Thank you for using Analyst Inside!

This User's Guide is intended to help you get Analyst Inside up and running. It is not intended to be a comprehensive manual covering every detailed aspect of the Analyst Inside Configurator software and the Analyst Inside Webpage…we hope that we have made them intuitive enough that you will be able to navigate them without much trouble.

If can't find what you need here, please reach out to us at <insert proper support email here> and we'd be happy to help!

Table of Contents

Getting Started

Getting Analyst Inside up and running is a four step process.

1) Install the data acquisition hardware and Analyst Inside module
   This includes installing the accelerometers on the machine, wiring the accelerometers to the 1444 Dynamix data acquisition blocks, configuring the 1444s in the Logix Controller, and installing the Analyst Inside module in the control rack

2) Configure the Analyst Inside
   This is where you tell Analyst Inside what type of machine is being monitored and the location of the accelerometers on the machine. You'll also configure users to receive email and/or text messages when Analyst Inside detects any issues.

3) Baseline the Machine
   Once the configuration has been downloaded to the Analyst Inside module, the system will baseline the machine's vibration signature under normal operating conditions. This requires 100 samples and typically takes around 25 hours of machine runtime to complete

4) Access the Analyst Inside Web Page
   Once the configuration is done, most of the interaction with the system will be done via the Analyst Inside web page. This web page is served up from the module itself (as opposed to an external web server out on the Internet somewhere). From this webpage you will be able to view Active Alarms, view historical Alarm Logs, view the state of the Machines being monitored, and perform some troubleshooting diagnostics if necessary

Installation

Install hardware

Install power to the Analyst Inside module and connect Ethernet cable(s).

The standard convention is to connect one NIC port to the Automation network and the other NIC port to the Business/Office network.

Note: The 1444 vibration monitor requires Logix controller version 20 or later

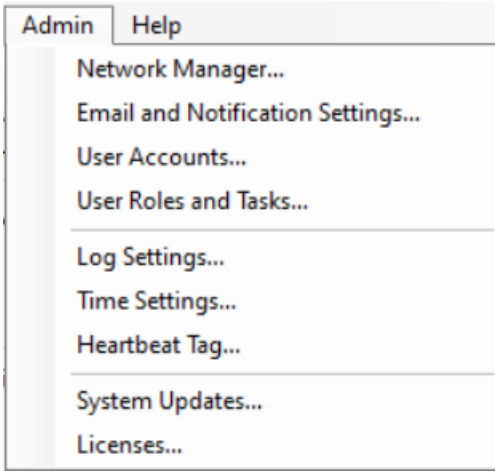
Install configuration software

Initially run the AnalystInsideConfiguratorInstaller.exe file to install the configuration software.

Afterward, firmware updates can be installed to the module using the configuration software. The latest configuration software update can then be installed back to the computer from the Analyst Inside module using the Admin / System Updates function.

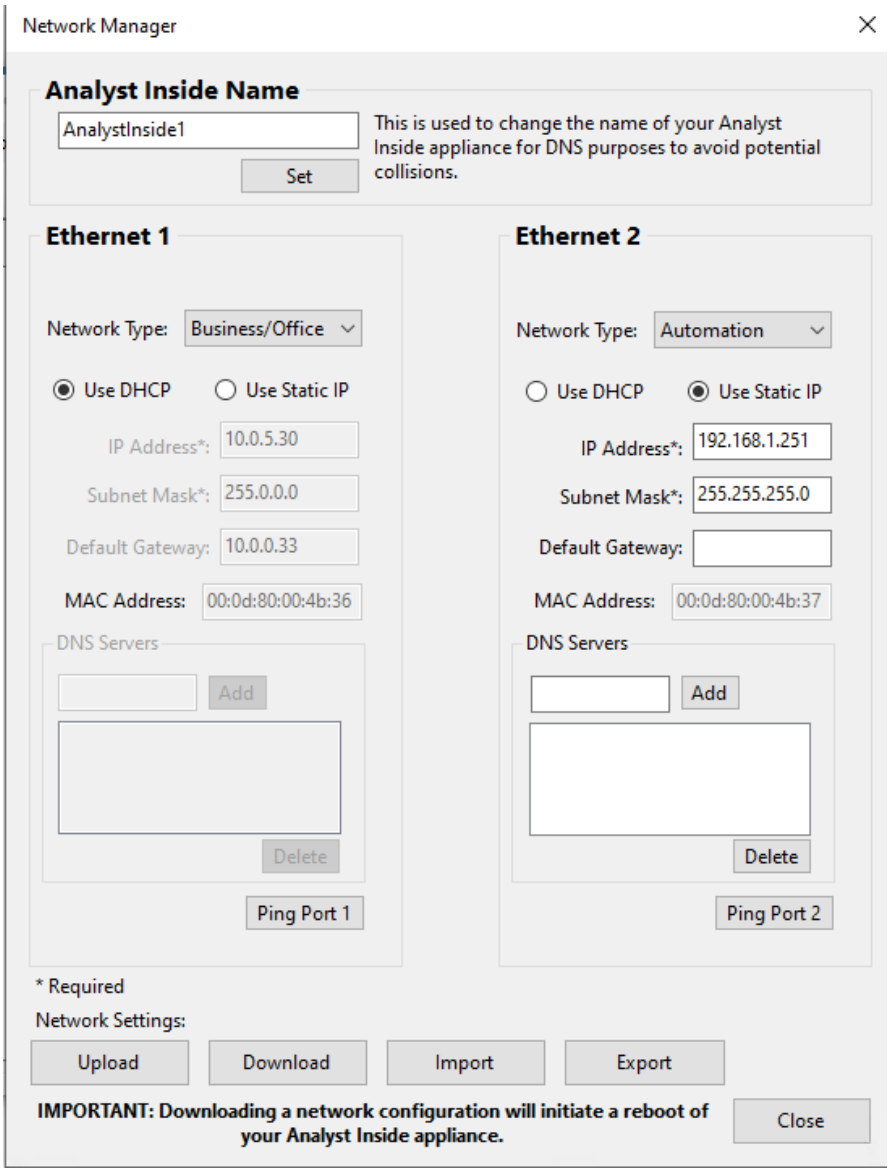
Configure Analyst Inside – Infrastructure

The Admin menu has the following settings:

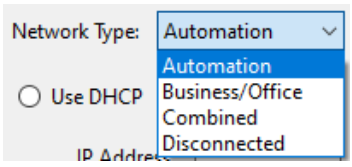


Network settings

Use the Admin / Network Manager dialog to Upload the default network settings (192.168.1.250) from the module, modify as needed, and Download changes back to the module.



Note: A port can also be configured for Combined Automation and Business/Office networks. The other port then defaults to Disconnected.



E-mail and Notification Settings

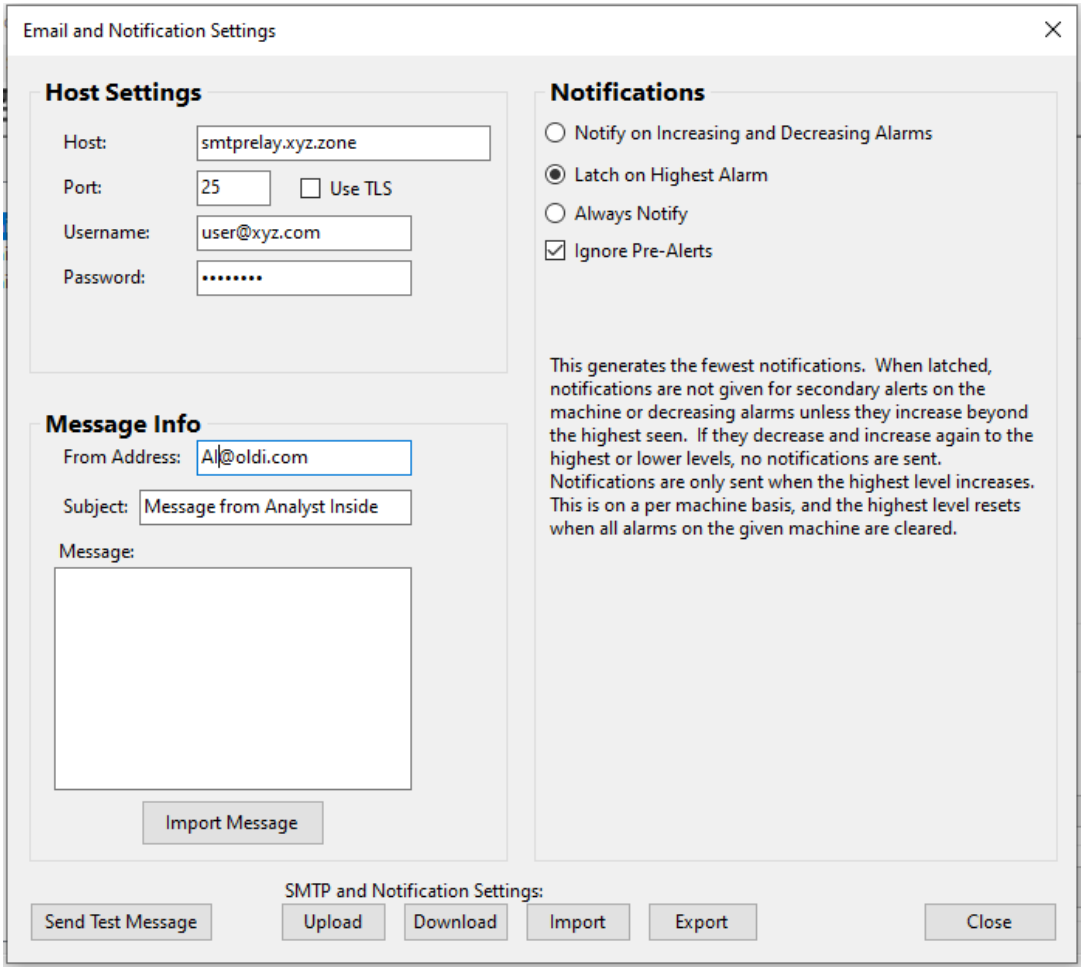
The Admin / E-mail and Notification Settings function is used to configure the sending of notifications from the Analyst Inside module.

Configure Host Settings with the company E-mail server and (if required) enter a valid username and password with access to the server.

The Message Info section can be configured as desired to indicate where the message is coming from. The address here doesn't have to be an existing E-mail address, it's just for information purposes.

Notification options are configurable and are described in the dialog text.

Selecting the Ignore Pre-Alerts option will prevent the lowest level alarms from generating E-mail/Text notifications.

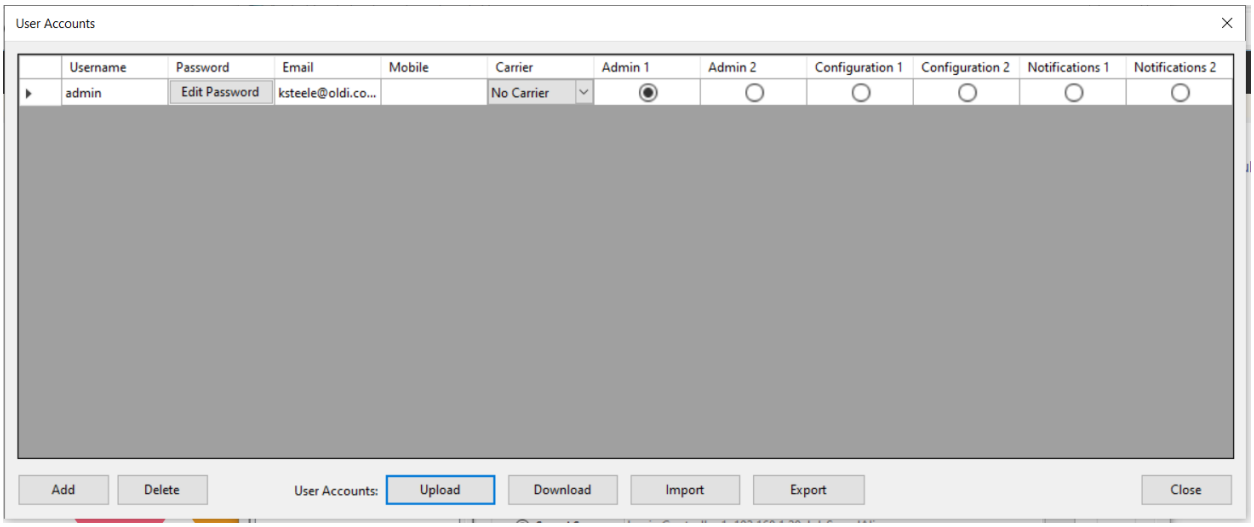


User Accounts

The Admin / User Accounts function is used for adding users, setting passwords (default for new users is no password), and setting the user type (which determines access privileges).

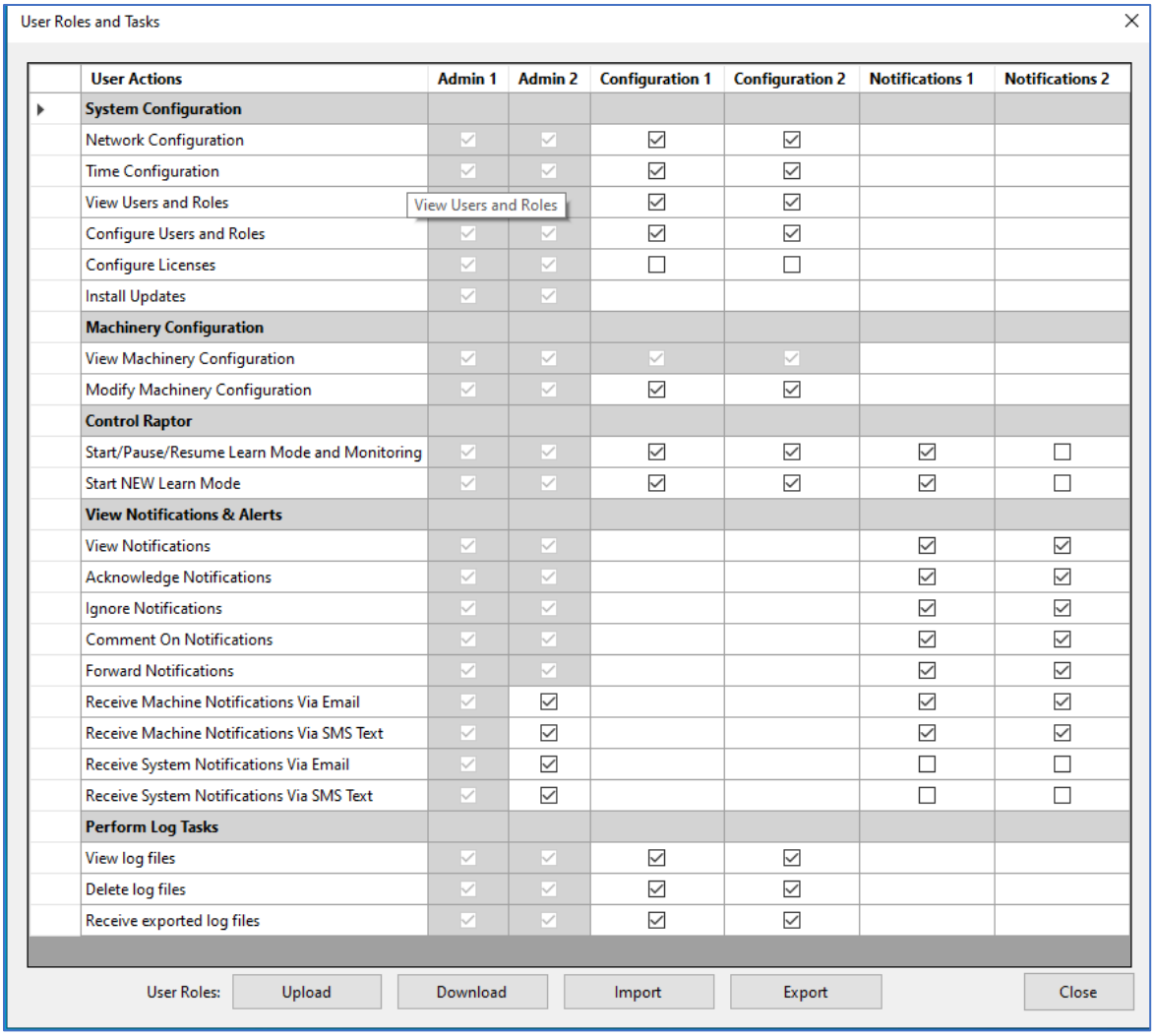
This is also where E-mail address and Mobile number/carrier are entered for receiving alarm and other notifications.

At least one administrative user should be configured to receive E-mail notifications of when log files are full, system errors, etc.



User Roles and Tasks

The Admin / User Roles and Tasks function is used for customizing the access privileges for each user type.



Licensing

The Analyst Inside will be licensed to some level when purchased, but this function can be used to upgrade the licensed capabilities.

From the Admin menu, select Licenses…

Select the number of Points to license and enter a User ID for reference.

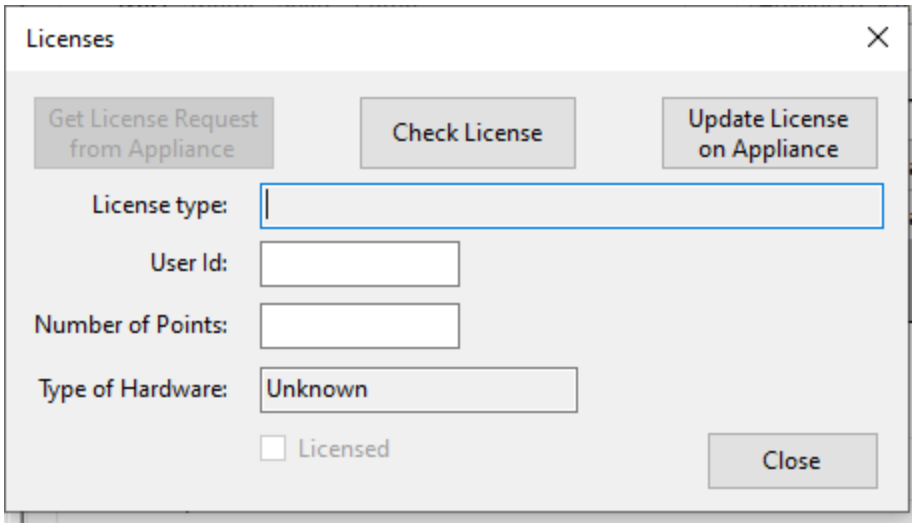
Click the Get License Request from Appliance button.

Login to the module, then save the request to a file.

Forward (e.g. E-mail) the License Request file to get a License file.

Click the Update License on Appliance button, browse to open the provided license file to download it to the module.

Click the Check License button to confirm licensing.



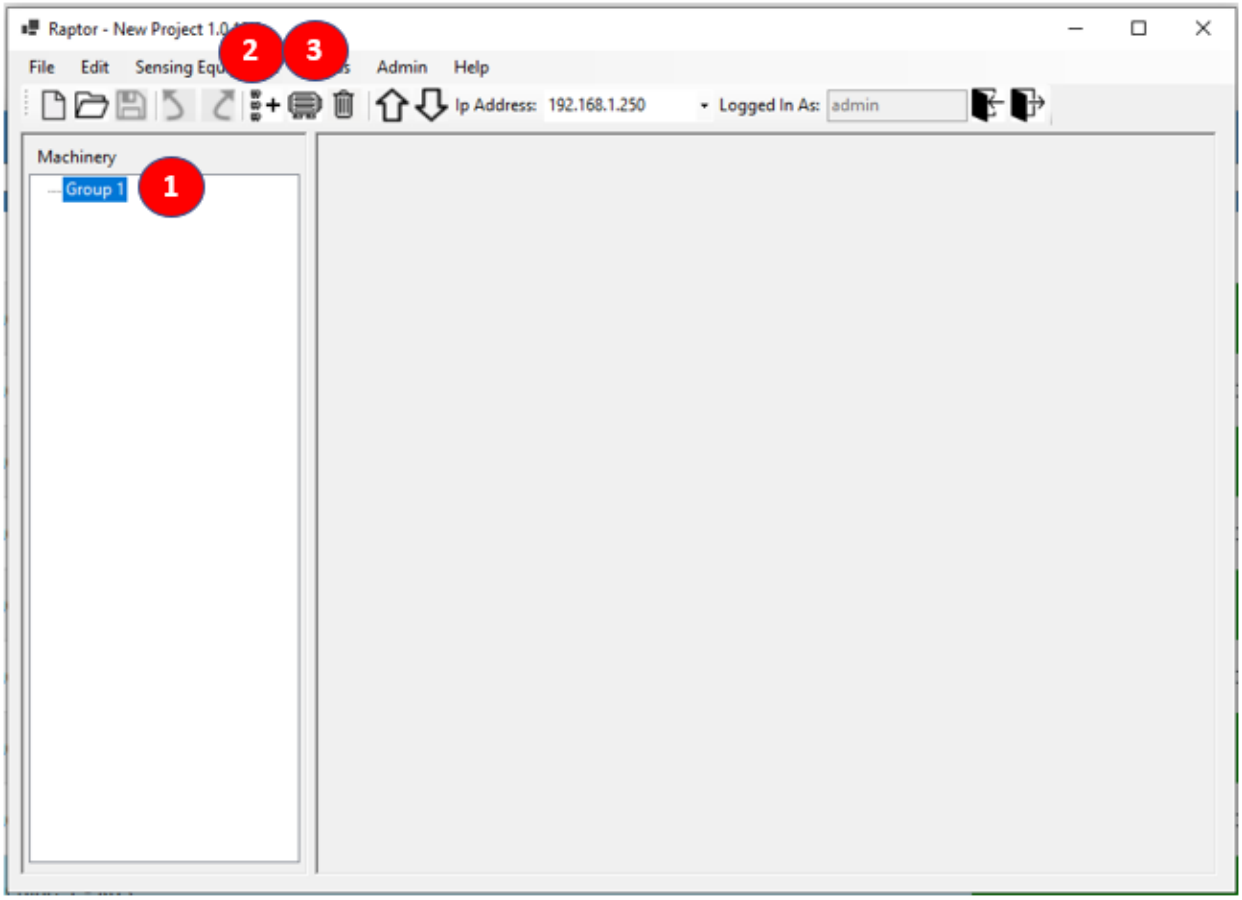
Configure Analyst Inside – Machine Information

Configure Basic Machine Info

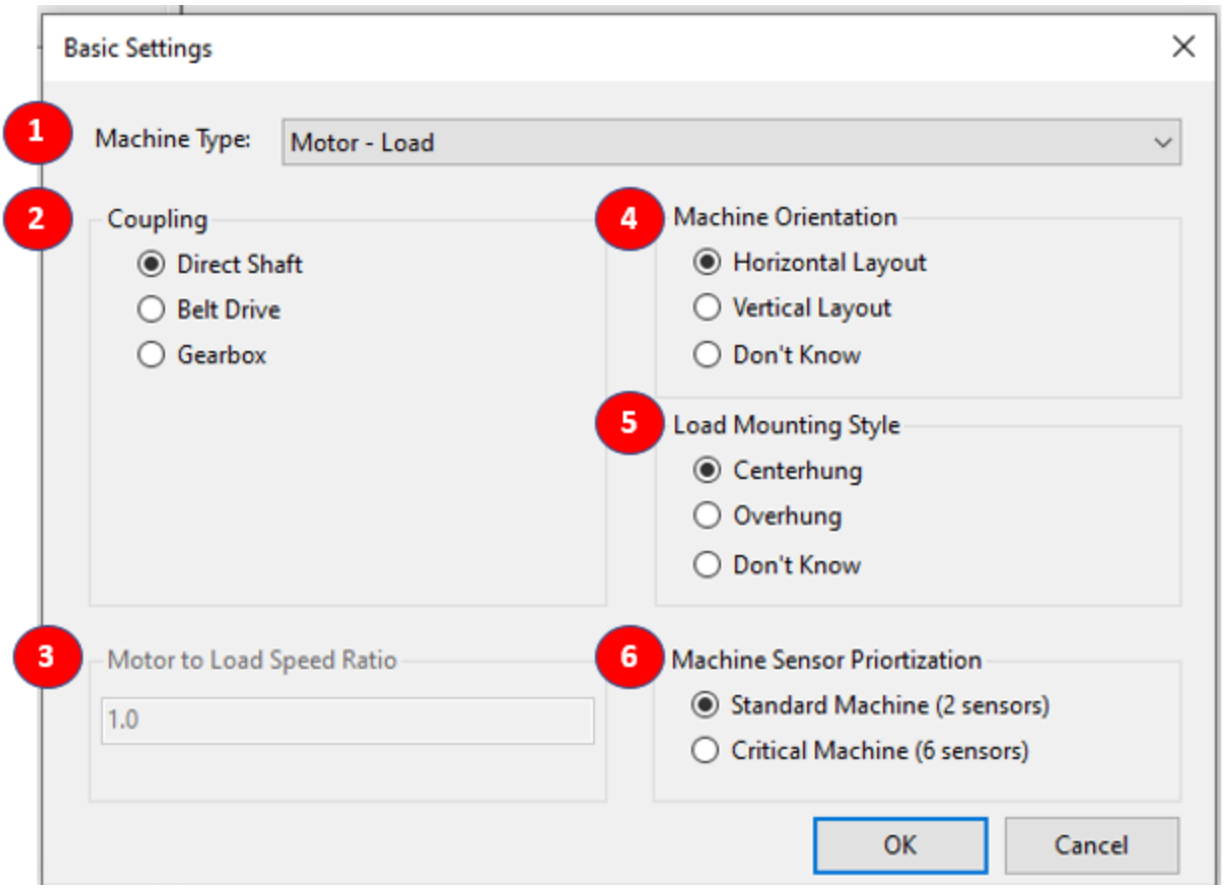
Use Groups to organize Machines as desired, e.g., by plant area. Click on a Group (1) in the navigation tree to edit the Group Name.

Click the Add Group button (2) to add additional Groups.

Highlight a Group and click the Add Machines button (3) to add Machines under the appropriate Group. Note: Hover over the buttons to see tooltips describing the buttons.



When adding a Machine, configure the following settings to match the physical machine.



Select the Machine Type (1). e.g. Motor/Pump, Motor/Fan, or Motor/Load (for other types of driven components). This will affect the type of analysis performed on the machine, as well as the naming conventions used throughout the system.

Select the type of Coupling (2).

For Belt or Gear couplings, enter the speed ratio (3). This will calculate the speed of the driven component, which is essential for vibration analysis.

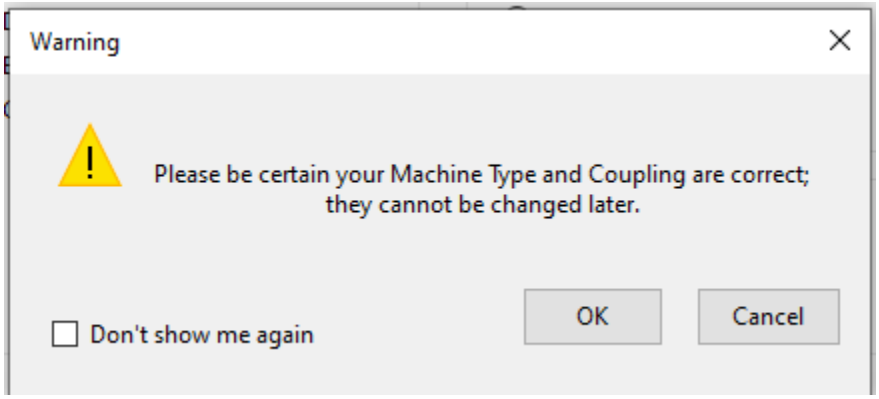
Select the Machine Orientation (4). This will affect the type of analysis performed, as well as the naming convention for measurement location.

Select the driven component mounting style (5). This will affect the type of analysis performed. e.g. Centerhung is for components suspended between two bearings and Overhung is for components suspended beyond one or two bearings.

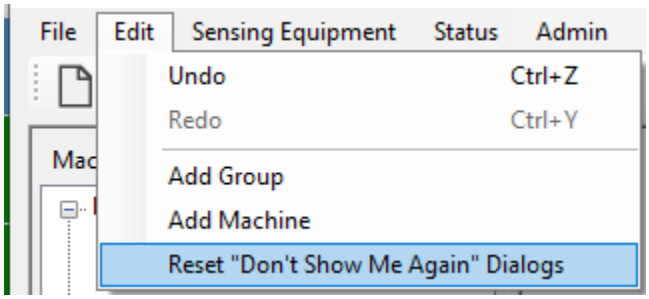
Select Standard or Critical (6) to generate the number of default sensor locations. Note: additional default locations are generated for machine drive trains that include a gearbox. Additional locations can also be manually added after creating a Standard configuration.

Click OK to close this dialog.

A confirmation dialog is displayed to ensure the Machine and Coupling types are correct, as these setting cannot be changed after the machine configuration is created. After saving, changing these settings requires deleting the machine configuration and starting over. Checking the "Don't show me again" box will prevent this dialog from being displayed for future machine configurations.

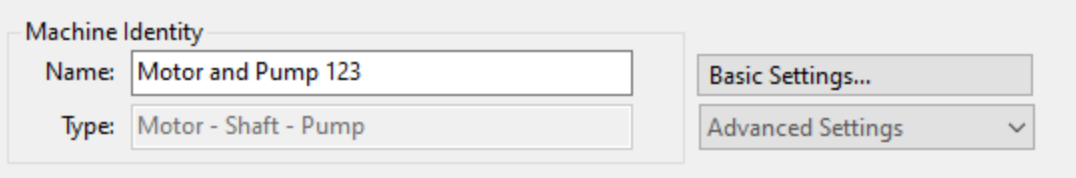


Note: This type of warning dialog can be restored by selecting the Edit / Reset "Don't Show Me Again" Dialogs command.



Click OK to confirm the settings.

Note: Click the Basic Settings… button to return to the Basic Settings dialog.



Bind Sensor Mounting Locations to Vibration Input Channels

This step is to link Sensor Mounting Locations in the configuration software to physical vibration sensor input channels.

Click the ellipsis (…) button (1) next to each Sensor Mounting Location to link it to a physical vibration sensor channel.

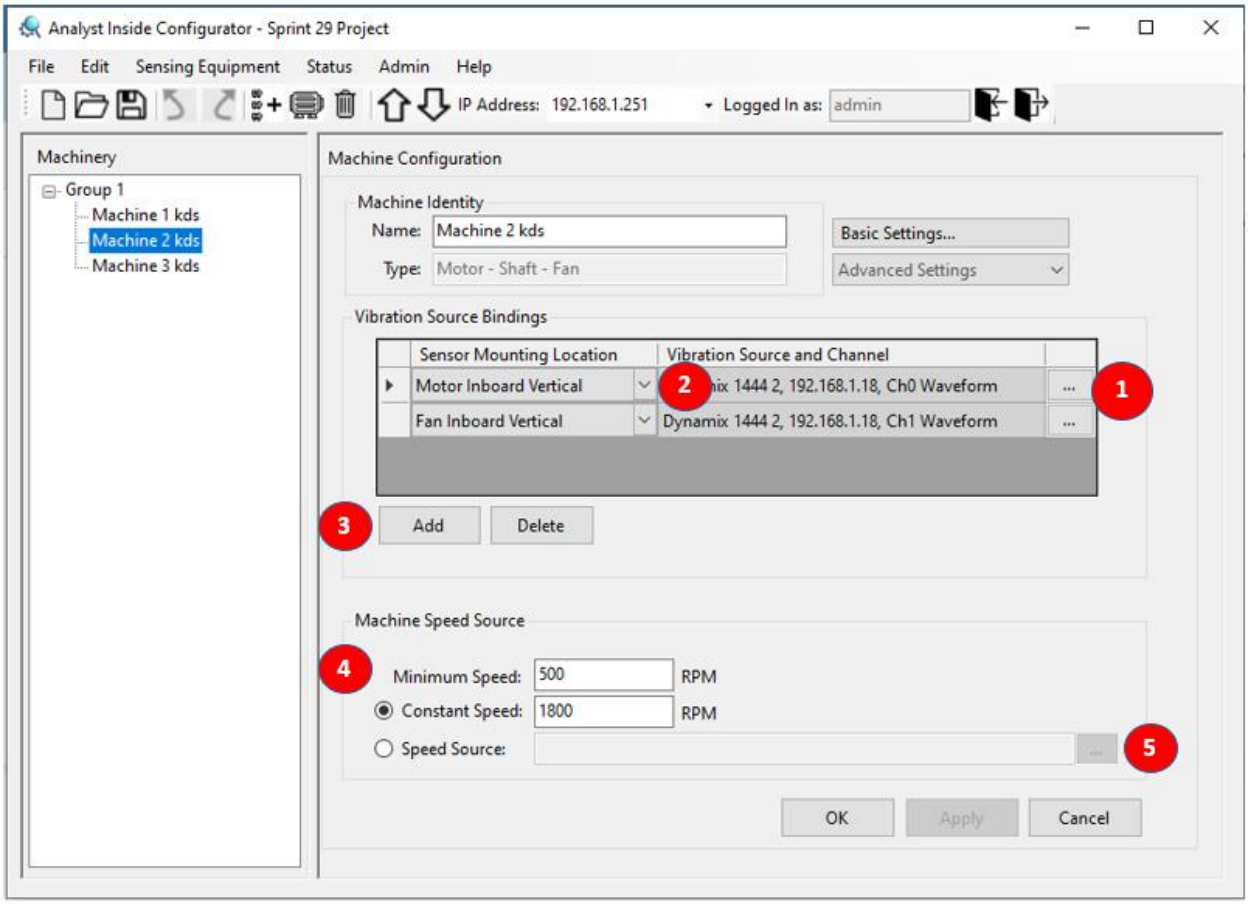
Use the Sensor Mounting Location drop down lists (2) to change/select from the available sensor mounting locations to link to physical input channels.

Use the Add/Delete buttons (3) to add or delete from the set of available Sensor Mounting Locations.

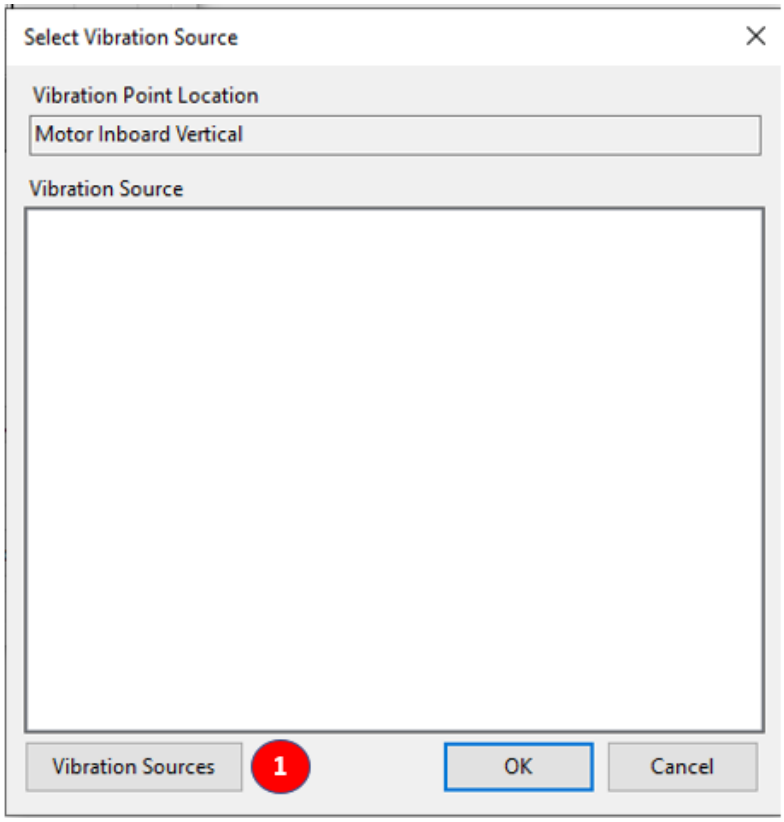
Enter a Constant Speed value for the machine or select the Speed Source option (4) to obtain the machine speed from a controller tag.

A Minimum Speed is configurable, below which vibration monitoring will be suspended. (e.g. if the machine has stopped, or running so slow that vibration monitoring is not useful).

If the Speed Source option is selected, click the ellipsis (…) button (5) to link to a controller tag for reading a variable machine speed.



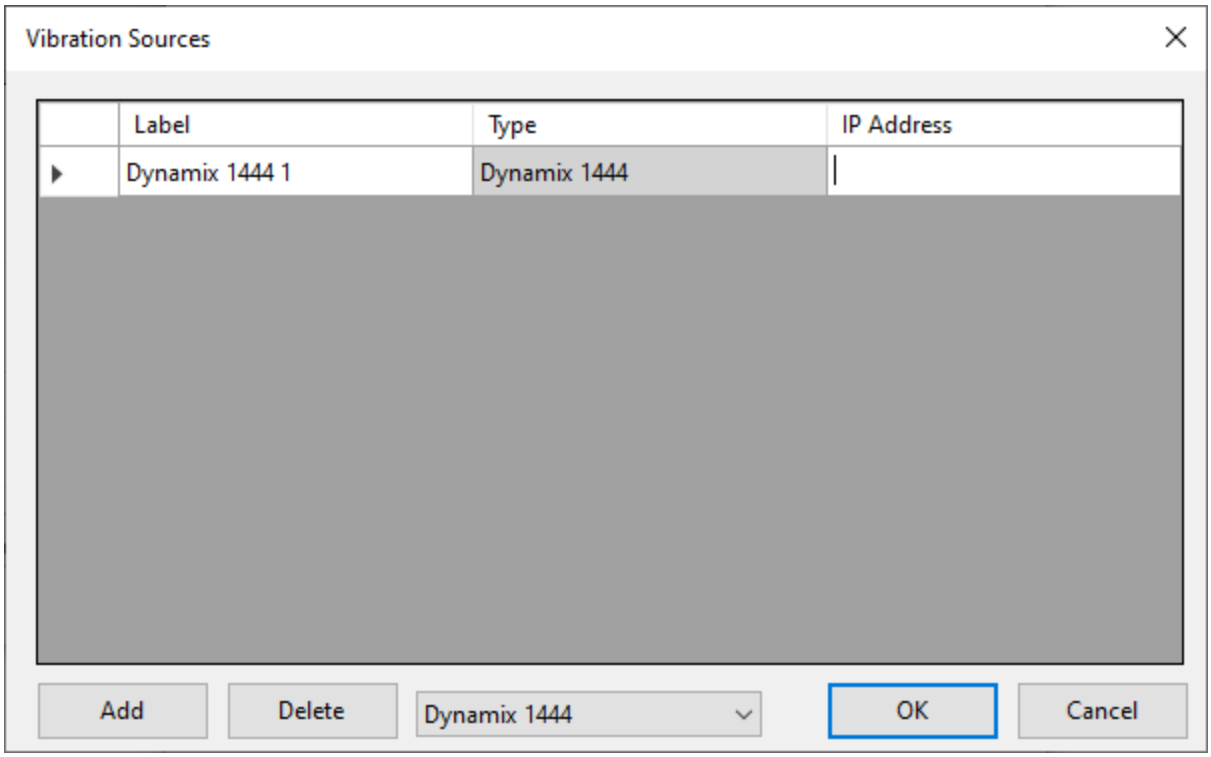
After clicking the ellipsis button next to a Sensor Mounting Location, to link it to a physical vibration sensor channel, click the Vibration Sources button (1) to add a vibration source (e.g., a 1444).



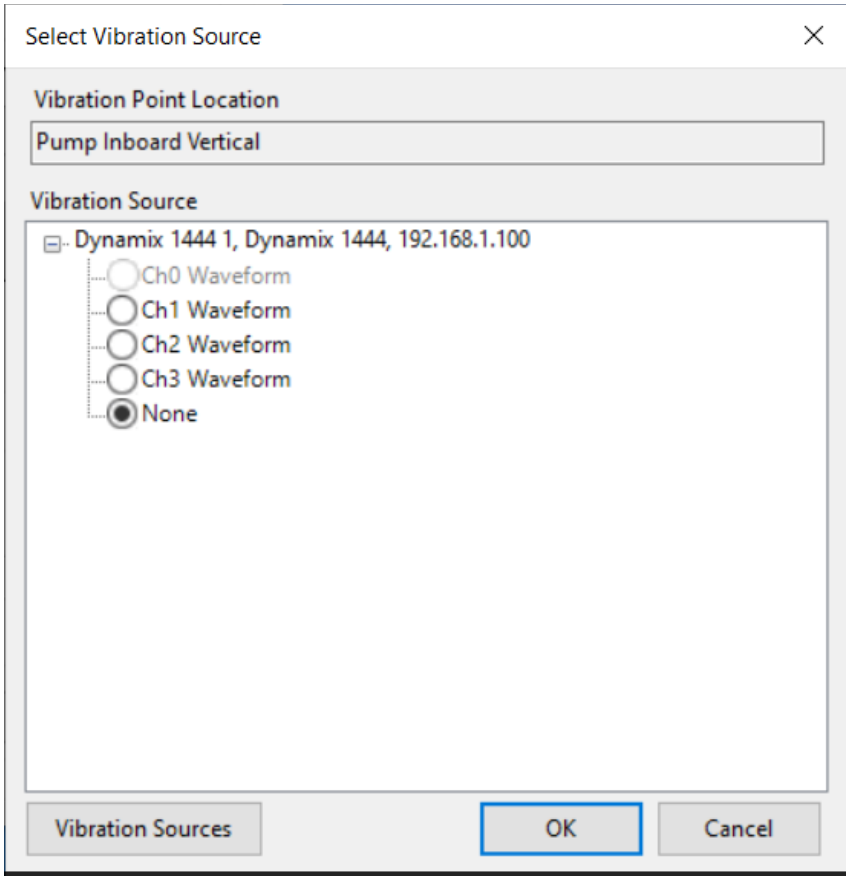
On the following dialog, enter the IP Address of the 1444 module.

The Label for the 1444 can also be edited.

Then, click OK.



Click a radio button to select the desired vibration Channel input (channels that have already been assigned are grayed out), then click OK

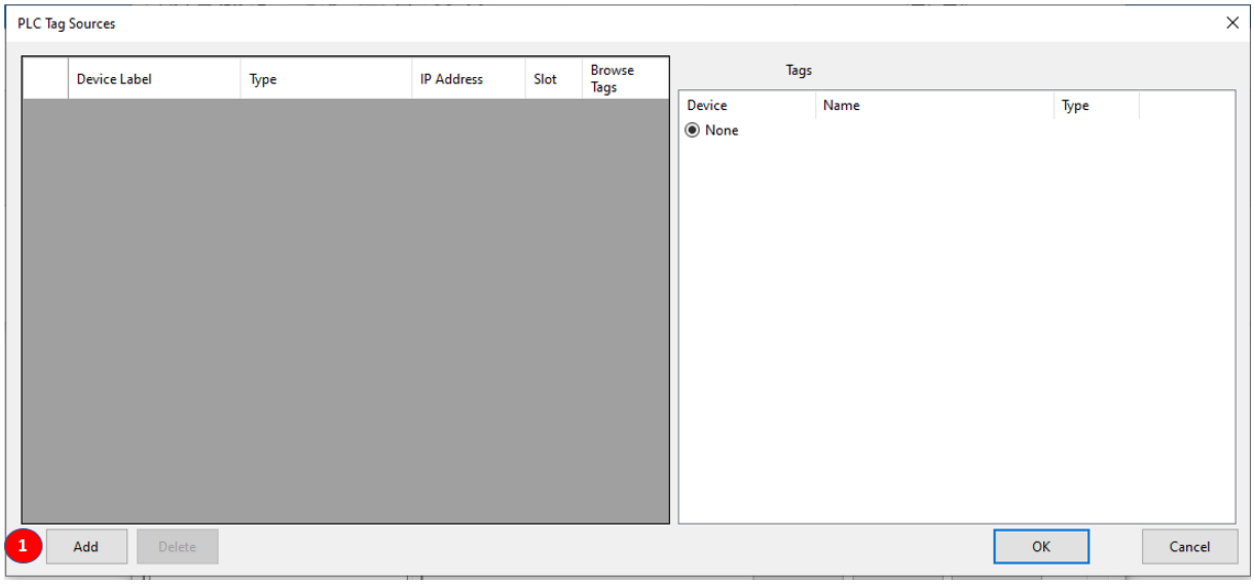


Configure Machine Speed / Source

Enter a Constant Machine Speed, or for variable speed machines select the Speed Source option to browse to a Tag from the controller to indicate the current machine speed.

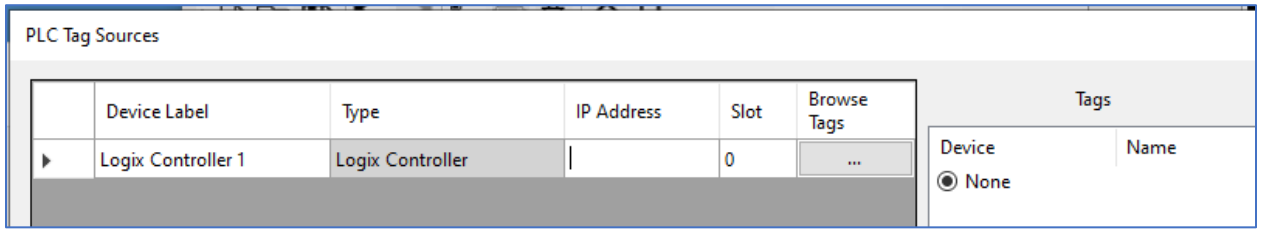
Click the ellipsis button (1) to browse to a Speed tag. The speed tag type must be a numerical value.

Click the Add (1) button on the following dialog to add a controller.



Enter the IP address and slot number of the controller. The Device Label can also be edited.

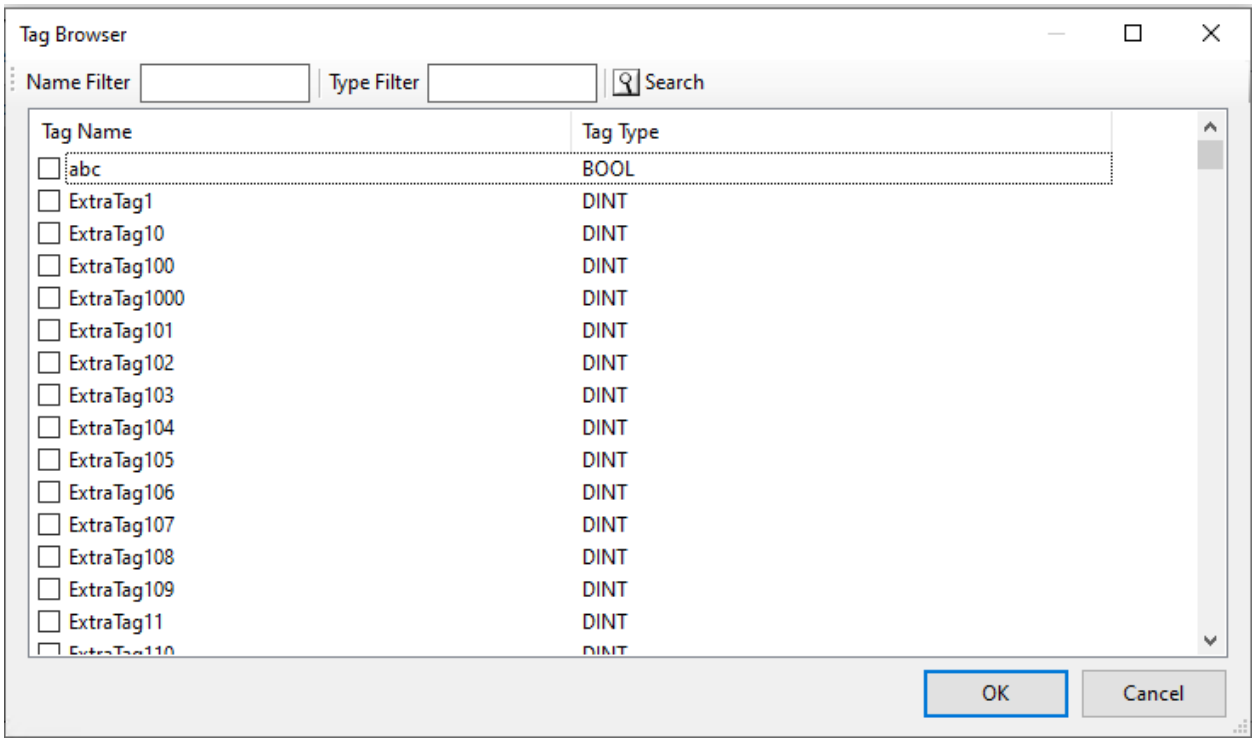
Click the Browse Tags ellipsis button to display a list of selectable tags



An Alias tag must be created in Logix Designer for the tag to show up in this list. The Alias tag should be linked to a Speed tag from a 1444.

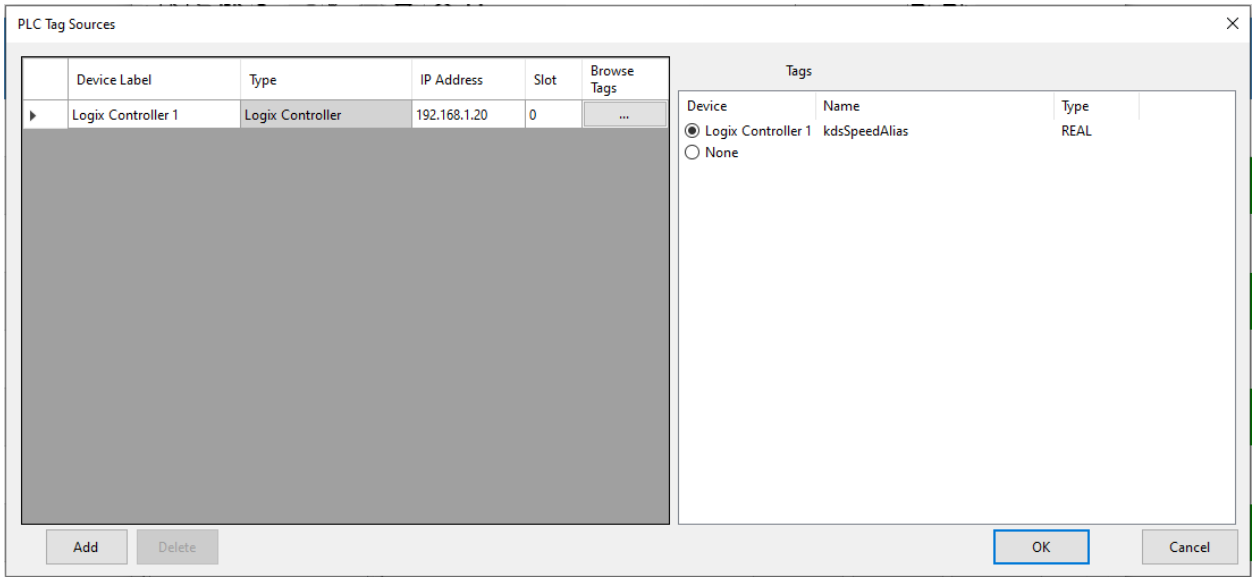
If the tag list is long, the Name and Type filter fields can be used to reduce the number of tags displayed (enter text to search for, then click the Search button).

Select a Speed Alias Tag and click OK.

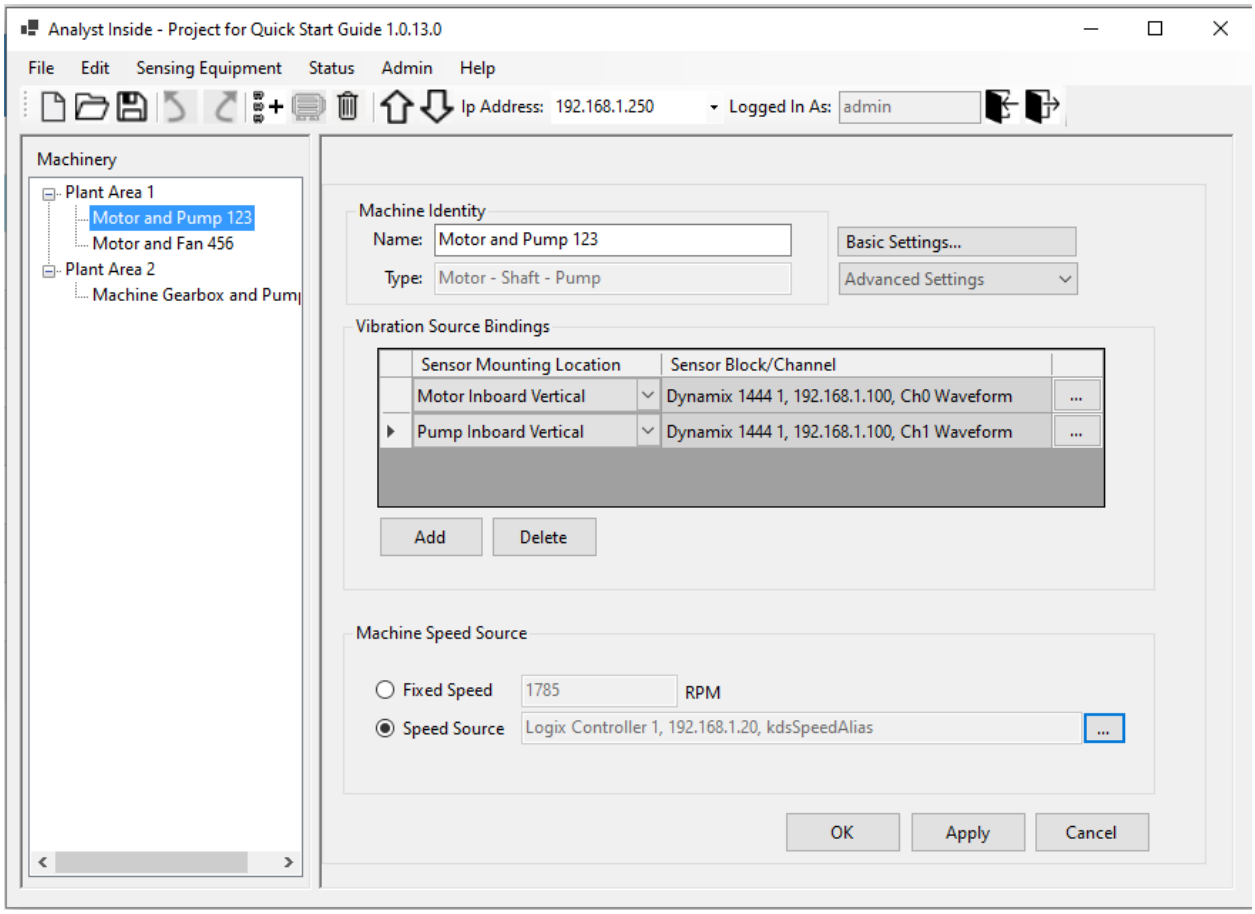


The selected Speed tag will then be displayed on the following dialog.

Make sure the desired Speed tag is selected and click OK to finalize the selection.



When complete, the configuration could look something like this:



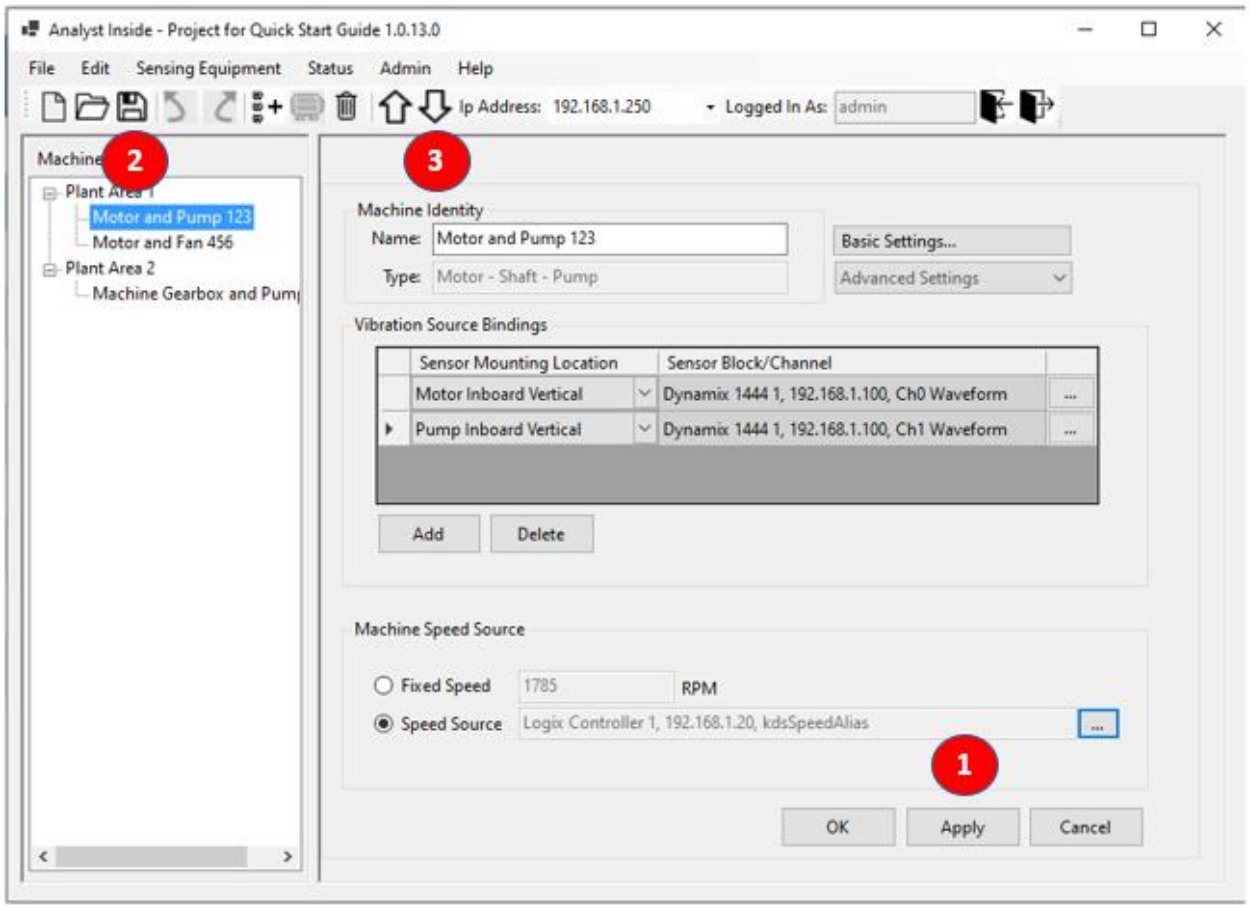
Save / Download

After assigning Vibration and Speed sources, click Apply (1) to save changes.

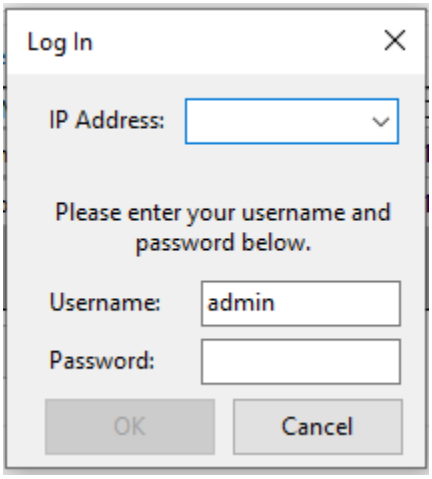
Click the file Save (2) button to save a backup of the project to a file on the computer hard drive.

Click the Download arrow (3) to download the configuration to the Analyst Inside module.

Note: Clicking the Upload arrow will retrieve the configuration that is currently loaded in the module.



Note: If not already logged in, a prompt will appear to enter the IP address of the module and enter a username and password.

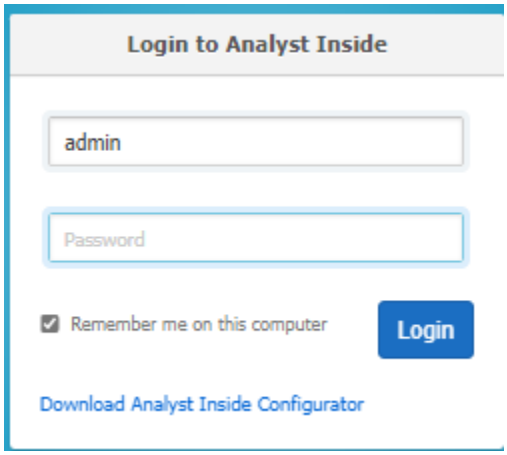


A confirmation dialog is displayed after the Download is complete.

Web App

Launch a web browser and enter the IP address of the Analyst Inside module.

Enter a valid username and password to login to the Analyst Inside module.



Note: The Configurator software can also be downloaded from this menu, without logging in.

Machines page

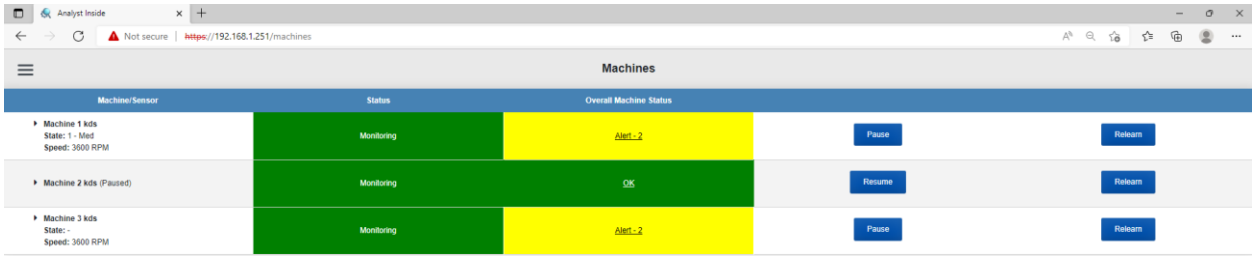
The Analyst Inside Web Application initially opens on the Machines page (or on the last page that was selected before a browser session expired).

The Status column indicates whether the machine is Monitoring for alarms, or is still in a state of Learning the machine's baseline vibration characteristics, or if a channel is unconfigured.

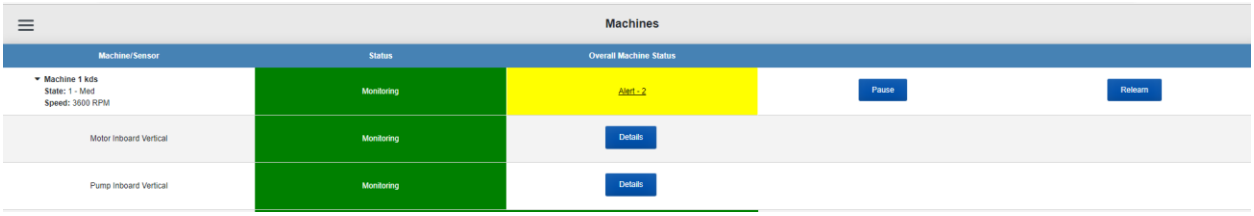
The Overall Machine Status column indicates the highest alarm level of the machine.

Pause: The Pause button will pause the monitoring of the machine (for example when the machine is down for repair)

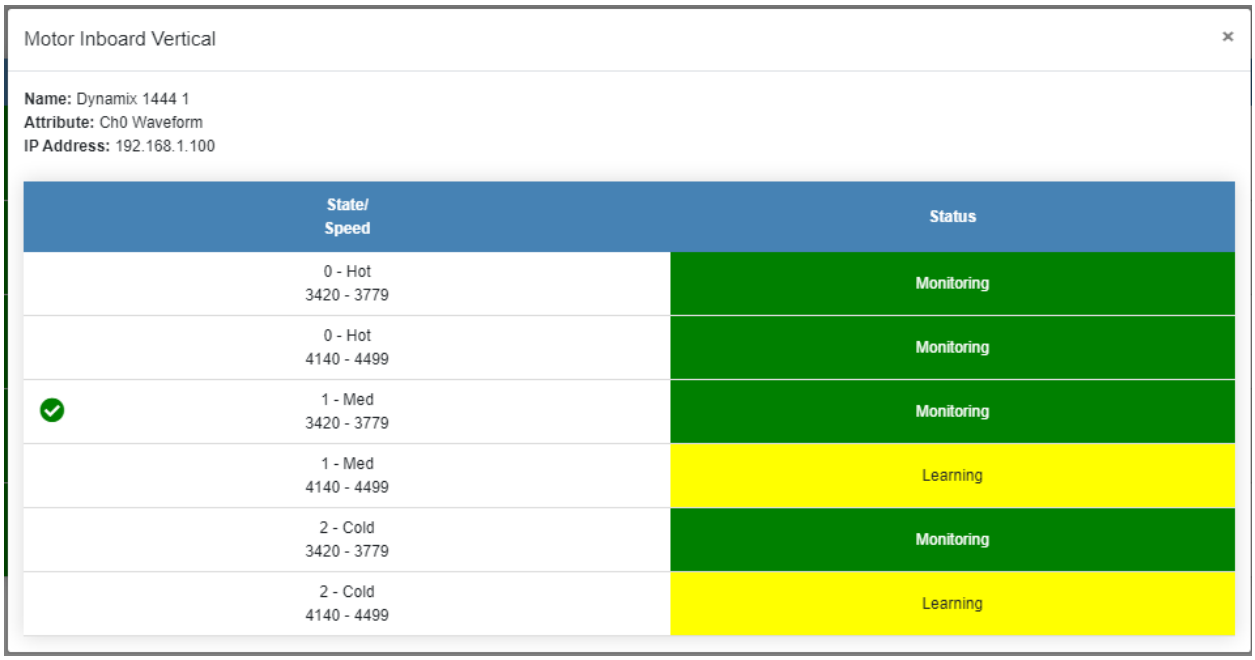
Relearn: The Relearn button will cause the Analyst Inside module to relearn a new baseline state for a machine (for example, after the machine is replaced or repaired). Note: After a repair, the Analyst Inside should be allowed to run for a while with the previous baseline data to confirm the repair was successful and the alarm state has returned to OK.



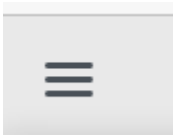
Expanding a machine displays the individual measurement points/channels on a machine.

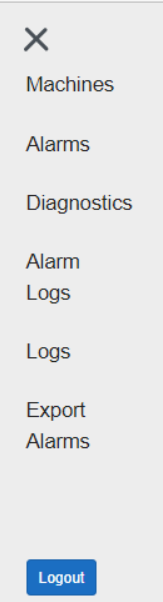


Details: The Detail buttons provide more information such as what Speed Range and State condition a channel is monitoring.



The "hamburger" menu at the top left corner provides navigation between the Machines, Active Alarms, Diagnostics, Alarm Logs, and Logs pages; as well as Alarm Export and Logout functions.

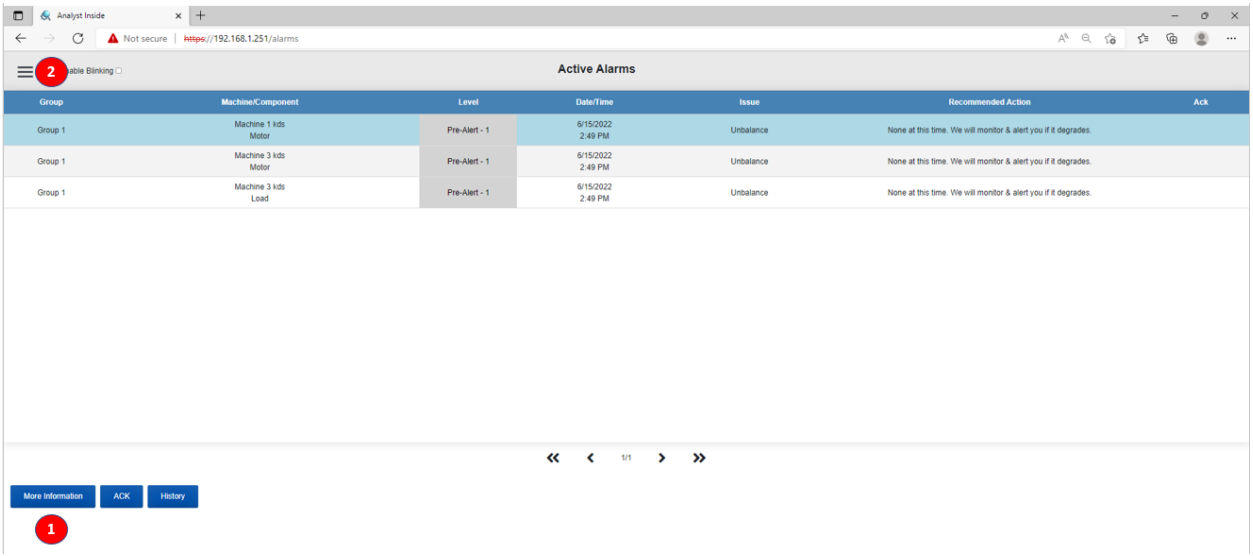




Active Alarms page

Clicking the hamburger menu and selecting the Active Alarms page displays currently active alarms.

Note: For a particular Machine/Component, the highest alarm from any speed/state will be displayed, even if that speed/state is not currently active.



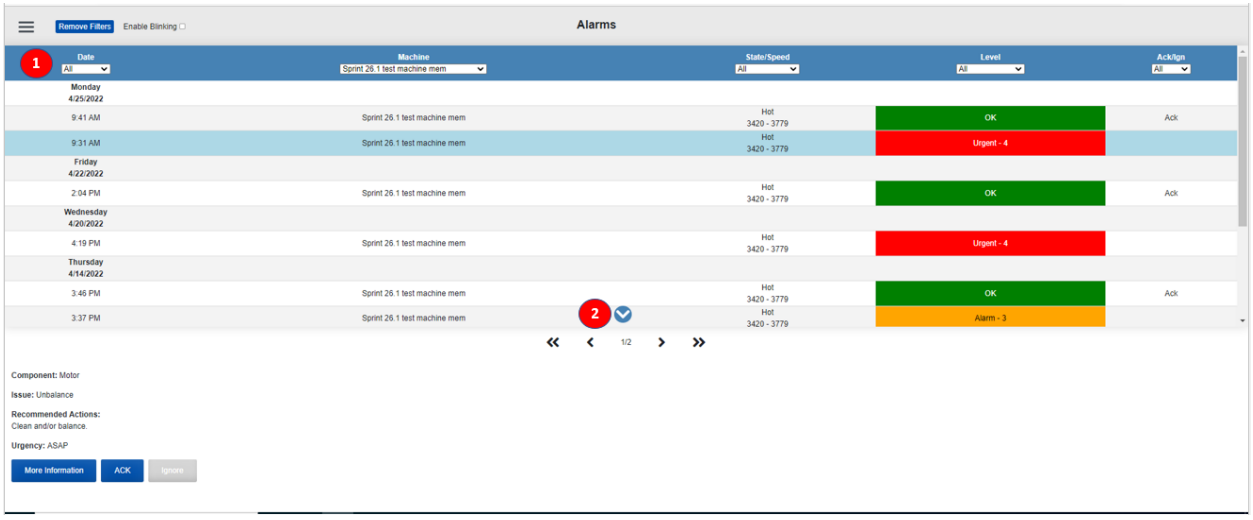
The buttons (1) at the bottom left allow more information to be displayed for a selected alarm, or to Acknowledge the alarm, or to display a History of the alarm.

The Enable Blinking check-box, next to the hamburger menu, controls whether unacknowledged alarms blink or not.

The filter selections in the top row (1) of the Alarms page provide the ability to focus in on specific alarms of interest. The Remove Filters button in the top left corner will remove any selected filtering.

Alarms are listed by date/time. Each row includes details on the Machine name, the State/Speed in which the alarm occurred, the alarm severity, and the acknowledged/Ignore state.

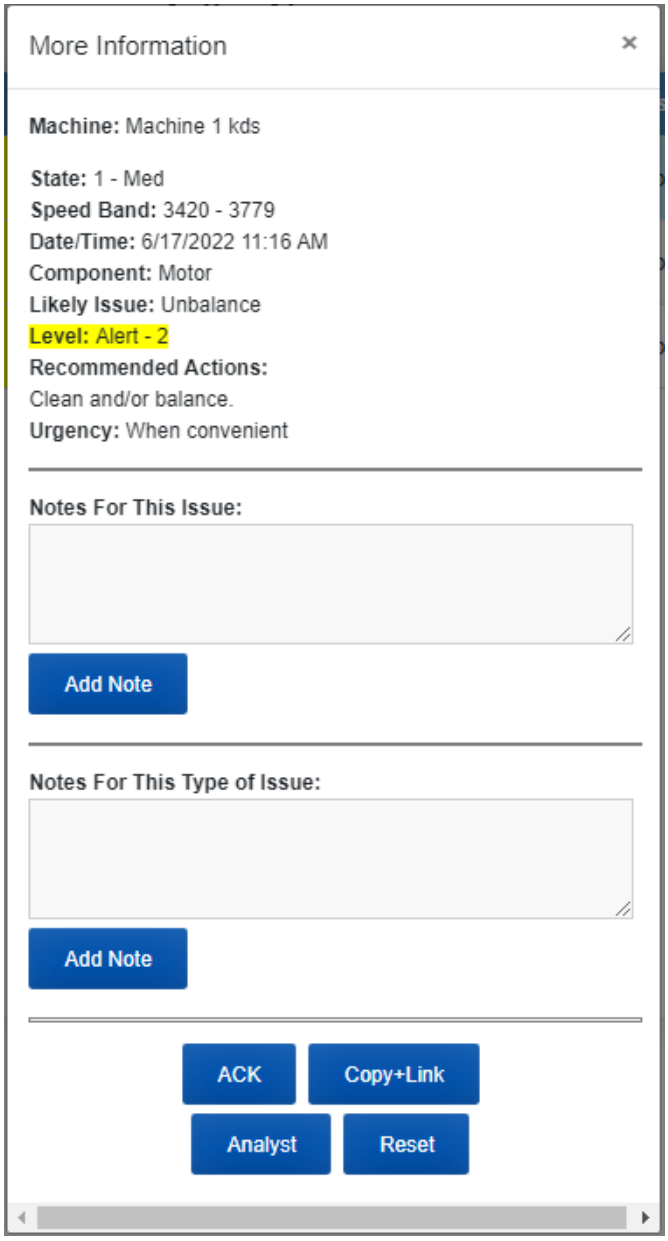
The blue down-arrow button (2) indicates more alarms are listed on the current page.



Double clicking an alarm row (or clicking the More Information button) opens a More Information dialog.

Clicking the Add Note button under the "Notes for This Issue" field, allows notes to be entered for this specific alarm instance.

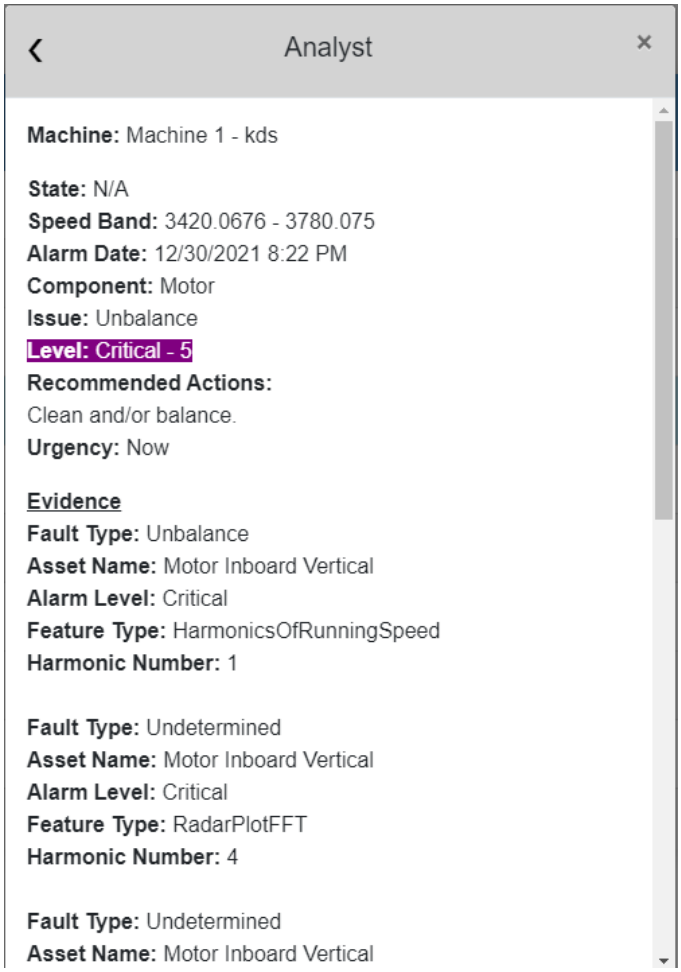
Clicking the Add Note button under the "Notes for This Type of Issue" allows notes to entered that will show up on all instances of this same issue, regardless of the alarm severity level.



Buttons at the bottom of this dialog provide options for Acknowledging an alarm. This tag can be used to filter the displayed list of alarms.

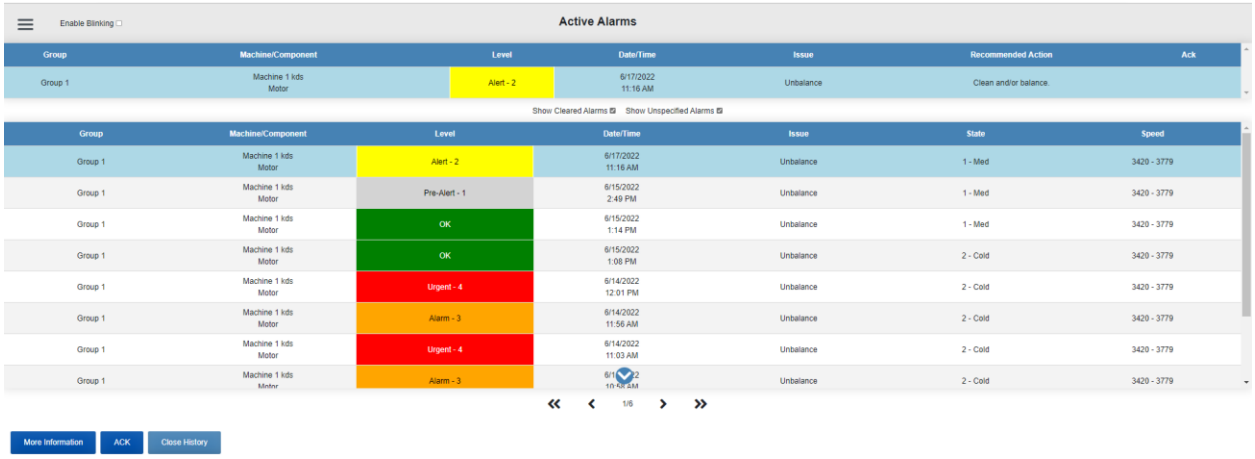
The Reset option is for rare cases when an alarm is present from a State the machine no longer runs in. This can be used to reset the alarm to an OK state, which will prevent it from being considered in determining the overall alarm state displayed on the Machines page. The Reset function should not be used on alarms for a currently active machine speed/state.

Clicking the Analyst button provides additional information on what is generating the alarm.



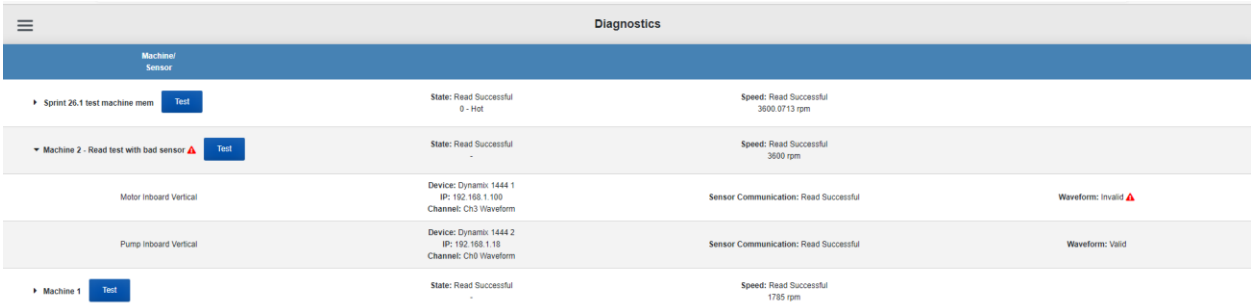
Alarm History Page for a specific alarm

Clicking the History button, at the bottom of the Active Alarms page, displays a history of that alarm.



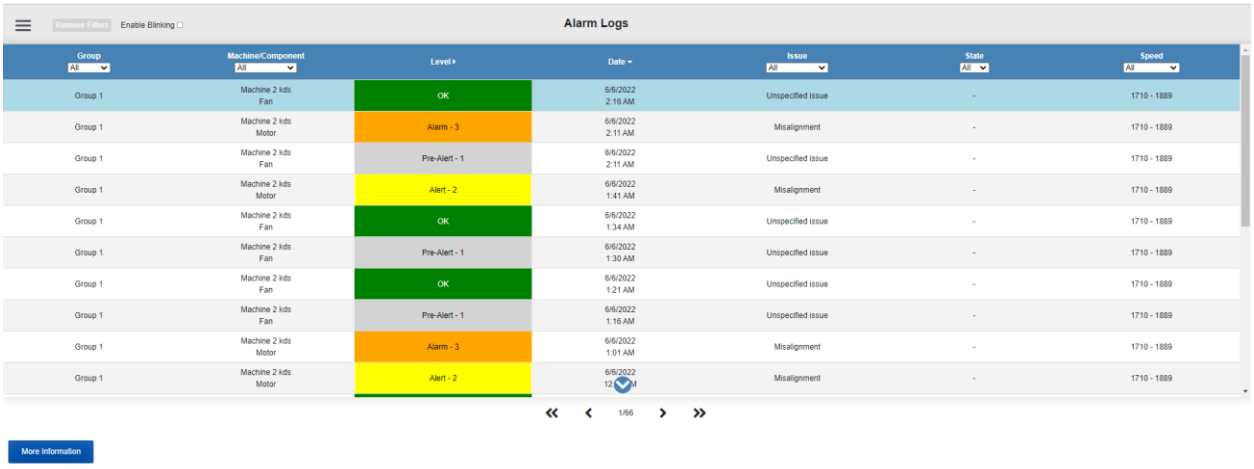
Diagnostics page

Selecting the Diagnostics option from the hamburger menu provides additional information on system issues. A red triangle is used to draw attention to specific issues, such as a bad sensor.



Alarm Logs page

Selecting the Alarm Logs option from the hamburger menu lists all alarms that have occurred for all machines.



Logs page

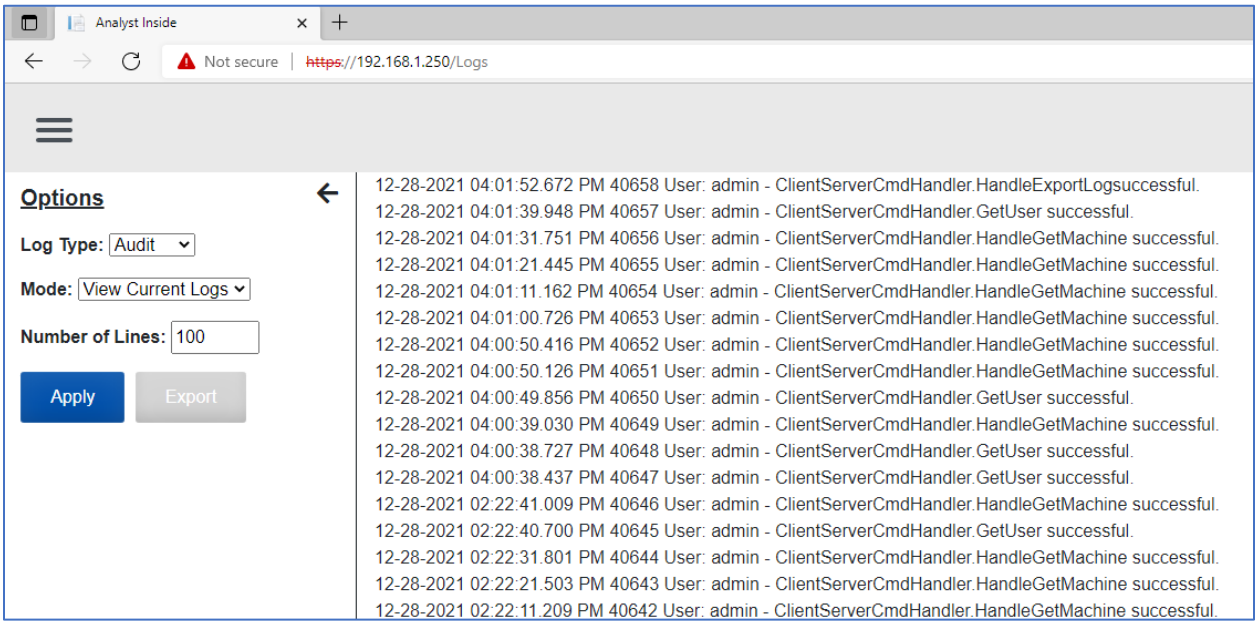
Clicking the hamburger menu and selecting the Logs page provides detailed log information. The Log type can be selected as Audit or System (Consider System Logs to be debug and general operations information. Audit log is for user interactions, login/out, change of configuration etc.).

The mode can be set to current or historical logs.

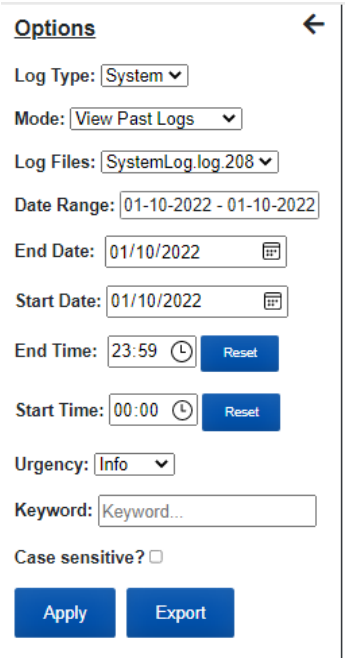
The number of log lines to display can be entered.

After making changes to the Options selections, click the Apply button to make them take effect.

Example of View Current Logs:



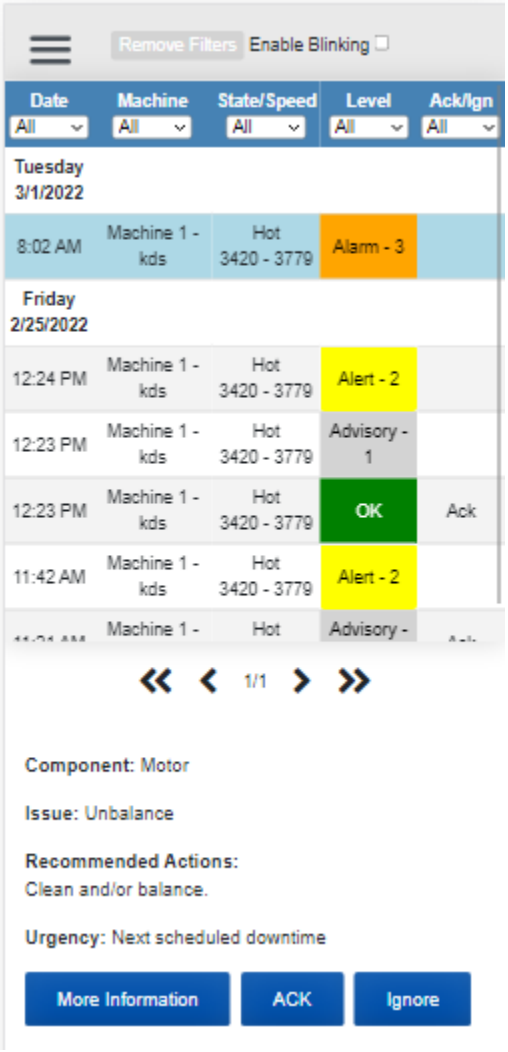
Example of View Past Logs filtering options:



Smart Phone / Tablet Interaction

From a web browser on a smart phone or tablet device, enter the IP address and login credentials for an Analyst Inside module to see similar screens as from the Web App running on a PC.

This interface works basically the same as the Web App on a PC, except for slight formatting changes to fit on a smaller screen, and the use of tap and swipe gestures instead of mouse clicks and scroll bars.



Notifications can also be configured to send E-mail and/or text messages to a phone.

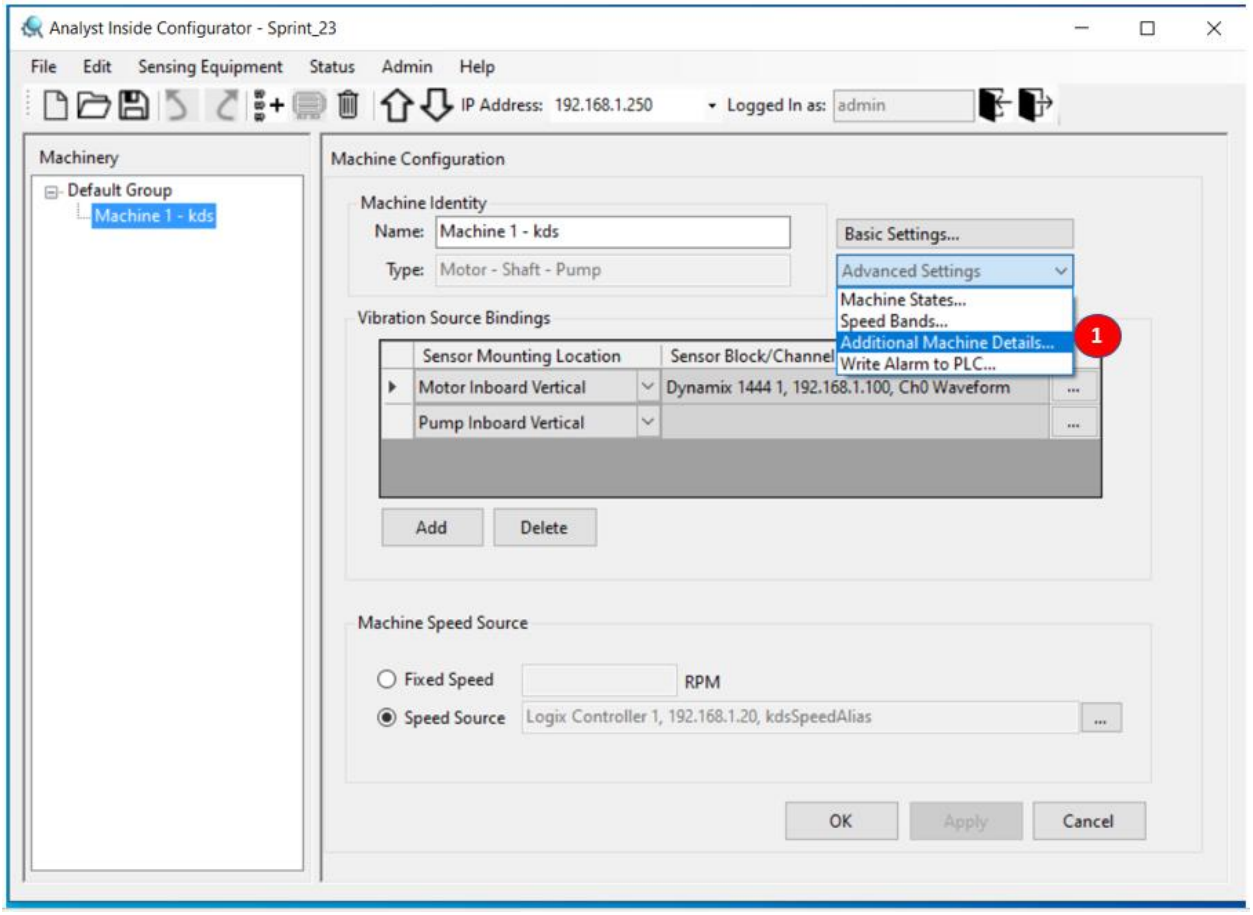
Appendix 1

Details on Advanced Settings and Admin functions

Additional Machine Details

Entering additional information about the machine will improve the vibration analysis results.

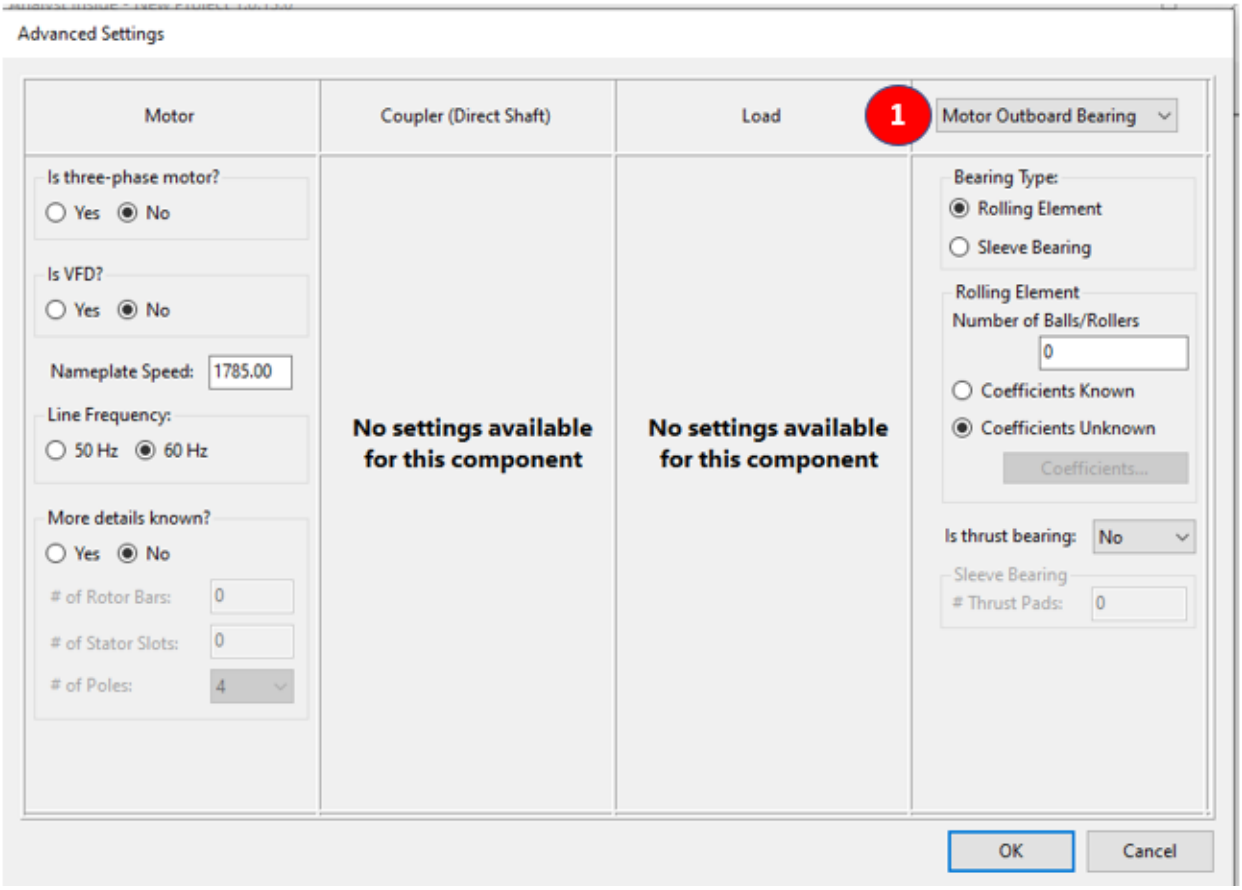
From the Machine Configuration dialog, click the Advanced Settings drop-down and select the Additional Machine Details option (1).



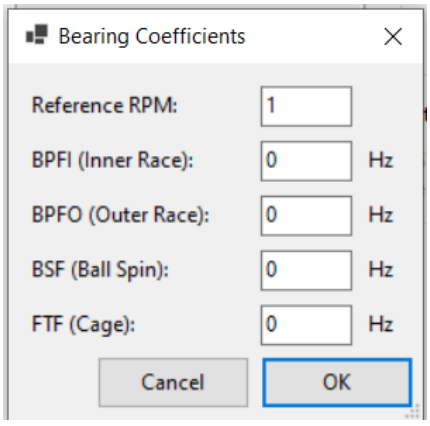
Enter as much information as known about the machine.

Note: If something is unknown, it's better to leave it blank than to guess and enter something that is incorrect (example: number of gear teeth). Entering incorrect machine details can result in an incorrect diagnosis.

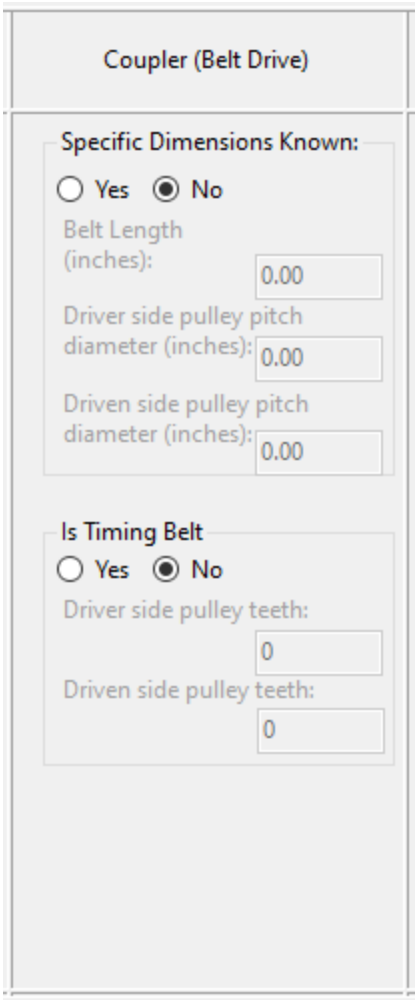
The drop-down list (1) on the far-right column allows selection of each bearing for entering bearing fault frequencies

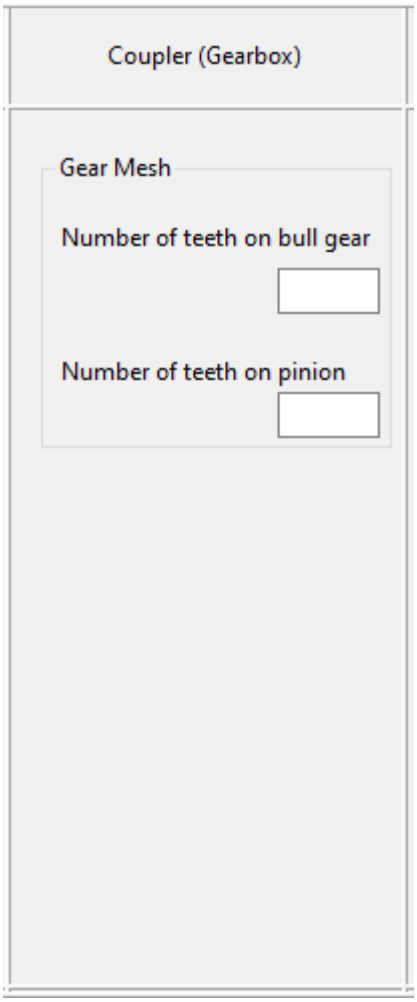


If bearing coefficients are known, enter these for best bearing analysis results.

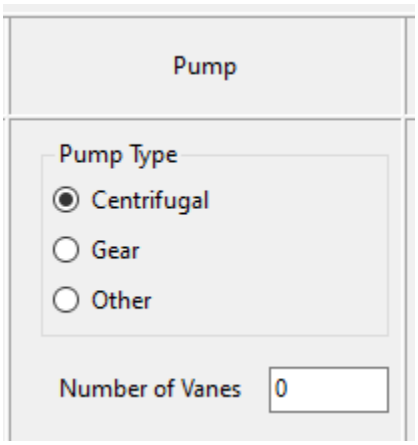


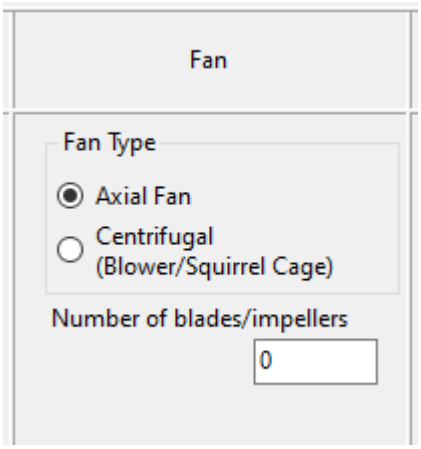
The second column will vary based on the type of coupling selected. Entering information on the type of coupling and dimensions of belt/pulleys or # gear-teeth will help the Analyst Inside provide more detailed results.



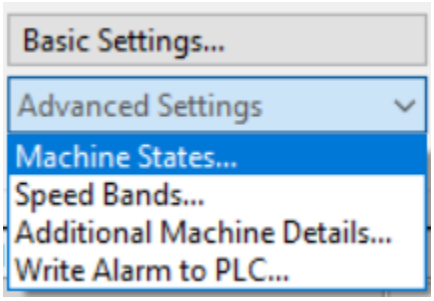


The third column will vary based on the type of driven component selected. Entering information on the type of component and number of Vanes/Blades will help the Analyst Inside provide more detailed results.





Machine States settings



This function allows configuration of multiple machine states where the machine vibration levels can be baselined and monitored with different alarm settings separately for each state.

The machine state is determined by linking to an Integer controller tag that provides the current state (e.g., 0, 1, 2, …).

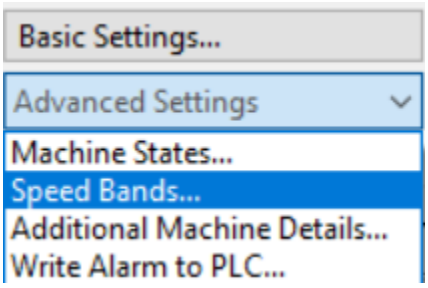
In addition to linking to the State Tag, a table must be created to indicate the meaning of each State value.

Examples of different states include Full/Med/No Load, Hot/Cold, Dampers Open/Closed, different batch products being produced, etc.

It is possible to assign the same state tag to multiple machines, or create a separate state tag for each machine.

Note: If a State Tag/Table are added, any data collected prior to adding the State configuration will be deleted.

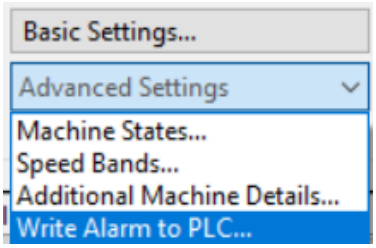
Speed Bands settings



This function allows configuration of Manual Speed Bands -vs- Auto Learned Speed Bands.

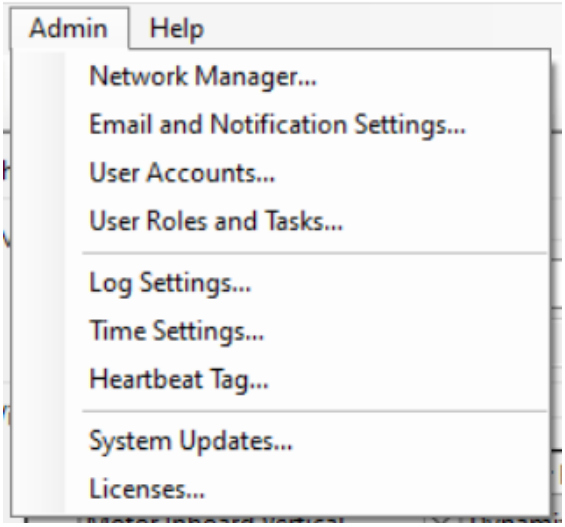
Having multiple speed bands allows vibration levels to be baselined and monitored with different alarm settings for different speed ranges.

Write Alarm to PLC settings



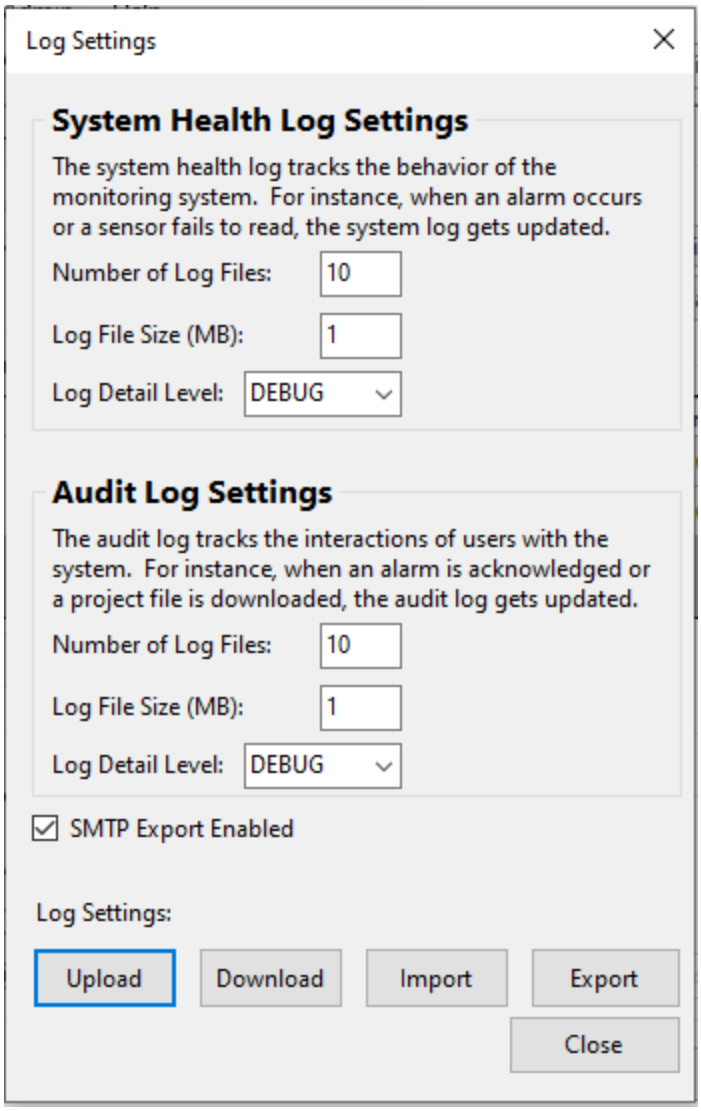
This function allows linking to a controller tag for writing the Alarm state of a Machine. Each machine should be assigned a separate Tag to indicate its alarm state to the controller.

Additional Admin settings:



Log Settings

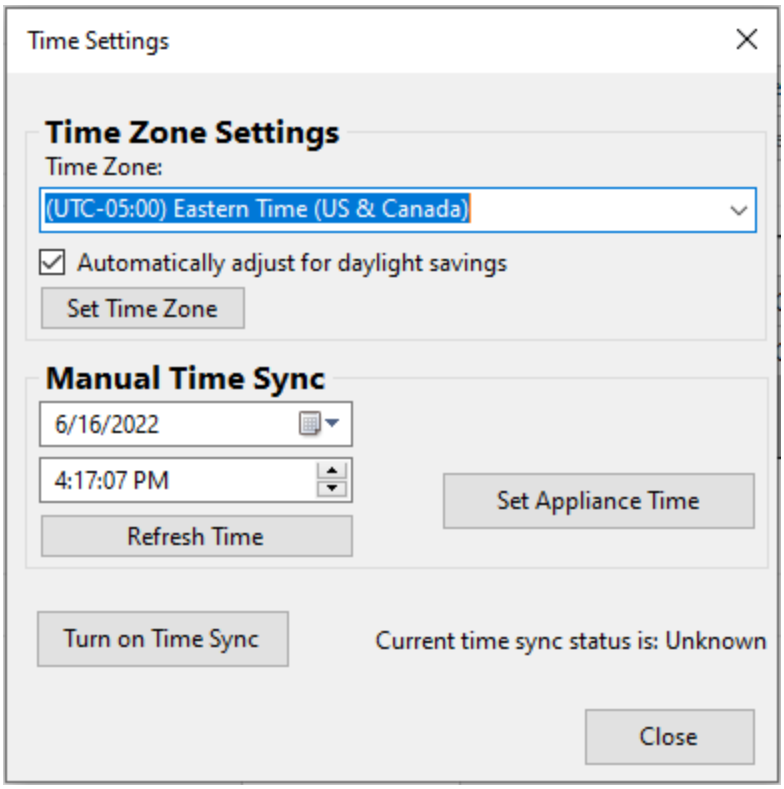
The Log Settings dialog allows configuration of how log files are stored in the Analyst Inside module.



Time Settings

The Time Settings dialog allows updates to the internal clock in the Analyst Inside module.

The auto Time Sync function requires the module to have access to the internet.



Heartbeat Tag

This function allows linking an Analyst Inside module to a controller tag to write the status of the module. The Analyst Inside will write a 1 to this tag each time it performs a set of measurements. Controller logic can be written to make use of this function to indicate if the Analyst Inside stops writing to this tag. A separate controller tag should be used for each separate Analyst Inside module.

System Updates

This function allows firmware updates to the module as new releases become available.

It also provides a method to install configuration UI software updates, which are bundled with the Analyst Inside firmware.

It also provides a means to backup/restore the module to a previous state.