8872 Manual

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Chapter 1

8872 Theory of Operation

8872 Theory of Operation – Hardware

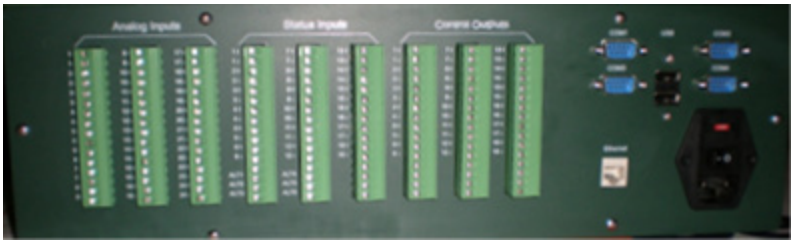
The Model 8872 is a Windows-based data logger, based on Windows Professional. The 8872 includes a number of hardware and software features to ensure that the device matches the field reliability of the 8832, while offering the convenience of a Windows-based platform and integration with Agilaire's AirVision software.

The core of the 8872 is a fanless PC, with 8 GB of RAM. The device is equipped with a 128 GB solid state flash drive (SSD).

Agilaire's new 8872 Data System Controller (Data Logger)

For all digital versions of the 8872, the remainder of the enclosure simply provides convenient USB, serial, and HOMI I/O connections in a standard 3U rack mount enclosure, a form factor similar to the 8816 / 8832 family. However, the 8872 also supports traditional analog / discrete I/O via a variety of internal I/O modules and a protection / connector board to provide familiar detachable terminal block connections to the back. The layout of the connections is designed to make the unit easy to use as a 'drop in' replacement for an 8816 or 8832.

Up to six (6) I/O modules can be mounted internally, each consisting of either 8 voltage inputs, or a 6 status input / 6 relay output combination.

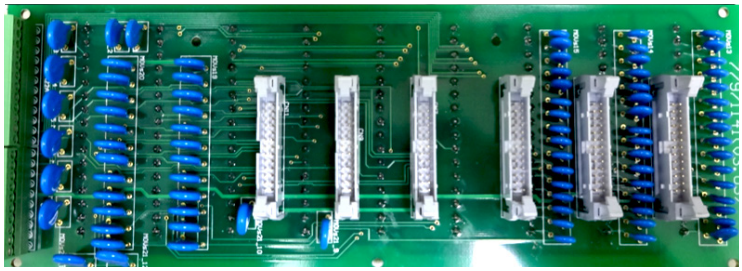


Back view of Agilare 8872

The rear panel PCB provides surge and overvoltage protection devices for up to 24 voltage inputs, 18 status inputs, and 18 relay outputs.

Status inputs can also be used for rainfall inputs or frequency/counter inputs (e.g., wind speed).

Additional external I/O can be connected via the rear panel Ethernet connector. External I/O modules are commonly used for specialty input (rainfall counters, RTDs, Thermocouples, etc).


8872 Signal Protection Board-an Agilaire Advantage

The rear panel also includes two (2) USB port connections and four (4) RS-232 port connections (COM1 through COM4). The front panel provides the external I/O network Ethernet connection and two (2) USB connectors. The device supports standard HOMI monitors, USB keyboard/mouse, and most standard PC peripherals and drivers.

It is important to note that the front panel Ethernet connector and the internal I/O modules run on a different network range (10.0.0.X) than the rear panel Ethernet connector (whose IP address can be set by the user). For convenience, it is possible to request that Agilaire route the primary (user) Ethernet connection to the rear panel instead of the front panel. In this case, the front panel connector is disabled.

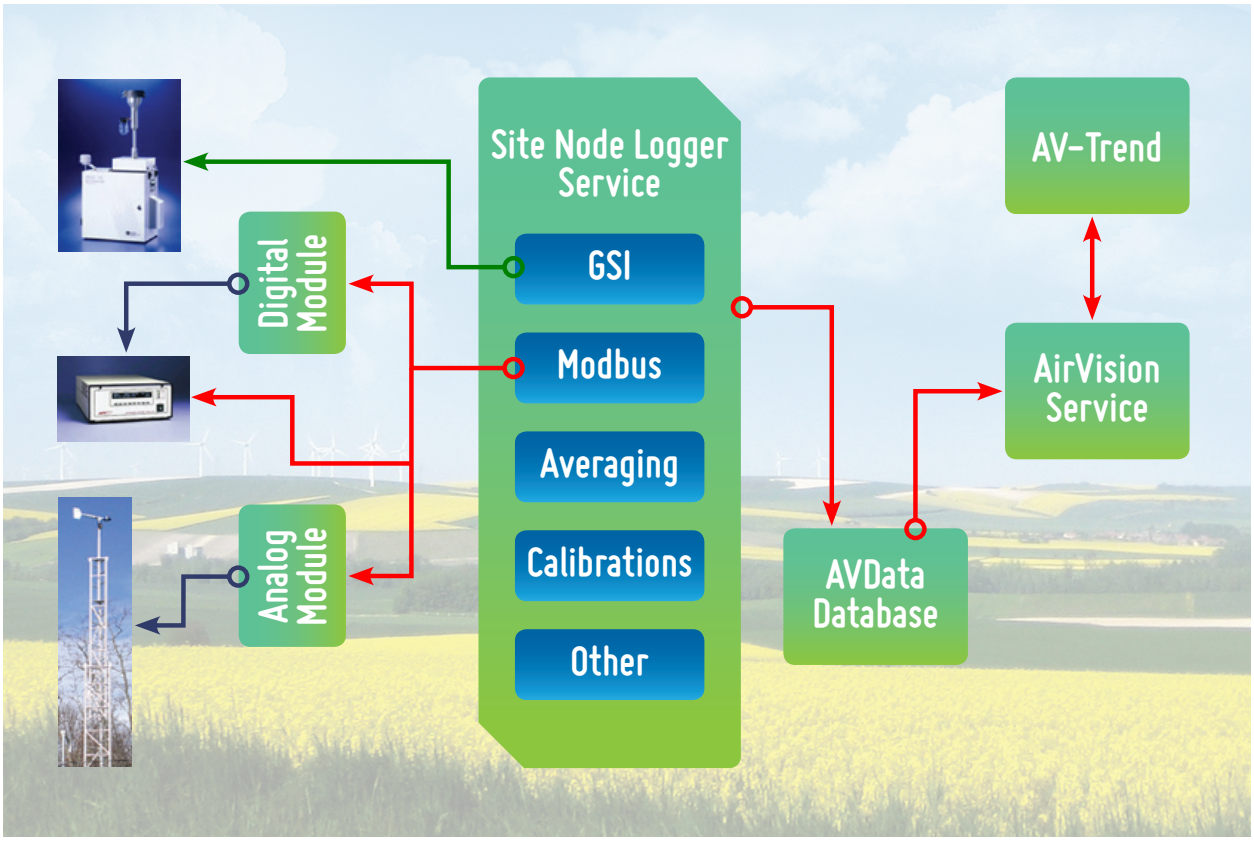
Theory of Operation – Software

While the AV-Trend software provides the interface for all configuration, reporting, data annotation, logbook, etc, it does not perform the realtime functions normally associated with the data logger, such as:

- Instantaneous scans of I/O, Modbus, GSI connections
- Short-term averaging and validation / flagging
- Calibration Control
- Short-term alarm generation with relay output control

To fulfill these requirements, the AirVision Service runs a plug-in called the Site Node Logger. The addition of this plug-in distinguishes an 8872 from an AV-Trend PC. This service scans the configuration within the 8872 (channels, calibrations, etc) and loads processes and threads to perform the realtim functions, inserting averaged data, calibrations results, etc, into the 8872 database at the required time.

The Site Node Logger operates at a general scan rate of 3 seconds (for internal I/O modules and external Modbus/GSI devices). Consult Agilaire for applications where higher scan rates are required.

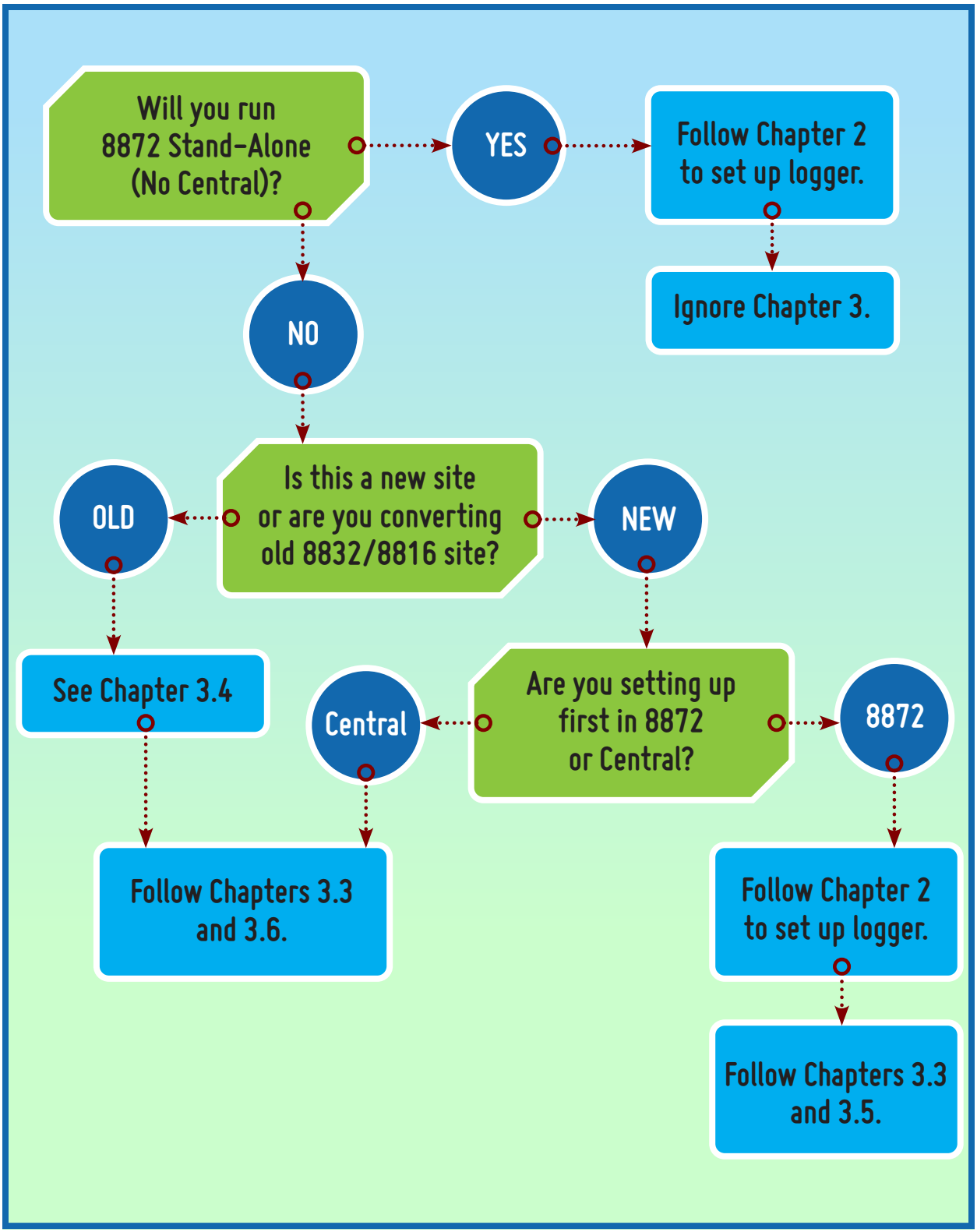


Special Notes Regarding GSI / Modbus Channel Types (8872 vs. 8832)

Several improvements have been made regarding the handling of GSI and Modbus channels in the 8872, compared to its Model 8832 predecessor:

- Dongles are no longer required for EcoTech 9800 series analyzers
- GSI-based met channels no longer use the two-channel setup (GSI channel, then type V/W/7/8 channels)
- Sigma-Theta channels now use the “Input Channel” to point to the WDR channel, rather than having a duplicate analog input setup.

Initial Logger Configuration

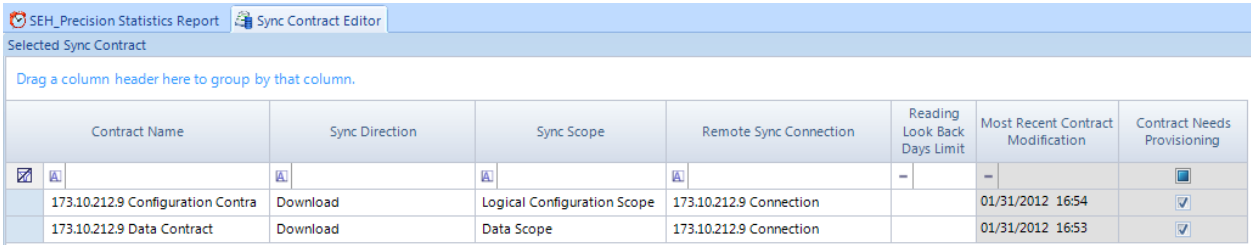


Initial Logger Configuration

By default, the 8872's configuration is pre-loaded with I/O modules as Modbus devices and digital inputs/outputs to match the supplied I/O configuration. No Parameter records are entered, so the user can create new parameters to match the desired configuration (unused channels are ignored).

This configuration can be done in the AirVision central, but an initial synchronization of the logger channels should be done before embarking on this.

⇨ **Important:** It is critical that the user should not create channels in the AirVision central that conflict with the channels already loaded in the 8872 before synchronizing. These channel configurations include internal ID codes that will not reconcile in this case.


SEH_Precision Statistics Report | Sync Contract Editor

Selected Sync Contract

Drag a column header here to group by that column.

Contract Name	Sync Direction	Sync Scope	Remote Sync Connection	Reading Look Back Days Limit	Most Recent Contract Modification	Contract Needs Provisioning
173.10.212.9 Configuration Contra	Download	Logical Configuration Scope	173.10.212.9 Connection		01/31/2012 16:54	☑
173.10.212.9 Data Contract	Download	Data Scope	173.10.212.9 Connection		01/31/2012 16:53	☑

After the first configuration sync, you may elect to change this to either of the following:

- Download, Then Upload = apply changes in logger to central, then apply changes in central to logger
- Upload, Then Download = apply changes in Central to logger first, then apply changes in logger to central.

Special Notes Regarding Required SQL Configuration for 8872

- **TCP/IP Protocol** must be enabled using **SQL Configuration Tool**.
- SQL Server must be configured to allow **Remote Connections**.
- The "sa" account must be enabled (under **Security**) and the correct password must be set in the connection string.
- **Firewall** should allow **ports 8998 open** on the 8872, router, and intervening firewalls.

Normally, Agilaire sets all these defaults in the 8872, but the settings are repeated here in the event local IT staff changes the settings, or for users who want to use site node logger software with their own PC hardware.

Reference

Default Internal Network Settings:

Internal I/O Module	*TCP Address*
Voltage Input 1-8	10.0.0.101
Voltage input 9-16	10.0.0.102
Voltage Input 17-24	10.0.0.103
Digital Input/Output 1-6	10.0.0.201
Digital Input/Output 7-12	10.0.0.202
Digital input/Output 13-18	10.0.0.203

Site Node Logger Service Error Log Location:

C:\Users\All Users\Agilaire\AirVision\Server\SiteNodeLogger

Troubleshooting

Symptom	*Check*
No new data coming into database, no data is visible on real-time display	1. Check **Windows Service Manager** (**Start > Run > services.msc**) to verify that **Site Node Logger** and **Watchdog** services are running. 2. If not, try to manually start service. 3. If service fails to start, locate **Logs** and email to Agilaire. 4. Also check **ConfigError** file in **Log Directory** for messages.
New data comes in, but all values are marked “0<”.	1. Verify that secondary network **IP address** is set to **10.0.0.5, with Gateway 10.0.0.1**. 2. Use **Start > Run > cmd** to open DOS window and try to **ping** each of the internal I/O modules at the IP addresses given above. 3. If ping fails for **one module**, check **internal Ethernet wiring** for faults. 4. If ping fails for **all modules**, check **internal Ethernet switch** for power indication and connection lights. 5. If service fails, locate **Logs** and email to Agilaire. 6. Also check **ConfigError** file in **Log Directory** for messages.
New data comes in, some values are marked “<”, but values are coming in and some averages are not flagged.	Check **Modbus** device scan rates in the 8872, **Configuration >Channels>Modbus Instruments**. Scan rates should be set to “30” unless otherwise directed by Agilaire.

Chapter 2

Configuring the 8872

The 8872 provides nearly unlimited flexibility in setting up systems and configuring servers. This chapter explains how to set up the following parts of the 8872:

2.1 Configuring System Preferences

2.1.1 Logger Properties

Digital I/O

2.2 Site and Parameter Setup

Channel Configuration

2.3 Channel Type Specifics

Adding/Modifying Channels - Basic Settings

Channel Specific Settings

Math Channels

Validation and Flags

CEM Channel Types

Validation and Flags

2.4 Adding an Instrument

2.5 Setting up Calibrations

2.6 Configuring Digital Events

2.7 Average Alarms

2.9 Scheduling Tasks

2.10 Favorites Editor

2.11 GSI Driver Editor

2.12 Configuring Security

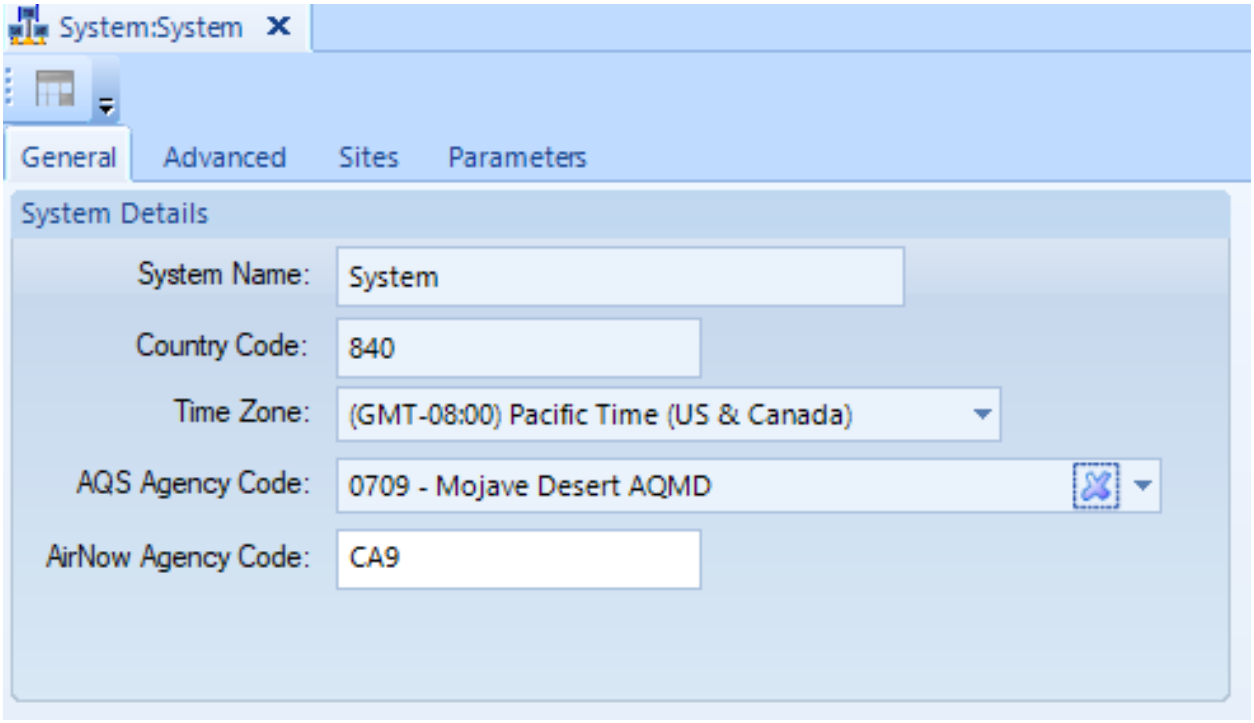
2.1 Configuring System Preferences

To set up system preferences, open **Parameter Settings** from **Configuration Editors** and double-click the **System** icon. The System is the agency or area, such as Knox County or State of Tennessee. Typically, each agency setup will only have one System (a second system could be used to help separate, for example, air toxics or water quality data from the other quality data), but it is possible to set up more than one by clicking the **Add System** button on the ribbon.

Verify that the **Time Zone** is correct. The other fields (listed below) are optional, and typically used only if your license includes full Ambient reporting:

System Name ("System")
County Code (not used by the 8872)
Agency Code (not used by the 8872)

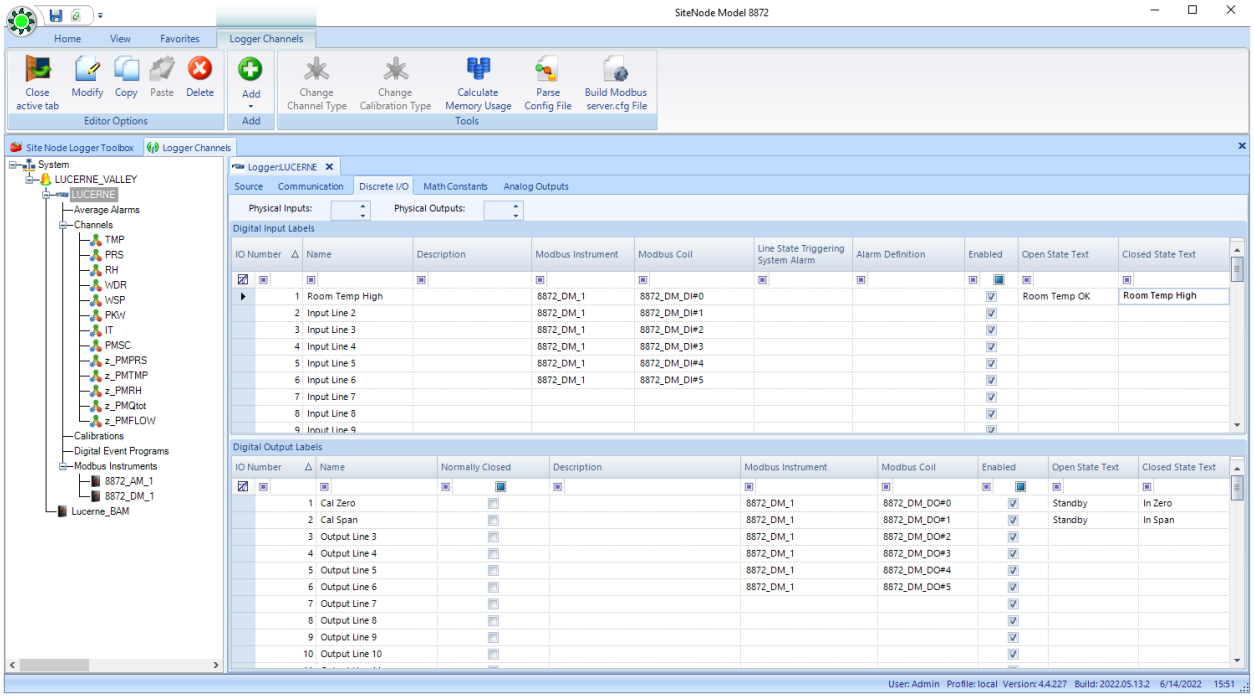
Click the **Save** button.



System Configuration from Parameter Settings Editor

2.1.1 Logger Properties

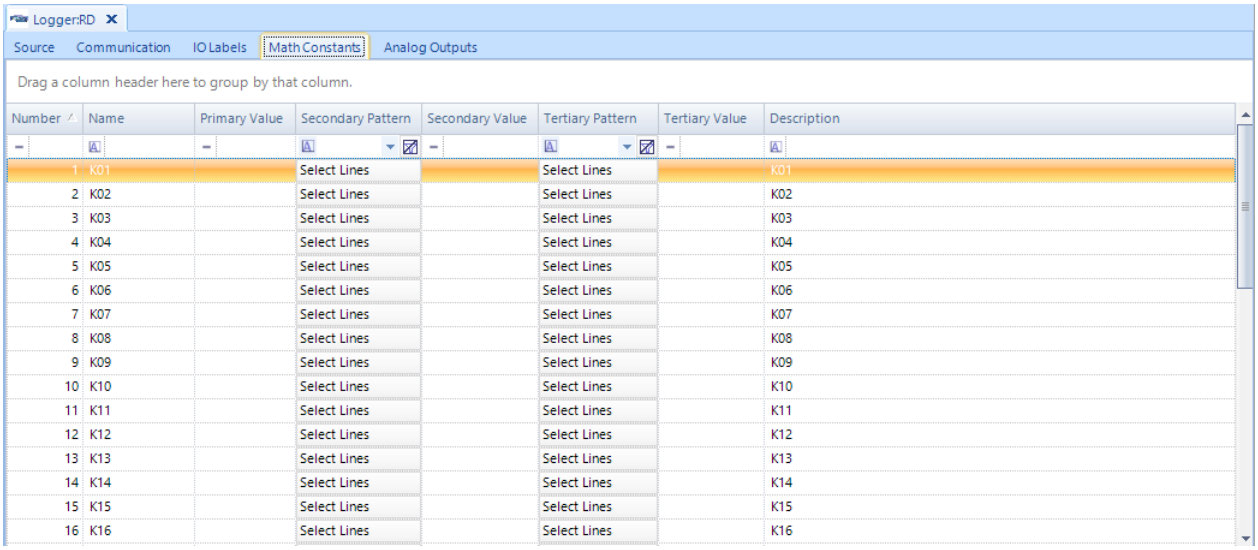
Digital I/O



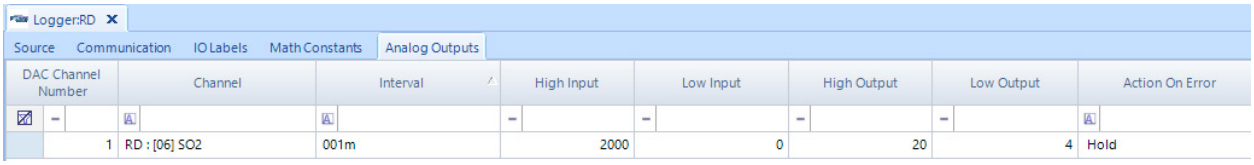
IO Labels - This tab is used in to set the properties of the digital inputs and output lines in the data logger, and how they relate to other elements of the software. Properties include.

- **Name:** 20-character label downloaded to the data logger.
- **Description:** Optional, allows for a longer description.
- **Name:** 20-character label downloaded to the data logger.
- **Modbus Instrument / Coil:** Leave blank for physical inputs/outputs in ESC loggers. Set for internal modules on the 8872 and for any external Modbus-capable instrument or calibrator to map pseudo-inputs and pseudo-outputs to analyzer/calibrator control or status monitoring functions. See tutorial videos under “Training” at Agilaire.com for more details on connecting to commonly used calibrators.
- **Alarm Definition / Line State Triggering Alarm:** Used for the Advanced Alarm Feature in AirVision/CEM. See AirVision/CEM manual, Digital Alarm Trigger for details. Not used in regular ambient applications.
- **Open State Text:** Allows user to define an alternate text for the Site Node Logger Toolbox display of inputs/outputs in the Model 8872 data logger for the open (normal) state condition.
- **Open State Text:** Allows user to define an alternate text for the Site Node Logger Toolbox display of inputs/outputs in the Model 8872 data logger for the closed (active) state condition.

Math Constants - This tab is used to set primary values and, optionally, secondary or tertiary values (switched by physical or pseudo digital inputs) of math constants (K01-K32) used by the data loggers in math equations. The math equation will use the primary value, unless the status input pattern matches that set for either the secondary or tertiary value, and a secondary/tertiary value has been set. This feature is used commonly in CEM applications for fuel factor / GCV value switching, but can also be used in ambient applications as holding registers for values updated by channel averages (e.g., holding end of hour BAM values) or values written during the calibration process (e.g., expected values read back from calibrators). See the "write to math constant" functions in the Channel Configuration->Validation and in the Calibration configuration sections.



Analog Outputs - This tab is used to set analog output settings for the external DAC (digital analog converter modules. Consult the Analog Outputs section/appendix in the relevant logger manuals for more details on usage.



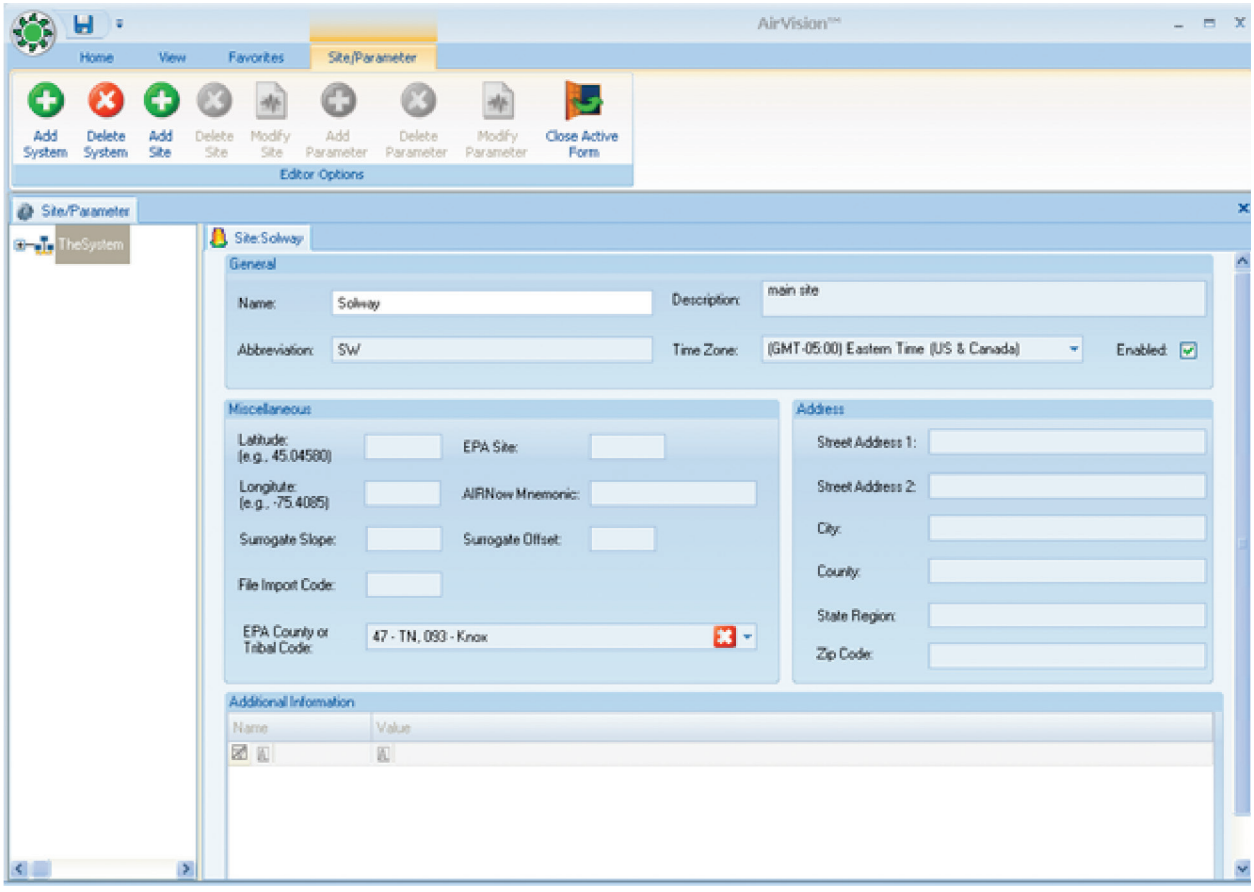
2.2 Site and Parameter Setup

The **Parameter Settings Editor** from the **Configuration Editors** menu allows administrators to add, edit, and delete sites and parameters. For the Model 8872, you should only have a single Site represented.

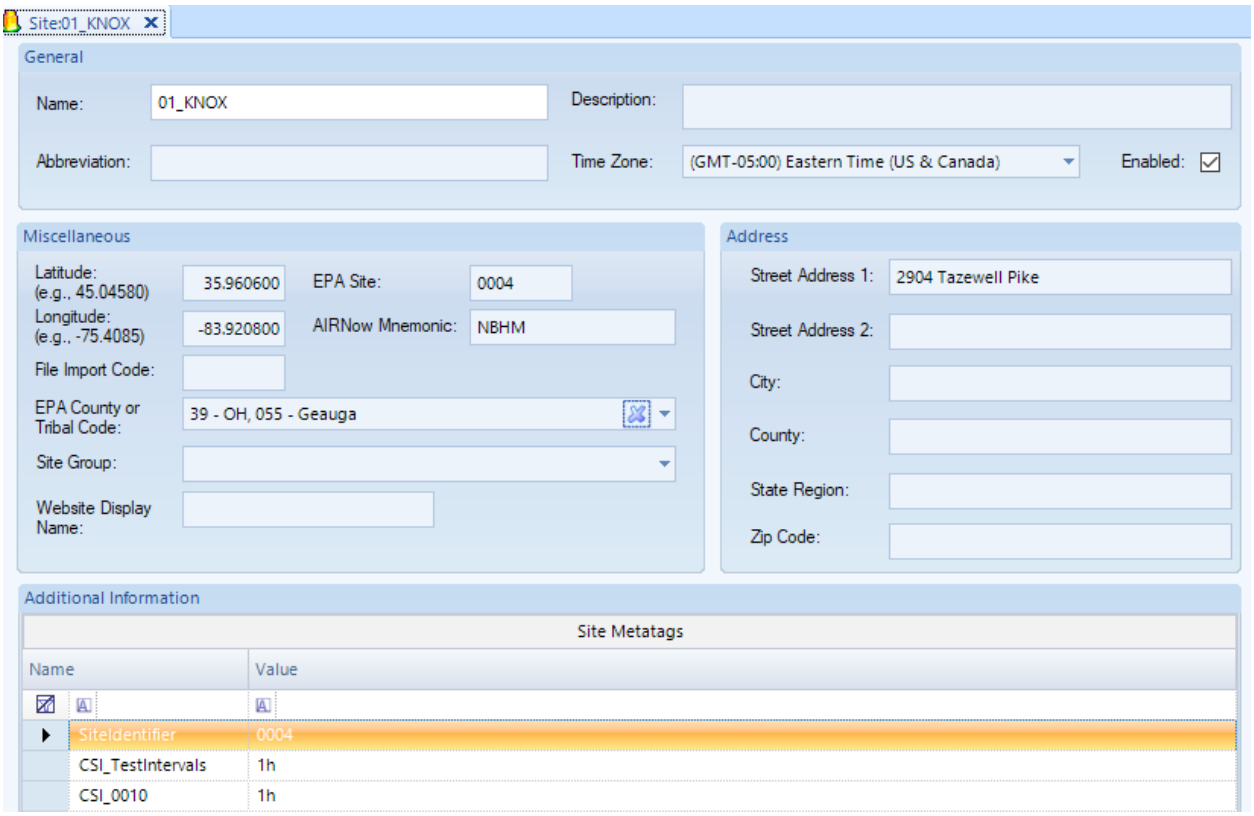
Adding a Site

To add a site (if it is not already automatically added or to modify the default site settings), single-click **Configuration Editors/Parameter Settings**. In the **Parameter Settings** screen, highlight your **System** in the tree diagram and click the **Add Site button.** Required fields are **Name** and **Time Zone**. Enter the name of your **Site** and select a **Time Zone** from the drop-down list. Select the **Enabled** box and click the **Save** icon.

To edit a site, double-click the **Site** name in the Parameter Settings tree diagram, make changes, and click the **Save** icon.



Site Configuration from Parameter Settings in Configuration Editors



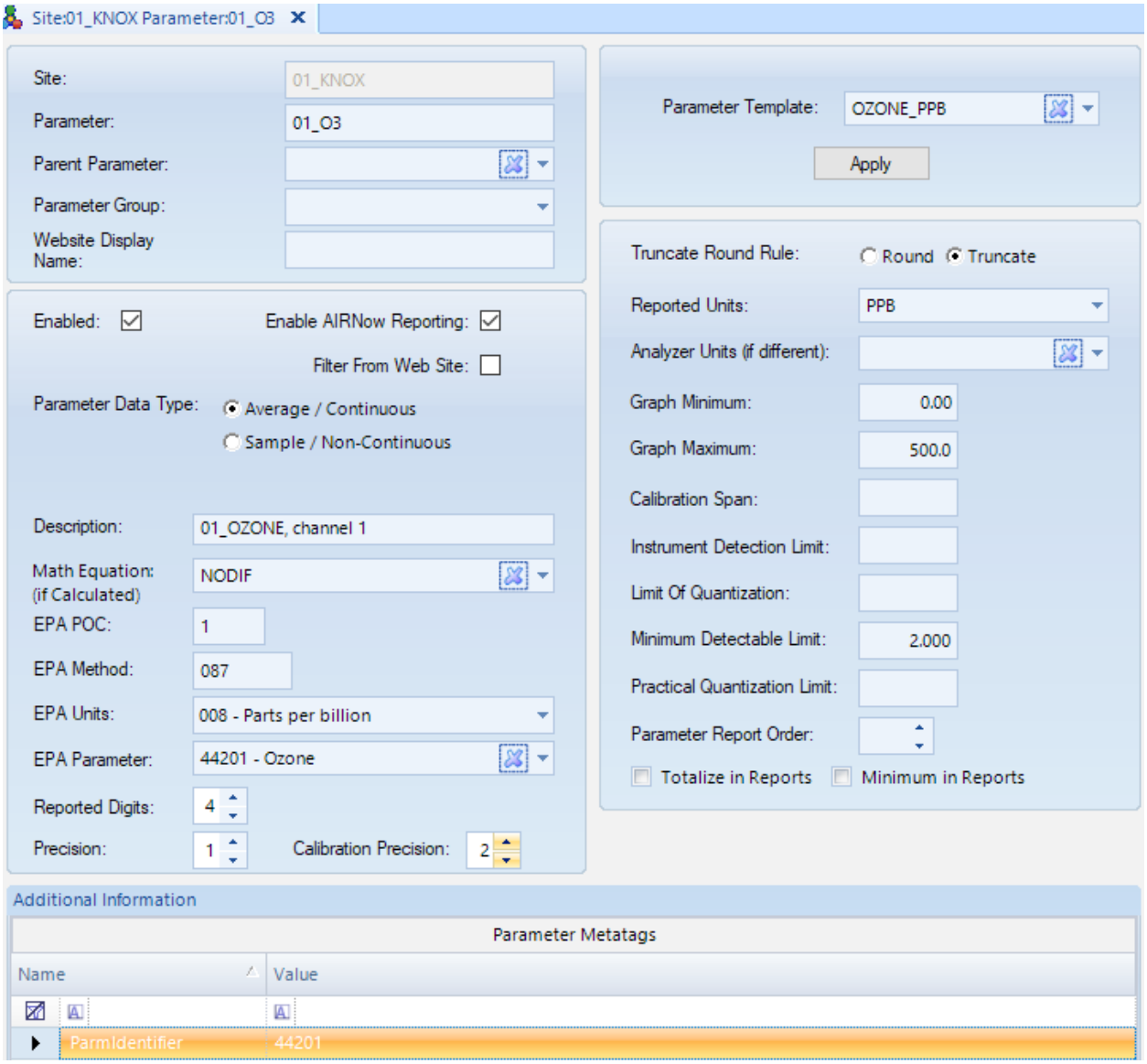
The Site Editor contains the following fields for information about the site:

- **Name (Required)** — Alphanumeric characters to refer to the site, e.g., NKnox
- **Description** — Brief description of the site, e.g., North Knoxville (optional)
- **Abbreviation** — This field is used for special formats only. (File Import is not available in the Model 8872.)
- **Time Zone (Required)** — Select from drop-down list.
- **Enabled (Required for polling)** — Check the box to enable the site. If this box is not selected the site will not be polled or appear in report/editor selections.
- **Latitude** — To comply with EPA standards, enter latitude in decimal format. For example, 75 degrees, 15 minutes, and 0 seconds would be entered as 75.250000. Enter up to 2 places and a minus sign if needed to the left of the decimal and up to 6 places to the right of the decimal.

- **Longitude** — To comply with EPA standards, enter longitude in decimal format. For example, 75 degrees, 15 minutes, and 0 seconds would be entered as 75.250000. Enter up to 2 places and a minus sign if needed to the left of the decimal and up to 6 places to the right of the decimal
- **EPA Site** — Two-character site code provided by EPA (Full Ambient Reporting only)
- **AIRNow Mnemonic** — Not used by the 8872
- **Surrogate Slope** — Not normally used by the 8872
- **Surrogate Offset** — Not normally used by the 8872
- **File Import Code** — Not normally used by the 8872
- **EPA County or Tribal Code** — County or Tribal code provided by EPA (Full Ambient Reporting only)
- **Site Group- (Optional)** — Allows user to organize sites into user-defined groups (e.g., “Rural”, “Downtown”, “NCore”). Names of parameter groups must first be entered into the **Site Groups Editor** in Configuration->List Editors. Normally, this is an AirVision Server-Side function, and is only shown in the 8872 / Site AV-Trend PCs for display purposes.
- **Web Site Display Name (AirVision only)** — Allows user to define a name to use to display the site in AgileWeb that is different than the regular AirVision name. If the field is blank (and the site is configured to display in AgileWeb), the regular AirVision site name is used by AgileWeb.
- **Address** — Physical address of the Site.
- **Additional Information** — You can add notes at the bottom of the Site Editor by clicking on the asterisk at the bottom of the screen. Enter a **Name**, for example “Distance to tree line,” and a **Value**, for example “70 feet.” When you have completed your entry press the **Enter** key on your computer keyboard. Your entry will be moved to the next row in the Additional Information section.

Adding Parameters

To add a parameter configuration, highlight a **Site** from the **Parameter Settings** tree diagram and click the **Add Parameter** button near the top of the 8872 screen. To edit a parameter select a **Site** and then double-click a **Parameter**.



Parameter Configuration from Parameter Settings in Configuration Editors

The **Parameter** screen displays the following fields. Some of the EPA Code fields are used only if your license supports full Ambient Reporting.

- **Site** — The Site you selected in the Parameter Settings tree diagram will automatically be displayed.
- **Parameter** — Alphanumeric characters to identify the Parameter
- **Parent Parameter** — A Parent Parameter can be designated to form relationships that can be used for drill-down in the Data Editor. For example, a primary analyzer pollutant such as NOx could be a parent and designated diagnostic parameters such as sample flow or box temperature could be children. Another example would be to assign particulate parameters as parents and metals for XRF (X-ray fluorescence) analysis as children. If the parameter has a parent parameter, select it from the drop-down list.
- **Parameter Group-(Optional)** — Allows user to organize parameters into user-defined groups (e.g., “Gases”, “Met”, “Particulate”, “PAMS”). Names of parameter groups must first be entered into the **Parameter Groups Editor** in Configuration->List Editors. Normally, this is an AirVision Server-Side function, and is only shown in the 8872 / Site AV-Trend PCs for display purposes.
- **Parameter Template** — Parameter information can be filled in automatically by selecting a Parameter Template, which will set up EPA codes and units. Basic Parameter Templates are provided in the 8872. If you want to automatically fill in parameter information using a template, select a parameter template from the drop-down list and click **Apply**. If you have converted your data from E-DAS and the information is already filled in, you can still select a template but if you click **Apply** it will be overwritten.
- **Enabled** — Check the box to enable the parameter.
- **Enable AIRNow Reporting** — Not used in the Model 8872
- **Filter from Web Site** — Check the box to filter data from website.
- **Parameter Data Type** — Select a data type:**Average** for continuous data, **Sample/Non-Continuous** for data that is not continuous (e.g., FRM, AirToxics, PAMS, etc).
- **Description** — Enter a brief description of the parameter (optional).

- **EPA POC** — Enter an EPA Parameter Occurrence Code if needed. POC is used for different monitors measuring the same parameter at one site. (Full Ambient Reporting only.)
- **EPA Method** — EPA sampling Method Code
- **EPA Units** — Select EPA Units (including the EPA unit code) from the drop-down list (e.g., 007-parts per million, 015-degrees Fahrenheit).
- **EPA Parameter** — Select a parameter (including EPA parameter codes) from the drop-down list (e.g., 44201 - Ozone).
- **Reported Digits** — Total number of digits, including decimal places, that will be reported to the EPA.
- **Precision** — Number of decimal places for reporting precision.X's and Y's to the right of the reporting precision field illustrate the format of the digits/precision, e.g., XX.YY indicates a total of four Reported Digits with a Reporting Precision of two.
- **Cal Report Precision** — Number of decimal places to the right to use for calibration report, calibration error calculations, and AQS reporting of 1-Point Precision Checks.
- **Truncate/Round Rule** — Determines whether data in reports will be rounded or truncated
- **Reported Units** — Units that will be used for reports e.g., PPM
- **Analyzer Units** — If the analyzer units are different from the primary parameter, select analyzer units from the drop-down list.
- **Graph Minimum** — Lower y-axis limit for graph display
- **Graph Maximum** — Upper y-axis limit to for graph display
- **Calibration Span** — This field is determined by the instrument. Enter the configured calibration span value for the parameter to determine the parameter's calibration error (at the data logger).
- **Instrument Detection Limit (DL)** — Not used in 8872.

- **Limit of Quantization (LOQ)** Not used in 8872.
- **Minimum Detectable Limit (MDL)** Not used in 8872.
- **Practical Quantization Limit (PQL)** Not used in 8872.
- **Parameter Report Order** Parameters in reports are printed in the same order that they are shown under each site. Select Parameter Report Order to change the order parameters appear in reports. Report Order only applies to Daily Summary and Monthly Reports.
- **Totalize in Reports** If this option is selected, Monthly Reports will show a total of data rather than an average. Totalize in Reports is most commonly used for rainfall.
- **Minimum in Reports** If this option is selected, Monthly Reports will show a minimum of data rather than a Maximum. Minimum in Reports is most commonly used for temperature.
- **Additional Information** You can add notes at the bottom of the Parameter Editor by clicking on the asterisk at the bottom of the screen. Enter a **Name**, for example “Data Last Certified,” and a **Value**, for example “9/1/2008.” To add another row when you have completed your entry, press the **Tab** key on your computer keyboard. A blank row will be displayed.

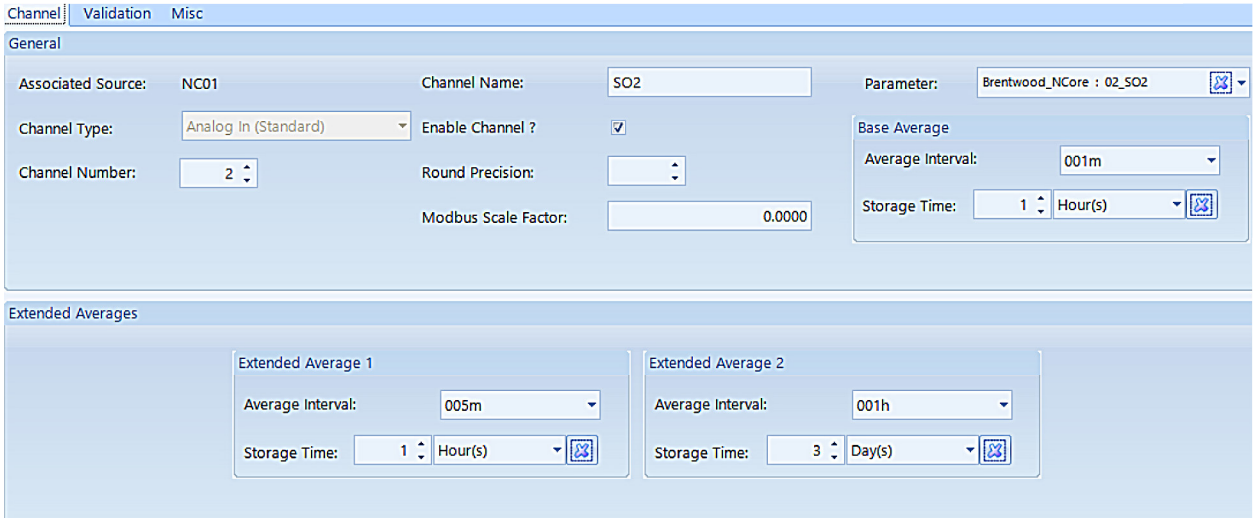
Channel Configuration

"Channels" are the entities that tell a data logger (8832, 8872) how to acquire data in real-time from an instrument to form averages, that are then passed on to *Parameters* in AirVision to store the data. Channels represent the physical side (instruments, wires, RS-232 connections, etc), while Parameters represent the logical side or "slots in the database." It's possible to have *Parameters* but not *Channels* if the data comes from some source other than being averaged by the data logger, such as the File Import Tool, or direct instrument polling.

The information for *Channels* is set up in Data Source Details in AirVision (or "Logger Channels" in the 8872 menu).

Basic Channel Information

In the setup of most of the channel types the Channel tab will have identical fields on the Channel tab as the Standard channel setup has, except where noted in descriptions below in this document.



Do not use spaces in the channel names and avoid using equation symbols (*, /, +, -, %) in the channel names as these can cause problems with math channels if such channel names are used in a math equation.

When a Channel is first created the Channel Name will be displayed as Chan1, Chan2, etc. If you have already configured a parameter (recommended), when you select the associated Parameter in the top right, the name will automatically propagate over to the Channel Name field once the next field has been selected. However, channel names are limited to 8 characters (as a holdover from 8816s and 8832s), but the Channel Name can be edited to fit.

The Channel Number will automatically be filled in with the next available number, but it can be changed by using the radio buttons to select the logical number of the channel being configured.

Set the Average Intervals for the Base, Extended1, and Extended 2 and their Storage Times. 001M data is usually setup on the Base Average. The data logger will average instantaneous readings over the Base Avg Interval, and then those base intervals are used to build the two extended intervals. To change the interval click the down arrow and select another interval type from the drop down list.

The Extended Average 1 is usually used for auxiliary data, the most common being 005M or 015M data. If the Base Average Interval is 1 minute, then the first extended average may be an auxiliary, hourly, or daily interval type (of which have to be divisible by 60 and a multiplier of the base). To change the interval click the down arrow and select another interval type from the drop down list.

The Extended Average 2 is usually used for hourly data, but can be used for daily data as Average 1 is set to hourly data. Average 2 must use a higher interval type than Average 1, and must be a multiplier of the base average. To change the interval click the down arrow and select another interval type from the drop down list.

Storage Time for all three intervals is the length of time the 8816 or 8832 data logger will store the averages (not used/visible for the 8872). Each interval has its own storage time setting which can be set between 0 to 999. Click the down arrow and select from the from down list the time span of: S = seconds, M = minutes, H = hours, D = days.

Basic Channel Types

The different channel types distinguish the way that an input is taken, or the way averages are formed from the data. A summary of the various channel types follows:

Channel Type	*Description*
Standard Averaging	Takes the instantaneous values of an analog input on the Model 8872 and forms up to three linear averages.
Modbus	Takes the instantaneous values from a Modbus device (e.g., analyzer) and forms up to three linear averages.
GSI (Serial)	Takes the instantaneous values from a serial device (e.g., analyzer) and forms up to three linear averages.
Scalar Wind Speed	Takes the instantaneous values of an analog input or from another GSI channel and forms up to three linear averages. Provides three resultant averages.
Scalar Wind Direction	Takes the instantaneous values of an analog input or from another GSI channel and forms up to three unitary vector averages, taking into account 360 degree crossover (and resolving directions > 360 degrees for the case of 0-540 instruments). Provides three resultant averages.
Vector Wind Speed	Takes the instantaneous values of an analog input or from another GSI channel and forms up to three vector-based averages, based on a companion vector wind direction channel. Provides three resultant averages.
Vector Wind Direction	Takes the instantaneous values of an analog input or from another GSI channel and forms up to three vector-based averages, based on a companion vector wind speed channel. Provides three resultant averages.
Sigma Theta	Takes input from another wind direction channel (standard or GSI) and performs the Yamartino sigma-theta calculation to determine sigma-theta. Gives two resultant averages, with the second being an RMS calculation from the first.
Linear Sigma	Takes the input from any other channel type and performs a linear sigma (square root of standard deviation) calculation. Useful for sigma-W calculations. Provides three resultant averages.
External Channels	The Model 8872 supports a new channel type “E” for External Channels. These allow the user to create a ‘fake’ channel associated with parameter from a directly polled instrument (e.g., BAM, E-Sampler, etc), where the logger is not doing real-time acquisition It exists ONLY to create a channel number for use with logger polling. The External type channel requires no other special configuration, and is ignored by the Site Node Logger process.
Rolling Average	Takes the input from any other channel type and performs a rolling average calculation (e.g., hourly average that rolls on the minute, 8-hour average that rolls on the hour, etc). Only one resultant average.
General Channel	Takes the input from any other channel type and performs determines either the maximum or minimum value of that input during a designated averaging period. If the input interval is set to 1s, the max/min instantaneous reading is recorded, rather than the max/min average. Commonly used for peak wind gust calculations, or max/min daily temperatures.
Rainfall Channel	Takes the input from any Modbus device, calculates the difference before/after any average period, and weights that difference by a designated scaling factor (e.g., 0.01 inches per count). Provides three resultants.

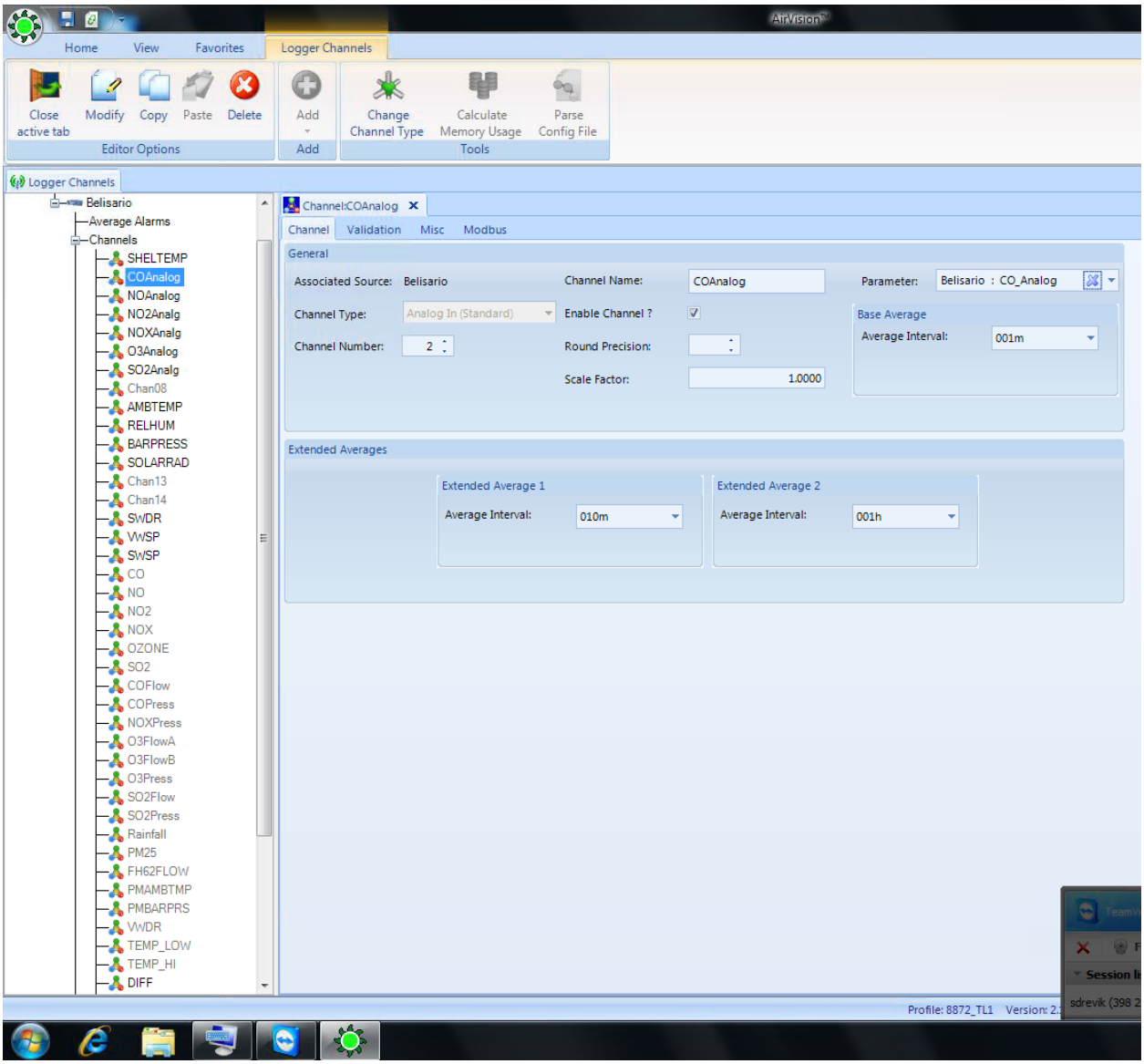
Stream-Switched	Used in CEM applications for time-shared CEMS. Takes input from another channel representing the analyzer (analog, Modbus, etc), and divides it into separate channels/parameters for stream A, stream B, etc. Streams are identified via a status input pattern that could be from an external controller, or could be a pseudo output/input pair from a Digital Event Program in the logger itself (which is also activating external solenoids). Supports 'build time' after switching online and 'hold value' options when the stream is offline.
Merge	Used in CEM applications, generally to merge the value of analyzers with separate low range / high range outputs into a single measurement.
Time On-LIne	Used in CEM applications to monitor the time that a process is up or down, based on status inputs and/or measured values of other parameters (e.g., stack temperature > X, fuel flow > Y, etc).

2.3 Channel Type Specifics

Adding/Modifying Channels - Basic Settings

Still in the **Configuration Editor**, **Logger Channels**,

- select a **Logger** that has already been added to a **Site**
- click the **Add** button.
- select **Add Channels**,
- select a **Channel Type**, e.g., Standard Averaging, GSI, VWS, etc. For details on how these different channel types work and their settings, consult page 26 - Channel Types.
- select a **Channel Number** (a channel number will automatically be added in order but it can be changed)
- select a **Parameter.** When you select a parameter, the Channel Name will automatically be changed to match the Parameter name.
- select an **Average Interval** and **Storage** for the **Base Average**, **Extended Average 1**, and **Extended Average 2**.
- Click the **Save** button

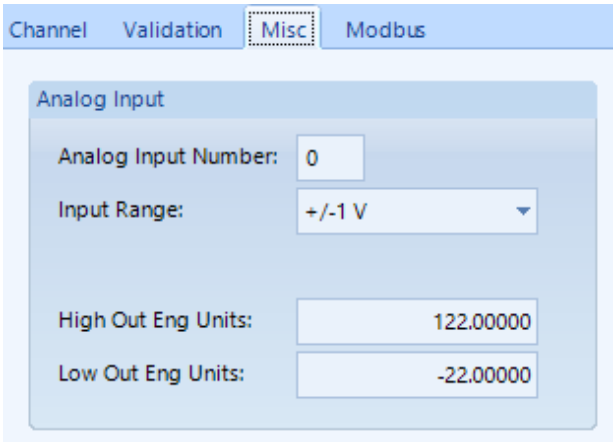


Adding channels to loggers in the Data Source Configuration from Configuration Editors

Channel Specific Settings

The **Analog In (Standard)** channel takes readings from a physical analog input, scales the voltage (or current) to an engineering value, and then performs a simple arithmetic average of all the values. The settings under the Misc. tab define the information required:

- The Analog Input Number specifies the physical input that the analyzer wires are connected to. The analog input number does not have to be the same as the channel number.



- The High and Low Out Eng Units of the instrument corresponding to the Full Scale range and zero.

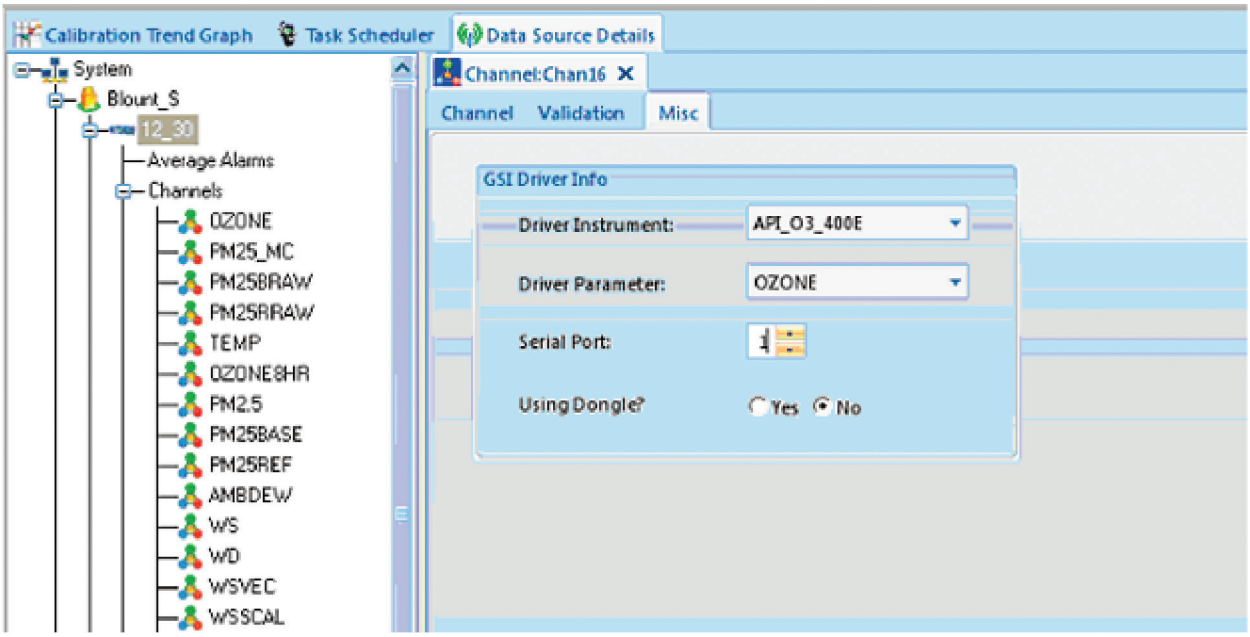
- Volts Full Scale

  The voltage (or current) range of the connected instrument.

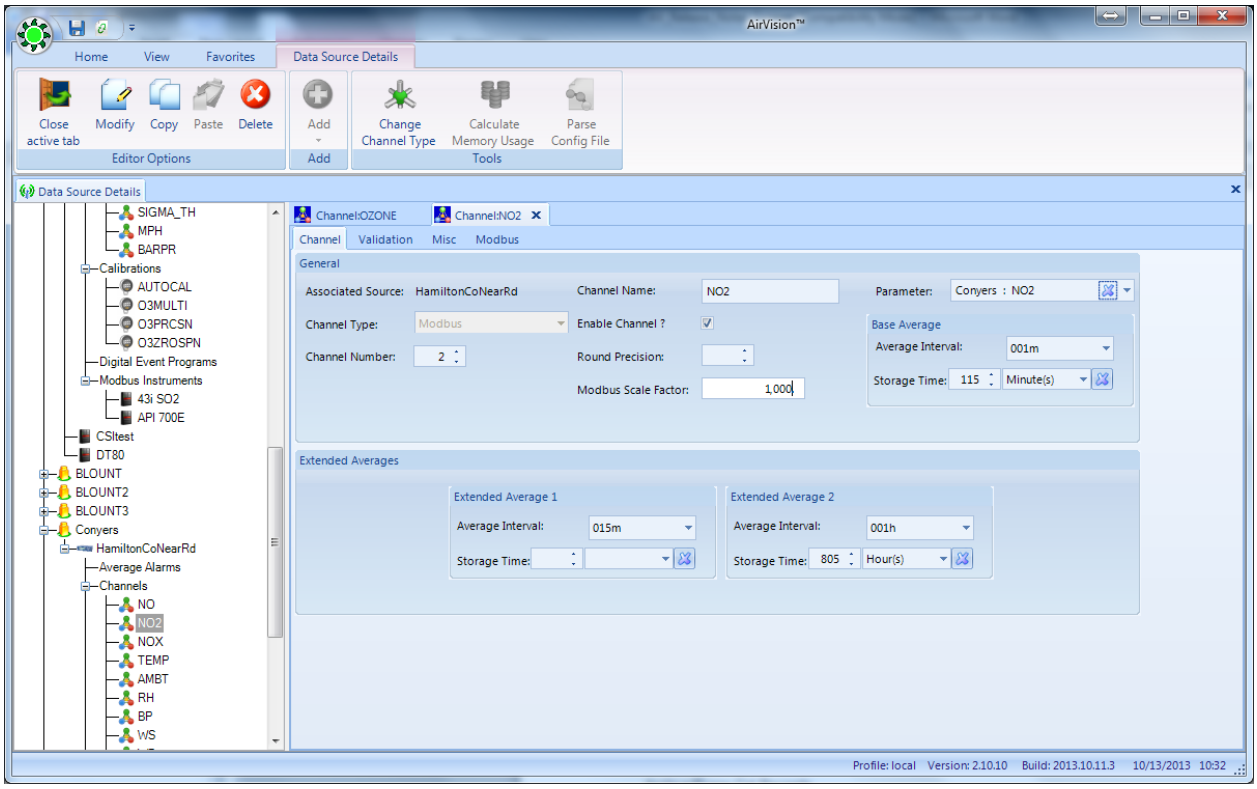
  Allowed settings are:
  - 10 V
  - 5 V
  - 1 V
  - 150 MV
  - 4-20 MA
  - 0-20 MA

The **GSI or RS-232 channel** uses a serial communications interface used by the data logger to retrieve data from devices such as analyzers and digital control systems. The interface can receive data strings and stores values into GSI Channels for data collection. For these channel types, the "Misc" screen allows the user to define which RS-232 port is to be used, the type of instrument being connected, and the value within that instrument that is desired. Note that the baud rate of the RS-232 port is set in the PC Settings editor.

On the Misc tab an option is given for Hold Data Between Updates? is set to Yes or No.
If Yes is selected it will use the last value received until the next value arrives, for instruments that send data infrequently. Normally, this is set to "No."

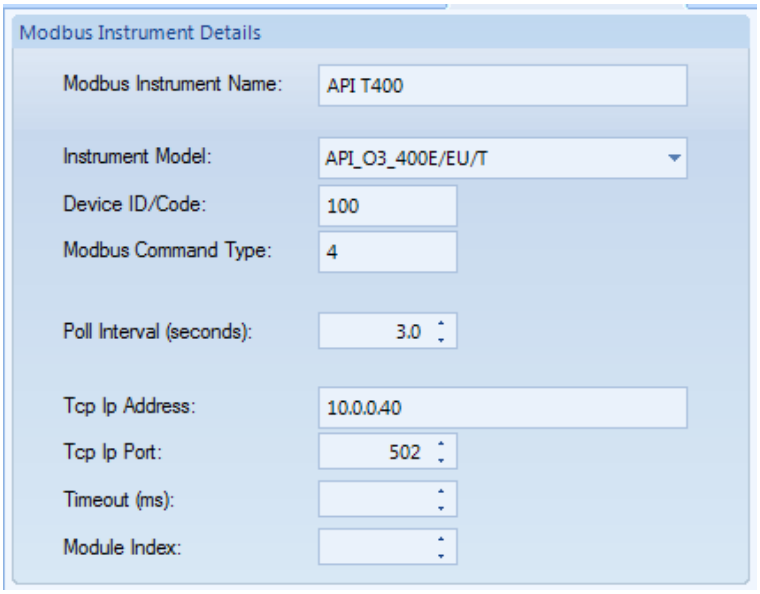


The **Modbus channel** is used to take data from a Modbusused to take data from a Modbus-capable instrument via an Ethernet connection.A Logger Modbus Instrument needs to first be created before the Modbus channel is created so that the instrument that was created will show in the drop down list for the Modbus Instrument on the Modbus tab (similar to the GSI/RS-232 channel).



Modbus instruments have additional networking information that needs to be known. You must create an instance of the Modbus instrument in the Logger Channels editor before creating the Modbus channels for that instrument (This procedure prevents the need to repeat entry of the networking information for each channel).

To create the instrument, go to the Logger Channels editor, select the data logger in the tree diagram, and select **Add > Logger Modbus Instrument**.



Modbus Instrument Details in Logger Channels

Enter the following fields:

- **Instrument Name**--a user-defined label for the instrument
- **Driver Type**--select from picklist of known analyzers
- **Modbus Code**--also known as the **Modbus Device ID**, this ID is set in the analyzer, and is some value from 1-255
- **Modbus Command Type**--defines which Modbus command is used to read data from the analyzer (3 for TECO, 4 for API, consult instrument documentation for other brands)
- **Poll Interva**l- how often data should be requested from the instrument, in tenth of a second increments. Generally, a rate of 2-3 seconds is recommended for most analyzers.
- **TCP Address**--IP address of the instrument, as viewed from the logger's perspective
- **TCP Port**--Port used by the instrument for Modbus requests, usually "502".
- **Timeout (MS)**--Designates the time the logger will wait on an instrument for a Modbus response. Typical values are 250-750 MS, if needed, for an analyze missing readings occasionally.

Modbus channels in the 8872 will use the **Modbus Scaling Factor** to convert floating point data from the instrument before using it in averages, calibrations, etc. This can be used to convert an analyzer that only provides PPB data on the Modbus link to PPM data, or similar conversions. This approach is preferred over **Analyzer Units** in the logger, since the **Analyzer Units** conversion only takes place on averages and calibration data, but causes inconsistency with other logger configuration settings (alarm limits, calibration expected values, etc., and can cause issues with a synchronized Central.).

Math Channels

The **Math Pack channel** supports calculations between channels and math constants as Math or Average Math channels. Math channels evaluate the equation with every scan of the system, while Average Math channels apply the equation only against the calculated averages of the constituent channels.

Arguments as inputs to the math channel can be channel names (e.g., "SO2"), math constants (e.g., "K01"), or fixed numbers.

Binary operators (operators on two variables) include:

* * Multiply
* / Divide
* + Add
* - Subtract
* % Modulo (remainder)

Other binary and Uniary functions (functions that operate on one variable or one result of another embedded equation) include:

NAME	DESCRIPTION	USAGE
Abs	Returns the absolute value of a specified number.	Abs(-1)
Acos	Returns the angle whose cosine is the specified number.	Acos(1)
Asin	Returns the angle whose sine is the specified number.	Asin(0)
Atan	Returns the angle whose tangent is the specified number.	Atan(0)
Cos	Returns the cosine of the specified angle.	Cos(0)
Exp	Returns e raised to the specified power.	Exp(0)
Log	Returns the logarithm of a specified number.	Log(1, 10)
Log10	Returns the base 10 logarithm of a specified number.	Log10(1)
Max	Returns the larger of two specified numbers.	Max(1, 2)
Min	Returns the smaller of two numbers.	Min(1, 2)
Pow	Returns a specified number raised to the specified power.	Pow(3, 2)
Round	Rounds a value to the nearest integer or specified number of decimal places. The mid number behaviour can be changed by using EvaluateOption.RoundAwayFromZero during construction of the Expression object.	Round(3.222, 2)
Sign	Returns a value indicating the sign of a number.	Sign(-10)
Sin	Returns the sine of the specified angle.	Sin(0)
Sqrt	Returns the square root of a specified number.	Sqrt(4)
Tan	Returns the tangent of the specified angle.	Tan(0)
Truncate	Calculates the integral part of a number.	Truncate(1.7)
JDAY()	Returns julian day of the year (1-366)	
MINHR()	Returns minutes into the hour (00-59)	
SECMN()	Returns seconds into the minute (00-59)	
HRDAY()	Returns hours into the day (00-23)	

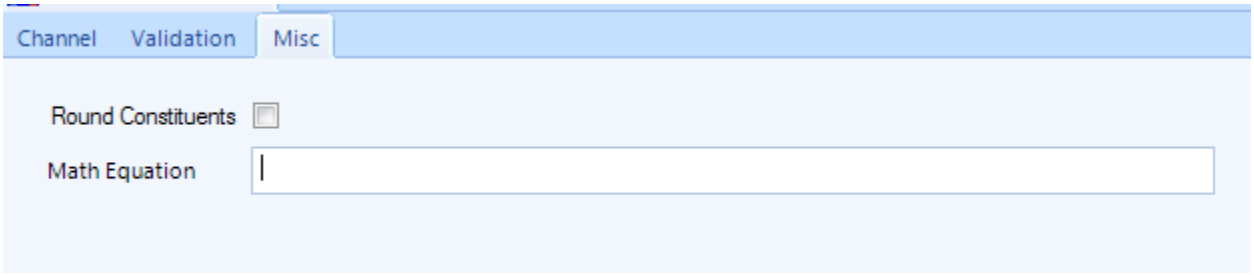
⇨ **Important!** These equations MUST be referred to by the case-specific version of the equation. You must use “Max(x,y)”, not “MAX(x,y).”

Equations do NOT terminate with an "**=**" sign (unlike the 8816 or 8832), so an example equation might look like:

SO2 * 0.00166 * K17 * FLOW

On the Misc. tab Round Constituents will round to the number of places specified in the Decimal Positioner field, before the equation and average are calculated (used primarily in special CEM applications). Channel names that contain spaces cannot be used in a math pack formula.

The **Average math pack** channels function like math pack channels except instead of performing calculations on instantaneous readings and then averaging the results, these channels wait until the end of an averaging interval and perform calculations on the averages. The Average Math Channel configuration screen is identical to the Math Channel configuration screen except for the channel type.



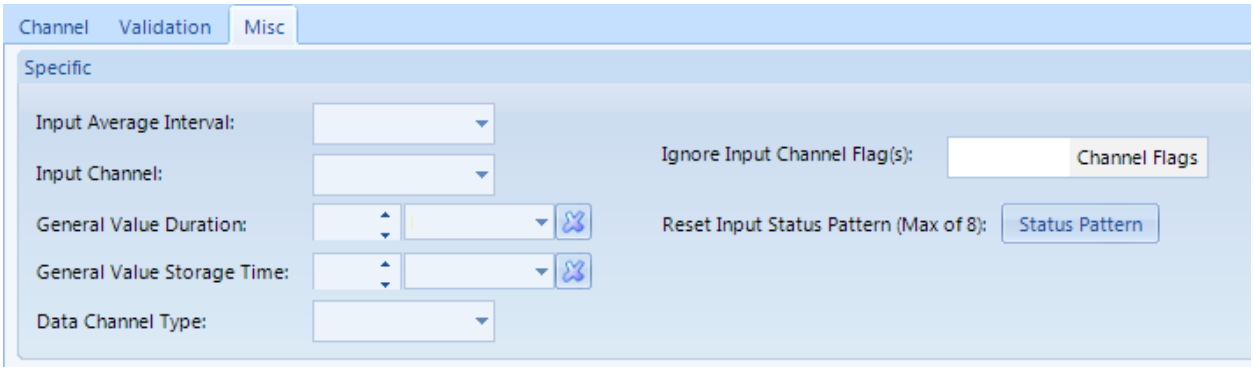
The **General channel** is used to run special calculations based on the input of another channel that is already configured (e.g., analog input, Modbus, etc). The different calculation types include:

- Maximum (find highest sub-interval in a given interval, e.g., highest minute in hour)
- Minimum (same, but finding the lowest)
- Accumulate (totals sub-intervals into final average)
- Number of Valid Averages (number of sub-intervals that are valid)
- Percent Valid (similar, but result expressed as a percentage 0-100)
- Difference (calculate difference of current average from previous average)

The Maximum method is commonly used on SO2 channels to find the highest 5 minute average in an hour, or for peak wind speeds. The Difference method is often used against a “raw” rainfall analog input to calculate the difference in the voltage to determine rainfall in an hour.

On the Misc. tab:

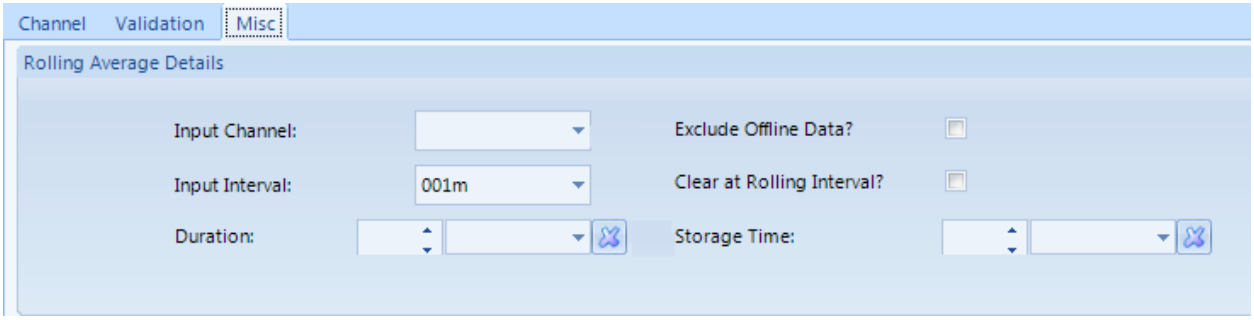
- Input Average Interval is the data type the general channel is to be based on, such as minute or hourly data (e.g., the "sub-interval" for the calculation.
- Input Channel Number is the channel number of the configured channel that will be the data source.
- General value Duration is the average basis for the General Channel Result.
- The Data Channel Type sets the calculation type; accumulative, maximum, minimum, number of valid runs, percent complete number of runs, or difference.
- Ignore Input Channel Flags are the flags to be ignored when verifying the validity of the current data point.
- Reset Input Status Pattern allows the user to set a digital status input pattern that, if observed, a reset will be generated to the calculation so far (e.g., previous sub-intervals will be ignored). This is not commonly used.



The **Rolling channel** calculates an extended rolling average from another channel's average, such as hourly averages rolling on the minute. The rolling average is updated when the base average is updated. For example, if the base average interval is one minute and the rolling average interval is one hour, the rolling average channel will store a new data point every minute; each data point will be an average of the previous 60 one-minute averages.

On the Misc. tab:

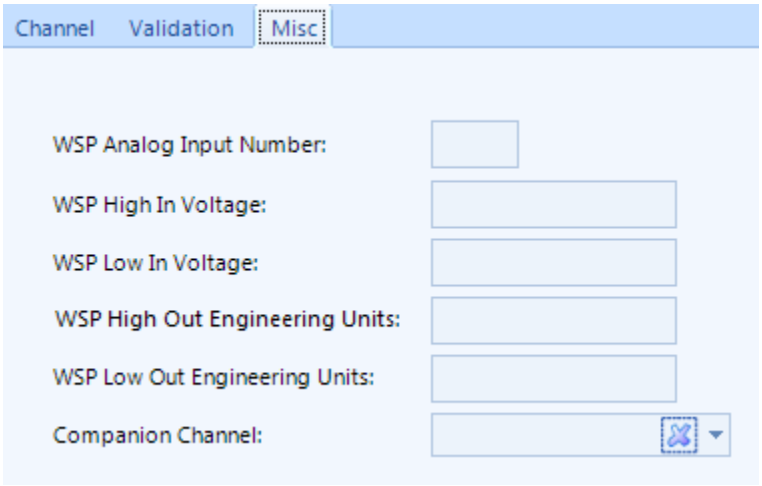
- Input Channel is the input channel number used for the rolling channel average.
- Input Interval is the data used to input into the rolling channel averages, and is the frequency at which the rolling average channel will create data.
- Duration is the length of the 'buffer' of input intervals used to calculate each average.



Meteorological Channel Types

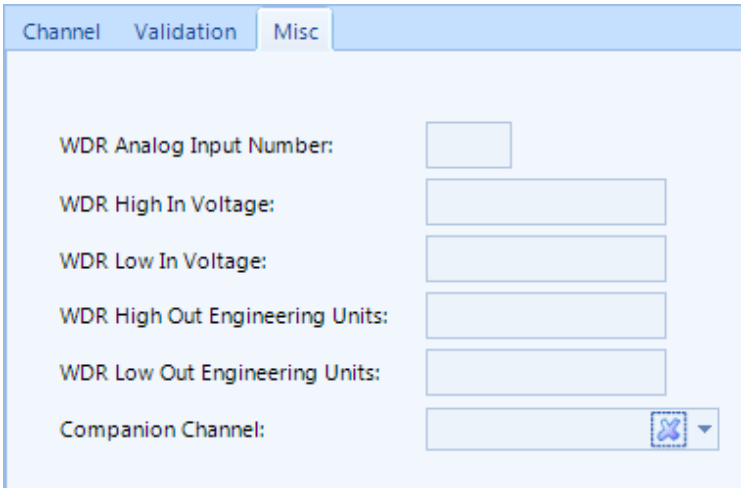
The **Vector Wind Speed channel** computes average wind speed as a vectored average. A corresponding Vector Wind Direction Channel must also be configured to support the Vector Wind Speed Channel. Input types can be analog inputs, or GSI (RS-232) based sensors, with a specific channel type for each approach. For the analog input type, the "Misc" tab is similar to the Analog Input Channel, while for the GSI version, the "Misc" tab looks like the GSI channel. The main difference is the manner of calculation, handling zero crossover, 0-360 and 0-540 degree instruments, etc.

For vector wind channels, an additional input is given for the companion channel (e.g., the Vector Wind Direction Channel for VWSP, and the Vector Wind Speed Channel for VWDR). The selection is the channel number for 8816s and 8832s, while 8872s use a pick list from already configured channels.

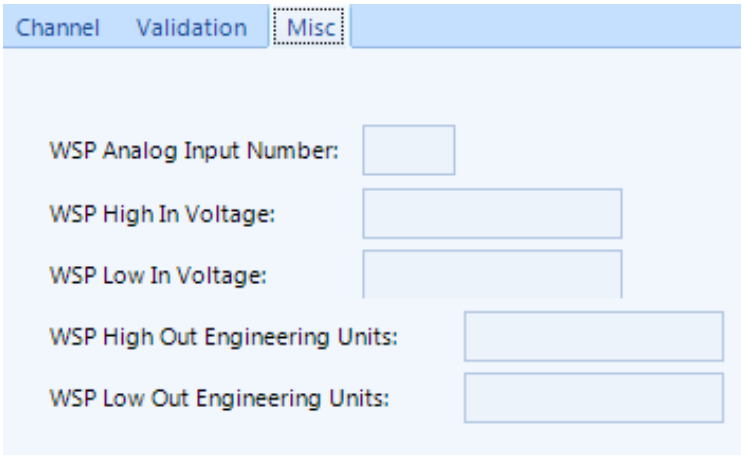


Before this field can be filled in both the vector wind and vector speed channels have to be created and saved, then you can go back and fill in the companion channel field.

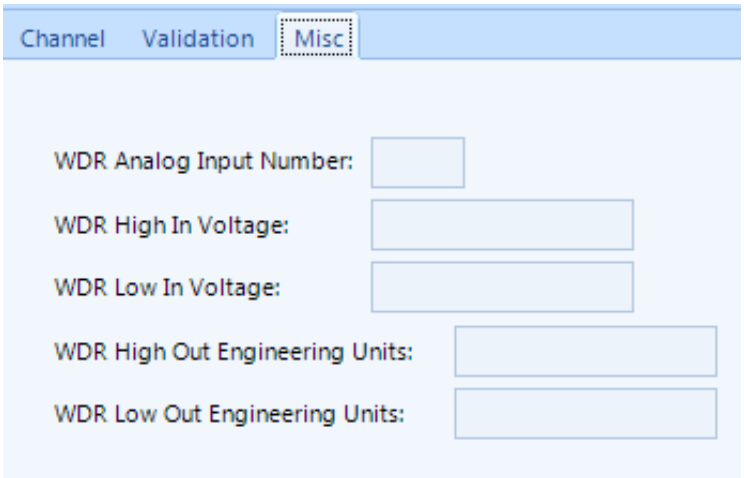
The **Vector Wind Direction channel** performs the direction part of the vector calculation, and is similar to the Vector Wind Speed channel listed above, including the Companion channel field.



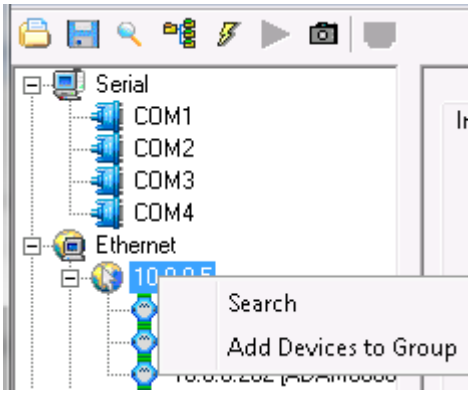
The **Wind Speed channel** is configured the same as the Vector Wind Speed channel minus the Vector Wind Direction channel companion field.



The **Wind Direction channel** is configured the same as the Vector Wind Direction channel minus the Vector Wind Speed channel companion field.

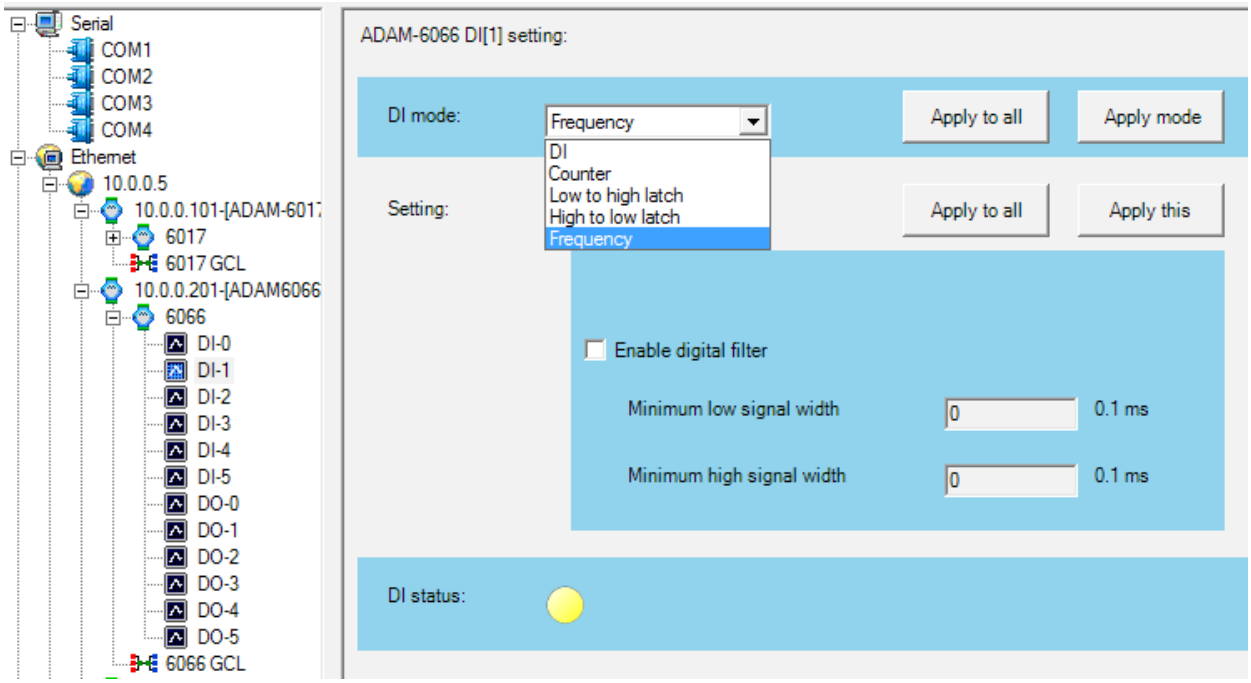


Configure Frequency Based Wind Speed on 8872



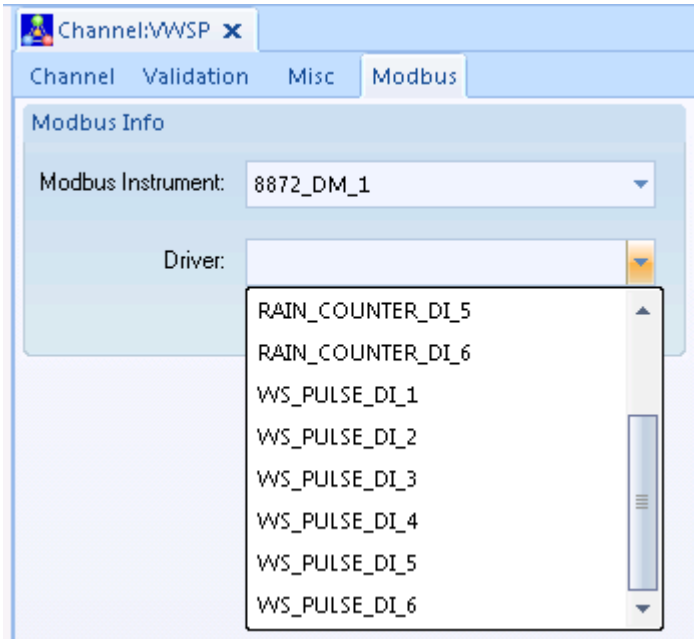
A Met Card is not required for pulse / frequency input wind speed, such as from the Met One 010C. The 8872 can use its status inputs for wind speed. However, a signal converter like theMSC-82 may still be required to amplify the signal level. The maximum input is ~ 2 Khz.

1. Wire your sensor to the desired Status Input pair (+ and -) .
2. In the APAX utility, right click on the 10.0.0.5 entry and chose Search.
3. Click on the entry based on the Status Input you used:
   a. 10.0.0.201 for inputs 1-6
   b. 10.0.0.202 for inputs 7-12
4. Expand the 6066 entry and click on the appropriate status input.
   a. NOTE: the DI will be one value lower than the Status Input you chose on the back of the 8872 (ex. Status Input 1 would be DI-0 in APAX)
5. Change the DI Mode from “DI” to “Frequency”.

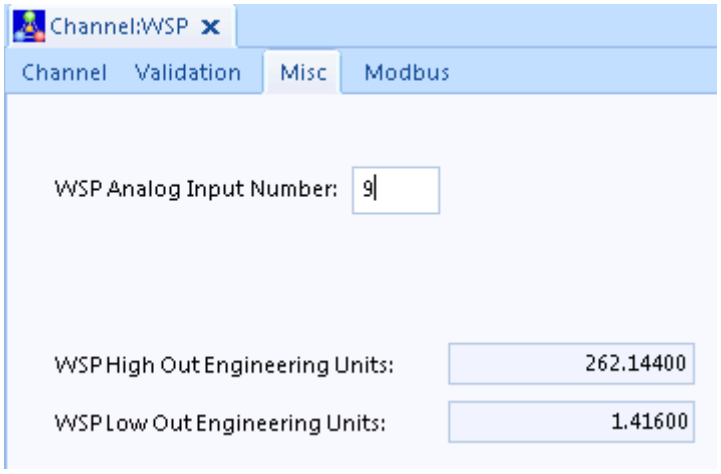


6. Once changed, click 'Apply mode'.
7. In AVTrend, go to Logger Channels and select your wind speed channel.
8. On the Modbus tab, link the channel to the correct input module, and the correct input on that module.

NOTE: DI-0 in Apax equates to Status Inputs 1+ and 1- on the rear of the logger and to DI_1 in AVTrend; DI-1 would equate to 2+, 2- and DI_2; etc.



9. On the Misc tab, set the High Out and Low Out units.

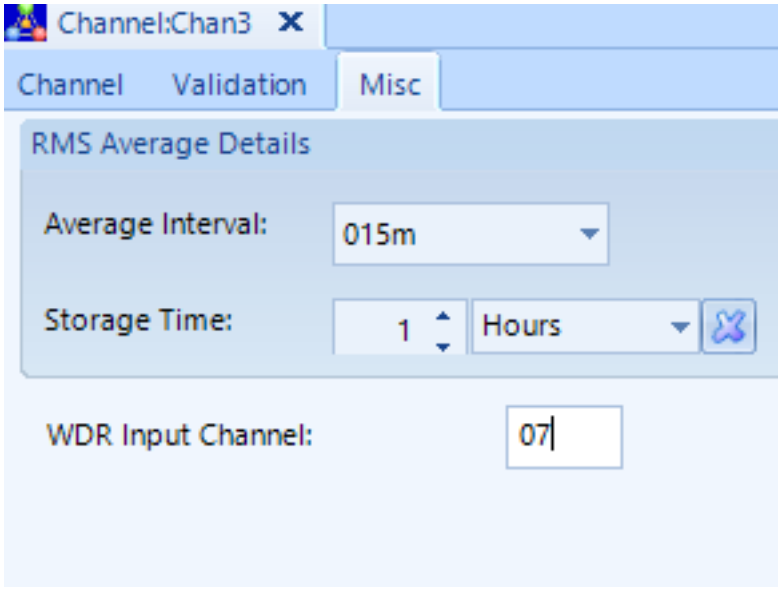


To determine the values to enter use the equation: Output Value) / (Translation Value).

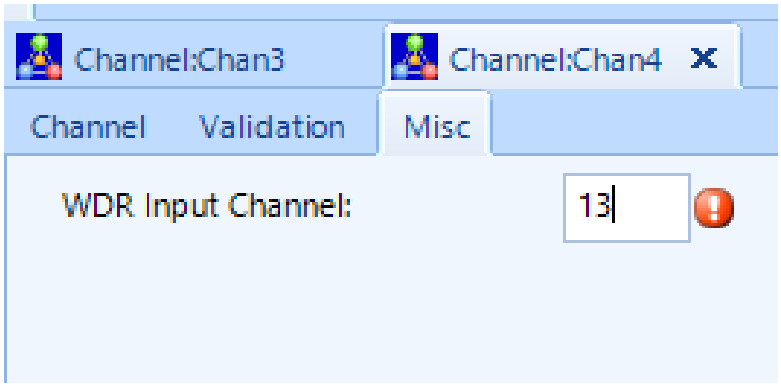
EX. A Met One 010C may be spec'd at a range of 0.27 to 50 meters per second, with 1250 Hz equivalent to 50m/s.

High Out would equal (50)/(1250) Low Out would equal (0.27)/(1250)

The **Sigma Theta** takes the input of a wind direction channel and calculates a USEPA sigma theta (Yamartino method). The input is set to a Wind Direction or Vector Wind Direction channel. The RMS interval is the sub-interval for the root-mean-square combination of sub-intervals, and for most applications is set to 15 minutes.



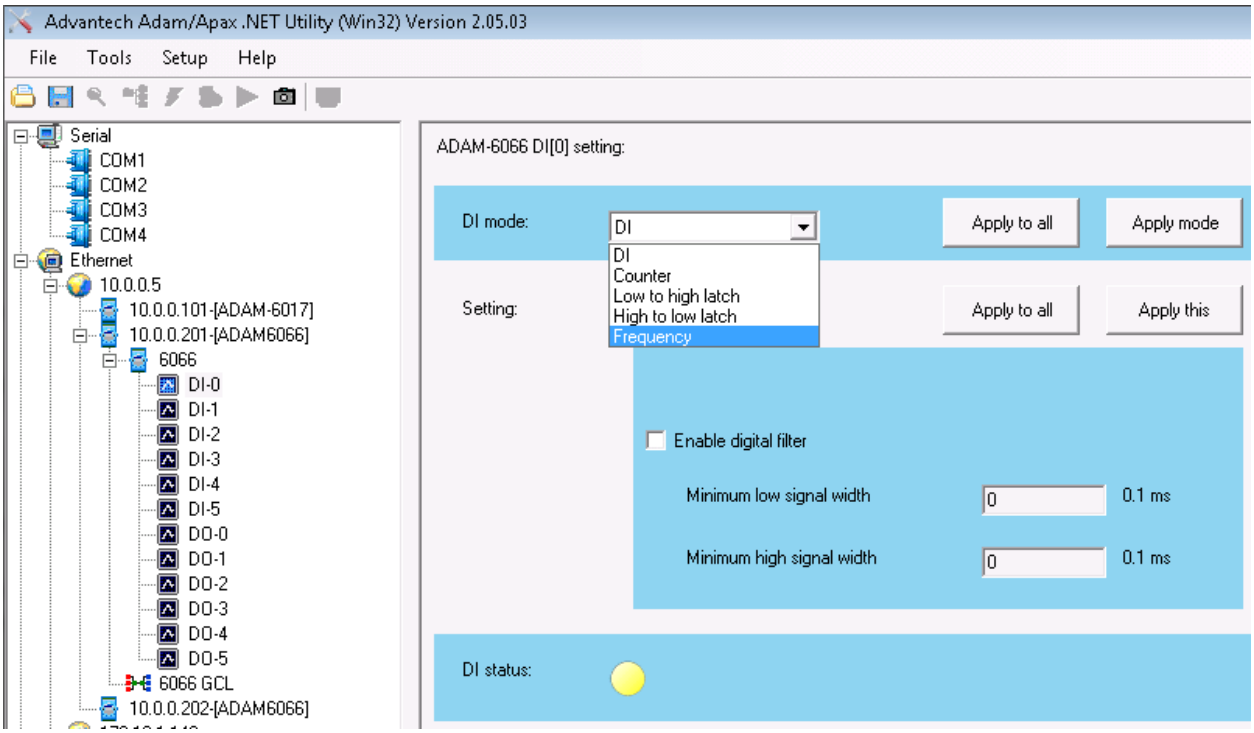
The **Linear Sigma** channel takes data from an analog input to calculate a standard deviation/mathematical sigma (measure of standard deviation) of another channel.



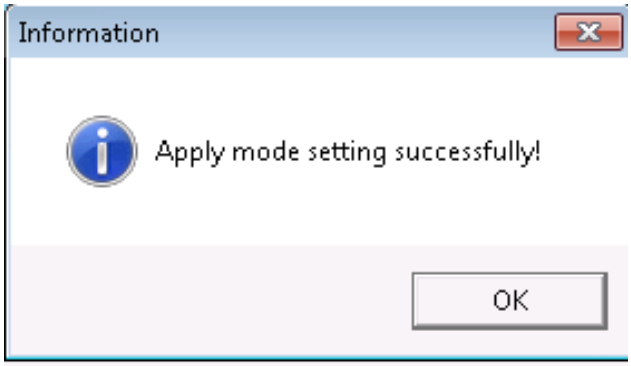
Configuring 8872 Digital Inputs for Rainfall Counter Inputs

Rather than having a separate Met Card, the 8872 can use its status inputs for rainfall counts.

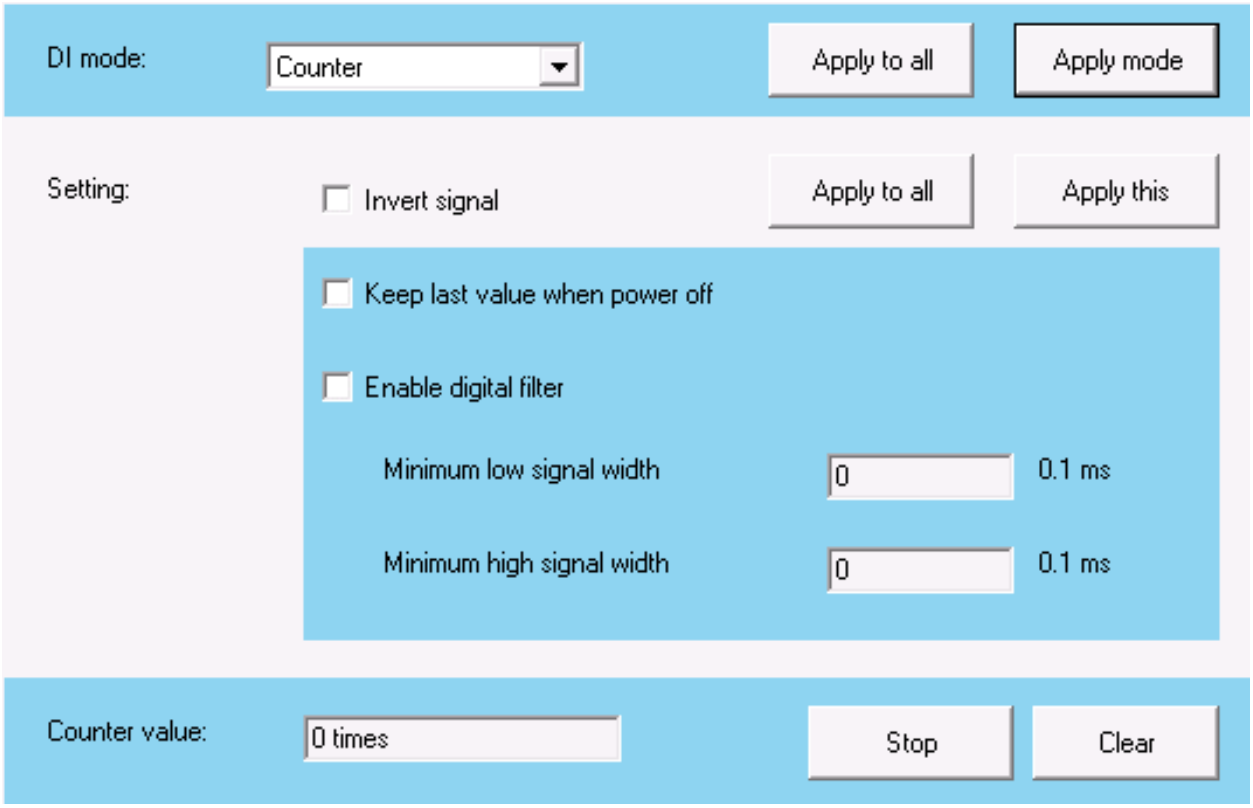
1. Launch the Apax Utility and expand the 6066 module based on the specified input number.
   a. For inputs 1-6 use the 201 module, for inputs 7-12 use the 202 module.
2. Select the input as listed on the sheet, offset by 1 (input 1 would be DI-0, input 2 would be DI-1, etc.)
3. In the 'DI mode' pick list select Counter. Do not use this input for other status input functions.



4. Click the 'Apply mode' button to save the changes, the following message should be received.



5. Once the mode change is applied, the screen will appear as follows (depending on mode selected).



On the Channel setup in AVTrend the Analog Input Channel Number under the Misc tab would not be used. Under the Modbus tab, link the channel to the correct input module, and the correct input number on that module.

This example is for Status Input #1 would be "RF_DI_1" on "8872_DM_1".

Status Input #2 would be "RF_DI_2" on "8872_DM_1".

Status Input #7 would be "RF_DI_1" on "8872_DM_2".

External Channels

The Model 8872 supports a new channel type “E” for External Channels. These allow the user to create a ‘fake’ channel associated with parameter from a directly polled instrument (e.g., BAM, API 602, E-Sampler, etc), where the logger is not doing real-time acquisition (e.g., directly polled instruments in an 8872). It exists ONLY to create a channel number for use with logger polling. The External type channel requires no other special configuration, and is ignored by the Site Node Logger process.

Rolling Average

Misc Tab

- ***Input Channel***
  Defines which channel is to be used for the input of the rolling average. It may be of any channel type.
- ***Input Interval***
  Defines the input interval from the input channel for the rolling average calculation. This will also define the rate at which averages are stored for the rolling average.
- ***Duration***
  This designates length of the rolling average "buffer", or how many averages are used in the rolling average calculation. Invalid averages are kept in the buffer, but not used in the resultant calculation.
- ***Exclude Offline Data***
  Not used in the Model 8872
- ***Clear At Rolling Interval***
  This tells the logger to "clear" the rolling buffer at the end of the duration interval. This is commonly used for 'building' averages that need to be reset every hour, day, etc.
- ***Storage Time***
  Not used in the Model 8872

General

Misc Tab

- ***Input Channel***
  Defines which channel is to be used for the input of the calculation. It may be of any channel type.
- ***Input Interval***
  Defines the input interval that is to be used for the calculation.
- ***General Value Duration***
  This designates length of the period for which the calculation is to be performed. E.g., to find the highest 1 minute average in an hour, the Input Interval would be 1 minute, but the General Value Duration would be 1 hour.
- ***General Value Storage Time***
  Not used in the Model 8872
- ***Data Channel Type***
  May be defined as “Maximum” or “Minimum”.
- ***Ignore Input Channel Flags***
  Defines flags that, if found on the input interval, cause that average to be ignored for calculation purposes.
- ***Reset Input Status Pattern***
  Defines a digital input pattern that can be used to “reset” the minimum or maximum recorded so far in a period.

CEM Channel Types

The **Stream-Switched Averaging channel** allows the data logger to monitor one analyzer that is time-shared between two sampling trains. It forms a base average and two extended averages from another channel, and accepts data from that input channel only when an on-line digital input status is met. If this condition is not met, the data can be designated as invalid, or the data (last good reading, base average, extended average, or average) over the previous on-line period may be "held" until the on-line status condition is met.When stream switch channels are controlled by digital event programs or are calibrated using automatic calibration programs, the digital program or calibration timing may not line up exactlywith the stream switch channels averaging periods. Calibrations and event programs should be configured to end a few seconds before the start of the next base average.

On the Misc. tab:

- On-Line pattern defines the status input pattern (physical or pseudo-inputs) used to define when the stream is "on" for data collection purposes.
- Offline Action defines how to handle data when the on-line pattern is not active:
  - Hold Last (instantaneous) Reading
  - Hold Last Base Average
  - Invalid (invalidate data)
- Purge Time defines how long to continue with the "offline" action when the status inputs transition from the off-line condition to the on-line condition.

The **Time On-Line and Multi-Condition TOL (Time Online) channels** allow the data logger to record when a process or generating unit is online for CEM reporting purposes. The resultant 'average' is typically a count of the base intervals (e.g., base average = 0 or 1, hourly averages range from 0-60, counting the number of online minutes, etc).

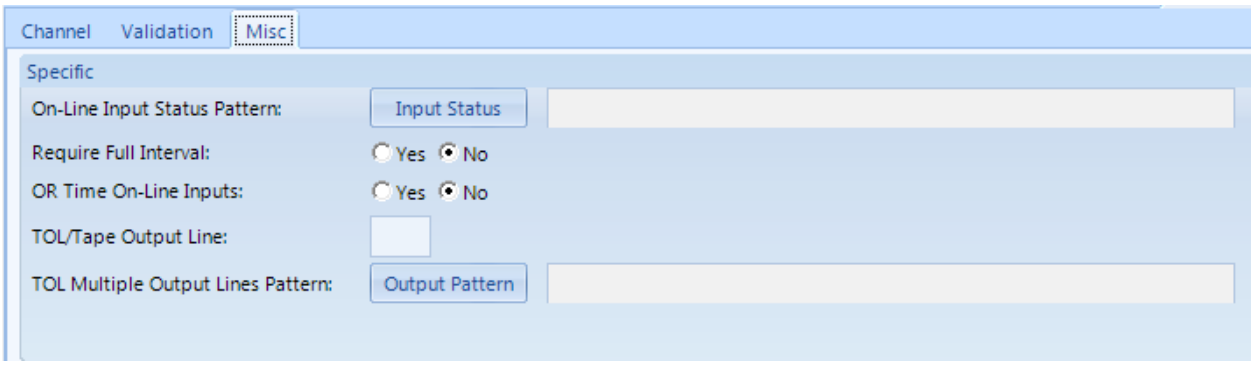
The basic Time On-Line channel allows the user to define an "Online Input" (status input pattern of physical and/or pseudo-inputs). When that pattern is seen as true, the TOL channel counts the process as on.

The Multi-Condition Time On-Line channel allows a more complex definition of up to three conditions, each of which can be a status input or a threshold of a channel value, for example:

"Flame On" (status input #01) is true (closed) AND

"Fuel Flow" (Modbus channel #7) is > 4 gallons/minute AND

"Stack Temperature" (analog input #7) is > 300 degF.


Channel
Validation
Misc
Specific
On-Line Input Status Pattern:
Input Status
Require Full Interval:
Yes
No
OR Time On-Line Inputs:
Yes
No
TOL/Tape Output Line:
TOL Multiple Output Lines Pattern:
Output Pattern

Validation and Flags

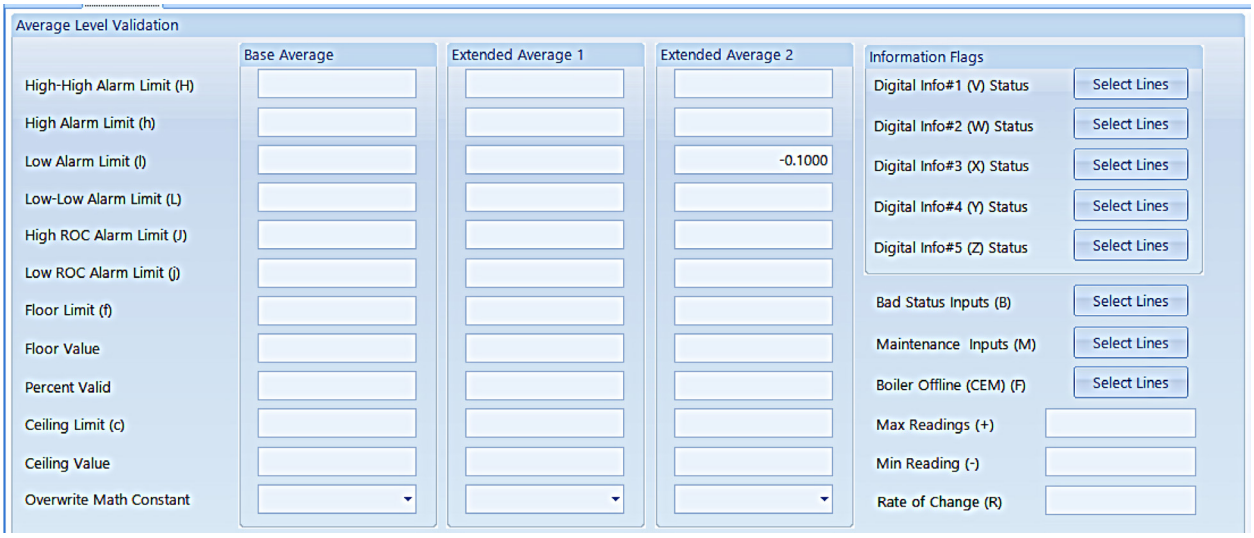
Flags in AirVision can generally come from the data source (data logger, instrument), or applied later via data editing.

For data coming from data loggers, the flag list and sources of the flags are as follows. Flags are listed below in order of priority (from the data logger's perspective). Some flags are 'instantaneous' flags applied to readings (and visible on all resultant averages), while some flags are only applied to the particular average interval they are set for, like a high or low limit. Flags in **red** will invalidate the readings for the period the condition exists.

FLAG	TYPE	DESCRIPTION	SOURCE OF FLAG
<	Average	Insufficient data for valid average	Automatically applied by logger if less than 75% or defined % valid in Validation Settings.
>	Average	Sufficient data for valid average, but some data missing	Automatically applied by logger if > 75% (or user defined threshold) but < 100% of readings valid.
P	**Instantaneous**	**Power failure**	Power failure experienced (invalidates one base average).
D	**Instantaneous**	**Channel Offline**	Channel disabled via user interface (Logger Toolbox in 8872).
T	**Instantaneous**	**Out Of Control due to bad Cal**	Normally a CEM feature, if cal drift > OOC limit set in Calibration program, then channel invalid until a good cal is passed.
F	**Instantaneous**	**Boiler Offline (CEM)**	Normally CEM feature, boiler is considered offline based on status input pattern configured in Validation settings.
B	**Instantaneous**	**Bad Instrument Stations**	Instrument is considered offline based on configured status input pattern. Will also appear during periods of Modbus or RS-232 communication 'dropouts' between logger and instrument.
C	**Instantaneous**	**Instrument in Calibration**	Logger running calibration program affecting this instrument/channel.
M	**Instantaneous**	**Instrument in Maintenance**	Channel disabled via user interface (Logger Toolbox in 8872) or via configured status input.

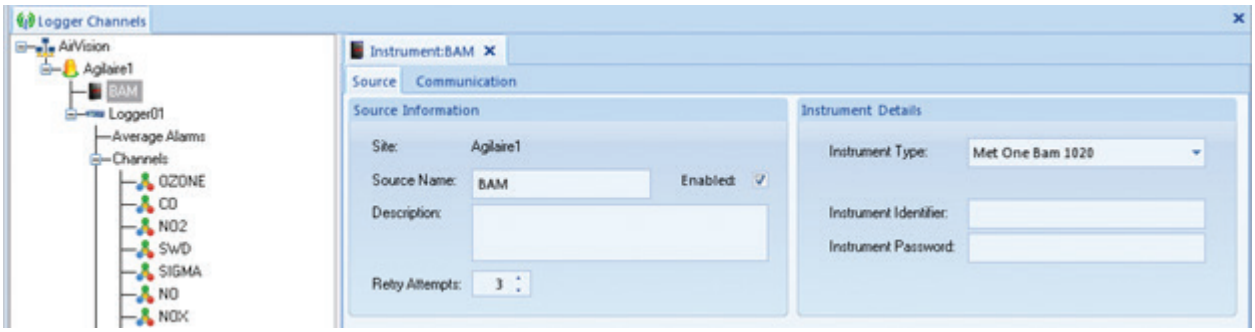
FLAG	TYPE	DESCRIPTION	SOURCE OF FLAG
A	**Instantaneous**	**Math Error**	Error executing math pack channel equation, most commonly divide by zero.
+	**Instantaneous**	**Maximum Reading Error**	Reading > configured “Maximum Reading”, invalidates the base average.
-	**Instantaneous**	**Minimum Reading Error**	Reading < configured “Minimum Reading”, invalidates the base average.
R	**Instantaneous**	**Rate of Change Error**	Reading changed from one reading to another > the configured rate of change limit.
H	Average	High High Limit Exceeded	Average (e.g., 1m, 1h) value > configured limit.
L	Average	Low-Low Limit Exceeded	Average (e.g., 1m, 1h) value > configured limit.
h	Average	High Limit Exceeded	Average (e.g., 1m, 1h) value , configured limit.
l	Average	Low Limit Exceeded	Average (e.g., 1m, 1h) value < configured limit.
J	Average	High High Rate of Change	Change from previous average > set limit.
j	Average	High rate of change	Change from previous average > set limit.
V	Instantaneous	Digital Information#1	Configured status input pattern detected.
W	Instantaneous	Digital Information#2	Configured status input pattern detected.
X	Instantaneous	Digital Information#3	Configured status input pattern detected.
Y	Instantaneous	Digital Information#4	Configured status input pattern detected.
Z	Instantaneous	Digital Information#5	Configured status input pattern detected.
f	Average	Floor limit exceeded	Average < configured Floor Limit, value changed to floor value.
c	Average	Ceiling limit exceeded	Average > configured Ceiling limit, value changed to ceiling value.

The Validation settings can be found in the Logger Channels editor:



2.4 Adding an Instrument

If the 8872 is licensed to poll and instrument directly, select **Configuration Editors/Logger Channels** and highlight the **site name** in the **Logger Channels** configuration tree diagram. Click the **Add button** and select **Instrument**. The **Instrument Type** (ID) field is required and can be selected from the drop-down list. Enter a **Source Name**, an **Instrument Identifier** and **Instrument Password** , and click the **Enabled** box. Click the **Save** icon.



Instrument Configuration from Logger Channels in Configuration Editors

You will also need to go into the Communications tab and set the communication route (e.g., "COM1", etc.) For more details, consult the application notes for direct polling at www.agilaire.com/application-notes.

2.5 Setting Up Calibrations

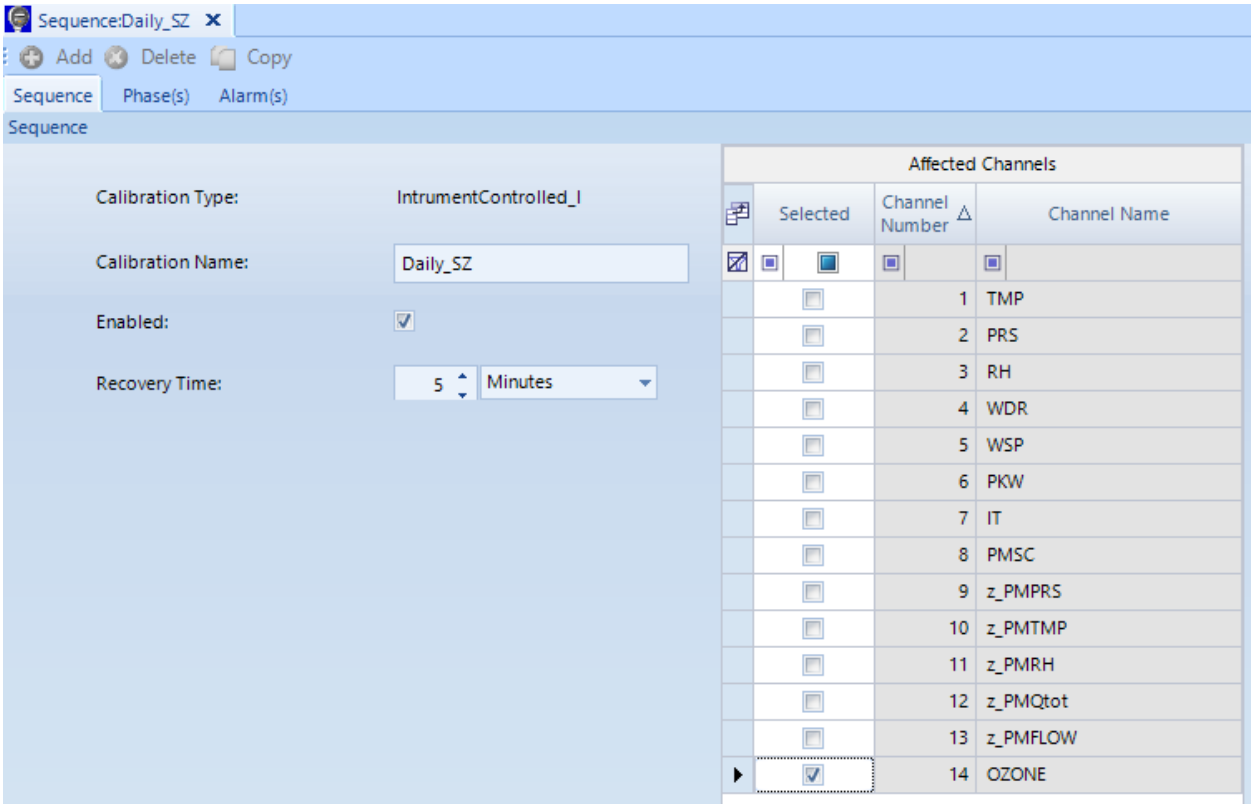
The Model 8872 follows the 8816 / 8832 approach to calibrations, where calibrations are defined as their own entities, and store data in calibration result records (rather than just flagging fine-resolution data). The Model 8872 supports five models of calibration, distinguished by how they are initiated and timed/controlled:

Calibration Type	*Description*
Automatic Calibration	Logger initiates the calibration at a pre-programmed time, repeats on a set interval, and controls the timing of the calibration through activating physical outputs on the Model 8872, or remote outputs via Modbus link to calibrators, instruments, etc.
Instrument Initiated	Similar to the Automatic Calibration, except that rather than having a start time and repeat interval, the user defines a start status input pattern (physical on 8872 or via remote Modbus I/O). When the correct pattern is seen, the calibration starts. It does not repeat again until the start pattern is seen again. Usually used for a "pushbutton" cal, or to follow a programmed timing from an instrument that can only provide an "in calibration" status signal.
User Initiated	Similar to the Automatic Calibration, except the calibration is only begun using the "start calibration" function in the Model 8872's user interface.
Instrument Controlled	Logger follows the phases of a calibration via physical or remote status inputs, with a unique pattern defined for each phase. Instrument controls all of the timing, but the user can define the window of time at the end of each phase for which the data is taken (e.g., "take the last 90 seconds as data"). Usually used to follow sequences programmed into calibrators, where the calibrator sends a pattern via physical inputs or Modbus.
Interactive (Menu)	Progression through phasing and timing controlled by the user through the use interface.

All calibrations have a Recovery stage at the end of the cal, during which data is invalidated, but is not associated with any input patterns or control outputs. This is to represent the time for the system to return to normal sampling condition.

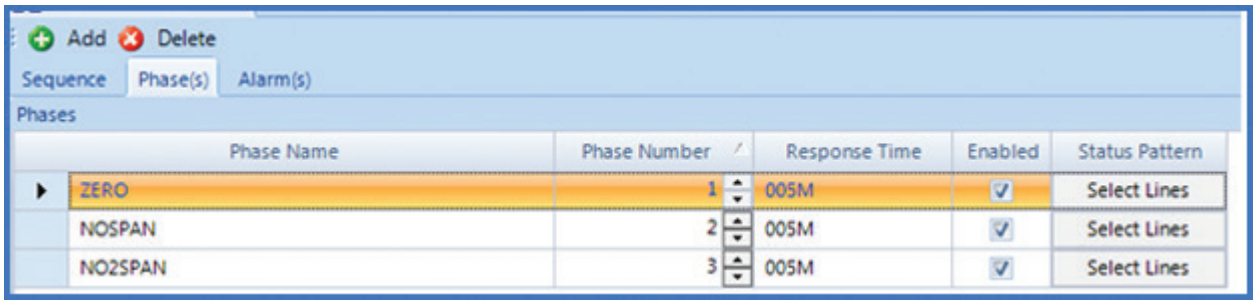
All calibrations also have a list of **Affected Channels** that defines which parameters are to be invalidated during the calibration. Generally, the parameters are the same as the list of **Data Channels** (for which we record data), but there are some cases where a 1:1 correlation does not exist, for example, and SO2 calibration through a common gas manifold may require that other gas parameters be marked invalid.

Other calibration sequence properties may include:



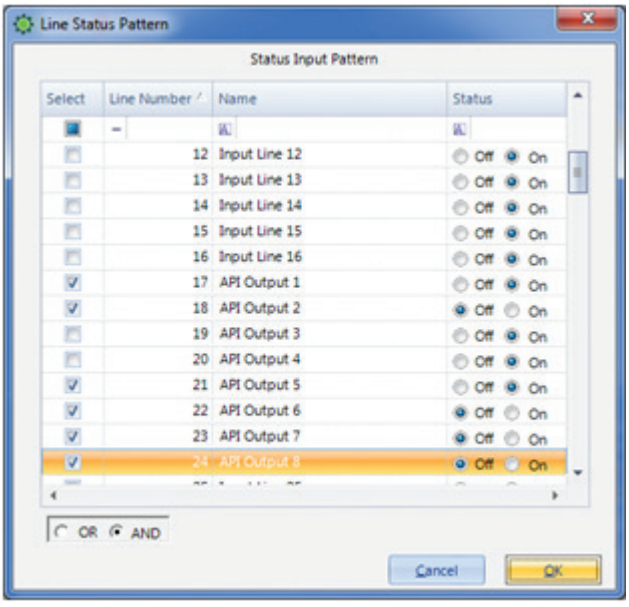
- ***Name of Cal Sequence***
  The label used to identify this calibration program.
- ***Enabled:***
  Can be used to activate / deactivate the calibration program.
- ***Starting Time (Automatic)***
  The month, day, and time that the data system controller should begin this calibration sequence.
- ***Interval (Automatic)***
  How often this calibration sequence should repeat; usually every 24 hours (1d).
- ***Start Pattern: (Instrument Initiated)***
  Defines the status input pattern that starts the calibration.comcast.net
- ***Recovery Pattern***
  Defines a physical/pseudo output pattern to be set during the recovery phase (example: set calibrarot to STANDBY mode).

Within the **Phase** settings, properties may include:



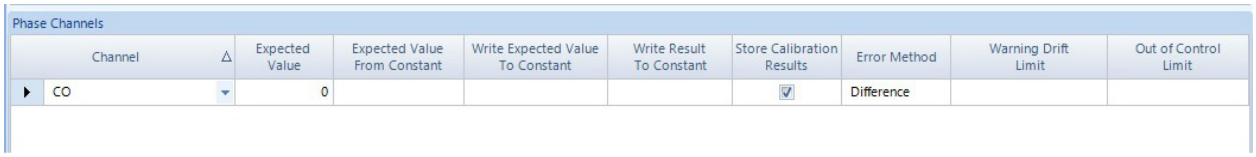
Phase Settings

- ***Phase Name***
  The label used to identify this calibration stage/phase (e.g., Zero, Span, Prec)
- ***Phase Number***
  Defines the order of the phases in which they run (not used for Instrument Controlled calibrations, as their phases can occur in any order).
- ***Duration Time (Automatic, User Initiated, Instrument Initiated)***
  The period of time that the control outputs for that phase will be set.
- **Response Time**
  The window of time at the end of that phase in which readings are averaged to form the resultant value for that phase.
- ***Status Pattern***
  Defines the status output or input pattern associated with that phase. For input patterns, the user should define which inputs are to be observed, and if they should be closed or opened for that pattern. **The pattern for each phase and calibration should be unique.**
- ***Level***
  Defines the calibration level (ZERO, SPAN, etc.) for AirVision reports.



Line Status Pattern for Phases

For each Phase Channel (combination of phase and recorded channel), the properties include:

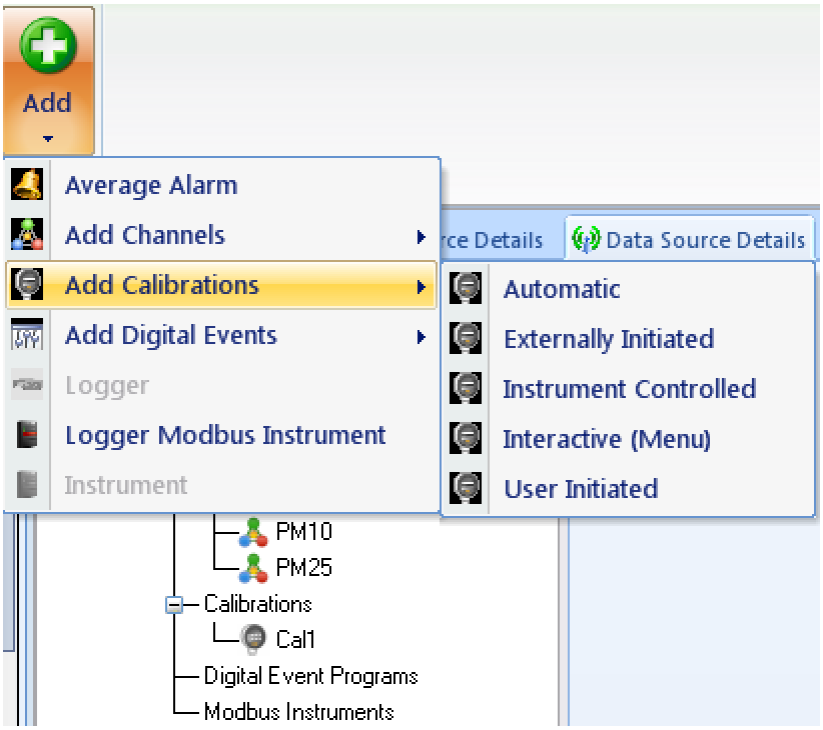


Phase Channel Properties

- ***Channel***
  Which parameter(s) are to be recorded for this phase
- ***Expected Value***
  The target value for the instrument during this phase.
- ***Expected Value From Constant***
  The expected value held in a math constant can be used for the calibration.
- ***Write Expected Value To Constant***
  The expected value can be written to a math constant to be used for other purposes.
- ***Write Result To Constant***
  A calibration result can be written to a math constant to be used for other purposes such as in a math pack channel formula.
- ***Store Calibration Results***
  Normally set, this can be used to inhibit recording a value that is taken for some other purpose (e.g., Write Value to Constant).
- ***Error Method***
  Used to designate the error method used for the Calibration Result. Choices are
  Standard: Shows cal error as ABS(difference) / Cal Span
  Difference: Shows cal error as actual difference of engineering units
  Linearity: Shows cal error as ABS(difference) / Expected Value
- ***Warning Drift Limit***
  The user can define an absolute value difference between the observed value and the expected value and, if this limit is exceeded, an alarm output can be set.
- ***EV for Auto Correct***
  Not used in the Model 8872 (at this time)

To configure calibrations:

- open **Configuration Editors > Logger Channels**
- highlight the **Logger** in the tree diagram
- click the small arrow under the **Add** button
- select **Calibrations** from the drop-down list
- select one of the following calibration types:
  Automatic
  Externally Initiated
  Instrument Controlled
  Interactive (Menu)
  User Initiated

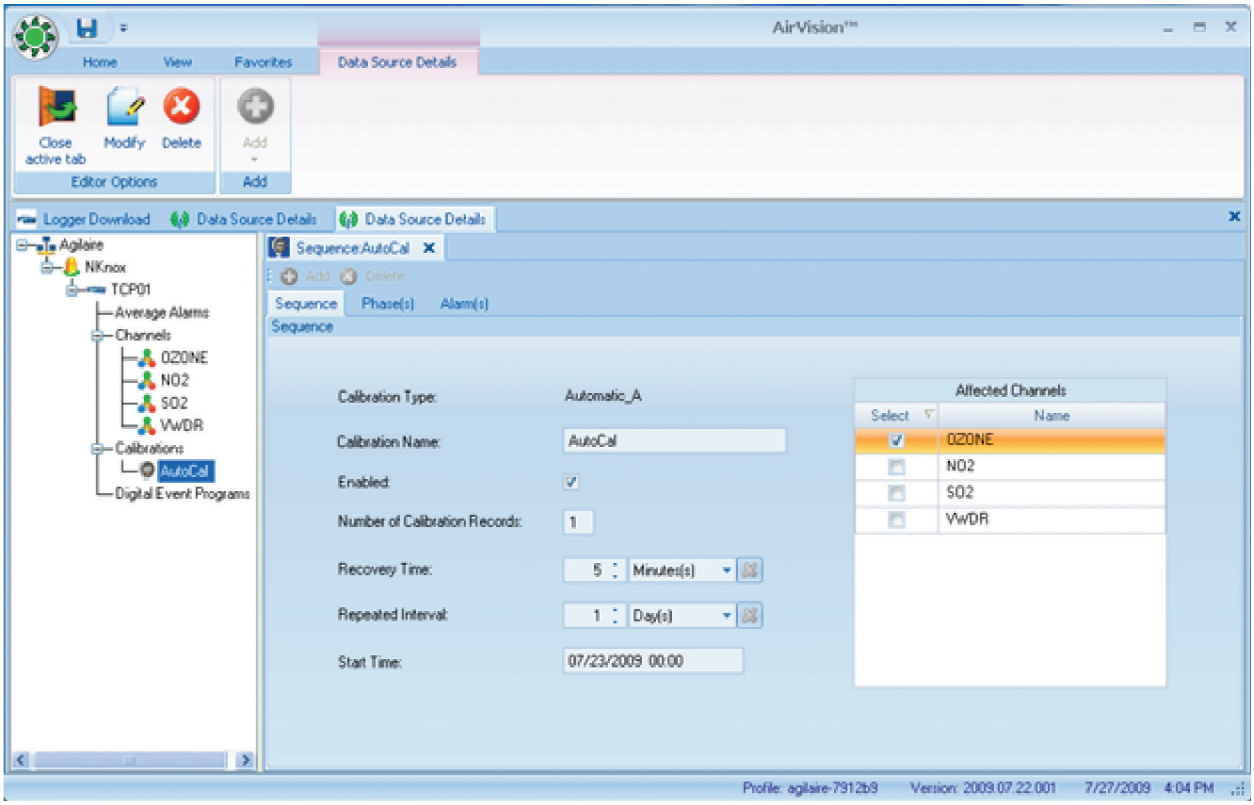


Adding calibrations in Configuration Editors > Logger Channels

Configuring Automatic Calibrations

If you configure **Automatic** Calibrations, the cal you enable will be automatically initiated by the data logger's internal clock. The Automatic Cal Sequence configuration screen has the following fields :

- **Calibration Type** will be already filled in (Automatic_A).
- **Calibration Name** is required to identify the cal program.
- Check **Enabled** if the calibration is to run.
- **Number of Calibration Records** determines how many cals the data logger will store before overwriting.
- **Recovery Time** specifies the time required to purge cal gas after phases.
- **Repeated Interval** determines how often cal sequence will repeat.
- **Start Time** determines what time cal sequence will start.
- **Affected Channels** determines which channels will be taken off-line during cal. Select from a list of previously configured parameters.

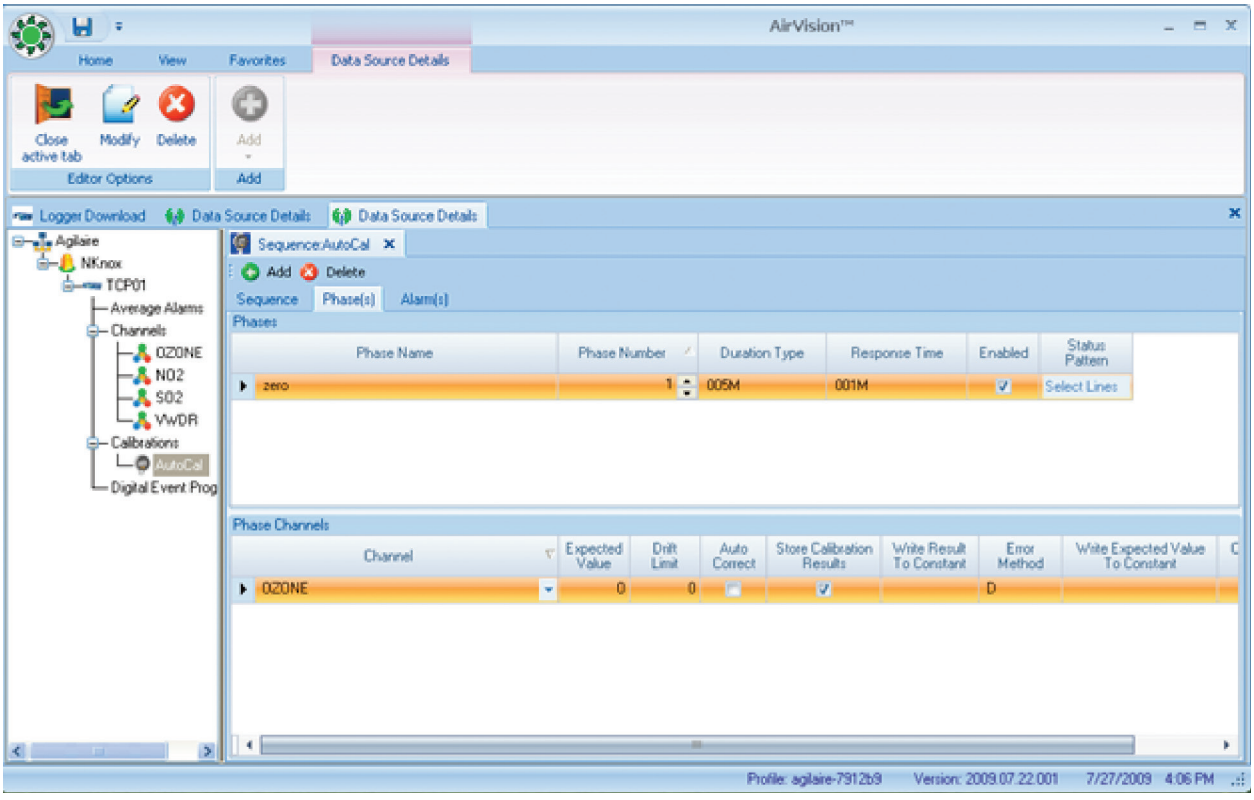


Automatic Calibration configuration in Configuration Editors > Logger Channels

Configuring Phases

To set up Phases:

- click the **Phase(s)** tab behind the Sequence Cal tab.
- To enter a phase name, click the click the **Add** (above the tabs) and select **Phase** from the drop-down list.
- Enter a **Phase Name**, **Phase Number**, **Duration Type**, **Response Time**, and click to check the box in the **Enabled** column.
- To configure a **Status Pattern**, click in the **Status Pattern** column and a check list of **Output Control Patterns** will come up.
- After the Phase table is configured, click **Add** again and select **Phase Channels**.
- Select a **Channel** from a drop-down list, and optionally enter an **Expected Value**, **Expected Value from Constant**, **Warning Drift Limit**, **EV for Auto Correct** (click to enable), **Store Cal Results** (click to enable), **Write Result to Constant**, **Error Method**, **Write Expected Value to Constant**, and **Out of Control Limit**.

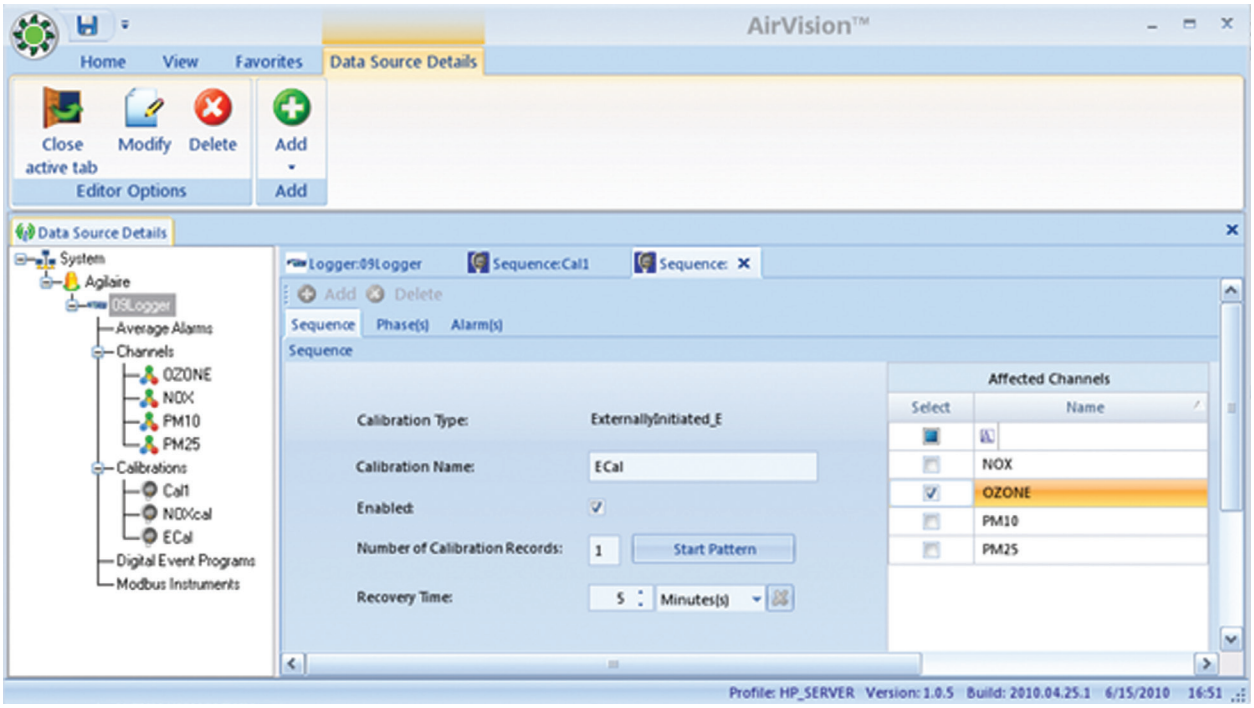


Configuring calibration phases in Configuration Editors > Logger Channels

Externally Initiated Calibration

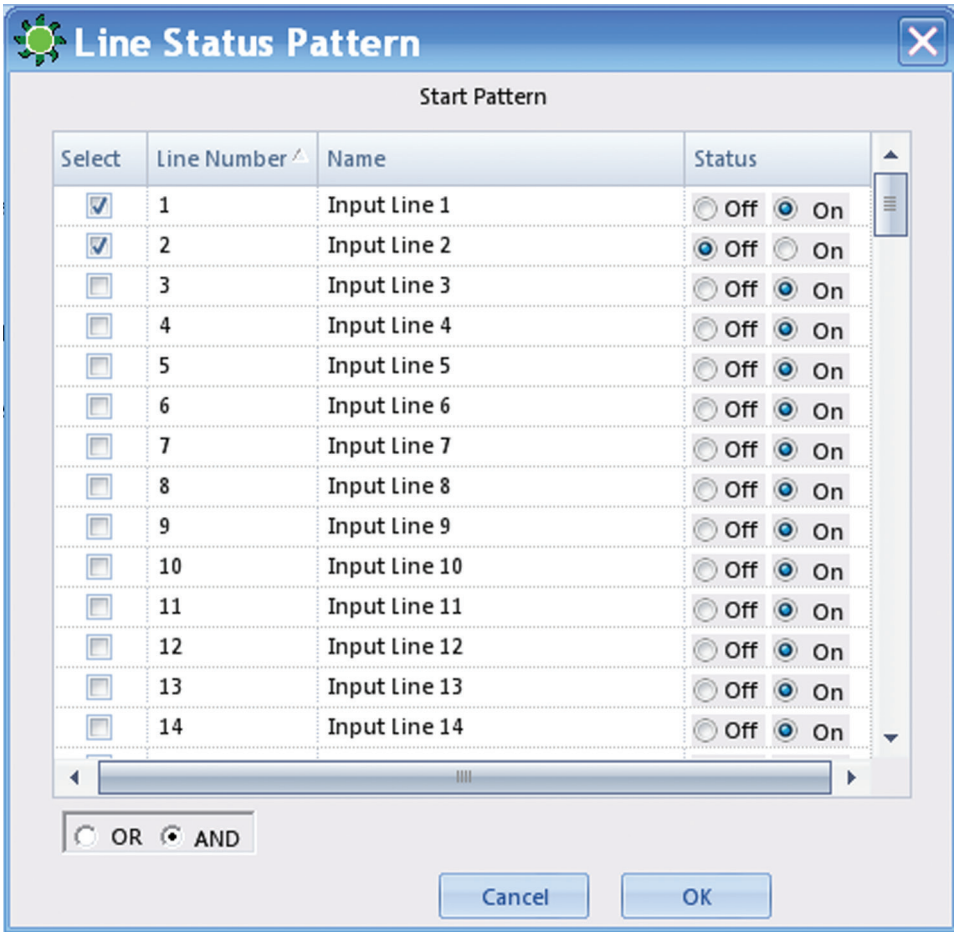
Externally initiated calibration is identical to an automatic calibration except for the way it is initiated. The sequence is started when a specified pattern of input control lines is met. To configure the **Start Pattern** (Line Status Pattern), click the **Start Pattern button**.

Individual phases are then initiated sequentially. As with an automatic calibration, the duration of each phase in the sequence can be specified.



Configuring Externally Initiated Calibrations in Configuration Editors > Logger Channels

When you click the **Start Patter**n button in the **Externally Initiation Calibration** screen, you **will see a Line Status Pattern** screen. Check the **Select** box to select an **Input Line** and select a **Status** of **On** or **Off**.The Externally Initiated Cal will begin when the **Start Pattern** is met.

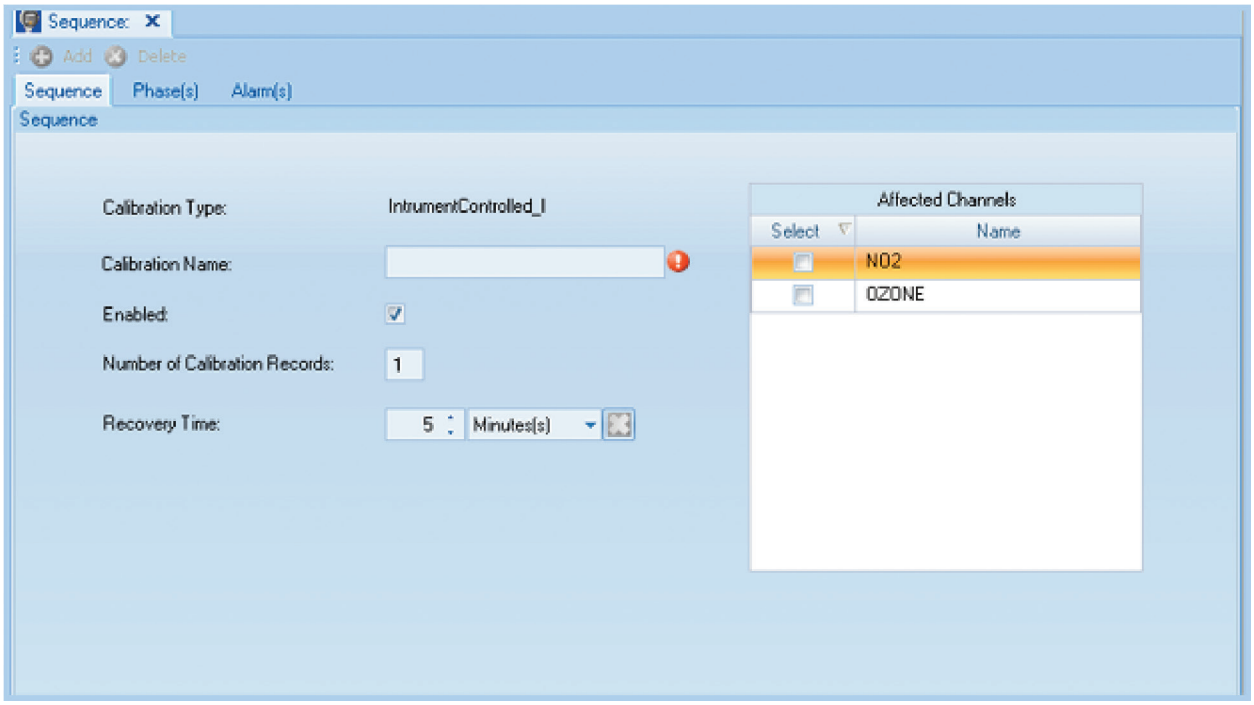


Configuring Start Pattern (Line Status Pattern) in Externally Initiated Calibrations in Configuration Editors > Logger Channels

Configuring Instrument Controlled Calibrations

If you configure **Instrument Controlled** Calibrations, enabled calibrations will be initiated by the data logger when it detects a specified digital input pattern. Each phase will continue until the input line pattern changes. The Instrument Controlled Cal screen has the following fields:

- **Calibration Type** will be already filled in (InstrumentControlled_I).
- **Calibration Name** is required to identify the cal program.
- Check **Enabled** if the calibration is to run.
- **Number of Calibration Records** determines how many cals the data logger will store before overwriting.
- **Recovery Time** specifies the time required to purge cal gas after phases
- **Affected Channels** determines which channels will be taken off-line during cal. Select from a list of previously configured parameters.



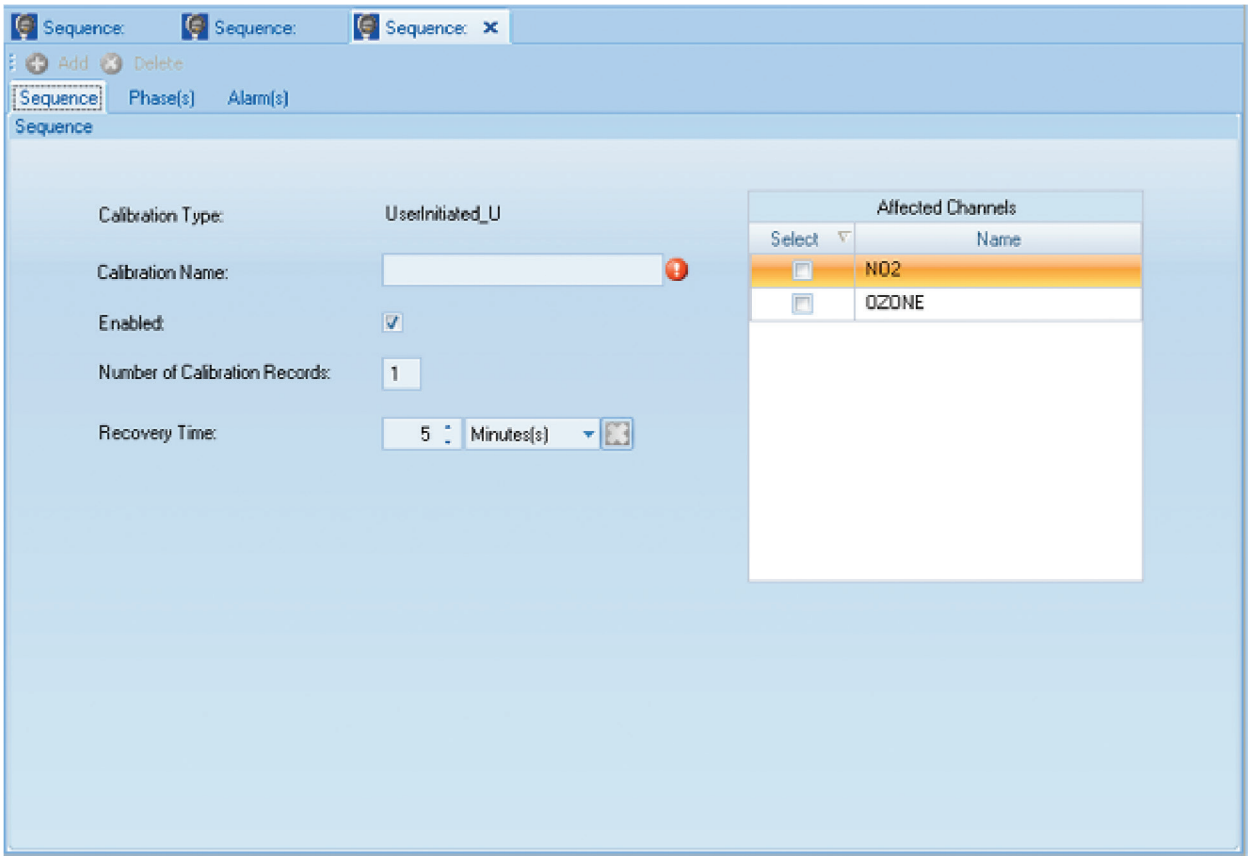
Configuring Instrument Controlled Calibrations from Configuration Editors > Logger Channels

Configuring User-Initiated Calibrations

User-initiated calibrations are started manually by linking to the data logger. When the cal sequence is started, each phase will be initiated in order. The duration of each phase is configured with the same fields as automatic cals.

The User-Initiated Cal configuration screen has the following fields :

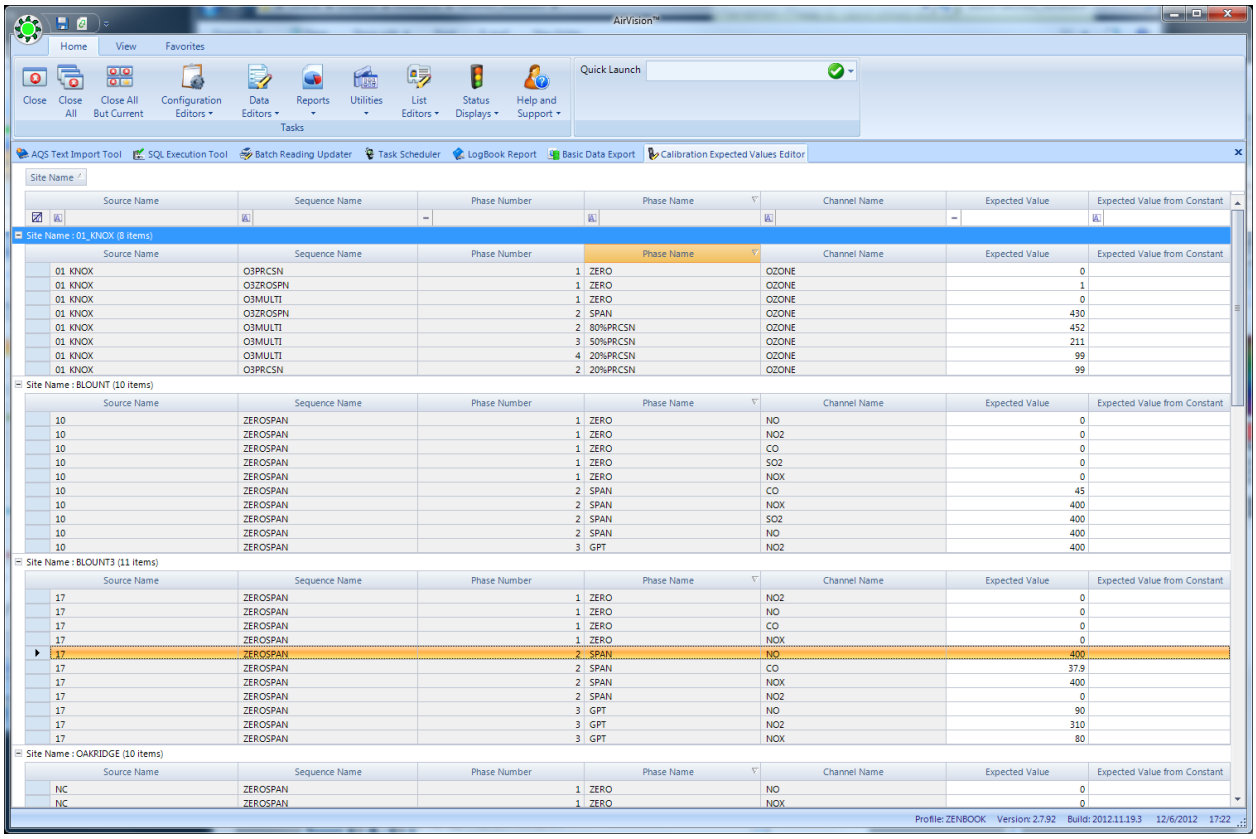
- **Calibration Type** will be already filled in (UserInitiated_U).
- **Calibration Name** is required to identify the cal program.
- Check **Enabled** if the calibration is to run.
- **Number of Calibration Records** determines how many cals the data logger will store before overwriting.
- **Recovery Time** specifies the time required to purge cal gas after phases.
- **Affected Channels** determines which channels will be taken off-line during cal. Select from a list of previously configured parameters.



Configuring User-Initiated Calibrations

Calibration Expected Values Editor

This editor allows the user to quickly update target values for the calibration without sorting through the Calibration configuration editor. The system shows all configured calibrations as expandable/collapsible boxes. Once opened, columns headers can be clicked to sort by phase name, expected value, etc. for easier data entry.



2.6 Configuring Digital Events

Timed Digital Event Programs

The Digital Event feature allows the user to specify a digital control output event. A digital event program can be either timed or triggered by a digital input.

For example, a digital event program could be described as: Starting at 7:30 PM on July 6, turn digital outputs 13 and 14 on, leave them on for 75 minutes, and repeat this sequence every third day.

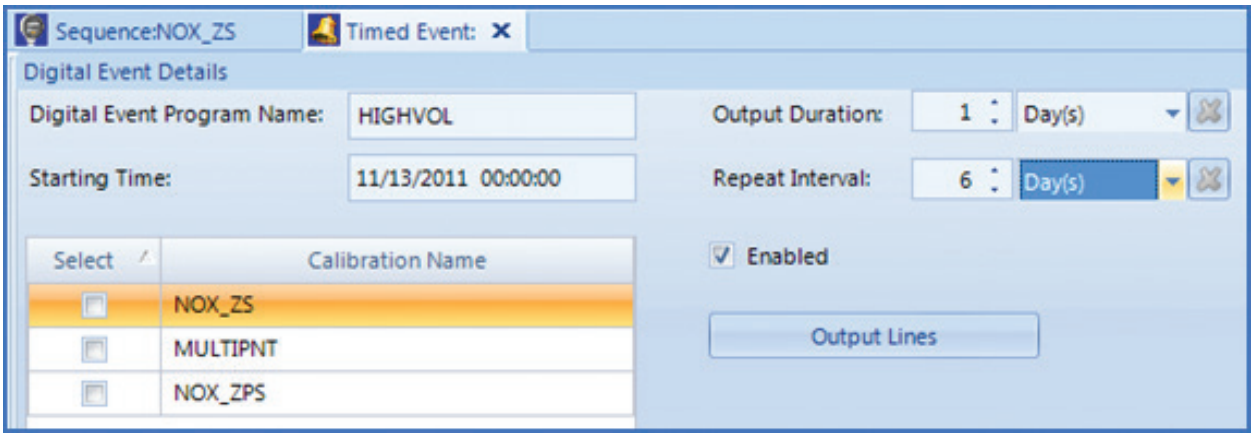
For a timed digital event program, the start time and repeat interval for the digital output(s) event are specified, much like an automatic calibration. Other definitions include:

- ***Output Control Line(s)***
  The list of the relay outputs that should be activated at the start time.
- ***Output Duration***
  The length of time that the Output Control Line(s) will be activated. After the Output Duration, the lines will return to their inactive state. 5s to 999 s, m, h, or d (for seconds, minutes, hours, or days, respectively).
- ***Disable During Calibration(s)***
  The list of calibration program names during which the digital program will update its Starting Time but will not activate output lines. This option allows calibrations to override normally programmed sequence.
- ***Serial Port, Output String (Triggered GSI)***
  When the sequence is triggered, the designated string will be sent out the serial port.
- ***Triggered Digital Event Programs***

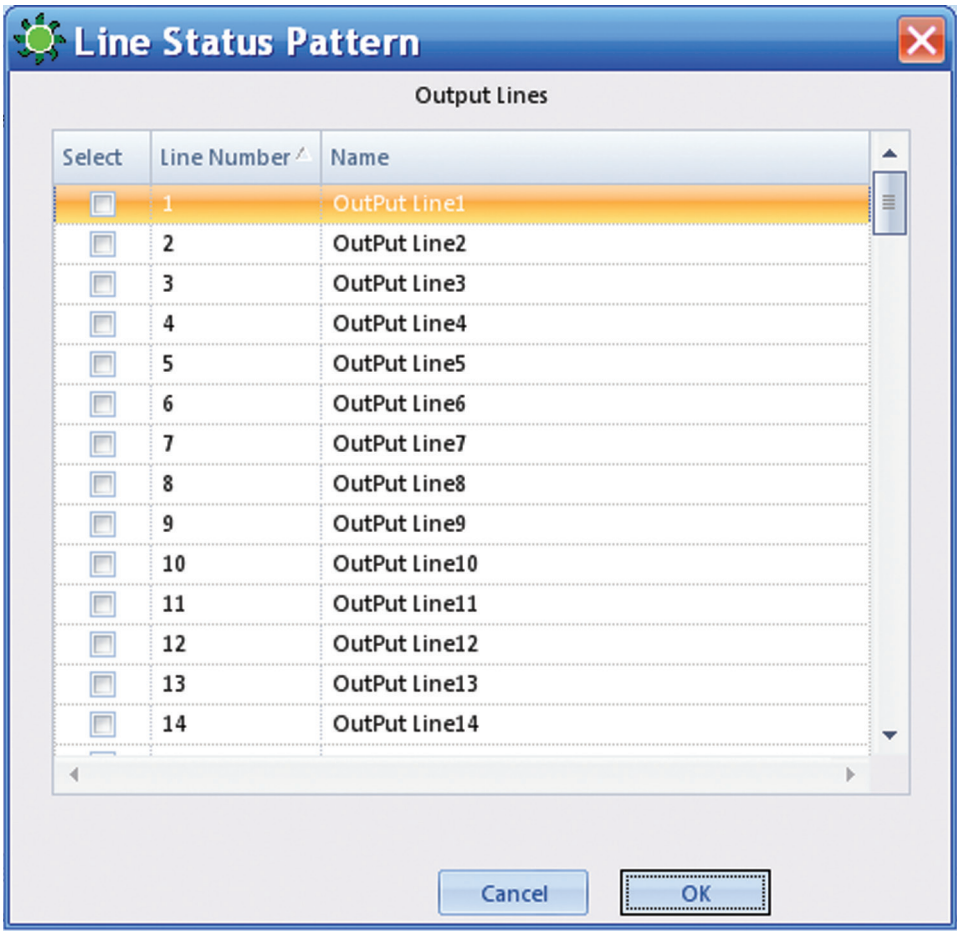
  A digital input pattern is specified that will initiate the digital output(s) event (much like an Instrument Initiated Calibration). The output lines will remain on in their active state for the specified duration. At the end of this time, the output lines will be deactivated unless the triggering digital input pattern is still true.

Configuring Digital Timed Events

1. Highlight the **Data Logger** in **Configuration Editors > Logger Channels** tree menu.
2. Click the green **Add** button in the ribbon and select **Add Digital Events > Timed Event**.
3. Enter a **Digital Event Program Name**, a **Starting Time**, **Output Durations**, **Repeat Interval**, and check **Enabled**.
4. If the Digitally Timed Even is for a calibration, select a **Calibration Name** from the drop-down list.
5. Click the **Output Lines** button to bring up the **Line Status Pattern** screen and select a **Line Number**. Click **OK**.



Timed Digital Event



Line Status Pattern for Output Lines

Configuring Digital Triggered Events

1. Highlight the **Data Logger** in **Configuration Editors > Logger Channels** tree menu.

2. Click the green **Add** button in the ribbon and select **Add Digital Events > Triggered Event**..

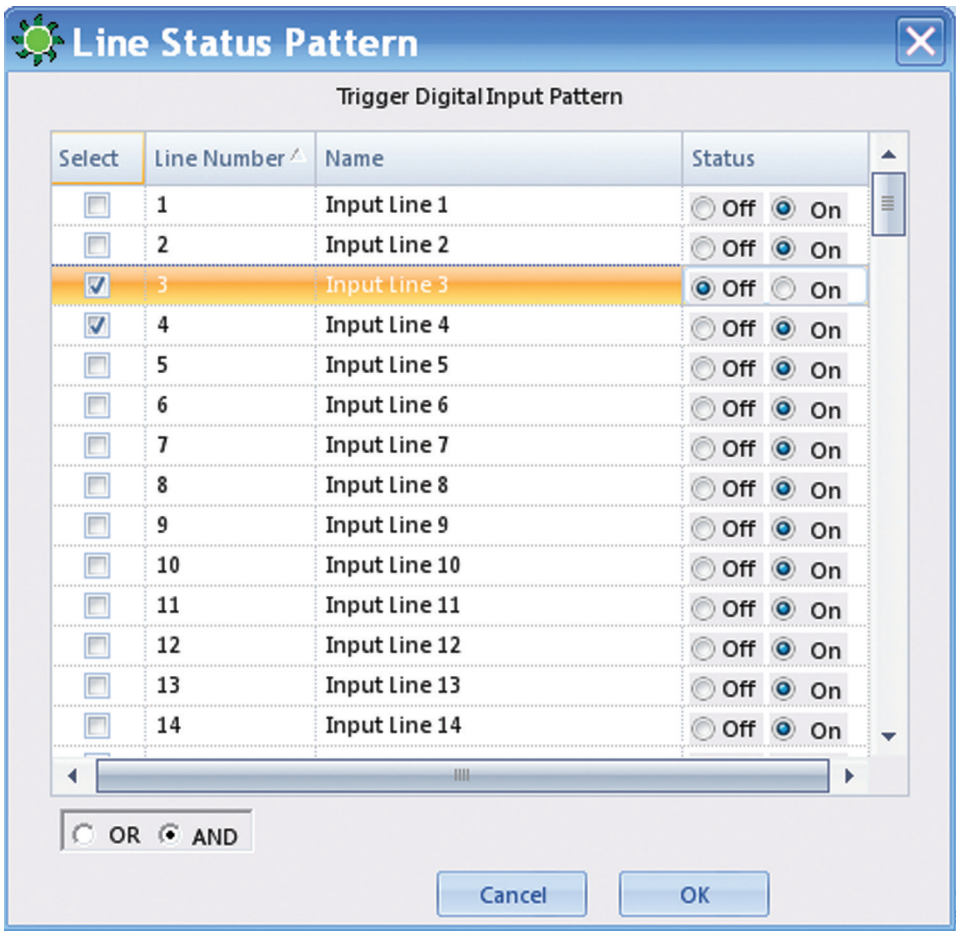
3.Enter a Triggered **Digital Event Program Name**, an **Output Duration** and check **Enabled**. After the output duration time period, the program will check the digital input pattern to see if it still matches. If not, the output control lines will be switched off. If the pattern still matches, the output relays will remain on, and the duration time will begin again.

4. If the Digitally Triggered Event is for a calibration, select a **Calibration Name** from the drop-down list.

5. Click the **Output Lines** button to bring up the output **Line Status Pattern** screen and select which **Output Line or Lines** will be switched on when the triggered digital input pattern occurs. Click **OK**..

6. Click the **Trigger Digital Event Pattern button** to bring up the **Line Status Pattern** screen for Trigger Digital Input Pattern and select which **Input Line**.or **Lines** turned **On** or **Off** will trigger the event and switch on the specified **Output Line(s)**..

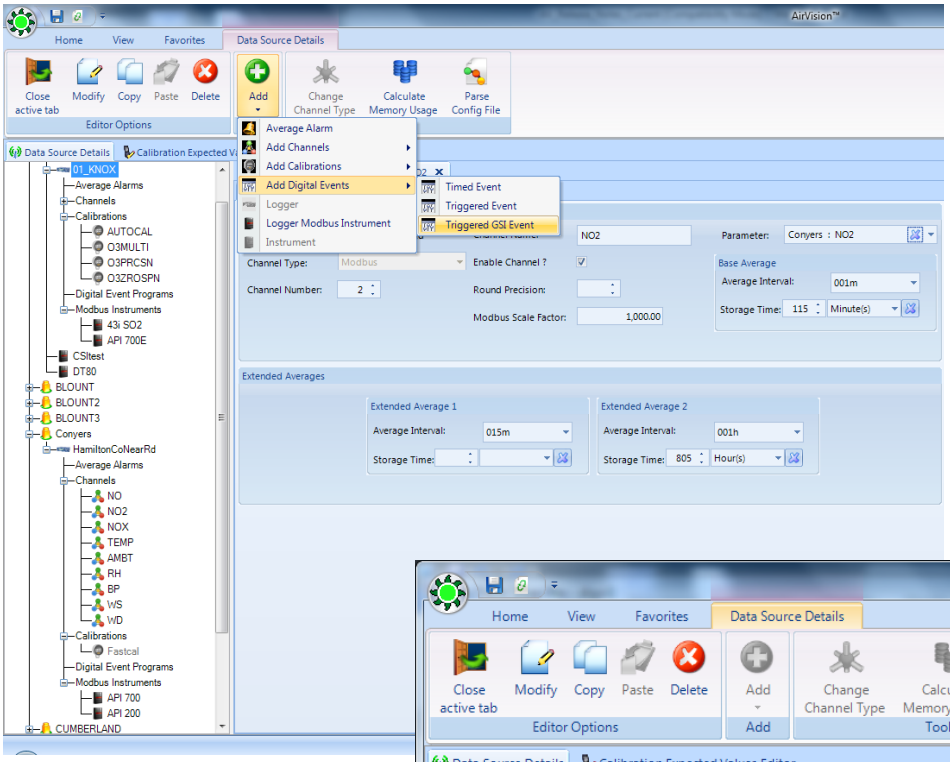
7. In the lower left corner of the screen, select **And** or **Or**. If you select **And** (the default), the digital event program will be triggered **only if ALL** the specified conditions occur. If you select **Or**, the digital event program will be triggered if **ANY** of the specified conditions occur. Click **OK**.



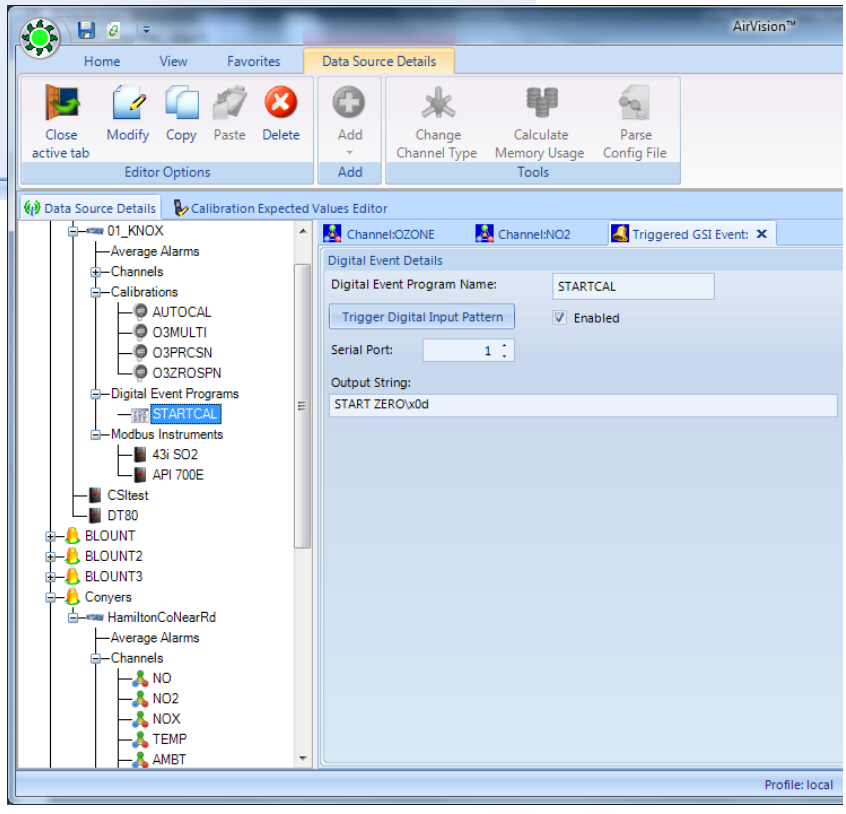
Trigger Digital Input Line Status Pattern with OR/AND selection

Configuring DI-Triggered GSI Events

These events are used to send GSI strings based on the transition of a digital input (or of a pseudo DI-DO pair in the logger). Commonly, these are used to control RS-232 based calibrators or other devices. For this device, a digital input pattern is defined. When the logger sees the digital input transition to match this pattern, the GSI string is sent out the designated serial port (just once). The string is not resent until the logger goes to a non-matching input state, and then back to the matching state.



Triggered GSI Event



Digital Event details

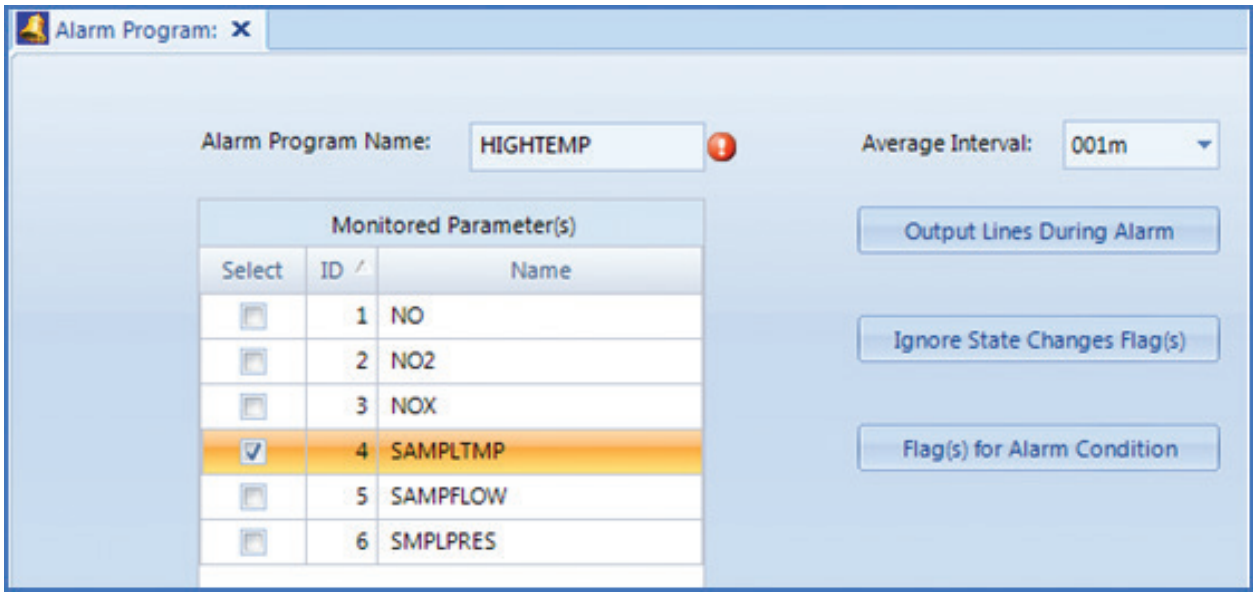
2.7 Average Alarms

Average and Calibration Alarms

Although AirVision and the 8872 component contains an alarm checking system, these programs are used primarily to send e-mail notifications. In some cases, it may be necessary to activate a physical relay or switch a Modbus digital point based on a calibration result. For these actions, the Model 8872 supports the same local logger alarm programs as the Model 8816 / 8832 data loggers.

Logger Average Alarms

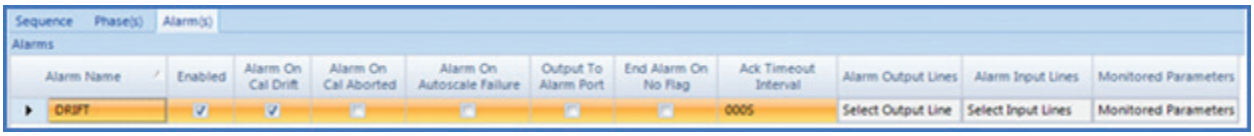
Logger Average Alarms are set in the Logger Channels screen, using **Add > Average Alarm**. In the same manner as the AirVision/ 8872 alarms, the user designates the parameter(s) to be observed, the average interval, the triggering flag(s), and potentially a list of flags that might inhibit the alarm condition (e.g., maintenance, calibration). The only addition is that the user can set the **Output Lines During Alarm** (similar to setting relay outputs for a calibration). These relays will be turned on during the alarm condition, and remain set until the alarm condition goes away.



Alarm Program configuration

Calibration Alarms

Calibration alarms are set as part of the calibration configuration, using the **Alarms** tab and the **Add > Alarm** button. The user would designate:

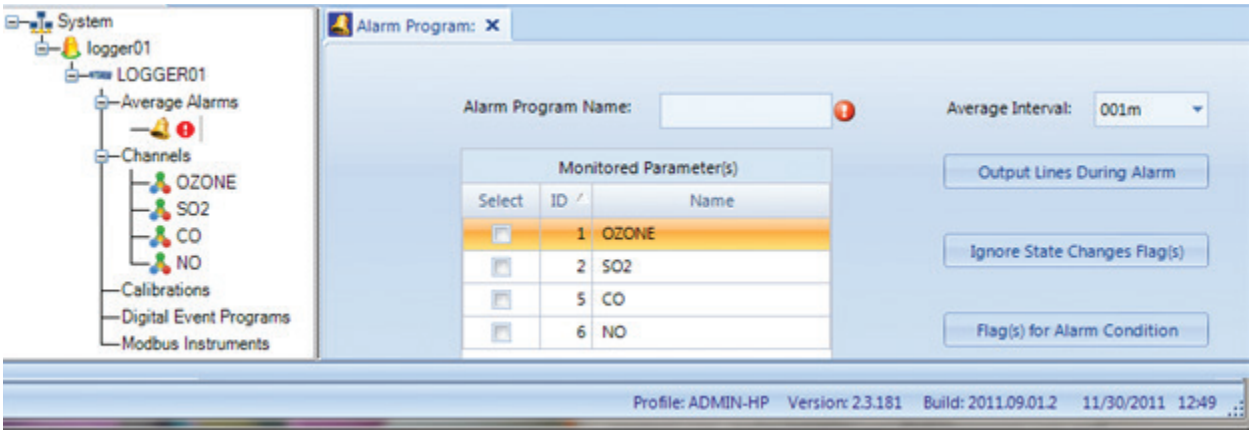


Calibration Alarm configuration

- ***Alarm Name***
  The name to distinguish different cal alarm programs.
- ***Enabled***
  Allows the alarm to be temporarily disabled.
- ***Alarm On Cal Drift***
  If set, the alarm will be triggered if any of the Monitored Parameters are found to have a difference between measured value/result and Expected Value to be greater than the drift limit for that channel / phase.
- ***Alarm On Cal Aborted***
  If set, the alarm will be triggered if the calibration sequence is aborted before it complete.
- ***Alarm On Autoscale Failure***
  If set, the alarm will be triggered if "EV for Auto Correct" is set, but the data logger cannot mathematically calculate a rescaling adjustment.
- ***Output to Alarm Port***
  Not used in the Model 8872.
- ***End Alarm on No Flag***
  Not used in the Model 8872.
- ***Ack (Acknowledge) Timeout Interval***
  Not used in the Model 8872.
- ***Alarm Output Lines***
  Used to define which relays / Modbus outputs are to be turned on when the alarm condition is found.
- ***Alarm Input Lines***
  Not used in the Model 8872.
- ***Monitored Parameters***
  Used to set the list of calibration parameters that are observed for calibration purposes (may be a subset of the total list of calibrated parameters).

Average Alarms

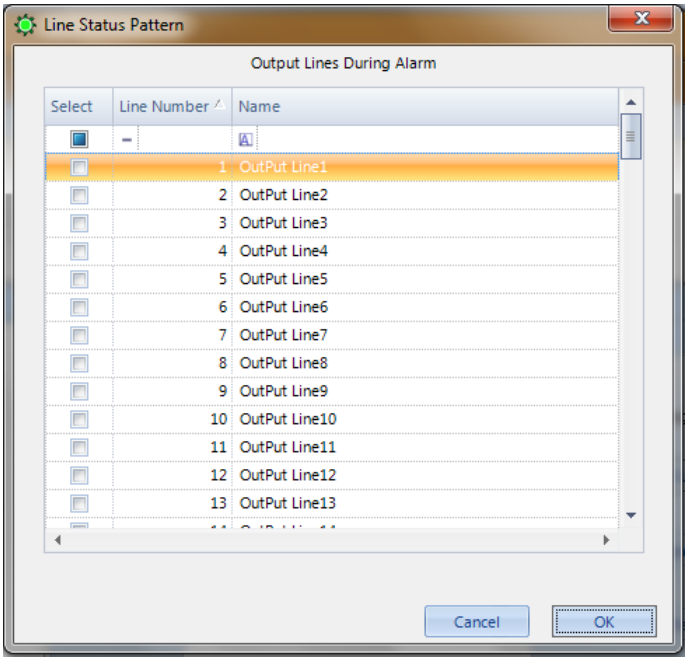
Average Alarms are configured the same way as Cals and Digital Events, by selecting **Configuration Editors > Logger Channels** and highlighting the logger in the Logger Channels tree, then selecting **Add > Average Alarm** from the drop-down list. You will see the following screens:



Average Alarm Configuration (Configuration Editors > Add Average Alarm)

Select a Monitored Parameter (or Parameters), then click Output Lines During Alarm,

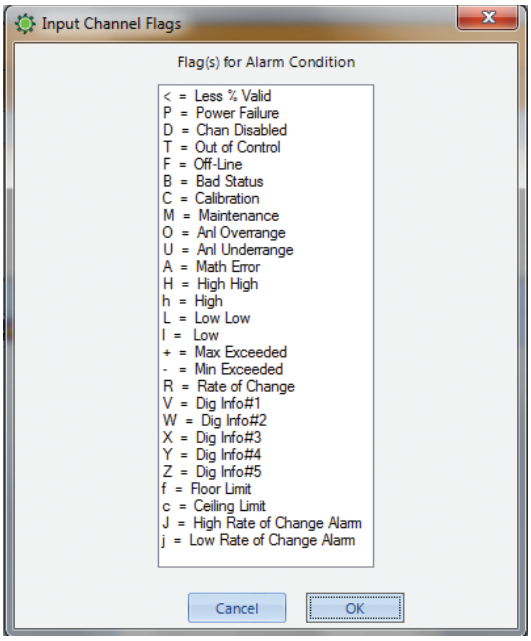
In **Output Lines During Alarm** click in the box to check the **Output Lines** that will trigger the alarm, then click **OK.**



Output Alarms During Alarms--Line Status Pattern

Select Flags for Alarm Condition, highlight which Input Channel Flags will trigger an Alarm Condition, then click OK.

Click the Save icon on the ribbon.



Input Channel Flags > Flags for Alarm Condition

2.9 Scheduling Tasks

Some automatic actions in the 8872 are managed by the **Task Scheduler**, which runs as part of the background AirVision service.

The following tasks can be configured in the Task Scheduler, depending on your licensed options:

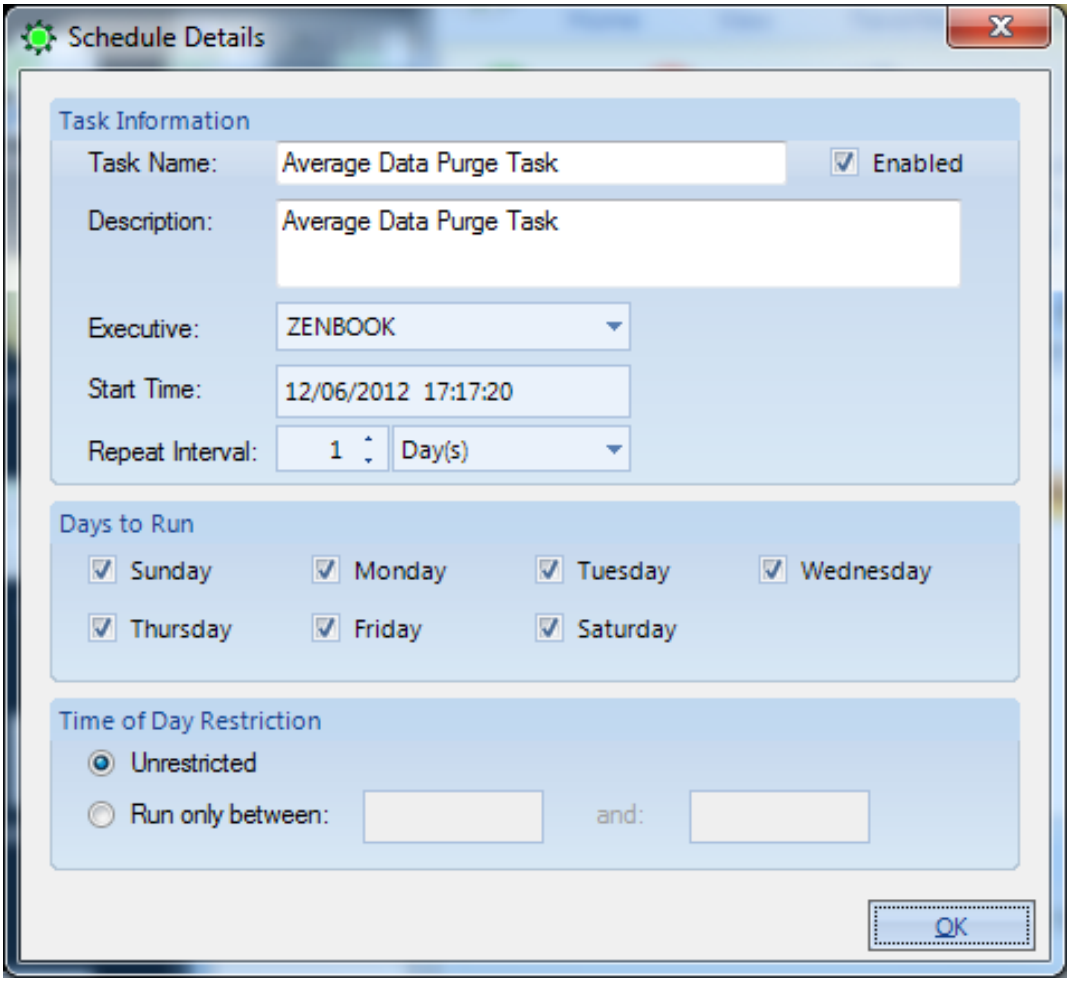
- Average Data Purge Task
- Fill Average Data Gaps Task
- Journal Message Purge Task
- Scheduled Command Line Task
- Scheduled Report Task
- SQL Execution Task
- New Task Group

The 8872 tasks include default purge/archive tasks and SQL Execution tasks to automatically backup the database. Usually none of the tasks are needed.

Task Scheduler

The Task Scheduler screen has three sections:

- **Task Schedule** displays all scheduled tasks and cannot be edited.
- **Task Schedule Details** section is where you select an **Executive**, and **Start Time**, and a **Repeat Interval**. **Enabled** must be checked in this section before you can select **Enabled** in the **Scheduled Task Selection** section.
- An **Advanced** tab is provided next to the repeat interval to allow the user to specify if the task is only to run on certain days of the week, or only in a ‘window’ of certain hours of the day This is especially useful for polling tasks.



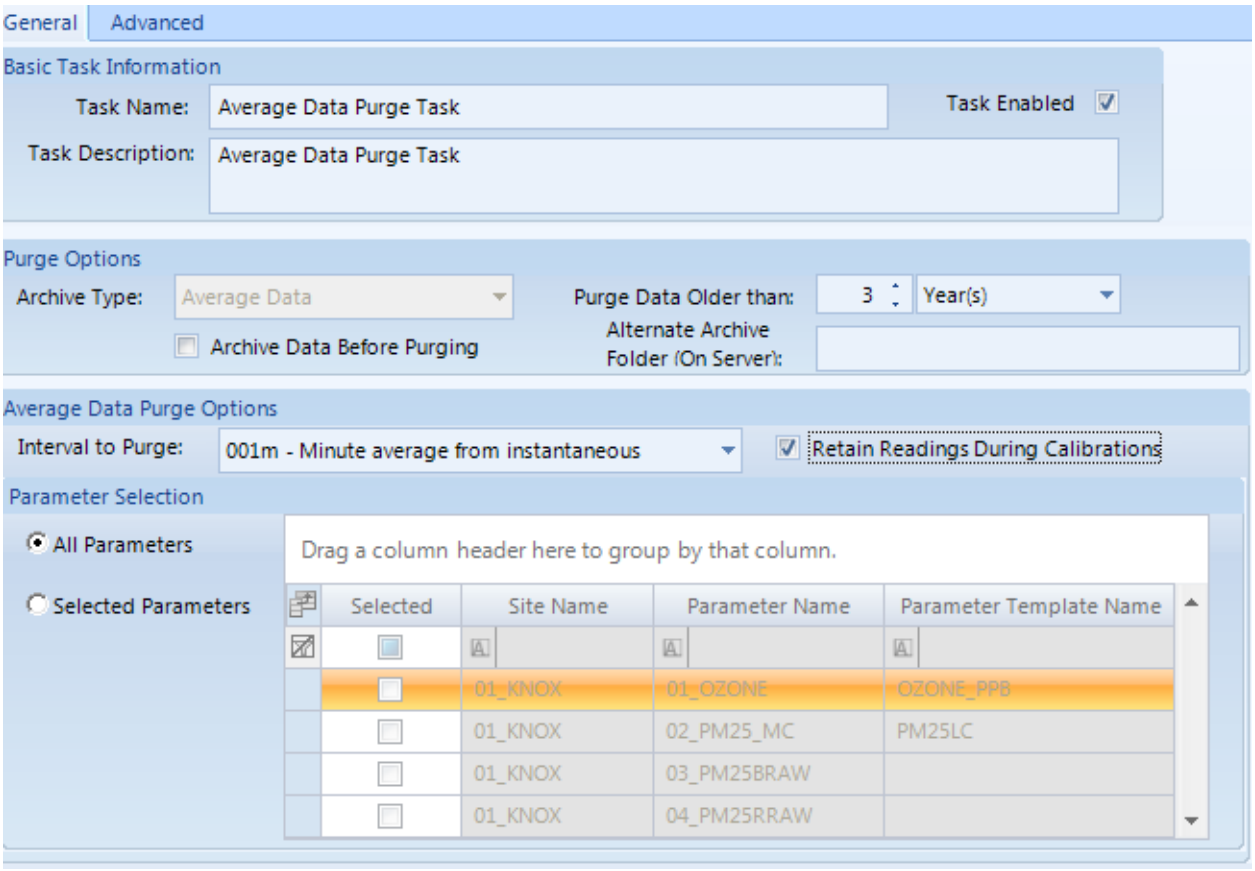
Task Scheduler showing a Logger Poll Task (Configuration Editors > Task Scheduler)

To configure an individual task in the **Task Scheduler** (**Configuration Editors > Task Scheduler**), click the **Add** button in the ribbon at the top of the screen and select one of the following categories. For example:

- **Average Data Purge Task** purges or archives old data from the database. Eventually, the 8872 database becomes so big that it takes a long time to back it up, so it is helpful to remove and/or save old data, in particular minute data. You can choose any average interval to be scheduled for Purge or Archive. Purged data will be permanently deleted from the database. Archived data is copied to an external file before purging. Archived data is stored with all flags and annotations and can be re-imported later.The Model 8872 uses specialized data keys so sites and channels can be renamed or renumbered and archived data can still be correctly imported. Select the age of the data to purge: **Purge Data Older Than** a specified number of seconds, minutes, hours, days, weeks, or years. We recommend purging 1-minute data older than 1 year to keep the database within allowable size.

▶ **Note:** Average Data can be purged manually via the **Utilities menu>Purge Average Data**.

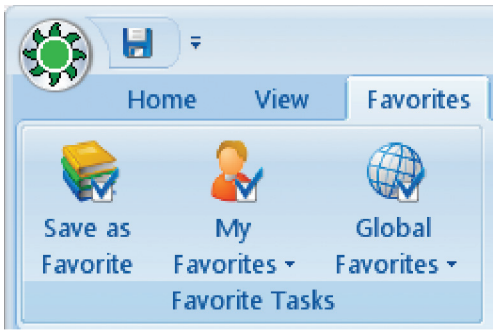
A checkbox option allows you to **retain data during calibrations**. If selected, any data flagged with the **C** flag will not be purged. This allows you to retain minute data from calibrations (e.g., for use in the Calibration Trend Graph's Response Plot) while still removing old minute data.



Purge or archive data in Configuration Editors > Task Scheduler

2.10 Favorites Editor

The Model 8872 simplifies regular tasks with a list of user-defined **Favorites**, which function like Favorites in Internet browsers. Favorites can be created for most menu items, including reports, editors, configurations, journals, calibration functions, security settings, logger functions, emails, and task scheduling. Favorites can be saved for different sites, parameters, average intervals, and date ranges. They can be saved for all users or for one user.

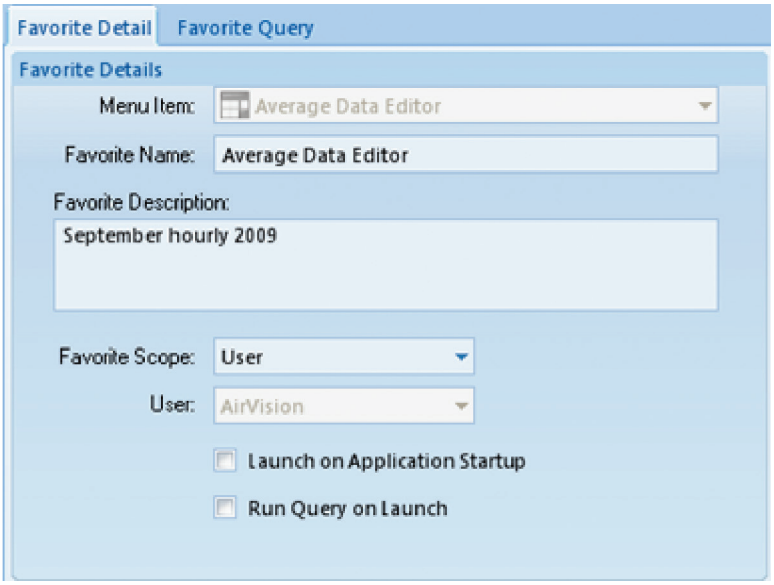


Favorites menu

Creating a Favorite

To create a favorite, open **Configuration Editors > Favorites Editors**. Click the red **Add Favorite button** on the left side of the ribbon.

▶ **Note:** Favorites can also be created inside Reports by selecting the **Favorites tab** and clicking the **Save as Favorites icon**.



Add a Favorite screen

Favorite Detail Tab

Under the **Favorite Detail** tab of the Favorites Editor: select a **Menu Item** from the drop-down list, enter a **Favorite Name**, enter a **Favorite Description** (optional), select a **Favorite Scope** from the drop-down list (**User** or **All Users**) and select from the following options:

- **Launch on Application Startup** to run the Favorite upon logging in to the 8872
- **Run Query on Launch** to execute data retrieval when the Favorite is selected.

Favorite Query Tab

Next, open the **Favorite Query** tab if it is available.

▶ **Note:** The Favorite Query tab will only be in the Favorites Editor after a Menu Item is selected that requires a time range, interval, and parameter(s), such as the Average Data Report and the Average Data Editor.

Select a **Date Range**, choose an **Average Interval** and select a **Parameter**. To select more than one parameter, drag the arrow in the blue left column or hold down the **Ctrl** key while you select parameters.

To save a favorite when you're in any data editor or report, complete a query, and select **Favorites** from the top menu. The ribbon bar will change to show the favorites menu.

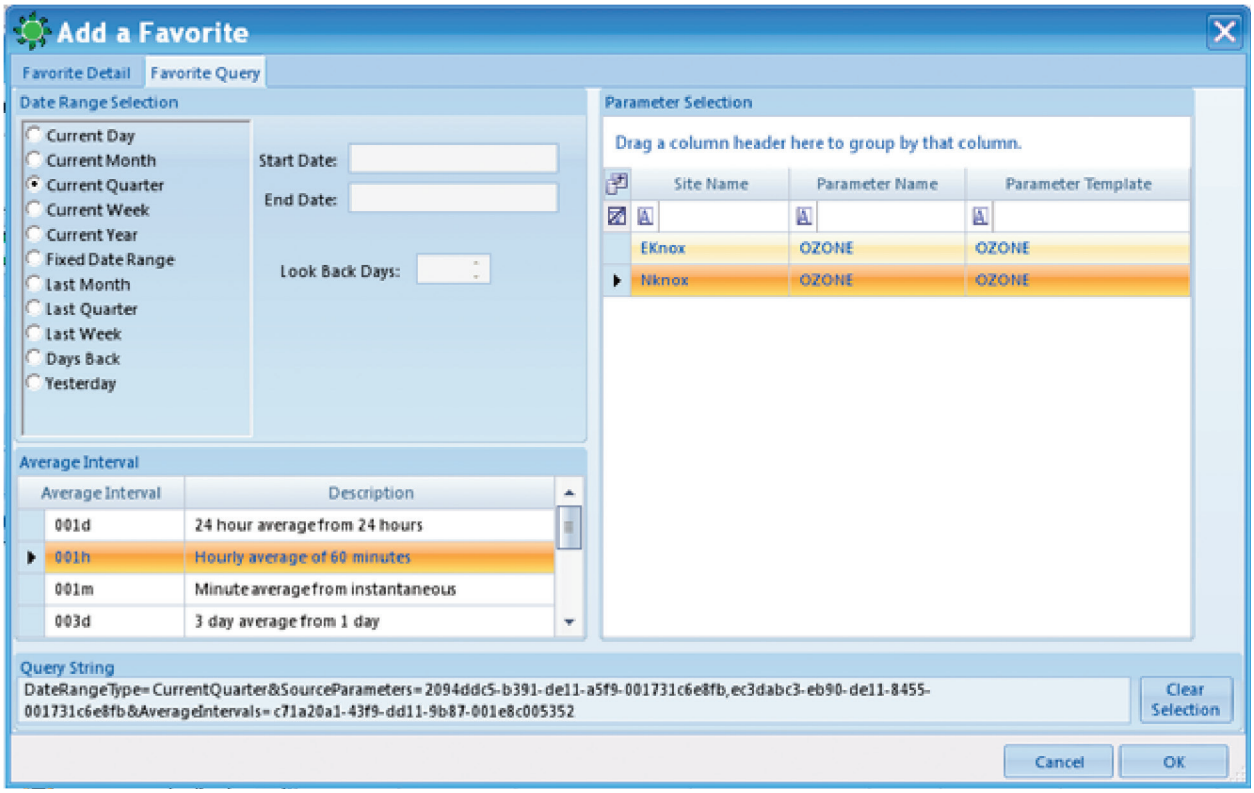
Select **Save as Favorite** to bring up the **Add a Favorite** screen.

You can also configure the **Favorite** by selecting the **Favorite Query** tab after you select **Save as Favorite**. From this screen you can adjust the site/parameter list, date range, or average interval. These values can also be adjusted later in the **Favorites Editor** in the **Configuration menu**.

To return to the ribbon controlling the current application, select the top menu function (above the ribbon), for example, Average Data Editor.

To use an existing Favorite, select **Favorites** from the top menu (above the ribbon bar), select **User Favorite** or **Global Favorites**, and the saved **Favorite**.

A copy button on the ribbon allows you to copy an existing favorite for slight modification, if needed.

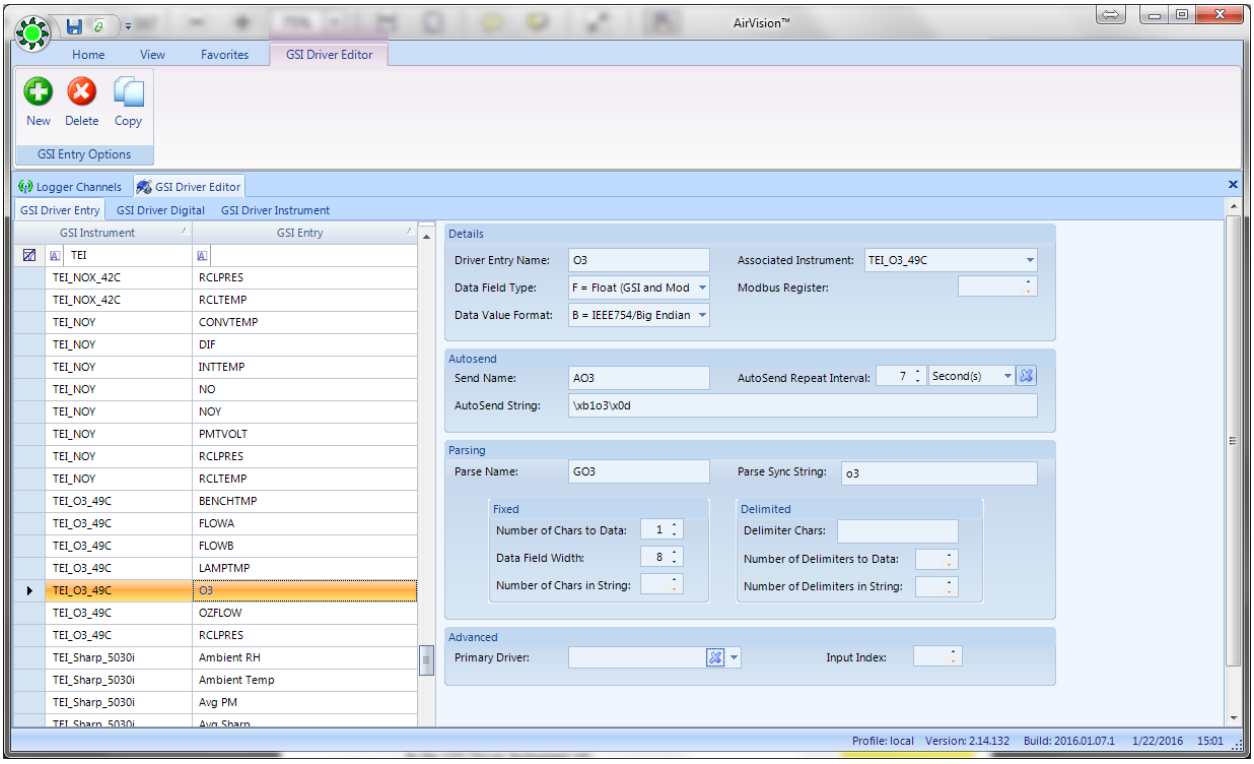


Favorite Query tab from Add a Favorite

2.11 GSI Driver Editor

The purpose of the GSI Driver Editor (**Editors>GSI Driver Editor**)is to provide a way to add, delete, or modify GSI driver entries in an editor similar to the Parameter Template editor for GSI entries and GSI instruments.

The GSI Driver Editor consists of an alphabetized pick-list of existing GSI entries for modification. Two editors are provided, one for instruments and one for entries, or two sections/tabs of the forms.



The default (factory) driver library is typically maintained and updated by Agilaire. If you need a site-specific or instrument-specific drive/variant, we recommend using the "Copy" button on the ribbon to copy existing drivers to a new copy for use modification.

2.12 Configuring Security

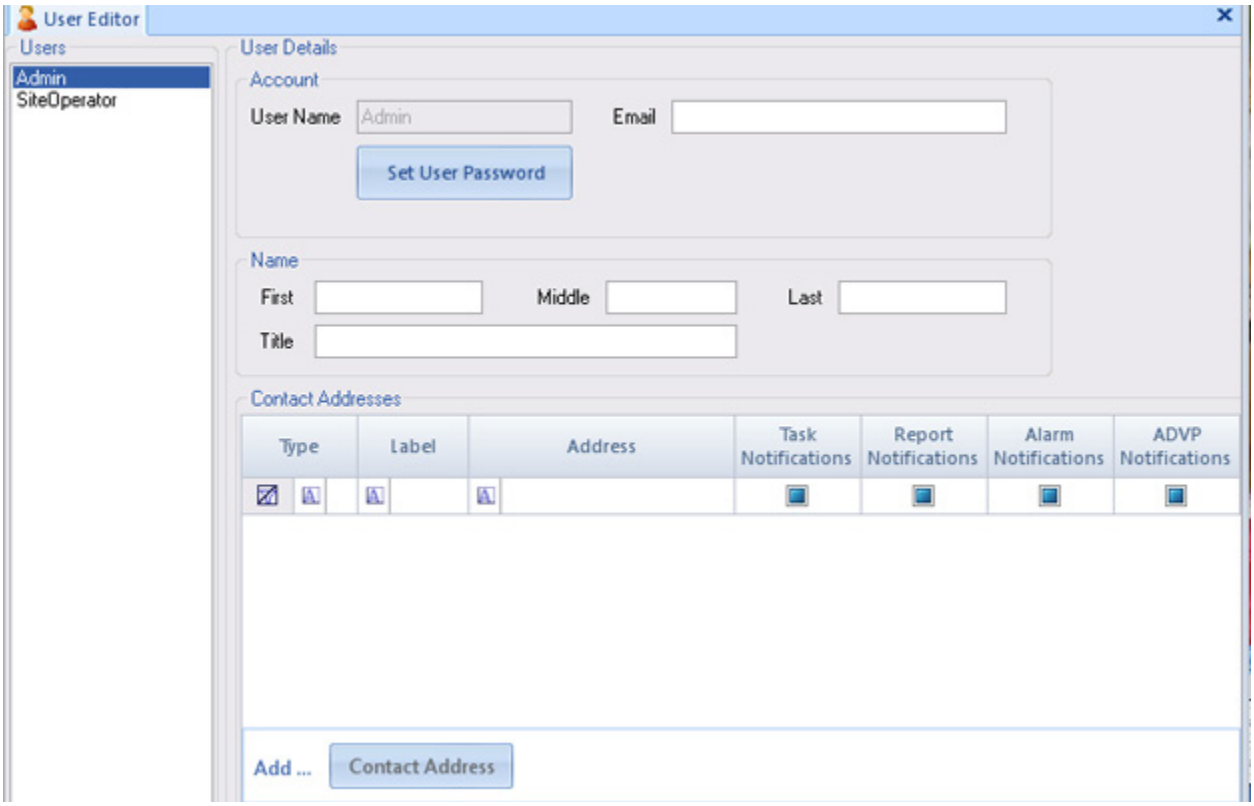
If user security is not centrally managed by AirVision, user security in the 8872 is set up by administrative personnel and is similar to Microsoft Windows:

- Each system user has an identity, including a username and password
- A User may be a member of one or more User Groups
- Access and rights are assigned to User Groups

User Groups in the 8872 are usually assigned by job responsibility. Users can be members of more than one Group, and each site can have a different access group.

User Editor

Administrators can add or delete users: open **Configuration Editors > Security > User Editor** and click **Add User** (or **Delete User**) button. Enter an Email address (optional). Click **Save**.

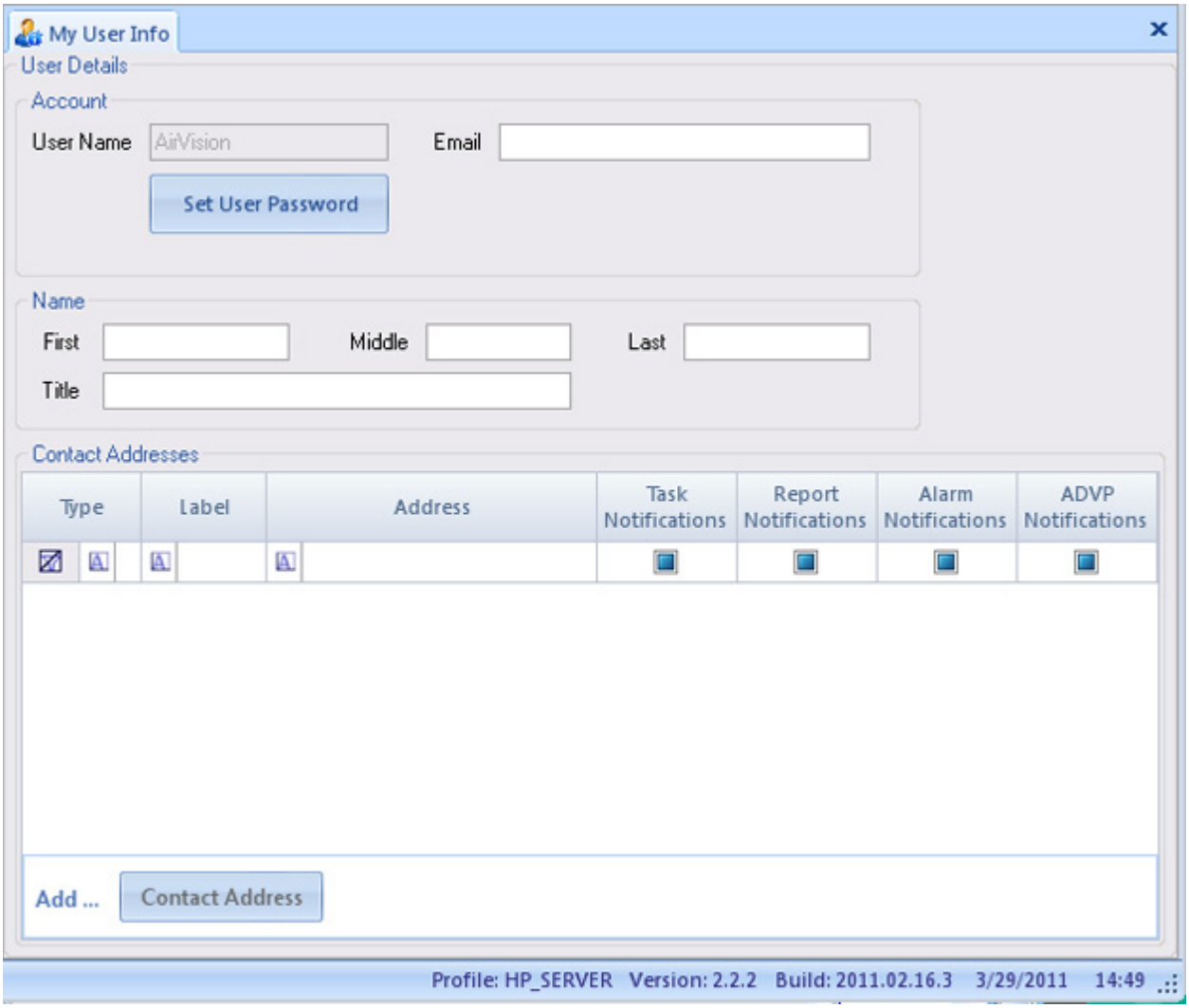


User Editor from Configuration Editors > Security > User Editor

My User Settings

Although the Model 8872 shares the same security model as AirVision, the use of Group Permissions is often not necessary, or relegated only to two access levels (one for full configuration access, one for accessing the displays and reports only.

Non-administrative personnel can change their own Password, Email, and Name, but not their User Name in the **My User Info** screen in **Configuration Editors > Security**. If a User Name needs to be changed (for example, if a name is misspelled), an Administrator would have to delete the original User Name and add a new one.



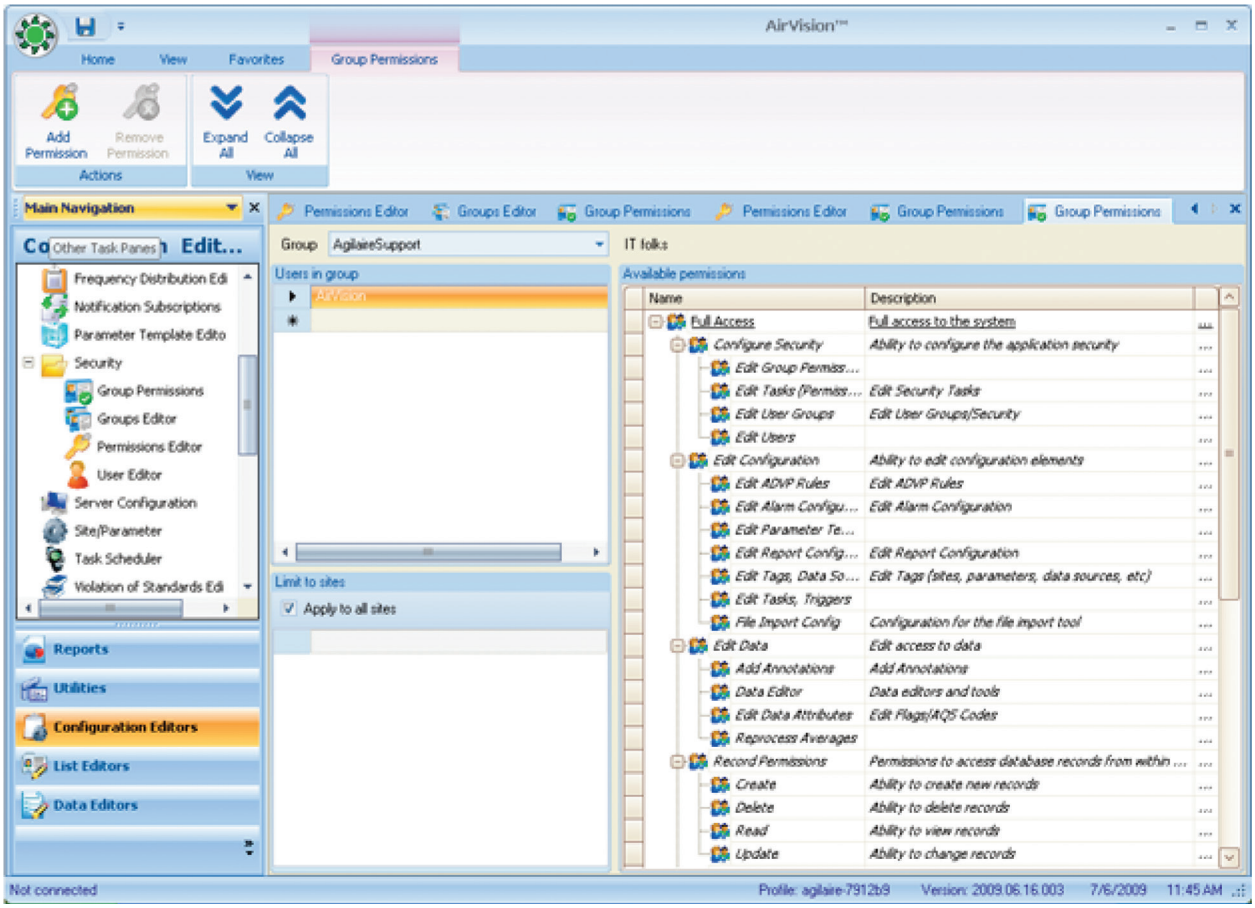
My User iNFO screen in Configuration Editors > Security

Group Permissions

Finally, define the permissions for each **User Group** using the **Configuration Editors > Security > Group Permissions Editor**. Select a Group in the drop-down list. The list of configured users is displayed (and users can be added here as well). The right panel shows the various rights available in the system, and the status for the current group:

- Grayed = access disabled
- Black, underlined = access enabled
- Black, italic = access enabled by inheriting from another granted access.

In this example, access has been granted to certain Security permissions (Groups, and User Groups, but not Edit Tasks). Access is granted to all configuration items at the topmost level, and all sub-tasks are permitted by inheritance. For example, to turn off Edit ADVP Rules, first remove the overall Edit Configurations permission and then add the individual permissions. Expand and Collapse the tree diagram using the buttons on the ribbon.



Group Permissions from Configuration Editors > Security > Group Permissions Editor

Chapter 3

Logger-Central Communications

Although the Model 8872 itself is a fully capable stand-alone reporting platform, in most architectures the Model 8872 is connected to a Central Server or Data Management System (DMS) as the final repository of the data for multiple sites. The Model 8872 has three main communication methods for transferring data back to the Central/DMS:

- Controller Interface Service - in this mode, the Model 8872 emulates a Model 8816/8832 for data polling. It can be used for both legacy dial-up modem networks or TCP/IP networks. However, configuration download is not supported.
- FTP Push - This mode is more commonly used in TCP/IP networks where the a public/static IP address is not available for the remote site. In this mode, the Model 8872 pushes files back to the Central/DMS on a regular basis.

3.1 Controller Interface Service

3.2 Setting up AirVision Server to Receive FTP Push

3.3 Central - Remote Sync Setup

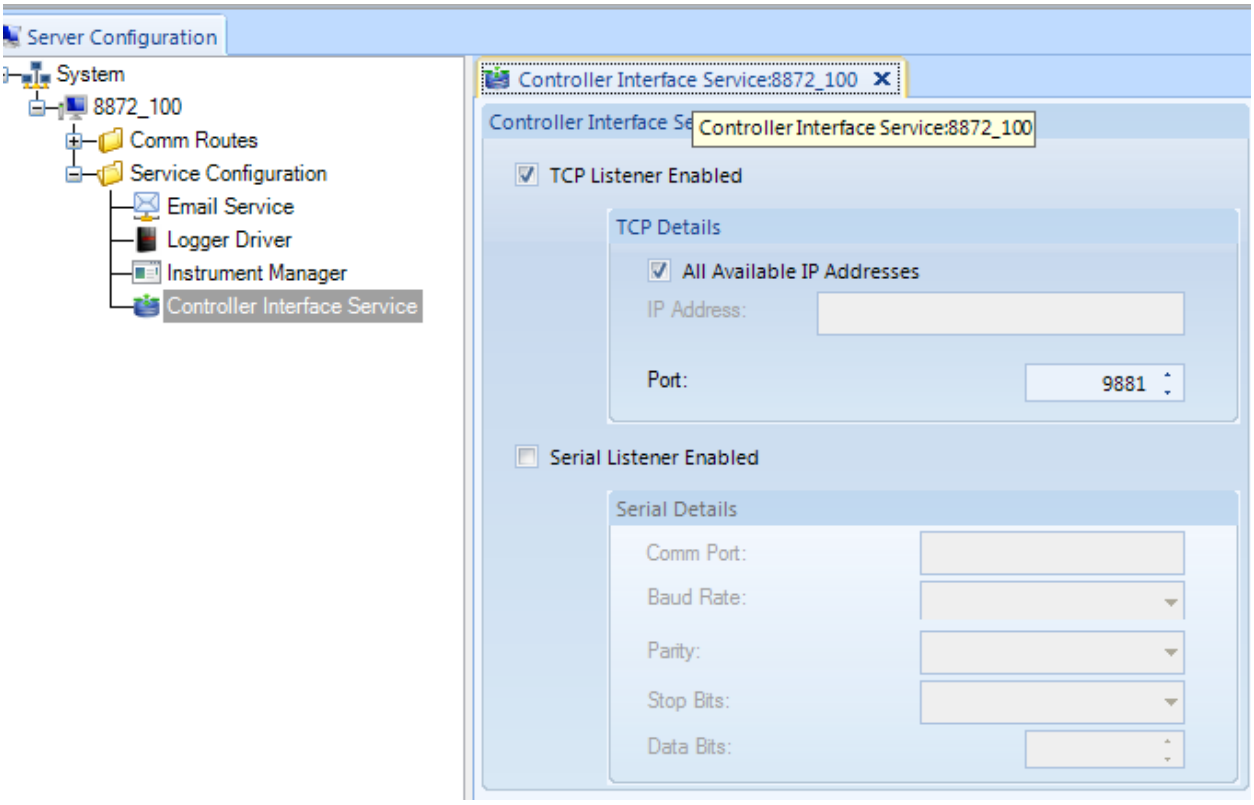
3.4 Sync Contract Direction Options

3.5 Sync Troubleshooting Tips

3.1 Controller Interface Service

The Controller Interface Service is a background service in the Model 8872 that allows the logger to emulate a Model 8832 for polling purposes. It supports all data polling (averages, cals, messages, power failures, etc), but does not support configuration download messages.

The service is normally enabled for each Model 8872 at the time of shipment, and can be found in the PC Configuration settings:



If it is not visible, you may right-click on the PC icon with the logger name, and add the "Controller Interface Service" to the list of plug-ins.

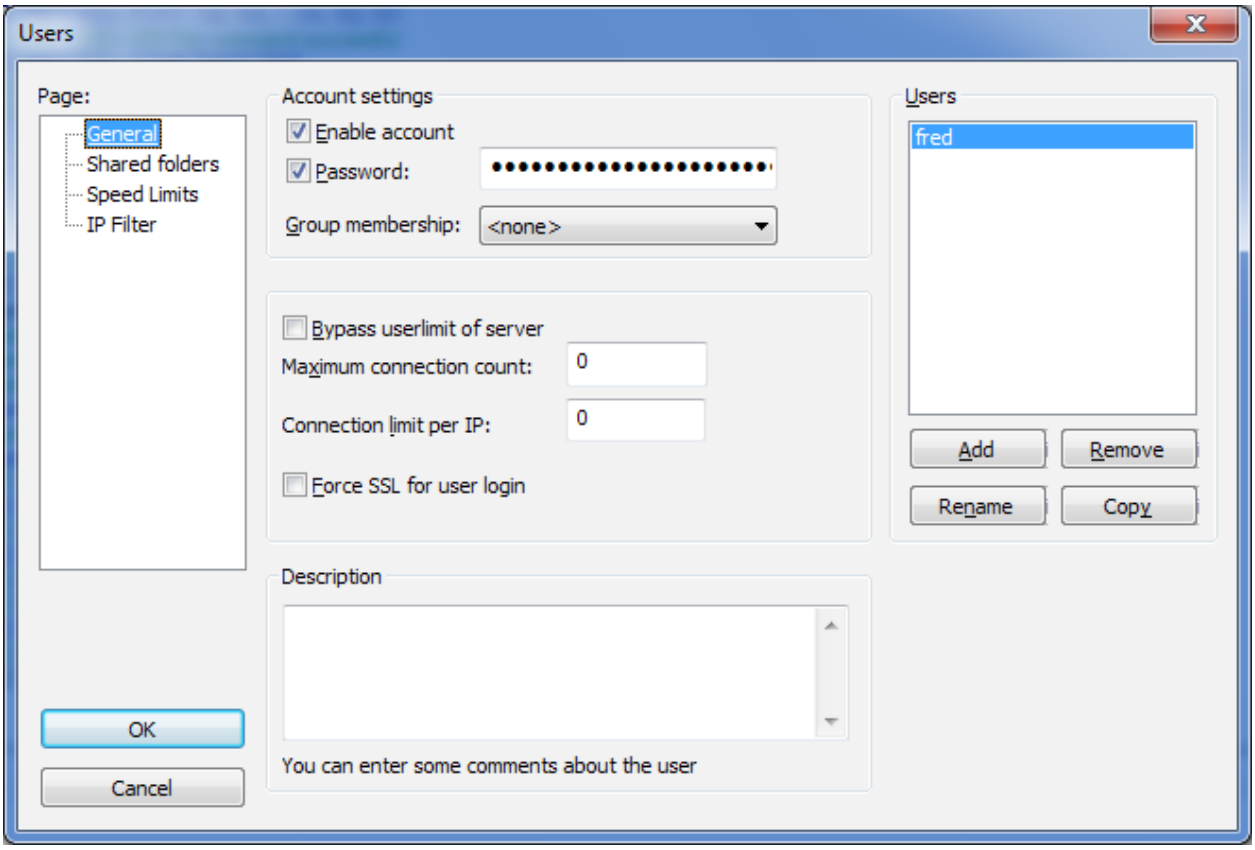
By default, the logger will listen for polling strings on port 9881, but this port may be changed if needed. The service can also be set to listen for polling commands on a serial port (e.g., COM1, COM2), but that port **may not be used for any other function**, such as direct instrument polling or Generic Serial Interface (GSI).

All incoming messages and generated responses are viewable in the Log Viewer (Utilities).

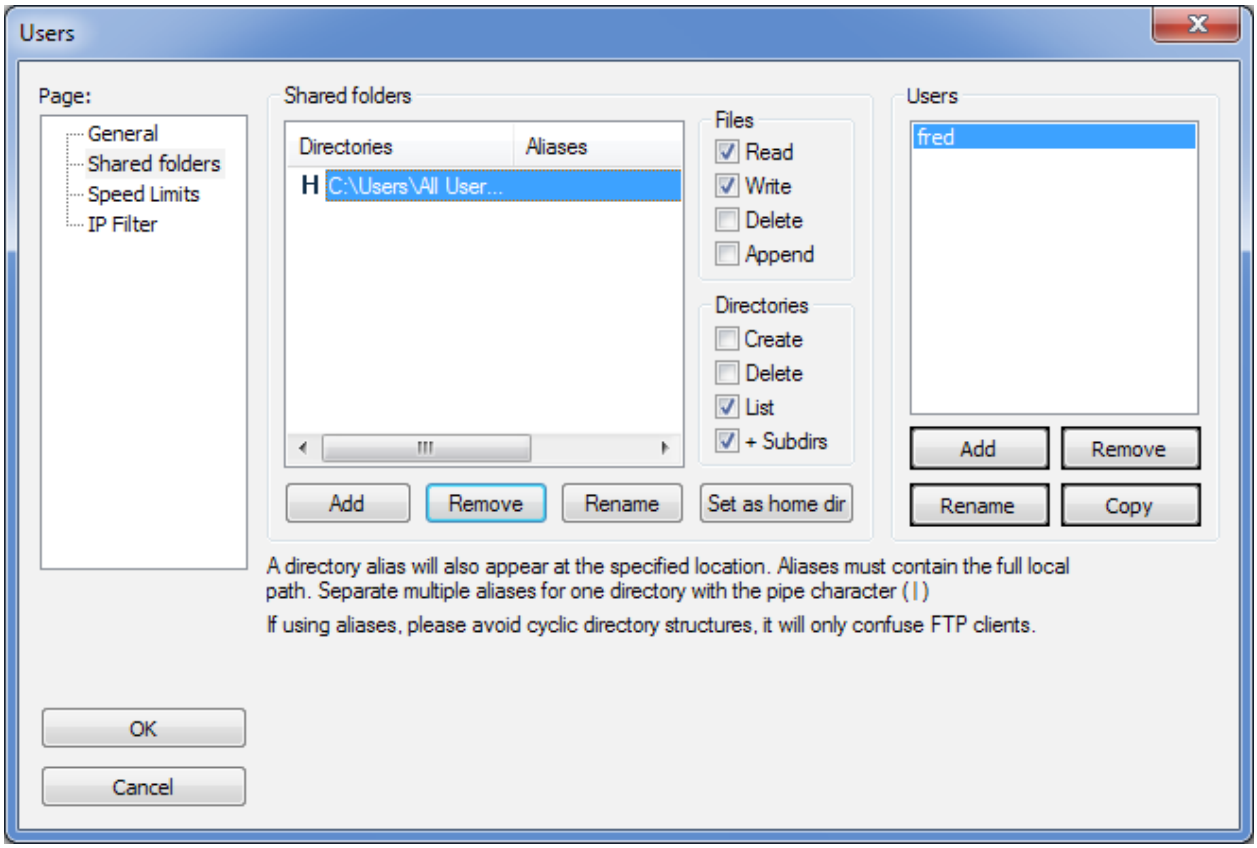
3.2 Setting up AirVision Server to Receive FTP Push

Install FileZilla FTP Server, set to run as a background service automatically.

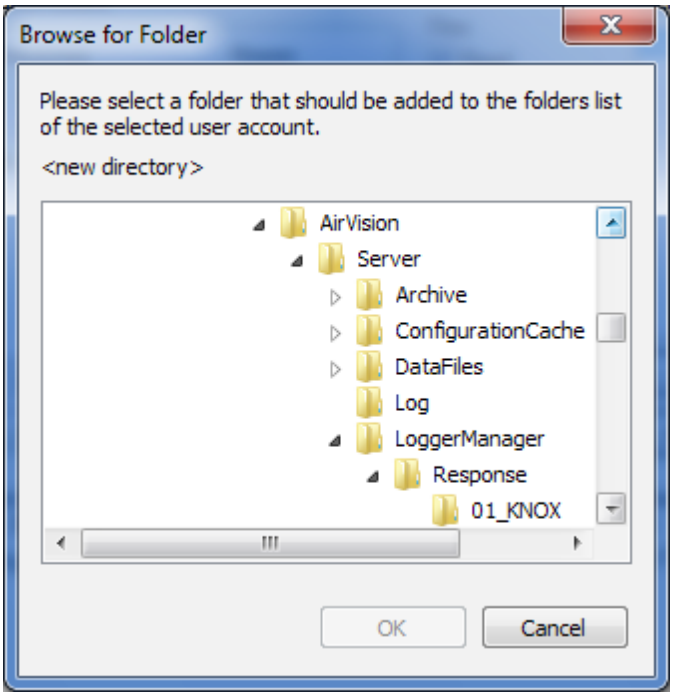
Start FileZilla manager (accept default logins) and use the Users **Add** button to create a new user. Set username and password. You will set up a unique user for each Model 8872 out in the field.



Once you have created the user, select the **Shared Folders** button.



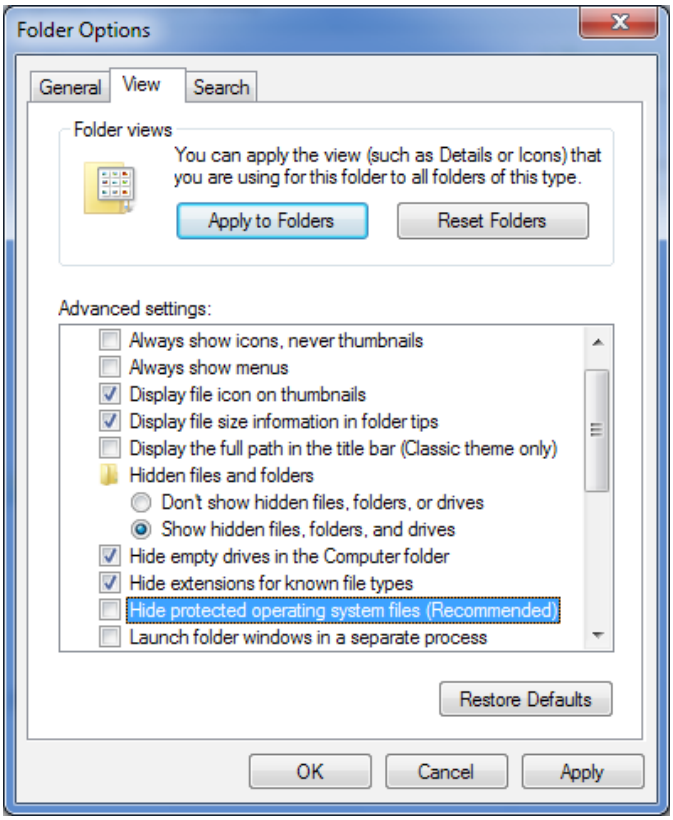
Use Add to create a new home directory for the user. Navigate to **Users->All Users->Agilaire->AirVision->Server ->Logger Manager->Response->(Site Name)**.



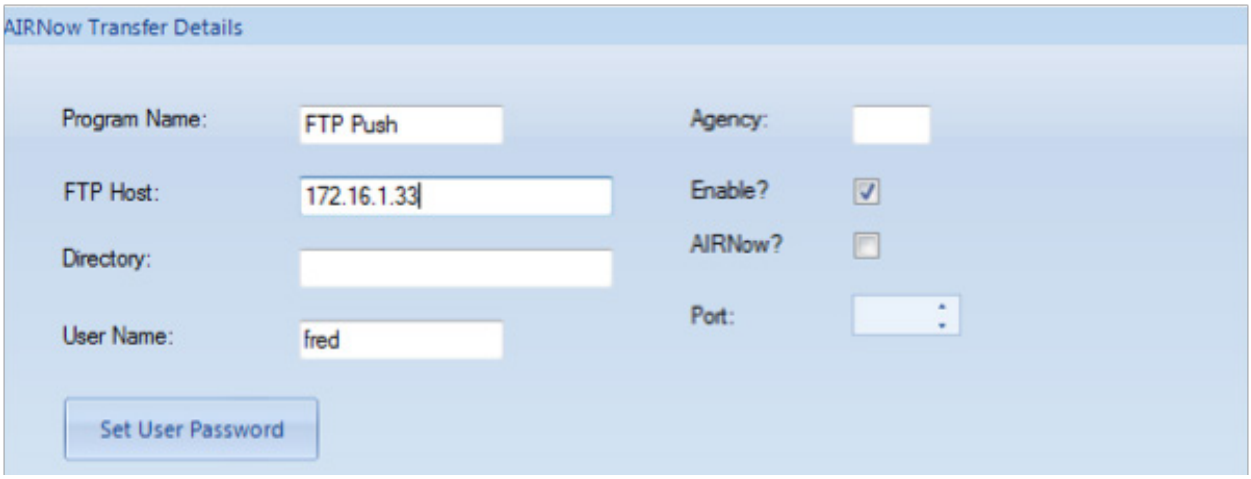
Make sure to define the user as having both read and write privileges.

If you do not see **All Users**, you will need to open Windows Explorer and select **Organize-> File and Search Options**, and de-select **Hide Protected System Operating Files**. Once you have done this and selected **Apply**, you can re-open the file browser in Filezilla to re-select the desired folder.

Repeat this process for each site, creating a unique user for each site. *(Alternatively, you may choose one user and use the "Response" level as the home directory. In this case, in the FTP transfer program for the site, you can choose the appropriate subdirectory for the site).*

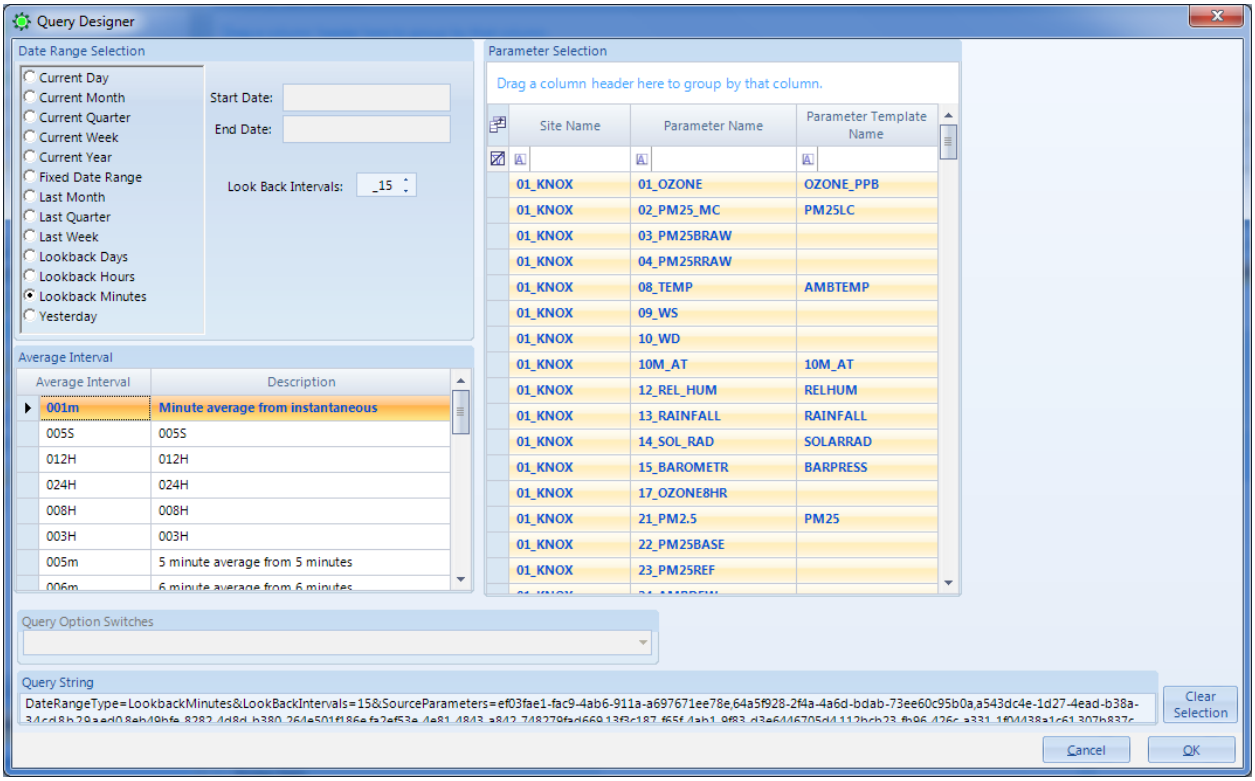


When this is done, you can create FTP programs in the Model 8872 (**Configuration->Report Configurations->FTP Programs**). Define the IP address or resolvable name for the Central PC you are pushing to, and enter the user name and password. Leave the other fields blank.



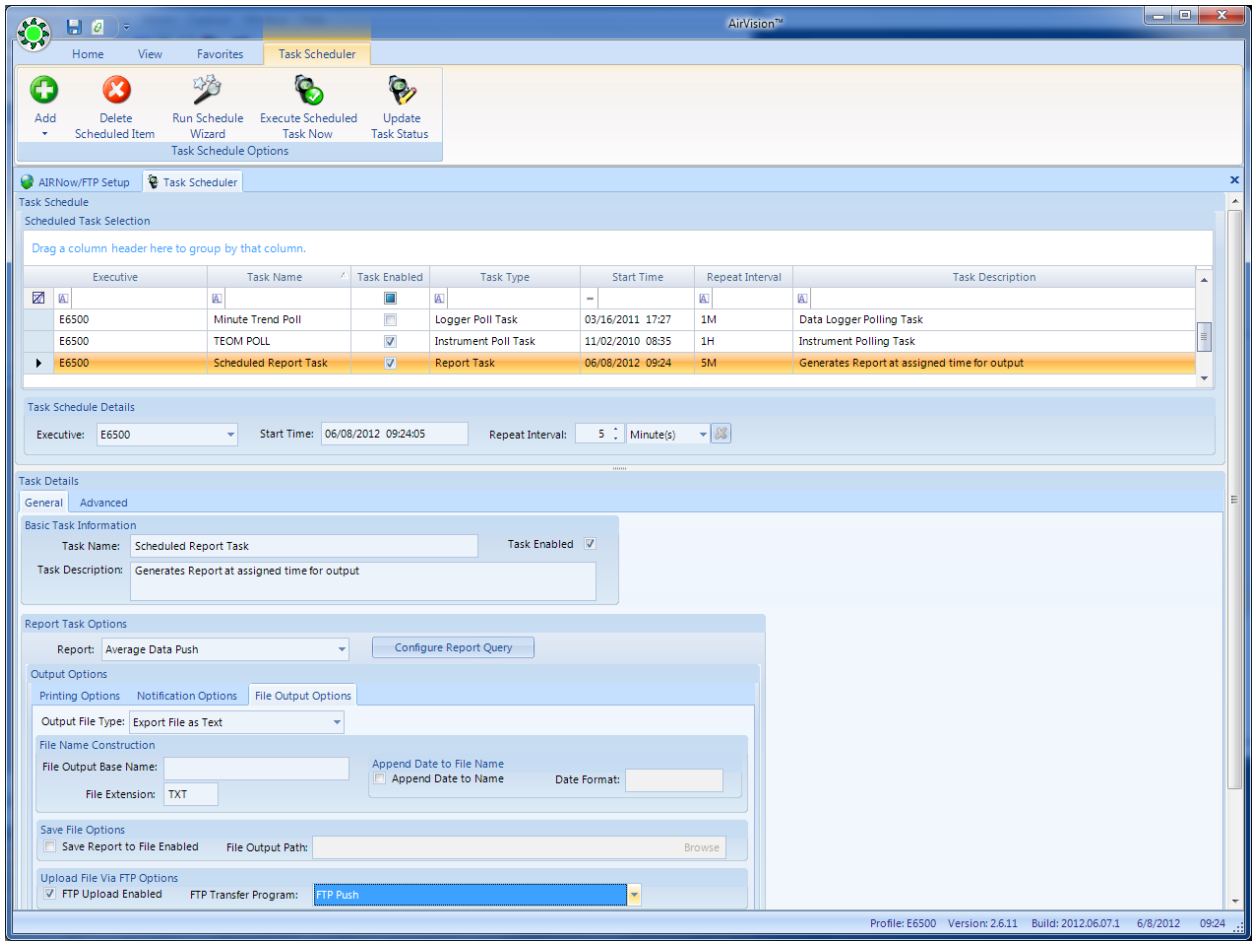
To create the individual push tasks, use **Configuration->Task Scheduler** and **Add->Scheduled Report Task** to choose any of the **Push** type reports. (Push Average Data, Push Calibration Data, etc). You may also wish to create **Group Task** and put all the **push** tasks under the group task for easier management.

Use the **Configure Report Query** button to choose the desired parameters, intervals, etc. for each push task. For the Date Range, we would recommend using **Lookback Minutes** and setting the lookback to a value equal to or greater than the task execution frequency (e.g., if pushing data every 5 minutes, set the lookback to at least 5 minutes). If the logger is polling another device through Instrument Polling (e.g., BAM), consider adding enough overlap to handle short-term communication outages to the other device.

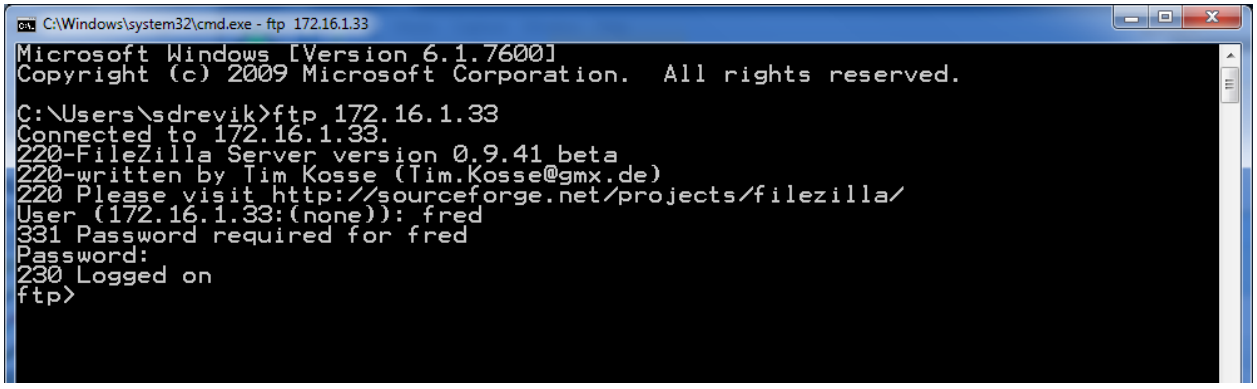


Note that for average data, you will need to make a push task for each averaging interval.

Finally, in the task, select **File Output Options**, select **FTP Enabled**, and choose your FTP program that you created earlier. You should define the file extension as RSP. You can choose anything you want for the file name. It is recommended that you select **Append Date To Name**.



Click **Save** and let the server restart. Pushes will start, and can be reviewed in the Scheduled Task Status display If you encounter any FTP problems, test the connection from the 8872 by going to a DOS prompt and manually initiating an ftp:



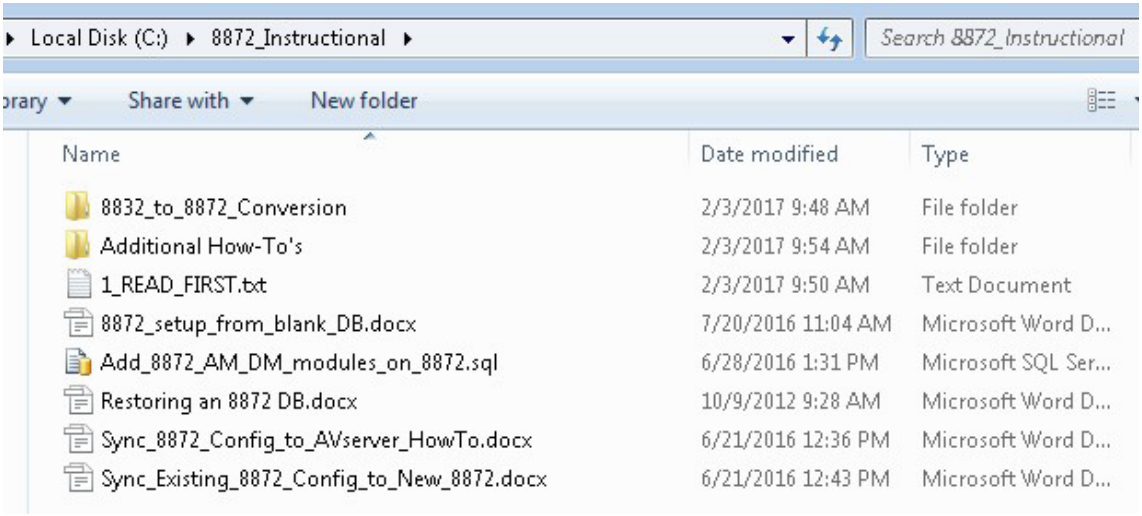
3.3 Central - Remote Sync Setup

To manage configuration between the server and the logger, the Model 8872 also supports a database-to-database synchronization. The advantage of this approach is the bidirectional update of settings, so that changes made either in the Central or in the Model 8872 are reflected on each end.

Sync can be used for configuration, logbook entries, and AirVision users and groups. For actual data retrieval the regular Model 8832 emulation polling (see “Controller Interface Service”, section 3.1) should be used.

Depending on your existing configuration and desired use of the 8872, there are various process documents available to assist you. These can be found on Agilaire’s FTP site where AVTrend updates are available (contact support@agilaire.com if you need access information). They are also included on each 8872 that is shipped out from Agilaire.

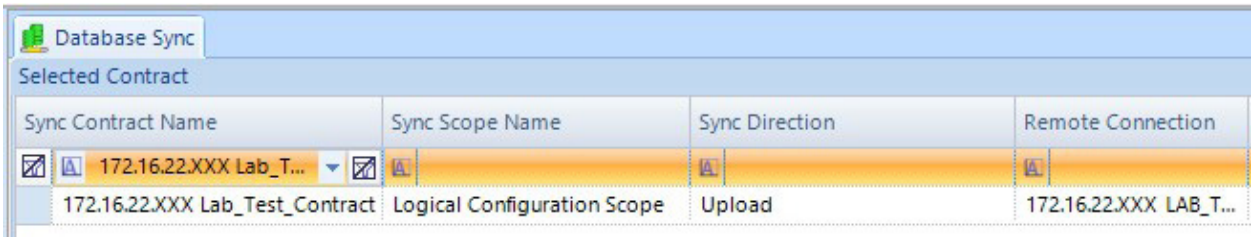
The 8872_Instructional folder provides a subfolder for the 8832 to 8872 conversion process as well as a selection of other how-to documents related to the 8872. Review the ‘1_READ_ FIRST’ file to confirm your course of action.



- If you are deploying a new 8872 to replace an existing 8832 or 8816, go to the '8832_ to_8872_Conversion' folder.
  - ***Read the '1_Conversion_READ FIRST' text file in the folder before you begin.***
- If you have an already configured 8872 on the AirVision server you wish to sync to a new 8872, use the Sync_Existing_8872_Config_to_New_8872' document.
- If you have an already configured 8872 logger you wish to sync to your AirVision server, use the 'Sync_8872_Config_to_AVserver_HowTo' document.
- If you need to setup an 8872 using a blank database (not the As Shipped from Agilaire database), follow the '8872_setup_from_blank_DB' document in this folder.

3.4 Sync Contract Direction Options

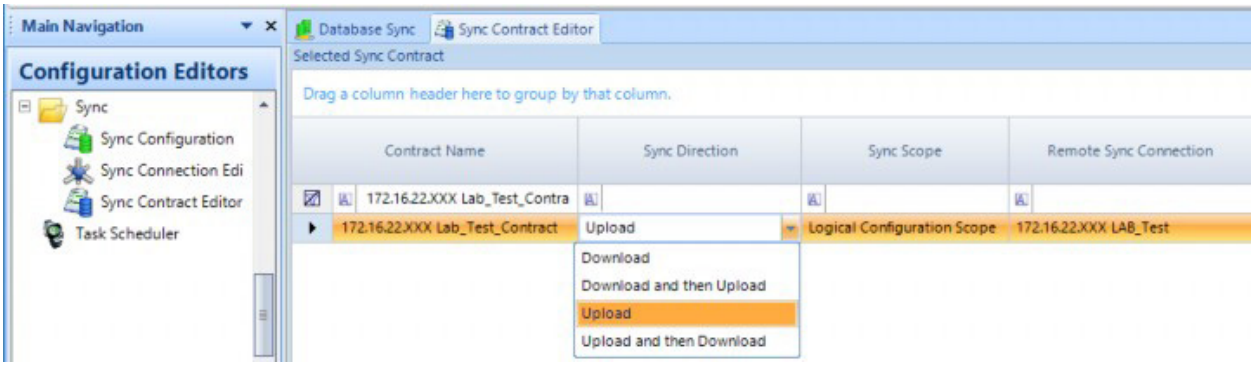
Before performing a sync, always check the Sync Direction.



Sync Direction determines the action attempted by the sync execution.

- Download – transfers configuration changes FROM the 8872 TO the AirVision server
- Download then Upload - transfers configuration changes FROM the 8872 TO the AirVision server, then transfers configuration changes FROM the AirVision server TO the 8872; giving priority to the download action
- Upload – transfers configuration changes FROM the AirVision server TO the 8872
- Upload then Download - transfers configuration changes FROM the AirVision server TO the 8872, then transfers configuration changes FROM the 8872 TO the AirVision server; giving priority to the upload action

If it needs to be changed, use the Sync Contract Editor. Make the desired Sync Direction selection, save, then refresh the Database Sync tab before executing the sync.



3.5 Sync Troubleshooting Tips

The **Test Connection** button in the Sync Wizard (or in the Sync Connection Editor) can be used to test connectivity to the 8872 database. If you have difficulty, the following trouble-shooting steps can be helpful:

- In **SQL Management Studio**, use the same settings (IP address, instance name, username, password) to try to connect to the remote site.
- From the AirVision server, use **TELNET** to try to open a basic TCP connection the site IP address and the designated port (or the default port 8998).
- Verify Windows Firewall settings and exceptions, ensure exception exists for port 8998.
- If the connection is refused, check router settings or check SQL settings to confirm which IP port is being used.

Chapter 4

Reports

After data has been polled, either by a scheduled task (**Configuration Editor>Task Scheduler**) or manually (**Utilities>Manual Poll**) the 8872 can run the following reports after the Criteria Pane has been configured:

Criteria Pane

Basic Reports

- Daily Summary Report
- Daily Parameter Report
- Monthly Report

Calibration Reports

- Calibration Results
- Calibration Trend Graph
- Calibration X-Bar-R Chart

Configuration Reports

- Calibration Configuration Report
- Channel Configuration Report
- Parameter Configuration Report
- Scheduled Tasks Report
- Site Configuration Report

Internal Reports

- DB Modification History Report
- Exception Journal Report
- Historical Log Viewer
- Journal Message Log
- Software Version Report
- Table Size Information

Logger Reports

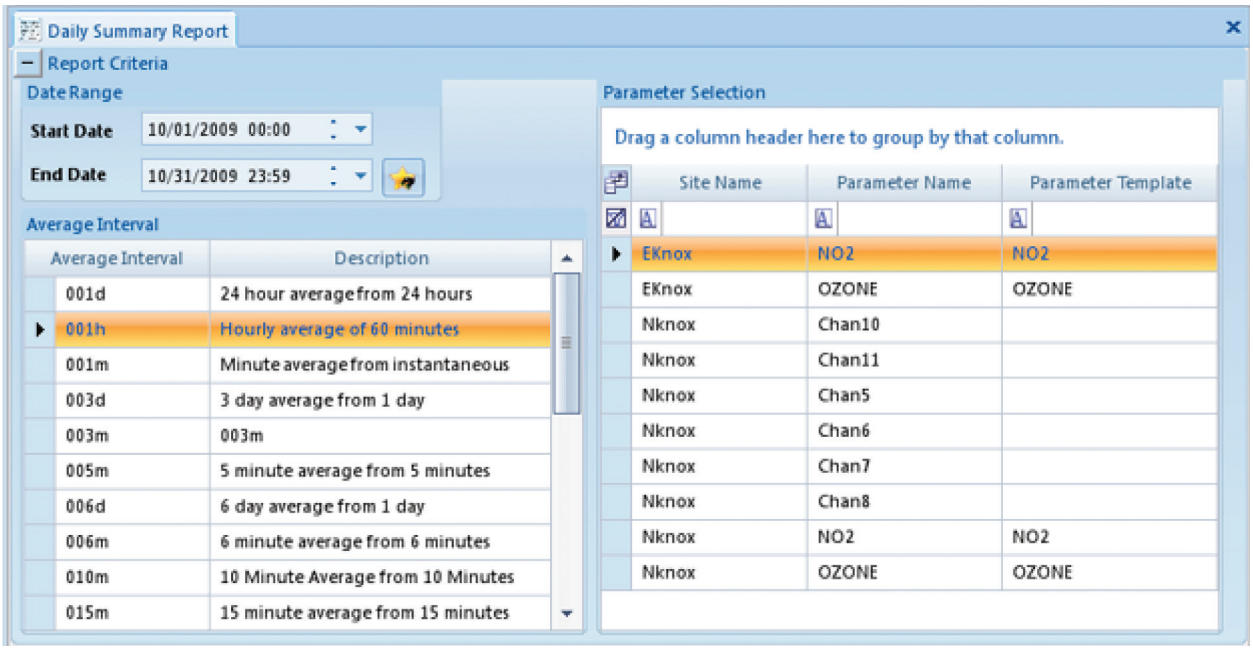
- Alarm Journal
- Input Line Status Report
- Power Failure Report

Other Reports

- Annotations Report
- LogBook Report

Criteria Pane

All reports use a Criteria Pane to select a time range and list of pollutants for the report.



Report Criteria pane in Reports > Daily Summary Report

You can select the Date Range any of the following ways:

- Manually type in a month, day, year, and time.
- Click in a date field (the month, date, year, hour, minute) and click the small up or down arrow keys to raise or lower that field (month, day, year, hour, minute). (It isn't necessary to highlight the field, just put the cursor in it.)
- Use the down arrow at the right end of the field to bring up a **Calendar.** You can click the arrows to change the month, or click the name of the month or year to bring up a list.
- Use the **Star** button to select from a pre-defined date range:

  Current Day
  Yesterday
  Current Week
  Last Week
  Current Month
  Last Month
  Current Quarter
  Last Quarter
  Current Year
  Number of days back from current day

In addition, the time criteria (e.g., the star icon button) allows you to choose “shift forward one day” or “shift backward one day.” If you select one of these and hit apply, it acts similar to the “Data Forward” or “Data Backward” buttons, except always shifting by 24 hours, rather than the size of the data window. This is useful for reviewing calibration minute data for several days, where the calibration falls on the same time each day.

Scroll to select an **Average Interval** (most reports only support one average interval at a time).

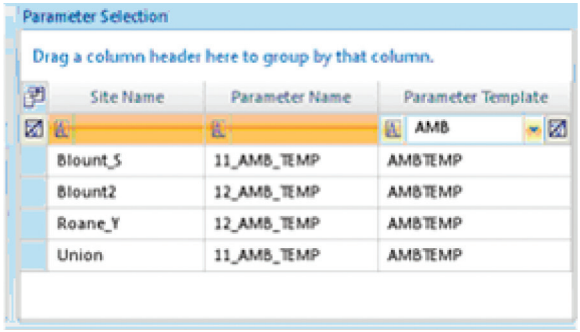
Click to select a site and parameter; use standard Windows Shift-Click and Control-Click conventions to select multiple parameters.

Filters

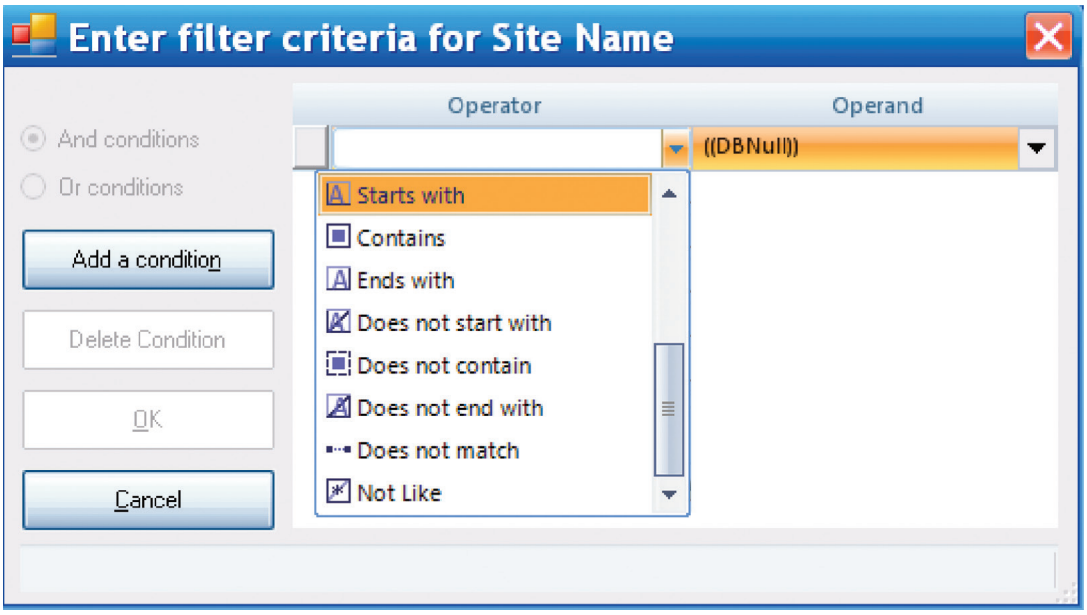
Filter fields are available in the top row of each column. Click in the row to use the filter to list a single site, parameter, or parameter template.

Click the down-arrow to the right of each filter field to select a particular entry in the column. Choices in the drop-down list will be Custom, Blanks, Non-blanks, plus each entry in the column (site name, parameter names, or parameter templates)

To write your own criteria, select **Custom** and configure the screen that pops up.



Filter fields in Reports criteria pane

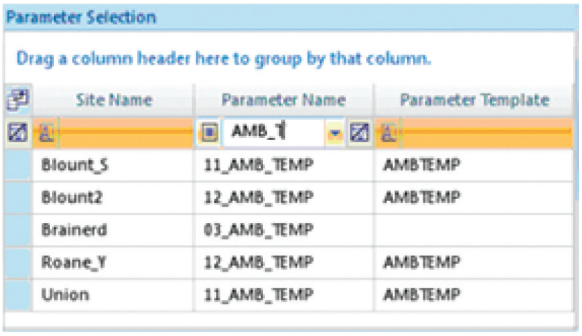


Custom filter criteria screen

Click the box with the letter **A** in the left side of each filter field to change the filter field from the default of **Starts With** to one of the following:

Equals
Does not equal
Less than
Less than or equal to
Greater than or equal to
Like
Matches Regular Expression
Starts with
Contains
Ends with
Does not start with
Does not contain
Does not end with
Does not match
Not like

For example, if you imported E-DAS data and used the option to put the channel number in front of the channel name, you might end up with some ozone channels that were "01_OZONE" while others were "03_OZONE" and "04_OZONE". Using the boxed "A" filter, you could search for all parameters names that contain ""Ozone" and more easily select them from a large list of parameters.

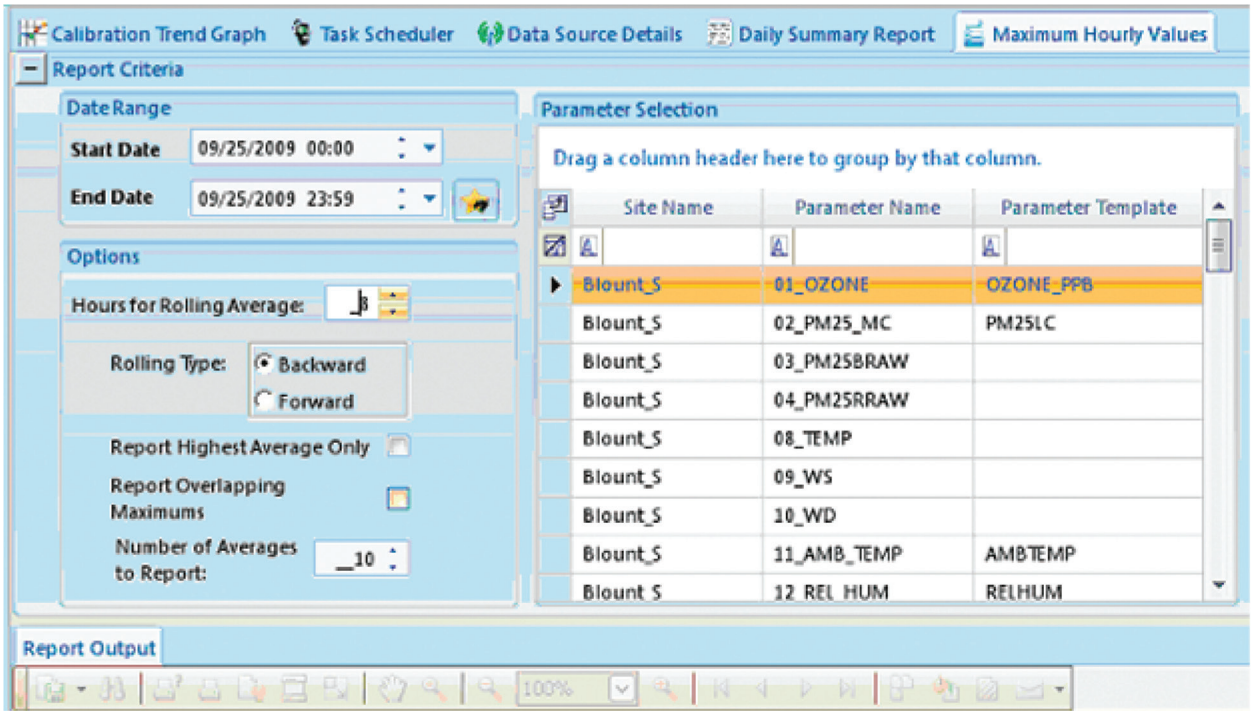


Using a filter to determine which parameters do not have a template

Additional Fields for Specific Reports

For some reports, the Criteria Panel is expanded with additional fields. For the Maximum Hourly Averages report, additional information is needed on how the data in the report should be filtered and calculated:

- Rolling hours, and time-tagging type
- Report highest average only for any day
- Allow report of overlapping maximums (for multiple hour rolling averages)
- Number of maximum averages to report



Additional Report Criteria required for Maximum Hourly Values report

Other reports with additional criteria include:

- Wind / Pollution Rose requires you to designate which Wind Rose report profile to use.
- AQS/XML Report requires you to choose which kinds of records to be assembled.
- Concentration Distribution, Frequency Distribution, Monthly Reports all allow you to designate an N-hour rolling average as an option.

Basic Reports

Daily Summary Report

The Daily Summary Report is usually used for the daily summary of hourly data for all parameters at a site or sites, but it can also be used to report any time range or average interval. Statistics (Average, Maximum, Minimum, and Count) are at the bottom of each column.

To generate a Daily Summary Report (**Reports > Daily Summary Report**), select Start and End Dates, an Average Interval, Site Name or Names, and Parameter Name or Names. Click the Generate Report icon on the Ribbon.

Current Time: 3/9/2009 2:18:57 PM

Daily Summary Report

Site: SITEONE 9/1/2007 Interval 001h

	AMBTEMI	OZONE	RAINFALL	RELHUM	RWDR	RWSP	SIGTHET/	SOLARRA	SWSP
Hour									
00:00	13.5	78	0	99	126	4.4	9	0	4.4
01:00	13.6	78	0	99	122	4.5	10	0	4.5
02:00	13.5	83	0	98	136	4.5	8	0	4.5
03:00	13.8	88	0	100	143	3.9	8	0	3.9
04:00	13.8	87	0	100	125	3.6	10	0	3.6
05:00	13.5	86	0	100	110	3.2	10	0	3.2
06:00	13.4	83	0	100	110	3	9	36	3
07:00	14	79	0	100	103	2.7	13	193	2.7
08:00	14	78	0	98	101	2.9	12	259	2.9
09:00	14	73	0	98	102	2.2	16	157	2.2
10:00	14.9	68	0	94	110	2.5	18	345	2.5
11:00	15.5	64	0	91	121	2.2	22	357	2.2
Average	13.958	78.75		98.083	117.417	3.3	12.083	112.25	3.3
Max	15.5	88	0	100	143	4.5	22	357	4.5
Min	13.4	64	0	91	101	2.2	8	0	2.2
Count	12	12	12	12	12	12	12	12	12

Daily Summary Report

Daily Parameter Report

The Daily Parameter Report shows a single day summary for the entire monitoring network, grouping parameters together by the Parameter Template, but showing all sites sharing that parameter template.

Parameters that do not have a parameter template designated are not reported.

To generate a Daily Parameter Report (**Reports > Daily Parameter Report**), select Start and End Dates, an Average Interval, Site Name or Names, and Parameter Name or Names. Click the Generate Report icon on the Ribbon.

Daily Parameter Report

3/1/2006

Parameter	SiteName	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Summary		
																										Avg	Max	RDS
AMBTEMP	11_Roane	-9.1	-9.7	-10.3	-11.3	-12.7	-11.9	-11.9	-11.9	-10.9	-9.9	-8.6	-7.4	-6.6	-4	-3	-2	-1.5	-2.1	-2.5	-4.3	-4.8	-5.3	-5.2	-5.5	-7.2	-1.5	24
	12_Blaine	-8.4	-8.7	-9.6	-10.4	-10.4	-10.7	-11.5	-10.3	-8.9	-7.9	-6.8	-5.8	-4.6	-4.5	-4.2	-4	-4.2	-5.3	-6	-6.2	-6.2	-6.6	-7.1	-7.5	-7.3	-4	24
	Blount	-11.1	-10.4	-11	-11.3	-12.9	-13.9	-14.6	-14.1	-13	-12.2	-10.7	-8.7	-6.7	-6.2	-5.5	-4.5	-4.4	-4.4	-3.9	-3.5	-3	-3	-3.4	-3.8	-8.2	-3	24
CO	11_Roane		.4	.4	.4	.4	.4	.4	.5	.5	.5	.5	.4	.4	.4	.4	.5	.5	.5	.4	.5	.5	.5	.4	.4	.5	.9	23
NO	11_Roane		1.8	.6	3	5.4	1.5	2.2	7.1	5.6	4.6	11.6	5	8	4.4	6.4	11.3	5.8	9.1	5.9	7.9	8.7	16.5	11.6	8.3	6.6	16.5	23
NO2	11_Roane		5.3	7.3	10.2	21	4.2	4.9	8.7	5.1	4.2	7.8	4.4	4.2	4.3	5.6	9.9	8	13.3	8.9	14.8	21.5	23.5	13.3	21.2	10.5	23.5	23
NOX	11_Roane		8.2	9.1	23.3	27.5	6.7	7.9	16.8	11.5	9.7	17.8	10.2	12.9	9.6	12.9	23.1	14.7	23.3	15.6	23.6	31.2	40.8	26	30.6	17.9	40.8	23
OZONE_PPB	12_Blaine		36.9	37.0	41.4	41.4	40.5	38.6	39.1	40.6	40.5	40.8	40.4	40.6	40.5	41.1	41.9	42	42.1	41.4	42	42	41.2	39.4	36.9	40.3	42.1	23
PM25LC	11_Roane	5.6	5.3	4.3	7.4	11.6	5.5	1.4	5.4	4	5.2	4.8	4.1	2.8	3.2	3.8	3.4	5.2	6	6	5.5	4.3	6.9	7.6	8.6	5.4	11.6	24
	12_Blaine	7	10.2	5.8	2.8	2.5	2.9	5	4.3	6.7	7.2	3	3.3	4.7	3.4	2	3.2	3.3	3.3	5.4	4.5	3.4	3.3	5.2	7.1	4.5	10.2	24
RAINFALL	Blount	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
RELHUM	11_Roane	56.8	58.2	67.5	71.4	75.1	69.7	64.8	63.9	57.4	49.6	46.3	42.3	36.6	30.8	29.2	27.7	25.6	28	38.8	43.8	44	44.9	45	49.1	49.6	75.1	24
	12_Blaine	80.8	72.1	68.2	65.1	62.8	58.1	60.6	57.5	49.7	44.3	38.5	34.9	33.9	36.2	35.8	37.6	41	45.9	49.8	51.8	52.7	56.7	61.1	65.6	51.7	80.8	24
	Blount	67.9	66	66.3	66.8	68	64.4	62.2	61.7	51.2	45.6	45.3	39.7	36.5	36.8	36.7	37	37	36.9	36.3	36	34.8	36.8	36	37	45.8	67.9	24
SO2	11_Roane		4.4	5.9	15.7	15.3	3.6	3.4	3.8	3.1	4.2	2.3	3.8	7.2	4.3	1.5	1.3	1.5	1.8	3.3	4.5	4.6	5.7	4.4	4.7	4.7	15.7	23
WDR	11_Roane	280.8	277	214.8	168.1	226.8	303.4	301.1	293.6	249	270.1	218.1	209	279.6	293.1	227.3	208.2	214.4	217.8	195	163.7	168.5	168.2	176.5	152.5	228.2	303.4	24
	12_Blaine	256.4	262.7	250.9	232.5	238	227.4	258.6	262.5	256.4	285	272.3	271.2	246.1	234.6	231.8	235.4	232.5	240	230.5	229.2	216.2	216.8	211.2	207.6	244	286.4	24
	Blount	198.4	278.4	237.1	206.6	189.1	189	153.6	131.6	125.8	140.6	94.5	133.9	178.1	185.7	181.4	184.7	151.5	144.3	148.4	147.9	195.9	161.7	131.4	144.2	165.9	278.4	24
WSP	11_Roane	1.8	1.9	1.4	1	1.6	2.5	2.3	2.1	2.6	2	1.5	2.4	2.2	2.3	2.4	2.3	2.4	1.8	2.7	2.2	1.5	1.5	1.9	1.4	2	2.7	24
	12_Blaine	1.9	2.1	1.9	2.2	2.1	2.6	1.4	1.7	2.6	3	3.2	3.1	3.3	4.1	3.7	4.1	3.5	3	2.3	2.8	2.4	1.8	1.3	1.2	2.6	4.1	24
	Blount	1.8	4.3	2.5	2.1	1.8	2.1	1.6	1.9	1.8	1.8	1.7	1.1	1.4	2	2.3	1.9	1.8	1.8	1.1	.7	.9	1	1.5	1.5	1.8	4.3	24

Daily Parameter Report (Reports > Daily Parameter Report)

Monthly Report

Monthly reports provide a matrix view of a single parameter, showing values for the entire month. Invalid or flagged data is shown with a color background or font change defining the data condition. Statistics are provided for each row (day) and column (hour).

To run a **Monthly Report:**

1. Select **Reports > Monthly Report.**
2. Select a **Start** and **End** date
3. Select number of **Hours for Rolling Average**
4. Select a **Rolling Type** (**Backward or Forward**)
5. Select the **Parameters** that will be displayed in the report
6. If you want the **Flags Legend** to be shown in the report, click to select **Flags**. (You may have to scroll down to see the Flags option.
7. Click the **Generate Report** button on the Ribbon.

▶ **Note:** If **Totalize in Reports** was selected in **Configuration Editors > Parameter Settings**, Monthly Reports will show a total of data rather than an average. If **Minimum in Reports** was this option was selected in **Configuration Editors > Parameter Settings**, Monthly Reports will show a minimum of data rather than an average or a total. Totalize in Reports and Minimum in Reports are most commonly used for rainfall.

Current Date: 10/13/2013 10:43 AM

Monthly Report

Site Name: 01_KNOX 095 : 0004 February 2006 Avg Interval: 1 hour

Parameter: 01_O3 44201 Units: PPB 008 Method: 080

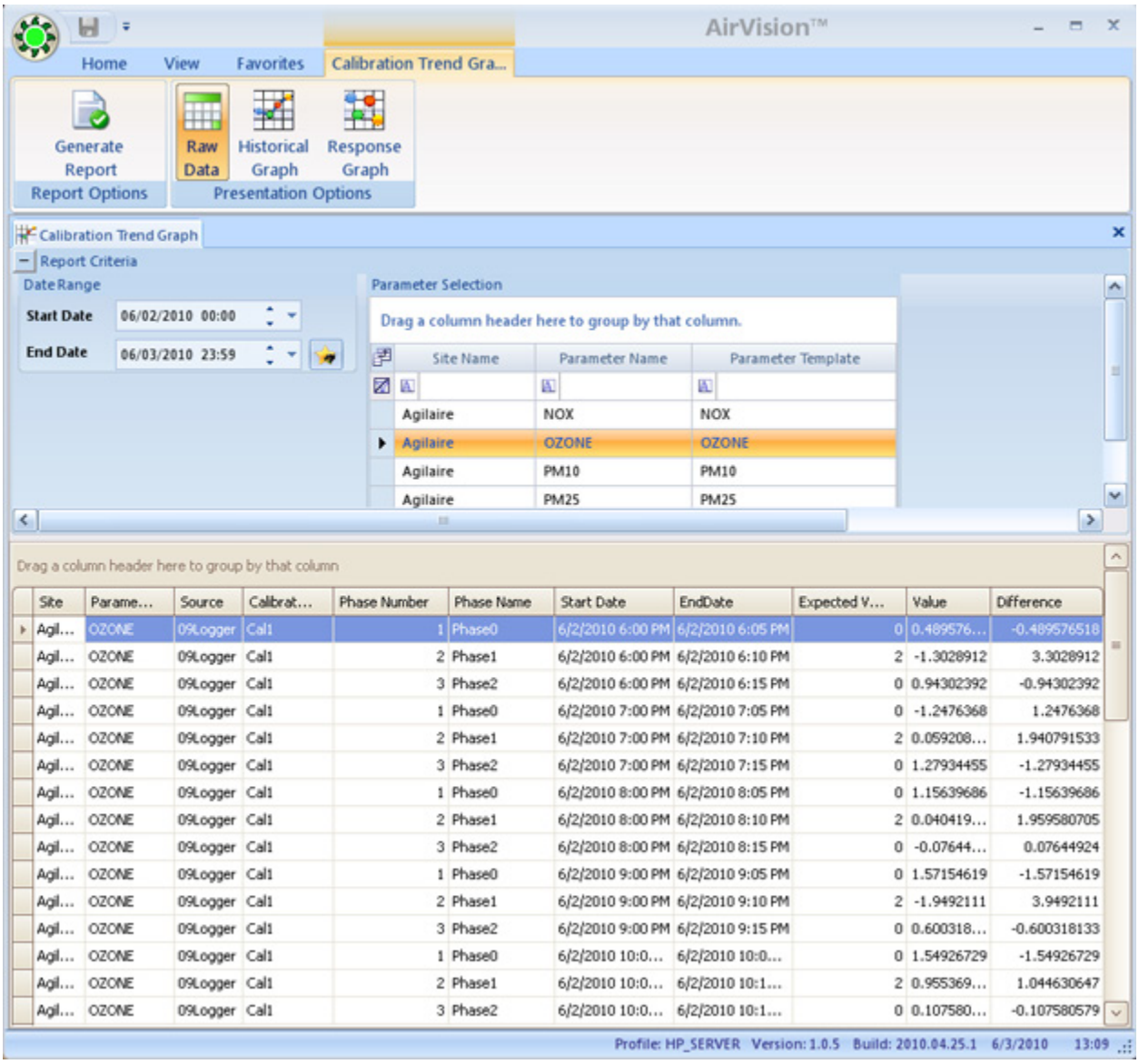
Hours

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Summary		
																									Max	Avg	RDS
01		27	29	29	29	27	28	28	31	31	35	39	38	39	39	37	37	38	35	34	33	32	28	23	39	32	23
02	113	15	16	20	27	20	15	19	18	17	23	25	26	27	25	25	22	16	9	7	12	20	24	25	113	23	24
03	119	30	31	33	32	32	32	31	29	81	194	24	34	33	33	32	34	37	36	36	36	35	37	38	194	45	24
04	121	30	30	32	28	21	20	13	14	25	23	35	38	37	42	41	38	36	35	36	39	38	38	38	121	35	24
05	123	33	33	33	32	35	38	42	39	26	21	21	21	23	23	24	23	23	24	25	26	25	23	22	123	31	24
06	119	30	31	30	31	33	35	36	35	37	40	40	40	41	42	42	40	39	38	37	35	34	33	33	119	39	24
07	125	34	35	20	36	18	34	34	33	34	35	36	38	19	19	19	19	19	18	18	18	18	18	17	125	29	24
08	C	15	16	14	14	15	12	11	14	16	18	18	18	18	19	19	19	19	18	18	18	18	18	18	19	16	23
09	C	32	30	31	31	30	26	22	26	32	34	M	M	23	28	30	31	32	33	33	34	35	35	35	35	30	21
10	C	35	34	33	32	32	32	33	34	35	36	37	38	38	39	40	40	39	38	38	35	35	36	35	40	35	23
11	C	32	30	20	19	20	19	21		31	37	39	40	38	37	39	38	37	30	28	38	38	37	36	40	32	22

Monthly Report with Parameter Code

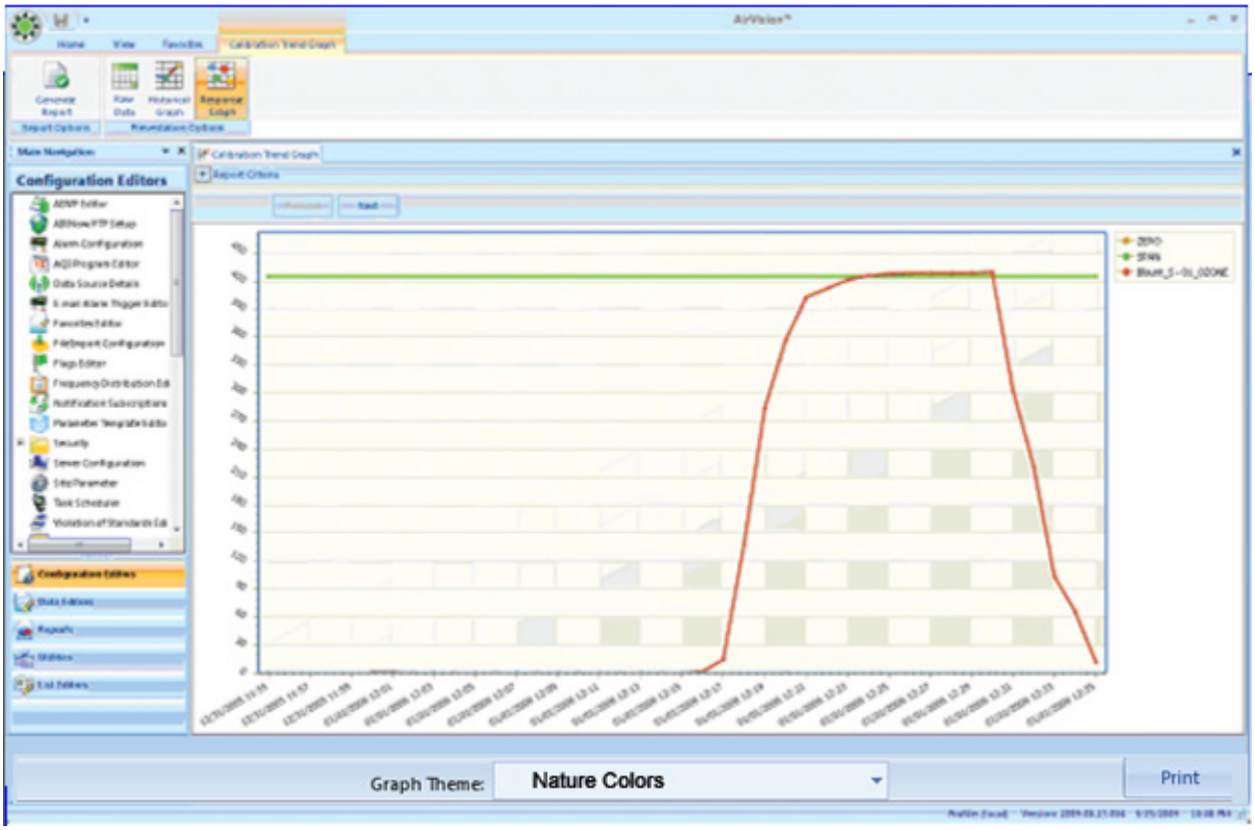
If **AQS Null Code**s have been set for invalidated data, they are displayed in the **Monthly Repor**t. If Site Codes, and/or Parameter codes have been selected in the Configuration Menu they will be included in the Header. Options are provided to show null codes or flags when an invalid hour is shown on the report. These options are also available in the Scheduled Task (options).

If you select **Historical Graph** from the Ribbon, you can view data in a graph. Each color represents a different phase, as shown in the legend. You can change the color scheme by selecting a **Graph Theme** from the drop down list at the bottom of the screen.



Historical Calibration Trend Graph

If you select **Response Graph** from the Ribbon at the top of the screen, you can review fine-resolution data during each calibration cycle to see instrument response. Each cal can be cycled through using the **Forward**/**Back** button. You can change the color scheme by selecting a **Graph Theme** from the drop down list at the bottom of the screen.



Calibration Trend Response Graph

Current Date: 10/18/2010 12:51 PM

Site Name: Agilaire

Parameter: OZONE

Monthly Report

October 2010

Avg Interval: 1 hour

Units: PPM

Hours

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Summary Avg	Summary Max	Summary RDS
01	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	0.005	0.005	24
02	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	0.005	0.005	24
03	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	0.005	0.005	24
04	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	.005	1.675 D	3.534	3.547	0.369	3.547	24
05	3.561	3.574	3.587	3.597	3.609	3.618	3.628	3.636	3.606 >	3.555	3.523	3.525	3.527	3.522	3.518	3.522	3.52	3.518	3.505	3.502	3.51	3.521	3.533	3.547	3.552	3.636	24
06	3.562	3.576	3.586	3.597	3.611	3.62	3.629	3.638	3.635	3.596	All <	3.521	3.524	3.542	3.552	3.555 >	3.555	3.551	3.544	3.533	3.536	3.546	3.556	3.571	3.571	3.638	23
07	3.583	3.598	3.61	3.62	3.632	3.641	3.653	3.665	3.657	3.657	3.566	3.56	3.557	3.542	3.53	3.525	3.52	3.523	3.523	3.513	3.511	3.509	3.512	3.522	3.572	3.665	24
08	3.53	3.541	3.55	3.56	3.57	3.58	3.599	All <	3.594	3.54	3.5	3.493	3.493	3.493	3.491	3.491	3.495	3.496	3.489	3.478	3.474	3.481	3.487	3.497	3.518	3.599	23
09	3.507	3.519	All <	3.542	3.549	3.558	3.563	3.574	3.578	3.557	3.518	3.492	3.488	3.496	3.496	3.496	3.499	3.495	3.492	3.488	3.479	3.481	3.48	3.483	3.514	3.578	23
10	3.492	3.498	3.507	3.516	3.524	3.53	3.538	3.545	3.547	3.527	3.492	3.49	3.497	3.517	3.519	3.522	3.522	3.519	3.515	3.514	3.503	3.501	3.51	3.516	3.515	3.547	24
11	3.527	3.535	3.543	3.554	3.565	3.572	3.582	3.591	3.594	3.562	3.541	3.54	3.533	3.534	3.535	3.531	3.533	3.533	3.528	3.527	3.527	3.522	3.531	3.534	3.544	3.594	24
12	3.539	3.548	3.552	3.561	3.567	3.576	3.582	3.589	3.591	3.577	3.554	3.539	3.538	3.543	3.538	3.531	3.532	3.524	3.521	3.523	3.516	3.517	3.521	3.521	3.546	3.591	24
13	3.527	3.525	3.524	3.527	3.533	3.538	3.538	3.542	3.539	3.529	3.529	3.531	3.526	3.527	3.528	1.881 D	.003	.003	.003	.003	.003	.003	.003	.003	2.327	3.542	24
14	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	0.003	0.003	24
15	.003	.003	.003	.004	.004	.004	.004	.004	.004	.004	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	0.003	0.004	24
16	.003	.003	.003	.003	.004	.004	.004	.004	.004	.004	.004	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	0.003	0.004	24
17	.003	.003	.003	.003	.004	.004	.004	.004	.004	.004	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	0.003	0.004	24
18	.003	.003	.003	.003	.003	.003	.003	.003 >	.003	.003	.003														0.003	0.003	11
Max	3.583	3.598	3.61	3.62	3.632	3.641	3.653	3.665	3.657	3.657	3.566	3.56	3.557	3.543	3.552	3.555	3.555	3.551	3.544	3.533	3.536	3.546	3.556	3.57	3.665	3.665	3.665
Avg	1.77	1.774	1.676	1.783	1.788	1.792	1.797	1.695	1.798	1.785	1.662	1.866	1.865	1.867	1.867	1.828	1.859	1.858	1.856	1.853	1.852	1.751	1.864	1.868	1.766	1.766	1.766
Count	18	18	17	18	18	18	18	17	18	18	17	17	17	17	17	17	17	17	17	17	17	17	17	17	416	416	416

Monthly Report

Flags

>	Some Data Missing	+	Max Exceeded	-	Min Exceeded	<	Logger Invalid
?	Suspect	a	Audit	B	Bad Status	C	Calibration
c	Ceiling Limit	D	Channel Disabled	E	Edited	e	Site Malfunction
f	Floor Limit	H	High-High Alarm	h	High Alarm	I	Invalidated By Edit
J	Rate of Change Alarm	L	Low-Low Alarm	l	Low Alarm	M	Maintenance
m	Marked Maint by edit	O	Overrange	o	Other	P	Power Failure
p	Precision Check	Q	Quality Assured	R	Rate of Change Exceeded	V	Dig Info#1
W	Dig Info#2	X	Dig Info#3	Y	Dig Info#4	Z	Dig Info#5
z	Zero Adjusted						

Flags Legend in Monthly Report

Calibration Reports

Calibration Results

Calibration Results show the calibration event and results for any zero/span, precision check, or other calibration program.

Current Date : 3/9/2009
Current Time : 3:47 PM

Calibration Report

Site: SITEONE
Source: Logger01
Date: 02-Jul-2008

Parameter	Sequence	Phase	Start Time	End Time	Value	Expected Value	% Error
test1	TESTCAL	PHASE1	00:00:00	00:01:00	1.123	1	12.35

Calibration Report

Calibration Trend Graph

Calibration Trend Graphs provide a long-term view of calibration zero/span results over a user-defined period of time (month, quarter, etc). Select a **Start** and **End Date** and a **Parameter**. Click the **Generate Report** icon on the ribbon.

If you select **Raw Data Graph** from the ribbon at the top of the screen, you can view calibration data in a text table.

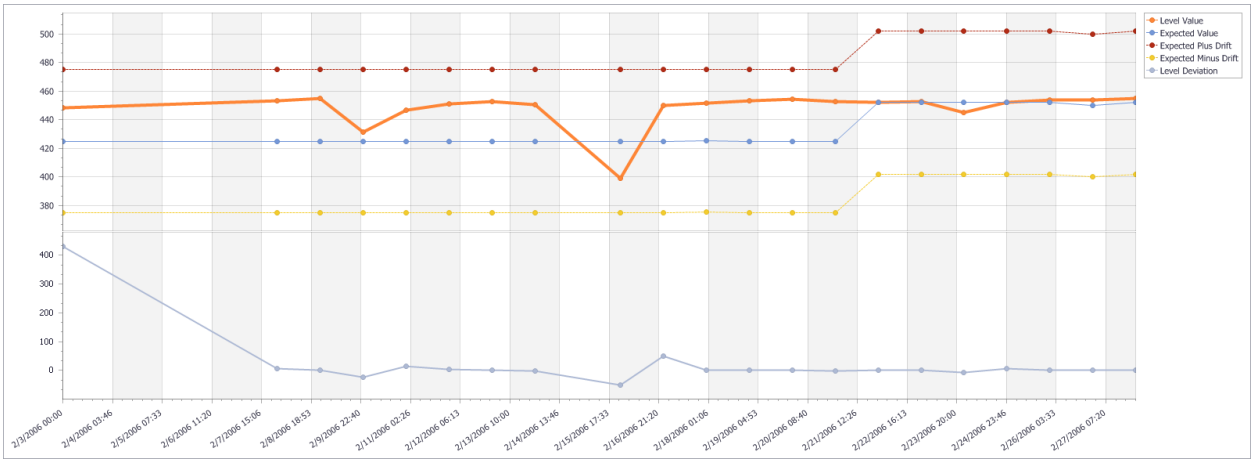
Drag a column header here to group by that column

Site	Parameter	Source	Calibration	Phase Number	Phase Name	Start Date	EndDate	Expected Value	Value	Difference
SITEONE	OZONE	01	Autocal	1	Zero	10/11/2009 3:15 AM	10/11/2009 3:20 AM	0	-0.06620079	0.06620079
SITEONE	OZONE	01	Autocal	2	Span1	10/11/2009 3:15 AM	10/11/2009 3:25 AM	10	-0.06620765	10.06620765
SITEONE	OZONE	01	Autocal	3	Span2	10/11/2009 3:15 AM	10/11/2009 3:30 AM	20	-0.06617844	20.06617844
SITEONE	OZONE	01	Autocal	1	Zero	10/12/2009 3:15 AM	10/12/2009 3:20 AM	0	3.2763E-05	-3.2763E-05
SITEONE	OZONE	01	Autocal	2	Span1	10/12/2009 3:15 AM	10/12/2009 3:25 AM	10	1.8676E-05	9.999981324
SITEONE	OZONE	01	Autocal	3	Span2	10/12/2009 3:15 AM	10/12/2009 3:30 AM	20	1.3046E-05	19.999986954
SITEONE	OZONE	01	Autocal	1	Zero	10/13/2009 3:15 AM	10/13/2009 3:20 AM	0	3.8957E-05	-3.8957E-05
SITEONE	OZONE	01	Autocal	2	Span1	10/13/2009 3:15 AM	10/13/2009 3:25 AM	10	4.1682E-05	9.999958318
SITEONE	OZONE	01	Autocal	3	Span2	10/13/2009 3:15 AM	10/13/2009 3:30 AM	20	2.7749E-05	19.999972251

Raw Data Calibration Display

Calibration X-Bar-R Chart

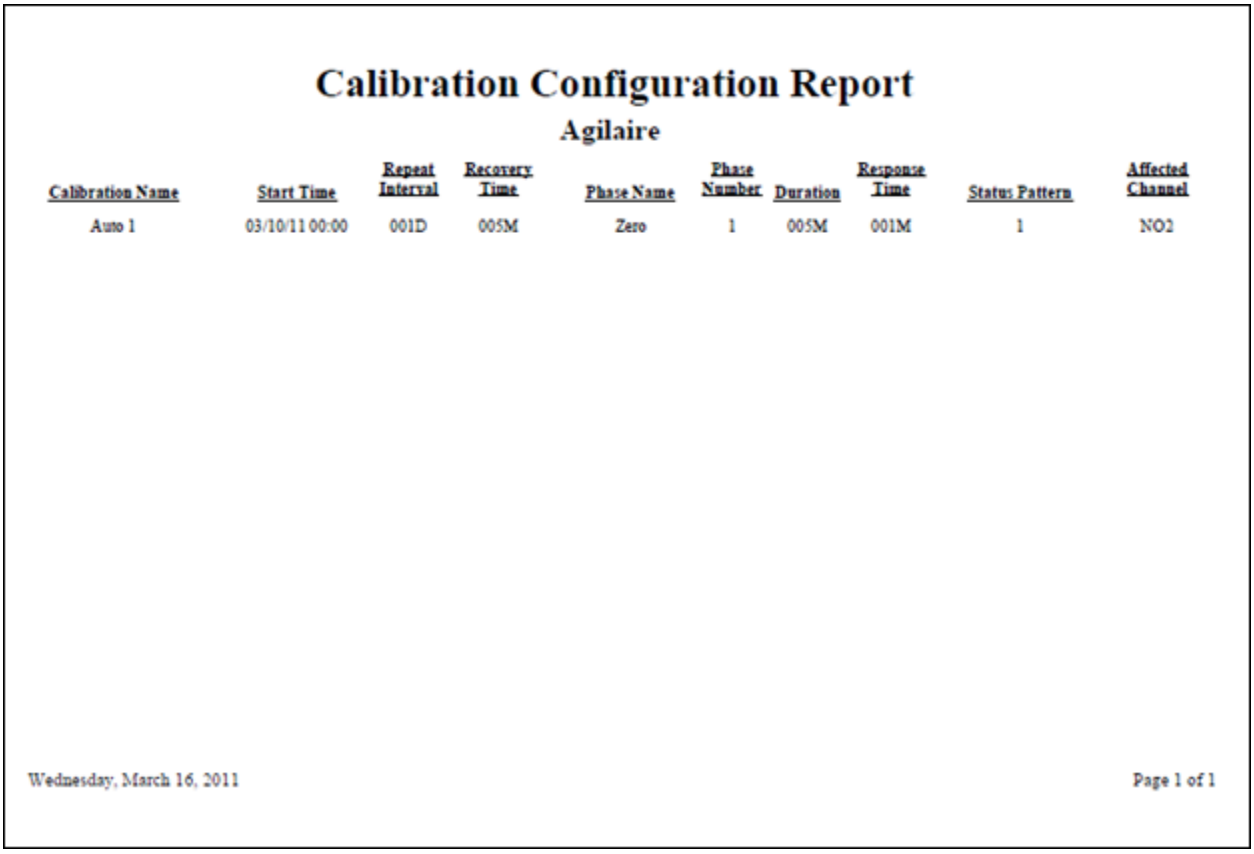
This chart provides a detailed review of a particular phase (e.g., zero, span, precision) for a particular parameter over time. The top chart shows the measured response and expected / reference value for each calibration event. If drift limits have been set, those bounds are shown as well. The bottom chart shows the value of the drift (difference) from one cal event to the next.



Configuration Reports

Calibration Configuration Report

To run a Calibration Configuration Report (**Reports > Configuration folder > Calibration Configuration Report**), select a site or sites and click the **Generate Report** icon on the Ribbon.



Calibration Configuration Report

Agilaire

Calibration Name	Start Time	Repeat Interval	Recovery Time	Phase Name	Phase Number	Duration	Response Time	Status Pattern	Affected Channel
Auto 1	03/10/11 00:00	001D	005M	Zero	1	005M	001M	1	NO2

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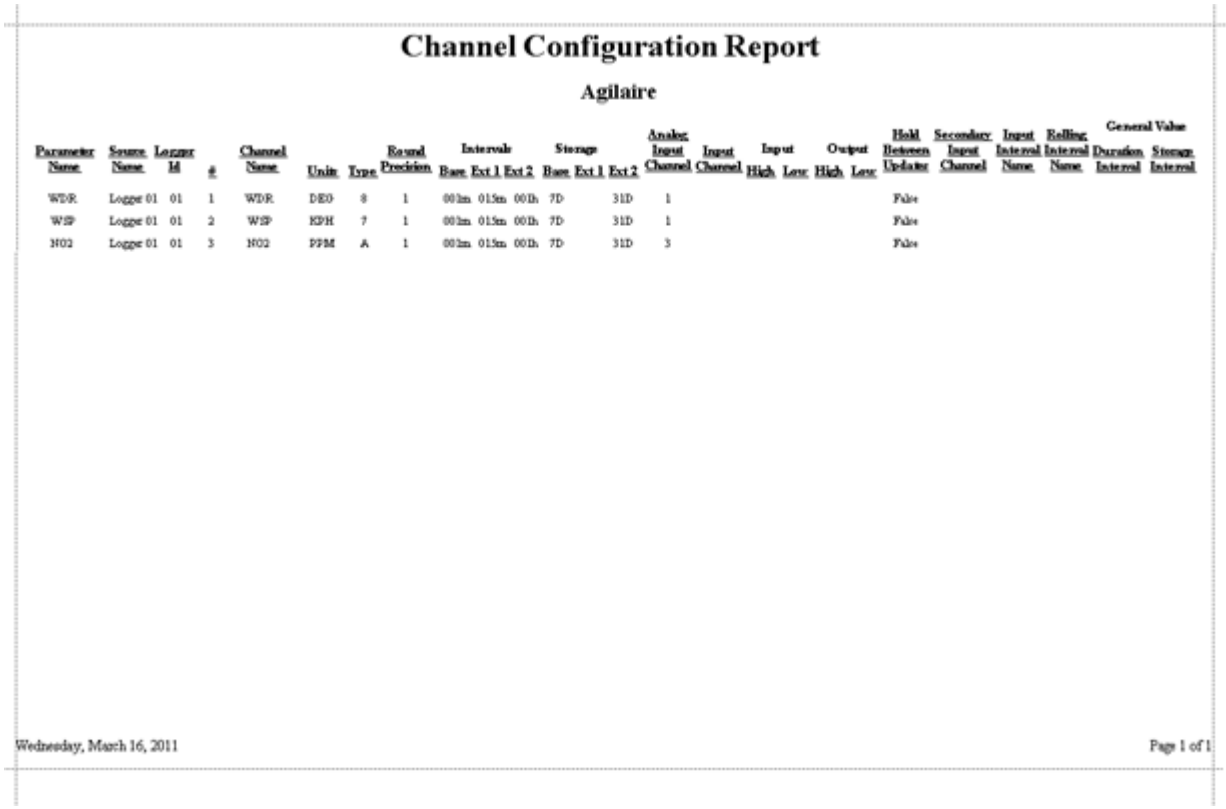
Calibration Configuration Report (Reports > Configuration folder > Calibration Configuration Report)

Channel Configuration Report

To run a Channel Configuration Report (**Reports > Configuration folder > Channel Configuration Report**), select a Site or Sites and a Parameter Name or Parameter Names. Click the **Generate Report** icon on the Ribbon.



Channel Configuration Report

Agilaire

Parameter Name	Source Name	Logger Id	#	Channel Name	Unit	Type	Round Precision	Intervals			Storage			Analog Input Channel	Input Channel	Input		Output		Hold Between Updates	Secondary Input Channel	Input Interval Name	Rolling Interval Name	General Value	
								Base	Ext 1	Ext 2	Base	Ext 1	Ext 2			High	Low	High	Low					Duration Interval	Storage Interval
WDR	Logger 01	01	1	WDR	DEG	8	1	00:1m	01:5m	00:1h	7D		31D	1						False					
WSP	Logger 01	01	2	WSP	KPH	7	1	00:1m	01:5m	00:1h	7D		31D	1						False					
H02	Logger 01	01	3	H02	PPM	A	1	00:1m	01:5m	00:1h	7D		31D	3						False					

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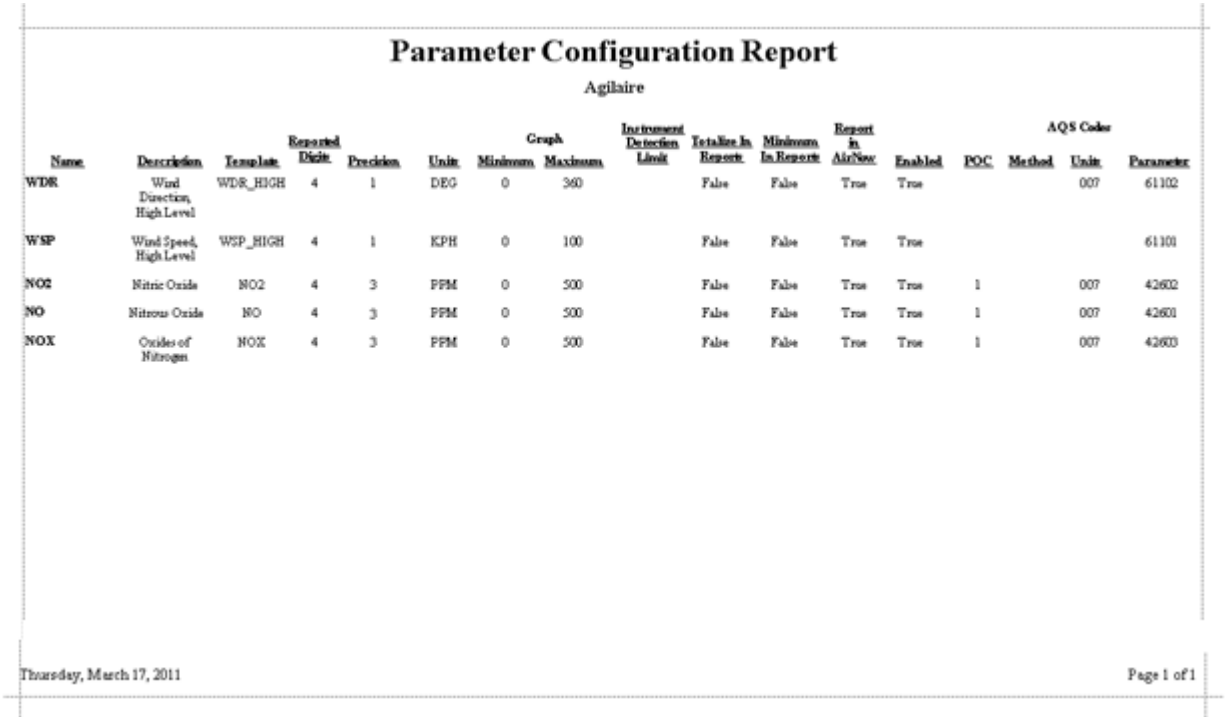
Channel Configuration Report (Reports > Configuration folder > Channel Configuration Report)

Parameter Configuration Report

To run a Parameter Configuration Report, (**Reports > Configuration folder > Parameter Configuration Report**), select a Site or Sites and a Parameter Name or Parameters Names. Click the **Generate Report** icon on the Ribbon.



Parameter Configuration Report

Agilaire

Name	Description	Template	Reported Digits	Precision	Units	Graph Minimum	Graph Maximum	Instrument Detection Limit	Totalize In Reports	Minimum In Reports	Report in AirNow	Enabled	POC	AQS Codes Method	AQS Codes Units	AQS Codes Parameter
WDR	Wind Direction, High Level	WDR_HIGH	4	1	DEG	0	360		False	False	True	True			007	61102
WSP	Wind Speed, High Level	WSP_HIGH	4	1	KPH	0	100		False	False	True	True				61101
NO2	Nitric Oxide	NO2	4	3	PPM	0	500		False	False	True	True	1		007	42602
NO	Nitrous Oxide	NO	4	3	PPM	0	500		False	False	True	True	1		007	42601
NOX	Oxides of Nitrogen	NOX	4	3	PPM	0	500		False	False	True	True	1		007	42603

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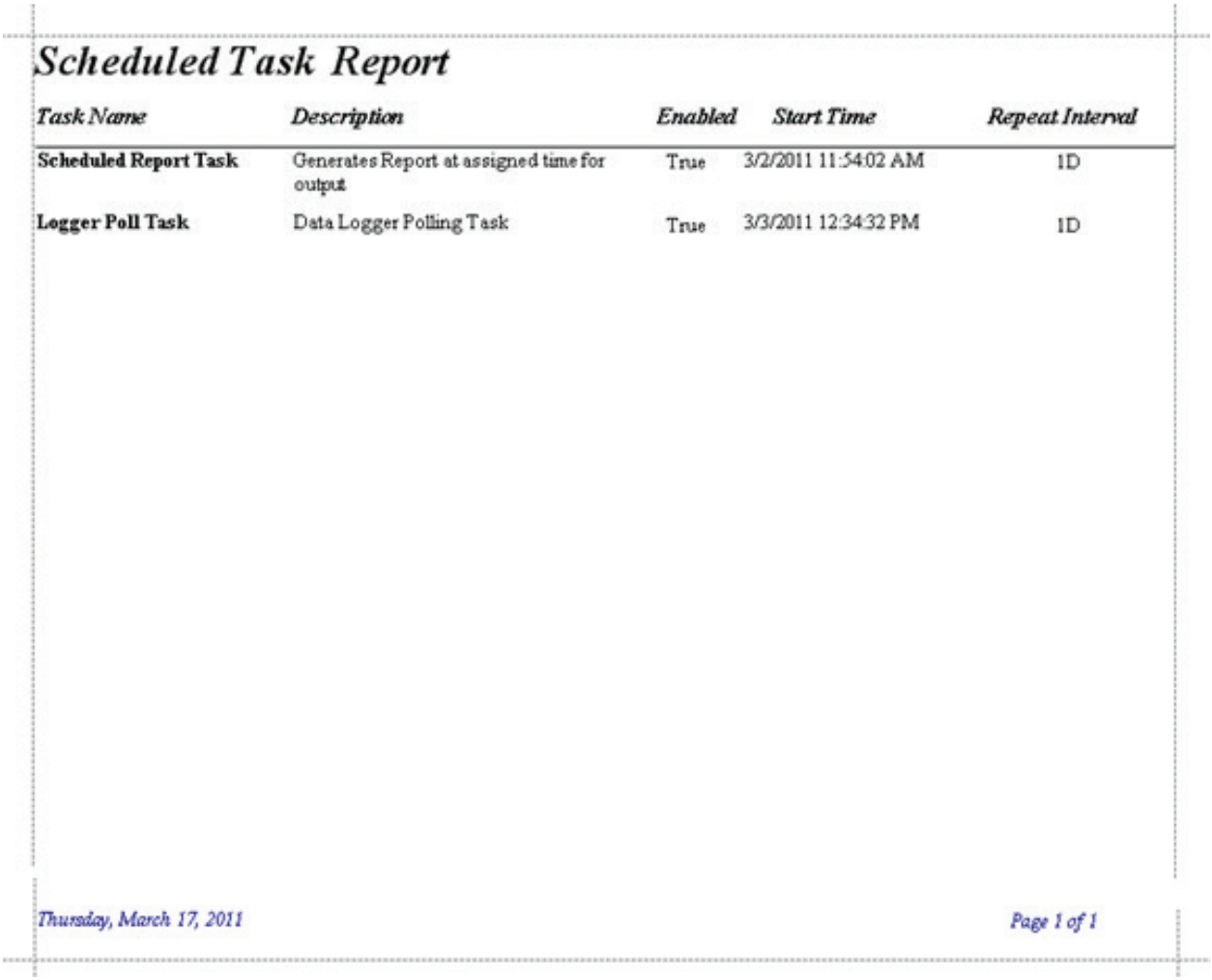
Parameter Configuration Report, (Reports > Configuration folder > Parameter Configuration Report)

Scheduled Tasks Report

To run a Scheduled Tasks Report, open **Reports > Configuration folder > Scheduled Tasks Report** and the report will be displayed automatically. No query is necessary.



Scheduled Task Report

Task Name	Description	Enabled	Start Time	Repeat Interval
Scheduled Report Task	Generates Report at assigned time for output	True	3/2/2011 11:54:02 AM	1D
Logger Poll Task	Data Logger Polling Task	True	3/3/2011 12:34:32 PM	1D

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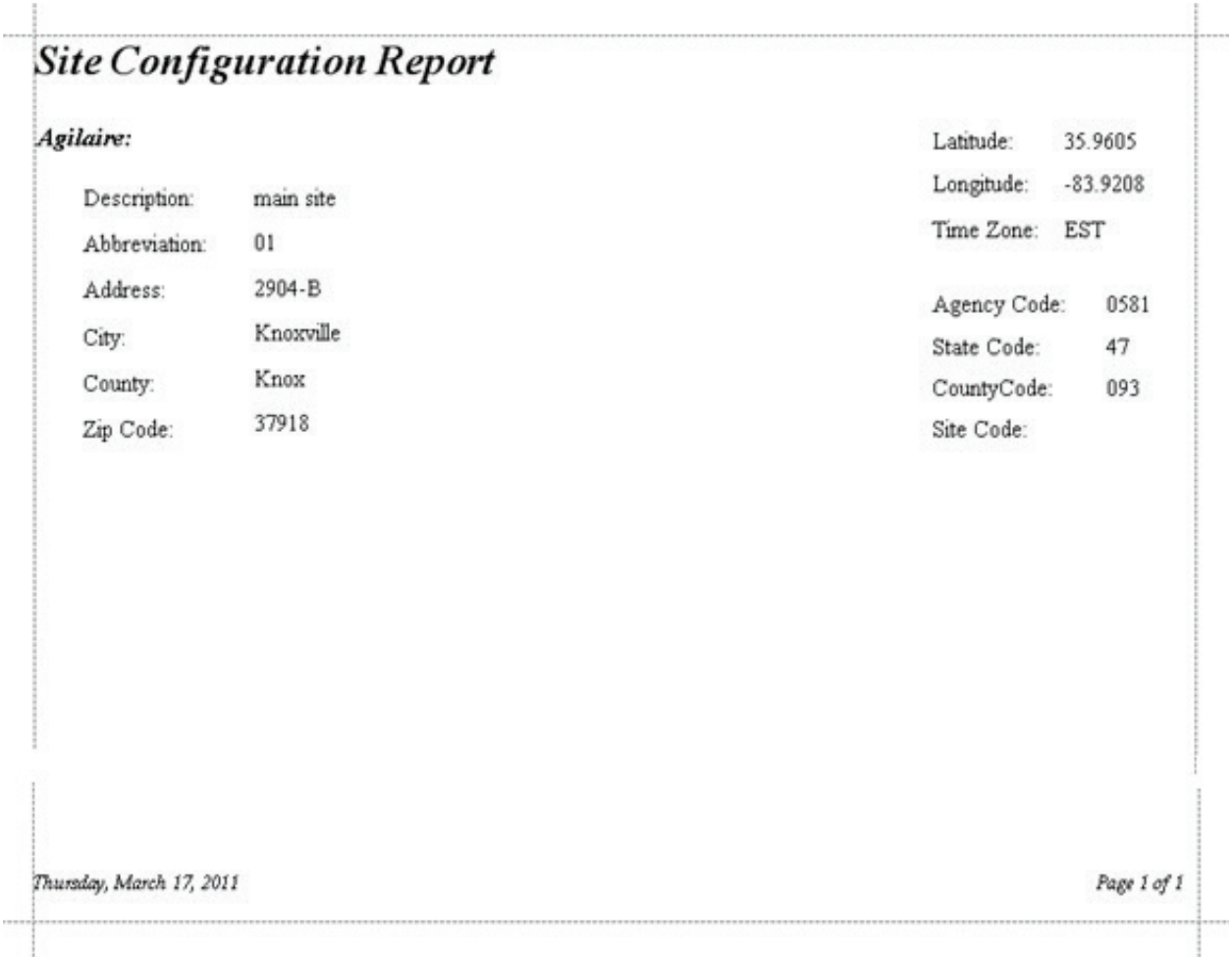
Scheduled Task Report (Reports > Configuration folder > Scheduled Tasks Report)

Site Configuration Report

To run a Site Configuration Report, (**Reports > Configuration folder > Site Configuration Report**), select a Site or Sites and click the **Generate Report** icon on the Ribbon.



Site Configuration Report

Agilaire:

Description:	main site
Abbreviation:	01
Address:	2904-B
City:	Knoxville
County:	Knox
Zip Code:	37918

Latitude:	35.9605
Longitude:	-83.9208
Time Zone:	EST
Agency Code:	0581
State Code:	47
CountyCode:	093
Site Code:	

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Site Configuration Report, (Reports > Configuration folder > Site Configuration Report)

Internal Reports

DB Modification History

The Database Modifications Report lists all modifications that were made to the AirVision database by Agilaire.

Database Modifications Report

Schema Name	dbo
Name	f_CreateGuidStringFromInteger
Type Description	SQL_SCALAR_FUNCTION
Creation Date	3/29/2010 4:18:07 PM
Last Modified	3/29/2010 4:18:07 PM
Parent Name	

Schema Name	dbo
Name	f_DateValue
Type Description	SQL_SCALAR_FUNCTION
Creation Date	3/29/2010 4:18:07 PM
Last Modified	3/29/2010 4:18:07 PM
Parent Name	

Schema Name	Reporting
Name	TableSizeInformation
Type Description	VIEW
Creation Date	3/29/2010 4:18:07 PM
Last Modified	3/29/2010 4:18:07 PM
Parent Name	

Schema Name	dbo
Name	f_GetDBServerUTCOffset
Type Description	SQL_SCALAR_FUNCTION
Creation Date	3/29/2010 4:18:08 PM
Last Modified	3/29/2010 4:18:08 PM
Parent Name	

Database Modification History Report (Reports>Internal Reports>DB Modification History)

Exception Journal Report

The Exception Journal Report displays all AirVision Exception messages for the Date Range and Logging Type selected. Logging Types are selected from a drop-down list of the following: Unhandled, Nested, Rethrown, Asset, and Validation.

Exception Journal Report

Time Stamp	Exception Log Type	Exception Type Name	UtilityJournalMessageID
10/4/2010 11:03:13 AM	Nested	System.Net.Sockets.SocketException	a2142582-c8cf-df11-91bd-001731c6e8fb

Computer Name	Windows User	Application User	Program Name	Product Version
HP_Server	SYSTEM	AirVision	AirVision.WindowsService	2010.09.18.1

Assembly Name	Namespace	Type Name
System.dll	System.Net.Sockets	Socket

Method Prototype

Int32 Send(Byte[], Int32, Int32, System.Net.Sockets.SocketFlags)

Exception Message

An established connection was aborted by the software in your host machine

Exception Stack Trace

at System.Net.Sockets.Socket.Send(Byte[] buffer, Int32 offset, Int32 size, SocketFlags socketFlags)
at System.Net.Sockets.NetworkStream.Write(Byte[] buffer, Int32 offset, Int32 size)

Time Stamp	Exception Log Type	Exception Type Name	UtilityJournalMessageID
10/4/2010 11:03:13 AM	Nested	System.IO.IOException	a3142582-c8cf-df11-91bd-001731c6e8fb

Computer Name	Windows User	Application User	Program Name	Product Version
HP_Server	SYSTEM	AirVision	AirVision.WindowsService	2010.09.18.1

Assembly Name	Namespace	Type Name
System.dll	System.Net.Sockets	NetworkStream

Method Prototype

Void Write(Byte[], Int32, Int32)

Exception Message

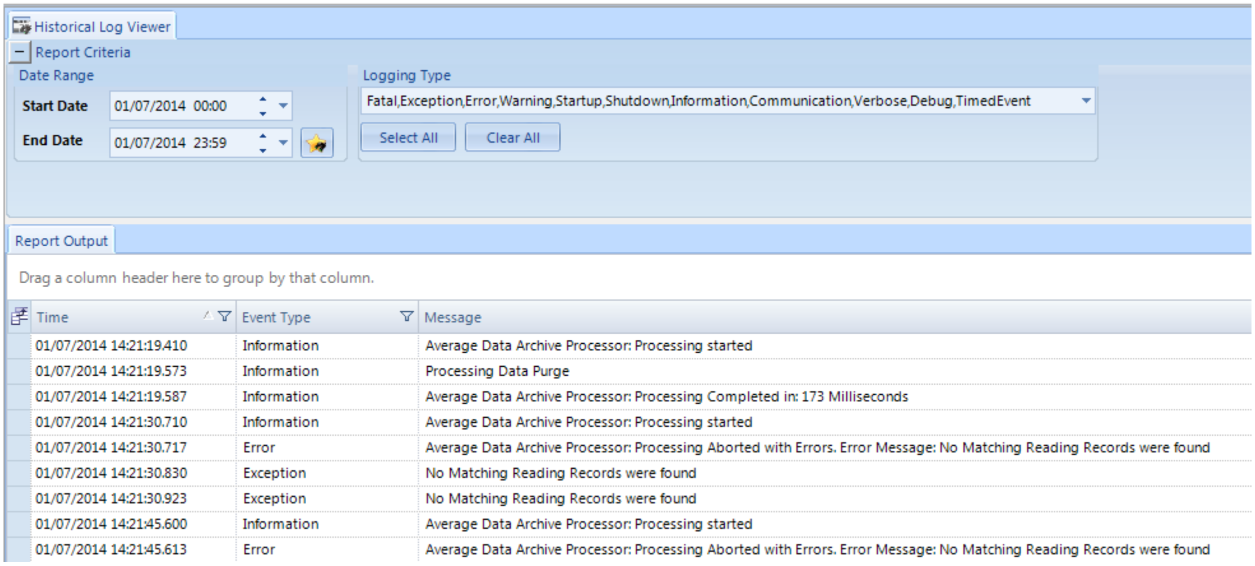
Unable to write data to the transport connection: An established connection was aborted by the software in your host machine.

Exception Stack Trace

at System.Net.Sockets.NetworkStream.Write(Byte[] buffer, Int32 offset, Int32 size)
at AirVision.Services.Communication.Communicators.TcpCommunicator.Write(String command)

Exception Journal Report (Reports>Internal Reports>Exception Journal)

Historical Log Viewer



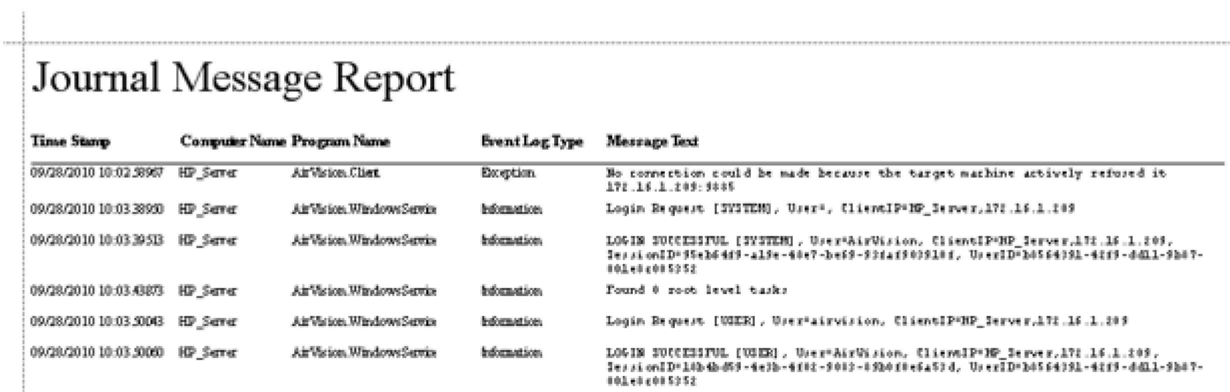
Time	Event Type	Message
01/07/2014 14:21:19.410	Information	Average Data Archive Processor: Processing started
01/07/2014 14:21:19.573	Information	Processing Data Purge
01/07/2014 14:21:19.587	Information	Average Data Archive Processor: Processing Completed in: 173 Milliseconds
01/07/2014 14:21:30.710	Information	Average Data Archive Processor: Processing started
01/07/2014 14:21:30.717	Error	Average Data Archive Processor: Processing Aborted with Errors. Error Message: No Matching Reading Records were found
01/07/2014 14:21:30.830	Exception	No Matching Reading Records were found
01/07/2014 14:21:30.923	Exception	No Matching Reading Records were found
01/07/2014 14:21:45.600	Information	Average Data Archive Processor: Processing started
01/07/2014 14:21:45.613	Error	Average Data Archive Processor: Processing Aborted with Errors. Error Message: No Matching Reading Records were found

Utilities->Log Viewer

Journal Message Log

The Journal Message Log (**Reports > Internal Reports > Journal Message Log**) displays messages about selected Logging Types. Logging Types are displayed in a drop-down check list when you click the arrow in the Logging Type field. Type selections are: **Fatal**, **Exception**, **Error**, **Warning**, **Startup**, **Shutdown**, **Information**, **Communication**, **Verbose**, **Debug**, **Timed Even**t, or **Select all**.

▶ **Note:** To log detailed information about a specific (problematic) Logging Type or Types, select that Logging Type in addition to Verbose from the drop-down menu before you generate the Journal Message Report.



Journal Message Report

Time Stamp	Computer Name	Program Name	Event Log Type	Message Text
09/28/2010 10:02:38967	HP_Server	AirVision.Client	Exception	No connection could be made because the target machine actively refused it 172.16.1.209:9885
09/28/2010 10:03:38950	HP_Server	AirVision.WindowsServic	Information	Login Request [SYSTEM], User=, ClientIP=HP_Server,172.16.1.209
09/28/2010 10:03:39513	HP_Server	AirVision.WindowsServic	Information	LOGIN SUCCESSFUL [SYSTEM], User=AirVision, ClientIP=HP_Server,172.16.1.209, SessionID=[illegible], UserID=[illegible]
09/28/2010 10:03:43873	HP_Server	AirVision.WindowsServic	Information	Found 0 root level tasks
09/28/2010 10:03:50043	HP_Server	AirVision.WindowsServic	Information	Login Request [USER], User=airvision, ClientIP=HP_Server,172.16.1.209
09/28/2010 10:03:50060	HP_Server	AirVision.WindowsServic	Information	LOGIN SUCCESSFUL [USER], User=AirVision, ClientIP=HP_Server,172.16.1.209, SessionID=[illegible], UserID=[illegible]

Journal Message Log (Reports > Internal Reports > Journal Message Log)

Software Version Report

The Software Version Report (**Reports>Internal Reports >Software Version Report**) displays Timestamps for Database Schema and Software Builds, Version IDs, and Software Version. The Software Version REport is primarily used for troubleshooting in the event of unusual software behavior.

Software Version Report

Database Schema Timestamp	7/23/2010 3:14:16 PM
Database Schema Version Id	19d9b0d3-79b3-4401-ad5c-eda98399a07e
Database Schema Version Number	4058
Client Database Schema Timestamp	5/3/2010 1:01:22 PM
Client Database Schema Version Id	a6397b90-8a18-4ea5-8b05-954bc3d6dc06
Client Database Schema Version Number	4004
Client Build Timestamp	6/26/2010 3:03:44 AM
Client Build Version	2010.06.26.1
Client Product Version	2.0.0 Alpha
Server Database Schema Timestamp	6/3/2010 1:01:22 PM
Server Database Schema Version Id	a6397b90-8a18-4ea5-8b05-954bc3d6dc06
Server Database Schema Version Number	4004
Server Build Timestamp	6/26/2010 3:02:00 AM
Server Build Version	2010.06.26.1
Server Product Version	2.0.0 Alpha

Software Version Report (Reports>Internal Reports)

Table Size Information

The Table Size Information Report lists all tables in the database and their size.

Table Size Information Report

Table Name	Rows	Reserved (K)	Data (K)	Index Size (K)	Unused (K)
All Tables	24,400	29,160	24,288	4,280	592
AdvpCharacteristicRelation	12	32	8	24	0
AdvpDataCharacteristic	4	32	8	24	0
AdvpHistoricalAverage	0	0	0	0	0
AdvpLogicalJoinOperator	2	32	8	24	0
AdvpRuleCondition	0	0	0	0	0
AdvpRuleStatus	0	0	0	0	0
AdvpRuleStatusSite	0	0	0	0	0
AdvpValueComparisonType	4	32	8	24	0
AlarmAdvpParameter	0	0	0	0	0
AlarmAdvpRule	0	0	0	0	0
AlarmAdvpTask	0	0	0	0	0
AlarmTriggerFlag	0	0	0	0	0
AmbAirNowFlagDetail	6	16	8	8	0
AmbAirNowTask	0	0	0	0	0
AmbAqiLevel	63	88	56	32	0
AmbAqiProgram	10	32	8	24	0
AmbAqsBlankType	3	32	8	24	0
AmbAqsCompositeType	5	32	8	24	0
AmbAqsCountyTribalCode	3,376	784	504	248	32
AmbAqsDurationCode	23	32	8	24	0
AmbAqsFrequencyCode	31	32	8	24	0
AmbAqsNullCode	52	64	16	48	0
AmbAqsParameterCategory	4	32	8	24	0
AmbAqsParameterType	1,065	320	240	72	8
AmbAqsStateCode	57	48	8	40	0
AmbAqsUnitCode	124	56	24	32	0
AmbFrequencyDistribRange	0	0	0	0	0
AmbFrequencyDistribution	0	0	0	0	0
AmbFtpTransfer	0	0	0	0	0
AmbVosProgram	0	0	0	0	0
AmbWindRoseLevel	16	16	8	8	0
AmbWindRoseProgram	2	32	8	24	0

Table Report (Reports>Internal Reports)

Logger Reports

The Logger Reports folder in the Reports menu contains the following reports:

- Alarm Journal
- Input Line Status Report
- Power Failure Report

Alarm Journal

The Alarm Journal displays the Site Name, Channel Number, Channel Name, Alarm Program Name, Alarm Start/End Time, Reason Code, and Triggering Flag.

To run an Alarm Journal, select **Reports > Logger Reports > Alarm Journal**. In the Report Criteria screen, select a Start/End Date and a Site/ Source Name. Click the **Generate Report** icon. A Logger Alarm Journal Report will be displayed in the bottom section of the screen.

Logger Alarm Journal Report

Site Name SITEONE

Logger Identifier 01 **Logger Name** Logger01

Channel Number	Channel Name	Alarm Program Name	Alarm Start Time	Alarm End Time	Reason Code	Flag Triggering
2	test2	TEMPOUT	2/12/2008 6:08:00 AM	2/12/2008 8:43:00 AM		h
2	test2	TEMPOUT	2/12/2008 8:27:00 AM	2/12/2008 8:36:00 AM		h
2	test2	TEMPOUT	2/12/2008 8:37:00 AM	2/12/2008 8:40:00 AM		h
2	test2	TEMPOUT	2/12/2008 8:42:00 AM	2/12/2008 8:45:00 AM		h
2	test2	TEMPOUT	2/12/2008 8:49:00 AM	2/13/2008 7:05:00 AM		h
2	test2	TEMPOUT	2/12/2008 2:37:00 PM	2/12/2008 4:12:00 PM		h
2	test2	TEMPOUT	2/12/2008 8:34:00 PM	2/12/2008 9:50:00 PM		h

Logger Alarm Journal Report

Input Line Status Report

The Input Line Status Report displays Site and Logger Name, Logger ID, Line Number Line Name, Line State, Time of Change, and Line Description.

To run an Input Line Status Report, select **Reports > Logger Reports > Input Line Status Report**. In the Report Criteria screen, select a Start/End Date and a Site/ Source Name. Click the **Generate Report** icon. An Input Line Status Report will be displayed in the bottom section of the screen.Each site/logger is shown in a separate page.

Input Line Report

Site Name SITEONE

Logger Name Logger01 Logger Identifier 01

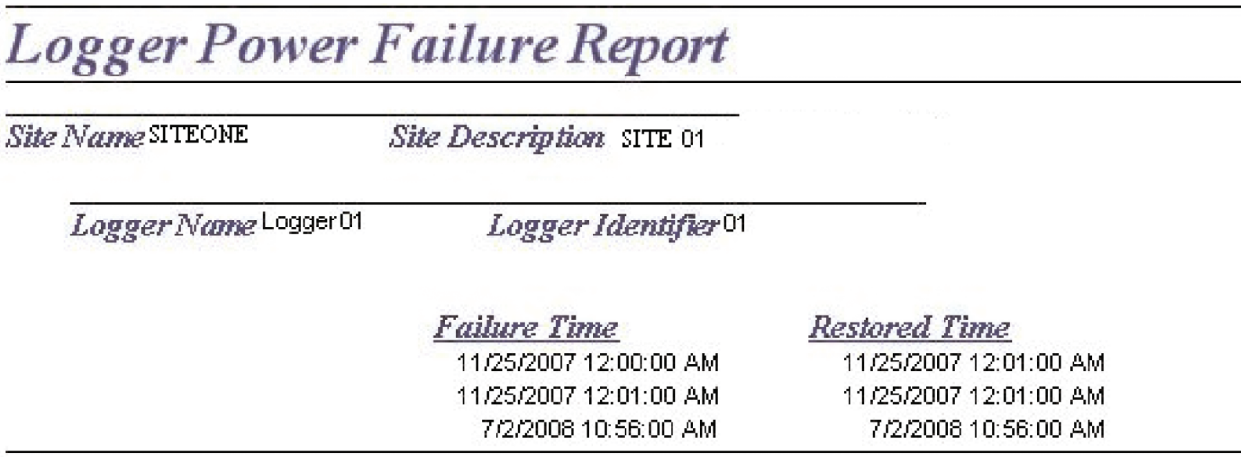
Line Number	Line Name	Line State	Time Of Change	Line Description
4	OutPut Line4	☑	2/5/2009 1:38:45 PM	
4	OutPut Line4	☐	2/5/2009 1:38:46 PM	
37	OutPut Line37	☑	5/5/2009 12:00:02 AM	
37	OutPut Line37	☐	5/5/2009 12:05:01 AM	
37	OutPut Line37	☑	5/6/2009 12:00:02 AM	
2	DIG002	☑	5/6/2009 12:00:02 AM	
2	DIG002	☐	5/6/2009 12:05:01 AM	
37	OutPut Line37	☐	5/6/2009 12:05:01 AM	
37	OutPut Line37	☑	5/7/2009 12:00:02 AM	
2	DIG002	☑	5/7/2009 12:00:02 AM	
2	DIG002	☐	5/7/2009 12:05:01 AM	
37	OutPut Line37	☐	5/7/2009 12:05:01 AM	
37	OutPut Line37	☑	5/8/2009 12:00:02 AM	
2	DIG002	☑	5/8/2009 12:00:02 AM	
2	DIG002	☐	5/8/2009 12:05:01 AM	
37	OutPut Line37	☐	5/8/2009 12:05:01 AM	

Input Line Report

Power Failure Report

The Power Failure Report displays Site and Logger Name, Logger ID, Failure Time and Restored Time.

To run a Power Failure Report, select **Reports > Logger Reports > Power Failure Report**. In the Report Criteria screen, select a **Start/End Date** and a **Site/ Source Name**. Click the **Generate Report** icon. A Power Failure Report will be displayed in the bottom section of the screen. Each site/logger is shown in a separate page.



Logger Power Failure Report

Site Name SITEONE Site Description SITE 01

Logger Name Logger01 Logger Identifier 01

Failure Time	Restored Time
11/25/2007 12:00:00 AM	11/25/2007 12:01:00 AM
11/25/2007 12:01:00 AM	11/25/2007 12:01:00 AM
7/2/2008 10:56:00 AM	7/2/2008 10:56:00 AM

Power Failure Report

Other Reports

Annotations Report

The Annotations report may be run on any list of parameters, for any time range. It provides a summary of all annotations it finds.

To see a report of annotations made in the Average Data Editor, open the Reports menu and select Annotations Report. Make the usual query selections of **Start/End Date**, **Average Interval**, and **Parameter(s)**. Click the **Generate Report** icon on the ribbon.

Current Date : 9/28/2010
Current Time : 9:10 PM

Annotation Report

01-Mar-2006 00:00 to 06-Mar-2006 00:00

Site: Roane_Y
Parameter: 02_SO2

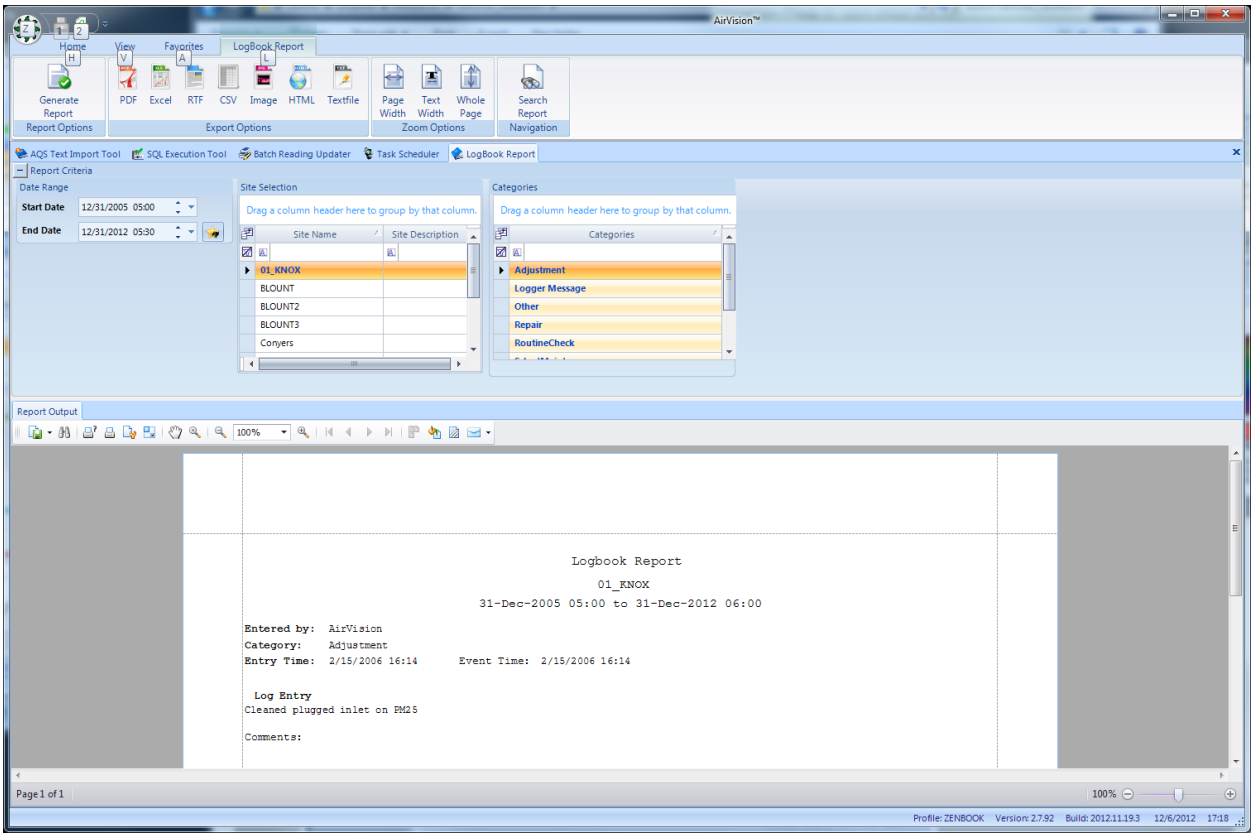
Category	User Name	Annotation Date	Date	Annotation
Instrument Failure	Admin	28-Sep-10 21:10	01-Mar-06 20:00	Lightning strike
Maintenance	New User	28-Sep-10 21:09	01-Mar-06 05:00	Replaced pump seal
Maintenance	New User	28-Sep-10 21:09	01-Mar-06 06:00	Replaced pump seal
QA Note	Fred5	28-Sep-10 21:09	01-Mar-06 09:00	Quarterly Audit
QA Note	Fred5	28-Sep-10 21:09	01-Mar-06 10:00	Quarterly Audit
QA Note	Fred5	28-Sep-10 21:09	01-Mar-06 11:00	Quarterly Audit

Annotations Report

LogBook Report

The LogBook Report generates reports of logbook entries that were made in the LogBook Entries Editor. To query a LogBook Report select LogBook Report from the Reports menu. Select **Start** and **End Dates** and a **Site Name** from the top section of the screen and click the **Generate Report** icon in the upper left section of the screen. The user may also choose one or all Logbook Categories as a filter for the report.

The logbook report will be displayed in the lower section of the screen



LogBook Report

Chapter 5

Data Editors

Average Data Editor

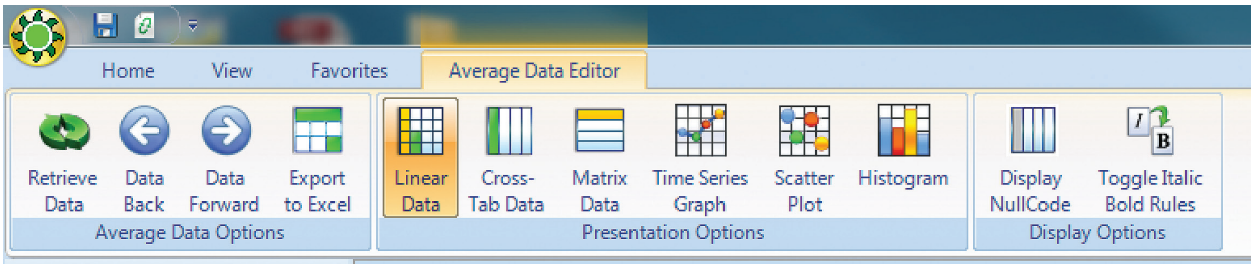
The 8872 Average Data Editor (**Data Editors > Average Data Editor**) combines multiple functions into a single tool:

- Editing data point details
- Batch editing
- Comparison of current data with historical minimum, maximum, and mean
- Analyze/Exported

▶ **Note:** This section is provided for "standalone" 8872 reporting systems without AirVision. For systems with AirVision, normally all data is edited in AirVision, and edits taking place on the 8872 after polling would not be reflected on the server -- the exception being Annotations added (see pg. 146).

In addition, you can toggle between the following six formats by clicking buttons in the ribbon at the top of the screen:

- Linear Table (the default display)
- Cross-Tab Table
- Matrix Table
- Time Series Graph (can be used for single or multiple parameters, but the historical comparison tools in this X-Y scatter plot only appear in single-parameter queries)
- Scatter Plot graph (requires queries of two or more parameters)
- Histogram (for single parameter queries)



Ribbon bar to toggle between Data Editor displays; arrows to scroll backward and forward through data

Control-Keys can also be helpful for navigating when using the editor:

- **CTRL-N** for Next (Data Forward)
- **CTRL-P** for Previous (Data Back)
- **CTRL-L** to Reload data set.

To edit data in the Average Data Editor (**Data Editors > Average Data Editor**), enter

- **Start** and **End Date** (type dates or use arrow keys to select)
- **Average Interval** (for example, 001h Hourly average of 60 minutes)
- **Parameter Selection** (for example, Site Name NKNOX, Parameter Name NO2, Parameter Template NO2)
- Click the **Retrieve Data** button in the ribbon at the top of the screen

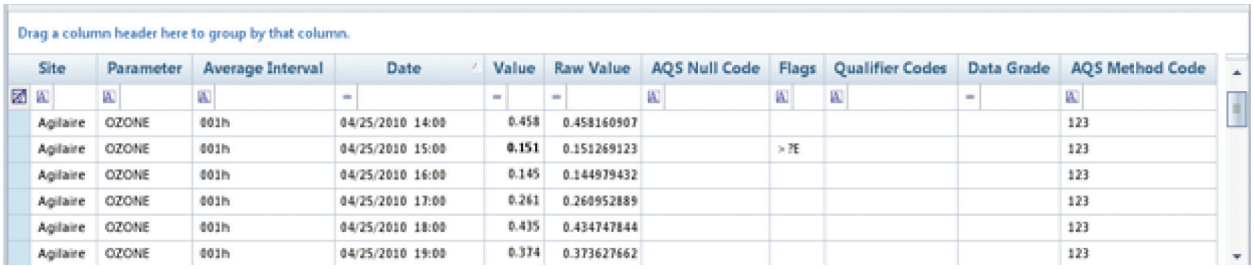
The Average Data Editor will open the Linear Data Editor by default. Click buttons in the ribbon to change formats.

Linear Data Editor

The Linear Data Editor

- Site Name, Parameter Name, Parameter Template Name
- Average Interval
- Start and End Dates
- Value (Hover the mouse pointer over data values to see any annotations.)
- Raw Value (can't be edited)
- AQS Null Codes
- Data Logger Flags
- Qualifier Codes
- Data Grade (used by ADVP).

To edit data values, double-click in the Value cell or right-click to bring up a pop-up menu.


Drag a column header here to group by that column.

Site	Parameter	Average Interval	Date	Value	Raw Value	AQS Null Code	Flags	Qualifier Codes	Data Grade	AQS Method Code
Agilaire	OZONE	001h	04/25/2010 14:00	0.458	0.458160907					123
Agilaire	OZONE	001h	04/25/2010 15:00	0.151	0.151269123		>?E			123
Agilaire	OZONE	001h	04/25/2010 16:00	0.145	0.144979432					123
Agilaire	OZONE	001h	04/25/2010 17:00	0.261	0.260952889					123
Agilaire	OZONE	001h	04/25/2010 18:00	0.435	0.434747844					123
Agilaire	OZONE	001h	04/25/2010 19:00	0.374	0.373627662					123

Average Data Editor from Data Editors menu

Cell Color Codes

All data is color-coded based on the flag-to-color mappings listed in the Flags Editor. The Model 8872 is loaded with some default mappings, but you can customize this for your system. The color mappings are global to all users for consistency.

In addition, the 8872 uses two font changes to represent data in the data editor:

- **Bold** values represent data that does not match the raw database (edited values), or has a flag attached to it.
- *Italics* values represent data that has an annotation. Hover the mouse pointer over data values to see details of annotations.

Right-Click Options

Each of the three non-graphical data editors support select, shift-select, CTRL-select, click-drag selection capabilities, and a right-click menu options. Right-click a data point in the Value column to bring up the following menu:

- **Restore from Raw** copies value from the raw database to the final Value and resets flags.
- **Set to Minimum Detectable Limit** sets data value to MDL configured in Parameter Editor.
- **Set AQS Code** brings up a pick list to apply new AQS null codes.
- **Set Qualifier Code** brings up a selection box for AQS qualifier (exception) codes.
- **View All Flags** (for single data points only) shows all data logger and system flags and allows you to change or clear flags. Multiple flags can be displayed in each cell.
- **Set Annotations** brings up an annotation screen so you can add an annotation.
- **Batch Edit** allows you to scale two or more selected data values as **mX+b** (Original Value times a Multiplier plus a Constant Value), for example, divide by 10 and clear the suspect flag.

  1. First, you must select **Enabled**.
  2. You have the option to combine scaling with one or more of the following: **Update Values**, **Set Annotations**, **Set AQS Code**, **Set Qualifier Code**, and **Set Flags**.
  3. If you select **Set Flags**, you will have the option to **Update Children Flags**.

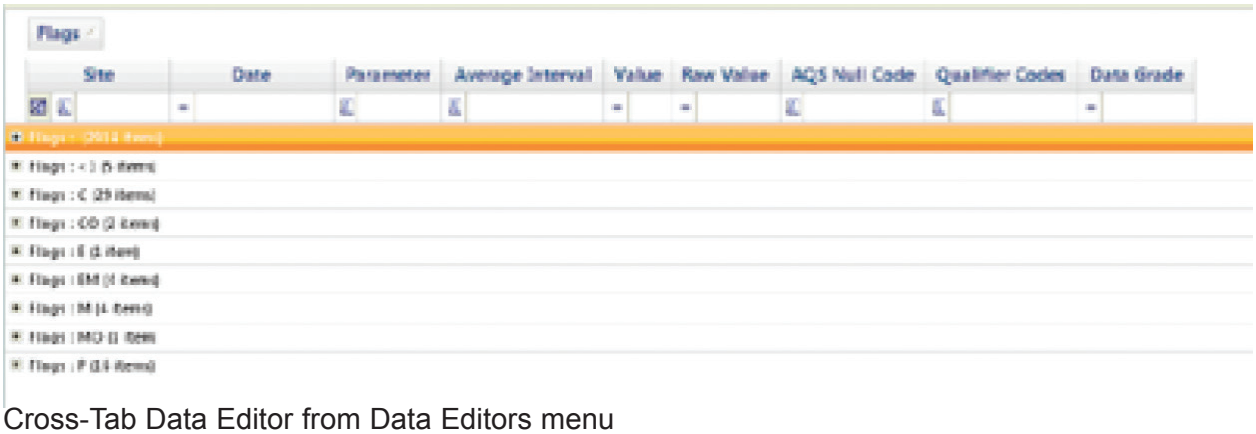
- **Show Children** brings up another instance of the Data Editor with the selected parameters and time range for the Child parameter(s) of the selected parameter. This function requires that Parent-Child Parameter relationships are configured in **Configuration Editors > Parameter Settings**.
- **Drill Down Interval** allows you to drill down to minute averages from hourly averages.
- **Export to Excel** exports the selected data range to an Excel document, including color, font, and layout details. This right-click option is different from the Export to Excel button in the ribbon at the top of the screen because the button on the ribbon exports the entire data set in the data editor and the right-click option exports only selected data.

Click a column heading to sort data by a different heading, for example to group data according to flags. Default is to sort by date.

Click-hold-drag columns to change the order of columns or to drag a column heading to the **Drag a column header here to group by that column** area.

Cross-Tab Data Editor

The Cross-Tab Data Editor shows parameters as columns and date/time as rows and provides the same right-click menu as the Linear Data Editor.



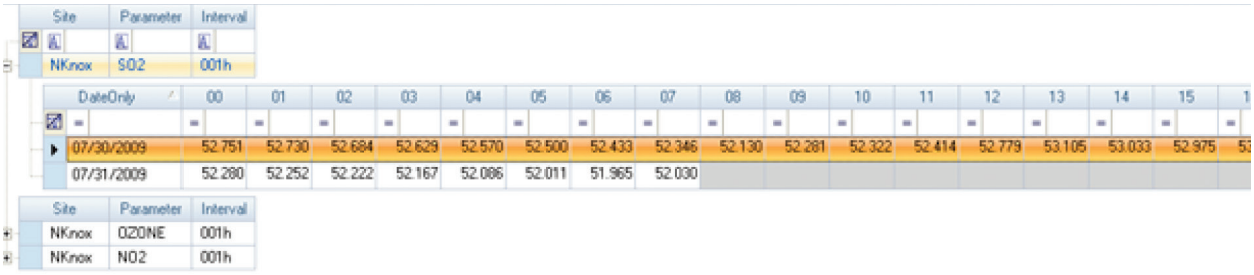
Cross-Tab Data Editor from Data Editors menu

▶ **Note:** You can sort data by any column by clicking on a column header. You can find all flagged data easily, for example data grouped by data logger flag. Each group can then be expanded and individually sorted. When you change editor modes, the groupings are not kept.

Also, you can click-hold-and-drag columns to change the order, and click-drag columns to the **Drag a column header here to group** area to group data. If you do this accidentally or change your mind, you can drag it back.

Matrix Data Editor

The Matrix Data Editor presents data in a format similar to the monthly report. If you select multiple parameters, they are grouped with a plus (+) symbol for expansion.

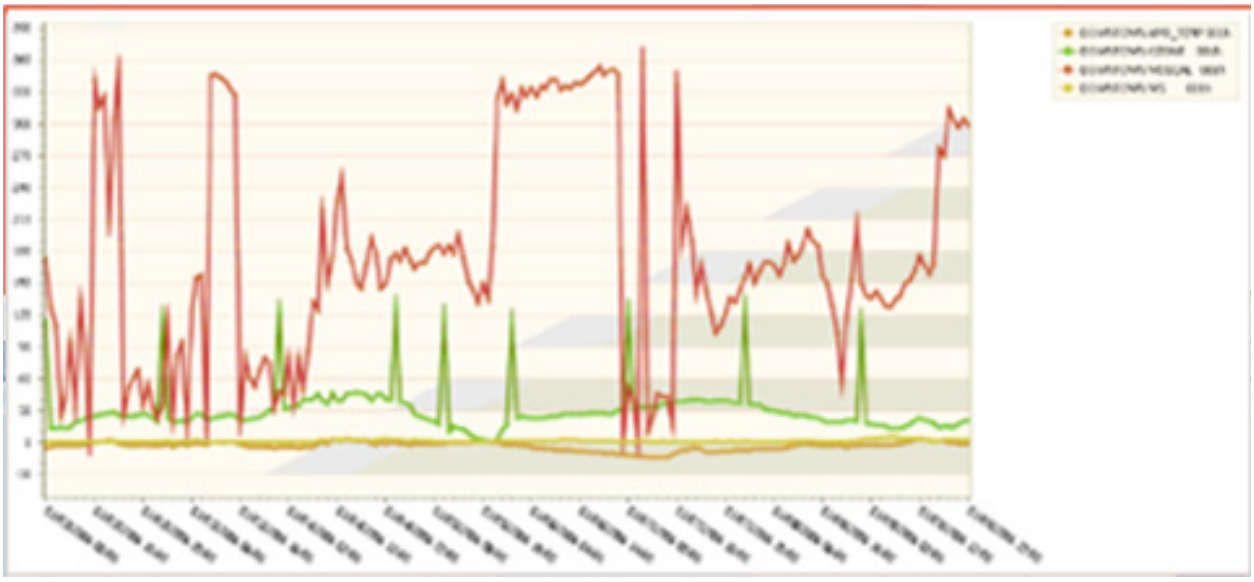


Matrix Data Editor from Data Editors menu

Time Series Graph

You can generate the Time Series Graph in two modes, for one or more parameters.
In multi-parameter mode, you can group different parameters together for any time period.
With the tools at the bottom or the screen, you can change the color scheme, remove or restore the legend, and print the graph.

The minus (-) sign in the upper left corner of the screen minimizes the selection criteria to make more room for the graph.



Time Series from Data Editors menu with multiple parameters selected

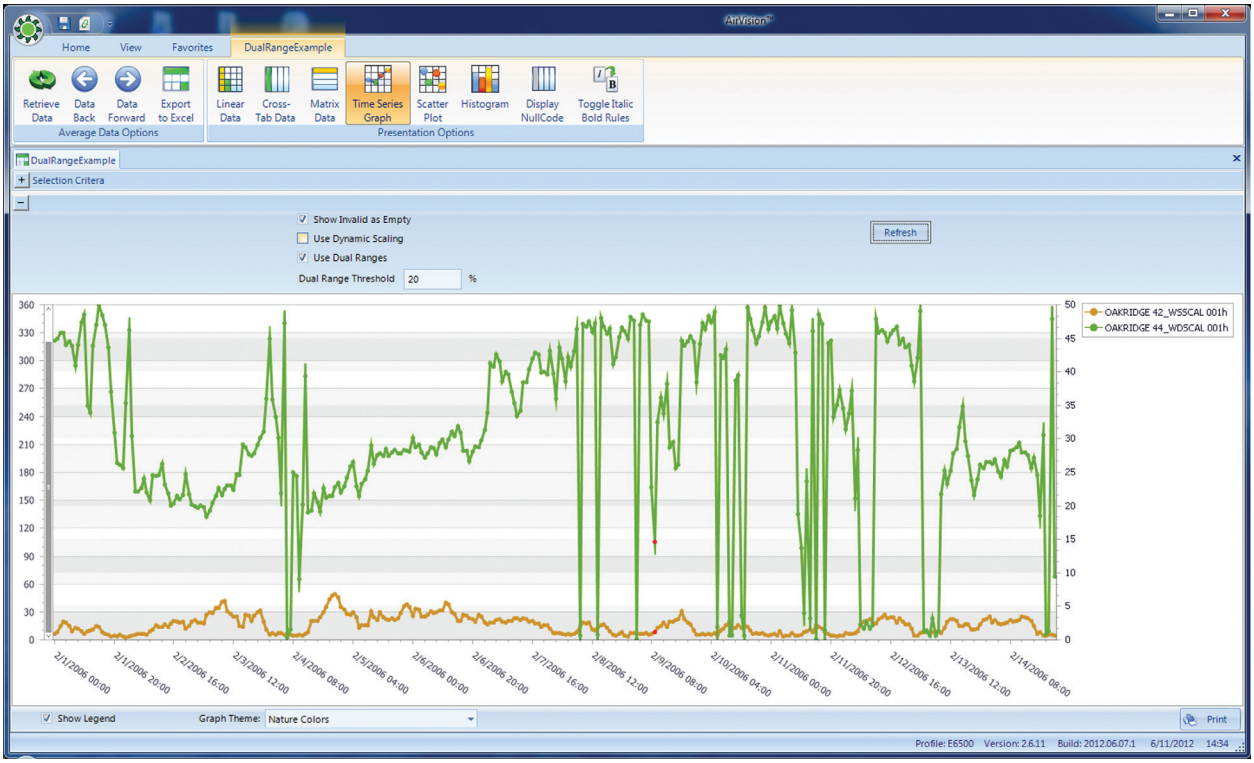
Use the mouse scroll wheel to zoom in or out; right-click and hold to drag the zoomed graph to a different data area.

Hover the cursor over a data point to see the specific date, time, and data value. If there is a flag on the data point the flag will also be displayed.|

You can toggle between hiding or showing invalid data (e.g., data during calibration, maintenance, or analyzer failures).

When graphing parameters with two dramatically different full scale ranges, you may choose to use the "Dual Y-Axis Scale" option. When choosing this option, you must also choose the percentage (e.g., 10%, 20%) of the full scale range that is used as the 'breakpoint' for the secondary Y-axis. A value of 20% is common. Note that this function requires that Graph Maximum and Graph Minimum be set in the Parameter configuration. Graphs that have any parameters without limits configured cannot use the Dual Y-Axis function.

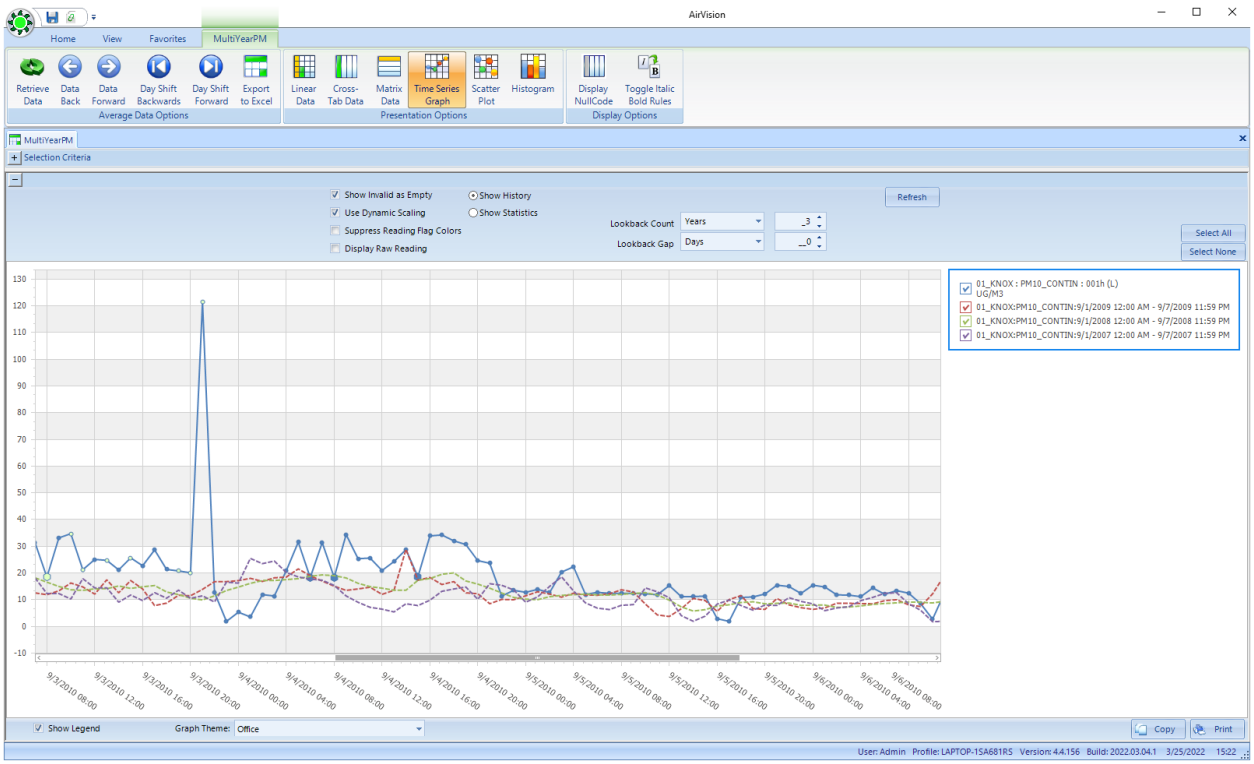
Suppress Flag Colors - If not selected, flagged data will be shown with “dots” with colors based on the Flag configuration. If selected, data will just be shown as the trend graph color. In both cases, hovering the cursor over the point will always show the flag, and the flag colors are still represented in the tabular/grid display.



Dual Y-Axis function

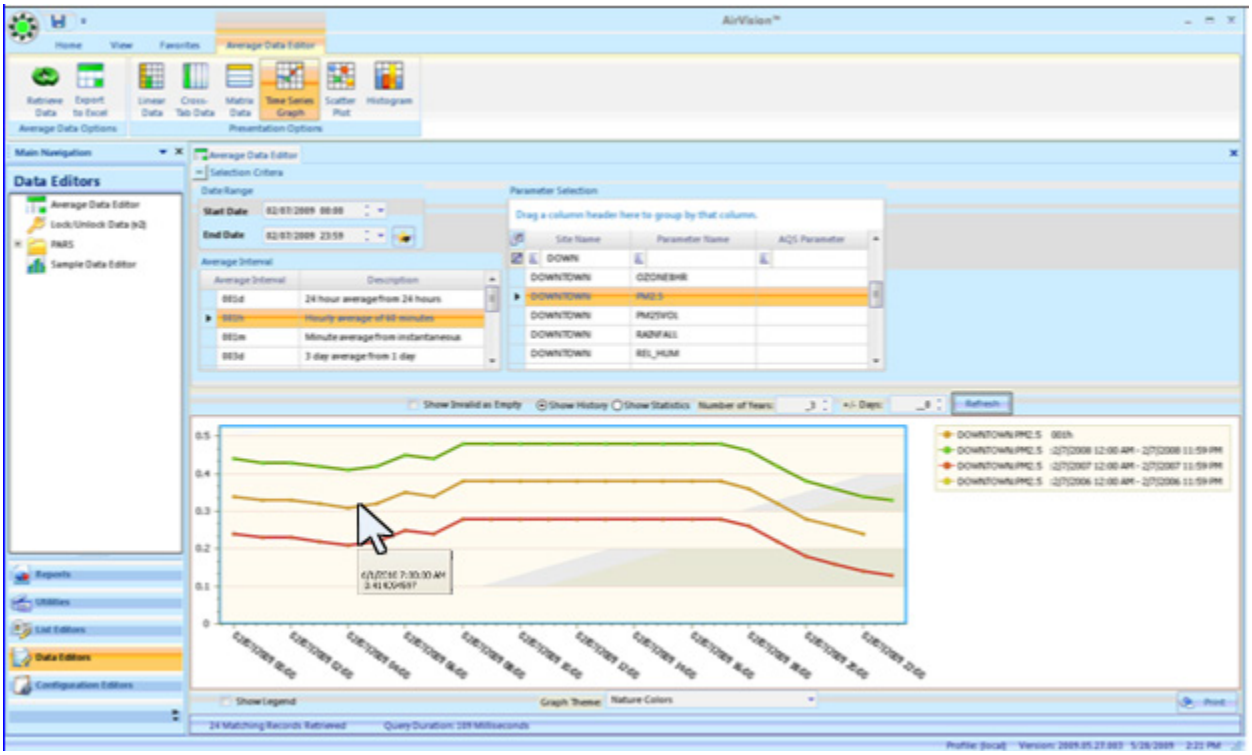
For one parameter, you can choose previous intervals to be other than one year by selecting **Show History** from the options above the graph.If you bring up the Time Series Graph in single parameter mode, you get additional options at the top of the graph:

- Show History displays N previous years of data alongside main graph
- Show Statistics displays cumulative statistics of N previous years--min, max, avg
- Number of Years
- +/- Days allows rolling average of additional days in historical statistics
- Refresh



Time Series Graph with a single parameter selected and hover over displaying date, time data value, and flag

If the database contains data from previous years for the same parameter, those previous years can be graphed in the Time Series Graph alongside the current data by selecting **Show History** and the number of years you want to graph. Each previous year is graphed individually. Select **Refresh** to update the graph.



Time Series Graph with a single parameter and Show History option and hover over displaying date, and time data value

The "+/- Days" selector can be used to compile nearby days for the same hour into the comparison statistics. An example of how this is applied would be:

Current Data = 1/15/09,. Number of Years = 3, +/- Days = 1

1/5/09 data at hour 00 would be compared against statistics using the following points:

1/4/06, hour 00
1/5/06, hour 00
1/6/06, hour 00
1/4/07, hour 00
1/5/07, hour 00
1/6/07, hour 00
1/4/08, hour 00
1/5/08, hour 00
1/6/08, hour 00

Obviously, selection of a large data set with a long look back period and large skews can be very processor intensive for the client and the SQL server for large data sets. Agilaire recommends this tool be used for data sets of roughly a week or less.

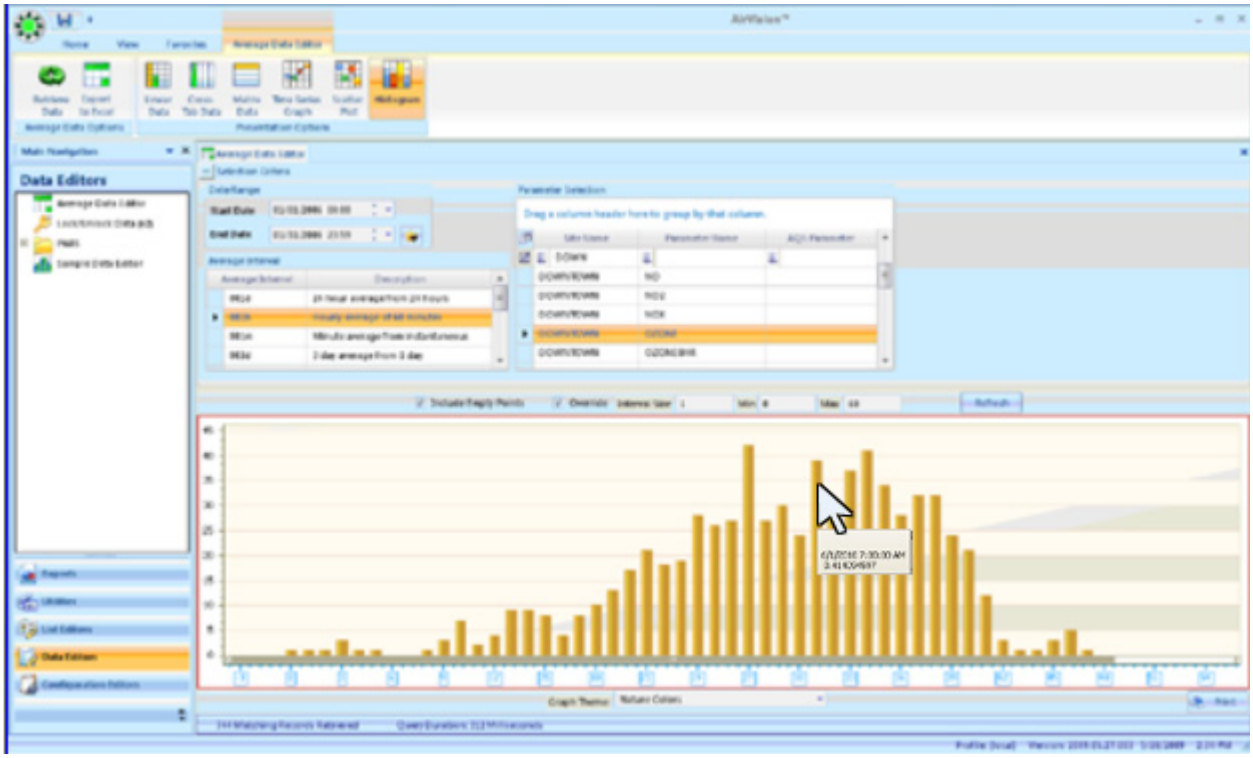
Scatter Plot Graph

The Scatter Plot Graph allows any two parameters in the existing chart to be plotted in an X-Y chart. The Y axis parameter is the primary parameter and all data points are color coded according to the Data Flags color mappings to help distinguish outliers that have already been flagged.

Scatter Plot Graph from Data Editors menu with hover over displaying date, time and data value

Histogram

The Histogram provides a graph of the distribution of values for the entire data set, but it is designed to display only one parameter at a time, so be careful not to use multiple parameters. The default graph uses the graph maximum/minimum from **Configuration Editors > Parameter Settings**, but you can check **Override** to set a custom max/min specifically for the X axis of this graph.



Histogram from Data Editors menu with hover over displaying date, time and data value

LogBook Entry Editor

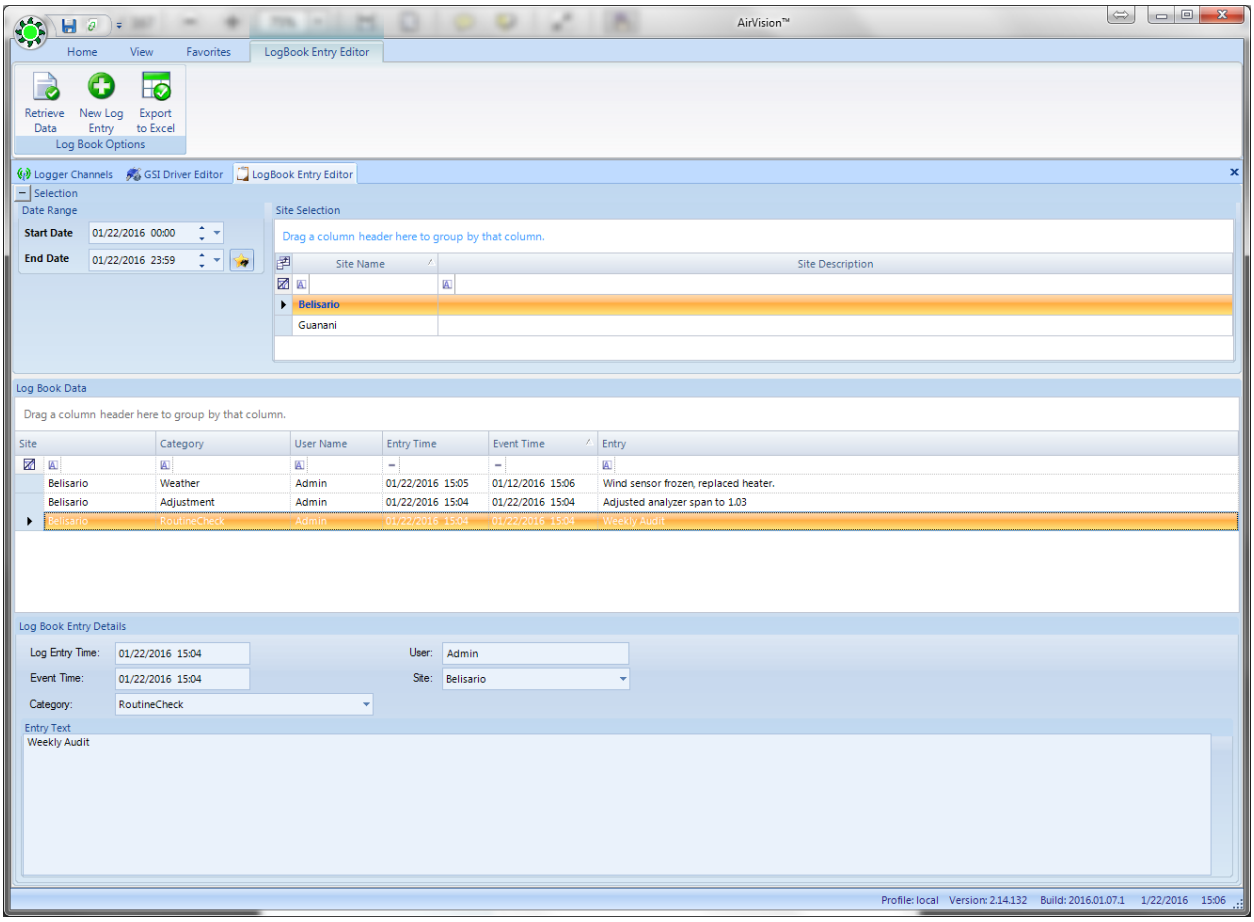
The LogBook Entry Editor allows you to make entries in a logbook that can then be seen in LogBook Reports. To make a logbook entry, open **LogBook Entry Editor** from the **Editors** menu.

Click the **New Log Entry** button in the upper left corner of the screen

In the bottom section of the screen enter a **Log Entry Time**, **User Entry Time**, select a **Category** from the drop-down list or select **New Category** and enter a different category, select a **User** and a **Site** from the drop-down lists

Enter the LogBook message in the **Entry Text** box and click **Save**.

The new entry information will be displayed in a row in the top section of the screen.



Adding LogBook entries in the LogBook Entry Editor from the Editors menu

By default, the logbook entries do not accept changes or addendums after the record has been saved. A system option is available to allow addendums to be made. To enable this, contact support@agilaire.com.

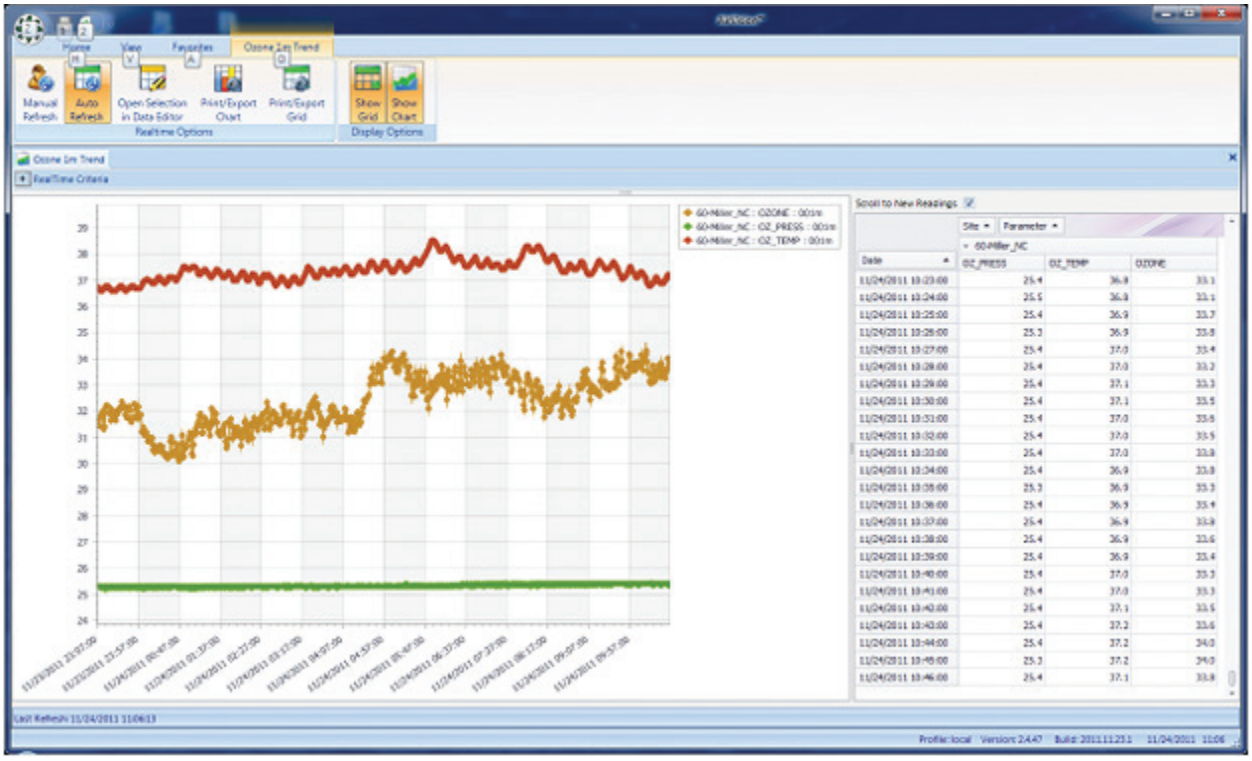
Chapter 6

Realtime Display Programs

The Model 8872 has three main realtime display programs to keep you informed of the realtime status of the readings, calibrations, I/O status, and averages:

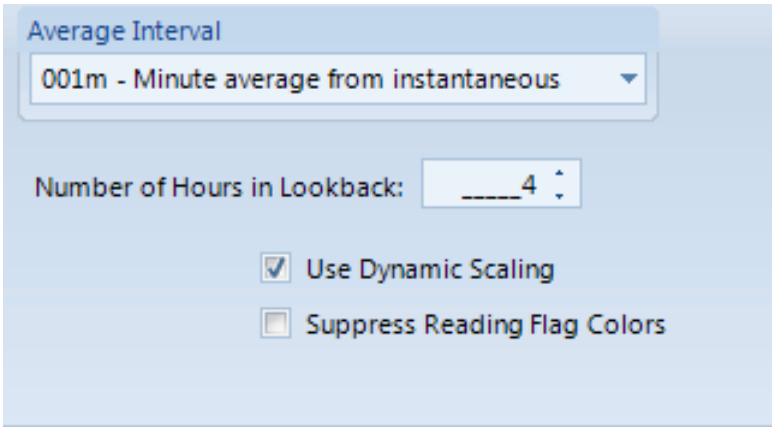
- **Realtime Trend** is the same display used by AV-Trend to provide strip-chart likes trends and basic tabular displays.
- **Tabular Display** provides a series of LED-like displays, which can be zoomed in to time-series charts. This display is very useful for mixing of multiple display averages (instantaneous, minute, hourly, etc) on the same page.
- **Site Node Logger Tool Box** is a blend of three tools:
  - **Readings** – current readings, and buttons to control / display maintenance or offline status of the channels; used to mark channels online/offline, or in/out of maintenance.
  - **Calibration** – shows the current status of calibrations, and allows you to start or abort a calibration program.
  - **Digital I/O** – show the current status of all physical or remote (Modbus) digital input/output points.

Realtime Trend Display



Realtime Graph in Status Displays>RealTime DataTrending Graph, showing both Chart and Grid

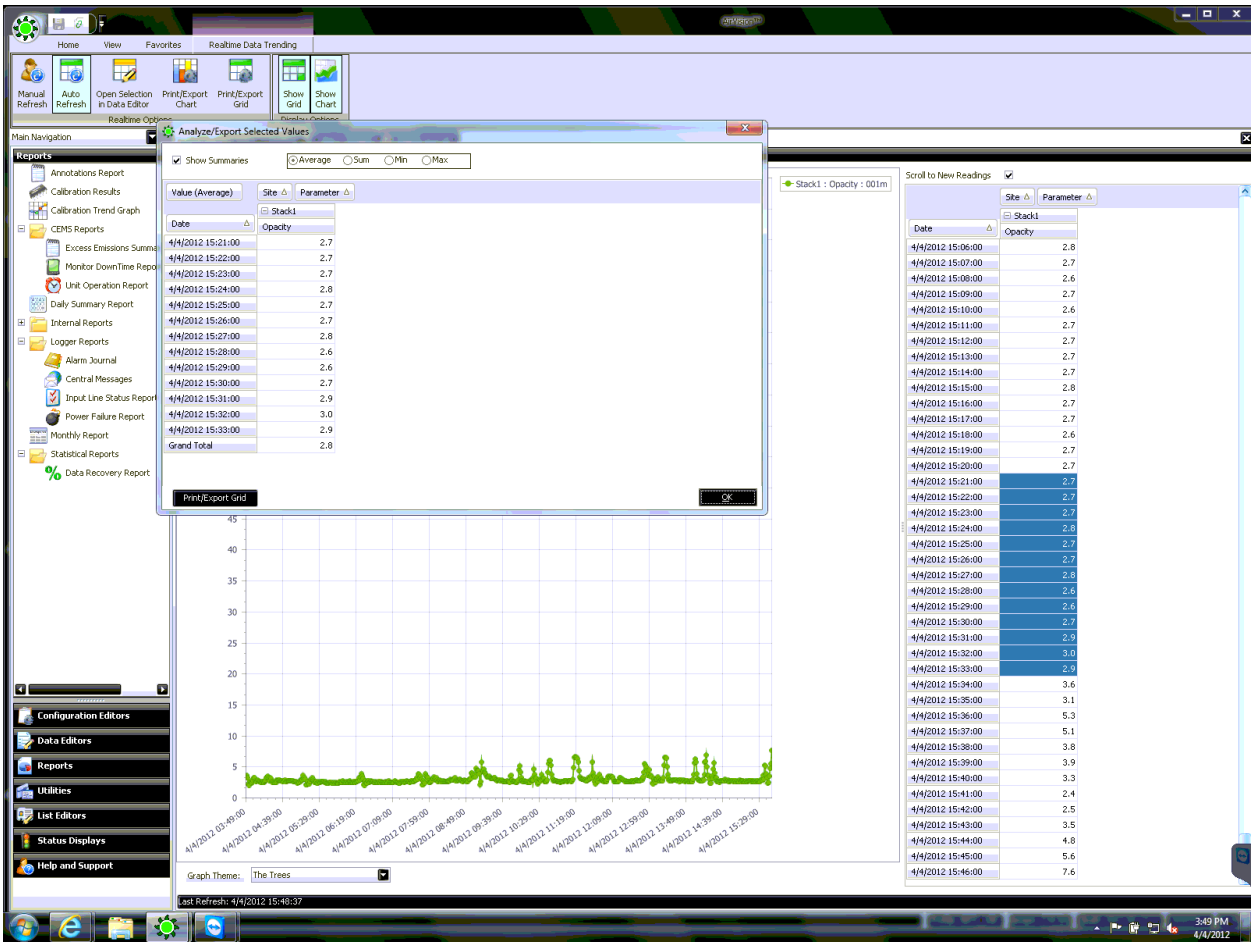
In the graph criteria, the user may select several customizations:



- **Number of Hours in Lookback** - This allows the user to dynamically define the width of the graph. After changing, the user should select "Manual Refresh" from the ribbon to take effect. This preference is stored with any Favorite created.
- **Use Dynamic Scaling** - If selected, the data graph min/max is set based on the range of data, rather than the graph min/max configured in the Parameter settings editor.
- **Suppress Flag Colors** - If not selected, flagged data will be shown with "dots" with colors based on the Flag configuration. If selected, data will just be shown as the trend graph color. In both cases, hovering the cursor over the point will always show the flag, and the flag colors are still represented in the tabular/grid display.

Within the Real-Time Trend, the user may drag-select and right-click a list of data points. The user is then presented with two options:

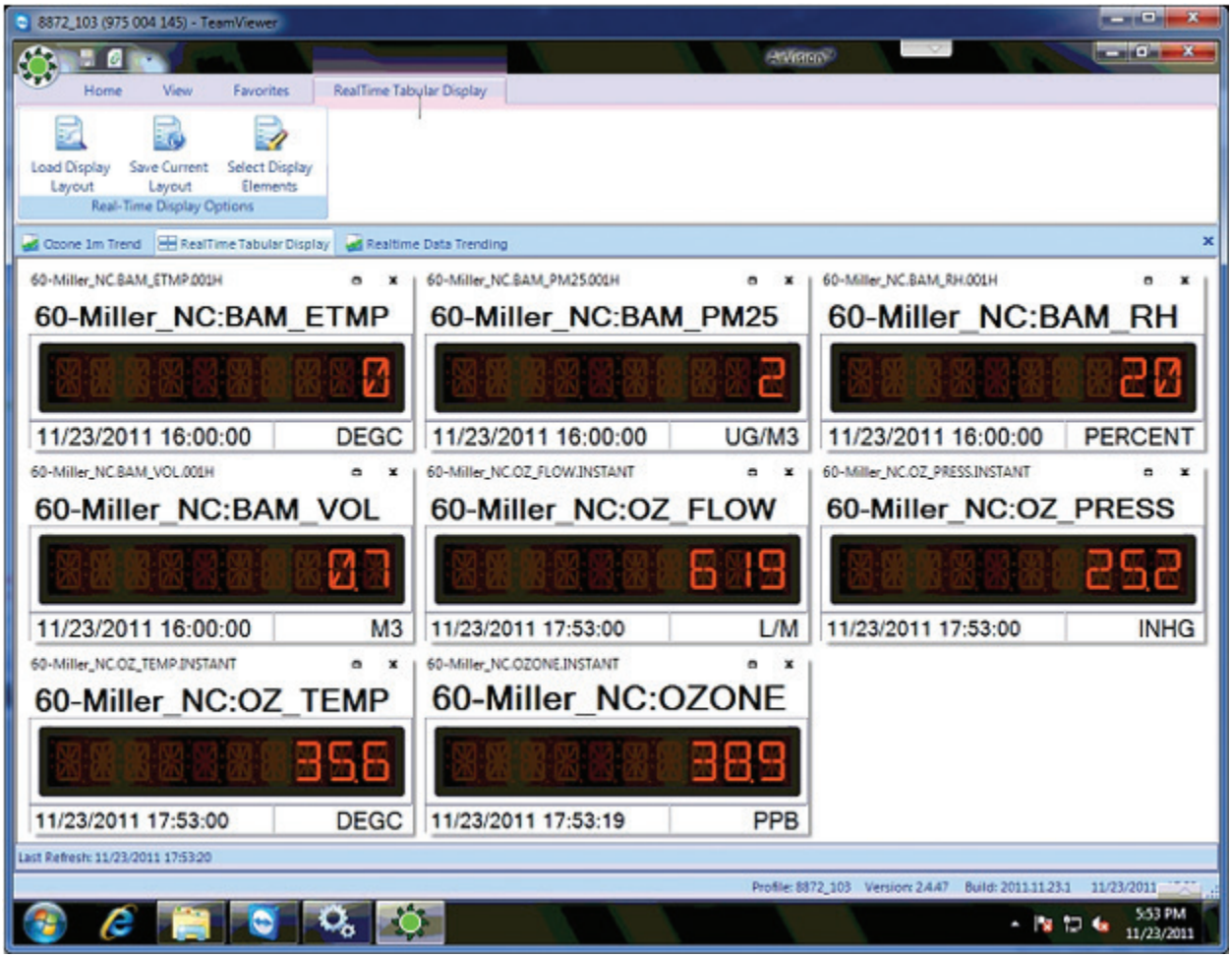
- **Annotate Selected** - this will allow the user to add a text annotation to the data, which can be polled by the AirVision server.
- **Analyze Selected** - this will bring up a box, allowing the user to see an average, or other statistics of only the selected data points. This is commonly used to average calibration or test "runs" of data. The results can also be printed or saved using the "Print/Export Grid" button.



Right Click

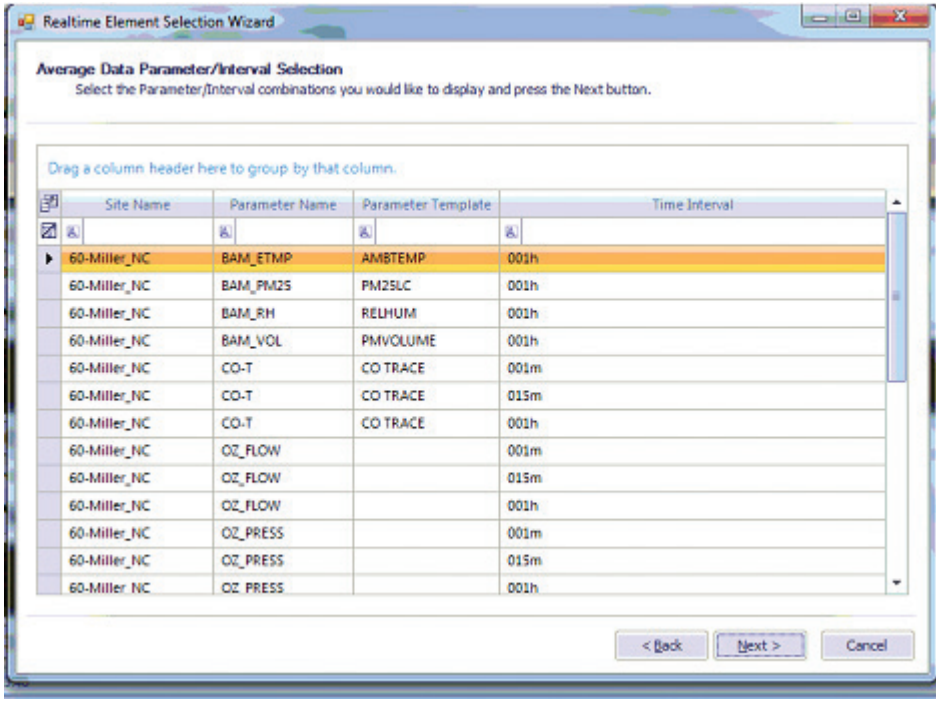
Tabular Display

The **Tabular Display** provides a series of LED-like displays, which can be zoomed in to time-series charts. The chart display is very useful for mixing multiple display averages (instantaneous, minute, hourly, etc) on the same page. Boxes can be dragged to create a custom layout, and the layout can be saved for future recall. Because of the complexity of the elements in the layout, they are stored separately than the regular Favorites system.

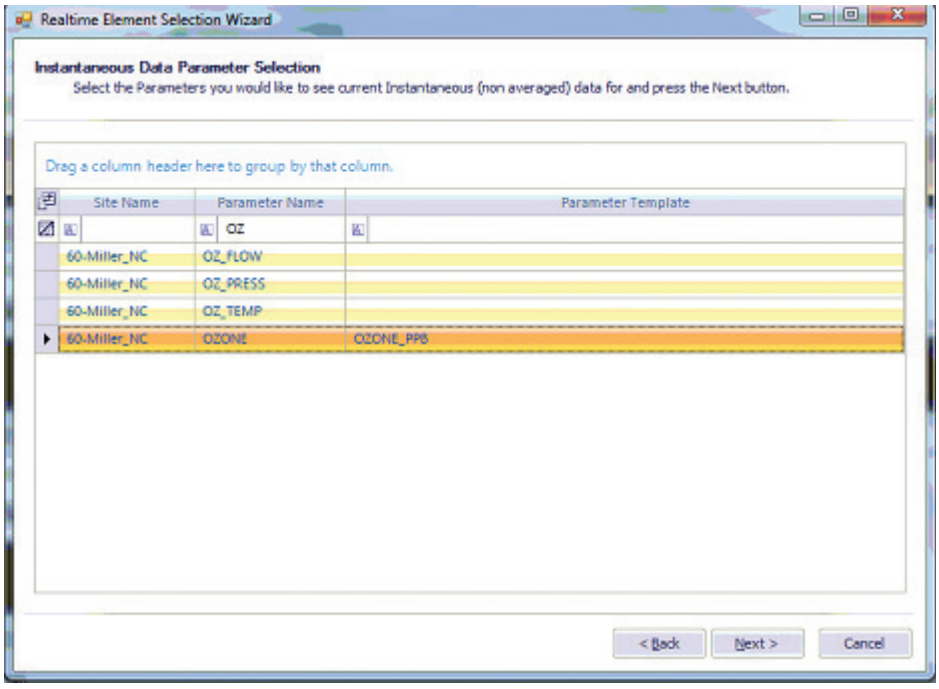


Create a new layout by clicking the Select Display Elements icon from the ribbon

You can use the filter fields to narrow parameter names and, more importantly, average intervals, if needed. The form supports standard Windows drag-select, shift-select, and CTRL-select actions. Note that the display will support multiple average intervals, so it is possible to mix minute and hourly data (e.g., analyzers and BAMs) on the same screen. Instantaneous data panels are selected on the next page.

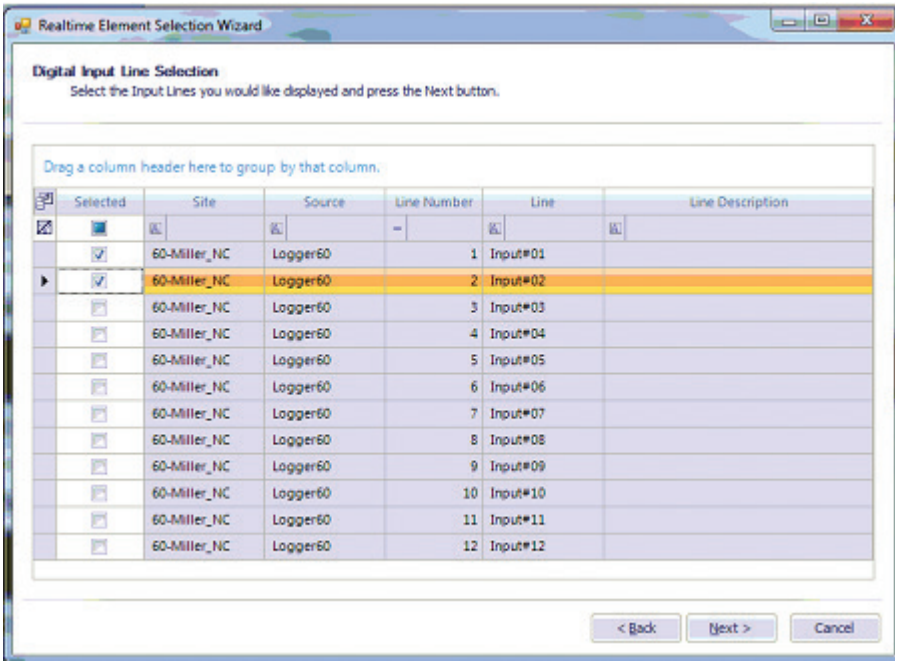


Realtime Element Selection Wizard--Average Data Parameter / Interval Selection



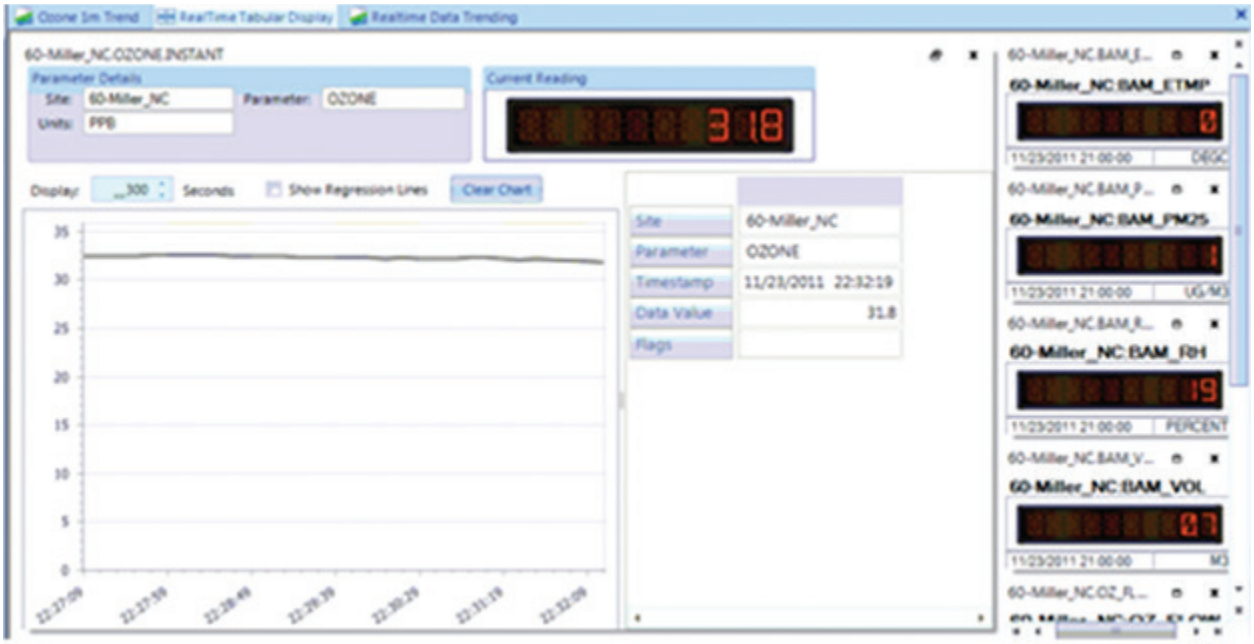
Realtime Element Selection Wizard--Instantaneous Data Parameter Selection

Finally, the Wizard asks if you want to view the realtime status of any digital input status lines. Select lines by clicking the left-side check boxes.



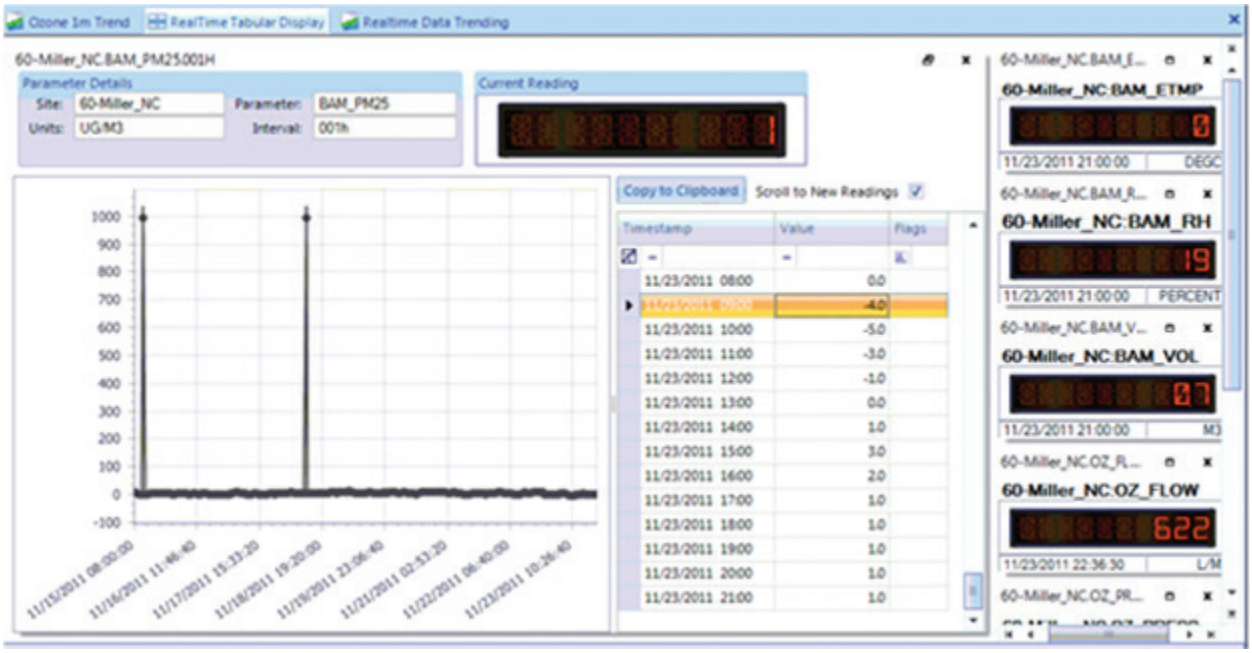
Realtime Element Selection Wizard--Digital Input Line Selection

Once the wizard is finished, the display will start and begin updating. Panels can be dragged into any desired order/arrangement by click-drag (click and drag from the **title bar** area at the top, above the large-font name). Panels can be eliminated by clicking the **X** box in the upper right. To zoom into a particular reading, click the expand box to the left of the **X**.



Updating Display with movable Panels

The other panels will minimize, and the selected parameters will expand into a trend chart, with an LED panel, still updating the current reading / average. For instantaneous data, the duration of the display can be modified if needed. Instantaneous readings default to show the previous 5 minutes, while charts of averages are longer. Instantaneous readings also have an option to show a trendline of the general direction of the newest readings.



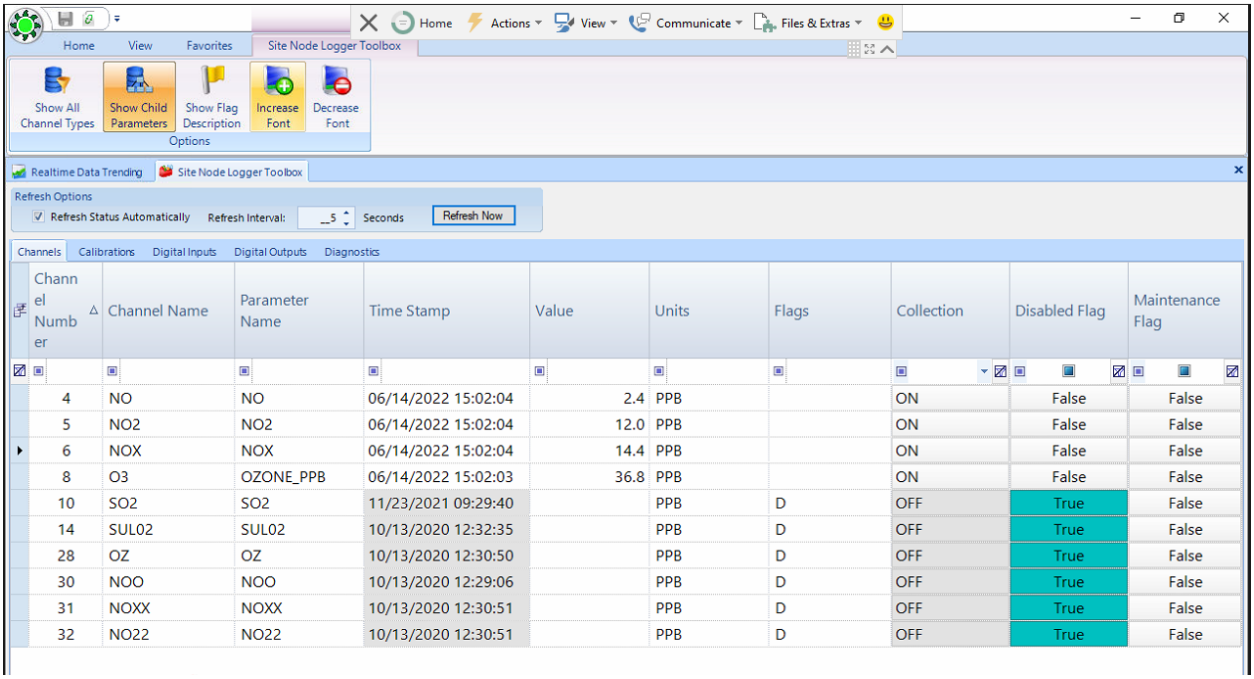
A grid of previous averages for averaged data.

To return the display to its previous mode, click the resize button (two stacked windows) next to the **X** close box.

Site Node Logger Tool Box

The **Site Node Logger Tool Box** contains four tabs:

- **Channels Tab** shows the current of readings of all channels (analog input, serial, or Modbus), as well as provide buttons to control and display the disabled (**D**) and maintenance (**M**) status of each channel. To mark a channel in/out of maintenance or to mark/unmark disabled, click the button.



Channel Number	Channel Name	Parameter Name	Time Stamp	Value	Units	Flags	Collection	Disabled Flag	Maintenance Flag
4	NO	NO	06/14/2022 15:02:04	2.4	PPB		ON	False	False
5	NO2	NO2	06/14/2022 15:02:04	12.0	PPB		ON	False	False
6	NOX	NOX	06/14/2022 15:02:04	14.4	PPB		ON	False	False
8	O3	OZONE_PPB	06/14/2022 15:02:03	36.8	PPB		ON	False	False
10	SO2	SO2	11/23/2021 09:29:40		PPB	D	OFF	True	False
14	SUL02	SUL02	10/13/2020 12:32:35		PPB	D	OFF	True	False
28	OZ	OZ	10/13/2020 12:30:50		PPB	D	OFF	True	False
30	NOO	NOO	10/13/2020 12:29:06		PPB	D	OFF	True	False
31	NOXX	NOXX	10/13/2020 12:30:51		PPB	D	OFF	True	False
32	NO22	NO22	10/13/2020 12:30:51		PPB	D	OFF	True	False

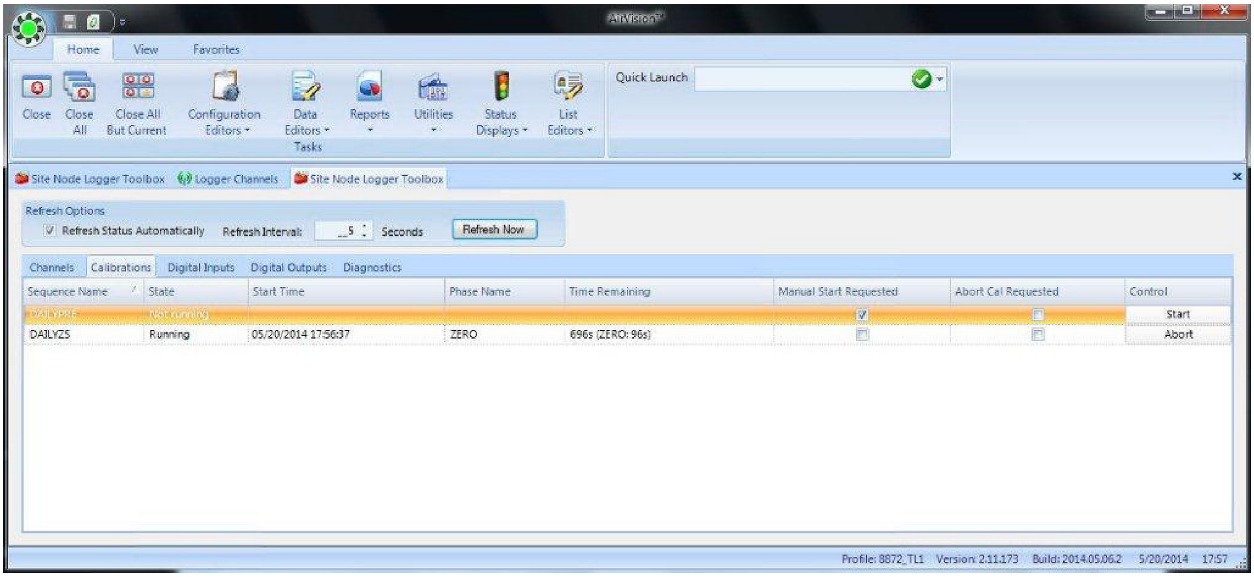
Channels Tab

The **Enable** button can be used to enable or disable all data acquisition to an instrument - this is the recommended approach for a Modbus/GSI instrument that is removed or powered off.

Ribbon button allow the user to:

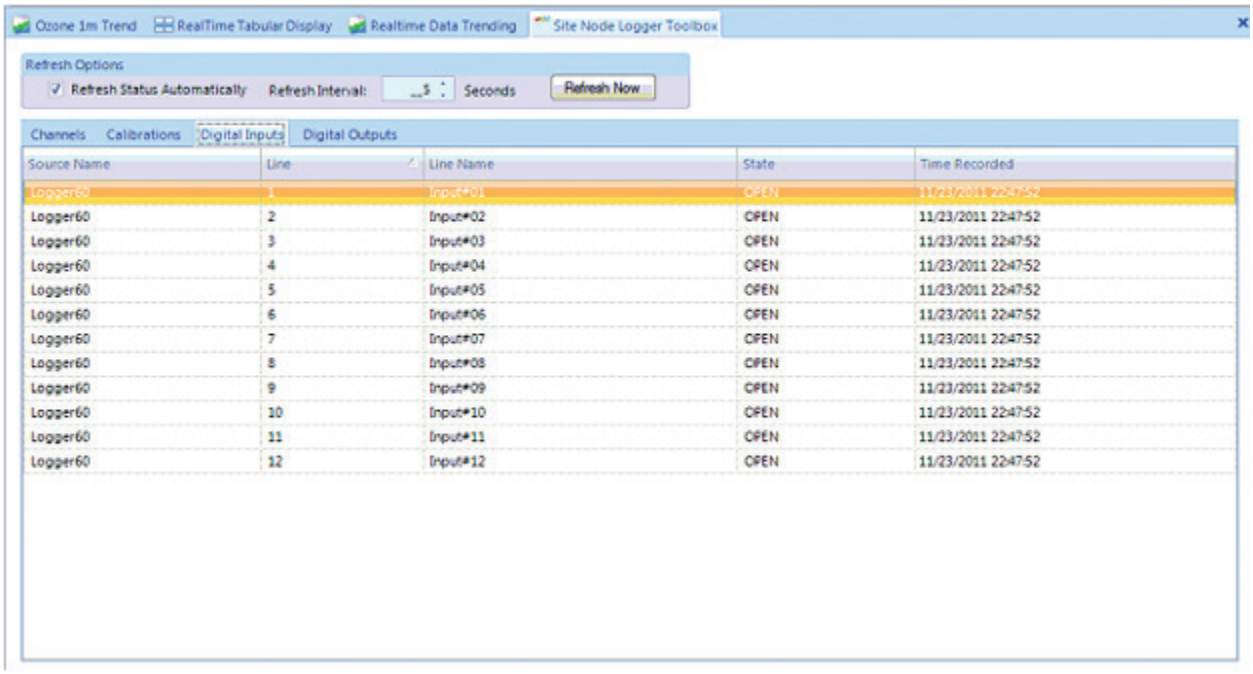
- Enlarge or shrink the font used in the display (for easier reading)
- Hide or show channel types that don't have real-time readings (e. g., rainfall, General channels, Sigma-Theta, etc.)
- Hide or show channels that have Parent Parameters (usually diagnostic entries)

- **Calibrations Tab** shows the current status of all configured calibration programs, as well as provide buttons to start or abort those calibrations.



Calibrations Tab

- **Digital Input and Output Tab** shows the current status of all status input output lines, both for physical inputs and remote (Modbus) lines. No control functions exist in these displays.



Digital Input and Output Tab

Application Notes

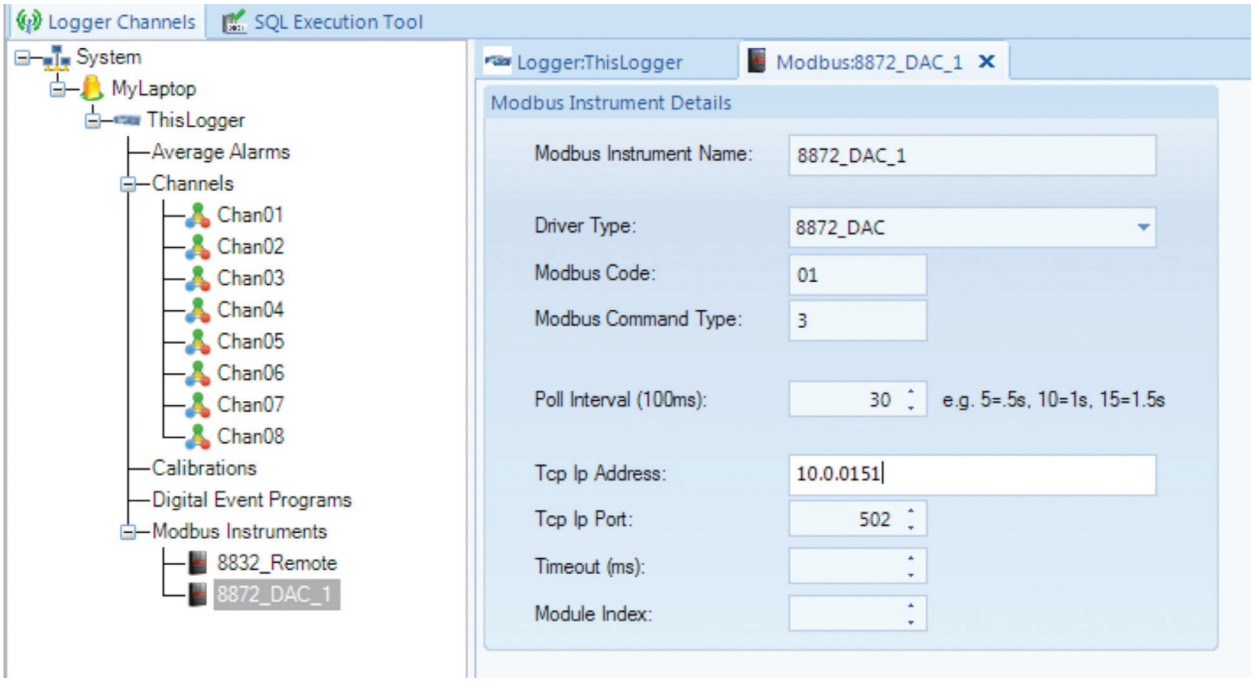
Appendix A Setting up Analog Outputs on the Model 8872

The Model 8872 does not use any custom analog output boards, but rather has the capability to talk to a wide variety of Modbus-based analog output modules commonly available. The most common we use (and the one for this illustration) is the Acromag 972/973EN-4004 device.

If purchased from Agilaire, the units will be preprogrammed with IP addresses compatible with the Model 8872's External I/O network. The first module will be 10.0.0.151, the second will be 10.0.0.0.152, etc.

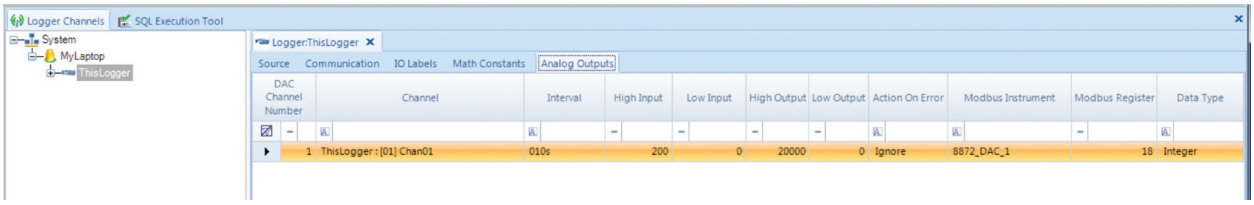
The unit is DIN-rail mounted, and must be given a 15-36 VDC power supply (not provided by 8872, typically a DIN rail power supply). The user should then connect the module to the "External I/O" network (rear panel) through a basic passive Ethernet switch:

Next, create a Logger Modbus Device under **Configuration->Logger Channels** using the supplied driver:



To set the analog output function for each particular analog output channel open the "Analog Ouputs" tab. To create a new analog output program, use the bottom row (with the '*' asterisk) and enter in the fields:

- DAC Channel Number (1, 2, 3, etc)
- Channel (Logger)
- Average Interval to transmit/update (001s for instantaneous)
- Low/High- represents upper / lower engineering units to be output (e.g. 0 to 500 ppm)
- Low/High Output – set to 0 and 20,000 for Acromag devices.
- Action On Error- set to either Ignore, Zero (drive to zero value), Hold, or LowVal (e.g., 4mA).
- Modbus Instrument- associates with Modbus device.
- Modbus Register: For Acromag, use:
- Data Type: Integer

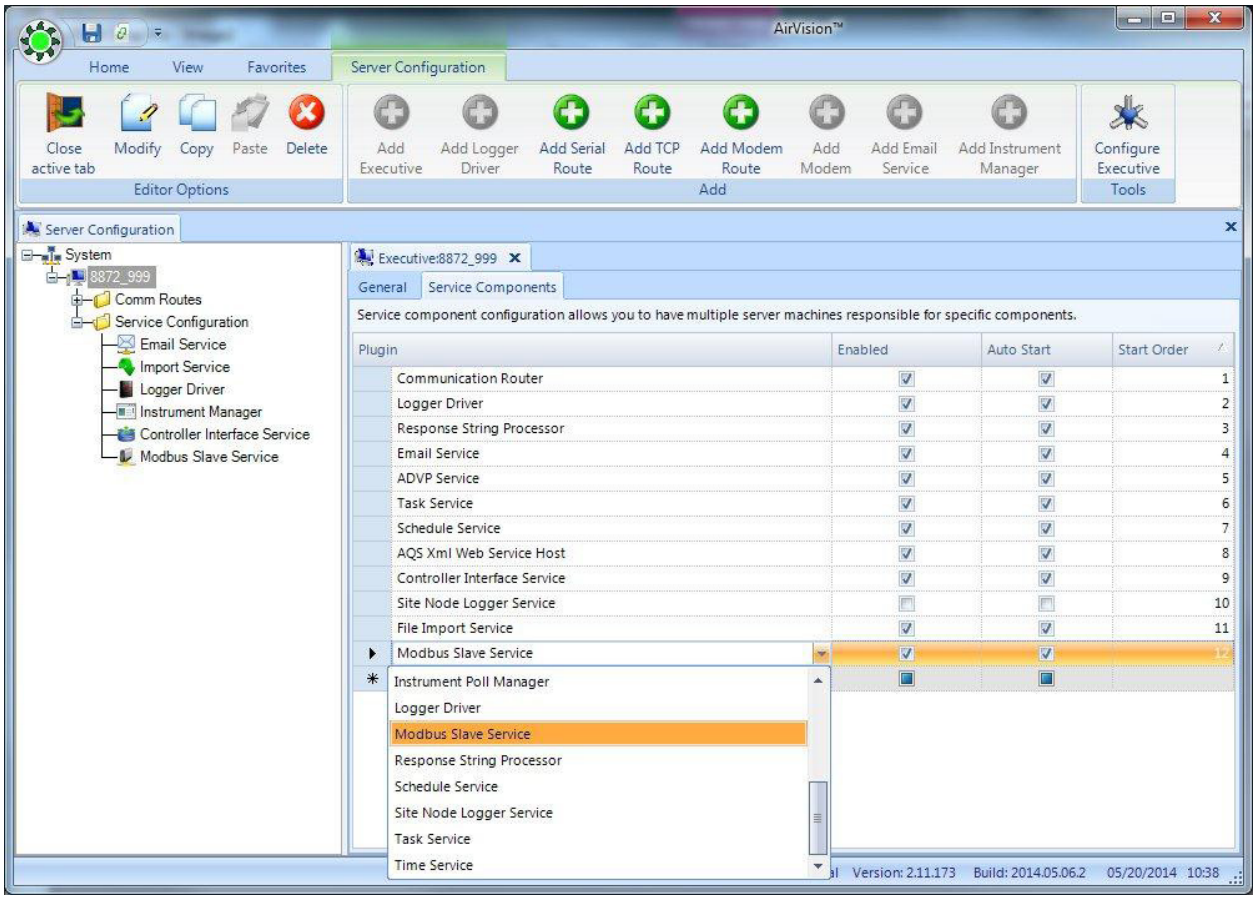


Allow the Site Node Logger service to restart, and the analog output should begin to drive the desired value.

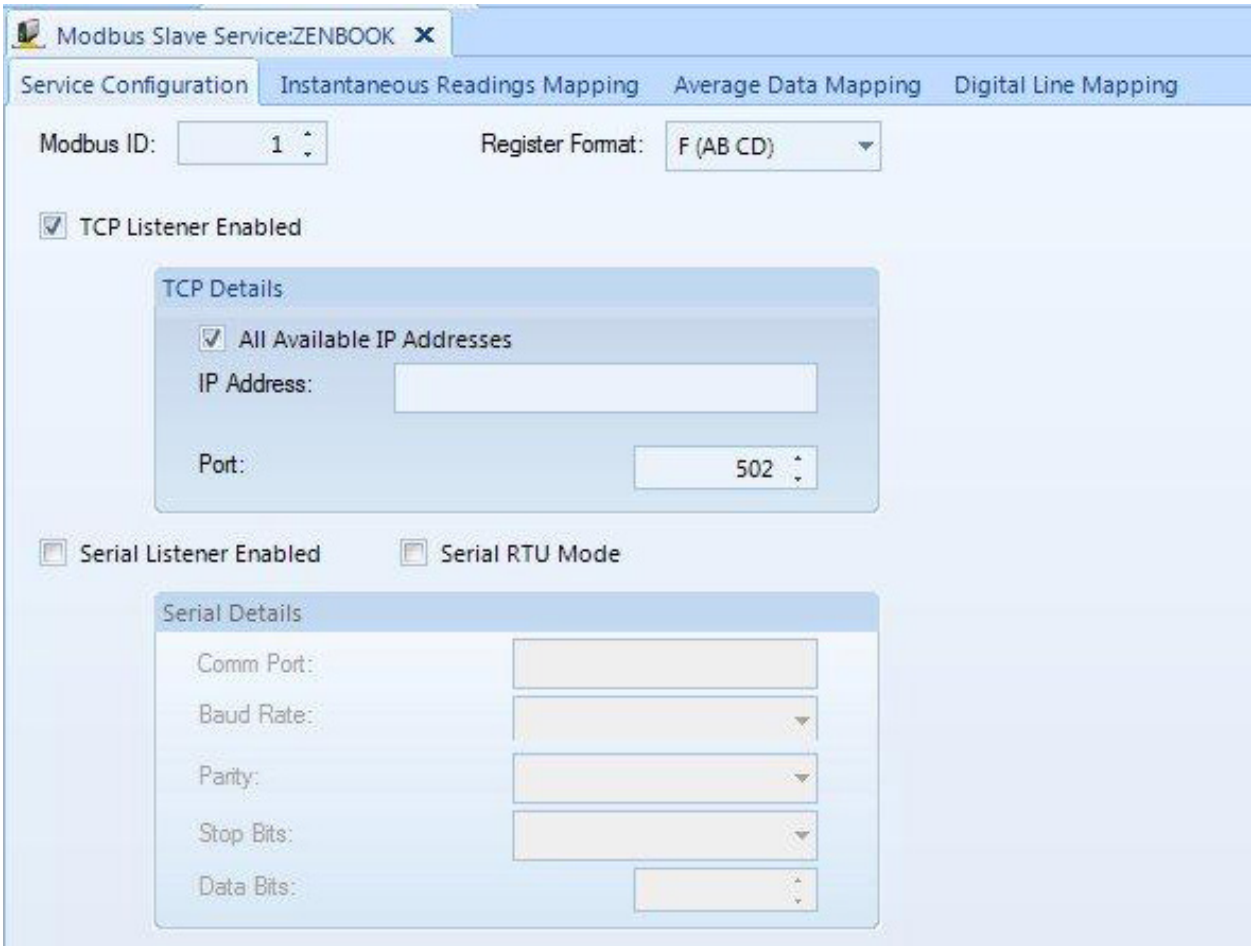
Appendix B Modbus Slave Plug-In

This plug-in allows for the Model 8872 to act as a Modbus Slave/Server on the network and provide data from the Model 8872 to a distributed control system (DCS) or SCADA system.

To enable the plug-in, go to **Configuration->PC Configuration**, double click on the logger entity, and open the **Plug-Ins** tab. Select a new plug-in, and select **Modbus Slave Service**.



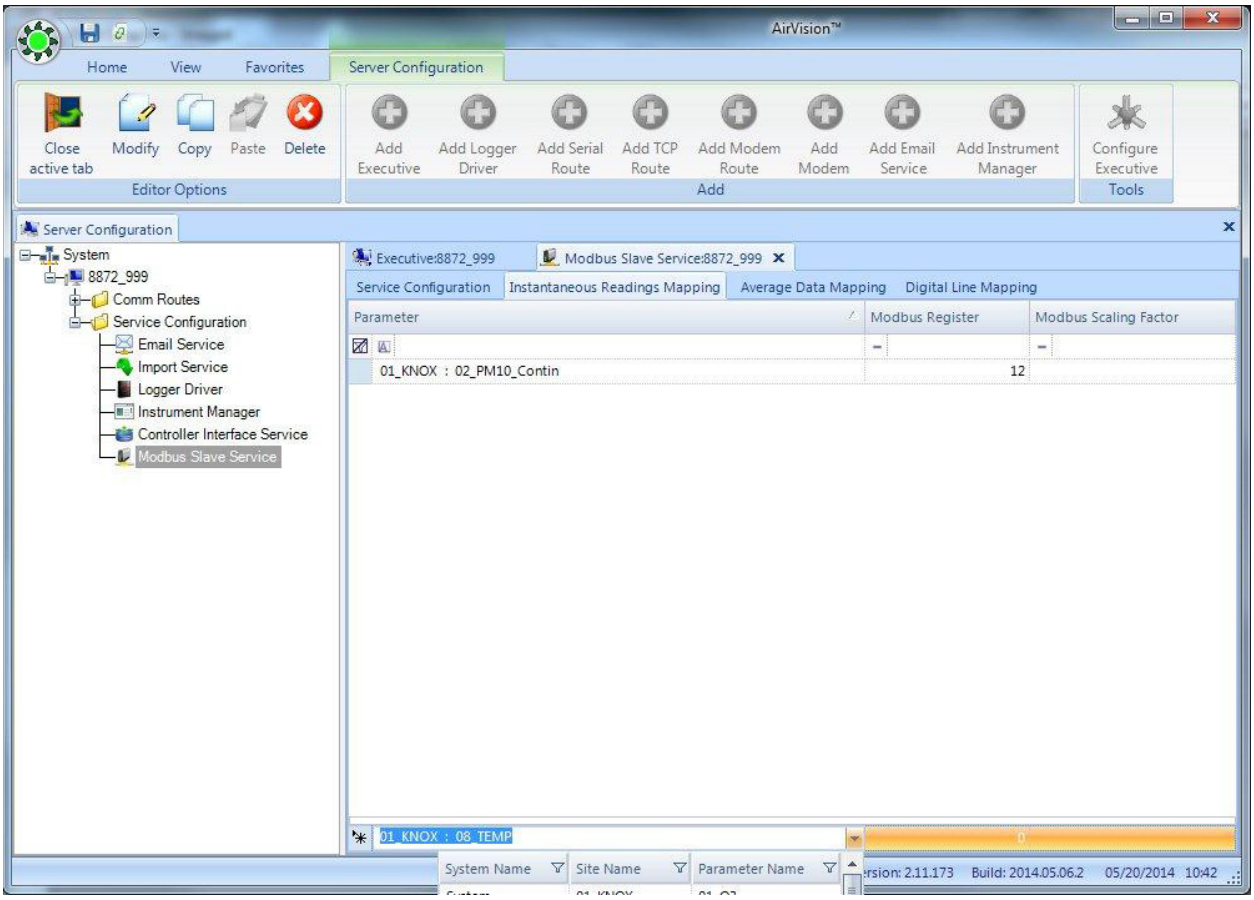
Save, and allow the service to restart. The left side panel will now show an item for the new service. Double-click on it to open the properties:



From here, we can set the Modbus ID (required by some DCS/SCADA systems), the default format for floating point numbers (consult DCS/SCADA guidelines), or if you wish to portray the data as 16-bit integers (RTU). You may also define whether you wish to use one of the RS-232 ports as well as the standard TCP Port 502.

Once you have made these settings, you can go into the other three tabs and create the 'tags' that you wish to portray to the DCS/SCADA system. These include instantaneous readings and averages (represented as registers) or digital inputs (represented as coils).

Click in the * section at the bottom of the screen to add a new tag:

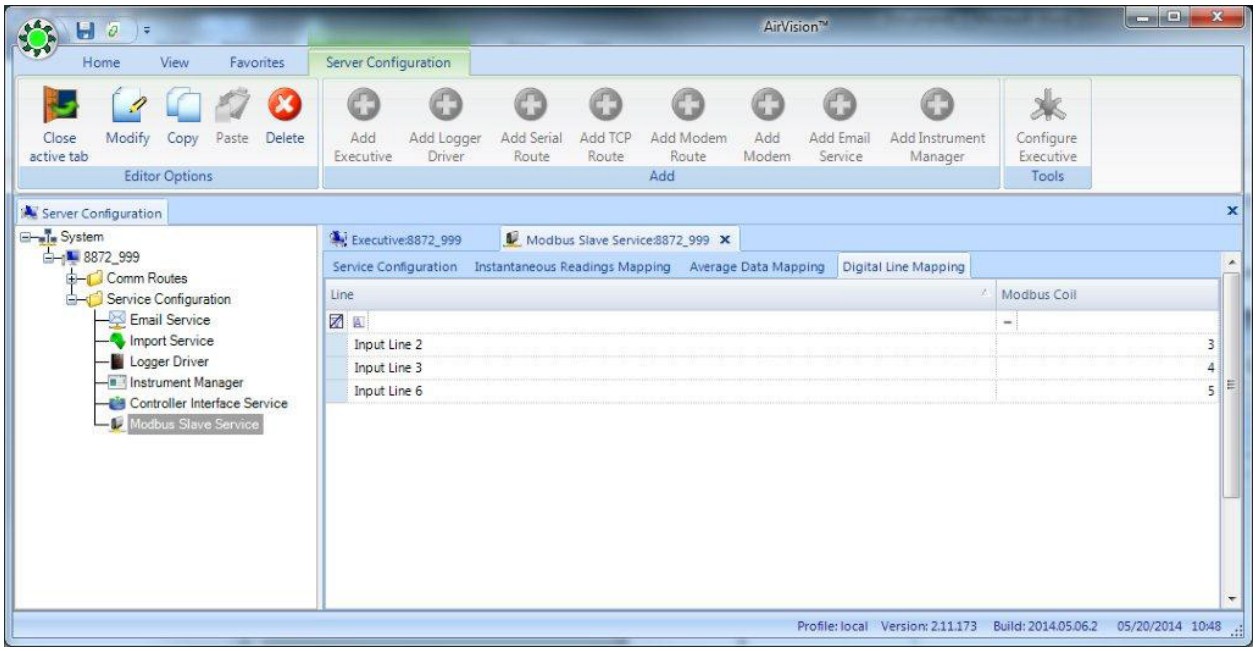


The scaling factor is only used when the default register format is set to 16-bit integers, otherwise it is ignored / does not need to be set. The scaling factor is used to convert values to integers (and the appropriate logic will need to be set on the DCS/SCADA end as well):

Integer Value = Floating Point Value / Scaling Factor.

Thus, a scaling factor of 0.01 will convert a value of 1.23 into integer '123'. Values are rounded.

Coils are simply mapped to a status input point and only take up one “number” space each:



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