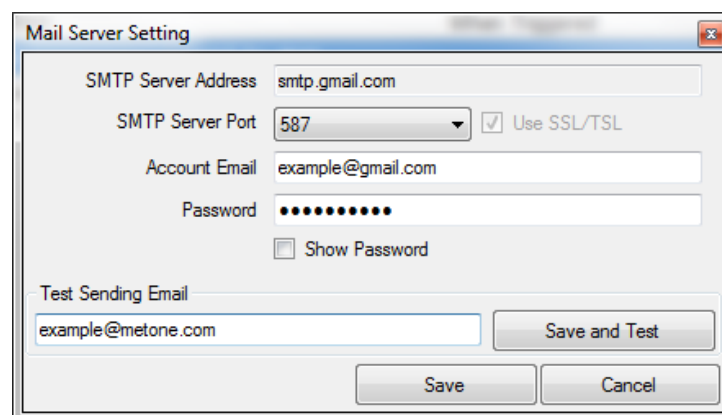
## 4.2 Notification Send Types

### 4.2.1 E-mail

Air Plus allows notifications by e-mail. Setting a notification to this send type will generate an e-mail to the user with a custom message when the notification is triggered. For example, if I create a notification with an event type of new data arrival and a send type of email, then every time Air Plus successfully downloads new data it will generate an email to me with a custom message I set.

In order to be able to send e-mails, two things are required; a Gmail account must be used for sending the e-mails and the user's e-mail address must be entered so Air Plus knows where to send the notification. When adding a new notification, Air Plus's notification wizard will guide you through the necessary steps for setting up a notification. It will ask for the user e-mail to send the notification to and if a Gmail account has not been setup, it will ask for that information too.

Currently, for sending email and text message notifications, a Gmail account is required. If you do not have a Gmail account, please visit <http://www.gmail.com> to create an account. Once you have an account, when prompted for a mail server, enter your username with the @gmail.com tag and password. Leave the server port to the default selection unless you know what you are doing. Once completed, you may enter an email address to send a test email to by pressing the test button, or press save to move onto the next step.



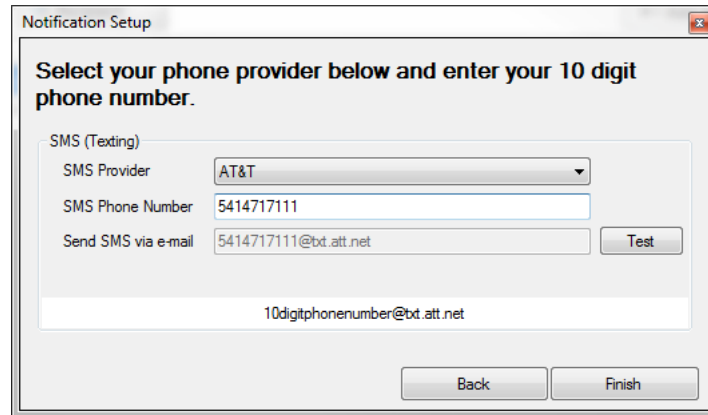
The image shows a 'Mail Server Setting' dialog box. It contains the following fields and controls:

- SMTP Server Address:** A text field containing 'smtp.gmail.com'.
- SMTP Server Port:** A dropdown menu showing '587'.
- Use SSL/TSL:** A checked checkbox.
- Account Email:** A text field containing 'example@gmail.com'.
- Password:** A text field with masked characters (dots).
- Show Password:** An unchecked checkbox.
- Test Sending Email:** A text field containing 'example@metone.com'.
- Buttons:** 'Save and Test', 'Save', and 'Cancel'.

### 4.2.2 Text Message

Air Plus allows notifications by text message. When setting up a notification, choose by text message. Air Plus will then prompt the user for a cell phone provider and a 10 digit cell phone number. If your provider is not in the drop down list, you may use the Custom option to manually enter your provider's formatted email. For example, AT&T's formatted email is [10digitnumber@txt.att.net](mailto:10digitnumber@txt.att.net).





**Notification Setup**

Select your phone provider below and enter your 10 digit phone number.

SMS (Texting)

SMS Provider: AT&T

SMS Phone Number: 5414717111

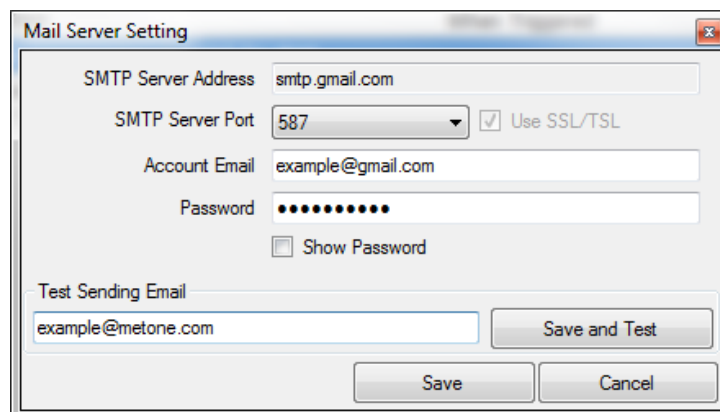
Send SMS via e-mail: 5414717111@txt.att.net

Test

10digitphonenumber@txt.att.net

Back Finish

Currently, for sending email and text message notifications, a Gmail account is required. If you do not have a Gmail account, please visit <http://www.gmail.com> to create an account. Once you have an account, when prompted for a mail server, enter your username with the @gmail.com tag and password. Leave the server port to the default selection unless you know what you are doing. Once completed, you may enter an email address to send a test email to by pressing the test button, or press save to move onto the next step.



**Mail Server Setting**

SMTP Server Address: smtp.gmail.com

SMTP Server Port: 587

☒ Use SSL/TSL

Account Email: example@gmail.com

Password: .....

☐ Show Password

Test Sending Email

example@metone.com

Save and Test

Save Cancel

#### 4.2.3 Twitter

Air Plus allows for pushing notifications to twitter. This is useful for users who would like to post their current air particulate readings to their twitter account. To setup a notification to twitter, when adding a new notification, choose by twitter.

Press the Create Key button to begin adding your twitter account, or if you have already added your account your key will be displayed in the text boxes and you may press the next button to continue.

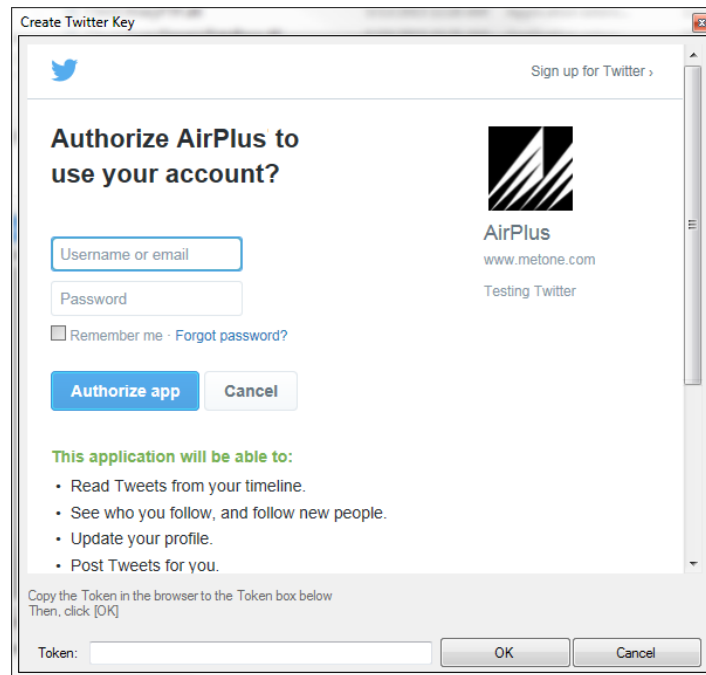
Notification Setup

Please click on the [Create Key] button, log in with your Twitter credentials below. Once you are logged in a verification code will be given to you. Enter this code in the box below and press 'Next' to continue.

Twitter

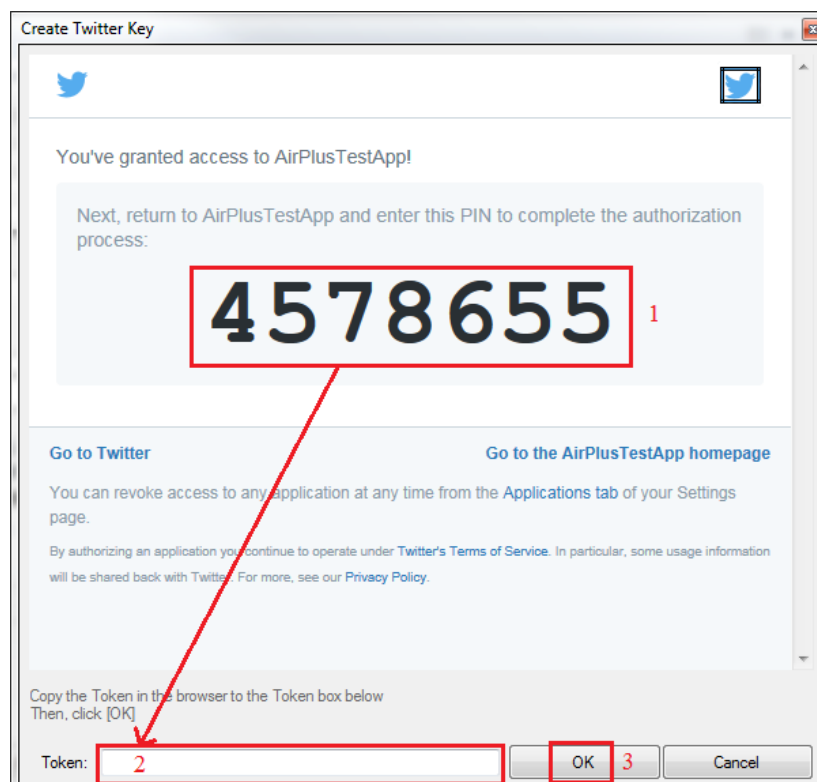
Key Not Created Yet

When prompted, enter your twitter credentials and press the Authorize App button to allow Air Plus to use your twitter for posting notifications.



The screenshot shows a window titled "Create Twitter Key" with a Twitter logo in the top left. The main heading is "Authorize AirPlus to use your account?". Below this are input fields for "Username or email" and "Password", a "Remember me" checkbox, and a link for "Forgot password?". There are two buttons: "Authorize app" (highlighted in blue) and "Cancel". To the right is the AirPlus logo and text: "AirPlus", "www.mefone.com", and "Testing Twitter". Below the buttons, it says "This application will be able to:" followed by a list of permissions: "Read Tweets from your timeline.", "See who you follow, and follow new people.", "Update your profile.", and "Post Tweets for you." At the bottom, it says "Copy the Token in the browser to the Token box below. Then, click [OK]". There is a "Token:" label followed by a text box and "OK" and "Cancel" buttons.

Once authorized, a PIN number will be generated to allow Air Plus to access your twitter account. Copy this number from the window and paste it in the token text box below. Press ok to save and return to the notification wizard.




The screenshot shows the same "Create Twitter Key" window, but now it says "You've granted access to AirPlusTestApp!". Below this, it says "Next, return to AirPlusTestApp and enter this PIN to complete the authorization process:". A large PIN "4578655" is displayed in a box, with a red "1" next to it. Below the PIN, there are two links: "Go to Twitter" and "Go to the AirPlusTestApp homepage". A red arrow points from the PIN box to the "Token:" text box at the bottom, which now contains the number "2". The "OK" button is highlighted with a red box and a red "3" next to it. The "Cancel" button is also visible.

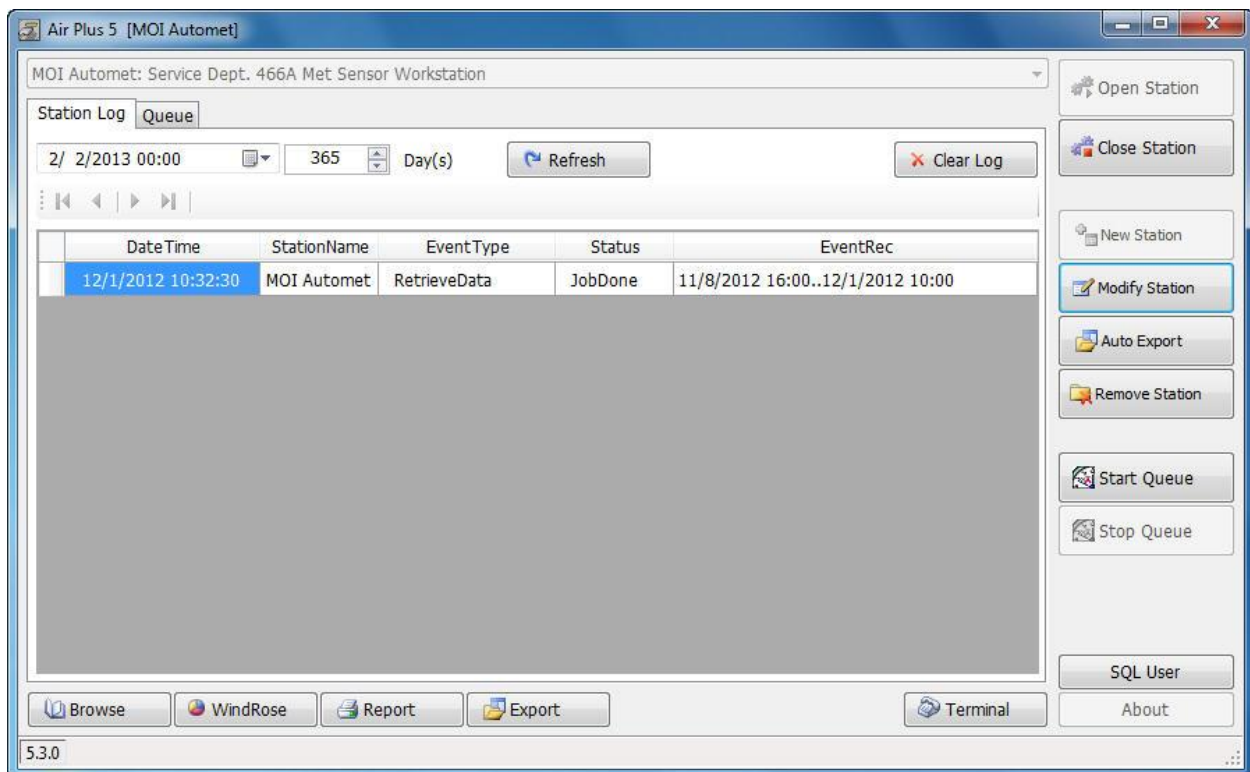



## 5 Data Retrieval

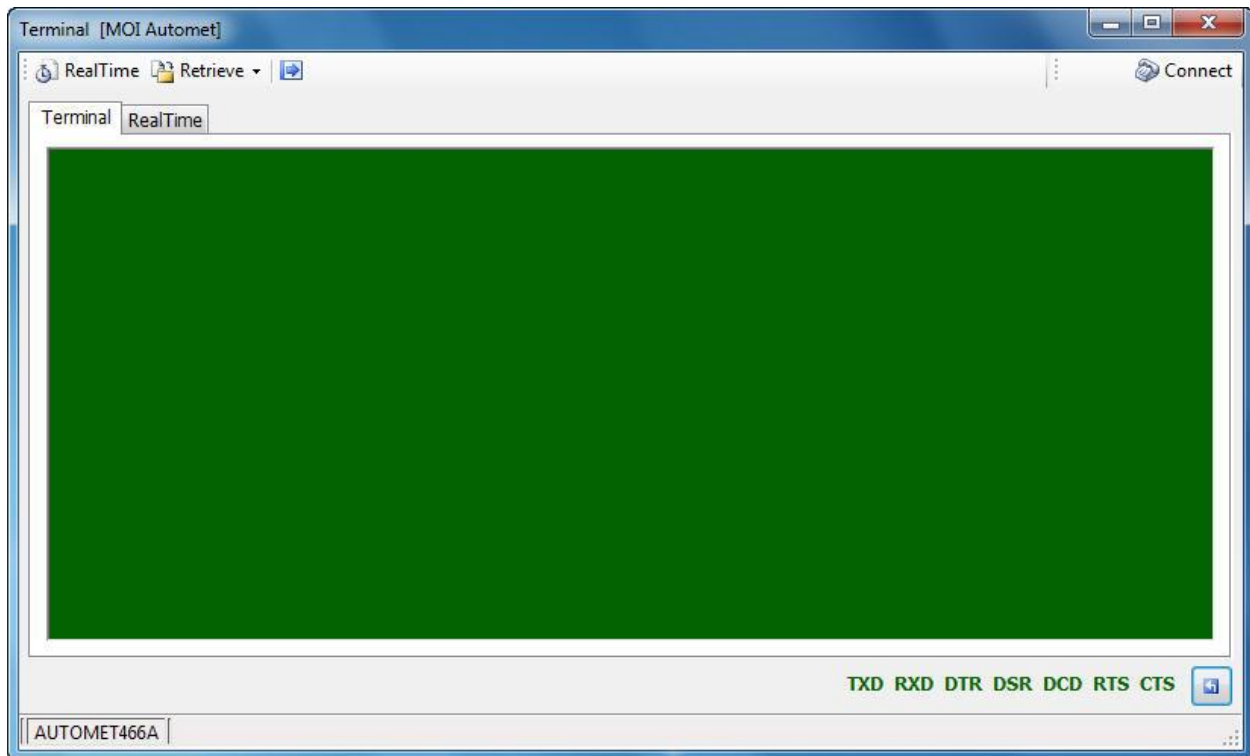
Once the station has been configured, and the equipment has been installed, data retrieval may begin. There are three methods of data retrieval that can be done using the Air Plus software, manual download, automatic download (the automatic polling queue), and real time observation. The descriptions below will all assume a direct RS-232 link exists between the data logger and the computer running the Air Plus software.


### 5.1 Manual Data Retrieval

Manual data retrieval is the most basic method of collecting stored data. From the main screen, select the station from which you wish to retrieve data and press the  **Open** button. This will activate the station for data collection and reading.



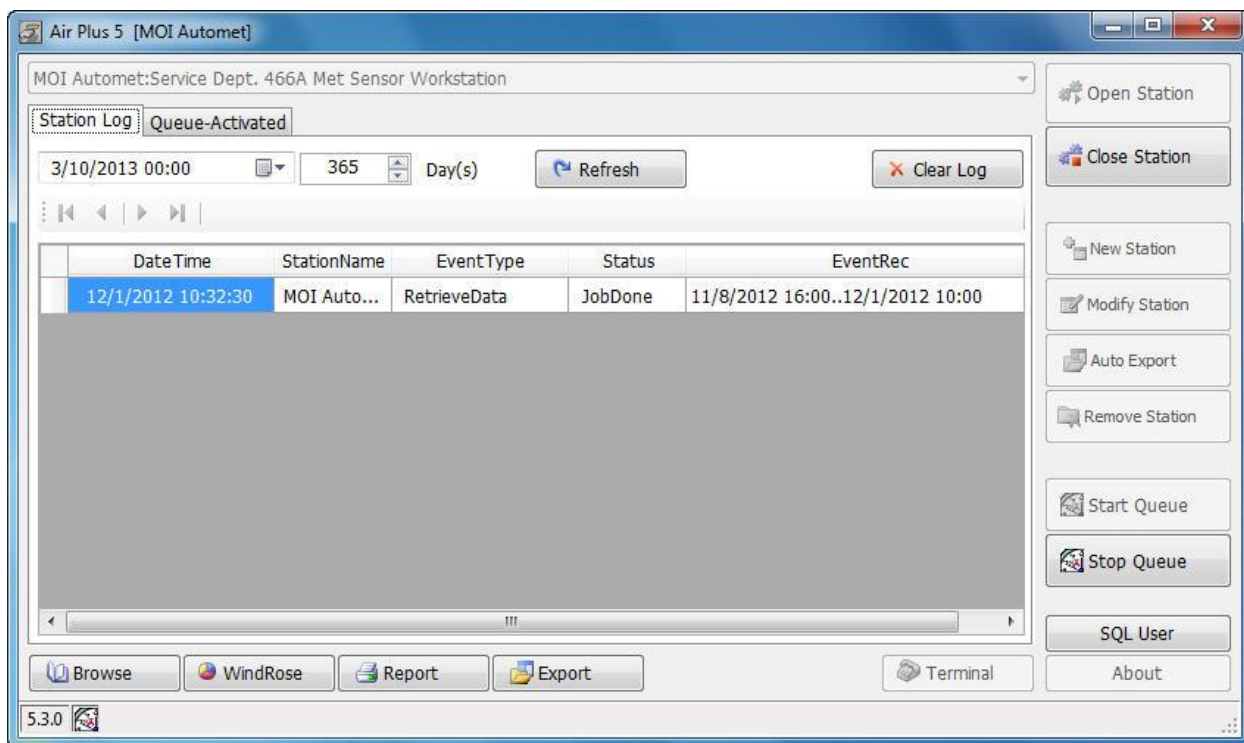
Pressing the  Terminal button will take you to the terminal screen that will allow you to interact directly with the data logger.

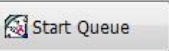


On this screen press the  Retrieve button and then select whether you wish to download all data stored in the data logger or just the new data since the last time data was retrieved from this data logger. The data will now download and be automatically stored in your database. Close this window to return to the main screen and see your data.

## 5.2 Automatic Data Retrieval Using the Queue Feature

Once your automatic polling queue is setup as described in the “Queue Tab and the Auto Export Feature” section, you must activate the automatic polling sequence.



On the main screen, press the  button located on the right hand side of the window. This will activate all enabled queue events for all configured stations and allow them to run as scheduled. As shown in the screen shot above, when the automatic polling queue is active, you will not be able to add, remove, or modify stations. You will also not be able to adjust the Auto Export settings or access manual communications.

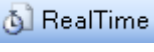

Press the  button to deactivate all automatic events and prevent them from running.

On this window, you may select the Queue tab to see which queue events have successfully run. Any event marked with a green check in the check box has been completed.



**Note: When the Queued method of data retrieval is active, you will see this icon in the lower left corner of the main screen.**

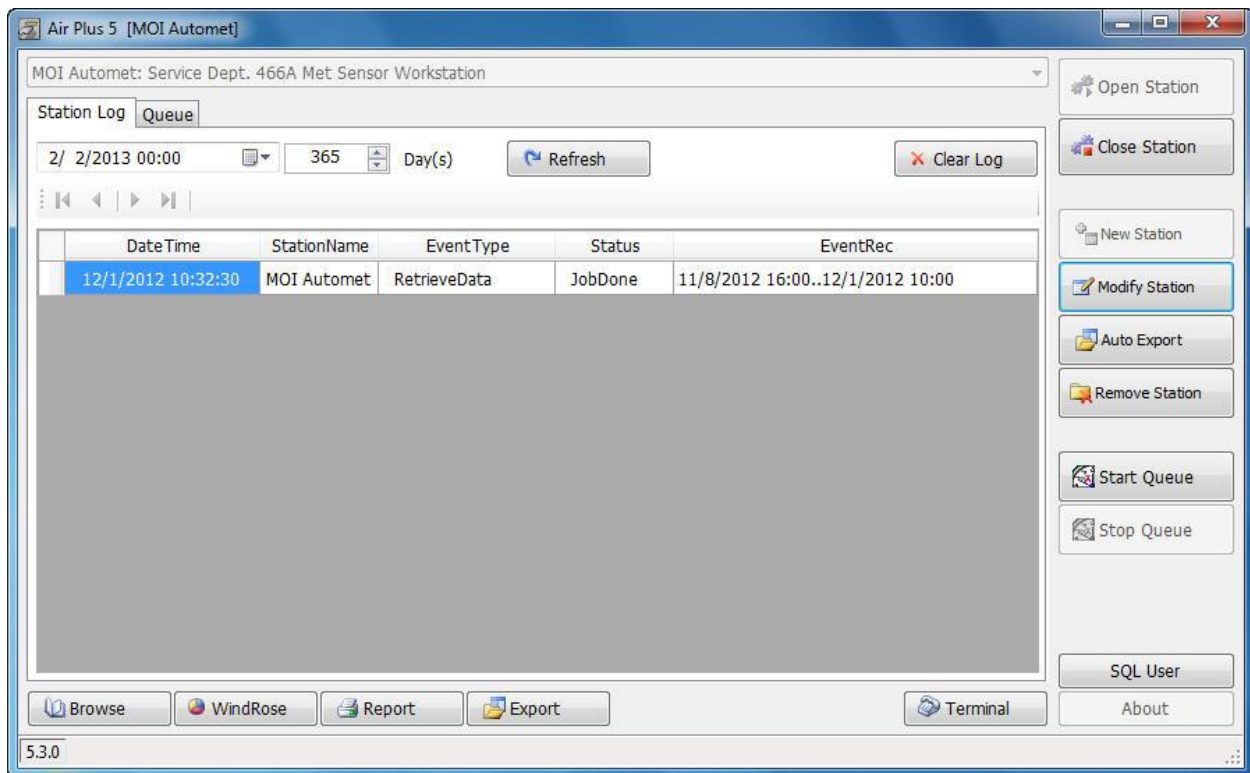
## 5.3 Real Time Monitor

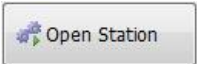
Enter the Terminal screen as described in section 3.1 and select the Real Time tab. On this screen press the  button. The data logger values will now be displayed in real time, being updated every ten seconds. Press the  button (only viewable when connected to the data logger) to cancel real time monitoring.

## 6 Viewing Data

Once data has been collected from the data logger, it is now possible to view graphs and charts of the collected information. You may also create printed reports, or export selected portions of the data to a \*.csv (comma separated value) file type for use in other programs, such as Microsoft Excel.

### 6.1 Single Channel Data in Table Format

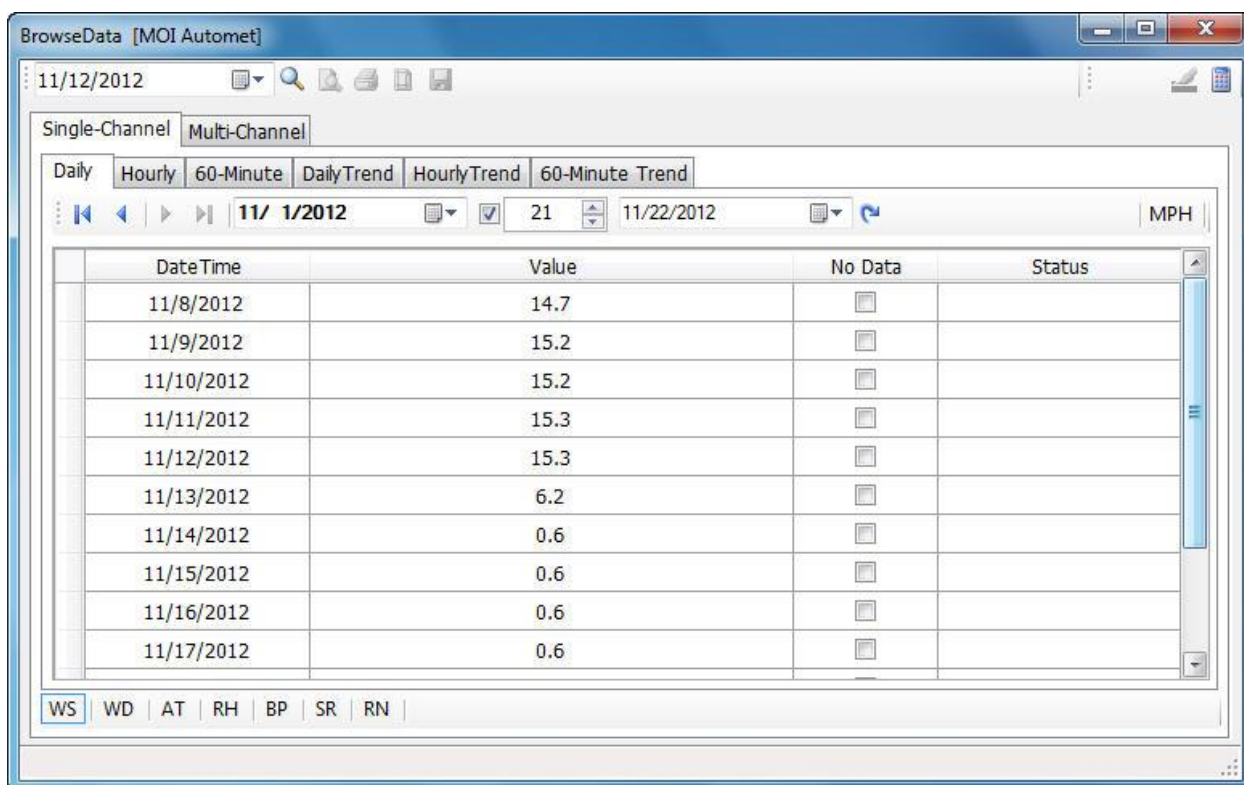


From the main screen, select a station from the dropdown list and press the  button. This will activate the station for data collection and reading.

Press the  button in the lower left corner to enter the browse data screen.



### 6.1.1 Daily Average Tab



The Daily Average tab is selected when you first enter the Browse Data window. The Daily data is calculated from the raw data logger data set (shown above as the tab labeled “60-Minute”).

The default behavior for this screen is to show the daily averages for the previous one year interval from today’s date. To view Hourly data or the raw data logger interval data, select the Hourly or Custom Interval tabs, respectively.

You can set the date ranges for the data sets to be displayed on each tab separately. This is explained in more detail in the “Selecting a Date Range” section.

The date field in the top left corner of the Browse Data screen allows you to enter a specific date to jump to in your data table.

The trend charts are created using the data that is chosen to be displayed on the Daily, Hourly, and Custom Interval tabs and are discussed in more detail in the “Single Channel Trend Reports” section.

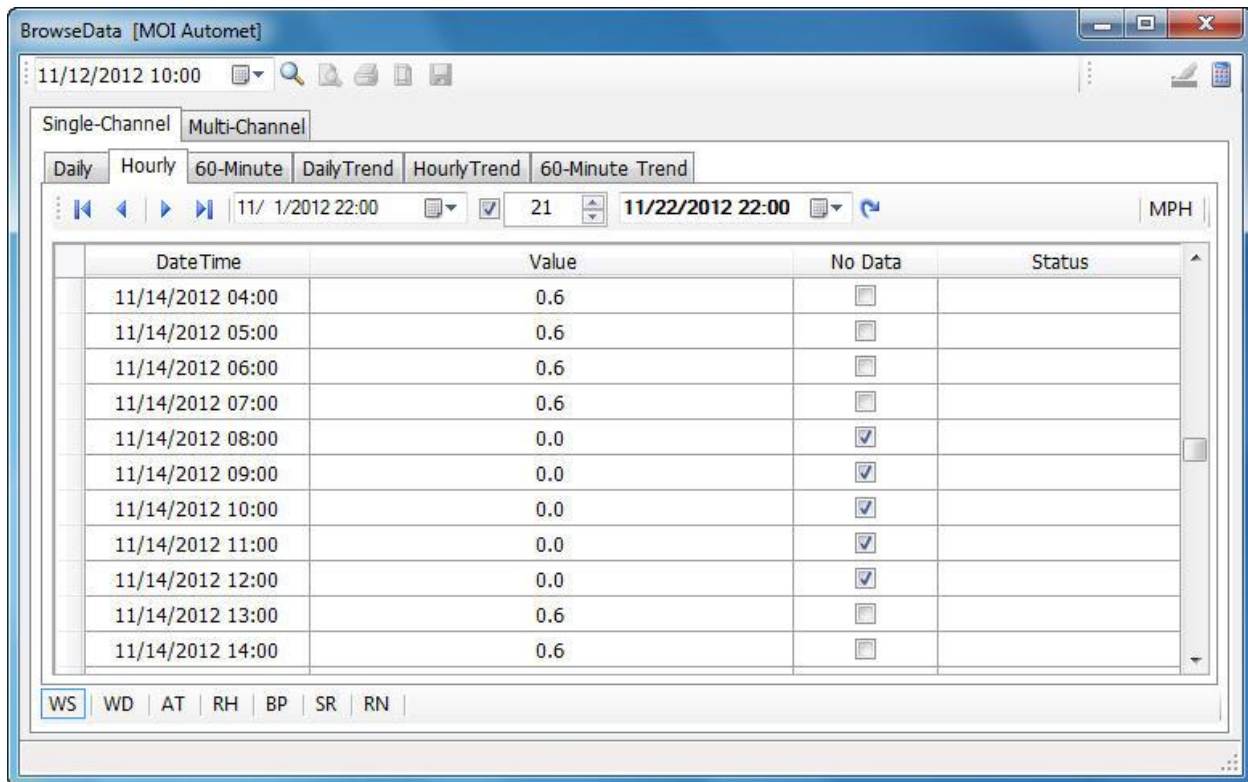
Across the bottom of the screen are the parameter selection tabs. Select the parameter you wish to view and that data will be displayed in the table directly above the tabs.

The No Data check boxes indicate either days of missing data or data that has been marked as an Outlier and should be ignored. See the “Outliers” section for more details.

Data points that appear on this tab marked as No Data will show as 0 value on a printed report and will be flagged with a ? to indicate it is not reliable and should be ignored.

The Status column will indicate alarming conditions in the data logger. The codes in this column are product dependent. See Appendix E for a complete listing of codes by logger type.

## 6.1.2 Hourly Average Tab



This tab is similar to the daily average tab, but it displays the hourly averages. As such, the date selection range now also includes a time stamp.

The default value for this screen is to show the hourly averages for the previous one month interval from today's date.

In the screen shot above you can see there was either no data collected by the logger for Wind Speed from 08:00 to 12:00 or the data has been determined to be invalid and marked as an Outlier on the Custom tab. See the "Outliers" section for more detail.

Data points that appear on this tab marked as No Data will show as 0 value on a printed report and will be flagged with a ? to indicate it is not reliable and should be ignored.

### 6.1.3 Data Logger (or Custom) Average Tab

DateTime	Value	Outlier	Status
11/14/2012 04:00	0.6	<input type="checkbox"/>	
11/14/2012 05:00	0.6	<input type="checkbox"/>	
11/14/2012 06:00	0.6	<input type="checkbox"/>	
11/14/2012 07:00	0.6	<input type="checkbox"/>	
11/14/2012 12:00	193.6	<input checked="" type="checkbox"/>	
11/14/2012 13:00	0.6	<input type="checkbox"/>	
11/14/2012 14:00	0.6	<input type="checkbox"/>	
11/14/2012 15:00	0.6	<input type="checkbox"/>	
11/14/2012 16:00	0.6	<input type="checkbox"/>	
11/14/2012 17:00	0.6	<input type="checkbox"/>	

This tab displays the raw data directly collected from the data logger. It is also referred to as the Custom or Aux tab. The label on it indicates the data averaging interval in the logger and it will vary depending on the interval setting selected on the Logger Tab when defining or modifying your station.

The default value for this screen is to show the data logger averages for the previous two week interval from today's date.

In the screen shot above, you can see there was no data collected from 08:00 to 11:00 and that the data collected at 12:00 is obviously not correct. The 12:00 entry has been marked as an Outlier and will be ignored when calculating the hourly and daily average data sets. See the "Outliers" section for more details.

#### 6.1.4 Selecting a Date Range

Located directly above the data table on the Daily, Hourly, and Custom tabs is the date range selection. The left hand date entry field is the starting date for the data you wish to display. By selecting the drop down arrow, a calendar box (shown right) will open allowing you to pick the year, month and day of your choice. You may browse through the months using the left and right arrows in the top of the dialog box or click on the name of the month and the year fields to manually choose these values.



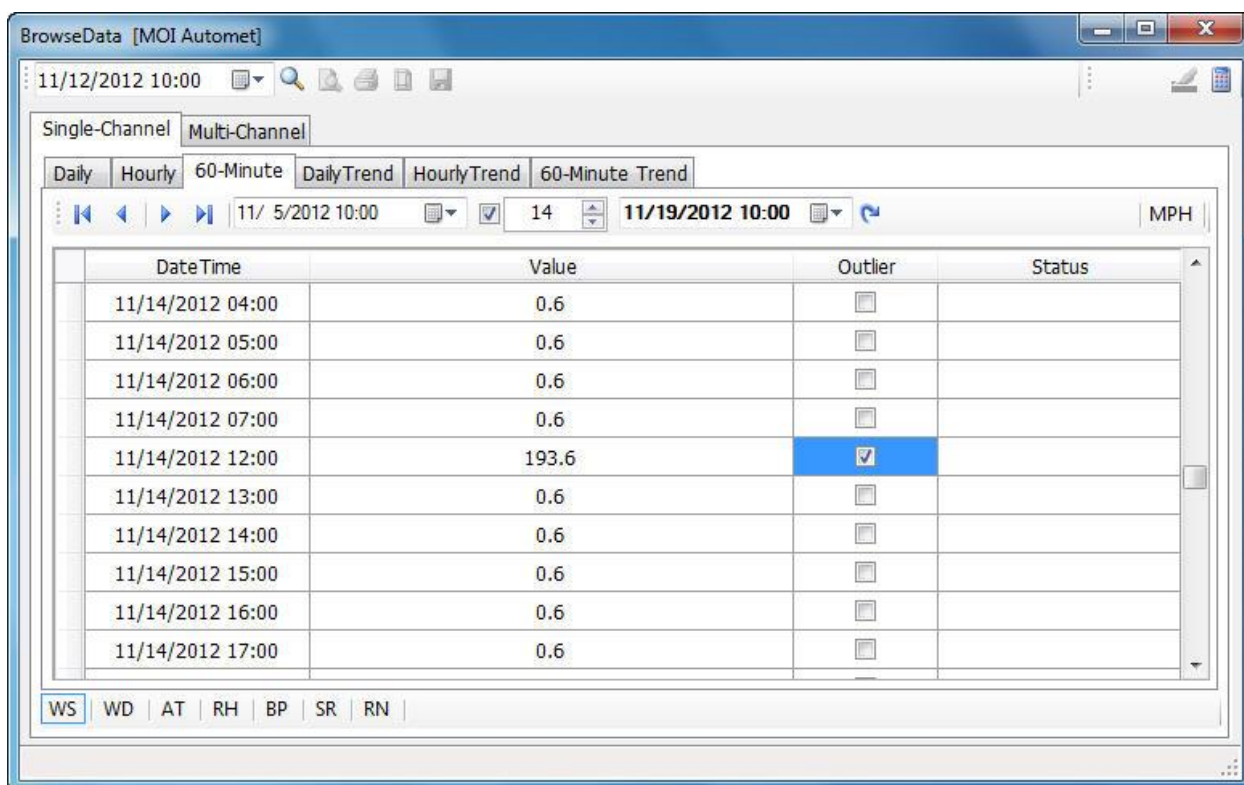
Enter the number of days you wish to view in the box between the two date fields and check the check box next to it. This will automatically fill in the ending date in the right hand date box that many days after the start date. For example, checking the box and entering 365 in the center field will set the date range to display one year from the starting date.

This same method also works to specify a start date with a known ending date. Simply enter the end date in the right hand box and the center number box will now set the starting date that many days before the end date.

You may also choose to leave the center check box unchecked and manually enter the starting and ending dates in their respective entry fields.

Click the refresh table button on the far right to display the chosen daily averages in the data table.


## 6.1.5 Outliers



The Custom tab provides a column of checkboxes labeled as Outlier. The intent of these boxes is to provide a means to ignore invalid data when calculating the hourly and daily averages.

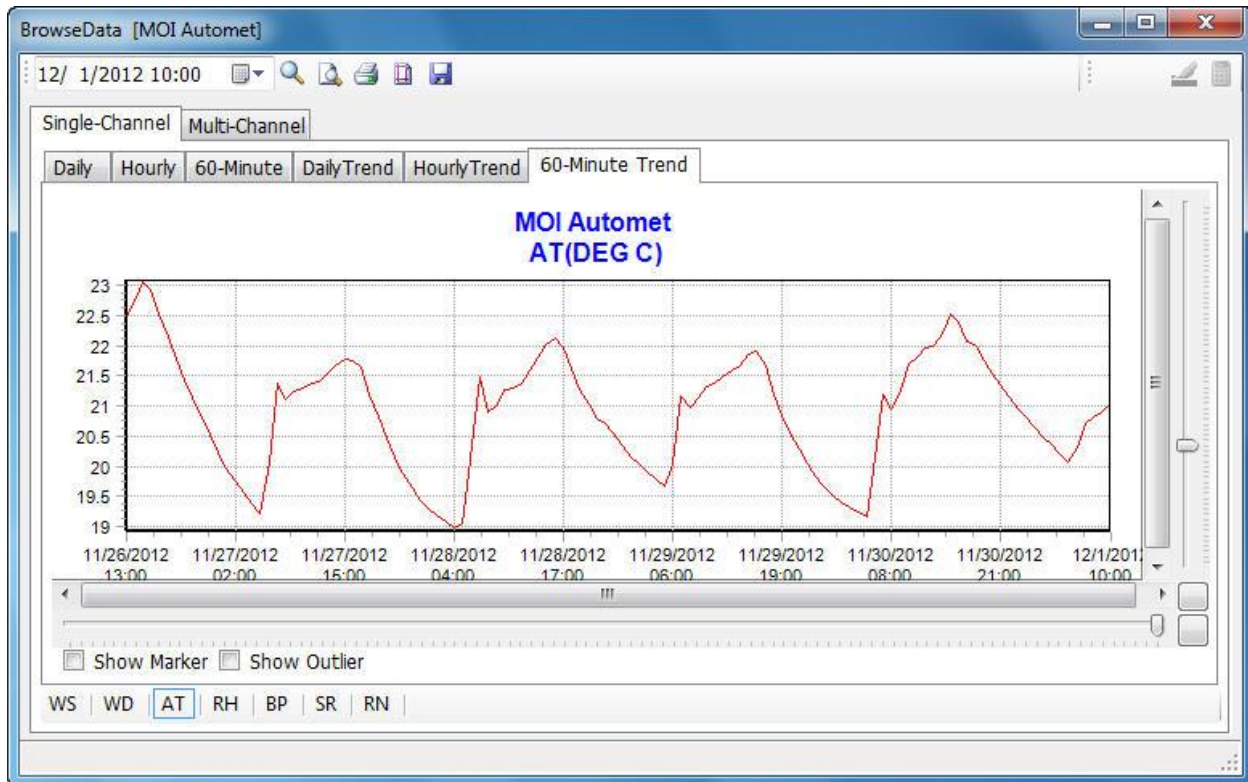
In the screen shot above, you can see the data collected at 12:00 is obviously not correct. The Outlier box has been checked which marks the point as invalid and it will be ignored when calculating the hourly and daily average data sets. This will only invalidate this one data point. All other data for Wind Speed will still be considered in the averages. All other data for 12:00, such as Wind Direction, Ambient Temperature, etc. will still be considered valid and used in their respective average calculations. If you wish to invalidate all data points for a specific time, each parameter must be marked individually.

If all of the data points that are averaged together to create the hourly average are marked as Outliers, then the hourly average will be marked as No Data. The daily average calculation is the same way. This means as long as there is at least one valid data point in the set, the hourly and daily averages will still be able to be calculated.

Once all of the desired changes have been made to the Outlier column, press the  button in the upper right hand corner of the screen. This recalculates the averages to adjust for the changes you have made. If you forget to press this button, when you exit the Browse Data screen you will be warned that the averages need to be recalculated for the changes to take effect.

Data points marked as Outlier will show as 0 value on a printed report and will be flagged with a ? to indicate it is not reliable and should be ignored.

## 6.2 Single Channel Trend Reports



The trend chart tabs automatically create the applicable trend chart from the data range selected on the corresponding average tab. The default vertical and horizontal scaling settings are generated using the maximum and minimum values in the chosen data set.

The dark sliders closest to the trend chart allow you to scroll through the data to view any particular section. The light sliders to the outside of the data sliders allow you to rescale the trend chart, zooming out to show a more points or zooming in to show greater detail. The white buttons below and to the right of the data and scaling sliders reset the four trend chart sliders to the default values.

Across the bottom of the screen are the parameter selection tabs. Select the parameter you wish to view and that trend chart will be displayed.

Trend charts may be printed using the print features located at the top of the screen.



### 6.3 Multi-Channel Data

The multi-channel tab allows viewing of multiple parameters at the same time. This can be a very useful tool when comparing data from different sensors of the same type (such as wind speed at various heights on a tower) or to see what was happening with one parameter during a change in another.

BrowseData [MOI Automet]

11/10/2012 22:00

Single-Channel Multi-Channel


Table Trend

10/20/2012 22:00 42 12/ 1/2012 22:00

DateTime	AT	Outlier	RH	Outlier	Status
11/10/2012 07:00	21.0	<input type="checkbox"/>	34	<input type="checkbox"/>	
11/10/2012 08:00	20.5	<input type="checkbox"/>	35	<input type="checkbox"/>	
11/10/2012 09:00	20.7	<input type="checkbox"/>	35	<input type="checkbox"/>	
11/10/2012 10:00	20.5	<input type="checkbox"/>	35	<input type="checkbox"/>	
11/10/2012 11:00	20.5	<input type="checkbox"/>	35	<input type="checkbox"/>	
11/10/2012 12:00	20.6	<input type="checkbox"/>	35	<input type="checkbox"/>	
11/10/2012 13:00	20.7	<input type="checkbox"/>	35	<input type="checkbox"/>	
11/10/2012 14:00	20.8	<input type="checkbox"/>	36	<input type="checkbox"/>	
11/10/2012 15:00	20.7	<input type="checkbox"/>	35	<input type="checkbox"/>	
11/10/2012 16:00	20.7	<input type="checkbox"/>	35	<input type="checkbox"/>	

☐ Daily ☐ Hourly ☒ 60-Minute WS WD ☒ AT ☒ RH BP SR RN

The multi-channel tab is very similar to the single channel tab in terms of operation. The main difference is in the bottom of the screen. You are not restricted to one parameter selection but may select multiple parameters to view simultaneously. Once you have selected the

parameters, the data set (hourly, daily, etc.), and the date range you need, pressing the  refresh button to the right of the date range selection will display the data selected in the data table.




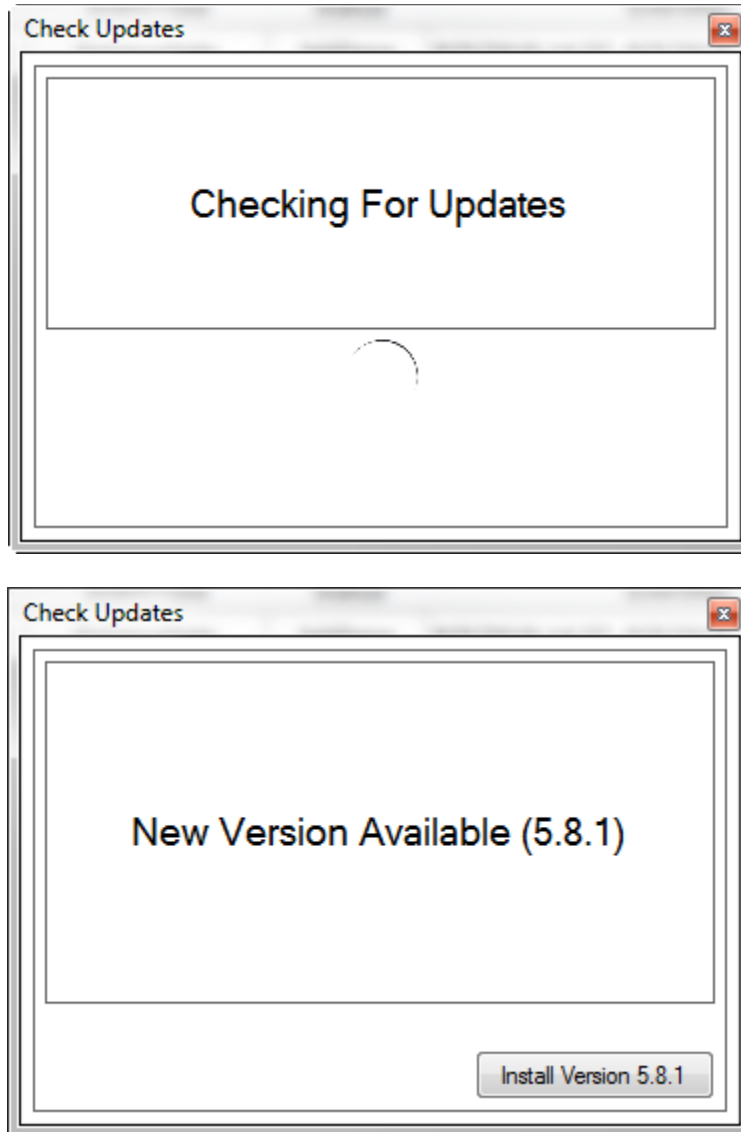
The multi-channel trend chart behaves in the same fashion as the single channel trend chart with the exception that it displays more than one channel of information.

To change the data displayed in the multi-channel table or trend chart, you must press the refresh button to the right of the date range selection on the table tab. This is true for any change you wish to make, whether it is to display hourly instead of daily averages or to display different parameters. The data set will not update until the refresh button on the table tab is pressed.



## 7 Updates

Air Plus features a built-in update feature in which Air Plus can check online for the latest updates for Air Plus. From the main screen press the  button. This will bring up the check for updates dialog in which if there is an update available the user will have the option to update.



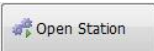

Press the  to update Air Plus to the latest version.

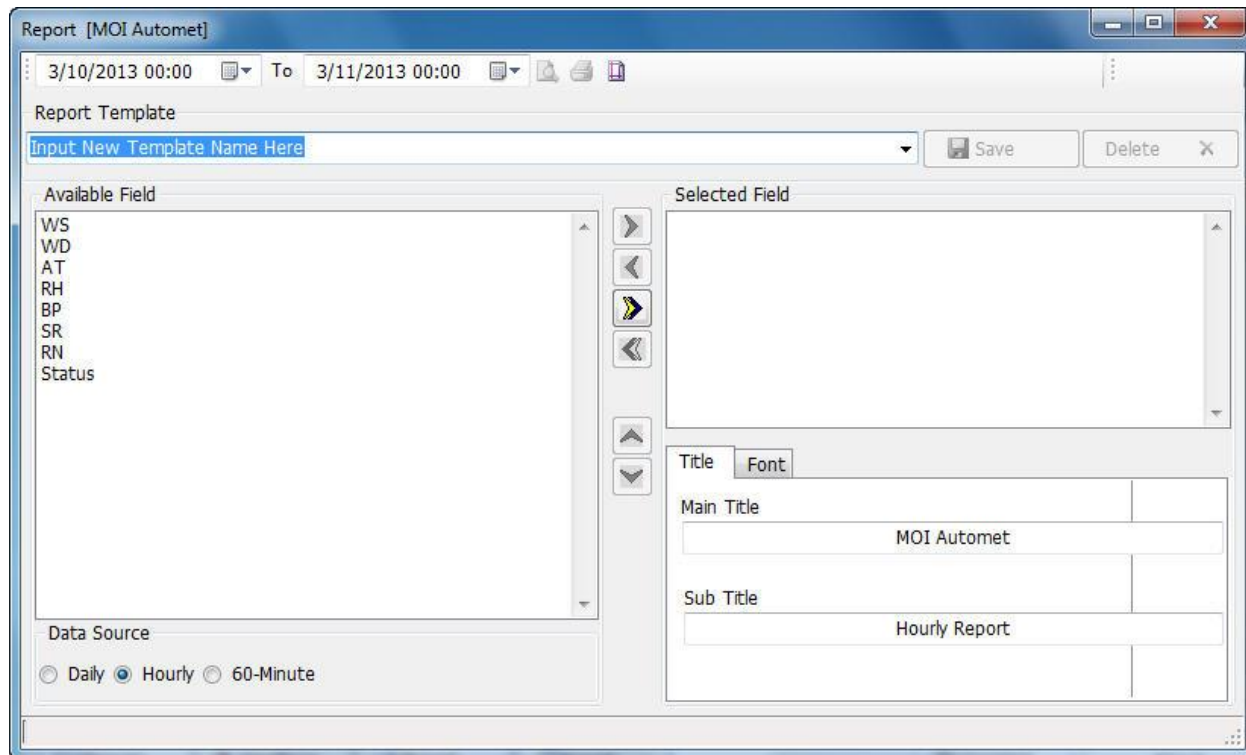
## 8 Printed Reports

The Air Plus software has the ability to print a customizable range of data. The reports may be created to display any of the desired fields of data in any date range that data exists.





## 8.1 Creating Reports



From the main screen, select the station from which you wish to view data and press the

 button. This will activate the station for data collection and reading. Press the  button near the bottom center portion of the window. This will bring up the report screen.



At the top of the screen select the starting and ending date ranges in the date selection fields. If you are printing hourly or shorter averages, you may also manually type in the time of day you wish to include in your report.

You may now select which parameters you would like to include in your report. In the Available Field frame, select the parameters that you wish to print. You may hold down the CTRL key to select multiple entries. Pressing the  (located between the Available Field and the Selected Field frames) will move your highlighted parameters to the Selected Field frame. Any parameter listed in the Selected Field frame will be printed on the report. Pressing the  will move all parameters from the Available Field frame to the Selected Field frame. You may also use the  and  to remove items from the Selected Field frame.

The parameters in the Selected Field frame will be printed left to right on the printout, with the top of the list being printed first. If the parameters are not listed in the preferred print order, it is possible to rearrange them. Highlight a parameter in the Selected Field frame and then use the  and  located in the center of the screen to change the position of that parameter in the list of items being printed.

The main heading for your report and a sub heading description may be entered in the lower right corner of the report screen. The default setting is for the Station Name to be the report

main heading and the sub heading is blank. The font sizes and types for all of the text on the report may be changed on the Font tab in the lower right corner.

Once your report is configured, it may be printed using the print features located at the top of the screen.

All data points that are flagged as No Data or Outlier will show as 0 value on a printed report and will be flagged with a ? to indicate it is not reliable and should be ignored.

## 8.2 Saving Report Templates

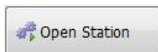
You may save the report configuration as a Report Template for rapid access in the future. Simply type the name of the template in the Report Template field and press the Save button located to the right of the field. The drop down arrow on the right hand side of this field allows quick access to all saved templates. Outdated templates may be deleted by selecting them and pressing the Delete button located to the right of the Save button.

## 9 Wind Rose Reports

The Air Plus software also has the ability to print a wind rose plot from the collected data. This report is often required by agencies reporting data to the EPA and can be created very simply with Air Plus.

### 9.1 Creating Reports

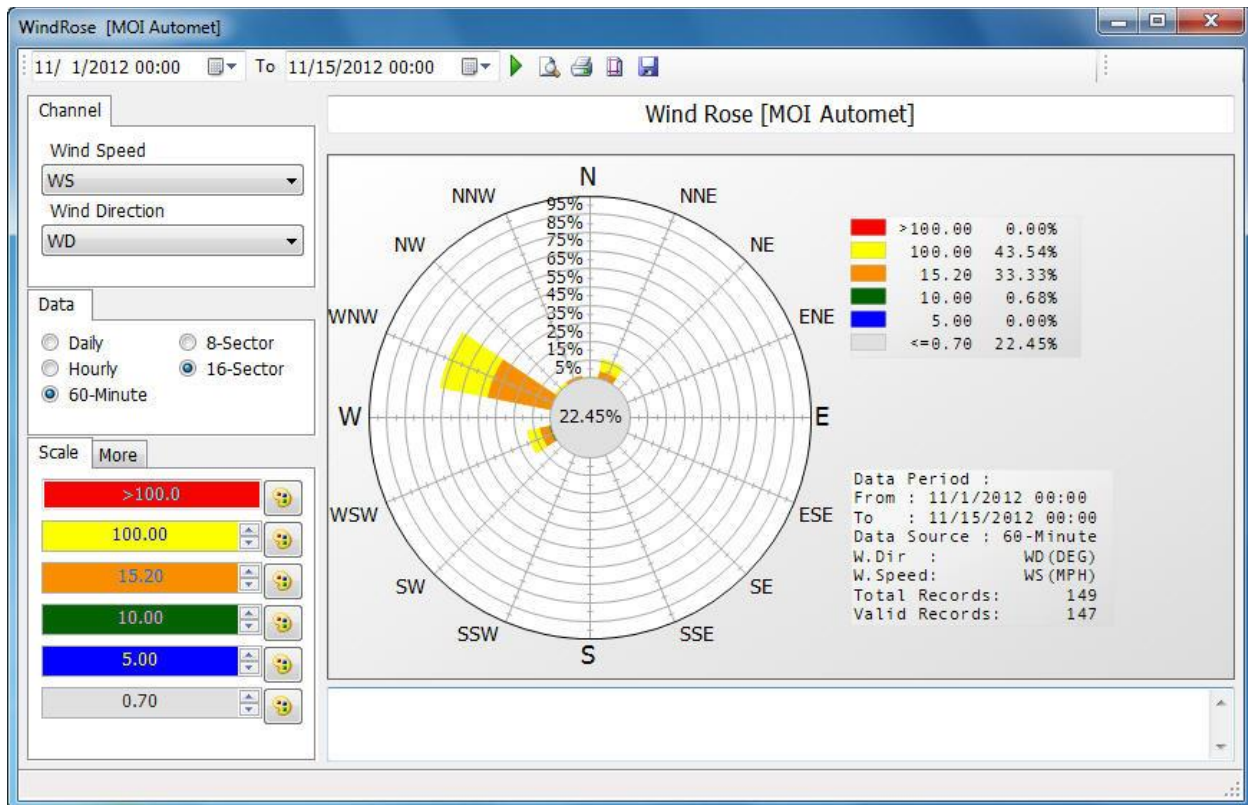
From the main screen, select the station from which you wish to view data and press the



button. This will activate the station for data collection and reading. Press the



button near the bottom center portion of the window. This will bring up the wind rose screen.



At the top of the screen select the starting and ending date ranges in the date selection fields. If you are printing hourly or shorter averages, you may also manually type in the time of day you wish to include in your report.

The wind speed and wind direction channels are selected by default. If there are multiple wind speed and/or direction channels, be certain the correct channels are selected for display. Time intervals, such as daily, hourly, etc. are selected in the Data tab located underneath the Channel tab. This section also allows you to choose between a 16 sector plot and an 8 sector plot.

Once your date range, channels, and data type are selected, press the green arrow button to the right of the date range selection fields to generate the report.

The title of the report may be changed if desired. Simply modify it in the title block above the plot so it appears as you wish it to be. It is the station name by default.

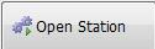
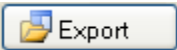
The colors indicating ranges of wind speed may be changed in the lower left corner using the scale tab. Selecting the more tab behind the scale tab allows for refining the appearance of the plot further, such as adjusting the width of the angles, the internal scale indicators, or the background gradient.

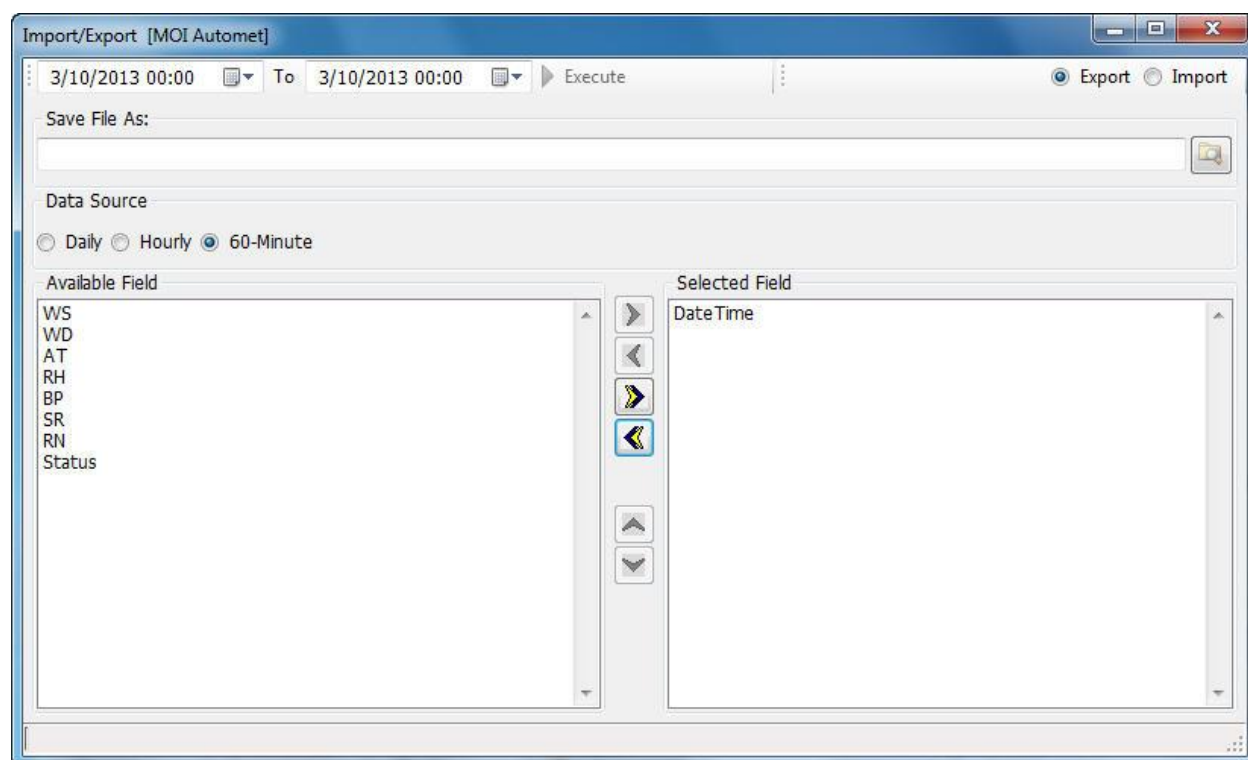
The report may now be printed using the print features located at the top of the screen.

## 10 Exporting and Importing Data

The Air Plus software is able to export data in standard comma separated (\*.csv) format. It can also import existing data that has previously been exported by Air Plus in to a new station. In some cases, data from Micro Met Plus 2.2 can also be imported.

### 10.1 Exporting data

From the main screen, select the station from which you wish to export data and press the  button. This will activate the station for data collection and reading. Press the  button near the bottom center portion of the window. This will bring up the import/export screen.



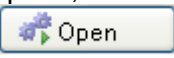
The top half of the screen allows you to select your date ranges and parameters for importing or exporting using the same means to create reports discussed in the Printed Reports: Creating Reports section of this manual. The top right corner also has a selection marker for choosing whether you are exporting or importing data. Select the Export marker to export the desired data.

The Data Source select field determines the time interval for the data you are exporting.

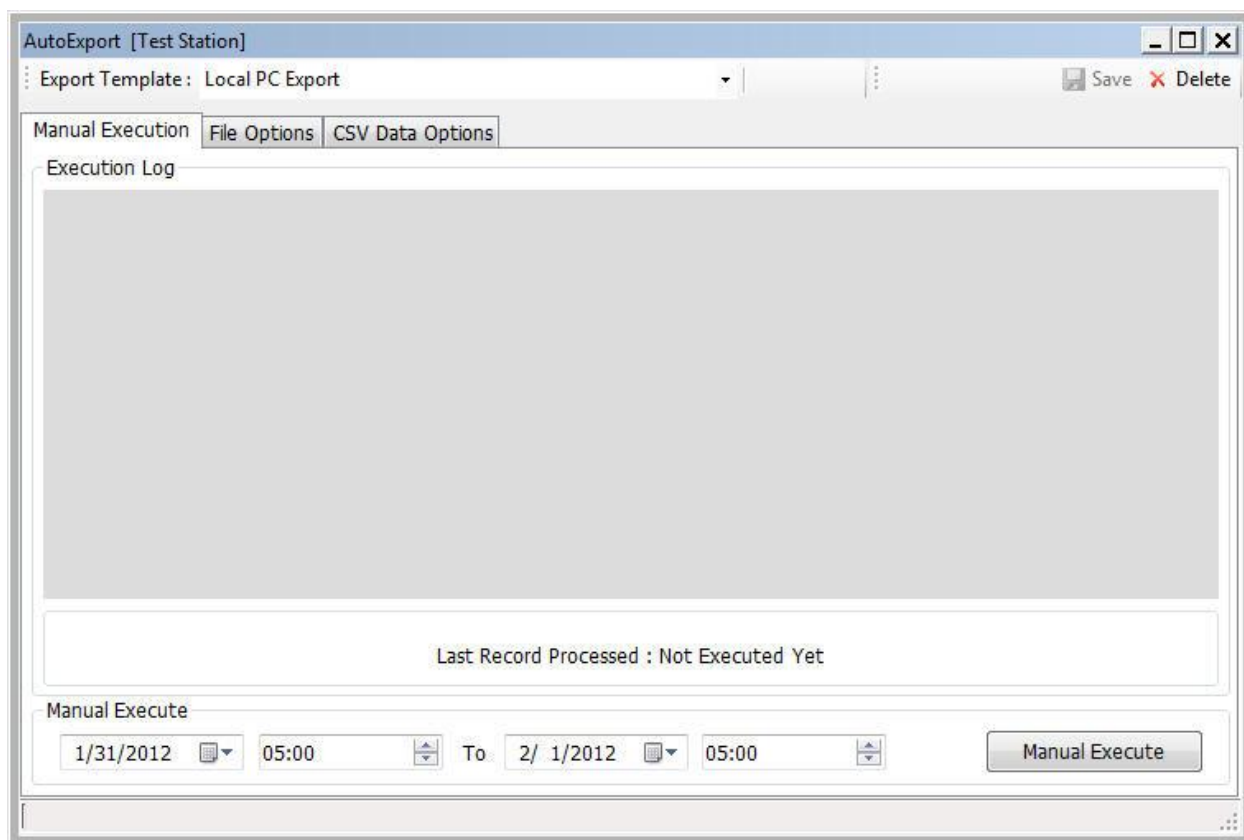
Once all of your parameters are chosen, press the browse button located to the right of the File to Export To field. This will allow selection of the destination folder and naming of the exported file. Press the SAVE button to return to the import/export screen. Press the Execute button to the right of the date range selection fields to export the data.

## 10.2 Auto Export

You may wish to automatically export and store your data to a csv file on your local PC, network location, or ftp server. The Auto Export feature (enabled in your Queue) gives you this ability. See the Configuration: Defining a New Station for instructions on creating an Auto Export event in your Queue. As part of an Auto Export event, a data download will be performed first; a separate download event does not need to be created.

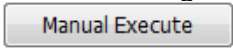
To create an Auto Export template, from the main screen, select the station from which you wish to export data and press the  button. This will activate the station for data

collection and reading. Press the  button to bring up the import/export screen. There are three tabs in this window, Manual Execution, File Options, and CSV Data Options.



### 10.2.1 Manual Execution

The first tab in the Auto Export window is for manual execution. This tab is used if you would like to manually performing an export of data following the rules in your chosen Export Template.

After creating and/or editing your Auto Export template, select the desired working template, specify the start date/time and end date/time, and then click on the  button. The processing messages will be displayed on the Execution Log above. Additionally, all the steps of FTP communication will be displayed here; this may be helpful when troubleshooting a connection problem.

***It is recommended that a manual execution be performed after creating a new template file to verify it is operating as intended.***

The screenshot shows the 'AutoExport [Test Station]' window with the 'File Options' tab selected. The 'Export Template' dropdown is set to 'Local PC Export'. The 'Out Put Location' text box contains 'C:\users\UserName\Documents\MOI\_DataBase\FileOutPut' with a browse button to its right. Below this is a checkbox for 'Send File To FTP:' which is currently unchecked. To the right of this checkbox are fields for 'FTP Server:', 'Folder:', 'Account Name:', and 'Password:'. A 'Port:' dropdown is set to '21'. To the right of these fields is a group box titled 'FTP Connecting Options' containing two radio buttons: 'Passive' (which is selected) and 'Active'. Below the FTP section, a label reads 'CSV File Name = Name Prefix + DateTime (optional) + Postfix and/or File Extension'. There are two radio buttons: 'By Last Record DateTime Value' (selected) and 'By PC Clock when File Created'. Below these are three text boxes: 'Test Station-', '+ Year Month Day Hour %yyyyMMddHH', and '+ .CSV'. A preview line shows 'FileName (ex): Test Station-2012020105.CSV'.

### 10.2.2 File Options

The second tab in the Auto Export window is for defining where your data file will be stored and how it shall be named.

The Output Location will default to your \*MOI\_DataBase\FileOutPut folder. If you would prefer a different folder, you may browse to it using the browse button to the right. Alternatively, you may type in a specific location, such as a network folder, if you are unable to find it using the browse feature.

To use the Send File to FTP option, check the box and enter your FTP Server details in the appropriate fields. A typical server may look like this:

The screenshot shows a configuration window for FTP settings. It includes the following fields and options:

- FTP Server :** ftp.companydomain.com
- Port :** 21
- Folder :** /air\_monitoring/data/
- Account Name :** Service
- Password :** (masked with dots)
- FTP Connecting Options:**
  - ☒ Passive
  - ☐ Active

Once you have set up your location and FTP Server details, the last step is to determine how your file shall be named. By default, the station name is used as the first part of the file name which is then followed by the date and time. The station name may be changed to anything you prefer.

The date and time format is selected from the drop down menu. The text string after the % in the date/time drop box is the format for date/time value conversion; the % mark itself is not included. The text before % is for description purposes and will not appear in the file name.

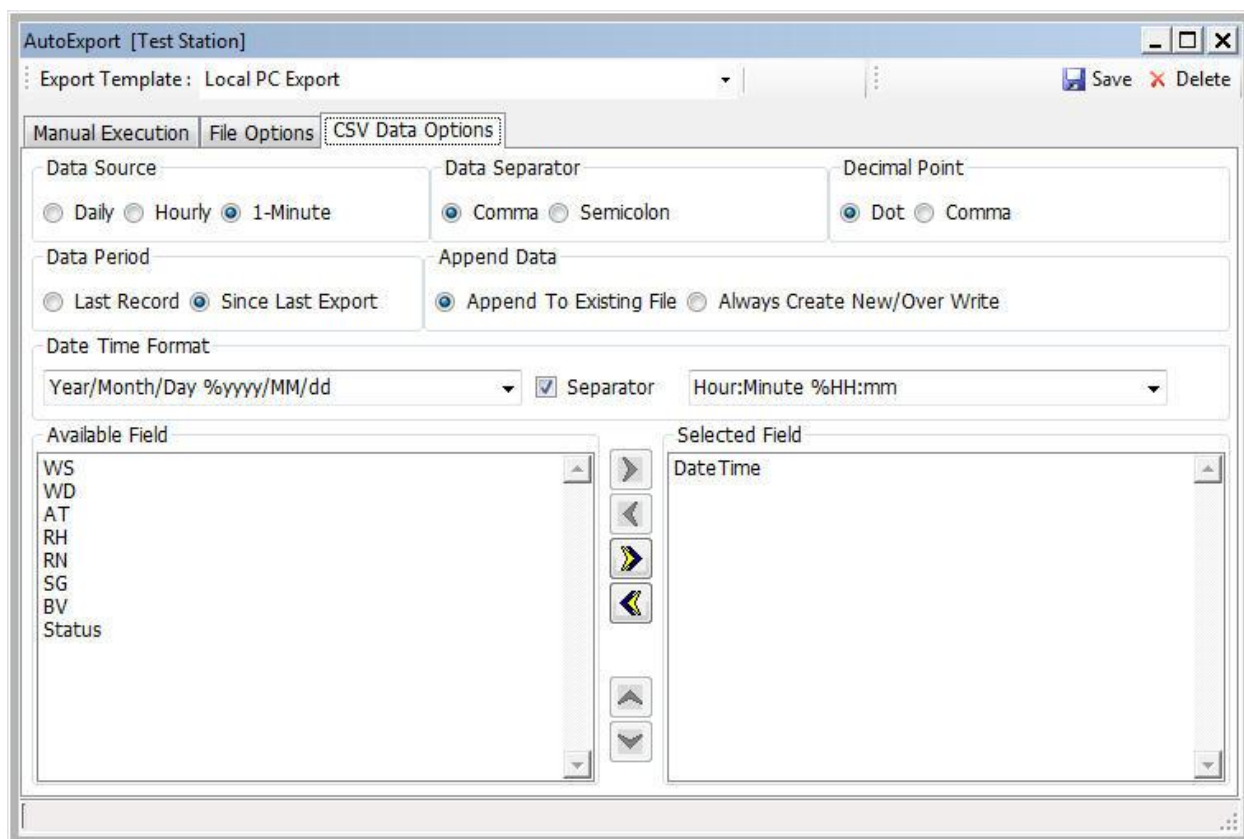
The date/time field may be removed from the file name by deleting the text and leaving it blank.

**Note: The format selected for date and time will affect the creation of your data files. See the discussion in the Interaction of Formatting Options section of this manual for more details.**

Finally, if you would prefer to use a different file extension, you may change it from .csv to another appropriate extension, such as .txt.

As you make define your file naming convention, a sample file name will be displayed at the bottom of the window.





### 10.2.3 CSV Data Options

This final tab in the Auto Export window is for defining the formatting to be used when creating your data file.

**Data Source** – This should match the interval used in your data set

**Data Separator** – This allows you to use a semicolon if your data uses a comma for a decimal point

**Decimal Point** – Allows your data to use a comma instead of a period (or dot) for the decimal point. Selecting comma will force the data separator to use a semicolon.

**Data Period** – Determines whether you will export all data stored since your last export or just the very last record collected.

**Append Data** – Choose whether you will add your new data to the end of your existing file or erase your existing file and replace it with the new data set.

**Date Time Format** – Use the drop down boxes to select the format you would like to use for your date and time information. If the Separator check box is checked, there will be a data separator splitting the time apart from the date, making them separate data fields.

The bottom portion of this tab allows you to select the data fields you would like to export and the order in which they should appear in the string. The arrow buttons here operate in the same way as described in the Printed Reports: Creating Reports section of this manual.

#### 10.2.4 Interaction of Formatting Options

The date/time selection (on the File Options tab), Data Period choice, and Append Data preferences interact with each other and can result in a variety of outputs.

When the Date/Time option is used:

A new file will be created every time the smallest time interval changes. For example, if it is set to year/month/day/hour then a new file will be created every hour. If it is set to year/month, then a new file will be created every month, and so on.

For the discussion below, assume we have selected year/month/day.

If Since Last Export is selected, then all new records since the last export will be put into a daily file.

If Last Record is selected, then only the last record saved will be used. For example, if the logger stores 1-minute records and the last export was an hour ago, there should be 60 new records available. However, only the last one will be exported to the daily file and the previous 59 records will be ignored.

If Append To Existing File is selected, all exports made on the same day will append the new records to the end of the same file.

If Always Create New/Over Write is selected, the daily file will be erased and replaced with the new records being exported. This will happen every time data is exported on that day.

When the Date/Time is NOT used (it is left blank):

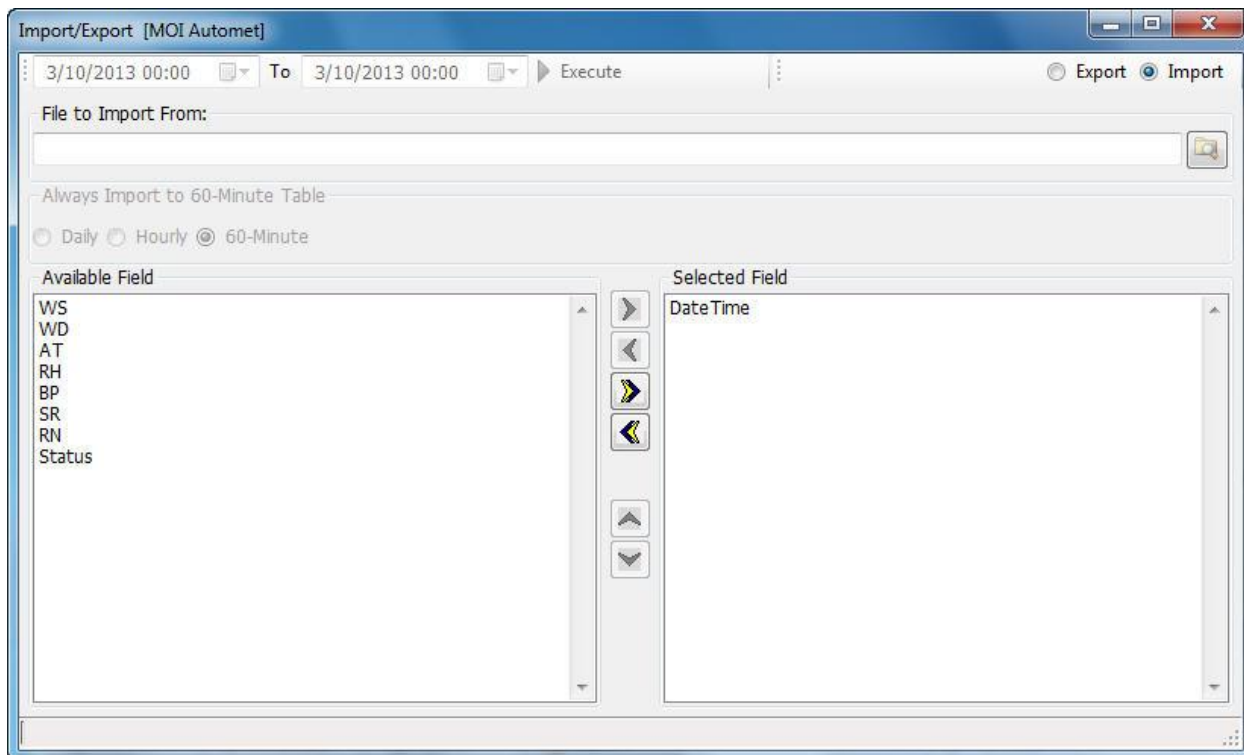
The file name will always be the same. It will not create a new file based on the time interval.

If Append To Existing File is selected, all records will be appended to the end and accumulated in the same file. Over time, this can result in an extremely large file.

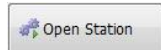
If Always Create New/Over Write is selected, the file will be erased and replaced with the new records being exported.

## 10.3 Importing data

Importing data to a station is a simple task.



From the main screen, select the station to which you wish to import data and press the



button. Press the



button near the bottom center portion of the window to enter the import/export screen (shown above).

This time we will select the Import marker in the top right corner of the screen.

Select your parameters for the data to be imported using the same means to create reports discussed in section 5.1. It is important that the parameters selected for importation exactly match those parameters in the data set that is being imported. This includes placing them in the same order.

Once all of your parameters are chosen and properly arranged, press the browse button located to the right of the File to Import From field. This will allow selection of the source file. Press the OPEN button to return to the import/export screen. Press the Execute button to the right of the date range selection fields to import the data

## Appendix A 466A Channel Parameters

**Warning:** Always make sure that critical Air Plus channel parameters (Data Type, Multiplier, Offset, and Full Scale Voltage) match the channel parameters of the data logger. This must be done before data is retrieved from the data logger. Failure to do so will cause incorrect data values to be stored in Air Plus.

The channel parameters for a 466A are located on the SENSOR setup screen. A typical screen is located below.

SETUP CHAN PARAMS					
CHAN	TYPE	UNITS	PREC	MULT	OFFSET
01	WS	m/s	1	0060.0	000.0
SENSOR FS VOLT:				2.500	
INV SLOPE:N VECT/SCALAR:S MODE:MANUAL					
SAVE		ID MODE		EXIT	

Transfer these channel parameters to the Air Plus Station Definition Channel screen for each channel. Map the channel parameters this way.

466A	Air Plus
TYPE	Channel Name
UNITS	Unit
PREC	Precision
MULT	Multiplier
OFFSET	Offset
FS VOLT	Channel Full Scale Voltage
VECT/SCALAR	Data Type

Channels parameters that are fixed and cannot be changes will be dimmed out.

## Appendix B BAM-1020 Channel Parameters

**Warning:** Always make sure that critical Air Plus channel parameters (Data Type, Multiplier, Offset, and Full Scale Voltage) match the channel parameters of the data logger. This must be done before data is retrieved from the data logger. Failure to do so will cause incorrect data values to be stored in Air Plus.

The channel parameters for a BAM-1020 are located on the SENSOR setup screen. A typical screen is located below.

SETUP CHAN PARAMS					
CHAN	TYPE	UNITS	PREC	MULT	OFFSET
I1	Conc	mg	3	01.000	-0.015
	SENSOR FS VOLT:		2.500		
INV	SLOPE:N	VECT/SCALAR:S	MODE:AUTO	ID	
SAVE		ID MODE		EXIT	

Transfer these channel parameters to the Air Plus Station Definition Channel screen for each channel. Map the channel parameters this way.

BAM-1020	Air Plus
TYPE	Channel Name
UNITS	Unit
PREC	Precision
MULT	Multiplier
OFFSET	Offset
FS VOLT	Channel Full Scale Voltage
VECT/SCALAR	Data Type

Channels parameters that cannot be changed will be dimmed out.

Typically a temperature sensor is connected to channel 6 and set to Auto ID. Three type of temperature sensors are supported: BX-592, BX-596, or CARB. Below are the channel parameters for all.

Type	Name	Units	Prec	Data Type	Mult	Offset	Full Scale
<b>BX-592</b>	AT	C	1	SCALAR	80.0	-30.0	1.0
<b>CARB</b>	AT	C	1	SCALAR	100.0	-50.0	1.0
<b>BX-596</b>	AT	C	1	SCALAR	95.0	-40.0	2.5

## Appendix C      E-BAM Channel Parameters

**Warning:** *Always make sure that critical Air Plus channel parameters (Data Type, Multiplier, Offset, and Full Scale Voltage) match the channel parameters of the data logger. This must be done before data is retrieved from the data logger. Failure to do so will cause incorrect data values to be stored in Air Plus.*

Only the E-BAM channel name parameters can be changed.

Channels parameters that cannot be changed will be dimmed out.

## Appendix D E-Sampler Channel Parameters

**Warning:** Always make sure that critical Air Plus channel parameters (Data Type, Multiplier, Offset, and Full Scale Voltage) match the channel parameters of the data logger. This must be done before data is retrieved from the data logger. Failure to do so will cause incorrect data values to be stored in Air Plus.

The E-Sampler has a setting called ENGR UNITS found on the SETUP/ENGINEERING UNITS screen. It can be set to either METRIC or ENGLISH.

Air Plus initializes E-Sampler channel parameters to METRIC units for channels AT, BP and WS.

The METRIC and ENGLISH channel parameters are shown next.

### Metric Channel Parameters

Channel	Name	Units	Prec	Data Type	Mult	Offset	Full Scale
3	AT	C	1	SCALAR	-147.1	95.8	2.5
4	BP	Pa	0	SCALAR	80000	30000	2.5
7	WS	m/s	1	SCALAR	44.7	0.28	2.5

### English Channel Parameters

Channel	Name	Units	Prec	Data Type	Mult	Offset	Full Scale
3	AT	F	1	SCALAR	-264.78	204.44	2.5
4	BP	inHg	1	SCALAR	23.62	8.86	2.5
7	WS	mph	0	SCALAR	100.0	0.63	2.5

## Appendix E      Status Column Alarm Codes by Device

Product	Status	Description
<b>466A</b>	C	The unit was in calibration mode.
<b>BAM-1020</b>	T	Tape transport error
	C	Beta count failure
	D	Membrane reading failure
	P	Excessive pressure drop
	F	Flow failure
	N	Nozzle failure
	R	Reference membrane failure
	L	Power failure
	I	Concentration calculation error
	M	Maintenance flag
	U	Telemetry fault
	E	External or Interface reset
<b>E-BAM</b>	T	Tape break (1)
	C	Beta count failure (2)
	D	Sensor failure (4)
	P	Pressure failure (8)
	F	Flow failure (16)
	N	Nozzle failure (32)
	R	Internal hardware failure (64)
	L	Low battery (128)
	M	Pump failure (512)
<b>E-Sampler</b>	T	Self-test failure (1)
	C	Span check error (2)
	D	Laser current failure (4)
	P	Pressure sensor failure (8)
	F	Flow failure (16)
	R	Internal hardware failure (64)
	L	Low battery failure (128)



